UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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In re:

License Renewal Application Submitted by

Entergy Nuclear Indian Point 2, LLC,
Entergy Nuclear Indian Point 3, LLC, and
Entergy Nuclear Operations, Inc.

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Docket Nos. 50-247-LR and 50-286-LR

ASLBP No. 07-858-03-LR-BD01

DPR-26, DPR-64

NEW YORK STATE
NOTICE OF INTENTION TO PARTICIPATE
AND PETITION TO INTERVENE

Filed on November 30, 2007

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PRELIMINARY STATEMENT

I. Introduction

The State of New York respectfully submits this petition to intervene in the Nuclear Regulatory Commission ("NRC") relicensing proceeding that will determine the future of the two Indian Point nuclear power plants, located in Buchanan, New York. The story of Indian Point is one that is almost forty years in the making, and it involves complex, technical but also common sense issues that are set forth in this Petition. For the first time, these issues, which are critical to the future of the Hudson Valley and to the millions who live in the region, must be addressed in an open and comprehensive public process. The State of New York urges the granting of this Petition by the NRC, particularly given the twenty years of consequences of such

a significant decision. The presence of the Indian Point nuclear power plant in our midst is untenable.

Sited within a 50 mile radius of 20 million people, in an area of elevated seismic risk and on the flight path of the airplanes hijacked by terrorists who crashed into the World Trade Center on September 11, 2001, the Indian Point power plants have a long history of problematic performance. These include, *inter alia*, the failure to provide for an adequate evacuation route in the event of an accident or terrorist attack; the persistent leak of radioactive material into groundwater; and persistent and troubling safety problems, which, in the last two years alone, have included malfunctioning discharge valves, electrical problems that caused the steam generator to stop functioning, worn wiring that tripped the main generator, low water levels in steam generators, and a fire and explosion in Indian Point 3's transformer yard. The plants' outdated design and operation have caused significant adverse environmental impacts to the Hudson River. These impacts include impingement, entrainment, and heat shock to numerous fish species in the Hudson, including the endangered sturgeon. Despite this history, Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Operations, Inc. ("Entergy" or "Applicant"), the owner of these plants, has applied to the NRC for renewal of its operating licenses for these plants for an additional 20 years.[1]

[1]Indian Point's original forty-year operating licenses for IP2 and IP3 end in 2013 and 2015, respectively. In May 2007, Entergy submitted to NRC license-renewal applications for IP2 and IP3, seeking to extend their operating licenses for another twenty years. 72 Fed. Reg. 26,850 (May 11, 2007).

Because of the unique public safety, health and environmental problems posed by these plants and raised by Entergy's relicensing application, the State of New York has a compelling interest in ensuring that these significant issues are fully aired and addressed through hearings in this proceeding in which the State can fully participate.

The State is aware that a recent report by the NRC's own Inspector General found that the NRC has effectively rubber stamped other relicensing applications, merely copying text from the application into its decisions to grant such applications, rather than providing any rigorous or independent evaluations of the merits of the application. By participating in this proceeding, the State seeks to bring such rubber stamping to an end and to insist on a full airing of the issues. The State's goal is not only to ensure public safety but also to bring transparency to bear on a process that for too long has excluded the public and stifled debate on the most critical issues related to the risks posed by Indian Point. If the federal government will not take adequate steps to ensure public safety with respect to the Indian Point power plants, the State of New York will step into this void and use every legal tool and resource to force a full consideration of these issues.

2. Overview of the Indian Point Power Plants and Their Safety and Environmental History

Indian Point is on the east bank of the Hudson River, twenty-four miles north of the New York City line and thirty-five miles from mid-Manhattan. This puts Indian Point in the most

densely populated area in the United States: approximately 20 million people, about six percent of the nation's population, live within fifty miles of Indian Point. Edwin Lyman, Dr., *Chernobyl on the Hudson? The Health and Economic Impacts of a Terrorist Attack at Indian Point Power Plant,* Union of Concerned Scientists, September 2004, p. 23. Indian Point is on or close to the Ramapo Fault and is close enough to the coast to be vulnerable to hurricanes. Yash P. Aggarwal et al., *Earthquakes, Faults, and Nuclear Power Plants in Southern New York & Northern New Jersey*, Science, Jan. 1, 1978, abstract available at http://www.sciencemag.org/cgi/content/abstract/200/4340/425 (last visited Nov. 29, 2007).

The Indian Point nuclear compound contains three reactors: Indian Point 1 ("IP1"), completed in 1962 but retired in 1974 after spending over half the time out of service for repairs; Indian Point 2 ("IP2"), licensed in 1973; and Indian Point 3 ("IP3"), licensed in 1976. NRC, Indian Point Unit 1, at http://www.nrc.gov/info-finder/decommissioning/powerreactor/indian-point-unit-1.html (last visited June 18, 2007); Entergy Corp., Indian Point Energy Center Units 2 & 3, at http://www.entergy-nuclear.com/plant_information/indian_point.aspx (last visited June 18, 2007). The fuel has been removed from IP1 (but not from the Indian Point site); additionally the reactor cores of IP2 and IP3 contain highly radioactive uranium and fission byproducts such as plutonium. *See generally* NRC, Uranium Enrichment, at http://www.nrc.gov/materials/fuel-cycle-fac/ur-enrichment.html; NRC, Fact Sheet on Plutonium, at http://nrc. gov/reading-rm/doccollections/fact-sheets/plutonium.html.

In addition, all three plants have "spent fuel pools" outside their protective containment

shells that contain large quantities of highly radioactive material. Randal C. Archibold, *Closed or Not, Indian Point and Its Perils Won't Vanish*, N.Y. Times (Jan. 28, 2003). After it is used in nuclear reactors to generate energy, spent nuclear fuel remains extremely hot and radioactive. National Research Council of the National Academies, *Safety and Security of Commercial Spent Nuclear Fuel Storage:* Public Report 17, 40 (2006) [hereinafter NAS Study]. To protect workers, facilities, and neighboring communities, most nuclear power plants in the nation have constructed large swimming-pool-like structures in which the spent fuel was to be stored temporarily until it cooled sufficiently to allow its transfer to a final disposal site. *Id.* at 19. Because no final disposal site has yet been developed, that fuel has remained for decades in these temporary storage pools. The storage pools are susceptible to fire and radiological release from a wide range of conditions, including intentional attacks. *See*, *e.g.*, NAS Study, *supra*. A 2004 study by the Union of Concerned Scientists concluded that a major release at Indian Point could kill as many as 44,000 people within a week and more than 500,000 people over time. *See* Lyman, *supra*, at 5-6, 17. The study estimated just a portion of the direct economic loss — the cost of decontamination, compensation for lost real estate, and lump-sum payments to enable those displaced to restart their lives — at between $1.1 trillion and $2.1 trillion. *Id.* at 6.

Indian Point has had numerous safety incidents over the years that can be attributed to human error or equipment failure. The metal in an IP2 steam generator tube cracked on February 15, 2000, allowing a small amount of radiation to escape. NRC Office of the Inspector General, NRC's Response to the Feb. 15, 2000 Steam Generator Tube Rupture at Indian Point Unit 2

Power Plant, Case No. 00-03S (2000), available at http://www.nrc.gov/readingrm/doc-collections/insp-gen/2000/00-03s.pdf. IP2 and IP3 have been shut down more than ten times just in the last year and a half, due to a variety of safety problems such as malfunctioning discharge valves, electrical complications that caused the steam generator to stop functioning, a leaking alloy pipe, worn wiring that tripped the main generator, low water levels in steam generators, and a fire and explosion in IP3's transformer yard. *See, e.g.,* Greg Clary, *Two Years of Ups and Downs at Indian Point*, Journal News, Mar. 25, 2007. While the plants have emergency sirens intended to warn the surrounding area if there is an emergency, they have been beset by problems and recently failed tests. *See, e.g.,* Lisa W. Foderaro, *Indian Point Siren Failures Set Off a Storm of Protest*, N.Y. Times, Sept. 18, 2005; Greg Clary, *Indian Point Sirens Fail Final Test Before Federal Deadline*, Journal News, Apr. 13, 2007. In addition, in 2005 and 2006, Entergy found two separate leaks of tritium and strontium-90 at levels above EPA drinking water limits from both IP2's and IP1's spent fuel pools. Debra West, *Indian Point to Begin Test to Aid Groundwater Cleanup*, N.Y. Times, Aug. 20, 2006; *see also* NRC, Frequently Asked Questions About Indian Point, at http://www.nrc.gov/reactors/plant-specific-items/indian-point/faq.html (last visited Nov. 29, 2007). Plumes of these radioactive isotopes have now leached into the groundwater underneath the plant and are seeping into the Hudson River. ER § 5.1 New and Significant Information: Groundwater Contamination.

Indian Point's emergency-preparedness plan is woefully inadequate. A 2003 report prepared by the consulting firm headed by James Lee Witt – former director of Federal

Emergency Management Agency ("FEMA"), the agency to which NRC delegates primary responsibility for reviewing the adequacy of such plans — concluded that safe evacuation of the area surrounding Indian Point is highly unlikely, if not impossible. James Lee Witt Associates, *Review of Emergency Preparedness of Areas Adjacent to Indian Point and Millstone,* p. viii (2003) [hereinafter Witt Report]. The Witt Report found that the NRC-approved Indian Point evacuation plan fails to consider (1) that many essential personnel will take care of their families rather than focus on their response activities, (2) the possible ramifications of a terrorist-caused event, and (3) the likelihood and effects of spontaneous or "shadow" evacuation. *Id.* at vi (A-338). The Witt Report's conclusions are bolstered by a 2003 traffic study by KLD Associates, which concluded that evacuation times for the Emergency Planning Zone ("EPZ") around Indian Point had doubled since 1994 and could take up to 9.25 hours in good weather conditions and 12 hours in snow conditions. KLD Associates, Inc., *Indian Point Energy Center Evacuation Time Estimate*, Table 1-1D at 1-14 (2003) [hereinafter KLD Traffic Study]. Due in part to the inadequacies identified in the Witt Report and the information contained in the KLD Traffic Study, three out of the four county governments with territory in the ten-mile EPZ for Indian Point — Westchester, Orange, and Rockland — have refused to submit annual updates for the Indian Point evacuation plan. Randal C. Archibold, *3 Counties Maneuver in Bid to Close Down Indian Point*, N.Y. Times, Jan. 16, 2003. In preparation for the Indian Point license renewal application process, Witt Associates re-examined the evacuation plan issues they initially raised in 2003, and now find that the current state of the plan re-affirms their earlier report. Witt

Associates concludes that because of the unique situation facing Indian Point and its surrounding population centers during an off-site radiological release, the NRC should conduct a full site-specific review of the evacuation plan.

According to both NRC's Office of Inspector General ("OIG") and the U.S General Accounting Office ("GAO"), NRC's ongoing regulatory oversight has failed to correct significant problems affecting the safe operation of Indian Point and other nuclear power plants. As far back as 1979, Robert Ryan, NRC's Director of the Office of State Programs, stated that it was "insane to have a three-unit reactor on the Hudson River in Westchester County, 40 miles from Times Square," and that Indian Point is "one of the most inappropriate sites in existence." Office of the Chief Counsel on Emergency Preparedness, *Staff Report to the President's Commission on the Accident at Three Mile Island*, p. 5, Oct. 1979, available at http://threemileisland.org/downloads//194.pdf (Last visited Nov. 29, 2007). This was even before the significant population growth in Westchester, Rockland, and Orange Counties over the last two decades and before the events of September 11, 2001, when two of the hijacked planes flew near or over the site. *See* National Commission on Terrorist Attacks Upon the U.S., *The 9/11 Commission Report*, p. 32 (2004), available at http://www.9-11commission.gov/report/911Report.pdf (last visited Nov. 29, 1007).

3. Summary of New York State's Contentions Requiring a Full Hearing

As required by NRC's rules and procedures, the State of New York presents in these papers 32 separate "contentions," which are presentations of issues of fact and law regarding

critical deficiencies in Entergy's Indian Point relicensing application with respect to public safety, health and the environment that require a full hearing. The State's contentions are supported by over a dozen sworn declarations provided by some of the nation's top experts on nuclear safety, seismic impacts and the environmental issues posed by nuclear power plants. These contentions are briefly summarized below.

Contention One. In Contention One, the State explains that Entergy's license renewal application is incomplete and inaccurate in many respects, including its failure to include: any analysis of new and significant earthquake information that bears on the ability of the plant to withstand an earthquake; any program for managing the effects of aging on electric cables and transformers that are important for plant safety; as well as its inclusion of references to documents that are not publicly available. Because of these failures it is not possible to determine the current licensing basis (CLB) for IP2 or IP3. Compounding this problem, NRC certified the application as complete, over the State's objections, despite significant unanswered questions and gaping holes.

Contention Two. In Contention Two, the State points to inadequacies in the Updated Final Safety Analysis Report ("UFSAR") submitted by Entergy, which is woefully out of date and fails to describe and identify all equipment, components and systems that require "aging management," meaning that Entergy has not properly evaluated the effects of aging on the structures at the plants or established controls that will ensure that the aging of structures at the plant is effectively managed. Because of these failures it is not possible to determine the current

licensing basis (CLB) for IP2 or IP3.

Contention Three. In Contention Three, the State asserts that Indian Points 2 and 3 are not in compliance with general design criteria (GDC) for nuclear power plants required by the NRC. Instead of complying with these regulations, Entergy has complied, at best, with design criteria proposed by a nuclear industry trade association, asserting that it is "exempted" from the federal requirements. Thus, it is not possible to determine whether the required systems and components have the necessary aging management plans because IP2 and IP3 do not have the systems and components required by the legally relevant GDC. Because of these failures it is not possible to determine the current licensing basis (CLB) for IP2 or IP3.

Contention Four. In Contention Four, the State points to Entergy's failure to prepare an environmental review report for each of the two Indian Point facilities, despite the fact that they are separate nuclear power plants, each with its own license, its own safety analysis reports, its own enforcement history and compliance problems and, until recently its own separate ownership.

Contentions Five - Eight. In Contentions Five - Eight, the State points to serious flaws in Entergy's Aging Management Plan for the Indian Point plants, which is a core planning requirement intended to ensure that the aging of the plants, their structures and components does not lead to weaknesses that could endanger the safety of the plant. The State points to the following key problems in Entergy's Aging Management Plan:

- Over the last decade, a series of events at nuclear power plants have raised serious

questions about whether nuclear facilities are in compliance with federal regulations governing the release of radioactive materials into the environment. As a result of leaks from Indian Point, plumes of tritium and strontium – powerful radioactive materials – have leaked from the plant's spent fuel pools into the Hudson River. However, Entergy does not provide for adequate inspection and monitoring for corrosion or leaks in its buried systems, structures and components (such as underground piping) that may contain radioactively contaminated water or other fluids. There is no adequate leak prevention program, nor is there adequate monitoring to determine if and when leakage of radioactively contaminated water occurs. For example, Entergy's aging management plan only calls for leak tests every ten years.

- Aging electrical cables and transformers can threaten the integrity of the reactor, the ability to shut down the reactor and maintain it in a safe shutdown condition, and ability to prevent or mitigate accidents. Entergy, however, has failed to commit to necessary safety inspections of its aging electric cables, wiring and transformers.

Contentions Nine-Eleven. In Contentions Nine-Eleven, the State explains that the environmental report ("ER") prepared for the Indian Point relicensing is flawed and incomplete. The ER fails to examine the potential for energy efficiency to displace a significant portion of the energy production from one or both of the Indian Point plants, ignoring the State of New York and Governor Spitzer's commitment to energy efficiency, embodied in Governor Spitzer's "15 by 15" plan to reduce electricity consumption in New York State by 15% by 2015. Remarks by Governor Eliot Spitzer. "15 by 15: A Clean Energy Strategy for New York." 19 Apr. 2007. Found at: http://www.state.ny.us/governor/kedocs/0419071_speech.html. The environmental report also ignores the potential for renewable energy to contribute to offsetting the loss of energy production from the Indian Point plants, as well as plant repowering and transmission line options.

Contentions Twelve-Thirteen. The environmental report is required to include a consideration of alternatives to mitigate severe accidents, which is known as the severe accident mitigation alternatives ("SAMA") analysis. The State points to a number of key flaws in this severe accident analysis. First, the severe accident analysis uses an outdated and inaccurate proxy to represent the decontamination and clean up costs resulting from a severe accident. Second, the SAMA analysis does consider a possible severe accident that could be caused by the failure of IP3 to meet required fire safety conditions. This failure of compliance with fundamental safety requirements increases the risk of fire induced failure of redundant safety-related electrically operated equipment. This in turn could result in the disabling of equipment essential for the safe hot shutdown of the reactor and maintaining this shutdown.

Contentions Fourteen-Fifteen. The severe accident alternatives analysis for the Indian Point power plants includes only outdated seismic data for the plants that is over 25 years old and does not include a substantial body of new data gathered in the last 25 years from an extensive network of earthquake detection systems. Newer data, ignored by Entergy, discloses a substantially higher likelihood of significant earthquake activity in the vicinity of the power plants. Entergy's ER fails to consider properly all reasonable measures to mitigate the impact of the more hazardous earthquakes that recent data indicate are possible over the next thirty years.

Contention Sixteen. Entergy's air dispersion model will not accurately predict the geographic dispersion of radioactive materials that would be released into the air in the event of a severe accident. Thus, Entergy's severe accident alternatives analysis does not present an

accurate estimate of the costs of human exposure in the event of such an accident.

Contention Seventeen. The ER report's cost-benefit analysis of extending the operating life of IP2 and IP3 for another 20 years is flawed. If these plants were closed on schedule in 2013 and 2015, the surrounding property would experience a significant increase in value because Entergy is required to decommission the plants and return the site to unrestricted use. This would happen within six years of shutdown according to NRC analysis. Entergy totally ignores these substantial land use impacts - both negative if the plants remain operational for another 20 years and positive, if the plants are closed on schedule, thus distorting the environmental balance required under the National Environmental Policy Act and NRC regulations

Contention Eighteen. The license renewal application for the Indian Point nuclear power plants does not comply with federal requirement because the final safety analysis report does not include critical information required by federal regulations. Because the final safety analysis report is woefully out of date and fails to contain sufficient information necessary even to describe and identify all the systems for which aging management is required, Entergy is unable to provide a reasonable assurance that the plants are in compliance with their current licenses.

Contention Nineteen. The Indian Point nuclear power plants do not provide reasonable assurance of adequate protection for the public health and safety because they do not comply with applicable federal regulations. Instead, they comply, at best, only with design criteria proposed by a nuclear industry trade association, whose provisions are substantially different

from and less stringent than the legally required federal general design criteria.

Contention Twenty-Twenty-Two. The Indian Point nuclear power plants do not provide reasonable assurance of adequate protection for the public health and safety because they fail to comply with key federal requirements, including maintenance of adequate fire barriers. They also fail to provide the required assurance of adequate protection because the final safety analysis report does not include up to date information on the type, frequency and severity of potential earthquakes in the region.

Contention Twenty-Three. The license renewal application for the Indian Point nuclear power plants fails to comply with federal requirements because Entergy has failed to propose a comprehensive baseline assessment, which is necessary to ensure that the effects of aging on the plants' structure are acceptable from a safety perspective if the operating licences are extended for another twenty years.

Contention Twenty-Four. The license renewal application for the Indian Point nuclear power plants fails to comply with federal requirements because Entergy hasn't committed to an adequate aging management program to ensure the continued integrity of the plants' containment structures if the operating licenses are extended. The integrity of the 40-year old concrete containment structures necessitates frequent and regular inspection intervals throughout the term of the license. Yet Entergy has not proposed to do such enhanced inspections.

Contentions Twenty-Five to Twenty-Six. Entergy's license renewal application does not include an adequate plan to monitor and manage the effects of aging due to embrittlement of the

reactor pressure vessels. When neutrons bombard metals in a pressurized water nuclear reactor, which occurs during nuclear fission, those metals can become embrittled. When metals become embrittled, they may fail when they are faced with a thermal shock event. Failure to consider the effects of embrittlement could result in a meltdown of the core and a release of a significant amount of radiation as a result of an accident. Similarly, the license renewal application does not include an adequate plan to monitor and manage the effects of aging due to metal fatigue on key reactor components.

Contention Twenty-Seven. The Environmental Report and the license renewal documents submitted by the applicant address to varying degrees a radiological release from the containment structures located on-site at Indian Point. The spent fuel pools which store significant volumes of radioactive material, far more than inside the active nuclear reactors, has no containment structure. However implausible it may be that this radioactive waste is exposed and unsecured, that is the case at Indian Point. It is also vulnerable to attack. The NRC asserts that if a radiological release occurred from these pools, it "would be no worse than expected from internal events." There is absolutely no basis for such a statement, and such a conclusion should not serve as a basis to avoid analysis and review of this crucial public health and safety issue. Experts agree that such analysis is needed, and the State of New York contends it must be done as part of this application.

Contention Twenty-Eight. Radionuclides are leaking into the groundwater from the aging structures of Indian Point. Amongst others, are strontium-90 and tritium, which exceed drinking

water standards by 14 times and 30 times, respectively. These radioactive substances have been linked to various forms of cancer. The radionuclides in the groundwater beneath Indian Point are also getting into the Hudson River. These leaks and their obvious public health and safety impacts are not being considered as part of this license renewal proceeding. A decade-old generic review and limited NRC investigation are no substitute for the mandatory and complete review required by law. The State of New York contends that the groundwater leaks must be considered in this proceeding.

Contention Twenty-Nine. Entergy's environmental report fails to address emergency preparedness and evacuation planning for Indian Point, violating the requirements of federal environmental review law. Any radiation release scenario, whatever its cause, is sure to be a complex and profound event, particularly if it is sudden and fast moving. The law, prudence and commons sense dictate that the applicant account for its evacuation plans under the environmental review of the license renewals and to address precisely how it plans to react to and protect these communities and their families and children should the unthinkable event happen at Indian Point. The applicant's environmental report has not addressed evacuation planning and must do so.

Contention Thirty. Indian Point's 40-year-old design uses massive quantities of Hudson River water when operating and returns significantly heated water back to the river. The Hudson River would be a far more productive estuarine ecosystem if the heat shock impacts from Indian Point could be mitigated. Tens of millions of fish suffer impacts, from behavioral and growth

impacts to fatalities. These impacts cannot be mitigated and they violate the requirements of the Clean Water Act. The State of New York contends that these thermal impacts must be fully analyzed and addressed in this license renewal proceeding.

Contention Thirty One. The Endangered Species Act became the law of the United States to stop the disappearance of species in jeopardy of extinction. The NRC must implement and follow this important legal obligation in the license renewal application process. Operation of Indian Point impinges shortnose sturgeon – an endangered species – and impinges and entrains the Atlantic sturgeon, a candidate threatened species under the Act. The applicant argues that Indian Point does not jeopardize these fish. The State of New York contends that there are serious questions about the applicant's views. The Endangered Species Act and common sense dictate that a full and thorough analysis is needed before the NRC makes a decision that could determine the fate of the sturgeon in the Hudson.

Contention Thirty Two. The operation of Indian Point consumes and returns approximately 2.5 billion gallons of Hudson River water each day. The River is an important estuarine ecosystem, and this operation has significant adverse impacts to the fish that call the Hudson home. Large fish are impinged" on screens at the water intake where they are severely stressed and then suffocated. Smaller fish are "entrained" in the water intake, pulled through the operating plant and killed. This relentless process has continued relatively unabated for almost 40 years, and the applicant now seeks 20 more years. This must not continue because the environmental costs are too high. The NRC must fully consider the alternative of closed cycle

cooling to mitigate these significant adverse impacts in this license renewal proceeding.

NOTICE OF INTENT TO PARTICIPATE

Pursuant to 10 C.F.R. § 2.309 and the Notice of Consideration of Issuance of A Renewed License for Operating (72 Fed.Reg. 42134 (Aug.1, 2007); 72 Fed.Reg. 55834 (Oct. 1, 2007) (for an additional twenty (20) years) and Opportunity for a Hearing (Notice), Petitioner, State of New York hereby submits contentions regarding Entergy's application for renewal of its license to operate IP2 and IP3 for an additional 20 years, or until 2033 and 2035, respectively.[2] As demonstrated below, these contentions should be admitted because they satisfy the NRC's admissibility requirements in 10 C.F.R. § 2.309.[3] Also, New York State requests, and is entitled to a full adjudicatory hearing with all the rights of discovery and cross-examination provided by 10 C.F.R. Subpart G. At a later date, to be set by the Atomic Safety and Licensing Board (ASLB), New York State will demonstrate that it meets the requirements of 10 C.F.R. § 2.310 (d) in making this request.[4]

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[2]This petition also applies to Indian Point 1 (IP1) to the extent its components are still in use for the operation of IP2 and IP3.

[3]Although these contentions meet the requirements of 10 C.F.R. § 2.309, New York State does not concede the procedures are lawful and reserves the right to challenge, in an appropriate legal forum, these procedures, as applied to New York State in this case, should that be necessary to permit New York State to present and fully adjudicate the important nuclear safety and environmental issues raised in its contentions.

[4]Although New York State meets the requirements of 10 C.F.R. § 2.310(d) for a full adjudicatory hearing on all contentions it raises, New York State does not concede the procedures of 10 C.F.R. § 2.310 which restrict use of full adjudicatory hearing procedures are

IP2 and IP3 are located within the boundaries of the State of New York. The State of New York submits this Petition. Therefore, pursuant to 10 C.F.R. § 2.309(d)(2), New York State is deemed to have standing for purposes of this proceeding and no further showing is required on that issue.

I. PARTICIPATION AS A MATTER OF RIGHT

The Atomic Energy Act, 42 U.S.C. § 2021(l) specifies that "[w]ith respect to each application for Commission license authorizing an activity as to which the Commission's authority is continued pursuant to subsection (c) of this section", which subsection includes a license authorizing, *inter alia*, "the construction and operation of any production or utilization facility"[5] the NRC "shall afford reasonable opportunity for State representatives to offer evidence, interrogate witnesses, and advise the Commission as to the application." 42 U.S.C. §

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lawful and reserves the right to challenge, in an appropriate legal forum, these procedures, as applied to New York State in this case, should that be necessary to permit New York State to fully adjudicate the important nuclear safety and environmental issues it raises.

[5]There cannot be any serious question that the application now pending to extend the operating life of IP2 and IP3 by 20 years is a request to authorize operation of these plants and falls within the scope of 42 U.S.C. §§ 2021(c)(1) and (1). There is no need at this time to address the question of whether this language applies equally to all operating license amendments regardless of whatever they seek to extend the operating license. In addition, the provisions of 10 C.F.R. § 50.91, which impose certain restrictions on state participation, are inapplicable here. That Section is limited to a Notice of Proposed Action under 10 C.F.R. § 2.105 which is deemed by the Commission to present no significant hazards. This is a Notice of Hearing for Consideration of Issuance of Amendment under 10 C.F.R. § 2.104.

2021(c)(1) and (l).[6] 10 C.F.R. § 2.315(c) acknowledges these rights of a state in those cases where a hearing is held. However, the statute extends the right to offer evidence and interrogate witnesses to all applications, even if pursuant to 10 C.F.R. § 2.309 no hearing will otherwise be held. Thus, in the case of a State and/or its designated representative, NRC must provide these rights of participation regardless of the existence of any "admissible contention" and include the right to present evidence and interrogate witnesses as to matters relevant to the application. New York State recognizes that without pre-filed contentions, witnesses may have difficulty preparing to answer questions posed and the Applicant, and Staff, if it participates, may have difficulty focusing their attention on the issues of concern to the State. For that reason New York State is submitting a statement of the contentions it now believes should be examined at the hearing and will supplement that list of contentions when and if new evidence becomes available that warrants such supplementation.

New York State believes the most efficient manner by which these statutory rights can be exercised is to allow both depositions and live testimony to the extent the issues are not fully developed in the deposition, but should the NRC conclude all state interrogation must be conducted at a Board-supervised hearing, New York State will conduct all of its interrogation of witnesses at that time. Although not specifically mentioned in § 2021(l), New York State also

[6]Thus, New York State should not be required in this case to separately demonstrate that the provisions of Subpart G should apply to any Contentions which are admitted. Nonetheless, out of an abundance of caution, New York State will provide that demonstration at an appropriate time.

believes that the cross-examination of witnesses assured by that provision will be more efficient if New York State submits to the Board and all parties cross-examination outlines, five days before the examination, to alert each witness to the subjects which New York State will explore. Similarly, New York State should have the right to seek production of documents if for no other reason than that production of documents will facilitate interrogation of witnesses and narrow the scope of their examination. Otherwise, witnesses will be asked questions about issues which are addressed in documents which either are not present during the interrogation and/or the analysis of which will require a hiatus in the interrogation.

New York State realizes that it may have information which Applicant, Staff or any other parties which may be permitted hearing status will want to see. To the extent that any party agrees to pre-hearing interrogatories, document production requests and depositions, although not required to do so by statute, New York State will respond to reasonable interrogatories, document production and deposition requests from such party, subject to the rules of Subpart G. Similarly, although not required to do so by statute, New York State is willing to have its witnesses cross-examined by any party that makes it witnesses available for cross-examination by New York State provided outlines of cross-examination are submitted at least five days in advance for the witness to be prepared to fully answer the questions posed.

The following discussion follows the provisions of 10 C.F.R. §§ 2.309 and 2.310 for purposes of simplicity and to demonstrate that even if New York State were not entitled to an adjudicatory hearing as a matter of right as to all of its contentions, it would nonetheless be

entitled to an adjudicatory hearing on all these contentions under the provisions relevant to other parties.

PETITION TO INTERVENE

I. INTRODUCTION

New York State has consistently pursued issues of nuclear safety and environmental protection before the Nuclear Regulatory Commission (NRC) and other appropriate state and federal agencies. Among the issues of greatest concern to New York State are the safety of its residents and preservation of New York's environment. By way of example:

- New York State has commissioned reports by James Lee Witt to identify and analyze weaknesses in the emergency evacuation plan for the Indian Point Nuclear Power Station;
- DEC exercises its authority under the federal Clean Water Act and the New York State Environmental Conservation Law to regulate the discharge of pollutants to the Hudson River and the operation of cooling water intake systems;
- The Attorney General has requested that the design basis threat (DBT) to nuclear power plants include air-based threats as envisioned by the federal Energy Policy Act of 2005;
- The Attorney General had requested that the environmental impacts of densely-packed spent fuel pools be analyzed;
- The State has deployed National Guard troops to protect the Indian Point Nuclear Power Station;
- The State has sought to ensure the thorough clean up of the West Valley nuclear waste storage site;
- The State challenged the "take title" provisions of the Low-Level Radioactive Waste Amendments Act of 1985, *New York v. United States*, 505 U.S. 144

(1992); and

- The State intervened in the administrative and judicial proceedings concerning the application for an operating license for the Shoreham Nuclear Power Station.

The Nuclear Regulatory Commission (NRC) recognizes the primacy of State concerns for the economic cost and generating mix of power facilities in that state and correctly leaves it to each state to determine whether a nuclear power plant deemed by the Commission to be safe and environmentally acceptable should be allowed to extend the operation of its facility beyond the originally approved license period:

> The final amendment [of NRC's environmental regulations with respect to licensing] also eliminates NRC's consideration of the need for generating capacity and the preparation of power demand forecasts for license renewal applications. The NRC acknowledges the primacy of State regulators and utility officials in defining energy requirements and determining the energy mix within their jurisdictions. Therefore, the issue of need for power and generating capacity will no longer be considered in NRC's license renewal decisions.

Environmental Review for Renewal of Nuclear Power Plant Operating Licenses (61 Fed. Reg. 28467 at 28468). (June 5, 1996)

Nonetheless, the NRC, in individual proceedings, does make findings in which it evaluates the environmental impacts of alternatives to the proposed extended license operation:

1. Neither the rule nor the Generic Environmental Impact Statement ("GEIS") would contain a consideration of the need for generating capacity or other issues involving the economic costs and benefits of license renewal and of the associated alternatives;

2. The purpose and need for the proposed action (i.e., license renewal) would be defined as preserving the continued operation of a nuclear power plant as a safe option that State regulators and utility officials may consider in their future

planning actions;

3. The only alternative to the proposed action would be the "no-action" alternative, and the environmental consequences of this alternative are the impacts of a range of energy sources that might be used if a nuclear power plant operating license were not renewed;

4. The environmental review for license renewal would include a comparison of the environmental impacts of license renewal with impacts of the range of energy sources that may be chosen in the case of "no action"; and

5. The NRC's National Environmental Policy Act ("NEPA") decision standard for license renewal would require the NRC to determine whether the environmental impacts of license renewal are so great that preserving the option of license renewal for future decisionmakers would be unreasonable.

Environmental Review for Renewal of Nuclear Power Plant Operating Licenses (61 Fed. Reg. 28467 at 28472).

II. APPLICABLE LEGAL STANDARDS

Standards of Admissibility

Proffered contentions must put "other parties in the proceeding on notice of the petitioners' specific grievances" in order to "give [] them a good idea of the claims they will be either supporting or opposing." *Matter of Duke Energy Corp.*, 49 NRC 328,333 (NRC Apr. 15, 1999) (Oconee Nuclear Station, Units 1, 2 and 3). Accordingly, in order to ensure "a clearer and more focused record for decision," 69 Fed. Reg. 2182, 2202 (Jan. 14, 2004), an admissible contention will provide (1) a specific statement of the legal or factual issue proposed; (2) a brief explanation of its basis; (3) a demonstration that the issue is within the scope of the proceeding;

(4) a demonstration that the issue is material to the findings the NRC must make to support the action involved in the proceeding; (5) a concise statement of the alleged facts or expert opinions, including references to specific sources and documents that support the petitioners' position and upon which the petitioner intends to rely at hearing; and (6) sufficient information to show that a genuine dispute exists with regard to a material issue of law or fact, including references to specific portions of the application that the petitioner disputes or, when the application is alleged to be deficient, the identification of such deficiencies and supporting reasons for this belief. *See* 10 C.F.R. § 2.309(f).

The contention rule has not become a "fortress to deny intervention" despite its 1989 fortification. *Matter of Duke Energy Corp.* (Oconee Nuclear Power Plant), 49 NRC at 335 (*quoting Philadelphia Elec. Co.* (Peach Bottom Atomic Power Sta., Units 2 and 3), 8 AEC 13, 20-21 (1974), *rev'd in part*, CLI-74-32, 8 AEC 217 (1974), *rev'd in part*, *York Committee for a Safe Environment v. N.R.C.*, 527 F.2d 812 (D.C. Cir. 1975)). Indeed, "[t]he Commission and its Boards regularly continue to admit for litigation and hearing contentions that are material and supported by reasonably specific factual and legal allegations." *Duke Energy*, 49 NRC at 333. Nor have more recent revisions materially changed the admissibility standard for contentions. *Matter of PPL Susquehanna, LLC*, 65 NRC 281, 303 (March 22, 2007).

Although an intervenor cannot use discovery or cross-examination as a "fishing expedition" in hopes of turning up supporting facts, there is also no requirement that the substantive case be made at the contention stage. *Matter of Entergy Nuclear Generation Co. et*

al. (Pilgrim Nuclear Power Station), 50-293-LR (ASLB Oct. 16, 2006), 2006 WL 4801142 at (NRC) 85 (*quoting Oconee*, 49 NRC at 342)).

> The Commission has also, however, explained that the requirement at § 2.309(f)(1)(v) "does not call upon the intervenor to make its case at [the contention] stage of the proceeding, but rather to indicate what facts or expert opinions, be it one fact or opinion or many, of which it is aware at that point in time which provide the basis for its contention. A petitioner does not have to provide a complete or final list of its experts or evidence or prove the merits of its contention at the admissibility stage. And, as with a summary disposition motion, the support for a contention may be viewed in a light that is favorable to the petitioner so long as the admissibility requirements are found to have been met. The requirement "generally is fulfilled when the sponsor of an otherwise acceptable contention provides a brief recitation of the factors underlying the contention or references to documents and texts that provide such reasons.

Pilgrim at 84 (*quotations and citations omitted*). "A contention may be plausible enough to meet the admission standards even if it is ultimately denied on the merits." *Matter of Entergy Nuclear Vermont Yankee, LLC* (Vermont Yankee), 50-271-LR, 2006 NRC Lexis 201, 28 (ASLB Sept. 22, 2006).

Specific Statement of the Issue of Law or Fact to be Raised or Controverted

First, a petitioner must clearly identify the issue of law or fact that it will raise or dispute. 10 C.F.R. § 2.309(f)(1)(i).

Brief Explanation of the Basis of the Contention

Next "a petitioner must provide some sort of *minimal* basis indicating the *potential* validity of the contention." Final Rule, *Rules of Practice for Domestic Licensing Proceedings - Procedural Changes in the Hearing Process*, 54 Fed. Reg. 33,168, 33,170 (Aug. 11, 1989)

(emphasis added). This minimal basis need not be "an exhaustive list of possible bases, but simply" enough to provide the alleged factual or legal bases in support of the contention. *Vermont Yankee*, 50-271-LR, 2006 NRC Lexis 201 (*quoting Louisiana Energy Serv., LP* (National Enrichment Facility), 60 NRC 619, 623 (2004)).

Showing that the Contention is Material to Findings that the NRC Must Make in Support of the Proposed Action

A proposed contention must concern an issue that is "material" to the findings the NRC must make. 10 C.F.R. § 2.309(f)(1)(iv). A "material" issue is one that would make a difference in the outcome of the proceeding. 54 Fed. Red. at 33,172. "This means that there should be some significant link between the claimed deficiency and either the health and safety of the public or the environment." *Vermont Yankee*, 60 NRC 548, 557 (Nov. 22, 2004).

Concise Statement of the Alleged Facts or Expert Opinions in Support of Petitioners Position

A petitioner must also demonstrate that each proposed contention is supported by "a concise statement of the alleged facts or expert opinions which support the . . . petitioner's position on the issue . . . together with references to the specific sources and documents on which [it] intends to rely." 10 C.F.R. § 2.309(f)(1)(v). This does not mean, though, that a petitioner must "make its case at this stage of the proceeding." 54 Fed. Reg. at 33,170. Rather, the petitioner must simply "indicate what facts or expert opinions, be it one fact or opinion or many, of which it is aware at that point in time which provide the basis for its contention." *Id.* Moreover, "a 'Board may appropriately view Petitioners' support for its contention in a light that

is favorable to the Petitioner.'" *Vermont Yankee*, 60 NRC at 555 *(quoting Matter of Arizona Public Service Co.* (Palo Verde Nuclear Station), 34 NRC, 149, 155 (Aug. 16, 1991)).

Sufficient Information to Show that a Genuine Dispute Exists with the Applicant or Licensee on a Material Issue of Law or Fact

> This will require the intervenor to read the pertinent portions of the license application, including the Safety Analysis Report and the Environmental Report, state the applicant's position and the petitioner's opposing view. Where the intervenor believes the application and supporting material do not address a relevant matter, it will be sufficient for the intervenor to explain why the application is deficient.

54 Fed. Reg. at 33,170.

As set forth in detail in the following contentions, the State easily satisfies the admissibility standard with respect to each contention. Further, as set forth below and as required by 10 C.F.R. § 2.309(f)(1)(iii), the State will show that each contention is within the scope of the proceeding.[7]

The State's Contentions are Within the Scope of the Proceeding

Each of the State's contentions is also within the scope of license renewal proceeding, which is described in Part 54. *See Matter of Florida Power & Light Co.* (Turkey Point Nuclear Power Plant), CLI-01-17, 54 NRC 3, 6-13 (Jul. 19, 2001); Nuclear Power Plant License Renewal, 60 Fed. Reg. 22,461 (May 8, 1995). License renewal application review typically

[7]The State acknowledges that certain contentions fall more squarely within the four corners of Category 1 within the meaning of 10 C.F.R. 51, subpart A, Appendix B. With respect to contentions 18-20 and 27-30, the State has provided a more detailed analysis of how each of these falls within the scope of the proceeding. That discussion is found with the relevant contention.

implicates issues that fall into one of two broad areas: safety/aging management issues, and environmental impacts.

Safety/Aging Management Issues

License renewal safety review is focused "upon those potential detrimental effects of aging that are not routinely addressed by ongoing regulatory oversight programs." *Matter of PPL Susquehanna, LLC* (Susquehanna Steam Electric), 65 NRC 281, 308 (Mar. 22, 2007).

> By its very nature, the aging of materials "becomes important principally during the period of extended operation beyond the initial 40-year license term," particularly since the design of some components may have been based explicitly upon an assumed service life of 40 years. *See* Final Rule: "Nuclear Power Plant License Renewal," 56 Fed. Reg. 64,943, 64,946 (Dec. 13, 1991); *see also* Final Rule: "Nuclear Power Plant License Renewal; Revisions," 60 Fed. Reg. 22,461, 22,479 (May 8, 1995). Adverse aging effects can result from metal fatigue, erosion, corrosion, thermal and radiation embrittlement, microbiologically induced effects, creep, and shrinkage. Such age-related degradation can affect a number of reactor and auxiliary systems, including the reactor vessel, the reactor coolant system pressure boundary, steam generators, electrical cables, the pressurizer, heat exchangers, and the spent fuel pool. Indeed, a host of individual components and structures are at issue. *See* 10 C.F.R. § 54.21(a)(1)(i). Left unmitigated, the effects of aging can overstress equipment, unacceptably reduce safety margins, and lead to the loss of required plant functions, including the capability to shut down the reactor and maintain it in a shutdown condition, and to otherwise prevent or mitigate the consequences of accidents with a potential for offsite exposures.

Florida Power, 54 NRC at 4.

Environmental Review

The scope of the environmental review is defined by 10 C.F.R. Part 51, the NRC's "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (NUREG-

1437 (May 1996)), and the initial hearing notice and order. *See, e.g., Vermont Yankee*, 2006 NRC Lexis 201 (ASLB Sept. 22, 2006). Some environmental issues that might otherwise be germane in a license renewal proceeding have been resolved generically for all plants and are normally, therefore, "beyond the scope of a license renewal hearing." *Turkey Point*, 54 NRC at 15; *see* 10 C.F.R. § 51.53(c)(3)(i). These "Category 1" issues are classified in 10 C.F.R. Part 51, Subpart A, Appendix B. Category 1 issues may be raised when a petitioner (1) demonstrates that there is new and significant information subsequent to the preparation of the GEIS regarding the environmental impacts of license renewal; (2) files a petition for a rulemaking with the NRC; or (3) seeks a waiver pursuant to 10 C.F.R. § 2.335.[8] *See Turkey Point*, 54 NRC at 10-12; *see also* 10 C.F.R. § 51.53(c)(3)(iv) (new and significant information).

New and Significant Information

The National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321-37, requires all federal agencies to examine environmental impacts that could be caused by their discretionary actions. The Supreme Court has identified NEPA's twin aims as (1) obligating a federal agency to consider every significant aspect of the environmental impact of a proposed action and (2) ensuring that the federal agency will inform the public that it has indeed considered environmental concerns in its decision-making process. *Baltimore Gas & Elec. Co. v. Natural*

[8]Because the NRC regulations specifically provide that only a "party to an adjudicatory proceeding" can seek a waiver,10 C.F.R. § 2.335, any determination that a regulation precludes any of the State's contentions must be held in abeyance until the State has been admitted to the proceeding as a "party" and has had an opportunity to pursue any necessary waiver petition.

Resources Defense Council, 462 U.S. 87, 97 (1983); *see also* 42 U.S.C. § 4332(2)(c) (identifying requirements of an EIS). As a federal agency, the NRC must comply with NEPA. *Calvert Cliffs Coordinating Comm. v. United States Atomic Energy Commission*, 449 F.2d 1109 (D.C. Cir. 1971) (NEPA applies to NRC predecessor).

Moreover, NEPA imposes continuing obligations on the NRC after it completes an environmental analysis. An agency that receives new and significant information casting doubt upon a previous environmental analysis must reevaluate the prior analysis. *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 374 (1989). This requirement is codified in the NRC's own regulations. *See* 10 C.F.R. § 51.92(a).

Not surprisingly, the NRC's license renewal application regulations also reiterate this obligation. 10 C.F.R. § 51.53(c)(3)(iv) provides that an ER must contain "any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware." The Commission has concluded this applicant obligation extends to new and significant information even when such information pertains to a Category 1 issue. *See Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), CLI-02-14, 55 NRC 278, 290 (2002). Nonetheless, some licensing boards have concluded that the failure of an ER to include this important information does not give rise to an admissible contention unless a petitioner has sought a waiver of the regulations from the Commission. *See, e.g., Vermont Yankee*, 50-271-LR (Sept. 22, 2006) at 23.

Vermont Yankee relied, for this absurd result, upon the Commission's oft-cited decision

in *Turkey Point*. *See generally Vermont Yankee*, 50-271-LR (Sept. 22, 2006) at 17-27. There, the Commission

> recognize[d] that even generic findings sometimes need revisiting in particular contexts. Our rules thus provide a number of opportunities for individuals to alert the Commission to new and significant information that might render a generic finding invalid, either with respect to all nuclear power plants or for one plant in particular. In the hearing process, for example, petitioners with new information showing that a generic rule would not serve its purpose at a particular plant may seek a waiver of the rule. *See* 10 C.F.R. § 2.758; *see also* note 3, *supra*, and accompanying text. Petitioners with evidence that a generic finding is incorrect for all plants may petition the Commission to initiate a fresh rulemaking. *See* 10 C.F.R. § 2.802. Such petitioners may also use the SEIS notice-and-comment process to ask the NRC to forgo use of the suspect generic finding and to suspend license renewal proceedings, pending a rulemaking or updating of the GEIS. *See* 61 Fed. Reg. at 28,470; GEIS at 1-10 to 1-11.

As this language makes clear, the Commission foreclosed no options, instead identifying some of the several options available, each of which is described as an alternative that petitioner "may" select. Nowhere did the Commission indicate that a waiver of the generic rule is a determinative requirement. Nor is such a conclusion obvious or necessary in light of the plain language of the final regulation.

In this case, to the extent the State sets forth new and significant information, it is used merely to rebut statements made, and conclusions drawn, by the Applicant. It is supplied solely to provide evidence of errors and omissions and is in no way an argument that the ER is inadequate because it failed to contain the new and significant information provided by the State.

New and Significant Information

The National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321-37, requires all federal agencies to examine environmental impacts that could be caused by their discretionary actions. The Supreme Court has identified NEPA's twin aims as (1) obligating a federal agency to consider every significant aspect of the environmental impact of a proposed action and (2) ensuring that the federal agency will inform the public that it has indeed considered environmental concerns in its decision-making process. *Baltimore Gas & Elec. Co. v. Natural Resources Defense Council*, 462 U.S. 87, 97 (1983); *see also* 42 U.S.C. § 4332(2)(c) (identifying requirements of an EIS). As a federal agency, the NRC must comply with NEPA. *Calvert Cliffs Coordinating Comm. v. United States Atomic Energy Commission*, 449 F.2d 1109 (D.C. Cir. 1971) (NEPA applies to NRC predecessor).

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new and significant information even when such information pertains to a Category 1 issue. *See Duke Energy Corp.* (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), 02-14, 55 NRC 278, 290 (2002). Nonetheless, some licensing boards have concluded that the failure of an ER to include this important information does not give rise to an admissible contention unless a petitioner has sought a waiver of the regulations from the Commission. *See, e.g., Vermont Yankee*, 50-271-LR (Sept. 22, 2006) at 23.

Vermont Yankee relied, for this absurd result, upon the Commission's oft-cited decision in *Turkey Point*. *See generally Vermont Yankee*, 50-271-LR (Sept. 22, 2006) at 17-27. There, the Commission

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determinative requirement. Nor is such a conclusion obvious or necessary in light of the plain language of the final regulation.

In this case, to the extent the State sets forth new and significant information, it is used merely to rebut statements made, and conclusions drawn, by the Applicant. It is supplied solely to provide evidence of errors and omissions and is in no way an argument that the ER is inadequate because it failed to contain the new and significant information provided by the State.

With respect to the remaining issues in Appendix B, "Category 2" issues, (1) the applicant must make a plant-specific analysis of environmental impacts in its Environmental Report, 10 C.F.R. § 51.53(c)(3)(ii), and (2) NRC Staff must prepare a supplemental Environmental Impact Statement, *id*. § 51.95(c). Contentions implicating Category 2 issues ordinarily are deemed to be within the scope of license renewal proceedings. *See Turkey Point*, 54 NRC at 11-13; *Matter of Amergen Energy Co.* (Oyster Creek), 50-0219-LP, 2006 NRC Lexis 195 (Feb. 27, 2006).

CONTENTION 1

THE LICENSE RENEWAL APPLICATION (LRA) VIOLATES 10 C.F.R. § 54.13 BECAUSE IT IS NEITHER COMPLETE NOR ACCURATE AND THUS, IN ORDER TO PROTECT THE DUE PROCESS AND 42 U.S.C. § 2239 RIGHTS OF THE INTERVENORS, THE BOARD SHOULD SUSPEND THE HEARING UNTIL THE APPLICANT FILES AN AMENDED APPLICATION IN COMPLIANCE WITH 10 C.F.R. § 54.13.

BASIS[9]

1. 10 C.F.R. § 54.13 requires an applicant to file a license renewal application that is "complete and accurate in all material respects."

2. In several material respects the LRA in general and the Environmental Report (ER) in particular, are neither complete nor accurate:

a. The UFSAR for IP2 and IP3 fails to include the updated information required by 10 C.F.R. § 50.71(e) and does not include any analysis of the new and significant earthquake information that bears on the ability of the plant to withstand an earthquake;

b. The UFSAR for IP2 and IP3 allege that the plant is designed, built and operated in compliance with General Design Criteria (GDC) that have never been adopted by the NRC and are at odds with the GDC that are legally applicable to these two plants;

[9]As required by 10 C.F.R. § 2.309(f)(1)(ii) the bases provided are not all the bases or all the details of the bases which support the contention and provide merely "a brief explanation of the basis for the contention."

c. Contrary to the requirements of 10 C.F.R. § 54.21(a) the LRA does not contain any aging management program for non-environmentally-qualified ("Non-EQ") low voltage cables, Non-EQ medium voltage cables and transformers important for plant safety;

d. Contrary to the requirements of 10 C.F.R. § 54.21(a) the LRA does not contain a specific aging management program to address the fact the cumulative use factor for a number of passive components exceeds the value of 1.0;

e. In many instances where specific aging management programs are required and where the LRA acknowledges that such programs are required, the LRA merely asserts that such programs will be developed but does not provide any substantive information about the specific program, its components or the basis for the belief that it will be sufficient to carry out its intended function;

f. The LRA and the UFSAR for each unit do not mention or address General Design Criteria numbers 8, 21, 22, 35, 51, 53, 64, and 65;

g. A substantial number of the references upon which the LRA is based are not publicly available nor are they attached to the LRA;

h. As early as September 21, 2007, the Staff identified 22 draft Requests for Additional Information (RAIs). Many of the concerns and the answers provided by Applicant, reflect the fact that even the Staff could not find in the LRA where certain issues were discussed and only after meeting with the Applicant was the Staff able to ascertain what the LRA was

saying. In the case of numerous other draft RAIs the Staff identified places where the Applicant had failed to justify the exclusion of components from the license renewal review process;

i. The ER ignores new and significant information of which Applicant was or should be aware of including potential increased risks of a severe accident as a result of terrorist activities, earthquake hazards, the lack of a basis to believe that the nuclear waste generated at the facility until 2013 and 2015 and for the period of proposed extended operation will be able to be sent to a high level waste disposal facility by 2025 (as assumed in 10 C.F.R. § 51.23) or any specific future date;

j. The ER fails to seriously consider or analyze realistic and viable alternatives to license extension, ignoring the guidance provided in NUREG 1437;

k. The ER ignores the adverse economic impact on off-site land that will occur if the two units are not shut down at the end of their current licenses and thus overstates the benefits of license extension and understates the detriments.

3. As a result of the Staff accepting the LRA for filing, the Staff has started a schedule for completion of its efforts which requires the parties to the proceeding to fully develop their positions on a number of substantive issues in the near future even though the LRA is neither complete nor accurate. *See* Letter from Pao-Tsin Kuo to Michael Balduzzi, dated July 27, 2007 (Determination of Acceptability and Sufficiency for Docketing, Proposed Review Schedule, and Opportunity for a Hearing Regarding the Application from Entergy Nuclear Operations, Inc. for Renewal of Operating Licenses for Indian Point Nuclear Generating Unit Nos. 2 and 3 (TAC

Nos. MD5407 and MD5408). For example, the environmental scoping period ended on October 12, 2007, even though the ER is far from complete and fails to contain numerous analyses required by Part 51. The draft Supplemental Environmental Impact Statement ("SEIS") is due on July 25, 2008 and contentions based on it will be due shortly thereafter, even though basic information required to be included in the ER has not been provided making the formulation of timely contention vastly more difficult.

4. Allowing the application to proceed to the point where the public is required to file contentions and meet the stringent requirements of 10 C.F.R. § 2.309(f), without providing any relief from the consequences of the passage of the time for the filing of initial contentions, but where the application is woefully incomplete, deprives the public of its right to due process and distorts the hearing rights provided such that neither the letter nor the intent of 42 U.S.C. § 2239 are met:

a. to the extent § 2.309(f) requires a proposed intervenor to provide an explicit statement of the contention and its basis, the absence of any substantive details in the LRA on numerous issues, some of which are identified above, and the mere presence of conclusory assertions deprives the intervenor of information important to meeting the contention filing requirement;

b. although § 2.309(f)(2) provides an opportunity for amending or filing new contentions, the regulations impose an entirely new set of strictly construed requirements (including, arguably, the provision of 10 C.F.R. § 2.323(a) that any filing must be made within

10 days of when the information upon which it is based became known to the intervenor) that must be met before the ASLB can even consider the newly proposed contention requiring the intervenor to incur substantial additional expense, overcome substantial additional hurdles and use substantially more resources[10];

c. the magnitude of the inadequacy of this application is already apparent in the NRC Staff's initiation of the "RAI" process by which the Staff, after the time for intervention petitions are due, seeks to fill gaps in the application of which it is aware. Unlike the more typical "clarification" RAIs, the Draft RAIs ("D-RAI") proposed by the Staff indicate some fundamental omissions in the LRA:

> D-RAI 2.3.3.1 1-6
>
> Section 3.1.8 of the SER [Safety Evaluation Report] dated March 6, 1979, discusses dry-pipe pre-action sprinkler systems for all cable trays in the electrical tunnels, electrical penetration areas, and cable trays in the motor control center areas. The dry-pipe pre-action sprinkler systems do not appear in LRA Section 2.3.3.1 1 as being in the scope of the license renewal and subject to an AMR [Aging Management Review]. The staff requests that the applicant verify whether the dry-pipe pre-action sprinkler systems for all cable trays in the electrical tunnels, electrical penetration areas, and cable trays in the motor control center areas are in the scope of license renewal in accordance with 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(l). If they are excluded

[10]The Staff has taken the position that even a contention which meets the requirements of 10 C.F.R. § 2.309(f)(2) must also meet the so-called "late filed contentions" requirements. *See In the Matter of Entergy Nuclear Vermont Yankee*, Memorandum and Order (Admitting Intervenor's New Contention), December 2, 2005, slip op. at 9 ("[t]he Staff asserts that the proposed new contention must also pass the eight factor balancing test specified for "nontimely filings" in 10 C.F.R. § 2.309(c)").

> from the scope of license renewal and not subject to an AMR, the staff requests that the applicant provide justification for the exclusion.
>
> ***
>
> D-RAI 2.3.3.1 1-7
>
> Section 5.9.1 of the SER dated March 6, 1979, discusses automatic deluge foam suppression systems for various areas in turbine building. The foam suppression systems do not appear in LRA Section 2.3.3.1 1 as being in the scope of the license renewal and subject to an AMR. The staff requests that the applicant verify whether the foam suppression systems for various areas in the turbine building are in the scope of license renewal in accordance with 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21 (a)(l). If the system is excluded from the scope of license renewal and not subject to an AMR, the staff requests that the applicant provide justification for the exclusion.

These are similar to the omissions already noted in other Contentions and underscore the fundamental inadequacy of the LRA.

d. in this proceeding, New York State specifically identified to the Staff, at an early time, some of the most egregious deficiencies in the application and requested that the Staff demand that the application be completed prior to being accepted for filing (*see* July 13, 2007 letter from John Sipos, NY Assistant Attorney General to Bo Pham, NRC Environmental Project Manager, ML027050210 ("The State of New York respectfully requests that the NRC determine that Entergy's recently-filed application to renew its operating licenses for the Indian Point nuclear reactors does not comply with 10 C.F.R. § 54.13. Accordingly, the State of New York requests that the NRC not docket or process this application and require Entergy to supplement the application");

e. regrettably the Staff ignored this request (July 25, 2007 letter from Bo Pham to John Sipos, ML072060503) and concluded that the application was sufficiently complete to accept it for filing while recognizing that the Staff would be seeking additional information from the Applicant;[11]

f. however, the regulatory history of 10 C.F.R. § 54.13 makes abundantly clear that the filing of an application that is "complete and accurate in all material respects" is not merely precatory language that the Staff is free to interpret loosely, but rather, this language was intended to assure that an applicant had filed an application that would meet the requirements of the Administrative Procedure Act's "timely renewal" provision which allows any license for which a "timely and sufficient" application is filed to remain in effect until the application is finally acted upon:

> Section 9(b) of the Administrative Procedure Act (APA), referred to as the "timely renewal doctrine," provides that, if a licensee of an activity of a continuing nature makes a "timely and sufficient" application for renewal in accordance with agency rules, the existing license does not expire until the application has been finally determined by the agency.
>
> ***
>
> Renewal applications should be essentially complete and sufficient when filed. Section 9(b) of the APA confers the benefit of "timely renewal" to those who make a timely filing of a "sufficient application."

Statement of Consideration, 56 Fed. Reg. 64943, 64962-3 (Dec. 13, 1991).

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[11]Hudson Riverkeeper raised similar concerns in a letter dated June 4, 2007 and received a similar response from the NRC Staff. Letter from Phillip Musegaas and Victor Tafur, Riverkeeper, to Bo Pham, NRC, June 4, 2007, ML071730115.

5. The Statement of Consideration accompanying the 1991 license renewal regulation amendments also included the following:

> However, a determination that an application is sufficient for purposes of timely renewal would not be litigable. Sufficiency is essentially a matter for the staff to determine based on the required contents of an application established in §§ 54.19, 54.21, 54.22, and 54.23. *It is enough that the licensee submits the required reports, analyses, and other documents required in such application.* That such documents may require further supplementation or review is of no consequence to continued operation under timely renewal.

Id. at 64963 (emphasis added). Applicant here has not submitted the required reports, analyses and other documents and thus the Commission's statement is not applicable. In addition the statement was made without apparent consideration of the impact on intervenors of such a restriction on the right to challenge the adequacy of an application and obviously without awareness of the massive modifications made by the Commission to the Rules of Practice 15 years later, in 2004. 69 Fed. Reg. 2,182 (jan. 14, 2004). Even if the Commission's attempt to exclude from consideration an issue as fundamental as whether the application, upon which all contentions must be based, is complete and accurate, were legal - a proposition New York State strongly rejects - in this case the preconditions for invocation of that exclusion have not been met. Analyses and studies which underlie licensee's responses to a variety of generic letters, which are required to be a part of the Updated Final Safety Analysis Report ("UFSAR") and thus of the LRA, have not been submitted. In addition, as noted in Contention 5, and others, many required aging management programs are simply not provided or the absence is not justified,

some of which deficiencies even the staff has noted in its recent draft RAIs. Thus, the required "reports, analyses and other documents," the assumed existence of which form the rational for the Commission's statement that challenges to the completeness of applications should not be matters for ASLB consideration, do not exist in this case. Thus, a fair reading of the Commission's statement is that where, as here, the required "reports, analyses and other documents" are not provided in the LRA the ASLB can and should consider such deficiencies and their consequences. See a more detailed discussion of the legal question in the legal portion of this Petition, *infra*.

6. The net effect of this tactic of filing a demonstrably inadequate and incomplete application, if not rejected by this Board, will be that Applicant will be able to sap the limited resources of intervenors by compelling them to file initial contentions based on an inadequate application and to file a series of amended contentions, many of which are the substantive analogues of the initial contentions, which amended contentions will be accepted only if they can overcome additional and substantial procedural hurdles. Subjecting an intervenor to this laborious and resource intensive process rewards the Applicant for its own failure to obey the clear mandate of the regulations.[12]

[12]Only the Applicant has a direct economic incentive in this proceeding. The intervenor parties, whether governmental agencies or public interest organizations, do not have economic incentives and thus cannot internalize the cost of their intervention and recoup the cost from future business transactions or receive any direct economic return on these costs.

7. Allowing a demonstrably deficient application to be accepted for filing, thus triggering the contention filing obligation of the public, is also prejudicial to the ASLB by forcing it to consider an initial set of contentions many of which will have to be amended once the applicant amends the application to provide essential information that should have been in the original applicant. This requires the Board to go through two complete contention review processes, all because the applicant has failed to file an application that is "complete and accurate" as required by the regulations. Since the Board is at least expected to be guided by a preset schedule for completion of the hearing - *see* 10 C.F.R. Part 2, Appendix B - the Applicant's delaying tactic places the ASLB in the position of having to depart from the recommended preset schedule or having to severely curtail the time allotted for intervenors in that already restrictive schedule.

SUPPORTING EVIDENCE[13]

8. No case better illustrates the enormous waste of time and problematic impact on the hearing process of allowing a demonstrably deficient application to be accepted for filing than the ongoing license renewal proceeding for the Vermont Yankee Nuclear Power Station. In a recent decision the ASLB ruled on an amended contention filed by the intervenor, New England Coalition ("NEC"). *In the Matter of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc.*, ASLBP No. 06-849-03-LR (Nov. 7, 2007). The original contention

[13]Consistent with 10 C.F.R. §§ 2.309(f)(1)(v) and (vi), the supporting evidence contains a concise, and not a comprehensive, statement of the facts that support the Contention and demonstrates that a genuine dispute exists based on the information provided in the LRA and its accompanying filings.

was based on the fact that Entergy – the same company that is the applicant in this case – had identified a number of plant components for which a fatigue failure analysis had shown unacceptably high cumulative usage factors. Rather than identify a particular solution to this serious safety problem, the application merely listed three *possibilities* that Entergy *might* use. After this failure to identify a specific solution to the problem was accepted as a contention,[14] Entergy proposed to adopt one of the three alternatives and filed a *draft* report (one prepared by its consultant, but not yet approved by Entergy) evaluating the chosen option, in support of a motion to dismiss the original contention as moot. After NEC's objection to being forced to submit a new contention based on the inadequacies of the draft analysis and its request to delay filing a new contention was approved by the ASLB, Entergy filed its final report. NEC then filed a timely amended contention based on the deficiencies in the analysis, including fully briefing its compliance with the requirements of 10 C.F.R. § 2.309(f)(2) for a late filed contention, and, after full briefing of that issue, the ASLB accepted the amended contention and held the original contention in abeyance pending hearings to resolve the question of whether the particular option chosen by Entergy would meet the license renewal standards. It is difficult to imagine a more convoluted or inefficient process. The victim of this iterative license application process was NEC (a not-for-profit citizens' group) which was forced to file numerous pleadings and offer

[14]The accepted contention asserted: Entergy's License Renewal Application does not include an adequate plan to monitor and manage the effects of aging [due to metal fatigue] on key reactor components that are subject to an aging management review, pursuant to 10 C.F.R. § 54.21(a) and an evaluation of the time limited aging analysis, pursuant to 10 C.F.R. § 54.21(c).

numerous expert analyses when, if the application had been complete in the first instance, Entergy would have included the final report of its consultant in support of the analysis upon which it relied to demonstrate that it met the failure fatigue requirements of the AEA. The ASLB also was victimized by the process as is apparent from the many pleadings and decisions it was forced to review and issue just to get to the point where Entergy was finally providing the level of detail that should have been included in its initial application. Finally, the iterative submissions have made it difficult for the citizens to follow the process.

9. The application in this proceeding contains precisely the same deficiency because Applicant has identified numerous instances in both IP2 and IP3 where cumulative usage factors for vital safety components are in excess of 1.0, *see* Entergy License Renewal Application, Appendix A, Evaluation of Time-Limited Aging Analysis - Unit 2, Sections A.2.2.2.3 and A.3.2.2.3, and where the only information on how Applicant intends to deal with this serious safety problem is a listing of options. *See id.* Thus, if this current proceeding is allowed to continue, rather than compelling Applicant to refile its application when the application is "complete and accurate" as required by 10 C.F.R. § 54.13, this ASLB can anticipate the same procedural morass as the ASLB in Vermont Yankee.

10. The extent of the deficiencies in the application are evident from the 22 draft RAIs that the Staff discussed with Entergy on September 21, 2007.

11. Entergy's LRA frequently relies on undefined programs "to be developed" at some later time. See, e.g, UFSAR, p. A-32–A-33 (stating "program activity guidance documents will

be developed" in connection with numerous identified components), p. B-106 (offering that "program activity guidance documents will be developed"); p. B-76 (noting that acceptance standards will be developed); p. 3.1-15 (noting that "additional inspection procedures are to be developed" for steel steam generator shell and core). Such contingent aspirations to develop inspection and aging management programs in the future are inadequate and forestall the ability of the public and the State to meaningful renew and challenge the aging management program.

CONTENTION 2

THE LICENSE RENEWAL APPLICATION FOR IP2 AND IP3 FAILS TO COMPLY WITH THE REQUIREMENTS OF 10 C.F.R. §§ 54.21 AND 54.29(a)(1) AND (2) SINCE INFORMATION FROM SAFETY ANALYSES AND EVALUATIONS PERFORMED AT THE NRC'S REQUEST ARE NOT IDENTIFIED OR INCLUDED IN THE UFSAR AND THUS IT IS NOT POSSIBLE TO DETERMINE WHICH SYSTEMS AND COMPONENTS IMPORTANT FOR SAFETY REQUIRE AGING MANAGEMENT OR WHAT TYPE OF AGING MANAGEMENT THEY REQUIRE.

BASIS

1. 10 C.F.R. § 50.71(e) imposes the following obligations on all licensees:

> Each person licensed to operate a nuclear power reactor pursuant to the provisions of Sec. 50.21 or Sec. 50.22 of this part shall update periodically, as provided in paragraphs (e) (3) and (4) of this section, the final safety analysis report (FSAR) originally submitted as part of the application for the operating license, to assure that the information included in the report contains the latest information developed. This submittal shall contain all the changes necessary to reflect information and analyses submitted to the Commission by the licensee or prepared by the licensee pursuant to Commission requirement since the submittal of the original FSAR, or as appropriate the last update to the FSAR under this section.

> The submittal shall include the effects \1\ of: All changes made in the facility or procedures as described in the FSAR; all safety analyses and evaluations performed by the licensee either in support of approved license amendments, or in support of conclusions that changes did not require a license amendment in accordance with Sec. 50.59(c)(2) of this part; and all analyses of new safety issues performed by or on behalf of the licensee at Commission request. The updated information shall be appropriately located within the update to the FSAR.

2. The purpose of this regulation is to assure that the Final Safety Analysis Report ("FSAR") accurately describes the plant and the actions taken by the licensee in response to new information or new NRC requirements.

3. The seriousness of the § 50.71(e) requirement is reflected in an attachment to a NRC Staff generic letter issued after adoption of the regulation, where, in answer to a question about the status of the original FSAR after filing of the updated FSAR, the Staff responded, in part: "If, as a result of possible audits, the NRC finds that the updated FSAR is not as certified to by the licensee, appropriate enforcement action would be taken." Generic Letter 81-06.at 1.

4. The Commission has explicitly linked the accuracy of the updated final safety analysis report (UFSAR) information and the license renewal process and aging management:

> During the license renewal process, the application and the FSAR supplement, together, provide the necessary information and administrative controls to evaluate and help ensure the efficacy of aging programs for these structures and components. After a renewed license is issued, the information in the FSAR supplement serves the dual purposes of (1) assuring that the licensee has considered relevant technical information regarding the evaluation of aging effects for these newly identified systems, structures, and components and (2) establishing appropriate administrative and regulatory controls on the programs that manage aging for these newly identified systems, structures, and components.

Nuclear Power Plant License Renewal; Revisions 1995 WL 301762, *48 (Statement of Considerations).

5. The importance of the UFSAR completeness is also demonstrated by its central role in defining the Current Licensing Basis (CLB), the definition of which includes the following:

> It also includes the plant-specific design-basis information defined in 10 CFR § 50.2 as documented in the most recent final safety analysis report (FSAR) as required by 10 CFR § 50.71 and the licensee's commitments remaining in effect that were made in docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.

10 C.F.R. § 54.3(a).

6. Thus, it is not possible to determine all equipment, components and systems that require aging management or whether proposed aging management programs are adequate to perform their intended function unless the UFSAR accurately reflects the status of the plant's safety equipment, components and systems.

7. Attached to the Declaration of David Lochbaum is a partial list of significant safety systems and procedures which IP2 and IP3 have been required to address by NRC generic letters, which have apparently been addressed but for which the analysis, resolution and changes, if any, required by generic letter and addressed by the licensee do not appear in the UFSAR for IP2 and IP3 and/or do not appear in the level of detail required by § 50.71(e).

8. Because the UFSAR is not in compliance with 10 C.F.R. § 50.71(e), is woefully out of date and fails to contain the detail necessary to even correctly describe and identify all of the systems for which aging management is required, Entergy is unable to provide reasonable assurance that it has developed and/or will implement the necessary aging management programs as required by 10 C.F.R. §§ 54.29(a)(1) and (2) or that it is identified those systems and components for which aging management is necessary as required by 10 C.F.R. § 54.21(a).

9. Because the UFSAR is not in compliance with 10 C.F.R. § 50.71(e), is woefully out of date and fails to contain the detail necessary to even correctly describe and identify all of the systems for which aging management is required, Entergy is unable to provide reasonable assurance that it has developed and/or will implement the necessary aging management programs as required by 10 C.F.R. §§ 54.29(a)(1) and (2).

SUPPORTING EVIDENCE

10. In May 1980, the NRC issued a final rule, 10 C.F.R. § 50.71(e), applicable to all licensees of operating power reactors like IP2 and IP3. That final rule stated:

> Each person licensed to operate a nuclear power reactor pursuant to the provisions of § 50.21 or § 50.22 shall update periodically, as provided in paragraphs (e)(3) and (e)(4) of this section, the final safety analysis report (FSAR) originally submitted as part of the application for the operating license, to assure that the information included in the FSAR contains the latest material developed.
>
> ***
>
> The updated FSAR shall be revised to include the effects of: all changes made in the facility or procedures as described in the FSAR; all safety evaluations performed by the licensee either in support of requested license amendments or in

> support of conclusions that changes did not involve an unreviewed safety question; and all analyses of new safety issues performed by or on behalf of the licensee at Commission request. The updated information shall be appropriately located within the FSAR.

The rule had the effect of requiring the FSAR to become a "living document" that is periodically updated to incorporate information regarding applicable modifications to the facility and procedures.

11. In December 1980, the NRC used its generic communications process to remind its licensees about their obligations under the recently promulgated rule.

> The Commission approved the rule 50.71(e) (copy enclosed) entitled "Periodic Updating of Final Safety Analysis Reports" and published the rule in the Federal Register on May 9, 1980. The rule became effective on July 22, 1980.
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> ***
>
> For non-SEP [Systematic Evaluation Program] plants, the rule requires submittal of the updated FSAR within 24 months of either July 22, 1980, or the date of issuance of the operating license, whichever is later.

Generic Letter 80-110.

12. The NRC's Systematic Evaluation Program ("SEP") was an initiative begun in 1977 seeking to compare the licensing bases for 11 older nuclear power reactors (Dresden Units 1&2, Yankee Rowe, Big Rock Point, San Onofre Unit 1, Connecticut Yankee, LaCrosse, Oyster Creek, Ginna, Millstone Unit 1, and Palisades) to current safety regulations. Because IP2 and IP3 were non-SEP reactors, 10 C.F.R. § 50.51(e) required the first update to the FSAR to be submitted to the NRC on or before July 22, 1982.

13. Nearly 15 years later, the NRC and the nuclear industry became aware of compliance problems with the 10 C.F.R. § 50.71(e) requirements. While the most prominent compliance problems surfaced at the Millstone nuclear plant in 1996, the problems extended beyond this one facility and prompted the NRC and the nuclear industry to take steps to remedy the situation.

14. The nuclear industry, via the Nuclear Energy Institute ("NEI"), developed guidance document NEI 98-03 Rev. 1 in June 1999 outlining the steps needed to comply with 10 C.F.R. § 50.71(e):

> Inspections in 1996-1997 by the NRC and licensees identified numerous discrepancies between UFSAR information and the actual plant design and operation. These findings have raised questions about possible noncompliance with 10 C.F.R. 50.71(e). The industry has developed this guidance in recognition of the importance of the UFSAR, the need to comply with 10 C.F.R. 50.71(e) update requirements, and the need for UFSARs to be consistent with the plant design and operation.

Id.

15. The NRC issued Regulatory Guide 1.181 in September 1999 to clarify its regulatory position on updating the FSARs:

> As a result of lessons learned from the Millstone experience and other initiatives related to UFSARs, the NRC has determined that additional guidance regarding compliance with 10 C.F.R. 50.71(e) is necessary. … In a staff requirements memorandum dated May 20, 1997, the Commission directed the staff, in part, to issue guidance for complying with 10 C.F.R. 50.71(e) so that UFSARs are updated to reflect changes to the design bases and to reflect the effects of other analyses performed since original licensing that should have been included under 10 C.F.R. 50.71(e). This regulatory guide provides the guidance requested by the May 20, 1997, staff requirements memorandum.

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> The objectives of 10 C.F.R. 50.71(e) are to ensure that licensees maintain the information in the UFSAR to reflect the current status of the facility and address new issues as they arise, so that the UFSAR can be used as a reference document in safety analyses.

Id. Among other things, the NRC formally endorsed NEI 98-03 in Regulatory Guide 1.181 as an acceptable method of complying with 10 C.F.R. § 50.71(e), although they readily acknowledged that licensees may employ other methods to comply:

> Revision 1 of NEI 98-03, "Guidelines for Updating Final Safety Analysis Reports," dated June 1999, provides methods that are acceptable to the NRC for complying with the provisions of 10 C.F.R. 50.71(e). … Licensees may use methods other than those proposed in Revision 1 of NEI 98-03 to meet the requirements of 10 C.F.R. 50.71(e). The NRC will determine the acceptability of other methods on a case-by-case basis.

NEI 98-03 Rev. 1. described the FSAR's role:

> UFSARs provide a description of each plant and, per the Supplementary Information for the FSAR update rule, serve as a "reference document to be used for recurring safety analyses performed by licensees, the Commission, and other interested parties." The UFSAR is used by the NRC in its regulatory oversight of a nuclear power plant, including its use as a reference for evaluating license amendment requests and in the preparation for and conduct of inspection activities. For licensees, portions of the UFSAR are used as a reference in evaluating changes to the facility and procedures under the 10 C.F.R. 50.59 change process. The UFSAR also serves to provide the general public a description of the plant and its operation.

Id. NEI 98-03 Rev. 1 described the updates to FSARs required by 10 C.F.R. § 50.71(e):

> Based on analysis of 10 C.F.R. 50.34(b), UFSAR updates should contain the following basic types of information concerning new requirements and information developed since the UFSAR was last updated that are required to be reflected in the UFSAR under 10 C.F.R. 50.71(e):
> " new or modified design bases

" summary of new or modified safety analyses
" UFSAR description sufficient to permit understanding of new or modified design bases, safety analyses, and facility operation

Id. NEI 98-03 Rev. 1 defined the "safety analyses" covered by the second bullet to be:

> Safety analyses are analyses performed pursuant to Commission requirement to demonstrate the integrity of the reactor coolant pressure boundary, the capability to shut down the reactor and maintain it in a safe shutdown condition, or the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the guidelines in 10 C.F.R. 50.34(a)(1) or 10 C.F.R. 100.11. Safety analyses are required to be presented in the UFSAR per 10 C.F.R. 50.34(b) or 10 C.F.R. 50.71(e) and include, but are not limited to, the accident analyses typically presented in Chapter 14 or 15 of the UFSAR.

Id. NEI 98-03 Rev. 1 described what constituted "new or modified safety analyses" (vice restated safety analyses) and the related level of detail issue for summaries of new or modified safety analyses:

> Licensees should evaluate the effects of analyses or similar evaluations performed by licensees in response to plant-specific NRC requests or NRC generic letters or bulletins. NRC-requested analyses and evaluations must be reflected in UFSAR updates only if, on the basis of the results of the requested analysis of evaluation, the licensee determines that the existing design bases, safety analyses or UFSAR description are either not accurate or not bounding or both. The existing design bases, safety analyses and UFSAR description must be updated to reflect the new information, as appropriate.

Id.

16. While not explicitly addressing the level of detail required for FSARs, 10 C.F.R. § 50.34(b)(2) required that the original FSARs include:

> … description and analysis of the structures, systems, and components of the facility, with emphasis on performance requirements, the bases, with technical justification therefore, upon which such requirements have been established, and

> the evaluations required to show that safety functions will be accomplished. The description shall be sufficient to permit understanding of the system designs and their relationship to safety evaluations.

Id. NEI 98-03 Rev. 1 contained case studies to assist licensees decide what did and did not constitute new or modified safety analyses to be summarized in the FSARs. One case study covered the evaluation required by the NRC by Bulletin 88-04:

> A change to the safety injection system was initiated to address an operability concern identified in NRC Bulletin 88-04, "Potential for Safety-Related Pump Loss." An evaluation of safety injection pump minimum-flow lines resulted in an increase in the recommended minimum-flow rate to preclude hydraulic instability at low flow conditions and assure pump operability. … Because sufficient minimum-flow is necessary to ensure the system is able to perform its intended safety function, the UFSAR description associated with the safety injection system should be modified to include a discussion of the minimum-flow function as it relates to maintaining operability of the safety injection pumps. In some cases, this may entail adding UFSAR discussion of the minimum-flow function where none previously existed.

17. Significantly, neither the Reg. Guide nor the NEI paper authorized a utility to ignore the requirements of 10 C.F.R. § 50.71(e)

18. On October 9, 1996, the NRC requested, pursuant to 10 C.F.R. § 50.54(f), that the licensees of IP2 and IP3 submit material to the NRC, under oath or affirmation, regarding the adequacy and availability of design bases information. The NRC expressly informed the Indian Point licensees that "the NRC staff has found that some licensees have failed to … assure that UFSARs properly reflect the facilities." The NRC described the nexus between these failures and public safety:

> Of particular concern is whether licensee programs are consistent with and are being maintained in accordance with their design bases. The extent of the licensees' failures to maintain control and to identify and correct the failures in a timely manner is of concern because of the potential impact on public health and safety should safety systems not respond to challenges from off-normal and accident conditions.

Id. The NRC requested licensees to take five actions, the first being to provide the NRC with a "Description of engineering design and configuration control processes, including those that implement 10 C.F.R. 50.59, 10 C.F.R. 50.71(e), and Appendix B to 10 C.F.R. Part 50." By letter dated February 13, 1997, the licensee for IP2 responded to the NRC's 10 C.F.R. § 50.54(f) request. The licensee described its process for updating the FSAR:

> The 10 C.F.R. 50.59 evaluations are used to identify updates to the Updated Final Safety Analysis Report (UFSAR). Updates to the UFSAR include the effects of changes made to the facility or procedures described in the USAR, Safety Evaluations performed in support of requested license amendments or conclusions that changes have not involved an unreviewed safety question (USQ) (10 C.F.R. 50.59 process).

Id. By letter dated February 7, 1997, the licensee for IP3 responded to the NRC's 10 C.F.R. 50.54(f) request. The licensee described its process for updating the FSAR:

> The process for updating the FSAR is controlled by procedure NLP-3 "FSAR Updates." This procedure requires that the FSAR is updated to reflect plant modifications, changes to procedures described in the FSAR, 10 C.F.R.50.59 Safety Evaluations, Technical Specification Amendments, NRC correspondence, and to reflect the on resolution of discrepancies [sic].

Id.

19. The FSAR updating processes for IP2 and IP3 were administered by different licensees at that time, but the processes were very similar. Both relied on the 10 C.F.R. § 50.59

process to trigger updates to the FSARs. This regulation controls when and under what conditions licensees "may make changes in the facility as described in the final safety analysis report (as updated), make changes in the procedures as described in the final safety analysis report (as updated), and conduct tests or experiments not described in the final safety analysis report (as updated)" without first obtaining NRC approval. The 10 C.F.R. § 50.59 processes do not trigger updates to the FSARs for safety analyses performed at the NRC's request unless those safety analyses also involve a plant modification or procedure revision.

20. 10 C.F.R. § 50.71(e) requires NRC licensees of operating nuclear reactors like IP2 and IP3 to periodically update the FSARs for their facilities to include applicable information from safety analyses performed at the NRC's request.

21. NEI's guidance document 98-03 Revision 1 describes a methodology for updating FSARs to conform to 10 C.F.R. 50.71(e) requirements. This guidance defines "safety analyses" and details what constitutes applicable information from safety analyses performed at the NRC's request to be incorporated into the FSARs.

22. NRC's Regulatory Guide 1.181 endorsed NEI 98-03 Rev. 1 as an acceptable means for conforming to the 10 C.F.R. § 50.71(e) requirements, but provided licensees the option of establishing an alternative means of conformance for the NRC to review and accept.

23. NRC's generic correspondence program uses Regulatory Issue Summaries, Information Notices, Generic Letters, and Bulletins to make licensees aware of relevant operating experience and to require licensees to take certain actions based on that operating experience.

Regulatory Issue Summaries and Information Notices involve administrative (e.g., scheduling testing of candidates for operator licenses) and information awareness matters. Generic Letters and Bulletins typically involve actions NRC requests licensees to take.

24. One of the State of New York's experts reviewed NRC Generic Letters and Bulletins issued since 1982, corresponding to when 10 C.F.R. § 50.71(e) required the IP2 and IP3 licensees to begin submitting periodic updates to the FSARs to include applicable information from safety analyses requested by the NRC via these generic correspondence documents. The generic correspondence documents included in this review are listed in Table 1.

25. For IP1, IP2, and IP3, our expert reviewed the licensee responses to the NRC generic correspondence. He also reviewed the latest FSARs for references to this NRC generic correspondence. The responses he reviewed are also listed in Table 1 along with references found within the FSARs.

26. The State of New York's expert also reviewed the license renewal application for IP2 and IP3 for references to the NRC generic correspondence. Table 1 also indicates the NRC generic correspondence references found in the license renewal application.

27. Summarized below are some of the Table 1 entries. Generally, these summaries indicate what safety analyses were performed by the Indian Point licensees in response to NRC generic correspondence and how that information was, or was not, reflected within the FSARs.

a. NRC Bulletin 82-02

The NRC issued Bulletin 82-02 on June 2, 1982, to licensees of operating pressurized water reactors regarding an age-related degradation mechanism (corrosion) affecting bolts and studs in the reactor coolant pressure boundary. Specifically, this bulletin informed licensees of significant corrosion of the closure studs for the reactor coolant pumps at Fort Calhoun and of closure studs for a steam generator primary manway at Maine Yankee. This bulletin required licensees to take appropriate steps to reduce the likelihood of similar corrosion problems at their facilities.

The IP2 licensee responded to the NRC on August 2, 1982, reporting that wastage in 8 of the 24 closure studs for reactor coolant pump 23 had occurred due to leakage from the pump's main flange. The IP2 licensee's response also informed the NRC that the reactor coolant pump insulation had been changed from blanket insulation to a preformed metal type to preclude boric acid buildup, and resulting corrosion, in event of future leaks. NRC Bulletin 82-02 is not mentioned in the IP2 FSAR. The design change to the reactor coolant pump insulation type made to prevent significant age-related degradation (corrosion) is not mentioned in the IP2 FSAR.

The licensee's August 2, 1982, response to the NRC for Bulletin 82-02 credited a design change in the type of insulation applied to the reactor coolant pumps in preventing significant age-related degradation from boric acid accumulation. This modification to the plant and its bases was not incorporated into the IP2 FSAR. The role of the preformed metal type insulation

in minimizing corrosion, credited in the licensee's response to NRC Bulletin 82-02, is not mentioned in the Indian Point license renewal application.

b. NRC Bulletin 84-03

The NRC issued Bulletin 84-03 on August 24, 1984, to licensees of operating reactors regarding the failure of the refueling cavity water seal at Connecticut Yankee that resulted in approximately 200,000 gallons of water flooding containment. This bulletin required licensees to evaluate the potential for and consequences of a refueling cavity water seal failure at their facilities.

On March 31, 1987, the licensee for IP2 submitted to the NRC safety analyses performed in response to Bulletin 84-03. These safety analyses included evaluations of postulated breaks in 4-inch and 6-inch diameter piping (assumed to occur individually) that results in drainage of water from the refueling cavity. The purpose of these evaluations was to determine if sufficient time existed for the operators to move an irradiated fuel assembly from an elevated position into a safe location before the lowering water level uncovered it. An estimated maximum time of 1.1 hours for the operators to re-position an elevated irradiated fuel assembly was used in the evaluations, which concluded that the calculated draindown times provided at least that amount of time. The submittal also apprised the NRC of the steps the operators would take, in addition to relocating an elevated irradiated fuel assembly, in response to a refueling cavity draindown event. Section 9.5.3.2, Malfunction Analysis, of the IP2 FSAR states "Various potential failures, which could create paths for drainage from the refueling cavity, have been considered. A plant

procedure defines actions to deal with these postulated events." Section 14.2.1, Fuel-Handling Accidents, of the IP2 FSAR stated "Adequate cooling of fuel during underwater handling is provided by convective heat transfer to the surrounding water. The fuel assembly is immersed continuously while in the refueling cavity or spent fuel pit." This section summarizes the results from evaluations of three postulated accident: (1) drop of a fuel assembly in the fuel handling building, (2) drop of a fuel assembly inside containment, and (3) drop of a spent fuel storage cask.

The IP2 FSAR has not been updated to reflect the safety analyses performed in response to NRC Bulletin 84-03. The FSAR currently contains a discussion of a fuel handling accident in which fuel rods are damaged from the postulated dropping of a fuel assembly. But the FSAR does not contain a discussion of the other credible fuel handling accident scenario evaluated by the licensee in response to NRC Bulletin 84-03; namely, that fuel rods are damaged by the fuel assembly remaining in place while the refueling cavity water level drops. The associated operator response times and procedural steps to prevent fuel damage in event of water inventory loss have not been incorporated into the IP2 FSAR.

By letter dated November 27, 1984, the licensee for IP3 submitted to the NRC safety analyses performed in response to Bulletin 84-03. These safety analyses included evaluations of various refueling cavity water seal failure modes such as deflection of the seal due to hydrostatic pressure, compressive forces that might push the seal through the annular gap between the reactor vessel flange and the reactor cavity floor, and damage resulting from a fuel assembly

dropping onto the seal and deflating it. The safety analyses additionally considered the response time for operators to mitigate a refueling cavity draindown. The submittal informed the NRC that operators can close the fuel transfer tube gate valve in approximately 20 minutes to isolate the fuel building from the reactor cavity, that operators can move the fuel transfer cart from the fuel building to the containment in approximately 5 minutes, and that operators can lower a fuel assembly in the upender from the vertical position to the horizontal position in approximately 2 minutes. Section 9.5.3, System Evaluation, of the IP3 FSAR states "An analysis is presented in Chapter 14 concerning damage to one complete outer row of fuel rods in an assembly. This accident is assumed as a conservative limit for evaluating environmental consequences of a fuel handling accident."

The IP3 FSAR has not been updated to reflect the safety analyses performed in response to NRC Bulletin 84-03. The FSAR currently contains a discussion of a fuel handling accident in which fuel rods are damaged from the postulated dropping of a fuel assembly. But the FSAR does not contain a discussion of other credible fuel handling accident scenarios evaluated by the licensee in response to NRC Bulletin 84-03; namely, (a) that fuel rods are damaged by the fuel assembly remaining in place while the refueling cavity water level drops, and (b) that a dropped fuel assembly damages the refueling cavity water seal causing a loss of water inventory. The associated operator response times and procedural steps to prevent fuel damage in event of water inventory loss have not been incorporated into the IP3 FSAR.

c. NRC Bulletin 87-01

The NRC issued Bulletin 87-01 on July 9, 1987, to licensees of operating nuclear reactors regarding a December 1986 event at the Surry nuclear plant that resulted in the deaths of four workers. Erosion/corrosion of a carbon steel pipe in the feedwater system caused it to rupture and release a two-phase mixture. This bulletin required licensees to take actions to prevent recurrence of this failure at their facilities.

By letter dated September 11, 1987, the licensee for IP2 submitted its response to the bulletin to the NRC. The IP2 licensee informed the NRC "As a result of the Surry event, we have augmented our inspection program to include the following single phase systems: the main feedwater system, the condensate system, the heater drain pump discharge piping and the auxiliary feedwater system." The IP2 licensee also informed the NRC "We are expanding our high energy pipe inspection program. In addition to the extraction steam program, the following systems are being added to that program: condensate, feedwater, moisture separator drains, feedwater heater drains, steam generator blowdown." Section 10.4, Tests and Inspections, of the IP2 FSAR states "In response to NRC IE Bulletin 87-01, an inspection program has been established for piping and fittings in the extraction steam, turbine crossunder, heater drain pump discharge, condensate, feedwater, and auxiliary feedwater systems. UT inspections are utilized to evaluate wall thickness at locations considered to be most susceptible to erosion/corrosion."

By letter dated September 15, 1987, the licensee for IP3 submitted its response to the bulletin to the NRC. The IP3 licensee informed the NRC "As a direct result of the Surry event

and other industry reported failures in single phase systems, the Authority undertook an expanded inspection program during the 1987 refueling outage." The discussion of erosion/corrosion piping degradation mechanisms and associated inspection regimes in the IP3 FSAR is limited to steam generator tubes, service water system piping, and emergency core cooling system piping and fails to describe the inspection scope revisions made in response to NRC Bulletin 87-01.

d. NRC Generic Letter 87-12

The NRC issued Generic Letter 87-12 on July 9, 1987, to licensees of pressurized water reactors like IP2 and IP3 regarding lessons learned from a loss of residual heat removal (RHR) cooling during midloop operation at Diablo Canyon. The bulletin required licensees to describe design features and procedures at their facilities that can prevent and/or mitigate loss of cooling events during midloop operations at their facilities.

By letter dated September 29, 1987, the licensee for IP2 informed the NRC that "during RCS draindown, the Residual Heat Removal (RHR) System complies with the licensing basis for IP3 as expressed in the FSAR and the Technical Specifications." The licensee went on to inform the NRC that "recognizing the potential significant of the Containment integrity issues addressed in the generic letter, we have conservatively analyzed offsite radiological consequences of RCS fluid boiloff without Containment integrity" and that the result from this safety analysis led the license to "prohibit draindown of the RCS to the water level where the potential for vortexing of RHR can occur unless the radioactivity level in the primary coolant is at an acceptable limit as

defined in the attached analyses." No reference to Generic Letter 87-12 exists in the IP2 FSAR and no discussion of these safety analyses and operational restrictions was found.

By letter dated September 21, 1987, the licensee for IP3 provided the NRC with its response to Generic Letter 87-12. Section 4.3.7, Cold Shutdown RCS Level Indication, of the IP3 FSAR describes the water level instrumentation installed in response to Generic Letters 87-12 and 88-17 - with explicit references to these documents - to monitor reactor coolant system conditions during cold shut down.

e. NRC Generic Letter 88-05

The NRC issued Generic Letter 88-05 on March 17, 1988, to licensees of operating pressurized water reactors including IP2 and IP3 regarding events where reactor coolant leakage below the technical specification limits caused degradation of carbon steel components it contacted. The NRC reported:

> In light of the above experience [boric acid degradation at Turkey Point Unit 4, Salem Unit 2, and Fort Calhoun], the NRC believes that boric acid leakage potentially affecting the integrity of the reactor coolant pressure boundary should be procedurally controlled to ensure continued compliance with the licensing basis. We therefore request that you provide assurances that a program has been implemented consisting of systematic measures to ensure that boric acid corrosion does not lead to degradation of the assurance that the reactor coolant pressure boundary will have an extremely low probability of abnormal leakage, rapidly propagating failure or gross rupture.
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> ***
>
> The request that licensees provide assurances that a program has been implemented to address the corrosive effects of reactor coolant system leakage at less than technical specification limits constitutes a new staff position. Previous

> staff positions have not considered the corrosion of external surfaces of the reactor coolant pressure boundary. Based on the frequency and continuing pattern of significant degradation of the reactor coolant pressure boundary that was discussed above, the staff now concludes that in the absence of such a program compliance with General Design Criteria 14, 30, and 31 cannot be ensured.

Id.

By letter dated May 31, 1988, the licensee for IP2 submitted a response to the NRC for Generic Letter 88-05. The licensee informed the NRC that its inspection program for boric acid corrosion developed in response to NRC Bulletin 82-02 "has since been expanded to cover more than 350 mechanical connections." Section 4.2.7.3, Locating Leaks, of the IP2 FSAR mentions that "the presence of boric acid crystals near the leak" makes visual observation a method of locating sources of escaping steam of water. Sections 6.7.1.2.1.3, Releases to the Containment Environment; 6.7.1.2.8, Steam Generator Blowdown Liquid Sample Monitor; 6.7.1.2.9, Residual Heat Removal Loop; 6.7.1.2.10, Recirculation Loop; and 6B.0, Operational Experience; contain similar discussions. No mention of Generic Letter 88-05, a boric acid corrosion control program, or an inspection program of mechanical components for borated water leakage and/or boric acid accumulation was found within the IP2 FSAR.

By letter dated June 1, 1988, the licensee for IP3 submitted a response to the NRC for Generic Letter 88-05. The licensee informed the NRC that it had revised procedures at IP3 in response to the generic letter. The licensee informed the NRC that these steps included requiring "prompt repair and clean-up [of boric acid] when the component can be readily made available for maintenance activities" and "an engineering evaluation for continuing operability in those

instances where prompt corrective action is impractical." No mention of Generic Letter 88-05, a boric acid corrosion control program, or an inspection program of piping and components for borated water leakage and/or boric acid accumulation was found within the IP3 FSAR.

In March 2002, workers at the Davis-Besse nuclear plant in Ohio discovered extensive degradation to the reactor vessel head caused by boric acid corrosion. The Davis-Besse licensee had also received Generic Letter 88-05 and committed to the NRC to implement a boric acid corrosion control program. A description of that boric acid corrosion control program was not incorporated into the Davis-Besse FSAR. Neither workers nor NRC inspectors detected over the intervening decade that the boric acid corrosion control program was not being implemented. Had the FSAR been updated to reflect the licensee's response to Generic Letter 88-05 as 10 C.F.R. § 50.51(e) requires, the likelihood would have been reduced that plant workers and NRC inspectors remained unaware of the implementation deficiency across this protracted period.

f. NRC Generic Letter 88-17

The NRC issued Generic Letter 88-17 on October 17, 1988, to licensees of operating pressurized water reactors including IP2 and IP3 requiring actions to be taken to protect against fuel damage and release of radioactivity to the environment caused by reactor coolant system draindown during cold shut down. This generic letter required licensees to "[i]mplement procedures and administrative controls that reasonably assure that containment closure will be achieved prior to the time at which a core uncovery could result from a loss of DHR [decay heat

removal] coupled with an inability to initiate alternate cooling or addition of water to the RCS inventory."

By letters dated February 3, 1989, August 22, 1990, September 20, 1991, and July 28, 1997, the licensee for IP2 responded to the NRC regarding Generic Letter 88-17. The licensee informed the NRC that it was installing two separate and diverse reactor coolant system (RCS) water level monitoring systems, adding a control room indicator for operators to monitor residual heat removal (RHR) flow conditions, revising procedures to de-energize two open motor-operated valves (RHR isolation valves MOV-730 and MOV-731) when RHR is operating, establishing a vent pathway prior to RCS draindown to the level where RHR pump vortexing is possible, and adding an alarm function for the RCS water level monitoring system. No mention of Generic Letter 88-17 was found within the IP2 FSAR. Section 5.1.4.2.3, Equipment and Personnel Access Hatches, discusses containment integrity during refueling, but only when "the Reactor Coolant System elevation >66 feet (i.e., not in reduced inventory)" [emphasis in original] which is not the configuration of concern in Generic Letter 88-17. Section 9.3.2.2, Residual Heat Removal Loop, states that "Instrumentation has been provided in the control room to monitor RHR and reactor coolant system level when the system is cooled and depressurized" and describes the design features of this level monitoring instrumentation. Section 7.5.2.1.16, Reactor Coolant System Pressure, describes how pressure instruments provide redundant interlock signals to RHR isolation valves MOV-730 and MOV-731 to prevent them from opening at high RCS pressure, but there is no mention in the FSAR about de-energizing these

valves in the open position when RHR is operating during cold shut down with the reactor coolant system partially drained.

g. NRC Bulletin 94-01

The NRC issued Bulletin 94-01 on April 14, 1994, to licensees with irradiated fuel stored in spent fuel pools at permanently shut down nuclear reactors including IP1 regarding lessons learned from an event at Dresden Unit 1 where cold weather caused water to freeze and rupture the pipe containing it.

By letter dated August 11, 1994, the licensee for IP1 submitted its response to the NRC on Bulletin 94-01. The licensee described five key steps in a work plan it developed with the express objective of identifying and quantifying non-evaporative losses of water from the Unit 1 spent fuel pools: (1) isolate the east/west pools containing spent fuel from four smaller pools using new gates, (2) install new water level monitoring instrumentation in the west pool, (3) de-water the four smaller pools, (4) monitor and sample various plant sumps and offsite locations, and (5) perform mass balance inventory calculations to quantify any inventory losses and demonstrate they are being recovered by the plant's subsurface drain system. The licensee also informed the NRC of a "hydro-geological assessment of the potential for any leakage from the storage pools to affect ground water supplies and the range of such influence were it determined to be capable of occurring." The IP1 FSAR contains no mention of Bulletin 94-01, the gates installed to separate the pools, the new spent fuel pool water level instrumentation, the inventory management program, or hydro-geological assessment results.

28. It is apparent from the above descriptions and the remainder of Table 1 that the Indian Point licensees failed to comply with the regulatory requirement in 10 C.F.R. § 50.71(e) to update the FSARs to reflect safety analyses performed at the request of the NRC. Even the 1996 reminder from the NRC following the problems at Millstone failed to stop the non-compliance problem and to remedy past shortfalls.

29. As a direct consequence of violating this regulation, the IP1, IP2, and IP3 FSARs do not adequately contain all of the required safety analyses information. Because the FSARs are demonstrably incomplete and inaccurate, it is impossible to ascertain the adequacy of the aging management programs for either Indian Point unit. The inadequate FSARs do not fully describe the safety functions performed by structures, systems, and components within the design and licensing bases, making it impossible to first establish that all required structures, systems, and components are properly included within the scope of the aging management programs and impossible to evaluate whether the scope and methodology of the aging management programs for those structures, systems, and components is adequate to provide reasonable assurance that the credited safety functions will be performed.

30. This long history of disregard for NRC safety requirements by both the previous and current owners of IP2 and IP3 also raise serious questions about the ability or willingness of the current owners to actually implement the aging management programs required to provide reasonable assurance of adequate protection for the public health and safety from extended operation of IP2 and IP3.

31. This contention is also supported by the Report and Table prepared by David Lochbaum and by his Declaration, all of which are attached.

CONTENTION 3

THE LRA DOES NOT COMPLY WITH THE REQUIREMENTS OF 10 C.F.R. §§ 54.29(a)(1) AND (2) FOR IP2 AND IP3 BECAUSE IT IS NOT POSSIBLE TO ASCERTAIN IF ALL RELEVANT EQUIPMENT, COMPONENTS AND SYSTEMS THAT ARE REQUIRED TO HAVE AGING MANAGEMENT HAVE BEEN IDENTIFIED OR TO DETERMINE WHETHER THE AGING MANAGEMENT REQUIREMENTS FOR LICENSE RENEWAL HAVE BEEN MET.

BASIS

1. Applicant does not demonstrate it will be "managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under § 54.21(a)(1)"or that it has completed "time-limited aging analyses that have been identified to require review under § 54.21(c)." 10 C.F.R. §§ 54.29(a)(1) and (2).

2. According to the UFSAR for IP2 and IP3, IP2 and IP3 are not in compliance with the relevant general design criteria (GDC), as required by 10 C.F.R. § 54.35, but are only in compliance, at best, with design criteria proposed by a nuclear industry trade association, whose proposed modifications to the GDC have never been adopted by the AEC or the NRC and whose provisions are substantially different from and less stringent than the legally required GDC.

3. The difference between the trade association proposed GDC and the GDC which are legally relevant to IP2 and IP3 are, for the most part, substantive and create significant safety gaps between the design which IP2 and IP3 assert they have met and the design which they are legally required to meet.

SUPPORTING EVIDENCE

3. The UFSAR for IP2 states that "[i]t was the AIF [Atomic Industrial Forum - a nuclear trade association] version of the 1967 General Design Criteria which formed the bases of the Indian Point 2 design and are discussed in this section." IP2 FSAR UPDATE Chapter 1, Page 8 of 72 Revision 20 Section 1.3. A copy of the AIF proposals and suggestions for changes to the 1967 GDC is attached.

4. The UFSAR for IP3 states that "In the July to October 1967 time frame, AIF Incorporated assembled nuclear industry comments and transmitted to the AEC revised wording of the 1967 Draft General Design Criteria along with a description of the changes. It was the AIF version of the 1967 General Design Criteria which formed the bases of the Indian Point 3 design and are discussed in this section."

5. However, the UFSAR for IP3 also states "The General Design Criteria which formed the bases for the Indian Point 3 design were published by the Atomic Energy Commission in the Federal Register of July 11, 1967 and subsequently made part of 10 CFR 50." UFSAR Section 1.3. This statement is not accurate as is apparent from an examination of the actual GDC, quoted in the UFSAR, which are used by IP3 for its design. *See* Chart, attached, for a comparison of the

language used in the UFSAR to describe the actual GDC to which IP3 was designed, the AIF draft proposal, which is the same as the quoted language for the GDC from the UFSAR and the actual GDC published by the Commission in 1967 which are the legally relevant GDC for IP3.

6. There are substantial substantive differences between the trade association version of the GDC and the officially promulgated 1967 Draft GDC many of which impact the type of aging management that would be required. The following are examples of the conflicts:

A. **Criterion 50 from 32 FR 10213 states**: Criterion 50-NDT Requirement for Containment Material (Category A): Principal load carrying components of ferritic materials exposed to the external environment shall be selected so that their temperatures under normal operating and testing conditions are not less than 30 degrees F above nil ductility transition (NDT) temperature.

Chapter 5, Page 4 of 89 Revision 20 (541/1698) of the Indian Point 2 UFSAR provided as part of the LRA states: 5.1.1.1.7 Nil-ductility Transition Temperature Requirement for Containment Material - Criterion: The selection and use of containment materials shall be in accordance with applicable engineering codes. (GDC 50).

Chapter 5, Page 5 of 188 (826/2108) of the Indian Point 3 UFSAR provided as part of the LRA states: Criterion: The selection and use of containment materials shall be in accordance with applicable engineering codes. (GDC 50 of 7/11/67).

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Both IP2 and IP3 state compliance with GDC 50. However, both UFSARS have reworded and changed the intent of this GDC 50 by removing the words "Principal load carrying components" and "less than 30 degrees F above nil ductility transition (NDT) temperature" from the regulation.

B. **Criterion 47 from 32 FR 10213 states**: Criterion 47-Testing of Emergency Core Cooling Systems (Category A). A capability shall be provided to test periodically the delivery capability of the emergency core cooling systems at a location as close to the core as is practical.

Chapter 6, Page 8 of 120 Revision 20 (Page 717/1698) of the IP2 UFSAR provided as part of the LRA states: 6.2.1.4 Testing of Emergency Core Cooling System Criterion: Capability shall be provided to test periodically the operability of the emergency core cooling system up to a location as close to the core as is practical. (GDC 47).

Chapter 6, Page 10 of 215 (Page 1019/2108) of the IP3 UFSAR provided as part of the LRA states: Testing of Emergency Core Cooling System Criterion 47: Capability shall be provided to test periodically the operability of the Emergency Core Cooling System up to a location as close to the core as is practical.

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Both IP2 and IP3 state compliance with GDC 47. However, the UFSARs have reworded and changed the intent of GDC 47 by removing the words "test periodically the delivery capability." The "delivery capability" of the Emergency Core Cooling System (ECCS) may be impacted by aging mechanisms such as pipe fouling, erosion, corrosion and heat exchanger tube fouling. The License Renewal Application (LRA) has failed to discuss any Aging Management Program (AMP) to assure that the "delivery capability" of the Emergency Core Cooling System (ECCS) continues to meet the requirements of this GDC.

C. **Criterion 34 from 32 FR 10213 states**: Criterion 34-Reactor Coolant Pressure Boundary Rapid Propagation Failure Prevention (Category A). The reactor coolant pressure boundary shall be designed to minimize the probability of rapidly propagating type failures. Consideration shall be given (a) to the notch-toughness properties of materials extending to the upper shelf of the Charpy transition curve, (b) to the state of stress of materials under static and transient loadings, (c) to the quality control specified for materials and component fabrication to limit flaw sizes, and (d) to the provisions for control over service temperature and irradiation effects which may require operational restrictions.

Chapter 4, Page 6 of 85 Revision 20 (Page 443/1698) of the IP2 UFSAR provided as part of the LRA States: 4.1.3.4 Reactor Coolant Pressure Boundary Rapid Propagation Failure Prevention Criterion: The reactor coolant pressure boundary shall be designed and operated to reduce to an acceptable level the probability of rapidly propagating type failure. Consideration is given (a) to the provisions for control over service temperature and irradiation effects, which may require operational restrictions, (b) to the design and construction of the reactor pressure vessel in accordance with applicable codes, including those, which establish

> requirements for absorption of energy within the elastic strain energy range and for absorption of energy by plastic deformation and (c) to the design and construction of reactor coolant pressure boundary piping and equipment in accordance with applicable codes. (GDC 34).
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> IP3 UFSAR provided as part of the LRA fails to address Criterion 34 from the 1967 GDCs.
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> ***
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> IP3 makes no commitment to comply with this regulation. IP2 has completely altered the words and the intent of this General Design Criterion by eliminating the following requirements that may be impacted by aging mechanisms within the scope of 10 CFR 54.4:
>
> > (a) to the notch-toughness properties of materials extending to the upper shelf of the Charpy transition curve,
> >
> > (b) to the state of stress of materials under static and transient loadings,
> >
> > (c) to the quality control specified for materials and component fabrication to limit flaw sizes, and
> >
> > (d) to the provisions for control over service temperature and irradiation effects which may require operational restrictions.

7. Throughout the UFSARs when the language of a GDC with which IP2 or IP3 is alleged to be in compliance is cited, the language is taken from the trade association version of the GDC and not the 1967 Draft GDC. *See* Chart attached to the Declaration of Paul Blanch.

8. While in a few instances the differences are of little obvious safety significance, in a number of instances the differences are substantial and result in IP2 and IP3 and the trade association illegally "granting" IP2 and IP3 an "exemption" from the applicable safety

requirements of the Commission. These substantial differences are highlighted in the attached Chart.

9. This contention is supported by the attached Declaration of Paul Blanch and the Chart prepared by him that is attached to that Declaration and is also supported by the references contained in the Declaration and the preceding paragraphs of this Contention.

CONTENTION 4

THE ENVIRONMENTAL REPORT FAILS TO COMPLY WITH THE PROVISIONS OF 10 C.F.R. § 51.53(C)(1) BECAUSE IT FAILS TO PROVIDE A SEPARATE "ENVIRONMENTAL REPORT" FOR EACH LICENSE FOR WHICH AN EXTENSION IS SOUGHT.

BASIS

1. NRC regulations require that an ER be prepared for each power plant. 10 C.F.R. § 51.53(c)(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'" (emphasis added)).

2. IP2 and IP3 have been treated as separate nuclear power plants throughout their construction and operation life, each having its own license, with its own technical specifications, own FSAR and UFSAR, its own amendment applications, its own enforcement history and, except for very recent times, its own separate ownership.

3. Treating the two individual plants as one for purposes of the ER severely distorts the environmental analysis. For example, the analysis of energy alternatives assumes that any alternative must be able to supply as much power as the two plants together produce when in fact several alternatives, including wind power and biomass, are sufficient to replace at least one unit if not both units.

4. Closing IP2 or IP3 by 2015 would not necessarily result in any disruption in the supply of electricity to New York because there is ample opportunity between now and 2015 to implement cost effective and technically feasible energy conservation measures and/or alternative energy generation facilities to more than cover the capacity lost by shutting IP2 or IP3.

SUPPORTING EVIDENCE

5. The ER analysis of alternatives assumes that alternatives must be found to replace both units and does not evaluate replacing only one unit. *See e.g.* ER at §§ 8.0 ("The goal of the proposed action (license renewal) is the production of approximately 2,158 MWe of base-load generation. Alternatives that do not meet this goal are not considered in detail.") and 8.3 ("However, these sources [meaning all renewable energy options] have been eliminated as reasonable alternatives to the proposed action because the generation of approximately 2,158 gross MWe of electricity as a base-load supply using these technologies is not technologically feasible.").

6. The report entitled *Energy Efficiency and Renewable Energy Resource Development Potential in New York State* prepared for NYSERDA (August 2003) at 3-7 outlines both energy conservation and renewable energy potential under current New York State planned initiatives.

7. Additional evidence of the energy potential to substitute for either one, if not both, of the Indian Point units is listed in detail in the Basis and Supporting Evidence for Contentions 10 and 11, *infra* and discussed in the attached declaration of David Schissel.

8. For example, in evaluating the potential off-site land use impacts of license renewal, the ER assumes both units are either extended or not extended rather than evaluate the individualized impacts if one unit is extended and the other is not, thus distorting the results and failing to fully evaluate the real alternatives and their impacts. ER § 4.18.5.

9. For example, in looking at the impacts of denial of license renewal the ER assumes both units are rejected rather than considering the impact of the loss of one and not the other. *See e.g.* ER § 6.4.2.

> However, the likely power generation alternatives if IP2 and IP3 cease operations on or before the expiration of the current operating licenses would require a commitment of resources for construction of the replacement plants as well as for fuel to run the plants.

10. In all the ways noted and throughout the ER the applicant treats IP2 and IP3 as a single facility, which they clearly are not, to enhance the alleged benefits, overstate the alleged disadvantages of denial of a renewal license and disregard the feasibility of denying the license renewal for one plant and granting it to the other. Only in the SAMA analysis does the ER

attempt to separate the two units and this because, apparently, the applicant could not get around the fact that, for the earthquake severe accident analysis, the CDF values for the two units are completely different (IPEEE Vol. 2 at 2-5), further underscoring the need to prepare a full separate ER for each unit.

CONTENTION 5

THE AGING MANAGEMENT PLAN CONTAINED IN THE LICENSE RENEWAL APPLICATION VIOLATES 10 C.F.R. §§ 54.21 AND 54.29(a) BECAUSE IT DOES NOT PROVIDE ADEQUATE INSPECTION AND MONITORING FOR CORROSION OR LEAKS IN ALL BURIED SYSTEMS, STRUCTURES, AND COMPONENTS THAT MAY CONVEY OR CONTAIN RADIOACTIVELY-CONTAMINATED WATER OR OTHER FLUIDS AND/OR MAY BE IMPORTANT FOR PLANT SAFETY.

BASIS

1. The Aging Management program proposed in the license renewal application for IP2 and IP3 is inadequate because: (1) it does not provide for adequate inspection of all systems, structures, and components that may contain or convey water, radioactively-contaminated water, and/or other fluids; (2) there is no adequate leak prevention program designed to replace such systems, structures, and components before leaks occur; and (3) there is no adequate monitoring to determine if and when leakage from these systems, structures, and components occurs. These systems, structures, and components include underground pipes, tanks, and transfer canals. This contention also applies to IP1 to the extent that Unit 2 and Unit 3 use Unit 1's buried systems,

structures, and components that may contain or convey water, radioactively-contaminated water, and/or other fluids.[15]

2. In order to renew its licenses for another 20 years, 10 C.F.R. § 54.21 requires IP1, IP2, and IP3 to demonstrate that for each system, structure, and component included within the scope of Part 54 the effects of aging will be adequately managed for the period of extended operation. 10 C.F.R. § 54.21 specifically includes "piping" as one of the systems, structures and components included within Part 54. The transfer canal between a reactor and an associated spent fuel pool is another system, structure, or component that falls within Part 54.

3. Pipes perform a critical role in the following systems: (1) safety injection; (2) service water (SW);[16] (3) fire protection; (4) fuel oil; (5) security generator; (6) city water; (7) plant

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[15]The October1980 Decommissioning Plan for IP1 states that "Unit 1 contains extensive common facilities that are required for the continued operation of Units 2 and 3. Except for the containment building and the fuel handling building that houses spent fuel, all other major buildings and systems are presently being used to support Indian Point Units 2 and 3 operations." *See* IP1 Decommissioning Plan at p. 4. Such systems include: ". . . fresh water supply, demineralized water supply, . . . service boilers including service boiler auxiliaries and fuel supply, . . . nuclear steam generator blowdown purification system, integrated liquid radwaste system, . . . sweep gas system, . . . [and] fire water service." *Id.*

[16]At some plants such systems are referred to as essential service water (ESW) systems. According to the NRC, the ESW system (or its equivalent) for U.S. commercial reactor plants is the assured, safety-related means of transferring sensible and decay heat from the reactor coolant system to the ultimate heat sink. The ESW system is also relied upon for other critical safety functions, such as providing cooling water for most of the essential, safety-related equipment used for mitigating plant accident and transient conditions, reactor coolant pump seal cooling, spent fuel pool cooling, and for dissipating sensible and reactor decay heat during shutdown conditions. Also, on PWRs, the safety-related auxiliary feedwater systems typically rely on the ESW system as an emergency makeup water source for feeding the steam generators. Plant-specific probabilistic risk assessments (PRAs) have shown that the loss of the ESW system may

drains; (8) auxiliary feedwater; and (9) heating. *See* LRA at B-27. These pipes – whether by design or a structural or system failure within the nuclear power station – may contain radioactive water. *See, e.g.,* Declaration of Tim Rice ¶ 23.

4. In addition, the concrete transfer canals (also described as conduits) that connect each unit's reactor core with the unit's associated spent fuel pool are included within in the scope of Part 54's systems, structures, and components. *See* 10 C.F.R. § 54.21(a)(1)(I). These transfer canals contain radioactive water.

5. Deficiencies in the Aging Management Plan that encompass the detection of corrosion or leaks in underground buried pipes and tanks, the transfer canals, and essential service water systems could endanger the safety and welfare of the public and are therefore within the scope of a re-licensing hearing. In addition, deficiencies in the Aging Management Plan concerning the detection of leaks or corrosion in other systems, structures, and components containing radioactive water could endanger the safety and welfare of the public and therefore also are within the scope of a re-licensing hearing.

6. Recent events around the United States and the world – as well as at the Indian Point Nuclear Power Station – have demonstrated that various aging piping systems have experienced leaks and/or corrosion. These leaks and corrosion threaten the integrity of such systems and compromise their ability to achieve their intended function. The existence of these leaks

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be a significant contributor to the potential for a core damage accident. *See* NRC Information Notice 2007-06 (ML062840608).

demonstrates that aging management of the piping systems is absolutely essential for extended operation of Indian Point.

7. In addition, reports have also confirmed that leaks of underground pipes and tanks can result in the release of significant amounts of radioactive materials into the groundwater or the atmosphere. Exposure to this radiation can threaten human health.

8. Despite the substantial evidence of the dangers of underground leaks from pipes, the LRA fails to include a comprehensive program of leak detection and prevention. Rather, the Applicant's aging management program for pipes consists of no preventative measures and no leak tests any more frequently than every 10 years unless, by happenstance, the opportunity to look at a pipe arises for some other reason. *See* LRA, p. A-19, § A.2.1.5; p. B-27, § B.1.6; p. B-42-43, § B.1.11. There is substantial evidence that such a laissez-faire inspection program will be ineffective at prevention or early detection of leaks from pipes that carry radioactive water or are otherwise important for plant safety. *See* Declaration of Rudolf Hausler, Ph.D., ¶¶ 42, 53.

9. Inspections that might only occur every ten years are insufficient if there is a potential leak of radioactive water from corroded components that could be migrating off-site. "Opportunistic inspections" that might occur no more often than ten years give the appearance that the matter of discovering leaks is being left to chance. There should be regular and frequent inspections of all components that contain radioactive water in this aging plant, including all weld junctures. *See* Hausler Declaration, ¶¶ 33, 53.

10. Entergy's License Renewal Application and proposed Aging Management Plan are deficient because they do not provide any evaluation of the baseline conditions of buried systems or their many weld junctures, nor do they provide any support for postulated or "typical" corrosion rates within the facility. *See* Hausler Declaration, ¶¶ 30, 32, 33, 53.

11. The LRA contains no plan for using cathodic protection or other methods to prevent leaks from occurring. Prevention is the best protection against leakage from pipes. *See* Hausler Declaration, ¶¶ 39-42, 43-49.

12. Entergy makes no commitment to comply with the National Association of Corrosion Engineers (NACE) corrosion control standards. *See* Hausler Declaration, ¶ 42.

SUPPORTING EVIDENCE

13. As support for this contention, the State respectfully refers to and incorporates the accompanying Declarations of Rudolf Hausler, Ph.D,. and Timothy Rice.

14. Over the last decade a series of events, occurring at a quickening pace and with increasing magnitude, have raised serious questions about whether nuclear facilities are in compliance with federal regulations governing the release of radioactive materials into the environment. A number of events have occurred where radioactively contaminated water has leaked into the ground from spent fuel pools, underground pipes and potentially from other systems and components, and remained undetected for as long as 12 years.

- In August 2004, the owner of the Dresden Nuclear Power Plant in Illinois discovered an underground leak from the condensate storage tank piping. Tritium levels in onsite ground water monitoring wells were as high as 1,700,000

picocuries per liter. A survey of neighboring private wells revealed tritium contamination in at least one well above background levels (approximately 1,000 picocuries per liter). *See* NRC, Preliminary Listing of Events Involving Tritium Leaks (Mar. 28, 2006), ML060930382.

- In December 2005, tritium was detected in a drinking water well at a home near the Braidwood Nuclear Plant in Illinois. The "initial evaluation indicated that the tritium in the groundwater was a result of past leakage from a pipe which carries normally non-radioactive circulating water discharge to the Kankakee River, about five miles from the site. Several millions [sic] gallons of water leaked from the discharge pipe in 1998 and 2000." *See* NRC Preliminary Notification of Event or Unusual Occurrence PNO-RIII-05-016A, "Potential Off-site Migration of Tritium Contamination (Update)" (December 7, 2005), ML053410293.

- In March 2006, a leak was discovered at Palo Verde Nuclear Generating Station in Arizona. *See* NRC Preliminary Notification of Event or Unusual Occurrence, PNO-IV-06-001, "Followup For Tritium Contamination Found In Water Onsite" (March 17, 2006), ML060760584. An analysis of the ground water revealed tritium levels of 71,400 picocuries/Liter (pCi/L). *Id*. The Arizona Republic reported on March 4, 2006 that, "Arizona Public Service Co. discovered radioactive water near a maze of underground pipes at the Palo Verde Nuclear Generating Station…and tests confirmed that the water contains more than three times the acceptable amount of tritium." *Radioactive Water Found at Palo Verde*, Ken Alltucker, The Arizona Republic (Mar. 4, 2006).

- In October 2007, high levels of tritium were detected in the groundwater under the Catawba Nuclear Power Station located in York, South Carolina. At one groundwater monitoring well, the tritium measured 42,000 pCi/L. *See* NRC Preliminary Notification of Event or Unusual Occurrence, PNO-II-07-012, "Onsite Groundwater Tritium Contamination" (October 11, 2007), ML 073111396.

- That same week, high levels of tritium were discovered in the groundwater at the Quad Cities Nuclear Power Station located in Warrenville, Illinois. The tritium levels measure up to 800,000 picocuries per litre. *See* NRC Preliminary Notification of Event or Unusual Occurrence, PNO-III-08-011, "Tritium Leakage" (October 11, 2007), ML 072890262. "Underground piping from the condensate water storage tank is being examined as a possible source." *Id*.

- Seven days later, on October 19, 2007, a leak was discovered in piping within the essential service water system that serviced both reactors at the Byron Nuclear Power Station located in Byron, Illinois. *See* NRC Preliminary Notification of Event or Unusual Occurrence, PNO-III-07-012, "Both Units at Byron Shut Down Due to a Leak in Pipe" (October 23, 2007), ML072960109. The NRC then announced that had begun a special inspection at the Byron Nuclear Power Station to review the circumstances surrounding the corrosion of piping in the equipment cooling water system and subsequent leak in one pipe. "As a result of the leakage, reactor operators shut both reactors down on Friday, Oct. 19, to repair the leak and inspect similar pipes. The pipes carry water from the plant where it is used for cooling of essential safety equipment back to basins under fan-driven cooling towers." *See* NRC Press Release, III-07-24, "NRC Begins Special Inspection at Byron Nuclear Station to Review Corrosion and Leakage of Equipment Cooling Water Pipe" (October 23, 2007), ML072960643.

- Similar leaks have been detected at other nuclear power plants in New Jersey (Salem) and Connecticut (Haddam) as well as the spent fuel pool at the Brookhaven National Laboratory on Long Island. *See* NRC Office of Nuclear Reactor Regulation, "Spent Fuel Pool Leakage To Onsite Groundwater," NRC Information Notice 2004-05, March 3, 2004 (Salem, New Jersey, Nuclear Power Generating Station); NRC Office of Nuclear Reactor Regulation, "Ground-Water Contamination Due to Undetected Leakage of Radioactive Water," NRC Information Notice 2006-13, July 10, 2006 (discussing leaks at Haddam Neck and other nuclear power plants); General Accounting Office, Information on the Tritium Leak and Contractor Dismissal at the Brookhaven National Laboratory (GAO/RCED-98-26) November 1997. These NRC and GAO documents are incorporated herein by reference.

15. In September 2005, during planned excavation adjacent to the IP2 spent fuel pool, Entergy discovered cracks in the concrete wall caused by shrinkage during the concrete curing process that leaked spent fuel pool water. Upon further investigation, the licensee determined that groundwater underlying portions of the Indian Point Nuclear Power Station site was contaminated with tritium due to possible leakage from the spent fuel pool or other on-site sources. On February 27, 2006, a sample showed tritium contamination levels of 30,000 pCi/L at

a location close to the Hudson River. *See* Indian Point Nuclear Generating Unit 2 - NRC Special Inspection Report No. 05000247/2005011 (March 16, 2007) ML060750842.

16. On March 21, 2006, Entergy announced that samples taken from an on-site monitoring well located near the Hudson River also showed detectable levels of strontium-90; Entergy also has identified elevated levels of nickel-63 and cesium in groundwater under the Indian Point Nuclear Power Station. *See* Jim Fitzgerald, *High Levels of Strontium-90 Found in Indian Point Groundwater*, Associated Press, Mar. 21, 2006; Greg Clary, *Indian Point Leak of Radioactive Element Spreads*, Poughkeepsie Journal News, Mar. 22, 2006; E-mail from Donald Croulet of Entergy to James Noggle of USNRC, "regarding H-3 sources IPEC-RL-Comments-1" (attachment, table) (Dec. 12, 2005), ML061000598.

17. The recently-filed LRA for Indian Point recognizes that the plumes of tritium and strontium leaking from the plant's spent fuel pools have reached the Hudson River. *See* Entergy Indian Point Environmental Report submitted April 30, 2007, at p. 4-87 (stating that Entergy and the NRC have concluded that "... there appears to be some level of contaminated groundwater that discharges to the Hudson River...").

18. On April 7, 2007, a visible steam plume vented up through the soil and pavement from an underground steam pipe that runs between Unit 2 and Unit 3. This breach was not reported to the NRC for approximately two weeks. Tritium radionuclides were detected in the water molecules that vented from the pipe. *See* Greg Clary, *New Tritium Leak Found at Indian Point*, Poughkeepsie Journal News, Apr. 24, 2007; *see also* Rice Declaration ¶ 23.

19. In addition, in the Fall of 2007, the NRC and Entergy confirmed that a leak developed in the concrete transfer canal between Unit 2 and its associated spent fuel pool. Water contaminated with radioactive nuclides leaked through the crack in the transfer canal. *See* E-mail, Kathleen McMullin, Entergy, to Eugene Coby, et al., NRC, "IPEC status report for Sept. 6 2007," ML072970221; *see also* Rice Declaration ¶ 15.

20. One common aspect of many of these leaks -- around the nation and at Indian Point -- is that they have been discovered by happenstance and that they usually have gone undetected for an extended period of time thereby permitting increasingly larger amounts of contaminated water to enter the ground (or air) around the facilities. *See* NRC, Liquid Radioactive Release Lessons Learned Task Force Final Report, Sept. 1, 2006, at ii, ML071420239.

21. The older the structure in question, the more likely it is for leakages to occur. *See* Hausler Declaration at ¶ 50; *see also* David Lochbaum, *U.S. Nuclear Plants in the 21st Century: the Risk of a Lifetime*, Union of Concerned Scientists (May 2004). To describe the likelihood of aging related problems in nuclear plants, Lochbaum uses the "Bathtub Curve," which was developed by National Aeronautics and Space Administration (NASA) scientists studying statistically the lifetimes of both living and non-living things. *Using Reliability-Centered Maintenance As The Foundation For An Efficient And Reliable Overall Maintenance Strategy*, NASA (2001). The curve, which is a graph of failure rate versus age, shows that after a relatively stable (bottom of the bathtub) period in the middle life of the subject, a steep rise in age-related failures occurs towards the end of its life. The right-hand side of the curve, labeled

"Region C," is the wear-out phase. Due to aging, it takes less stress to cause failure in this phase. Thus, the chances of failure increase with time spent in Region C. *U.S. Nuclear Plants in the 21st Century*, at 4. The renewal period would be this Region C, wear-out phase. "As reactors approach or enter Region C [the wear-out phase] and become more vulnerable to failure, aging management programs monitor the condition of equipment and structures so as to affect repairs or replacements before minimum safety margins are compromised. Unfortunately, age-related degradation is being found too often by failures than by condition-monitoring activities." *Id*., at 20.

22. This is especially true at Indian Point where the buried systems, structures, and components have been under the ground for 35 years or longer at Units 2 and 3 – and more than 45 years at Unit 1. Under the two-step licensing process, these buried components were installed well before each facility received its operation license. In the case of Indian Point, the AEC issued Consolidated Edison Company a provisional construction permit to build Unit No. 2 on October 14, 1966. *See* 31 Fed. Reg. 13,616-17 (October 21, 1966). The AEC issued ConEd a construction permit to build Unit 3 on August 13, 1969. *See* 34 Fed. Reg. 13,437 (Aug. 20,

1969).[17] The AEC issued ConEd a provisional construction permit to build Unit 1 in May 1956. *See* 21 Fed. Reg. 3,085 (May 9, 1956).

23. The presence of radioactive fluid in buried pipes or similar systems, structures, or components is significant because a recent study shows that radioactive water carried in underground pipes of an aging plant can speed up corrosion of already-worn pipes. Nuclear power plants emit radiation and particles across a range of energies. This radiation can cause accelerated corrosion in critically important parts of the plant, which can lead to efficiency and safety problems. Gamma rays and neutrons have energies high enough to cause changes in the interior metallic structure resulting in accelerated damage. Consequently these types of radiation and the best alloys to use to mitigate their effects have been extensively researched and their findings applied. Low energy radiation affects metal structures in a different way, but can still cause appreciable and expensive corrosion. Low energy radiation degrades the passive oxide layers that protect metals. Without this protective layer the metals are easily corroded. G. Bellanger, *Corrosion Induced by Low Energy Radionuclides: Modeling of Tritium and Its Radiolytic and Decay Products Formed in Nuclear Installations* (Elsevier Publications, 2006),

[17]The AEC authorized ConEd to pour the concrete for Unit 3's foundations nine months *before* the approval of its construction permit in 1969. *See* Letter, dated November 15, 1968, from Harold Price, Director of Regulation, Atomic Energy Commission, to Consolidated Edison Company of New York, Inc., Docket No. 50-286 (authorizing the company to "proceed at your own risk, prior to issuance of a construction permit" with the pouring of concrete liner plates, walls of vessel cavity, recirculation pump pit, installation of bottom liner pit and rebar for the base).

ISBN 0 08 0445101. Such structural changes and degradation can be prevented through monitoring and inspection. *See* Hausler Declaration, ¶¶ 43-49.

24. The Applicant describes the inspection and aging management programs for underground pipes and tanks at IP2 and IP3 in Appendix A and B of its License Renewal Application. Appendix A.3.1.5. entitled "Buried Pipes and Tanks Inspection Program" states that "buried components are inspected when excavated during maintenance." *See* LRA, at A-46. The LRA also states that if "trending" identifies a susceptible location, the areas with a history of corrosion might have an additional inspection, an alternative coating or a replacement. "Focused inspections" will be performed within 10 years of the license renewal unless an "opportunistic inspection" which allows assessment of pipe condition without excavation, occurs within the ten-year period. *See* LRA, at A-46.

25. In the LRA, Entergy also commits to review plant records to determine if "an inspection" (of an undefined nature) took place after 2003 and 2005, respectively. If such an undefined inspection did not occur after those dates, Entergy also commits to performing a "focused inspection" (also of an undefined nature) before 2013 and 2015. Entergy commits to conducting a focused inspection (again, undefined) by 2023 and 2025. *See* LRA, at A-46; *accord id.* at. B-27. Appendix B describes the Aging Management Program for buried pipes and tanks. This section also says that buried components will be inspected when excavated during maintenance, and that a focused inspection will be performed within ten years unless an opportunistic inspection occurs within this period.

26. Moreover, Appendix B does not appear to address internal inspections at all. *See* Hausler Declaration, ¶ 46.

27. The LRA does not specifically commit to conducting any inspections of buried systems, structures, or components IP1 that continue to be used by the Indian Point Nuclear Power Station.

28. As set forth in the accompanying declaration of Dr. Hausler, Entergy's proposed Aging Management Program for buried systems, structures, and components at IP2 and IP3 (and IP1) is inadequate.

CONTENTION 6

THE LICENSE RENEWAL APPLICATION FOR IP2 AND IP3 FAILS TO COMPLY WITH THE REQUIREMENTS OF 10 C.F.R. §§ 54.21(a) AND 54.29 BECAUSE APPLICANT HAS NOT PROPOSED A SPECIFIC PLAN FOR AGING MANAGEMENT OF NON-ENVIRONMENTALLY-QUALIFIED INACCESSIBLE MEDIUM-VOLTAGE CABLES AND WIRING FOR WHICH SUCH AGING MANAGEMENT IS REQUIRED.

BASIS

1. Failure to properly manage aging of Non-environmentally-qualified (Non-EQ) Inaccessible Medium-Voltage Cables may challenge:

a. the integrity of the reactor coolant pressure boundary;

b. the capability to shut down the reactor and maintain it in a safe shutdown condition; or

c. the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to those referred to in § 50.34(a)(1), § 50.67(b)(2), or § 100.11.

2. The failure to properly manage aging of the Non-EQ Inaccessible Medium-Voltage Cables could result in the loss of the 6.9 kV and 13.8 kV safety related buses that supply emergency power to the 480 volt safety equipment including Station Blackout (SBO) loads, service water motors/pumps, safety injection pumps, and other electrical loads required to meet the requirements of 10 C.F.R. § 54.4.

3. Consequence of failures of Non-EQ Inaccessible Medium-Voltage Cables may result in accidents beyond the Design Basis Accidents resulting in exposures to the public exceeding 10 C.F.R. § 100 limits.

4. The Applicant has not "demonstrate(d) that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation," 10 C.F.R. § 54.21(a)(3) for those SSC's identified for Pressurized Water Reactors in Table 1 of NUREG 1801.

5. The Applicant has failed to identify the location and extent of Non-EQ Inaccessible Medium-Voltage Cables in use at IP2 or IP3.

6. The Applicant has failed to provide access to referenced documents that are not publicly available (e.g., EPRI TR-103834-P1-2 and EPRI TR-109619). A computer search has been conducted by one of our experts of all publicly available documents using ADAMS,

CITRIX, BRS, GOOGLE and the EPRI web site and the search has not located these referenced documents. It is not possible to fully evaluate the adequacy of the AMP without these references.

7. The Applicant has failed to provide a copy of its "Non-EQ Insulated Cables And Connections Program."

8. The Applicant has failed to address specific recommendations from the referenced Sandia report (SAND96-0344).

9. There is no technical basis to support life extension using the existing medium voltage power cables without an aging management plan.

10. There is no technical basis to justify differences between programs for aging management of accessible cables and inaccessible cables. 10 C.F.R. § 54.21(a)(3).

SUPPORTING EVIDENCE

11. The Indian Point program description is vague in that it does not describe a program other than

> . . .medium-voltage cables (cables with operating voltage from 2kV to 35kV) exposed to significant moisture and voltage will be tested at least once every ten years to provide an indication of the condition of the conductor insulation. The program includes inspections for water accumulation in manholes at least once every two years.

LRA B.1.23. NUREG/CR-5643 contains recommendations for detecting degradation of cables; however there are no discussions in the LRA that these recommendations have been addressed.

12. A review of all documents supplied as part of the LRA has failed to identify which cables are encompassed by the AMP. A review of the "one line" electrical drawing from Chapter

8 of the IP2 UFSAR confirms that many of these medium voltage cables are within the scope of 10 C.F.R. § 54.4.

13. The applicant has failed to provide a copy of its "NonEQ Insulated Cables and Connections Program." It is not possible to assess the adequacy of the AMP without a copy of this program as described in LRA B.1.23. No details are provided explaining the Non-EQ Inaccessible Medium-Voltage Cable Program except that it appears to be limited to ". . . inspections for water accumulation in manholes at least once every two years." *Id.* Experience indicates that not all inaccessible cables are capable of inspection via "manholes."

14. NUREGs 1800 and 1801 contain extensive discussions about Aging Management for Electrical Cables and Terminations. These NUREGs reference a study conducted by Sandia National Laboratory (SAND96-0344, *Aging Management Guideline for Commercial Nuclear Power Plants – Electrical Cable and Terminations*, prepared by Sandia National Laboratories for the U.S. Department of Energy, September 1996, and sponsored by the Department of Energy and EPRI.

15. The Sandia study contains numerous recommendations related to the management of aging of cables and terminations with specific emphasis on 10 C.F.R. Part 54 and meeting the requirements of the regulation. Section 6 of the Sandia report contains eighteen (18) pages of recommendations and conclusions as to aging management for cables and terminations. The LRA Appendices A and B fail to address or commit to any of the specific recommendations of SAND96-0344. The Appendices merely state, in three separate places, that: "This program *will*

consider the technical information and guidance provided in NUREG/CR-5643, IEEE Std. P1205, SAND96- 0344, and EPRI TR 109619" (emphasis added).

16. Page 6.4 of the Sandia study states:

> No currently available technique was identified as being effective at monitoring the electrical aging of medium-voltage power cable. Some methods may be effective at detecting severe electrical degradation or monitoring certain types of degradation (such as thermal aging); however, correlation of these measurements with the expended or remaining life of these cables has not been demonstrated.

17. LRA B.1.23 (Attachment 2) describes an aging management program for monitoring the condition of Non-EQ Inaccessible Medium-Voltage Cable. This program is limited to testing:

> . . . at least once every ten years to provide an indication of the condition of the conductor insulation. The program includes inspections for water accumulation in manholes at least once every two years.

LRA B.1.25 describes an aging management program for monitoring the condition of Non-EQ Insulated Cables and Connections. This program includes:

> A representative sample of accessible insulated cables and connections within the scope of license renewal will be visually inspected for cable and connection jacket surface anomalies such as embrittlement, discoloration, cracking or surface contamination. The technical basis for sampling will be determined using EPRI document TR-109619, 'Guideline for the Management of Adverse Localized Equipment Environments.'

The only difference between the cables discussed in B.1.23 and B.1.25 is accessibility, which, in light of the comparable safety significance of both types of cables and the risk of aging damage

to both types of cables is not a technically defensible basis for treating the two types of Non-EQ Medium Voltage Cables differently.

18. The NRC Staff has recognized the importance of an aging management program for cables, even if they are inaccessible:

> The U.S. Nuclear Regulatory Commission (NRC) is issuing this generic letter to:
>
> (1) Inform licensees that the failure of certain power cables can affect the functionality of multiple accident mitigation systems or cause plant transients.
> (2) Inform licensees that in the absence of adequate monitoring of cable insulation, equipment could fail abruptly during service, causing plant transients or disabling accident mitigation systems.
> (3) Ask licensees to provide information on the monitoring of inaccessible or underground electrical cables.

NRC Generic Letter 2007-01: Inaccessible or Underground Power Cable Failures That Disable Accident Mitigation Systems or Cause Plant Transients (February 7, 2007) at 1. The Generic Letter continues:

> Electrical cables in nuclear power plants are usually located in dry environments, but some cables are exposed to moisture from condensation and wetting in inaccessible locations such as buried conduits, cable trenches, cable troughs, above ground and underground duct banks, underground vaults, and direct-buried installations. The cable insulation goes through gradual degradation due to a variety of reasons.

Id. at 1-2. The Generic Letter emphasizes the potential importance of these cables and evidence that inaccessible cables important to safety have failed even before the end of their useful life:

> These design criteria require that cables, which are routed underground, be capable of performing their function when subjected to anticipated environmental conditions such as moisture or flooding. Further, the design should minimize the probability of power interruption when transferring power between sources. The

> cable failures that could disable risk-significant equipment are expected to have monitoring programs to demonstrate that the cables can perform their safety function when called on. However, the recent industry cable failure data indicates a trend in unanticipated failures of underground/inaccessible cables that are important to safety.

Id. at 3.

19. The Generic Letter suggests several procedures that could be implemented to address the degradation of inaccessible cables:

> Some licensees have detected cable degradation prior to failures through techniques for measuring and trending the condition of cable insulation. Licensees can assess the condition of cable insulation with reasonable confidence using one or more of the following testing techniques: partial discharge testing, time domain reflectometry, dissipation factor testing, and very low frequency AC testing. Licensees can replace faulty cables during scheduled refueling outages prior to cable failure that would challenge plant safety.

Id. at 4. None of these measures are included in the IP2 AMP for Non-EQ Inaccessible Medium-Voltage Cables.

20. The Staff has documented failures in medium-voltage cables that were inaccessible and for which routine inspections were insufficient to detect the hazard before the cable failed:

> Davis-Besse Nuclear Power Station
>
> In determining the root cause of the medium-voltage cable failure, the licensee theorized that water in the conduit gradually penetrated the outer neoprene cable jacket, migrated through the cloth binder tape just inside the jacket and through the various layers of the cable construction, and finally penetrated the ethylene propylene rubber (EPR) insulation by osmosis. The water seeping into the cable layers likely contained impurities that precipitated in the outer region of the EPR. Because the conductor was off-centered, precipitation of these impurities presumably disturbed the electric field in the jacket material. The accompanying observed cracking and conversion of the jacket material to carbon may have

> released additional impurities that would have further degraded the cable. Breakdown of the insulation would be most concentrated in the regions of the highest electric field intensity produced by the current in the conductor. However, this scenario has not been confirmed.

NRC Information Notice 2002-12: Submerged Safety-related Electrical Cables (3/21/02) at 2.

21. Finally, the GALL Report specifically notes the dangers present in the failure to have an effective AMP for medium voltage cables:

> The purpose of the aging management program described herein is to provide reasonable assurance that the intended functions of inaccessible medium-voltage cables that are not subject to the environmental qualification requirements of 10 C.F.R. § 50.49 and are exposed to adverse localized environments caused by moisture while energized will be maintained consistent with the current licensing basis through the period of extended operation. An adverse localized environment is a condition in a limited plant area that is significantly more severe than the specified service environment for the cable. An adverse variation in environment is significant if it could appreciably increase the rate of aging of a component or have an immediate adverse effect on operability. This program considers the technical information and guidance provided in NUREG/CR-5643, IEEE Std. P1205, SAND96-0344, and EPRI TR-109619.
>
> In this aging management program periodic actions are taken to prevent cables from being exposed to significant moisture, such as inspecting for water collection in cable manholes, and draining water, as needed. *The above actions are not sufficient to assure that water is not trapped elsewhere in the raceways.* For example, if duct bank conduit has low points in the routing, there could be potential for long-term submergence at these low points. In addition, concrete raceways may crack due to soil settling over a long period of time and manhole covers may not be watertight. Additionally, in certain areas, the water table is high in seasonal cycles and therefore, the raceways may get refilled soon after purging. Furthermore, potential uncertainties exist with water trees even when duct banks are sloped with the intention to minimize water accumulation. Experience has shown that insulation degradation may occur if the cables are exposed to 100 percent relative humidity. The above periodic actions are necessary to minimize the potential for insulation degradation. *In addition to above periodic actions, in-scope, medium-voltage cables exposed to significant*

> *moisture and significant voltage are tested to provide an indication of the condition of the conductor insulation. The specific type of test performed will be determined prior to the initial test, and is to be a proven test for detecting deterioration of the insulation system due to wetting, such as power factor, partial discharge, or polarization index, as described in EPRI TR-103834-P1-2, or other testing that is state-of-the-art at the time the test is performed.*

NUREG-1801Vol. 2, Rev. 1, September 2005, at XI E-7 (emphasis added). None of these additional measures are specifically included in the IP2 AMP for Non-EQ Inaccessible Medium-Voltage Cables.

CONTENTION 7

THE LICENSE RENEWAL APPLICATION FOR IP2 AND IP3 FAILS TO COMPLY WITH THE REQUIREMENTS OF 10 C.F.R. §§ 54.21(a) AND 54.29 BECAUSE APPLICANT HAS NOT PROPOSED A SPECIFIC PLAN FOR AGING MANAGEMENT OF NON-ENVIRONMENTALLY QUALIFIED INACCESSIBLE LOW-VOLTAGE CABLES AND WIRING FOR WHICH SUCH AGING MANAGEMENT IS REQUIRED.

BASIS

1. 10 C.F.R. § 54.21 requires the LRA to list those systems and components subject to an aging management review that are within the scope of 10 C.F.R. § 54.4. The structures and components include "electrical cables and connections."

2. 10 C.F.R. § 54.21 also requires the LRA to "Describe and justify the methods used" in determining which systems and components are subject to aging management review.

3. 10 C.F.R. § 54.21 also requires the LRA to "demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation."

4. At no place in the LRA is there any discussion of an aging management program for low-voltage cables (less than 2 kV) nor is there a discussion of how the methodology used to select those systems for which aging management would be provided excluded low-voltage cables.

5. There are numerous inaccessible cables (less than 2 kV) ranging in voltage from 100 to 2,000 volts installed at IP2 and IP3 that meet the requirement as described in 10 CFR § 54.4 including power and control for the following vital components.

- Auxiliary component cooling pumps
- Safety injection pumps
- Residual heat removal pumps
- Nuclear service water pumps
- Containment air recirculation cooling fans
- Auxiliary feedwater pumps
- Spray pumps (if start signal present)

6. The LRA has not specifically identified the locations of the Non-EQ Inaccessible Low-Voltage Cables however these cables; however, exist in many locations including power to the Service Water Pumps.

7. The most recent UFSAR confirms the use of these vital cables at IP2 and IP3.

8. Failure to properly manage aging of Non-EQ Inaccessible Low-Voltage Cables may adversely impact:

a. The integrity of the reactor coolant pressure boundary;

b. The capability to shut down the reactor and maintain it in a safe shutdown condition; or

c. The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in § 50.34(a)(1), § 50.67(b)(2), or § 100.11 of this chapter, as applicable.

d. May result in the loss of emergency power to the 480 volt safety equipment including all Station Blackout (SBO) loads.

SUPPORTING EVIDENCE

9. Nuclear Energy Plant Optimization ("NEPO") Final Report on Aging and Condition Monitoring of Low-Voltage Cable Materials concluded:

> Each plant has a different aging environment containing different cable materials, different hot spots and different accessibility points for examining their cables. Techniques like modulus profiling and NMR profiling can be used to look for materials that age in unusual ways such as the inside anomalies found for Hyp-02 and Hyp-04 or the enhanced degradation due to copper-catalyzed oxidation found for EPR-01A. For plant locations where extracting larger pieces of jacket and/or insulation is possible, elongation measurements may be useful as a direct CM technique. When only smaller pieces or slices are available, other CM techniques are required. Roughly speaking, gram quantities are needed for elongation measurements, 50 mg for uptake, 5-10 mg for modulus profiling and 1 mg or less for NMR and percentage gel. When it is impossible to remove any material, the

> indenter approach may offer a totally non-destructive method. However, the indenter is most often applicable to cable jacketing materials since insulations are normally accessible only at terminations (places where small sacrificial specimens may be available for analyses). Often hot spots occur at terminations, thereby allowing access to insulation materials at higher-level aging conditions. The Wear-out approach is an ideal method to investigate the residual lifetimes of such materials. Similar to the result found for the EPR insulation aged for 23 years at 51˚C, Wear-out modeling of such extracted materials should be able to confirm very long lifetimes for many important insulation materials.

10. The extensive testing conducted by Sandia confirmed that some low-voltage cables are capable of substantial aging as a result of heat, radiation and other environmental factors present in the reactor.

11. The LRA reflects that Applicant paid no attention to low-voltage cables and made no effort to explain or justify its failure to provide an AMP for low-voltage cables.

CONTENTION 8

THE LRA FOR IP2 AND IP3 VIOLATES 10 C.F.R. §§ 54.21(a) AND 54.29 BECAUSE IT FAILS TO INCLUDE AN AGING MANAGEMENT PLAN FOR EACH ELECTRICAL TRANSFORMER WHOSE PROPER FUNCTION IS IMPORTANT FOR PLANT SAFETY.

BASIS

1. There are numerous Electrical Transformers that perform a function described in §§ 54.4(a)(1)/(2) and (3). Transformers function without moving parts or without a change in configuration or properties as defined in that regulation.

2. Failure to properly manage aging of Electrical Transformers may compromise:

a. The integrity of the reactor coolant pressure boundary;

b. The capability to shut down the reactor and maintain it in a safe shutdown condition; or

c. The capability to prevent or mitigate the consequences of accidents, which could result in potential offsite exposures comparable to those referred to in §§ 50.34(a)(1), 50.67(b)(2), or § 100.11 of this chapter, as applicable.

10 C.F.R. §§ 54.4(a)(1)(2) and (3).

3. The consequence of failures of Electrical Transformers may result in accidents beyond the Design Basis Accidents resulting in exposures to the public exceeding 10 C.F.R. § 100 limits.

4. Failure to properly manage aging of electrical transformers could result in loss of emergency power to the 480 volt safety equipment and 6.9kV busses, including all station blackout loads. Appendix A, Page A-35 of the UFSAR supplement describes a Structures Monitoring Program that includes a program for monitoring "transformer/switchyard support structures" yet there is no APM described for transformers within the scope of 10 C.F.R. § 54.21(a)(1)(I).

5. Attachment 2 of the LRA (p.2.4-22) also discusses the need for an AMP for "transformer support structures" based on the criterion of 10 CFR § 54.4(a)(3).

SUPPORTING EVIDENCE

6. The role of some of the transformers in providing power for safety functions is described in Chapter 8 of the UFSAR for each Unit on pp. 1167-68, 1333-43 of the UFSAR for IP3 and pp. 1039-50 of the UFSAR for IP2.

7. The UFSAR for IP2 is a one line diagram of the electrical plan for IP2, which identifies some of the transformers and their central role in the electrical system of the plant. IP2 UFSAR, figure 8.2.1, 8.2.2. A similar drawing for IP3 has not been provided with the LRA.

8. In D-RAI 2.5-1 the Staff identifies some of the transformers for which AMP should be provided but which are not included in the LRA.

> For purposes of the license renewal rule, the staff has determined that the plant system portion of the offsite power system that is used to connect the plant to the offsite power source should be included within the scope of the rule. This path typically includes switchyard circuit breakers that connect to the offsite system *power transformers (startup transformers), the transformers themselves*, the intervening overhead or underground circuits between circuit breaker and transformer and transformer and onsite electrical system, and the associated control circuits and structures. Ensuring that the appropriate offsite power system long-lived passive structures and components that are part of this circuit path are subject to an AMR will assure that the bases underlying the SBO requirements are maintained over the period of extended license.

September 21, 2007 Draft Requests for Additional Information Indian Point Nuclear Generating Unit Nos. 2 and 3 License Renewal Application at p. 10.

CONTENTION 9

THE ENVIRONMENTAL REPORT (§§ 7.3 AND 7.5) FAILS TO EVALUATE ENERGY CONSERVATION AS AN ALTERNATIVE THAT COULD DISPLACE THE ENERGY PRODUCTION OF ONE OR BOTH OF THE INDIAN POINT REACTORS AND THUS FAILS TO CARRY OUT ITS OBLIGATIONS UNDER 10 C.F.R. § 51.53(c)(2).

BASIS

1. The ER does not include an analysis of "costs and benefits [that] are . . . essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation," 10 C.F.R. § 51.53(c)(2) and ignores the clear mandate of the GEIS to conduct an analysis of energy conservation alternatives in order to evaluate both the benefits and costs of denial of a license extension for either or both units.

2. The ER states: "Because IP2 and IP3 constitute a significant block of long-term base-load capacity, it is reasonable to assume that a decision not to renew the IP2 and IP3 licenses would necessitate the replacement of its approximately 2,158 gross MWe capacity with other sources of generation." ER at § 7.3.

3. This statement unreasonably limits the alternatives that can and should be considered to the continued operation of either IP2 or IP3. Saving the amount of energy that either unit generates, or some significant portion thereof, is also a viable alternative to renewing its license, independently or in combination with other generation alternatives, as recognized by the GEIS at § 8.3.14.

4. Studies conducted in New York and with respect to closure of Indian Point demonstrate that all, or a significant portion of, the energy generated from either unit and/or from both units can be replaced by an aggressive, feasible and cost-effective energy conservation program that could be implemented by 2015.

5. The GEIS states:

> As defined in Chapter 1, the proposed action is the granting of a renewed license. Additionally, the purpose of such a proposal is to provide an option that allows for power generation capability beyond the term of a current nuclear power plant operating license in order to meet future system generating needs as such needs may be determined by state, utility, and, where authorized, federal (other than NRC) decision makers. This chapter examines the potential environmental impacts associated with denying a renewed license (i.e., the no action alternative); the potential environmental impacts from electric generating sources other than nuclear license renewal; the potential impacts from instituting additional conservation resources to reduce the total demand for power; and the potential impacts from power imports.
>
> ***
>
> This chapter also includes a discussion of conservation and power import alternatives. Although these alternatives do not represent discrete power generation sources, they represent options that states and utilities may use to reduce their need for power generation capability. In addition, energy conservation and power imports are possible consequences of the no-action alternative. While these two alternatives are not options that fulfill the stated purpose and need of the proposed action per se (i.e., options that provide power generation capability), they nevertheless are considered in this chapter because they are important tools available to energy planners in managing need for power and generating capacity.

Id. at § 8.1.

6. Leaving IP2 and/or IP3 as options inhibits the implementation of environmentally preferable energy conservation and rejection of the application for license renewal will enhance the amount of energy conservation measures and accelerate the dates of their implementation.

7. The ER concludes that evaluation of energy conservation is not required as an alternative to continued operation of both IP units because "The GEIS states that coal-fired and gas-fired generation capacity are the feasible alternatives to nuclear power generating capacity, based on current (and expected) technological and cost factors." This statement does not excuse the failure to evaluate energy conservation as an alternative to either unit which, as noted by the GEIS, could be a consequence of the denial of a license extension. Nor is it consistent with the GEIS statement that:

> As discussed in the introduction, the no-action alternative is denial of a renewed license. Denial of a renewed license as a power generating capability may lead to a variety of potential outcomes. In some cases, denial may lead to the selection of other electric generating sources to meet energy demands as determined by appropriate state and utility officials. In other cases, denial may lead to conservation measures and/or decisions to import power. In addition, denial may result in a combination of these different outcomes. Therefore, the environmental impacts of such resulting alternatives would be included as the environmental impacts of the no-action alternative.

Id. at §8.2. At a minimum, analysis of energy conversation feasibility, costs and environmental impacts is necessary to properly evaluate the impact of the "no action" alternative.

8. One mitigation measure that is ignored in the ER is mitigating the adverse impacts of operating IP2 and/or IP3 by totally displacing one or both of them with energy conservation or mitigating the adverse impacts of operating IP2 and/or IP3 during times when the plants' adverse

environmental impacts are most severe, such as during the summer when the water discharged from the plant may increase the water temperature of the Hudson River to levels that are not safe for fish or other biota or during times when spawning or other critical life cycle events are occurring for fish in the Hudson River.

9. Implementation of energy efficiency programs is the equivalent of generating energy and meeting energy needs. *See, e.g.,* State Energy Plan - 2005 Annual Report and Activities Update, Energy Coordinating Working Group Memorandum (March 2006) at 3 ("Energy efficiency helps meet an increasingly larger share of the State's energy needs and results in substantial reductions in air and water emissions from power plants and reductions in oil and natural gas used in households, businesses, and industry"). Energy efficiency and conservation have significantly less adverse environmental impacts than the extension of the operating license for Unit 2 and/or Unit 3 for 20 additional years. As the NRC itself recognizes in 10 C.F.R. Part 51, uranium enrichment entails significant environmental impacts that the identified alternatives will not produce. *See, e.g.,* 10 C.F.R § 51.51, Table S-3 (Table of Uranium Fuel Cycle Environmental Data), Table S-4 (Environmental of Transportation oof Fuel and Waste to and from One Light Water Cooled Nuclear Power Reactor). In a similar vein, the continued generation of high level and low level radioactive waste will necessitate the creation of secure disposal facilities for such radioactive waste, the siting, construction, and maintenance of which is not required for the alternatives. If the NRC grants the application, decommissioning and remediation of the site will be delayed. Further, given the ongoing release of radioactive fluids

from Indian Point's systems, structures, and components, it is probalte that the extended operation of the facility as a nuclear power station will result in the future release of radionuclides into the bedrock, groundwater, surface waters, and/or air. *See* Rice Declaration at ¶¶ 24-7.

SUPPORTING EVIDENCE

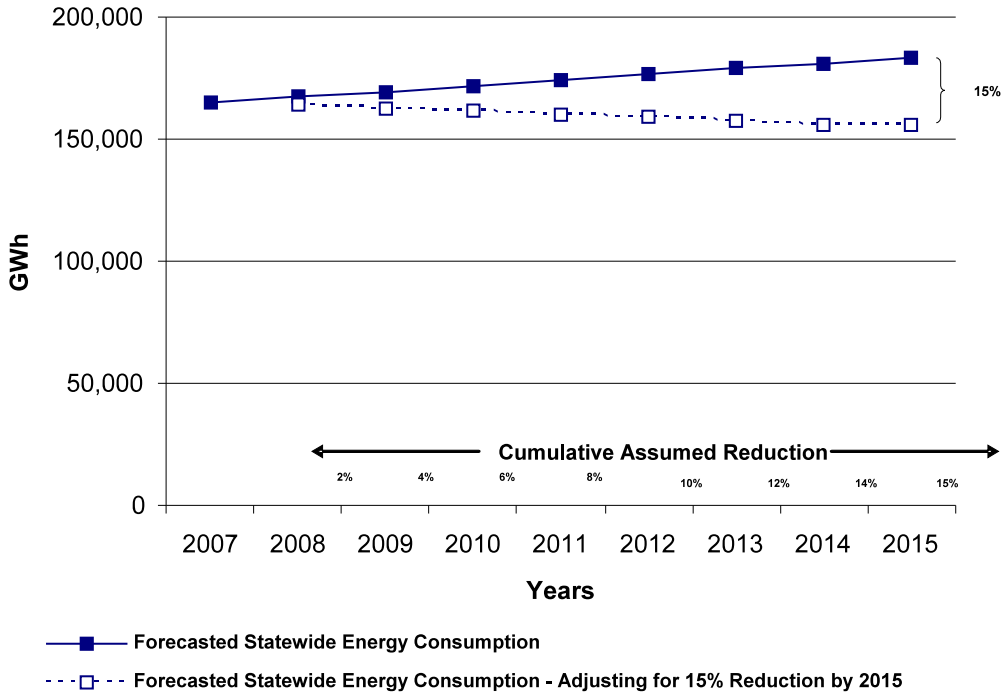
10. Governor Spitzer has announced a "15 by 15" Clean Energy Plan to reduce electric energy consumption in 2015 by 15 percent to be achieved by energy efficiency alone.[18] The energy efficiency that would be achieved under this Plan would more than replace the capacity and energy provided by both Indian Point Units.

11. As explained by the Governor, the plan would include taking actions to provide incentives to utilities to conserve energy, strengthening efficiency standards for energy intensive appliances and buildings, and by making the State Government's use of energy more efficient.

12. The "15 by 15" plan would reduce statewide electricity consumption by approximately 27,000 GWh by 2015. The following table illustrates the energy savings that would be achieved under the program assuming a linear implementation.

Table 1 – Impact of New York State's "15 by 15" Policy

[18]Remarks by Governor Eliot Spitzer. "15 by 15: A Clean Energy Strategy for New York." Apr. 19, 2007, *available at*: http://www.state.ny.us/governor/kedocs/0419071_speech.html.



13. The reasonably expected annual generation of both Indian Point Units after 2013 would be approximately 15,600 GWh. This reflects a capacity rating of 979MW for IP2, a 1,000 MW capacity rating for IP3, and 90 percent average annual capacity factors for both units. The capacity ratings for each unit reflect approximately 4 percent reductions in net plant output due to the addition of cooling towers that have been ordered by the New York Department of Environmental Conservation pursuant to ECL § 17 and 6 N.Y.C.R.R. and 6 N.Y.C.R.R. § 704 to be added to the plants as a condition of operation beyond the current license terms.

14. To determine the potential of this policy to offset the Indian Point units, the State of New York's expert evaluated the potential energy and summer peak capacity savings that can be expected from the "15 by 15" policy using both statewide[19] and zonal[20] forecasts of energy consumption in GWh by the New York Independent System Operator ("NYISO"). He used zonal forecasts from Zones H, I, J and K to represent the region that the Indian Point units directly serve. However, it is also relevant to look at the potential for summer peak capacity savings statewide as the region does import power from other regions.

15. The ramp-in required to achieve the target of 15% energy reduction by 2015 had not been determined. Therefore, our expert assumed a linear ramp-in of 2% per year starting in 2008 and ending in 2014, with 1% remaining required in 2015 to reach the goal of 15%. The State's expert calculated the statewide and regional energy reductions that would be required to achieve this goal by multiplying the total forecasted energy consumption by state and region by the cumulative percentage reduction required for the given year.

16. New York State's expert assumed that only 15% reductions would be achieved in the regions of New York State directly served by Indian Point (i.e., Zones H, I, J and K). This is a conservative assumption because it is likely that urban areas such as New York City and Long

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[19]New York Independent System Operator (NYISO). 2007 Load and Capacity Data. Table I-1. NYISO 2007 Long Term Forecast - 2007 to 2017: Energy (Gwh). Pg.4.

[20]New York Independent System Operator (NYISO). 207 Load and Capacity Data. Table I-2a. Forecast of Annual Energy by Zone - Gwh. Pg. 5.

Island would be able to achieve greater energy reductions than more rural areas that would have fewer energy savings opportunities.

17. New York State's expert then converted the energy reductions to summer peak capacity savings in order to assess the ability for these reduction goals to offset the need for the two Indian Point Units after 2013. The expert calculated a ratio between summer peak capacity and energy based on achievable potential estimates from the most recent study of energy efficiency potential in New York State. This study was conducted for NYSERDA in 2003 by Optimal Energy Inc.[21]

18. Statewide: New York State's expert used the following methodology to develop ratios to be applied to estimated statewide energy reductions. As zones in the State have a range of avoided costs, he calculated a range of summer peak capacity savings using low and high avoided cost scenarios.

a. Low Avoided Cost Scenario. A ratio between the statewide economic potential summer peak capacity savings and energy reductions in 2007 using low avoided costs (0.196) was applied to energy reductions from 2007-2011. A ratio between the statewide economic potential summer peak capacity savings and energy reductions in 2012 using high avoided costs (0.216) was applied to energy reductions from 2012-2015.

b. High Avoided Cost Scenario: A ratio between the statewide economic potential summer peak capacity savings and energy reductions in 2007 using high avoided costs (0.212) was applied to energy reductions from 2007-2011. A ratio between the statewide economic potential summer peak capacity savings and energy reductions in 2012 using high avoided costs (0.229) was applied to energy reductions from 2012-2015.

[21]Optimal Energy, Inc. Energy Efficiency and Renewable Energy Resource Development Potential in New York State. Final Report. Volume One: Summary Report. August 2003. Found at: http://www.nyserda.org/sep/EE&ERpotentialVolume1.pdf.

The energy reductions were multiplied by these ratios to arrive at summer peak capacity savings. A summary of the statewide results are shown in the Table below.

Table 2 – Statewide Summer Peak Capacity Savings Under "15 by 15"

	Cumulative Energy Reduction (GWh)	**Cumulative Summer Peak Capacity Savings – Range from Low to High Avoided Costs (MW)**	**Indian Point – Cumulative Capacity (MW)**
2008	3,349	656 – 710	
2009	6,779	1,328 – 1,436	
2010	10,305	2,019 – 2,183	
2011	13,923	2,728 – 2,950	
2012	17,662	3,817 – 4,049	
2013	21,451	**4,636 – 4,918**	**979**
2014	25,358	5,480 – 5,813	
2015	27,532	**5,950 – 6,311**	
2016			**1,979**

It is clear from this analysis that a 15% energy reduction in 2015 statewide would more than offset the need to extend the license of the two Indian Point units in 2013 and 2015.

19. The Need for Indian Point in Downstate New York (Zones H, I, J, and K): Our expert used a similar methodology to develop ratios to be applied to estimated regional energy reductions (including Zones H, I, J, and K). The only difference was that he used higher avoided costs rather than the range of avoided costs to represent these zones because these zones typically have the highest avoided costs in the state.

Exhibit 3 – Regional Summer Peak Capacity Savings Under "15 by 15"

	Cumulative Energy Reduction (GWh)	**Cumulative Summer Peak Capacity Savings – High Avoided Costs (MW)**	**Indian Point – Cumulative Capacity (MW)**
2008	1,748	370	
2009	3,541	750	
2010	5,394	1,143	
2011	7,301	1,547	
2012	9,288	2,129	
2013	11,282	**2,586**	**979**
2014	13,340	3,058	
2015	14,487	**3,321**	
2016			**1,979**

Again, a 15% energy reduction in 2015 statewide would more than offset both the energy and capacity from both Indian Point Units and would eliminate any need to extend the license of the two units in 2013 and 2015.

20. Significantly, the 15 percent reduction in statewide energy consumption anticipated under the "15 by 15" plan would not represent all of the economical potential energy efficiency that has been identified in New York State. A recent presentation by Philip Mosenthal of

Optimal Energy, Inc., has projected that there is 61,506 GWh of economically potential energy efficiency in the State.[22]

21. Additionally, in November 2006, the U.S. Department of Energy agreed to promulgate regulations, required under the Energy Policy and Conservation Act, that will force 22 separate classes of appliances to increase their energy efficiency -- and thereby conserve energy. *See State of New York v. Bodman, Secretary U.S. Department of Energy*, No. 05 Civ. 7807, Consent Decree (S.D.N.Y. Nov. 3, 2006). The judicially enforceable consent order covers the following products:

Product Category	**Deadline for DOE to Publish Final Rule**
Room air conditioners	June 2011
Central air conditioners and heat pumps	June 2011
Water heaters	March 2010
Pool heaters	March 2010
Direct heating equipment	March 2010
Furnaces and boilers	September 2007
Dishwashers	March 2009
Clothes dryers	June 2011
Fluorescent lamp ballasts	June 2011
Ranges and ovens	March 2009

[22] *Electric & Natural Gas Efficiency Potential in New York*, presentation by Philip Mosenthal, Optimal Energy, Inc., at the New York State Public Service Commission Energy Efficiency Portfolio Standard Overview Forum, July 19, 2007, slide no. 9.

Product Category	**Deadline for DOE to Publish Final Rule**
Additional lamps	June 2009
Incandescent reflector lamps	June 2009
Fluorescent lamps	June 2009
Packaged air conditioners and heat pumps	September 2008
Packaged boilers	February 2007
Instantaneous water heaters	February 2007
Medium-sized motors	June 2011
High intensity discharge lamps	June 2010
Electric distribution transformers	September 2007
Small motors	February 2010

Id., § III.

22. DOE recently moved forward and promulgated a regulation mandating higher efficiency standards for transformers. DOE estimates that the transformer standard will save approximately 2.74 quads of energy over 29 years (2010-2038). *See* 72 Fed. Reg. 58,192 (October 12, 2007). This regulation will provide conservation gains on a going-forward basis.

23. In January 2001, DOE also promulgated a regulation requiring air conditioners to become more efficient. This new rule required a "seasonal energy efficiency ratio" ("SEER") of 13 for central air conditioning units and a "heating seasonal performance factor" ("HSPF") of 7.7 and a SEER of 13 for central air conditioners with heat pumps. The rule provided that manufacturers would be subject to these standards as of January 23, 2006. The U.S. Court of

Appeals for the Second Circuit invalidated DOE's subsequent attempt to relax this efficiency standard. *NRDC v. Abraham, Secretary U.S. Department of Energy*, 355 F.3d 179 (2d Cir. 2004). This regulation, which only recently required increased energy efficiencies in various air conditioners, will provide ever increasing conservation gains on a going-forward basis.

24. The federal Department of Energy has routinely recognized the benefits of the Energy Policy and Conservation Act's program for updating appliance and equipment energy efficiency standards. *See, e.g.,* 70 Fed. Reg. 64144 (Oct. 31, 2005) ("without changes to the existing furnace and boiler standards, energy use and energy costs for consumers will continue to increase"); 66 Fed. Reg. 7170, 7193 (Jan. 22, 2001) ("Enhanced energy efficiency improves the nation's energy security, and reduces the environmental impacts of energy production."); *id.* ("Improved efficiency of central air conditions and heat pumps is also likely to improve the reliability of the nation's electric systems.").

25. Moreover, New York State regulations require New York State agencies and authorities to purchase energy efficient appliances. *See* 21 N.Y.C.R.R. Part 506. The New York State Energy Research Development Authority ("NYSERDA") recently promulgated regulations to increase the minimum energy efficient standards for appliances and energy using products purchased by or for the State. *See* New York State Register (April 4, 2007). These regulations will increase energy efficiency and conservation as the State purchases new appliances.

26. In New York City, the School Construction Authority and the Department of Education issued the "NYC Green Schools Guide" which identifies specific construction and

operation actions to, among other things, conserve energy in the City's large public school system. *See* NYC Green Schools Guide (issued March 15, 2007); *see also* New York City Local Law 86/05 (requiring sustainable standards for public construction projects within the City).

26. In New York City, the School Construction Authority and the Department of Education issued the "NYC Green Schools Guide," which identifies specific construction and operation actions to, among other things, conserve energy in the City's large public school system. *See* NYC Green Schools Guide (issued March 15, 2007); *see also* New York City Local Law 86/05 (2005) (requiring sustainable standards for public construction project within the City).

27. On November 13, 2007, the U.S. Environmental Protection Agency and the Department of Energy jointly announced that more than 60 energy, environmental and other organizations had collaborated on a new report that demonstrated how Americans could save more than $500 billion in energy costs over 25 years. The report, entitled the *National Action Plan for Energy Efficiency Vision for 2025*, provides a framework for states, utilities, and other stakeholders to consider when seeking policies and programs to achieve all cost effective energy efficiency measures. "Opportunities to increase and maximize energy efficiency in our homes, commercial buildings, and industrial facilities are both enormous and quantifiable and are a key component of the president's robust energy initiatives," said Kevin Kolevar, Assistant Secretary for Electricity Delivery and Energy Reliability, United States Department of Energy.

28. This contention is supported by the attached Declarations of Peter Bradford and David Schissel.

CONTENTION 10

IN VIOLATION OF THE REQUIREMENTS OF 10 C.F.R. § 51.53(c)(3)(iii) AND OF THE GEIS § 8.1, THE ER (§ 8.3) TREATS ALL ALTERNATIVES TO LICENSE RENEWAL EXCEPT NATURAL GAS OR COAL PLANTS AS UNREASONABLE AND PROVIDES NO SUBSTANTIAL ANALYSIS OF THE POTENTIAL FOR OTHER ALTERNATIVES IN THE NEW YORK ENERGY MARKET.

BASIS

1. The GEIS declares that a "reasonable set of alternatives" includes "wind energy, photovoltaic (PV) cells, solar thermal energy, hydroelectricity, geothermal energy, incineration of wood waste and municipal solid waste (MSW), energy crops, coal, natural gas, oil, advanced light water reactors (LWRs), and delayed retirement of existing non-nuclear plants." ER at § 8.1.

2. The ER asserts that "[o]ther [other than coal and natural gas] commonly known generation technologies considered are listed in the following paragraphs. However, these sources have been eliminated as reasonable alternatives to the proposed action because the generation of approximately 2,158 gross MWe of electricity as a base-load supply using these technologies is not technologically feasible." *Id*. at § 8.3.

3. The ER then dismisses such alternatives as wind power, bio-mass, delayed retirement, hydropower and energy conservation with only the most cursory analysis of their feasibility and costs and benefits. *Id*. at §§ 8.3.1-8.3.11.

4. In addition, the ER misstates the findings of the GEIS and/or relies upon the plant specific supplements issued for plants far distant from New York (such as Arkansas Unit One) to justify their cursory dismissal of many renewable energy options. *Id*. The GEIS specifically rejects the approach used in the ER by declaring that all alternatives must be fully evaluated for each license renewal proceeding and the GEIS does not resolve any of the issues related to such alternatives. GEIS at § 8.1 ("The information in this chapter does not constitute NRC's final consideration of alternatives to license renewal. Therefore, the rule accompanying this Generic Environmental Impact Statement (GEIS) does not contain any conclusions regarding the environmental impact or acceptability of alternatives to license renewal. Accordingly, the NRC will conduct a full analysis of alternatives at individual license renewal reviews"). Thus, reliance in the ER on the GEIS as providing conclusions regarding alternatives is misplaced and such mis-reliance is an insupportable basis for Entergy's abrogation of its obligation to independently and thoroughly evaluate each alternative and its feasibility based on the best available current information.

5. In violation of 10 C.F.R. § 5.53(c)(2) and the GEIS, the ER also uses allegations about the need for power to justify rejection of alternatives. *See, e.g.,* ER § 8.3.10.

6. The ER does not consider at least two additional alternatives that could displace the energy expected to be generated by IP2 and IP3. These alternatives include (1) repowering existing power plants to increase their efficiency, increase their power output and reduce their pollution, and (2) enhancing existing transmission lines. *See* Declaration from David Schlissel. Such alternatives – energy efficiency and conservation, transmission line upgrades, expansion of renewable energy production – have significantly less adverse environmental impacts than the extension of the operating license for Unit 2 and/or Unit 3 for 20 additional years. As the NRC itself recognizes in 10 C.F.R. Part 51, uranium enrichment entails significant environmental impacts that the identified alternatives will not produce. *See, e.g.,* 10 C.F.R § 51.51, Table S-3 (Table of Uranium Fuel Cycle Environmental Data), Table S-4 (Environmental of Transportation oof Fuel and Waste to and from One Light Water Cooled Nuclear Power Reactor). In a similar vein, the continued generation of high level and low level radioactive waste will necessitate the creation of secure disposal facilities for such radioactive waste, the siting, construction, and maintenance of which is not required for the alternatives. If the NRC grants the application, decommissioning and remediation of the site will be delayed. Further, given the ongoing release of radioactive fluids from Indian Point's systems, structures, and components, it is probalte that the extended operation of the facility as a nuclear power station will result in the future release of radionuclides into the bedrock, groundwater, surface waters, and/or air. *See* Rice Declaration at ¶¶ 24-7.

SUPPORTING EVIDENCE

7. According to NYSERDA's August 2007 *New York State Renewable Portfolio Standard Performance Report for the Program Period ending March 2007* (RPS Performance Report), new renewable capacity installed since the onset of the RPS program could exceed 1,206 MW by the end of 2008, of which 1,184 MW would be located in New York State. RPS Performance Report at 2. The 1,206 MW of new installed capacity is expected to produce approximately 3.6 million MWh of electricity per year. *Id.* at 1.

8. The RPS Performance Report also noted that the September 24, 2004 New York PSC Order set forth annual energy targets representing how much renewable energy should be used by New York ratepayers to satisfy the 2013 goal of having 25% of the power consumed in New York come from renewable energy. The RPS energy targets set by the PSC in its September 24, 2004 Order are shown below.

Table 1: EPS Energy Targets (in Megawatt hours)

	Main Tier Targets	Customer Sited Tier Targets	EO 111 Targets	Voluntary Market Targets	Combined Targets
2006	1,121,247	25,259	282,812	228,584	1,657,902
2007	2,326,171	50,488	314,579	457,167	3,148,405
2008	3,549,026	75,685	346,366	685,751	4,656,828
2009	4,767,994	100,855	378,174	914,335	6,161,358
2010	6,012,179	125,988	410,002	1,142,919	7,691,088
2011	7,297,746	151,081	391,857	1,371,502	9,212,186
2012	8,556,710	176,123	373,712	1,600,086	10,706,631
2013	9,854,038	201,130	355,568	1,828,670	12,239,406

To meet these targets, New York will require the addition of the following MW of renewable resources:

Table 4 - Estimated Renewable Energy Capacity for NY through 2013

Type	Capacity (MW)
Co-fire biomass	296
Hydro	1,100
LFG	121
Off-shore wind	579
Wind	2,450
Solar	16
Small wind	1
Fuel cell	28
Grand Total	4,590

9. There are an increasing number of analyses of the potential for renewable resources in New York State. It is reasonable to expect that the retirement of either or both Indian Point Units at the end of their current NRC licenses would provide a substantial impetus to the development of additional renewable resources and that continued operation of these two units inhibits the development and implementation of renewable energy alternatives. Indeed, the recent history of the electric power industry in the United States has demonstrated that a large system, like New York's can effectively create large portfolios of energy resources once a particular unit is closed, or once circumstances produce the same result. New York has accomplished this before, following the closure of the Shoreham nuclear facility, and other states including Maine and California have successfully developed energy-efficient alternative resources that exceeded previously considered expectations. *See* Declaration of Peter Bradford.

10. Wind Powering America: New York, a website sponsored by the US DOE, estimates that the in-state wind energy potential for New York State is 8,400 MW of capacity after land use and environmental exclusions (available at http://www.nrel.gov/docs/fy00osti/28090.pdf).

11. NYISO's September 2007 *Comprehensive Reliability Plan 2007*, noted the following concerning wind capacity:

> The NYISO interconnection queue includes proposals for wind generation that now total in excess of 5,000 MW. Wind generators are intermittent resources and have unique electrical characteristics that pose challenges for planning and operations of the interconnected system. The NYISO has completed a study conducted with GE Energy which evaluated the reliability and operating implications of the large scale integration of wind generation. The study concluded that if state-of-the-art wind technology is utilized, wind generation can

> reliably interconnect with only minor adjustments to existing planning, operating, and reliability practices.[23]

The study cited in this NYISO report is titled *The Effects of Integrating Wind Power on Transmission System Planning, Reliability, and Operations, Report on Phase 1, Preliminary Overall Reliability Assessment*, prepared for NYSERDA by GE Energy Consulting, 2004. *Report on Phase 2: System Performance Evaluation* was completed in March 2005.

12. When combined with other energy resources, wind can produce energy in patterns comparable to a baseload generation facility. At the same time, the effects of short term wind variability can be mitigated by building a larger number of wind turbines and by siting the wind turbines in different geographic locations. There is no evidence that any replacement capacity for Indian Point would need to be a fully dispatchable facility. Indeed, the electric grid in New York State will already have a large number of fully dispatchable facilities.

13. The arguments made by Entergy against reliance on wind power are outdated. As a detailed 2004 Wind Integration Study – Final Report prepared for Xcel Energy and the Minnesota Department of Commerce has noted:

> Many of the earlier concerns and issues related to the possible impacts of large wind generation facilities on the transmission grid have been shown to be exaggerated or unfounded by a growing body of research studies and empirical

[23]New York Independent System Operator, *The Comprehensive Reliability Plan 2007, A Long-Term Reliability Assessment of New York's Bulk Power System,* Final Report, September 2007, Appendices, at page 75.

> understanding gained from the installation and operation of over 6000 MW of wind generation in the United States.[24]

Contrary to what Entergy has claimed, wind power can reduce the need for at least some of the capacity from IP2 and IP3 and can provide low cost energy.

14. An August 2003 study prepared for NYSERDA, *Energy Efficiency and Renewable Energy Resource Development Potential in New York State*, by Optimal Energy, Inc., American Council for an Energy Efficient Economy, the Vermont Energy Investment Corporation, and Christine T. Donovan Associates, has provided the following estimates of the potential for renewable resources and energy efficiency in New York State:

[24] *Wind Integration Study-Final Report,* prepared for Xcel Energy and the Minnesota Department of Commerce by EnerNex Corporation and Wind Logistics, Inc., dated September 28, 2004, the Project Summary portion of which is included as Exhibit JI-4-A, at page 19.

Table 1.5 New York Statewide Economic Potential - Low Avoided Costs

	2007		2012		2022	
	Annual GWh	Summer Peak MW	Annual GWh	Summer Peak MW	Annual GWh	Summer Peak MW
Energy Efficiency Savings						
Residential	10,124	1,475	12,205	1,981	15,610	2,646
Commercial	27,490	6,173	32,124	8,009	32,994	9,266
Industrial	5,718	840	6,045	896	4,999	752
Total Efficiency	43,332	8,489	50,374	10,886	53,603	12,664
Renewable Supply						
Biomass	5,141	833	5,325	861	6,344	1,022
Fuel Cells	-	-	-	-	-	-
Hydropower	1,512	109	4,336	375	9,123	816
Landfill Gas	-	-	-	-	-	-
Municipal Solid Waste	-	-	682	91	1,421	190
Photovoltaics	-	-	-	-	-	-
Solar Thermal	175	-	181	-	189	-
Windpower	-	-	1,245	100	41,818	3,255
Total Renewable	6,828	942	11,769	1,427	58,894	5,283
Total Efficiency Savings & Renewable Supply	50,159	9,431	62,143	12,313	112,497	17,947

Table 1.6 New York Statewide Economic Potential - High Avoided Costs

	2007		2012		2022	
	Annual GWh	**Summer Peak MW**	**Annual GWh**	**Summer Peak MW**	**Annual GWh**	**Summer Peak MW**
Energy Efficiency Savings						
Residential	12,593	2,433	15,982	3,267	19,660	4,480
Commercial	30,273	7,021	35,340	8,988	36,847	10,225
Industrial	5,718	840	6,045	896	4,999	752
Total Efficiency	48,584	10,294	57,367	13,151	61,506	15,457
Renewable Supply						
Biomass	5,141	833	5,325	861	6,344	1,022
Fuel Cells	-	-	-	-	-	-
Hydropower	2,115	257	5,038	555	10,311	1,095
Landfill Gas	439	59	407	54	419	56
Municipal Solid Waste	-	-	682	91	1,421	190
Photovoltaics	-	-	-	-	-	-
Solar Thermal	175	-	181	-	189	-
Windpower	893	70	3,744	293	41,818	3,255
Total Renewable	8,762	1,219	15,376	1,855	60,501	5,618
Total Efficiency Savings & Renewable Supply	57,347	11,513	72,744	15,006	122,007	21,074

15. Based on the results of this study, renewable resources have the technical and economic potential to provide between 1,427 MW and 1,855 MW of new capacity in New York State by 2012 and between 5,283 MW and 5,618 MW of new capacity by 2022. Energy Efficiency and renewable resources together have the technical and economic potential to provide between 12,313 MW and 15,006 MW in 2012 and between 17,947 MW and 21,074 MW in 2022. Clearly, this is far more than would be required to replace the approximately 2,000 MW of capacity from IP2 and IP3.[25]

16. The same tables presented above show that renewable resources alone have the potential to provide between 11,769 and 15,376 GWh of energy in 2012 and between 58,894 and 60,501 GWh of energy in 2022. Similarly, energy efficiency and renewable resources combined could provide between 62,143 GWh and 72,744 GWh in 2012 and between 112,497 GWh and 122,007 GWh in 2022.[26]

17. The 2003 study for NYSERDA also showed that a significant portion of the energy that could be provided by energy efficiency and renewable resources would be in downstate New York.[27] For example, the study found that by 2012, energy efficiency and renewable resources have a technical and economic potential of approximately 30,000 GWh just in Zones J and K, which represent New York City and Long Island. It similarly found that by 2022, energy

[25] At Volume One, page 3-4.

[26] *Id.*

[27] *Id.*, Fugure 1.8, at page 3-7.

efficiency and renewable resources have a technical and economic potential of more than 50,000 GWh just in these same areas of the state. Again, this would easily replace the energy that would be provided by IP2 and IP3.

18. The May 2007 study, *New York's Solar Roadmap, A plan for energy reliability, security, environmental responsibility and economic development in New York State*,[28] has noted that a private-sector initiative launched in 2007 R&D, manufacturing, and industry leaders in New York State, have developed the strategic goal of increasing solar power deployment in the State from the current level of about 12 MW of grid-connected electricity as of January 2007 to over 2,000 MW by 2017.[29] This would provide about 5 percent of the peak electric capacity of the state.[30]

19. An October 2002 study by NYSERDA on *Combined Heat and Power, Market Potential for New York State*, has concluded that by 2012 there could be between 763.6 MW and

[28]This study, which was published by a collaboration of New York State Solar Power Industry Manufacturers, Engineers, Installers, Researchers, and Policy Analysts, is available at: http://www.neny.org/download.cfm/NENY_Membership_Application.pdf?AssetID=225.

[29]Executive Summary, at page 1.

[30]*Id.*, at page 2.

2,169.1 MW of combined heat and power in the state.[31] Between 525.4 MW and 1,319.7 MW of this combined heat and power could be in the Downstate area of the State.[32]

20. New York State already is taking significant actions to increase the amount of energy efficiency and renewable resources. Governor Spitzer has already announced the following major initiatives as part of the State's Clean Energy Agenda:

- Reduce energy consumption. Governor Spitzer has announced that New York will reduce energy consumption by 15 percent below the forecasted level in 2015 – this is the most aggressive target in the country. New York businesses can raise their profits and New York's families can reduce their utility bills by conserving energy. At the state level, government will lead by example and cut its own use of energy.

- Invest in and develop renewable energy such as wind, solar, hydropower, and fuel cells. The Spitzer-Paterson administration will ensure New York will meet the current goal of obtaining 25 percent of our energy from renewable resources by 2013, and the Task Force will evaluate whether to expand this goal. In addition, we must continue to support research and development in this area, and encourage renewable energy businesses to locate in New York.

- Clean Energy Siting Bill. Streamlining the state approval process for renewable and clean energy sources is an essential part of our effort. Governor Spitzer proposed a new power plant siting law ("Article X") that would provide a streamlined and expedited review process for wind projects and other clean energy sources.

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[31] *Combined Heat and Power, Market Potential for New York State*, NYSERDA, Final Report 02-12, October 2002, Table ES-4, at page ES-9.

[32] *Id.*

The State also has convened a Renewable Energy Task Force to evaluate, among other issues, whether the state's Renewable Portfolio Standard should be increased to 30 percent as a result of the Governor's announced "15 by 15" energy efficiency program.

21. Repowering a generation facility means replacing the plant's old, inefficient and polluting equipment with newer, more efficient equipment. Today, virtually all repowering projects replace old equipment with combined-cycle combustion turbines (CCCTs). CCCTs generate electricity in two stages. In the first stage, fuel is burned to operate a gas turbine generator, and in the second stage, excess heat from the gas turbine is used to drive a steam turbine and generate additional electricity. This two-stage process can turn 50 percent or more of the fuel energy into electricity. Repowering has become commonplace in the electric industry since the early 1990s. One repowering project in the Hudson River Valley was PSEG's Bethlehem Energy Center outside Albany. Completed in 2005, this project now consists of 750 MW of combined-cycle generating capacity, which includes a net increase in 350 MW relative to the old Albany Steam Plant that was replaced.

22. In practice, repowering can be done in at least two ways, either by rebuilding and replacing part or all of an existing plant or by closing down an existing power plant, building a new unit next to it, and reusing the existing transmission and fuel facilities.

23. Repowering older power plants provides a number of important environmental and electric system reliability benefits: improved plant availability, lower plant operating and maintenance costs; increased plant capacity and generation; reduced facility heat rates, which

lead to significantly more efficient fuel use; reuse of industrial sites; up to 99 percent reductions in water intake and related fish impacts; and large reductions in air emissions, both overall and in terms of emissions per MWh of electricity.

24. A recent study on repowering KeySpan's generating facilities on Long Island by the Center for Management Analysis at Long Island University concluded that repowering these facilities would provide cost effective generating capacity to carry Long Island at least into the next 20 to 40 years and beyond, and would provide "compelling" environmental benefits:

> Improvements in efficiency from about 35 percent to close to 60 percent in the conversion of fuel to electricity can be achieved. The resulting reduction in fuel burned for a given amount of generation will be significantly less nitrogen oxides and carbon monoxide emitted. Modern combined cycle units have state of the art emission control systems in contrast to the older steam electric units with no such controls. The re-powered units achieve emission reductions immediately since they replace higher emitting, older units that would likely continue to operate in an expansion program of new greenfield projects.

The study by the Center for Management Analysis concluded that converting the major plants on the KeySpan system to combined cycle could increase Long Island's electric supply by about 2,000 MW. Clearly, the repowering of these existing power plants on Long Island could replace the approximate 2,000 MW of capacity provided by IP2 and IP3.

25. Reliant Energy also received an Article X certificate to repower its aging Astoria Generating facility. This repowering would add another 1,816 MW of combined cycle capacity to the electric system in New York City. This would represent an increase of approximately 650

MW over the capacity of the existing Astoria facility. The retirement of IP2 and IP3 would create an incentive for the completion of this repowering project.

26. Detailed engineering and economic analyses must be performed to determine the optimum size of the repowered unit and the extent to which existing facilities can be refurbished and reused. The types of existing facilities that can be refurbished and reused include boilers, turbine generators, condensers, transmission switchyards, and other auxiliary plant equipment. The reuse of this equipment can lower the cost of building the repowered facility as compared to the cost of constructing a new unit at a new site.

27. There are a number of older fossil-fueled power plants situated on the river between Albany and New York City: Bowline Point, Roseton, and Danskammer. As noted earlier, one of these plants, the old Albany Station, is currently being replaced with modern power generation equipment. However, the other four fossil-fueled plants utilize older power generating technology, which is less efficient and has far greater environmental impacts than new generating systems. Most of the boilers and generating units in these four plants are over 25 years old - three of them are over 45 years old - and none of them has been retrofitted with post-combustion emission controls or modern cooling systems that minimize water use from the river. Repowering these plants with new combined cycle technology could add additional generating capacity to replace Indian Point at the same time that it would provide significant economic and environmental benefits.

28. Entergy has failed to adequately consider transmission system enhancements and upgrades as part of the portfolio of options for replacing the capacity and energy from IP2 and IP3. Such enhancements and upgrades could increase the capability to import power into the Hudson River Valley and downstate New York from New England, PJM or upstate New York.

29. For example, at least two new transmission links between New York and New Jersey have been proposed. Both of these are in the interconnection queue at the New York ISO. One of these is the Hudson Transmission Project that would provide a new controllable line into New York City rated at 600 MW. A second project, the 550 MW Harbor Cable Project and Generating Portfolio, would provide a full controllable transmission pathway from generating sources in New Jersey to New York City.

30. At the same time, the 2005 Levitan & Associates study identified three possible transmission alternatives to the retirement of IP2 and IP3. The first would include retirement with the construction of two physically separate 500 kV circuits between the Capital District around Albany to the downstate grid in New York City. Each of the circuits would be controllable and would be able to transmit 1,000 MW of power for a total of 2,000 MW. A third proposed project would be the 300 MW Linden Variable Frequency Transformers that would be physically located adjacent to the Linden Cogen plant in northern New Jersey. It would result in a variable 300 MW tie between Pennsylvania, New Jersey, Maryland, and New York City.

31. The second transmission alternative identified by Levitan & Associates would be to upgrade the existing 345 kV New Scotland-Leeds circuit and the 345 kV Leeds-Pleasant Valley

circuit, and construct a new 345 kV line from New Scotland to Pleasant Valley. This would increase the UPNY-SENY interface transfer capability by approximately 600 MW.

32. Finally, the third transmission alternative would be to convert the existing 345 kV Marcy-New Scotland circuit to a double circuit and to rebuild the New Scotland station to a breaker-and-a-half design. This would increase the Central-East transfer capability by approximately 650 MW and increase the transmission capability into New York City by approximately 450 MW.

33. Levitan & Associates also identified a fourth transmission alternative that would upgrade the interconnections between New York and the PJM system by re-conductoring the existing transmission paths from Ramapo to Buchanan and/or constructing a new dedicated (overhead or underground) transmission line from Ramapo to Buchanan. However, Levitan & Associates were unsure of the amount by which this alternative would increase the Total East transfer capability into New York State.

34. This contention is also supported by the attached Declarations of Peter Bradford and David Schissel.

CONTENTION 11

CONTRARY TO THE REQUIREMENTS OF NEPA AND 10 C.F.R. PART 51, THE ER FAILS TO FULLY CONSIDER THE ADVERSE ENVIRONMENTAL IMPACT THAT WILL BE CREATED BY LEAVING IP2 AND/OR IP3 AS AN ENERGY OPTION BEYOND 2013 AND 2015.

BASIS

1. As noted above, New York State has identified substantial energy conservation and renewable energy potential that could be implemented by 2013 and 2015 and would, if implemented, displace all the power to be generated by IP2 and/or IP3 for the proposed 20 additional years of operating authority.

2. However, so long as IP2 and/or IP3 remain as options the incentive to fully utilize these options is diminished, thus reducing the likelihood of their implementation. In fact, if IP2 and/or IP3 remain operational for an additional 20 years, they will displace the motivation to create over 2,000 mw of renewable energy and/or over 2,000 mw of conserved electricity.

3. Energy conservation produces no carbon, no pollution and requires the use of no fuel. Its benefit continues without further capital or maintenance costs for a substantial period of time.

4. The ER does not thoroughly analyze the environmental costs and benefits of IP2 and/or IP3 in contrast with energy conservation because it dismisses energy conservation as irrelevant, merely because this Applicant is not in the business of implementing energy conservation. Of course, that argument misses the entire point of the environmental review. The purpose of the review, as clearly spelled out in NEPA and Part 51, is to determine whether there

are alternative ways that will achieve the goal of the proposal with less environmental damage, not whether it will be to the economic advantage of the proponent of the proposal to implement such alternatives. This is particularly true because it is the agency, in this case NRC, that must decide whether this is an environmentally preferable course of action and it is not constrained by what this Applicant is willing to do. Based on its fallacious reasoning, the Applicant in its ER does not give any consideration to the considerable evidence, to support the proposition that energy conservation is fully capable of displacing all the energy that IP2 and IP3 can generate over the next 20 years and doing so at far less cost to the consumer.

5. Renewable energy sources such as wind, solar, biomass, and landfill gas are carbon neutral power sources with little or no fuel cycle environmental impacts, no waste disposal issues and, in the case of biomass and landfill gas, eliminate a waste disposal problem by using the "waste" to produce energy. *See also* Contention 10 ¶ 6.

6. The ER does not thoroughly analyze the environmental costs and benefits of IP2 and/or IP3 in contrast with any of the renewable energy sources because it dismisses them as infeasible without consideration of the considerable evidence to support the proposition that renewable energy options are fully capable of displacing all the energy that IP2 and IP3 can generate over the next 20 years.

SUPPORTING EVIDENCE

7. This contention is supported by evidence cited in Contentions 10 and 11 *supra*.

8. This contention is also supported by the Declarations of Peter Bradford and David Schlissel.

CONTENTION 12

ENTERGY'S SEVERE ACCIDENT MITIGATION ALTERNATIVES (SAMA) FOR INDIAN POINT 2 AND INDIAN POINT 3 DOES NOT ACCURATELY REFLECT DECONTAMINATION AND CLEAN UP COSTS ASSOCIATED WITH A SEVERE ACCIDENT IN THE NEW YORK METROPOLITAN AREA AND, THEREFORE, ENTERGY'S SAMA ANALYSIS UNDERESTIMATES THE COST OF A SEVERE ACCIDENT IN VIOLATION OF 10 C.F.R. § 51.53(c)(3)(ii)(L).

BASIS

1. The ER is required to include "a consideration of alternatives to mitigate severe accidents [SAMA]." 10 C.F.R. § 51.53(c)(3)(ii)(L). That analysis depends upon an accurate calculation of the cost of a severe accident in order to have a base line against which to measure proposed mitigation measures.

2. The SAMA analysis for IP2 and IP3 uses an outdated and inaccurate proxy to represent the decontamination and clean up costs resulting from a severe accident. The SAMA analysis relies on the MELCOR Accident Consequence Code System (MACCS/MACCS2) computer program. However, the cost formula contained in MACCS2 underestimates the costs likely to be incurred as a result of a dispersion of radiation. Therefore, Entergy's SAMA analysis significantly understates the costs associated with such an accident.

3. MACCS's cost calculation subroutine relies on an assumption that the dispersion will consist of large-sized radionuclide particles.

4. MACCS's cost calculations subroutine does not take into account the additional costs that would be incurred in decontaminating a suburban/urban area such as the one that exists within the 50-mile Emergency Planning Zone around Indian Point.

5. A severe accident resulting in the dispersion of radionuclides from a nuclear power plant likely will result in the dispersion of small-sized radionuclides.

6. Large-sized radionuclide particles are easier and less expensive to remove and clean up than small-sized radionuclide particles.

7. Conversely, it will be more expensive to decontaminate and clean up a suburban/urban area in which small-sized radionuclide particles have been dispersed, than it would be to clean up large-sized radionuclide particles.

8. Because MACCS's decontamination and clean up costs are based on large-sized radionuclide particles, it underestimates the costs of decontaminating a suburban/urban area following the dispersion of radionuclides from a nuclear power plant.

9. If the MACCS decontamination cost input reflected the accurate cost of cleaning up small-sized radionuclide particles in the suburban/urban areas within the Indian Point 50 mile Emergency Planning Zone, the result would be a significantly higher cost value for an accident at Indian Point.

10. Therefore, Entergy is unable to demonstrate that its SAMA analysis contained in the April 30, 2007 License Renewal Application has accurately determined which mitigation

measures are cost effective. Accordingly, the SAMA-MACCS analysis as presented to in the License Renewal Application is faulty and should be rejected.

11. In place of the outdated decontamination cost figure contained in the MACCS2 code, the SAMA analysis for IP2 and/or IP3 should incorporate the analytical framework contained in the 1996 Sandia National Laboratories report concerning site restoration costs as well as recent studies examining the cost consequences in the New York metropolitan area. *See* D. Chanin and W. Murfin, *Site Restoration: Estimation of Attributable Costs from Plutonium-Dispersal Accidents*, SAND96-0957, Unlimited Release, UC-502, (May 1996); Beyea, Lyman, von Hippel, *Damages from a Major Release of ^{137}Cs into the Atmosphere of the United States*, Science and Global Security, Vol. 12 at 125-136 (2004) (discussing accident costs at Indian Point and four other sites); Lyman, *Chernobyl on the Hudson? The Health and Economic Impacts of a Terrorist Attack at the Indian Point Nuclear Power Plant*, Union of Concerned Scientists (September 2004). These three publicly available reports should be used to determine the present and future value of decontamination costs for the four counties in the 10-mile Emergency Planning Zone as well other cities and towns in the New York City-Connecticut-New Jersey metropolitan area that are within 50-mile Emergency Planning Zone.

SUPPORTING EVIDENCE

12. The Sandia *Site Restoration* study analyzed the expected financial costs for cleaning up and decontaminating a mixed-use urban land and midwest farm and range land.

13. The *Site Restoration* study, which was commissioned by the U.S. Department of Energy, estimated the activities likely to be involved in the decontamination of an accident involving the dispersal of plutonium. Although *Site Restoration* studied a scenario in which plutonium from a nuclear weapon is dispersed as a result of an accident resulting from a fire or non-nuclear detonation of the weapon's explosive trigger device, the study's methodology and conclusions to estimate decontamination costs are directly useful to the LRA.

14. The Sandia study recognized that it is extremely difficult to clean up and decontaminate small radioactive particles (*i.e.*, particles ranging in size from a fraction of a micron to a few microns). *See Site Restoration* SAND96-0957, at p. 5-7. Such small-sized particles adhere more readily to objects and become more easily lodged in small cracks, crevices, masonry, fabric, or grass and other vegetation. *Id.* at 5-7 to 5-10. The study examined the costs for extended remediation for mixed-use urban land (defined as having the national average population density of 1,344 persons/km^2), midwest farmland, arid western rangeland, and forested area, and concluded that accident costs would be highest for urban areas. *Id.*, Executive Summary, at x, xiii.

15. *Site Restoration* recognized that earlier estimates (such as those incorporated within the MACCS codes) of decontamination costs are incorrect because they examined fallout from the nuclear explosion of nuclear weapons that produce large particles and high mass loadings (*i.e.*, particles ranging in size from tens to hundreds of microns). *Id*. at 2-9 to 2-10, 5-7. In the words of SAND96-0957, "[d]ata on recovery from nuclear explosions that have been publicly

available since the 1960's appear to have been misinterpreted, which has led to long-standing underestimates of the potential economic costs of severe reactor accidents." *Id.*, at 2-10.

16. For an extended decontamination and remediation operation in a mixed-use urban area with an average national population density, *Site Restoration* predicted a clean up cost of $311,000,000/km^2 with on-site waste disposal and $402,000,000/km^2 with off-site disposal. SAND96-0957 at p. 6-4. For a so-called expedited clean up of a heavily-contaminated urban area, *i.e.*, one that is finished within one year, the cost was predicted to be $398,000,000/km^2 using off-site disposal and $309,000,000/km^2 using on-site waste disposal. *Id.* at 6-5.[33]

17. The costs could be much higher. For a tourism, educational, transportation, and financial center such as the New York metropolitan area, the economic losses stemming from the stigma effects of the dispersion of radioactive material would likely be staggering. The Sandia *Site Restoration* study further recognized that:

> In comparing the numbers of cancer health effects that could result from a plutonium-dispersal accident to those that could result from a severe accident at a commercial nuclear power plant, it is readily apparent that the health consequences and costs of a severe reactor accident could greatly exceed the consequences of even a "worst-case" plutonium-dispersal accident because the quantities of radioactive material in nuclear weapons are a small fraction of the quantities present in an operating nuclear power plant.

Id. at 2-3 to 2-4. All of these costs must be taken into account.

[33]These Sandia *Site Restoration* projections are in 1996 dollars for an area of average population density and did "not include downtown business and commercial districts, heavy industrial areas, or high rise apartment buildings. Inclusion of these areas would increase costs." SAND96-0957, at p. 6-2.

18. Many areas within the Indian Point Emergency Planning Zones have higher population densities and property values than those examined in the Sandia *Site Restoration* report. Accordingly, as part of its analysis, the ER should revise the Sandia results for the densely populated and developed New York City area, incorporate the region's property values, and ensure that the resulting financial costs are expressed in present value (in 2008/2009/2010 dollars) and future value (until 2035, the likely term of any renewed operating license).

19. As noted, two recent studies provide additional information concerning the appropriate cost inputs for evacuation, temporary housing, decontamination, replacement, and disposal activities. Beyea, Lyman, von Hippel, *Damages from a Major Release of ^{137}Cs into the Atmosphere of the United States*, Science and Global Security, Vol. 12, p. 125-136 (2004) (discussing costs of Indian Point accident); Lyman, *Chernobyl on the Hudson? The Health and Economic Impacts of a Terrorist Attack at the Indian Point Nuclear Power Plant*, Union of Concerned Scientists (September 2004).

20. These two studies and the economic model found in the Sandia *Site Restoration* study are currently available to the applicant.[34] The results from this readily available model, as updated and revised for the New York-Connecticut-New Jersey metropolitan area, should be included in the ER and any SAMA analysis conducted as part of this license renewal proceeding.

[34] *See* http://www.osti.gov/bridge/product.biblio.jsp?osti_id=249283&query_id=2.

CONTENTION 13

THE ER SAMA ANALYSIS FOR IP3 IS DEFICIENT BECAUSE IT DOES NOT INCLUDE THE INCREASED RISK OF A FIRE BARRIER FAILURE AND THE LOSS OF BOTH CABLE TRAINS OF IMPORTANT SAFETY EQUIPMENT IN EVALUATING A SEVERE ACCIDENT.

BASIS

1. The LRA for IP3 fails to comply with the requirements of Appendix A, Criterion 3 of 10 C.F.R. Part 50 and Appendix R (Section G.2) of 10 C.F.R. Part 50 because it does not provide "enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating" nor does it meet either of the other two alternate requirements of Section G.2 of Appendix R.

2. This failure of compliance with fundamental safety requirements increases the risk of fire induced failure of redundant safety-related electrically operated equipment. The ER SAMA analysis does not consider the risk of electrical circuits important for safety failing to perform their function due to loss of redundant trains by fire and does not compare the costs of those larger consequences against the cost of mitigating the accident by upgrading the relevant cable and equipment enclosures to meet the requirements of Section G.2 of Appendix R.

3. In a Federal Register Notice dated October 4, 2007, NRC Staff described the relevant cable areas and their importance to plant safety as follows:

> Upper and Lower Electrical Tunnels (Fire Area ETN–4, Fire Zones 7A and 60A, respectively), and the Upper Penetration Area (Fire Area ETN–4, Fire Zone 73A), to the extent that 24-minute rated fire barriers are used to protect redundant safe shutdown trains located in the above fire areas.

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> 41' Elevation CCW Pump Area (Fire Area PAB–2, Fire Zone 1) ENO is requesting a revision of the existing exemptions to the extent that a 30-minute rated fire barrier is provided to protect redundant safe shutdown trains located in the same fire area.

72 Fed. Reg. 56,798-9.

4. The NRC Staff describes the important safety functions involved as follows:

> The underlying purpose of Subsection III.G.2 of 10 CFR 50, Appendix R, is to ensure that one of the redundant trains necessary to achieve and maintain hot shutdown conditions remains free of fire damage in the event of a fire. The provisions of III.G.2.c through the use of a 1-hour fire barrier with fire detectors and an automatic fire suppression system is one acceptable way to comply with this fire protection requirement.

5. The risk involved is that a fire will disable both trains and make it impossible to safely achieve a hot shutdown or maintain a hot shutdown. This risk is not evaluated in the SAMA analysis for IP3. ER at 4-68 to 4-70; IPEEE Vol. 2 at 3-19, 3-38, 3-59 and 3-80.

6. Thus, the statements in the SAMA analysis (ER at 4-68 to 4-70) that the fire hazard has been conservatively modeled are incorrect because they neglect consideration of the loss of redundant cable trains important to safety as a result of the use of only 24 minute or 30 minute barriers in lieu of the 1 hour barrier that is specified in Appendix R.

7. The justification for down-rating the duration for the fire barrier were calculations of the fire durations in the cable tunnel and PAB area. 72 F.R. 57699-700. The fire duration calculations used as inputs only permanently installed combustible materials — totally ignoring

transient combustibles (e.g., flammable cleaning fluids or paint brought in to treat an area) and sabotage or other illegal introduction of flammable materials. *Id*.

8. Such a constrained view of the real world risks of inadvertent or deliberate presence of additional combustibles in these plant areas is indefensible. In fact, at almost the same time as the Staff was excusing the failure of IP3 to conform to Appendix R based on an assumed minimum amount of combustible materials at Fire Area ETN–4, Fire Zones 7A and 60A and Fire Area PAB–2, Fire Zone 1, the Staff was applying Section B.5.b. of the February 25, 2002, Interim Compensatory Measures (ICM) Order (EA-02-026) and related NRC guidance to IP3. Section B.5.b. is based on the reasonable assumption that one tactic of terrorist attacks at a nuclear plant would be to introduce combustible materials and to thus initiate a fire emergency. *See* Safety Evaluation by The Office of Nuclear Reactor Regulation Related to Order No. EA-02-026 Entergy Nuclear Operations, Inc. Indian Point Nuclear Generating Unit Nos. 2 and 3 Docket Nos. 50-247 and 50-286 (July 11, 2007).

9. Thus, there is a realistic basis to assume that a fire in Fire Area ETN–4, Fire Zones 7A and 60A and Fire Area PAB–2, Fire Zone 1could last longer than 24 or 30 minutes due to the presence of unauthorized additional combustible material and the consequence of such a fire could be destruction of redundant trains of electrical cables, thus disabling equipment essential for the safe hot shutdown of the reactor and for safely maintaining hot shutdown.

SUPPORTING EVIDENCE

10. 10 C.F.R. Part 50, Appendix R provides the safety standards for fire protection.

11. 72 Fed. Reg. 56798-701 (October 4, 2007) identifies the deficiencies allowed in the fire protection for IP3 and the Staff basis for allowing those deficiencies.

12. Safety Evaluation by The Office of Nuclear Reactor Regulation Related to Order No. EA-02-026 Entergy Nuclear Operations, Inc. Indian Point Nuclear Generating Unit Nos. 2 and 3 Docket Nos. 50-247 and 50-286 (July 11, 2007), ML071920023 documents the real risk that intentional acts will result in more combustible materials in the plant than those assumed by the Staff in approving the exemption.

CONTENTION 14

THE LICENSE RENEWAL APPLICATION AND SAMA ANALYSIS ARE INCOMPLETE AND INSUFFICIENTLY ANALYZE ALTERNATIVES FOR MITIGATION OF SEVERE ACCIDENTS, IN THAT THEY (A) FAIL TO INCLUDE MORE RECENT INFORMATION REGARDING THE TYPE, FREQUENCY, AND SEVERITY OF POTENTIAL EARTHQUAKES AND (B) FAIL TO INCLUDE AN ANALYSIS OF SEVERE ACCIDENT MITIGATION ALTERNATIVES THAT COULD REDUCE THE EFFECTS OF AN EARTHQUAKE DAMAGING IP1 AND ITS SYSTEMS, STRUCTURES, AND COMPONENTS THAT SUPPORT IP2 AND IP3 ALL IN VIOLATION OF 10 C.F.R. § 51.53(c)(3)(ii)(L).

BASIS

1. On March 22, 1955, ConEd applied to the newly-created Atomic Energy Commission ("AEC") for permission to construct IP1.

2. In May 1956, the AEC issued a construction license to ConEd to build IP1. At that time, the AEC had not developed detailed siting regulations to address seismic or population issues.

3. At present, IP1 is located between IP2 and IP3.

4. Although the NRC approved the mothballing of the reactor in IP1, the Indian Point Nuclear Power Station continues to use various IP1 components. According to the 1980 decommissioning plan for the IP1 reactor, "Unit 1 contains extensive common facilities that are required for the continued operation of Units 2 and 3." *See* Decommissioning Plan for Indian Point Unit 1, § 2.1 (October 1980).[35] For example, the Indian Point Nuclear Power Station uses several IP1 systems, including without limitation: water supply, service boilers, electricities, integrated radwaste system, and nuclear steam generator blowdown purification system. *Id*. The facility also continues to use to IP1's leaking spent fuel pool. In addition, at least some of the IP1 structure, such as the Unit 1 superheater stack, if it were damaged in an earthquake could cause damage to components of IP2 and IP3, including but not limited to, the reactor containment, off-site power supplies, and spent fuel pools. *See, e.g.,* NUREG-1742, Vol. 2, p. 2-8 (identifying Unit 1 superheater stack as a seismic failure constituting a dominant risk contributor).

[35] *See also* Supplemental Environmental Information in Support of Indian Point Unit No. 1, p. 2 (March 1988)(Unit 1 "constitutes an integral part of power generating operations at the Indian Point site"). Both documents may be found in the LRA within "Indian Point No. 1 Safety Analysis Report," which can be found under the file entitled "unit-1-ufsar.pdf."

5. The most recent seismic data reported in the IP1 Safety Analysis Report appears to be over 20 years old and thus does not include a substantial body of new data gathered in the last 20 years from an extensive network of earthquake detection systems. New data developed in the last 20 years disclose a substantially higher likelihood of significant earthquake activity in the vicinity of IP1 that could exceed the earthquake design for the facility.

6. In addition, new data disclose that there is likely to be higher peak ground acceleration and higher response spectral amplitudes for seismic ground motions for the range of high frequencies (HF) between 10 and 100 Hz.

7. New techniques and many modern seismic design aspects of ground motions were not considered for IP1 in the LRA or the accompanying SAMA analysis.

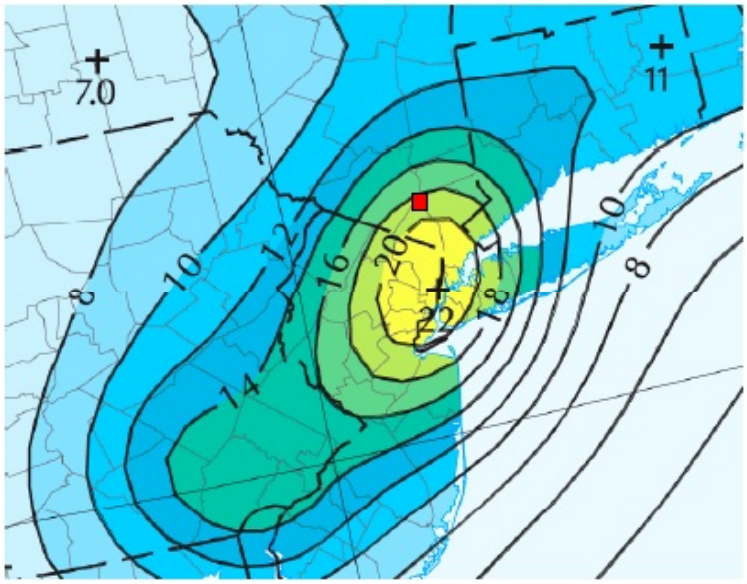
8. Starting in the late nineteen-seventies, about the time when IP2 and IP3 had already obtained their operating licenses, a concerted national research effort in basic and engineering seismology was set in motion. It involved the U.S. Geological Survey, National Science Foundation, FEMA, NIST, and Department of Energy (including several of its National Laboratories) and procedural advancement in the understanding of seismological engineering.

9. This knowledge has been very successfully utilized by the U.S. Geological Survey to produce a new generation of national seismic ground motion hazard maps;[36] they in turn are used as the basic input for a new generation of national seismic (model) codes for buildings (these model codes are usually adopted by state or local jurisdictions to set local regulatory construction

[36] *See, e.g.,* http://earthquake.usgs.gov/research/hazmaps/index.php

standards); similarly, the US Department of Transportation/Federal Highway Administration in cooperation with AASHTO (Association of State Highway Officials) uses much of this knowledge in guidelines to seismically design, construct, and retrofit bridges and other highway structures; the US Environmental Protection Agency uses the same seismic ground motion hazard information in setting standards for the design of municipal solid waste sites/landfills; federal and local agencies charged to execute a nationwide dam safety program have followed a similar model for retrofitting aging dams across the nation . . .

10. For the New York City seismic zone which includes the Indian Point site, the USGS seismic map is as follows:



Portion of the USGS probabilistic seismic\ ground motion map for the region including the Indian Point site (red square). The values contoured are peak ground accelerations (PGA measured as % of the Earth's gravitational acceleration, g, for an exceedance probability of 2% in 50 years. Note that the Indian-Point site is located at the northern edge of a "bulls eye" of higher seismic hazard centered near New York City and adjacent northern New Jersey. The tabulated PGA for the IP site is 0.19g.

11. The October 1980 Decommissioning Plan states in Section 6 "Safety Analysis", p. 29:

> Considering the current mothballed status of Indian Point Uit 1, the plant is adequately designed to protect the public health and safety if subjected to site safe shutdown earthquake.

This statement is not supported with any seismic safety analysis. The supplemental March 1988 document entitled *Supplemental Environmental Information in Support of Indian Point Unit No. 1* states on page 17:

> 5.2.3 Seismic Protection
>
> Con Edison evaluated the seismic capability of the Fuel Handling Building and the Spent Fuel Pools in the September 15, 1974 submittal to the NRC (Reference 11). The results of the analysis previously presented to the NRC indicated that for the postulated earthquake, there could be no damage to the fuel stored in the storage pool. The Fuel Handling Building itself could also withstand the effects of the earthquake, and there would be no structural damage resulting in steel falling into the storage pools. Similarly, the fuel storage racks could withstand the seismic effects without damage to the fuel contained in storage baskets. As stated in the analysis (Reference 11), "The results of these evaluations indicate that no nuclear fuel now present in Indian Point Unit No. 1 would be damaged as a result of an earthquake as severe as the postulated Safe Shutdown Earthquake."

This analysis appears to have been focused on potential damage to the spent fuel assemblies, but not other IP1 systems structures and components.

12. Because the LRA and the SAMA analysis do not take account of the greater present day knowledge regarding the earthquake likelihood and its consequences, those analyses fail to adequately evaluate either the likelihood or the consequences of a severe accident at IP1.

13. In order to reduce the earthquake risk for IP1 (and to the conjoined and adjacent Units 2 and 3), it is necessary to improve the ability of IP1's critical components to withstand the effects of an earthquake.

14. The ER does not consider any measures to mitigate the impact of the more severe earthquakes that more recent data suggest are possible over the next 25 years for the IP1 area.

SUPPORTING EVIDENCE

15. This contention is supported by the Declarations of Lynn R. Sykes and Leonardo Seeburg, of the Lamont Doherty Earth Observatory of Columbia University .

16. This contention is also supported by the references included in the Basis discussion.

CONTENTION 15

THE SEVERE ACCIDENT MITIGATION ALTERNATIVES (SAMA) ANALYSIS FOR INDIAN POINT 2 (ER pages 4-64 to 4-67) AND INDIAN POINT 3 (ER pages 4-68 to 4-71) ARE INCOMPLETE, AND INSUFFICIENTLY ANALYZE ALTERNATIVES FOR MITIGATION OF SEVERE ACCIDENTS IN VIOLATION OF 10 CFR § 51.53(c)(3)(ii)(L).

BASIS

1. The SAMA analysis fails to include more recent information regarding the type, frequency and severity of potential earthquakes and fails to include an analysis of severe accident mitigation alternatives that could reduce the effect of such earthquakes.

2. The most recent seismic data reported in the UFSAR for IP2 and IP3 are over 25 years old and thus do not include a substantial body of new data gathered in the last 25 years from an extensive network of earthquake detection systems.

3. The new engineering seismological findings, accumulating since the IP2 and IP3 licenses were granted in the 1970s, include - but are not limited to - the following:

- Higher peak ground acceleration (PGA) for the IP site (given by the USGS as 0.19g at a probability level commonly used for seismic building codes), compared to 0.1g used for the old OBE design, and 0.15g for SSE safety analyses of IP2/3.

- A peak of 1.5 to 4 times higher response spectral amplitudes for seismic ground motions for the range of high frequencies (HF) between 10 and 100 Hz compared to spectra used by the original OBE and SSE design. Despite assertions by Entergy that IP1/2/3 structures and components are not sensitive to such HF motions, its submitted UFSARs and other documents themselves clearly indicate that many Seismic Category 1 Structures at IP2/3 have their basic (and some higher-) mode responses in this high frequency range, and thus cannot be treated as if behaving rigidly. They are oscillating, subject to response amplifications at these high frequencies.

- Many modern seismic design aspects of ground motions were not considered in the old OBE and SSE designs for IP2/3. They include - but are not limited to: different ratios of Horizontal to Vertical (H/V) ground motions as a function of frequency; incoherency of ground motions leading to torsional seismic loads not previously considered; and, to a lesser degree, actual geological bedrock conditions and how structures interact with these site conditions, essentially having been assumed behaving seismically quasi-rigidly.

4. The discussion of the seismic analysis in the ER discloses only, in summary fashion, that seismic data were taken from the IPEEE submittal by IP2 and IP3 (which are not part of the LRA filing) and lists CDF probability numbers but no discussion or disclosure of the actual assumptions used regarding seismic events that went into calculating those numbers. *See* ER at 4-64 to 4-67 and E. 1-72 to 1-73 and ER at 4-68 to 4-71 and E. 3-68 to 3-69.

5. NUREG-1742 reflects a CDF for IP3 of 5.90E-05. Vol. 2, Table 2-2. IP3 has the highest CDF of all the operating reactors listed in the slide. NUREG-1742, Vol. 2, Table 2.2.

6. In the early and mid-1970's, Nicholas Ratcliffe mapped a series of faults in the vicinity of the Indian Point site. Among other seismic features in the area, Mr. Ratcliffe mapped a ½-mile long fault that travels directly under the containment building for Unit 3. *See* Map entitled Plate IA Geologic map Peekskill quadrangle" (with notation "Geology mapped by N. M. Ratcliffe 1973, 74, 75, 76"). New York State requests that the ASLB and the Commission take official notice of this map.

7. Staff from the Office of the Attorney General have attempted to locate within the April 30, 2007 LRA the graphic representations of the seismic spectra used by the Consolidated Edison Company of New York, Inc., and subsequent owners of IP3 to design and operate this nuclear

power plant so that it can be shut down safely during an earthquake. In particular, the seismic spectra figures were sought for use in evaluating the Entergy's April 30, 2007 application to renew IP3's operating license Entergy Nuclear Northeast. The IP3 seismic spectra figures do not appear to be included as part of the Indian Point Nuclear Generating Unit Nos. 2 and 3 - License Renewal Application.

8. New data, not shown to have been used in doing the IPEEE or SAMA seismic probability or damage analyses, disclose geologically related features in the spatial distribution and fault-rupture geometries of earthquakes that had not been detected 25 years ago and point toward a substantially higher likelihood of earthquake shaking in the vicinity of IP2 and IP3 that could exceed the earthquake design for the facility.

9. Specifically, new data suggest higher peak ground accelerations, and higher response spectral amplitudes for seismic ground motions in the high-frequency range (HF) between 10 and 100 Hz.

10. New techniques and many modern seismic design aspects of ground motions are not sufficiently documented in the LRA, ER or IPEEE to have been considered in the SAMA analysis for IP2 and IP3 (e.g., torsional effects from, and incoherency of, ground motions; and ratios of vertical to horizontal ground motions as a function of frequency).

11. Because the LRA, IPEEE and SAMA analyses do not sufficiently document that they have taken into account the greater knowledge regarding the earthquake likelihood and its consequences, the LRA, IPEEE and SAMA fail to demonstrate whether any analyses that may

have been made (but are not sufficiently documented), adequately evaluate either the likelihood or the consequences of a severe seismic accident at IP2 or IP3. Thus, the assertions in the ER that "A seismic PSA analysis was performed for the seismic portion of the IP2 IPEEE. The seismic PSA analysis was a conservative analysis" (ER at p. 4-65) and that "A seismic PSA analysis was performed for the seismic portion of the IP3 IPEEE. The seismic PSA analysis was a conservative analysis" (ER at p. 4-68), are not supported by the ER, LRA or IPEEE because none of those documents reflect a full analysis of the potential impact of an earthquake on the plant structures and components taking into account all of the new information available regarding earthquakes in the area of Indian Point. By the same token, the assertion that "Conservative assumptions in the seismic PSA analysis" (*id*.) were used is not supported.

12. In order to ensure that the earthquake risk for IP2 and IP3 is at acceptable levels, it may be necessary to improve the ability of critical components of the facility to withstand the effects of an earthquake, or for the LRA to show that such improvements have actually been carried out. Because of the deficiencies in the UFSAR as noted *supra* and *infra*, it is not possible to verify either what improvements have been made to IP2 or IP3 or even to determine what improvements Applicant alleges have been implemented. The IPEEE discloses only that Surge Tank Anchor Bolts (*see* IPEEE Vol. 2 (NUREG 1742) at 2-13) have been upgraded at IP2 and that a new actuation panel for CO2 Systems was "suggested" (*id*.) at IP3.

13. Since the foundation of the SAMA analysis is a calculation of the likelihood of a severe accident, and since the SAMA analysis conducted in the ER fails to demonstrate that

significant new evidence of the risk of more severe consequences of an earthquake was considered and used in the evaluation, the SAMA analysis is fatally flawed in that it does not support a conclusion either that it was conservatively done or that the risks and consequences of reasonably possible severe earthquake induced accidents have been properly evaluated.

14. Thus, the ER does not properly consider all reasonable measures to mitigate the impact of the more hazardous earthquakes that more recent data suggest are possible over the next 30 years for the IP2 and IP3 area.

SUPPORTING EVIDENCE

15. Given these apparent engineering seismological deficiencies and other omissions in the submitted LRA, including missing references to important documents used for the LRA, or avoidance of referring to modern seismological findings and seismic hazard assessments, the State's our experts find that Entergy has failed to prove that the operations of IP2 and IP3 and related support functions by the otherwise "mothballed" IP1, are not posing any undue risks to public safety and the environment under the latest most informed seismic scenarios as given by independent agencies such as the USGS. *See* U.S.G.S. Seismic Map (Contention ¶ 10). There is no evidence that these undue risks are evaluated in the SAMA analysis in a comprehensive and transparent manner.

16. Some of the information that should have been included in the LRA and some of the implications of such information that should have been discussed by the Applicant in its SAMA analysis of the potential hazard from a severe earthquake, are contained in the attached Report of

Lynn R. Sykes, Higgins Professor Emeritus of Earth and Environmental Science, Lamont-Doherty Earth Observatory, of Columbia University. Dr. Sykes concludes that: (1) the application for license renewals for IP2 and IP3 contains very dated information on earthquake hazards; (2) the application for license renewals for IP2 and IP3 underestimates earthquake hazard; (3) updated information on instrumentally-recorded earthquakes is vital to assessments of earthquake hazards to Indian Point; and (4) current earthquake risk as well as hazard need to be considered in safety analyses for Indian Point.

17. The analysis prepared by Leonardo Seeber, Doherty Senior Research Scientist at Lamont-Doherty Earth Observatory of Columbia University, a copy of which is attached, summarily characterizes earthquake activity in intraplate continental regions such as eastern North America, with emphasis on issues directly relevant to earthquake hazard in the greater New York City seismic zone (NYCSZ) and at the Indian Point site. Seeber points out that knowledge about earthquakes in intraplate regions and their relation to geologic features have substantially improved during the last three decades. This progress includes generalities about intraplate areas, where earthquake activity is relatively subdued yet poses significant hazard, as well as specifics about the NYCSZ. Particularly relevant are differences in understanding between the present and the time IP2 and IP3 were licensed. Some of these differences would unambiguously increase the estimated seismic hazard at Indian Point.

18. As Mr. Seeber explains, generally, earthquake activity and tectonics along active plate-boundaries and in intraplate zones were thought to differ in rate, but otherwise to stem from

the same fundamental process and thus to resemble one another qualitatively. Improved observations and understanding revealed distinctions in both the spatiotemporal distribution of earthquakes and their source characteristics. These differences affect algorithms used to derive ground motion from earthquake parameters and thus have important implications for hazard analysis.

19. The CDF numbers used in the ER for IP3 are actually different and lower than those disclosed in the IPEEE and the underlying calculations to support those changes, which involved at most, a new actuation panel for the CO2 system, appear to be primarily based on "updated random component failure probabilities and to model recovery of onsite power and local operation of the turbine-driven AFW pump," *id*., which are not disclosed. *See* IPEEE Vol. 2 (NUREG 1742) at 2-13. In addition, IPEEE notes that NRC Seismic Review Team "identified several 'seismic vulnerabilities' regarding seismically induced fire" but there was "no discussion ... provided in the submittal on improvements for the identified seismic-fire 'vulnerabilities'." *Id.* and IPEEE Vol 2 at 2-78 ("the seismic 'vulnerabilities' identified are: (1) the CO2 system whose rupture poses little risk; (2) the low seismic fragility level of the two 350,000-gallon fire water tanks; (3) the availability of the FPS pumps which are housed in the FPS pump house with masonry block walls; and (4) the marginal lateral support capacity of the fuel tank for the diesel pump.").

20. In addition, the IPEEE for IP3 identifies mean seismic CDF as 5.90E-05 as calculated by EPRI, (NUREG-1742, IPEEE Vol. 2 at 2-5) but the ER starts at the much lower LLNL value

of 4.40E-05, *id*. and ER at 4-68, without any explanation of why the EPRI value was inapplicable or inappropriate, particularly since Entergy claims the calculation it made was "conservative," *id*.

21. Some of the CDF numbers used in the ER for IP2 are actually different and lower than those disclosed in the IPEEE, which apparently involved strengthening Surge Tank Anchor Bolts for IP2, *see* IPEEE Vol. 2 (NUREG 1742) at 2-13. ER at 4-64 to 4-67 and E. 1-72 to 1-73. No calculations are provided to justify the assumed favorable impact of the Surge Tank Anchor Bolt improvement on CDF, but the change does underscore the kind of mitigation measures that should have been considered if the ER SAMA analysis had properly evaluated the earthquake risk.

22. In addition, the IPEEE for IP2 identifies mean seismic CDF as 1.50E-05 (IPEEE Vol. 2 at 2-5) but the ER starts at 1.46E-05 (ER at 4-66).

CONTENTION 16

ENTERGY'S ASSERTION, IN ITS SAMA ANALYSIS FOR IP2 AND IP3, THAT IT "CONSERVATIVELY" ESTIMATED THE POPULATION DOSE OF RADIATION IN A SEVERE ACCIDENT, IS UNSUPPORTED BECAUSE ENTERGY'S AIR DISPERSION MODEL WILL NOT ACCURATELY PREDICT THE GEOGRAPHIC DISPERSION OF RADIONUCLIDES RELEASED IN A SEVERE ACCIDENT AND ENTERGY'S SAMA WILL NOT PRESENT AN ACCURATE ESTIMATE OF THE COSTS OF HUMAN EXPOSURE.

BASIS

1. The SAMA analysis for IP2 assumed a scenario in which no one would be evacuated from a fifty mile radius around the plant and asserted that this "no evacuation scenario" would "conservatively estimate the population dose" of radiation because no one in the area would have his or her exposure minimized by leaving.

2. Entergy has chosen this "no evacuation" scenario to demonstrate that the mitigation alternatives it rejected were not cost beneficial, even when assuming that the reduction in exposure from a mitigation alternative would affect the maximum number of people and would therefore result in the maximum financial benefit to which the cost of a mitigation alternative would be compared.

3. The accuracy of Entergy's assertion that a "no evacuation" scenario will yield the most "conservative" or highest estimate of population dose depends on whether its air dispersion model accurately portrays the geographic areas that will be most affected within the 10 mile Emergency Planning Zone around the plant that actually would be evacuated during a severe

accident. The accuracy of Entergy's air dispersion model is essential to its assertion because population concentrations vary substantially within the ten mile radius around the plant (LRA Appendix E at 2-1). Therefore, the population dose of radiation within that area will depend on the geographic dispersion and concentration of the radionuclides that are released.

4. For example, if an air dispersion model predicts that the highest concentration of radionuclides will center over Peekskill, with a population of 22,400, or Haverstraw, with a population of 33,000, *id.*, then more people will be exposed at a higher dollar cost then if the model predicts that the highest concentration of radionuclides will center over Bear Mountain State Park to the northwest or the U.S. Army Reservation to the north. Because the cost effectiveness of any mitigation alternative depends on the dollar value of a reduction in exposure, then a reduction in exposure in Peekskill or Haverstraw will affect more people and be more valuable than will a reduction in exposure in Bear Mountain State Park.[37]

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[37]In addition, Entergy's projections of the 2035 population likely to be living within 50 miles of Indian Point are suspect and underestimate the potential exposed population. For example, Table 2-5 State and County Population, 50-Mile Radius of IP2 and IP3 on page 2-36 of the ER contains a projection that in 2035 the population of New York County (Manhattan) will be 1,570,657. The United State Census estimates that in 2006 Manhattan's population was 1,611,581, over 40,000 more than Entergy asserts would be at risk 29 years later. *See, e.g.*, U.S. Census Bureau, State and County QuickFacts, New York County, New York, available at http://quickfacts.census.gov/qfd/states/36/36061.html. In its recent submission to the ASLB, New York City contends that as of July 1, 2006 populations of Manhattan and the other four New York City Boroughs were even larger than the Census' estimates for 2006 and that the Census adopted the City's figures in September. *See, e.g.*, New York City Department of City Planning, Population Division, Population Update: the "Current" Population of NYC (2006), available at http://www.nyc.gov/html/dcp/html/census/popcur.shtm.

5. The ability of Entergy's air dispersion model to accurately predict the geographic dispersion and concentration of radionuclides in the area between the 10 mile and 50 mile radius around the plant is also essential to its rejection of 61 of 68 SAMAS as not being cost effective. All of New York City and its densely populated suburbs are within that fifty mile radius and the population dose will be substantially greater if more radioactivity reaches the Bronx or Manhattan than reaches Orange County west of the Hudson River. If Entergy's air dispersion model inaccurately predicts that more radioactivity will reach Orange County than the Bronx or Manhattan, the population dose cost will be inaccurately lower and mitigation alternatives will be improperly rejected as not cost effective.

6. In determining the geographic dispersion of radionuclides released in a severe accident, Entergy used an atmospheric dispersion model known as ATMOS, which is a straight line Gaussian plume model incorporated in the MAACS2 Code. ATMOS will not as accurately predict the dispersion and concentration of radionuclides as will newer EPA approved models such as AERMOD or CAL PUFF. Indeed, the EPA has not authorized the use of the ATMOS air dispersion model to demonstrate compliance with regulatory standards under the Clean Air Act.

7. Moreover, the accuracy of a straight line steady state Gaussian air dispersion model decreases with distance from the source of the release. For that reason, EPA does not approve the use of a straight line steady state Gaussian plume model to predict the dispersion of a pollutant beyond 50 kilometers, or thirty-two miles. Therefore, Entergy's use of the ATMOS

model to predict dispersion in a 50 *mile* radius of the plant, an area which includes the highest population concentrations, is unacceptable.

8. As a straight line steady state Gaussian plume model, ATMOS assumes that meteorological conditions are constant and uniform across the study area for each time period of simulation. It therefore does not account for changes in wind speed or direction during the simulation time period nor can it incorporate differences in terrain that will affect the way in which the release will travel. *See* Declaration of Bruce Egan ¶¶ 22-29, 46. Released material is assumed to travel downwind in a straight line and the concentrations of material in the horizontal and vertical dimensions are assumed to disperse in the shape of a Gaussian or bell curve.

9. Because of the simplicity of its assumptions, the ATMOS model will not yield the most accurate portrayal of the geographic dispersion and concentration of a radioactive release and will therefore not yield the most accurate population dose.

10. Therefore, Entergy's rejection of 61 of the 68 SAMAs considered for IP2 warrants further analysis based on a remodeling of the atmospheric dispersion of a release of radionuclides using a more accurate EPA approved air dispersion model.[38]

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[38]To the extent the Applicant intends to use ATMOS or any similar model that does not incorporate the factors and analyses detailed in the Attached Declaration of Dr. Bruce Egan, to make predictions about the direction and radionuclide content of any off-site release of radionuclides, those calculations will be equally deficient and will provide false information to the public and to emergency response teams. As a result, the Applicant will be unable to meet its obligations under 10 C.F.R. § 50.47(b)(9)("Adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use.").

SUPPORTING EVIDENCE

11. This contention is supported by the attached Declaration of Bruce Egan, Sc.D.

12. This contention is also supported by the references contained in the Basis and in Dr. Egan's Declaration.

CONTENTION 17

THE ENVIRONMENTAL REPORT FAILS TO INCLUDE AN ANALYSIS OF ADVERSE IMPACTS ON OFF-SITE LAND USE OF LICENSE RENEWAL AND THUS ERRONEOUSLY CONCLUDES THAT RELICENSING OF IP2 AND IP3 "WILL HAVE A SIGNIFICANT POSITIVE ECONOMIC IMPACT ON THE COMMUNITIES SURROUNDING THE STATION" (ER SECTION 8.5) AND UNDERSTATES THE ADVERSE IMPACT ON OFF-SITE LAND USE (ER SECTIONS 4.18.4 AND 4.18.5) IN VIOLATION OF 10 C.F.R. PART 51, SUBPART A, APPENDIX B.

BASIS

1. Appendix B to Subpart A of 10 C.F.R. Part 51 requires that off-site land use impacts be evaluated in the ER. Off-site land use impacts cannot be assessed generically and are thus Category 2 issues that fall within the scope of the proceeding. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (NRC 1996) (GEIS) § 4.7.4.2 ("Because land use changes may be perceived by some community members as adverse and by others as beneficial, the staff is unable to assess generically the potential significance of site-specific

off-site land use impacts. This is a Category 2 issue."); *see also* LRA Appendix E § 4.18.4 where the actual findings of the GEIS are erroneously implied to absolve applicant of doing a thorough analysis of the adverse and beneficial impacts of license renewal on off-site land use.

2. The evaluation of these impacts in the ER is deficient because it ignores the positive impact on land use and land value from denial of the license extension for IP2 and IP3 and simultaneously overstates the off-site benefits of license renewal.

3. If the licenses were not renewed, the plants would be decommissioned in 6 years such that the site would be available for unrestricted use and all the nuclear wastes at the site would be gone by 2025.

4. Restoration of the site to unrestricted use will substantially increase the beneficial uses for land adjacent to (within 2 miles) of the Indian Point site and will increase the value of that land.

5. Extended operation of IP2 or IP3 will deprive adjacent lands of the economic recovery that they would otherwise enjoy if IP2 and IP3 are not relicensed.

6. In addition, one of the modifications that extending the license for an additional 20 years will require is providing additional storage for spent fuel generated during the extended period.

7. The spent fuel pools at Indian Point are not sufficient to contain the spent fuel that will be generated during the additional 20 years of operation of IP2 or IP3 and thus dry cask storage is required.

8. This dry cask storage of high level nuclear wastes will create further impacts on the value and potential use of adjacent lands beyond the impacts of the operating nuclear plants.

9. The ER contains no analysis of the environmental impact on adjacent land values that will be associated with the construction and long term operation of a dry cask storage facility at the Indian Point site of a size sufficient to handle the spent fuel from extended operation of either reactor.

10. The ER contains no analysis of the environmental impact that will be associated with the continued use of the Indian Point site for nuclear operations beyond 2025. The ER looks only at tax-driven and population-driven land use impacts, completely ignoring the impact on adjacent lands of the unexpected continued operation of a nuclear generating facility, along with the new impact of dry cask storage.

11. 10 C.F.R. § 54.23 requires the Applicant to submit an environmental report that complies with Subpart A of 10 C.F.R. Part 51.

12. The GEIS identifies Indian Point as a site at which license renewal would produce a "moderate" impact to off-site land use based on a study conducted by the NRC Staff. GEIS Table 4.14. Relying solely on a staff regulatory guide, which it mistakenly believes permits it to ignore the moderate off-site land use impact that the GEIS found would occur at Indian Point, LRA Appendix E § 4.18.4, the ER first ignores the regulatory finding that off-site land use impacts from license extension at Indian Point would be "moderate." LRA Appendix E § 4.18.4.

The ER compounds that error by concluding, based on a faulty analysis, that the off-site land use impacts would be "small."

13. If the licenses for IP2 and IP3 are not extended, owners and potential purchasers of land adjacent to Indian Point can contemplate that the site will be cleared of all nuclear materials and facilities by 2025. Thus, they can begin now to consider development of the adjacent property without concern that the site remains either an operating nuclear facility and/or a storage site for nuclear waste.

14. However, if the licenses are extended for IP2 or IP3, the site will remain nuclear for at least another 20 years and substantial quantities of spent fuel will be stored in dry casks at the site during this period. This will have an adverse impact on the value of adjacent land and its development as compared to what would occur if the licenses were not renewed.

15. Thus, the ER fails to consider reasonable alternatives to mitigate off-site land use impact as required by 10 C.F.R. § 51.53(c)(3)(ii)(I) such that the commission cannot find that the applicable requirements of Appendix B of Subpart A of 10 C.F.R. Part 51 have been satisfied. 10 C.F.R. § 54.29(b).

SUPPORTING EVIDENCE

16. An analysis of off-site land use impacts of license renewal is required by 10 C.F.R. Part 51, Subpart A, Appendix B which identifies such impacts as Category 2 which means "Category 2: For the issue, the analysis reported in the Generic Environmental Impact Statement

has shown that one or more of the criteria of Category 1 cannot be met, and therefore additional plant-specific review is required." *Id*. at n. 2.

17. The Commission has decided by regulation, *see* 10 C.F.R. § 51.23, that by 2025 there will be a permanent off-site high level waste repository sufficient to handle all the wastes that will have been generated by IP1, IP2 and IP3 during their years of operation through 2015.

18. The Commission has also determined that the purpose of decommissioning nuclear facilities "is to take the facility safely from service and to reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of license." FGEIS on decommissioning of nuclear facilities, NUREG 0586 (August 1988) § 1.3. "DECON" is a decommissioning alternative in which "the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations." *Id.* § 2.4.2.

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19. Without considering either (1) the presence of the HI STORM Casks, or (2) the continued presence of an operating nuclear facility on adjacent landowners, the Environmental Report concludes that "new population-driven land use changes at the site during the license renewal term will be SMALL" (emphasis original). LRA Appendix E § 4.18. The Applicant concludes in addition that "the impact to *tax-driven land use changes* from the continued payment of PILOT and property taxes from IP2 and IP3 is expected to be SMALL due to pre-

established land use patterns and controls to guide land use development. Therefore, mitigation measures are not warranted" (italicized emphasis added). *Id.* § 4.18.6.

20. The Applicant further concluded that relicensing would result in benefits to the local community, including "continued PILOT, employee compensation, and local spending, as well as from lower electric energy" prices. *Id.* § 8.4.3.3.

21. However, the Applicant did not even consider the changes in property values associated with the unanticipated continuation of an operating nuclear power generation facility and the associated increase in dry cask storage of spent waste. *See Potential Impacts of Indian Point Relicensing on Property Values*, Stephen C. Sheppard, Ph.D., November 2007 (appended to Declaration of Stephen C. Sheppard, sworn to November 28, 2007).

22. Dr. Sheppard states, relying on *The Effect of Electric Utility Power Plant Location on Area Property Value*, Glenn Blomquist, Land Economics, Vol. 50, No. 1 (Feb., 1974) at 97-100, that "there was a clear and statistically significant impact of [non-nuclear] power plants on property values" up to a distance of 11,500 feet from the facility. *See Potential Impacts of Indian Point Relicensing on Property Values* at p. 2, attached to the Declaration of Stephen C. Sheppard. If anything, the impact of nuclear power plants is even larger. *Id.* At 4.

23. An analysis titled *An Interregional Hedonic Analysis of Noxious Facility Impacts on Local Wages and Property Values*, David Clark and Leslie Nieves, Journal of Environmental Economics and Management, Vol. 27 (1994) at 235-253, concludes, to a reasonable and professionally accepted degree of scientific certainty, that "the impact of nuclear generating

plants is more than 3 times the impact of coal fired plants and more than 4 times the impact of gas and oil fired generating facilities." *Potential Impacts of Indian Point Relicensing on Property Values* at p. 3, attached to the Declaration of Stephen C. Sheppard. This impact is from the facility itself when compared to an alternative use that is also capable of generating employment and income. These properly done studies support the contention that a nuclear power plant may have a significant, not a small, impact on adjacent land values.

24. Data from the 2000 Census demonstrate that, at the time of that census, the total value of residential property within 2 miles of the facility was about $2.2 billion. *Potential Impacts of Indian Point Relicensing on Property Values*. *Id.* At 4. According to Professor Sheppard's calculations, the current market value of residential property within 2 miles of the facility is slightly over $4.3 billion (an increase of 93% from the first quarter of 2000). *Id.* Professor Sheppard calculated, conservatively, that removal of the facility and its spent fuel would increase property values within 2 miles of Indian Point by $576,026,601. *Id.* Plainly, land use impacts of more than a half billion dollars cannot be considered "SMALL" or even "MODERATE."

25. Absent relicensing, the suppressed land values of adjacent property would recover. The Applicant failed to analyze the impact of the relicensing on the property values of adjacent lands and therefore wrongly concluded that, overall, relicensing would "have a significant positive economic impact on the communities surrounding the station." *Id.* § 8.5. The Applicant should have done the "more complete analysis of residential and commercial properties" using

"data from property tax records and land use information" that Dr. Sheppard says is possible.

Absent this analysis, Applicant's land use analysis is incomplete and its conclusions erroneous.

CONTENTION 18

THE LICENSE RENEWAL APPLICATION FOR IP2 AND IP3 FAILS TO COMPLY WITH THE REQUIREMENTS OF 10 C.F.R. § 50.71(e) BECAUSE INFORMATION FROM SAFETY ANALYSES AND EVALUATIONS PERFORMED AT THE NRC'S REQUEST ARE NOT IDENTIFIED OR INCLUDED IN THE UFSAR.

BASIS

1. 10 C.F.R. § 50.71(e) imposes the following obligations on all licensees:

> Each person licensed to operate a nuclear power reactor pursuant to the provisions of Sec. 50.21 or Sec. 50.22 of this part shall update periodically, as provided in paragraphs (e) (3) and (4) of this section, the final safety analysis report (FSAR) originally submitted as part of the application for the operating license, to assure that the information included in the report contains the latest information developed. This submittal shall contain all the changes necessary to reflect information and analyses submitted to the Commission by the licensee or prepared by the licensee pursuant to Commission requirement since the submittal of the original FSAR, or as appropriate the last update to the FSAR under this section. The submittal shall include the effects \1\ of: All changes made in the facility or procedures as described in the FSAR; all safety analyses and evaluations performed by the licensee either in support of approved license amendments, or in support of conclusions that changes did not require a license amendment in accordance with Sec. 50.59(c)(2) of this part; and all analyses of new safety issues performed by or on behalf of the licensee at Commission request. The updated information shall be appropriately located within the update to the FSAR.

2. The purpose of this regulation is to assure that the FSAR accurately describes the plant and the actions taken by the licensee in response to new information or new NRC requirements.

3. The seriousness of the § 50.71(e) requirement is reflected in an attachment to a NRC Staff generic letter issued after adoption of the regulation, where, in answer to a question about the status of the original FSAR after filing of the updated FSAR, the Staff responded, in part: "If, as a result of possible audits, the NRC finds that the updated FSAR is not as certified to by the licensee, appropriate enforcement action would be taken." Generic Letter 81-06 at 1.

4. The Commission has explicitly linked the accuracy of the UFSAR information and the license renewal process and aging management:

> During the license renewal process, the application and the FSAR supplement, together, provide the necessary information and administrative controls to evaluate and help ensure the efficacy of aging programs for these structures and components. After a renewed license is issued, the information in the FSAR supplement serves the dual purposes of (1) assuring that the licensee has considered relevant technical information regarding the evaluation of aging effects for these newly identified systems, structures, and components and (2) establishing appropriate administrative and regulatory controls on the programs that manage aging for these newly identified systems, structures, and components.

Nuclear Power Plant License Renewal; Revisions 1995 WL 301762, *48 (Statement of Considerations).

5. The importance of the UFSAR completeness is also demonstrated by its central role in defining the Current Licensing Basis (CLB), the definition of which includes the following:

> It also includes the plant-specific design-basis information defined in 10 CFR § 50.2 as documented in the most recent final safety analysis report (FSAR) as required by 10 CFR § 50.71 and the licensee's commitments remaining in effect that were made in docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.

10 C.F.R. § 54.3(a).

6. It is not possible to determine all equipment, components and systems that require aging management or whether proposed aging management programs are adequate to perform their intended function unless the UFSAR accurately reflects the status of the plant's safety equipment, components and systems.

7. The report of David Lochbaum provides a partial list of significant safety systems and procedures which IP2 and IP3 have been required to address by NRC generic letters, which have apparently been addressed but for which the analysis, resolution and changes, if any, required by generic letter and addressed by the licensee do not appear in the UFSAR for IP2 and IP3 and/or do not appear in the level of detail required by § 50.71(e).

8. Because the UFSAR is not in compliance with 10 C.F.R. § 50.71(e), is woefully out of date, and fails to contain the detail necessary to even correctly describe and identify all of the systems for which aging management is required, Entergy is unable to provide reasonable assurance that it has a current licensing basis or that its plant is in compliance with its current licensing basis thus violation 10 C.F.R. §§ 54.3(a) and 54.29(a). As the Commission has held the "current licensing basis represents an 'evolving set of requirements and commitments for a specific plant that are modified as necessary over the life of a plant to ensure continuation of an adequate level of safety.' 60 Fed. Reg. at 22,473." *In the Matter of Florida Power & Light Company (Turkey Point Nuclear Generating Plant, Units 3 and 4)* 54 N.R.C. 3, 8 (2001).

Entergy is unable to demonstrate that IP2 or IP3 have achieved, much less will maintain, an adequate level of safety during extended operation.[39]

9. Because the UFSAR is not in compliance with 10 C.F.R. § 50.71(e), is woefully out of date, and fails to contain the detail necessary to even correctly describe and identify all of the safety systems in IP2 and IP3, Entergy's is unable to demonstrate that "[t]here is reasonable assurance (i) that the activities authorized by the operating license can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the regulations in [Part 50]". 10 C.F.R. §50.57(a)(3).

SUPPORTING EVIDENCE

10. In May 1980, the NRC issued a final rule, 10 C.F.R. § 50.71(e), applicable to all licensees of operating power reactors like Indian Point Units 2 and 3. That final rule stated:

> Each person licensed to operate a nuclear power reactor pursuant to the provisions of § 50.21 or § 50.22 shall update periodically, as provided in paragraphs (e)(3) and (e)(4) of this section, the final safety analysis report (FSAR) originally submitted as part of the application for the operating license, to assure that the information included in the FSAR contains the latest material developed.
>
> ***
>
> The updated FSAR shall be revised to include the effects of: all changes made in the facility or procedures as described in the FSAR; all safety evaluations performed by the licensee either in support of requested license amendments or in support of conclusions that changes did not involve an unreviewed safety

[39]Because a license renewal is a replacement of the existing license with a term equal to the requested 20 year extension plus whatever years are left on the current license, the relevant time period which must be evaluated in the license renewal hearing is from the present through the end of the proposed extension. 10 C.F.R. §§ 54.31(b) and (c).

> question; and all analyses of new safety issues performed by or on behalf of the licensee at Commission request. The updated information shall be appropriately located within the FSAR.

The rule had the effect of requiring the FSAR to become a "living document" that is periodically updated to incorporate information regarding applicable modifications to the facility and procedures.

11. In December 1980, the NRC used its generic communications process to remind its licensees about their obligations under the recently promulgated rule.

> The Commission approved the rule 50.71(e) (copy enclosed) entitled "Periodic Updating of Final Safety Analysis Reports" and published the rule in the Federal Register on May 9, 1980. The rule became effective on July 22, 1980.
>
> ***
>
> For non-SEP [Systematic Evaluation Program] plants, the rule requires submittal of the updated FSAR within 24 months of either July 22, 1980, or the date of issuance of the operating license, whichever is later.

Generic Letter 80-110.

12. The NRC's Systematic Evaluation Program (SEP) was an initiative begun in 1977 seeking to compare the licensing bases for 11 older nuclear power reactors (Dresden Units 1&2, Yankee Rowe, Big Rock Point, San Onofre Unit 1, Connecticut Yankee, LaCrosse, Oyster Creek, Ginna, Millstone Unit 1, and Palisades) to current safety regulations. Because IP2 and IP3 were non-SEP reactors, 10 C.F.R. § 50.51(e) required the first update to the FSAR to be submitted to the NRC on or before July 22, 1982.

13. Nearly 15 years later, the NRC and the nuclear industry became aware of compliance problems with the 10 C.F.R. § 50.71(e) requirements. While the most prominent compliance problems surfaced at the Millstone nuclear plant in 1996, the problems extended beyond that one facility and prompted the NRC and the nuclear industry to take steps to remedy the situation.

14. The nuclear industry, via the Nuclear Energy Institute (NEI), developed guidance document NEI 98-03 Rev. 1 in June 1999 outlining the steps needed to comply with 10 C.F.R. § 50.71(e):

> Inspections in 1996-1997 by the NRC and licensees identified numerous discrepancies between UFSAR information and the actual plant design and operation. These findings have raised questions about possible noncompliance with 10 C.F.R. 50.71(e). The industry has developed this guidance in recognition of the importance of the UFSAR, the need to comply with 10 C.F.R. 50.71(e) update requirements, and the need for UFSARs to be consistent with the plant design and operation.

Id.

15. The NRC issued Regulatory Guide 1.181 in September 1999 to clarify its regulatory position on updating the FSARs:

> As a result of lessons learned from the Millstone experience and other initiatives related to UFSARs, the NRC has determined that additional guidance regarding compliance with 10 C.F.R. 50.71(e) is necessary. … In a staff requirements memorandum dated May 20, 1997, the Commission directed the staff, in part, to issue guidance for complying with 10 C.F.R. 50.71(e) so that UFSARs are updated to reflect changes to the design bases and to reflect the effects of other analyses performed since original licensing that should have been included under 10 C.F.R. 50.71(e). This regulatory guide provides the guidance requested by the May 20, 1997, staff requirements memorandum.

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> The objectives of 10 C.F.R. 50.71(e) are to ensure that licensees maintain the information in the UFSAR to reflect the current status of the facility and address new issues as they arise, so that the UFSAR can be used as a reference document in safety analyses.

Id. Among other things, the NRC formally endorsed NEI 98-03 in Regulatory Guide 1.181 as an acceptable method of complying with 10 C.F.R. § 50.71(e), although they readily acknowledged that licensees may employ other methods to comply:

> Revision 1 of NEI 98-03, "Guidelines for Updating Final Safety Analysis Reports," dated June 1999, provides methods that are acceptable to the NRC for complying with the provisions of 10 C.F.R. 50.71(e). … Licensees may use methods other than those proposed in Revision 1 of NEI 98-03 to meet the requirements of 10 C.F.R. 50.71(e). The NRC will determine the acceptability of other methods on a case-by-case basis.

NEI 98-03 Rev. 1. described the FSAR's role:

> UFSARs provide a description of each plant and, per the Supplementary Information for the FSAR update rule, serve as a "reference document to be used for recurring safety analyses performed by licensees, the Commission, and other interested parties." The UFSAR is used by the NRC in its regulatory oversight of a nuclear power plant, including its use as a reference for evaluating license amendment requests and in the preparation for and conduct of inspection activities. For licensees, portions of the UFSAR are used as a reference in evaluating changes to the facility and procedures under the 10 C.F.R. 50.59 change process. The UFSAR also serves to provide the general public a description of the plant and its operation.

Id. NEI 98-03 Rev. 1 described the updates to FSARs required by 10 C.F.R. § 50.71(e):

> Based on analysis of 10 C.F.R. 50.34(b), UFSAR updates should contain the following basic types of information concerning new requirements and information developed since the UFSAR was last updated that are required to be reflected in the UFSAR under 10 C.F.R. 50.71(e):
> " new or modified design bases
> " summary of new or modified safety analyses

" UFSAR description sufficient to permit understanding of new or modified design bases, safety analyses, and facility operation

Id. NEI 98-03 Rev. 1 defined the "safety analyses" covered by the second bullet to be:

> Safety analyses are analyses performed pursuant to Commission requirement to demonstrate the integrity of the reactor coolant pressure boundary, the capability to shut down the reactor and maintain it in a safe shutdown condition, or the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the guidelines in 10 C.F.R. 50.34(a)(1) or 10 C.F.R. 100.11. Safety analyses are required to be presented in the UFSAR per 10 C.F.R. 50.34(b) or 10 C.F.R. 50.71(e) and include, but are not limited to, the accident analyses typically presented in Chapter 14 or 15 of the UFSAR.

Id. NEI 98-03 Rev. 1 described what constituted "new or modified safety analyses" (vice restated safety analyses) and the related level of detail issue for summaries of new or modified safety analyses:

> Licensees should evaluate the effects of analyses or similar evaluations performed by licensees in response to plant-specific NRC requests or NRC generic letters or bulletins. NRC-requested analyses and evaluations must be reflected in UFSAR updates only if, on the basis of the results of the requested analysis of evaluation, the licensee determines that the existing design bases, safety analyses or UFSAR description are either not accurate or not bounding or both. The existing design bases, safety analyses and UFSAR description must be updated to reflect the new information, as appropriate.

Id.

16. While not explicitly addressing the level of detail required for FSARs, 10 C.F.R. § 50.34(b)(2) required that the original FSARs include:

> … description and analysis of the structures, systems, and components of the facility, with emphasis on performance requirements, the bases, with technical justification therefore, upon which such requirements have been established, and the evaluations required to show that safety functions will be accomplished. The

> description shall be sufficient to permit understanding of the system designs and their relationship to safety evaluations.

Id. NEI 98-03 Rev. 1 contained case studies to assist licensees decide what did and did not constitute new or modified safety analyses to be summarized in the FSARs. One case study covered the evaluation required by the NRC by Bulletin 88-04:

> A change to the safety injection system was initiated to address an operability concern identified in NRC Bulletin 88-04, "Potential for Safety-Related Pump Loss." An evaluation of safety injection pump minimum-flow lines resulted in an increase in the recommended minimum-flow rate to preclude hydraulic instability at low flow conditions and assure pump operability. … Because sufficient minimum-flow is necessary to ensure the system is able to perform its intended safety function, the UFSAR description associated with the safety injection system should be modified to include a discussion of the minimum-flow function as it relates to maintaining operability of the safety injection pumps. In some cases, this may entail adding UFSAR discussion of the minimum-flow function where none previously existed.

17. Significantly, neither the Reg. Guide nor the NEI paper authorized a utility to ignore the requirements of 10 C.F.R. § 50.71(e)

18. On October 9, 1996, the NRC requested, pursuant to 10 C.F.R. § 50.54(f), that the licensees of IP2 and IP3 submit material to the NRC, under oath or affirmation, regarding the adequacy and availability of design bases information. The NRC expressly informed the Indian Point licensees that "the NRC staff has found that some licensees have failed to … assure that UFSARs properly reflect the facilities." The NRC described the nexus between these failures and public safety:

> Of particular concern is whether licensee programs are consistent with and are being maintained in accordance with their design bases. The extent of the

> licensees' failures to maintain control and to identify and correct the failures in a timely manner is of concern because of the potential impact on public health and safety should safety systems not respond to challenges from off-normal and accident conditions.

Id. The NRC requested licensees to take five actions, the first being to provide the NRC with a "Description of engineering design and configuration control processes, including those that implement 10 C.F.R. 50.59, 10 C.F.R. 50.71(e), and Appendix B to 10 C.F.R. Part 50." By letter dated February 13, 1997, the licensee for Indian Point Unit 2 responded to the NRC's 10 C.F.R. § 50.54(f) request. The licensee described its process for updating the FSAR:

> The 10 C.F.R. 50.59 evaluations are used to identify updates to the Updated Final Safety Analysis Report (UFSAR). Updates to the UFSAR include the effects of changes made to the facility or procedures described in the USAR, Safety Evaluations performed in support of requested license amendments or conclusions that changes have not involved an unreviewed safety question (USQ) (10 C.F.R. 50.59 process).

Id. By letter dated February 7, 1997, the licensee for IP3 responded to the NRC's 10 C.F.R. § 50.54(f) request. The licensee described its process for updating the FSAR:

> The process for updating the FSAR is controlled by procedure NLP-3 "FSAR Updates." This procedure requires that the FSAR is updated to reflect plant modifications, changes to procedures described in the FSAR, 10C.F.R.50.59 Safety Evaluations, Technical Specification Amendments, NRC correspondence, and to reflect the on resolution of discrepancies [sic].

Id.

19. The FSAR updating processes for IP2 and IP3 were administered by different licensees at that time, but the processes were very similar. Both relied on the 10 C.F.R. § 50.59 process to trigger updates to the FSARs. This regulation controls when and under what

conditions licensees "may make changes in the facility as described in the final safety analysis report (as updated), make changes in the procedures as described in the final safety analysis report (as updated), and conduct tests or experiments not described in the final safety analysis report (as updated)" without first obtaining NRC approval. The 10 C.F.R. § 50.59 processes do not trigger updates to the FSARs for safety analyses performed at the NRC's request unless those safety analyses also involve a plant modification or procedure revision.

20. 10 C.F.R. § 50.71(e) requires NRC licensees of operating nuclear reactors like IP2 and IP3 to periodically update the FSARs for their facilities to include applicable information from safety analyses performed at the NRC's request.

21. NEI's guidance document 98-03 Revision 1 describes a methodology for updating FSARs to conform to 10 C.F.R. § 50.71(e) requirements. This guidance defines "safety analyses" and details what constitutes applicable information from safety analyses performed at the NRC's request to be incorporated into the FSARs.

22. NRC's Regulatory Guide 1.181 endorsed NEI 98-03 Rev. 1 as an acceptable means for conforming to the 10 C.F.R. § 50.71(e) requirements, but provided licensees the option of establishing an alternative means of conformance for the NRC to review and accept.

23. NRC's generic correspondence program uses Regulatory Issue Summaries, Information Notices, Generic Letters, and Bulletins to make licensees aware of relevant operating experience and to require licensees to take certain actions based on that operating experience. Regulatory Issue Summaries and Information Notices involve administrative (e.g., scheduling

testing of candidates for operator licenses) and information awareness matters. Generic Letters and Bulletins typically involve actions NRC requests licensees to take.

24. New York State's expert reviewed NRC Generic Letters and Bulletins issued since 1982, corresponding to when 10 C.F.R. § 50.71(e) required the IP2 and IP3 licensees to begin submitting periodic updates to the FSARs to include applicable information from safety analyses requested by the NRC via these generic correspondence documents. The generic correspondence documents included in this review are listed in Table 1.

25. For IP1, IP2, and IP3, New York State's expert reviewed the licensee responses to the NRC generic correspondence. He also reviewed the latest FSARs for references to this NRC generic correspondence. The responses he reviewed are also listed in Table 1 along with references found within the FSARs.

26. New York State's expert also reviewed the license renewal application for IP2 and IP3 for references to the NRC generic correspondence. Table 1 also indicates the NRC generic correspondence references found in the license renewal application.

27. Summarized below are some of the Table 1 entries. Generally, these summaries indicate what safety analyses were performed by the Indian Point licensees in response to NRC generic correspondence and how that information was, or was not, reflected within the FSARs.

a. NRC Bulletin 82-02

The NRC issued Bulletin 82-02 on June 2, 1982, to licensees of operating pressurized water reactors regarding an age-related degradation mechanism (corrosion) affecting bolts and

studs in the reactor coolant pressure boundary. Specifically, this bulletin informed licensees of significant corrosion of the closure studs for the reactor coolant pumps at Fort Calhoun and of closure studs for a steam generator primary manway at Maine Yankee. This bulletin required licensees to take appropriate steps to reduce the likelihood of similar corrosion problems at their facilities.

The IP2 licensee responded to the NRC on August 2, 1982, reporting that wastage in 8 of the 24 closure studs for reactor coolant pump 23 had occurred due to leakage from the pump's main flange. The IP2 licensee's response also informed the NRC that the reactor coolant pump insulation had been changed from blanket insulation to a preformed metal type to preclude boric acid buildup, and resulting corrosion, in event of future leaks. NRC Bulletin 82-02 is not mentioned in the IP2 FSAR. The design change to the reactor coolant pump insulation type made to prevent significant age-related degradation (corrosion) is not mentioned in the IP2 FSAR.

The licensee's August 2, 1982, response to the NRC for Bulletin 82-02 credited a design change in the type of insulation applied to the reactor coolant pumps in preventing significant age-related degradation from boric acid accumulation. This modification to the plant and its bases was not incorporated into the IP2 FSAR. The role of the preformed metal type insulation in minimizing corrosion, credited in the licensee's response to NRC Bulletin 82-02, is not mentioned in the Indian Point license renewal application.

b. NRC Bulletin 84-03

The NRC issued Bulletin 84-03 on August 24, 1984, to licensees of operating reactors regarding the failure of the refueling cavity water seal at Connecticut Yankee that resulted in approximately 200,000 gallons of water flooding containment. This bulletin required licensees to evaluate the potential for and consequences of a refueling cavity water seal failure at their facilities.

On March 31, 1987, the licensee for IP2 submitted to the NRC safety analyses performed in response to Bulletin 84-03. These safety analyses included evaluations of postulated breaks in 4-inch and 6-inch diameter piping (assumed to occur individually) that results in drainage of water from the refueling cavity. The purpose of these evaluations was to determine if sufficient time existed for the operators to move an irradiated fuel assembly from an elevated position into a safe location before the lowering water level uncovered it. An estimated maximum time of 1.1 hours for the operators to re-position an elevated irradiated fuel assembly was used in the evaluations, which concluded that the calculated draindown times provided at least that amount of time. The submittal also apprised the NRC of the steps the operators would take, in addition to relocating an elevated irradiated fuel assembly, in response to a refueling cavity draindown event. Section 9.5.3.2, Malfunction Analysis, of the Indian Point Unit 2 FSAR states "Various potential failures, which could create paths for drainage from the refueling cavity, have been considered. A plant procedure defines actions to deal with these postulated events." Section 14.2.1, Fuel-Handling Accidents, of the Indian Point Unit 2 FSAR stated "Adequate cooling of

fuel during underwater handling is provided by convective heat transfer to the surrounding water. The fuel assembly is immersed continuously while in the refueling cavity or spent fuel pit." This section summarizes the results from evaluations of three postulated accident: (1) drop of a fuel assembly in the fuel handling building, (2) drop of a fuel assembly inside containment, and (3) drop of a spent fuel storage cask.

The IP2 FSAR has not been updated to reflect the safety analyses performed in response to NRC Bulletin 84-03. The FSAR currently contains a discussion of a fuel handling accident in which fuel rods are damaged from the postulated dropping of a fuel assembly. But the FSAR does not contain a discussion of the other credible fuel handling accident scenario evaluated by the licensee in response to NRC Bulletin 84-03; namely, that fuel rods are damaged by the fuel assembly remaining in place while the refueling cavity water level drops. The associated operator response times and procedural steps to prevent fuel damage in event of water inventory loss have not been incorporated into the IP2 FSAR.

By letter dated November 27, 1984, the licensee for IP3 submitted to the NRC safety analyses performed in response to Bulletin 84-03. These safety analyses included evaluations of various refueling cavity water seal failure modes such as deflection of the seal due to hydrostatic pressure, compressive forces that might push the seal through the annular gap between the reactor vessel flange and the reactor cavity floor, and damage resulting from a fuel assembly dropping onto the seal and deflating it. The safety analyses additionally considered the response time for operators to mitigate a refueling cavity draindown. The submittal informed the NRC

that operators can close the fuel transfer tube gate valve in approximately 20 minutes to isolate the fuel building from the reactor cavity, that operators can move the fuel transfer cart from the fuel building to the containment in approximately 5 minutes, and that operators can lower a fuel assembly in the upender from the vertical position to the horizontal position in approximately 2 minutes. Section 9.5.3, System Evaluation, of the Indian Point Unit 3 FSAR states "An analysis is presented in Chapter 14 concerning damage to one complete outer row of fuel rods in an assembly. This accident is assumed as a conservative limit for evaluating environmental consequences of a fuel handling accident."

The IP3 FSAR has not been updated to reflect the safety analyses performed in response to NRC Bulletin 84-03. The FSAR currently contains a discussion of a fuel handling accident in which fuel rods are damaged from the postulated dropping of a fuel assembly. But the FSAR does not contain a discussion of other credible fuel handling accident scenarios evaluated by the licensee in response to NRC Bulletin 84-03; namely, (a) that fuel rods are damaged by the fuel assembly remaining in place while the refueling cavity water level drops, and (b) that a dropped fuel assembly damages the refueling cavity water seal causing a loss of water inventory. The associated operator response times and procedural steps to prevent fuel damage in event of water inventory loss have not been incorporated into the IP3 FSAR.

c. NRC Bulletin 87-01

The NRC issued Bulletin 87-01 on July 9, 1987, to licensees of operating nuclear reactors regarding a December 1986 event at the Surry nuclear plant that resulted in the deaths of four

workers. Erosion/corrosion of a carbon steel pipe in the feedwater system caused it to rupture and release a two-phase mixture. This bulletin required licensees to take actions to prevent recurrence of this failure at their facilities.

By letter dated September 11, 1987, the licensee for IP2 submitted its response to the bulletin to the NRC. The IP2 licensee informed the NRC "As a result of the Surry event, we have augmented our inspection program to include the following single phase systems: the main feedwater system, the condensate system, the heater drain pump discharge piping and the auxiliary feedwater system." The IP2 licensee also informed the NRC "We are expanding our high energy pipe inspection program. In addition to the extraction steam program, the following systems are being added to that program: condensate, feedwater, moisture separator drains, feedwater heater drains, steam generator blowdown." Section 10.4, Tests and Inspections, of the IP2 FSAR states "In response to NRC IE Bulletin 87-01, an inspection program has been established for piping and fittings in the extraction steam, turbine crossunder, heater drain pump discharge, condensate, feedwater, and auxiliary feedwater systems. UT inspections are utilized to evaluate wall thickness at locations considered to be most susceptible to erosion/corrosion."

By letter dated September 15, 1987, the licensee for IP3 submitted its response to the bulletin to the NRC. The IP3 licensee informed the NRC "As a direct result of the Surry event and other industry reported failures in single phase systems, the Authority undertook an expanded inspection program during the 1987 refueling outage." The discussion of erosion/corrosion piping degradation mechanisms and associated inspection regimes in the IP3

FSAR is limited to steam generator tubes, service water system piping, and emergency core cooling system piping and fails to describe the inspection scope revisions made in response to NRC Bulletin 87-01.

d. NRC Generic Letter 87-12

The NRC issued Generic Letter 87-12 on July 9, 1987, to licensees of pressurized water reactors like IP2 and IP3 regarding lessons learned from a loss of residual heat removal (RHR) cooling during midloop operation at Diablo Canyon. The bulletin required licensees to describe design features and procedures at their facilities that can prevent and/or mitigate loss of cooling events during midloop operations at their facilities.

By letter dated September 29, 1987, the licensee for IP2 informed the NRC that "during RCS draindown, the Residual Heat Removal (RHR) System complies with the licensing basis for IP3 as expressed in the FSAR and the Technical Specifications." The licensee went on to inform the NRC that "recognizing the potential significant of the Containment integrity issues addressed in the generic letter, we have conservatively analyzed offsite radiological consequences of RCS fluid boiloff without Containment integrity" and that the result from this safety analysis led the license to "prohibit draindown of the RCS to the water level where the potential for vortexing of RHR can occur unless the radioactivity level in the primary coolant is at an acceptable limit as defined in the attached analyses." No reference to Generic Letter 87-12 exists in the IP2 FSAR and no discussion of these safety analyses and operational restrictions was found.

By letter dated September 21, 1987, the licensee for IP3 provided the NRC with its response to Generic Letter 87-12. Section 4.3.7, Cold Shutdown RCS Level Indication, of the IP3 FSAR describes the water level instrumentation installed in response to Generic Letters 87-12 and 88-17 - with explicit references to these documents - to monitor reactor coolant system conditions during cold shut down.

e. NRC Generic Letter 88-05

The NRC issued Generic Letter 88-05 on March 17, 1988, to licensees of operating pressurized water reactors including IP2 and IP3 regarding events where reactor coolant leakage below the technical specification limits caused degradation of carbon steel components it contacted. The NRC reported:

> In light of the above experience [boric acid degradation at Turkey Point Unit 4, Salem Unit 2, and Fort Calhoun], the NRC believes that boric acid leakage potentially affecting the integrity of the reactor coolant pressure boundary should be procedurally controlled to ensure continued compliance with the licensing basis. We therefore request that you provide assurances that a program has been implemented consisting of systematic measures to ensure that boric acid corrosion does not lead to degradation of the assurance that the reactor coolant pressure boundary will have an extremely low probability of abnormal leakage, rapidly propagating failure or gross rupture.
>
> ***
>
> The request that licensees provide assurances that a program has been implemented to address the corrosive effects of reactor coolant system leakage at less than technical specification limits constitutes a new staff position. Previous staff positions have not considered the corrosion of external surfaces of the reactor coolant pressure boundary. Based on the frequency and continuing pattern of significant degradation of the reactor coolant pressure boundary that was

> discussed above, the staff now concludes that in the absence of such a program compliance with General Design Criteria 14, 30, and 31 cannot be ensured.

Id.

By letter dated May 31, 1988, the licensee for IP2 submitted a response to the NRC for Generic Letter 88-05. The licensee informed the NRC that its inspection program for boric acid corrosion developed in response to NRC Bulletin 82-02 "has since been expanded to cover more than 350 mechanical connections." Section 4.2.7.3, Locating Leaks, of the IP2 FSAR mentions that "the presence of boric acid crystals near the leak" makes visual observation a method of locating sources of escaping steam of water. Sections 6.7.1.2.1.3, Releases to the Containment Environment; 6.7.1.2.8, Steam Generator Blowdown Liquid Sample Monitor; 6.7.1.2.9, Residual Heat Removal Loop; 6.7.1.2.10, Recirculation Loop; and 6B.0, Operational Experience, contain similar discussions. No mention of Generic Letter 88-05, a boric acid corrosion control program, or an inspection program of mechanical components for borated water leakage and/or boric acid accumulation is found within the IP2 FSAR.

By letter dated June 1, 1988, the licensee for IP3 submitted a response to the NRC for Generic Letter 88-05. The licensee informed the NRC that it had revised procedures at IP3 in response to the generic letter. The licensee informed the NRC that these steps included requiring "prompt repair and clean-up [of boric acid] when the component can be readily made available for maintenance activities" and "an engineering evaluation for continuing operability in those instances where prompt corrective action is impractical." No mention of Generic Letter 88-05, a

boric acid corrosion control program, or an inspection program of piping and components for borated water leakage and/or boric acid accumulation was found within the IP3 FSAR.

In March 2002, workers at the Davis-Besse nuclear plant in Ohio discovered extensive degradation to the reactor vessel head caused by boric acid corrosion. The Davis-Besse licensee had also received Generic Letter 88-05 and committed to the NRC to implement a boric acid corrosion control program. A description of that boric acid corrosion control program was not incorporated into the Davis-Besse FSAR. Neither workers nor NRC inspectors detected over the intervening decade that the boric acid corrosion control program was not being implemented. Had the FSAR been updated to reflect the licensee's response to Generic Letter 88-05 as 10 C.F.R. § 50.51(e) requires, the likelihood would have been reduced that plant workers and NRC inspectors remained unaware of the implementation deficiency across this protracted period.

f. NRC Generic Letter 88-17

The NRC issued Generic Letter 88-17 on October 17, 1988, to licensees of operating pressurized water reactors including IP2 and IP3 requiring actions to be taken to protect against fuel damage and release of radioactivity to the environment caused by reactor coolant system draindown during cold shut down. This generic letter required licensees to "Implement procedures and administrative controls that reasonably assure that containment closure will be achieved prior to the time at which a core uncovery could result from a loss of DHR [decay heat removal] coupled with an inability to initiate alternate cooling or addition of water to the RCS inventory."

By letters dated February 3, 1989, August 22, 1990, September 20, 1991, and July 28, 1997, the licensee for IP2 responded to the NRC regarding Generic Letter 88-17. The licensee informed the NRC that it was installing two separate and diverse reactor coolant system (RCS) water level monitoring systems, adding a control room indicator for operators to monitor residual heat removal (RHR) flow conditions, revising procedures to de-energize two open motor-operated valves (RHR isolation valves MOV-730 and MOV-731) when RHR is operating, establishing a vent pathway prior to RCS draindown to the level where RHR pump vortexing is possible, and adding an alarm function for the RCS water level monitoring system. No mention of Generic Letter 88-17 was found within the IP2 FSAR. Section 5.1.4.2.3, Equipment and Personnel Access Hatches, discusses containment integrity during refueling, but only when "the Reactor Coolant System elevation >66 feet (i.e., not in reduced inventory)" [emphasis in original] which is not the configuration of concern in Generic Letter 88-17. Section 9.3.2.2, Residual Heat Removal Loop, states that "Instrumentation has been provided in the control room to monitor RHR and reactor coolant system level when the system is cooled and depressurized" and describes the design features of this level monitoring instrumentation. Section 7.5.2.1.16, Reactor Coolant System Pressure, describes how pressure instruments provide redundant interlock signals to RHR isolation valves MOV-730 and MOV-731 to prevent them from opening at high RCS pressure, but there is no mention in the FSAR about de-energizing these valves in the open position when RHR is operating during cold shut down with the reactor coolant system partially drained.

g. NRC Bulletin 94-01

The NRC issued Bulletin 94-01 on April 14, 1994, to licensees with irradiated fuel stored in spent fuel pools at permanently shut down nuclear reactors including IP1 regarding lessons learned from an event at Dresden Unit 1 where cold weather caused water to freeze and rupture the pipe containing it.

By letter dated August 11, 1994, the licensee for IP1 submitted its response to the NRC on Bulletin 94-01. The licensee described five key steps in a work plan it developed with the express objective of identifying and quantifying non-evaporative losses of water from the Unit 1 spent fuel pools: (1) isolate the east/west pools containing spent fuel from four smaller pools using new gates, (2) install new water level monitoring instrumentation in the west pool, (3) de-water the four smaller pools, (4) monitor and sample various plant sumps and offsite locations, and (5) perform mass balance inventory calculations to quantify any inventory losses and demonstrate they are being recovered by the plant's subsurface drain system. The licensee also informed the NRC of a "hydro-geological assessment of the potential for any leakage from the storage pools to affect ground water supplies and the range of such influence were it determined to be capable of occurring." The IP1 FSAR contains no mention of Bulletin 94-01, the gates installed to separate the pools, the new spent fuel pool water level instrumentation, the inventory management program, or hydro-geological assessment results.

28. It is apparent from the above descriptions and the remainder of Table 1 that the Indian Point licensees failed to comply with the regulatory requirement in 10 C.F.R. § 50.71(e) to

update the FSARs to reflect safety analyses performed at the request of the NRC. Even the 1996 reminder from the NRC following the problems at Millstone failed to stop the non-compliance problem and to remedy past shortfalls.

29. As a direct consequence of violating this regulation, the IP1, IP2, and IP3 FSARs do not adequately contain all of the required safety analyses information. Because the FSARs are demonstrably incomplete and inaccurate, it is impossible to ascertain the adequacy of the aging management programs for either Indian Point unit. The inadequate FSARs do not fully describe the safety functions performed by structures, systems, and components within the design and licensing bases, making it impossible to first establish that all required structures, systems, and components are properly included within the scope of the aging management programs and impossible to evaluate whether the scope and methodology of the aging management programs for those structures, systems, and components is adequate to provide reasonable assurance that the credited safety functions will be performed.

30. This long history of flagrant disregard for NRC safety requirements by both the previous and current owners of IP2 and IP3 also raise serious questions about the ability or willingness of the current owners to actually implement the aging management programs required to provide reasonable assurance of adequate protection for the public health and safety from extended operation of IP2 and IP3.

31. This contention is also supported by the Report and Table prepared by David Lochbaum and by his Declaration, all of which are attached.

CONTENTION 19

IP2 AND IP3 DO NOT PROVIDE REASONABLE ASSURANCE OF ADEQUATE PROTECTION FOR THE PUBLIC HEALTH AND SAFETY AS REQUIRED BY 10 C.F.R. § 50.57(a)(3) BECAUSE THEY ARE NOT DESIGNED TO MEET THE LEGALLY RELEVANT GENERAL DESIGN CRITERIA AND THUS ALSO VIOLATE 10 C.F.R. §§ 54.33(a), 54.35 and 50.54(h)

BASIS

1. According to the UFSAR for IP2 and IP3, IP2 and IP3 are not in compliance with the relevant general design criteria (GDC), as required by 10 C.F.R. § 54.35, but are only in compliance, at best, with design criteria proposed by a nuclear industry trade association, whose proposed modifications to the GDC have never been adopted by the AEC or the NRC and whose provisions are substantially different from and less stringent than the legally required GDC.

2. The difference between the trade association proposed GDC and the GDC which are legally relevant to IP2 and IP3 are, for the most part, substantive and create significant safety gaps between the design which IP2 and IP3 assert they have met and the design which they are legally required to meet.

SUPPORTING EVIDENCE

3. The UFSAR for IP2 states that "[i]t was the AIF [Atomic Industrial Forum - a nuclear trade association] version of the 1967 General Design Criteria which formed the bases of the Indian Point 2 design and are discussed in this section." IP2 UFSAR Chapter 1, Page 8 of 72,

Revision 20 § 1.3. A copy of the AIF proposals and suggestions for changes to the 1967 GDC is attached.

4. The UFSAR for IP3 states that the "In the July to October 1967 time frame, AIF Incorporated assembled nuclear industry comments and transmitted to the AEC revised wording of the 1967 Draft General Design Criteria along with a description of the changes. It was the AIF version of the 1967 General Design Criteria which formed the bases of the Indian Point 3 design and are discussed in this section."

5. However, the UFSAR for IP3 also states "The General Design Criteria which formed the bases for the Indian Point 3 design were published by the Atomic Energy Commission in the Federal Register of July 11, 1967 and subsequently made part of 10 CFR 50." UFSAR Section 1.3. This statement is not accurate as is apparent from an examination of the actual GDC, quoted in the UFSAR, which are used by IP3 for its design. *See* Chart, attached, for a comparison of the language used in the UFSAR to describe the actual GDC to which IP3 was designed, the AIF draft proposal, which is the same as the quoted language for the GDC from the UFSAR and the actual GDC published by the Commission in 1967 which are the legally relevant GDC for IP3.

6. There are substantial substantive differences between the trade association version of the GDC and the officially promulgated 1967 Draft GDC. The following are examples of the conflicts:

A. **Criterion 50 from 32 FR 10,213 states**: Criterion 50-NDT Requirement for Containment Material (Category A): Principal load carrying components of ferritic materials exposed to the external environment shall be selected so that

their temperatures under normal operating and testing conditions are not less than 30 degrees F above nil ductility transition (NDT) temperature.

Chapter 5, Page 4 of 89 Revision 20 (541/1698) of the Indian Point 2 UFSAR provided as part of the LRA states: 5.1.1.1.7 Nil-ductility Transition Temperature Requirement for Containment Material - Criterion: The selection and use of containment materials shall be in accordance with applicable engineering codes. (GDC 50).

Chapter 5, Page 5 of 188 (826/2108) of the Indian Point 3 UFSAR provided as part of the LRA states: Criterion: The selection and use of containment materials shall be in accordance with applicable engineering codes. (GDC 50 of 7/11/67).

***

Both IP2 and IP3 state compliance with GDC 50. However, both UFSARS have reworded and changed the intent of this GDC 50 by removing the words "Principal load carrying components" and "less than 30 degrees F above nil ductility transition (NDT) temperature" from the regulation.

B. **Criterion 47 from 32 FR 10,213 states**: Criterion 47-Testing of Emergency Core Cooling Systems (Category A). A capability shall be provided to test periodically the delivery capability of the emergency core cooling systems at a location as close to the core as is practical.

Chapter 6, Page 8 of 120 Revision 20 (Page 717/1698) of the IP2 UFSAR provided as part of the LRA states: 6.2.1.4 Testing of Emergency Core Cooling System Criterion: Capability shall be provided to test periodically the operability of the emergency core cooling system up to a location as close to the core as is practical. (GDC 47).

Chapter 6, Page 10 of 215 (Page 1019/2108) of the IP3 UFSAR provided as part of the LRA states: Testing of Emergency Core Cooling System Criterion 47: Capability shall be provided to test periodically the operability of the Emergency Core Cooling System up to a location as close to the core as is practical.

***

Both IP2 and IP3 state compliance with GDC 47. However, the UFSARs have reworded and changed the intent of GDC 47 by removing the words "test

periodically the delivery capability." The "delivery capability" of the Emergency Core Cooling System (ECCS) may be impacted by aging mechanisms such as pipe fouling, erosion, corrosion and heat exchanger tube fouling. The License Renewal Application (LRA) has failed to discuss any Aging Management Program (AMP) to assure that the "delivery capability" of the Emergency Core Cooling System (ECCS) continues to meet the requirements of this GDC.

C. **Criterion 34 from 32 FR 10,213 states**: Criterion 34-Reactor Coolant Pressure Boundary Rapid Propagation Failure Prevention (Category A). The reactor coolant pressure boundary shall be designed to minimize the probability of rapidly propagating type failures. Consideration shall be given (a) to the notch-toughness properties of materials extending to the upper shelf of the Charpy transition curve, (b) to the state of stress of materials under static and transient loadings, (c) to the quality control specified for materials and component fabrication to limit flaw sizes, and (d) to the provisions for control over service temperature and irradiation effects which may require operational restrictions.

Chapter 4, Page 6 of 85 Revision 20 (Page 443/1698) of the IP2 UFSAR provided as part of the LRA States: 4.1.3.4 Reactor Coolant Pressure Boundary Rapid Propagation Failure Prevention Criterion: The reactor coolant pressure boundary shall be designed and operated to reduce to an acceptable level the probability of rapidly propagating type failure. Consideration is given (a) to the provisions for control over service temperature and irradiation effects, which may require operational restrictions, (b) to the design and construction of the reactor pressure vessel in accordance with applicable codes, including those, which establish requirements for absorption of energy within the elastic strain energy range and for absorption of energy by plastic deformation and (c) to the design and construction of reactor coolant pressure boundary piping and equipment in accordance with applicable codes. (GDC 34).

IP3 UFSAR provided as part of the LRA fails to address Criterion 34 from the 1967 GDCs.

***

IP3 makes no commitment to comply with this regulation. IP2 has completely altered the words and the intent of this General Design Criterion by eliminating the following requirements that may be impacted by aging mechanisms within the scope of 10 CFR 54.4:

> (a) to the notch-toughness properties of materials extending to the upper shelf of the Charpy transition curve,
>
> (b) to the state of stress of materials under static and transient loadings,
>
> (c) to the quality control specified for materials and component fabrication to limit flaw sizes, and
>
> (d) to the provisions for control over service temperature and irradiation effects which may require operational restrictions.

7. Throughout the UFSAR when the language of a GDC with which IP2 or IP3 is alleged to be in compliance with is cited, the language is taken from the trade association version of the GDC and not the 1967 Draft GDC.

8. While in a few instances the differences are of little obvious safety significance, in a number of instances the differences are substantial and result in IP2 and IP3 and the trade association illegally "granting" IP2 and IP3 an "exemption" from the applicable safety requirements of the Commission. These substantial differences are highlighted in the attached to the Declaration of Paul Blanch.

9. This contention is supported by the attached Declaration of Paul Blanch and the Chart prepared by him that is attached to that Declaration and is also supported by the references contained in the Declaration and the preceding paragraphs of this Contention.

CONTENTION 20

IP3 DOES NOT PROVIDE REASONABLE ASSURANCE OF ADEQUATE PROTECTION FOR THE PUBLIC HEALTH AND SAFETY AS REQUIRED BY 10 C.F.R. § 50.57(a)(3) AND IS NOT IN COMPLIANCE WITH 10 C.F.R. PART 50, APPENDIX R BECAUSE IT FAILS TO MAINTAIN A FIRE BARRIER WITH A ONE HOUR RATING AND THUS ALSO IS IN VIOLATION OF 10 C.F.R. §§ 54.33(a), 54.35 AND 50.54(h).

BASIS

1. The license renewal application for IP3 fails to comply with the requirements of Appendix A, Criterion 3 of 10 C.F.R. Part 50 and Appendix R (Section G.2) of 10 C.F.R. Part 50 because it does not provide "enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating" nor does it meet either of the other two alternate requirements of Section G.2 of Appendix R.

2. This failure of compliance with fundamental safety requirements violates 10 C.F.R. § 50.54(h), which provides, in pertinent part "[t]he license shall be subject to the provisions of the Act now or hereafter in effect and to all rules, regulations, and orders of the Commission," violates 10 C.F.R. § 54.33(a) which requires that "[w]hether stated therein or not, each renewed license will contain and otherwise be subject to the conditions set forth in 10 CFR 50.54," and violates 10 C.F.R. § 54.35.

3. In an October 4, 2007 Federal Register Notice, NRC Staff approved a variation from Appendix R for IP3 and described the relevant cable areas and the reduction in the fire barrier protection for those areas as follows:

> Upper and Lower Electrical Tunnels (Fire Area ETN–4, Fire Zones 7A and 60A, respectively), and the Upper Penetration Area (Fire Area ETN–4, Fire Zone 73A), to the extent that 24-minute rated fire barriers are used to protect redundant safe shutdown trains located in the above fire areas.
>
> ***
>
> 41' Elevation CCW Pump Area (Fire Area PAB–2, Fire Zone 1) ENO is requesting a revision of the existing exemptions to the extent that a 30-minute rated fire barrier is provided to protect redundant safe shutdown trains located in the same fire area.

72 Fed. Reg. 56,798-9.

4. The NRC Staff describes the important safety functions involved as follows:

> The underlying purpose of Subsection III.G.2 of 10 CFR 50, Appendix R, is to ensure that one of the redundant trains necessary to achieve and maintain hot shutdown conditions remains free of fire damage in the event of a fire. The provisions of III.G.2.c through the use of a 1-hour fire barrier with fire detectors and an automatic fire suppression system is one acceptable way to comply with this fire protection requirement.

5. The risk involved is that a fire will disable both trains and make it impossible to safely achieve a hot shutdown and maintain a hot shutdown. Such a situation violates GDC 15 as applicable to IP3, which provides in relevant part:

> For instruments and control systems in vital areas where the potential consequences of failure require redundancy, the redundant channels must be independent and must be capable of being tested to determine that they remain independent. Sufficient redundancy must be provided that failure or removal from service of a single component or channel wil1 not inhibit necessary safety action when required. These criteria should, where applicable, be satisfied by the instrumentation associated with containment closure and isolation systems, after heat removal and core cooling systems, systems to prevent cold-slug accidents, and other vital systems, as well as the reactor nuclear and process safety system.

6. The justification offered by the Staff for down-rating the duration for the fire barrier were calculations of the fire durations in the cable tunnel and PAB area. 72 Fed. Reg. 57,699-700. The fire duration calculations only used as inputs permanently installed combustible materials - totally ignoring transient combustibles (e.g., flammable cleaning fluids or paint brought in to treat an area) and sabotage or other illegal introduction of flammable materials. *Id*.

7. Such a crabbed view of the real world risks of inadvertent or deliberate presence of additional combustibles in these plant areas is indefensible. In fact, at almost the same time as the Staff was excusing the failure of IP3 to conform to Appendix R based on an assumed minimum amount of combustible materials at Fire Area ETN–4, Fire Zones 7A and 60A and Fire Area PAB–2, Fire Zone 1, the Staff was applying Section B.5.b. of the February 25, 2002, Interim Compensatory Measures (ICM) Order (EA-02-026) and related NRC guidance to IP3. Section B.5.b is based on the reasonable assumption that one tactic of terrorist attacks at a nuclear plant would be to introduce combustible materials and to thus initiate a fire emergency. *See* Safety Evaluation by The Office of Nuclear Reactor Regulation Related to Order No. EA-02-026 Entergy Nuclear Operations, Inc. Indian Point Nuclear Generating Unit Nos. 2 and 3 Docket Nos. 50-247 and 50-286 (July 11, 2007).

8. Thus, there is a realistic basis to assume that a fire in Fire Area ETN–4, Fire Zones 7A and 60A and Fire Area PAB–2, Fire Zone 1could last longer than 24 or 30 minutes due to the presence of unauthorized additional combustible material and the consequence of such a fire

could be destruction of redundant trains of electrical cables, thus disabling equipment essential for the safe hot shutdown of the reactor and for safely maintaining hot shutdown.

SUPPORTING EVIDENCE

9. 10 C.F.R. Part 50, Appendix R provides the safety standards for fire protection.

10. 72 Fed. Reg. 56,798-701 (Oct. 4, 2007) identifies the deficiencies allowed in the fire protection for IP3 and the Staff basis for allowing those deficiencies.

11. The Safety Evaluation by The Office of Nuclear Reactor Regulation Related to Order No. EA-02-026 Entergy Nuclear Operations, Inc. Indian Point Nuclear Generating Unit Nos. 2 and 3 Docket Nos. 50-247 and 50-286 (July 11, 2007) documents the real risk that intentional acts will result in more combustible materials in the plant than those assumed by the Staff in approving the exemption.

CONTENTION 21

INDIAN POINT 1 DOES NOT PROVIDE REASONABLE ASSURANCE OF ADEQUATE PROTECTION FOR THE PUBLIC HEALTH AND SAFETY AS REQUIRED BY 10 C.F.R. § 50.57(a)(3) AND THE UFSAR INSUFFICIENTLY ANALYZES THE PLANT'S CAPABILITY TO WITHSTAND A DESIGN BASIS AND SAFE SHUTDOWN EARTHQUAKE BECAUSE IT FAILS TO INCLUDE MORE RECENT INFORMATION REGARDING THE TYPE, FREQUENCY, AND SEVERITY OF POTENTIAL EARTHQUAKES IN VIOLATION OF 10 C.F.R. §§ 50.54(h), 54.33(a), 54.35 and 10 C.F.R. PART 100, APPENDIX A.

BASIS

1. Although the NRC approved the mothballing of the reactor at IP1, the Indian Point Nuclear Power Station continues to use various IP1 components. According to the 1980 decommissioning plan for the IP1 reactor, "Unit 1 contains extensive common facilities that are required for the continued operation of Units 2 and 3." *See* Decommissioning Plan for Indian Point Unit 1, § 2.1 (October 1980). For example, the Indian Point Nuclear Power Station uses several IP1 systems, including without limitation: water supply, service boilers, electric ties, integrated radwaste system, and nuclear steam generator blowdown purification system. *Id*. The facility also continues to use to IP1's leaking spent fuel pool. In addition, at least some of the IP1 structure, if it were damaged in an earthquake could cause damage to components of IP2 and IP3, including but not limited to, the reactor containment, off-site power supplies and spent fuel pools. *See* IP1 UFSAR, Decommissioning Plan at p. 30 for a diagram of the site and the proximity of IP1 components, like the stack on the Superheater Building, to IP2 and IP3 and many of their safety components.

2. The most recent seismic data reported in the Safety Analysis Report for IP1 appears to be over 20 years old (*see* IP1 UFSAR, Supplemental Environmental Information in Support of Indian Point Unit No. 1 (March 1988) at 17) and thus does not include a substantial body of new data gathered in the last 20 years from an extensive network of earthquake detection systems. New data developed in the last 20 years discloses a substantially higher likelihood of significant earthquake activity in the vicinity of IP1 that could exceed the earthquake design for the facility.

3. In addition, new data discloses that there is likely to be higher peak ground acceleration and higher response spectral amplitudes for seismic ground motions for the range of high frequencies (HF) between 10 and 100 Hz.

4. New techniques and many modern seismic design aspects of ground motions were not considered for IP1 in the UFSAR or the LRA.

5. Because the LRA and the UFSAR do not take account of the greater knowledge regarding the earthquake likelihood and its consequences those analyses fail to adequately evaluate either the likelihood or the consequences of a severe accident at IP1. There has not been an analysis of the new data available on peak ground acceleration, higher response spectral amplitudes for seismic ground motion pursuant to the requirements of 10 C.F.R. Part 100, Appendix A, Sections iv, v and vi.

6. In order to reduce the earthquake risk for IP1 and conform with the requirements of 10 C.F.R. Part 100, Appendix A, it is necessary to fully evaluate the new data and the IP1 design to

determine whether improvements are needed to assure that critical components of the facility can withstand the effects of an earthquake.

SUPPORTING EVIDENCE

7. This contention is supported by the Declarations of Lynn R. Sykes and Leonardo Seeber of the Lamont Doherty Earth Observatory of Columbia University.

8. This contention is also supported by the references included in the Basis discussion.

CONTENTION 22

IP2 AND IP3 DO NOT PROVIDE REASONABLE ASSURANCE OF ADEQUATE PROTECTION FOR THE PUBLIC HEALTH AND SAFETY AS REQUIRED BY 10 C.F.R. § 50.57 (a)(3) AND THE UFSARS FOR IP2 AND IP3 INSUFFICIENTLY ANALYZE EACH UNIT'S CAPABILITY TO WITHSTAND A DESIGN BASIS AND SAFE SHUTDOWN EARTHQUAKE BECAUSE THEY FAIL TO INCLUDE MORE RECENT INFORMATION REGARDING THE TYPE, FREQUENCY AND SEVERITY OF POTENTIAL EARTHQUAKES IN VIOLATION OF 10 C.F.R. §§ 54.33(a), 54.35 and 10 C.F.R. PART 100, APPENDIX A.

BASIS

1. The UFSARs for IP2 and IP3 fail to include more recent information regarding the type, frequency and severity of potential earthquakes and fail to include an analysis of how that data impacts the application of 10 C.F.R. Part 100, Appendix A to each plant.

2. The most recent seismic data reported in the UFSAR for IP2 and IP3 are over 25 years old and thus do not include a substantial body of new data gathered in the last 25 years from an extensive network of earthquake detection systems.

3. The discussion of the seismic analysis in the ER discloses only, in summary fashion, that seismic data was taken from the IPEEE submittal by IP2 and IP3 (which are not part of the LRA filing) and lists core damage frequency ("CDF") probability numbers but no discussion or disclosure of the actual assumptions used regarding seismic events that went into calculating those numbers. *See* ER at pp. 4-64 to 4-67 and E. 1-72 to 1-73 and ER at pp. 4-68 to 4-71 and E. 3-68 to 3-69.

4. New data, not shown to have been used in doing the IPEEE or SAMA seismic probability or damage analyses, discloses geologically related features in the spatial distribution and fault-rupture geometries of earthquakes that had not been detected 25 years ago and point toward a substantially higher likelihood of earthquake shaking in the vicinity of IP2 and IP3 that could exceed the earthquake design for the facility.

5. Specifically, new data suggest higher peak ground accelerations, and higher response spectral amplitudes for seismic ground motions in the high-frequency range (HF) between 10 and 100 Hz.

6. New techniques and many modern seismic design aspects of ground motions are not sufficiently documented in the LRA, ER or IPEEE to have been considered in the SAMA

analysis for IP2 and IP3 (e.g. torsional effects from, and incoherency of, ground motions; and ratios of vertical to horizontal ground motions as a function of frequency).

7. Because the LRA, IPEEE and SAMA analyses do not sufficiently document that they have taken into account the greater knowledge regarding the earthquake likelihood and its consequences, the LRA, IPEEE and SAMA fail to demonstrate whether any analyses that may have been made (but are not sufficiently documented) adequately evaluate either the likelihood or the consequences of a severe seismic accident at IP2 or IP3. Thus, the assertions in the ER that "A seismic PSA analysis was performed for the seismic portion of the IP2 IPEEE. The seismic PSA analysis was a conservative analysis" (ER at p. 4-65) and that "A seismic PSA analysis was performed for the seismic portion of the IP3 IPEEE. The seismic PSA analysis was a conservative analysis" (ER at p. 4-68) are not supported by the ER, LRA or IPEEE because none of those documents reflect a full analysis of the potential impact of an earthquake on the plant structures and components taking into account all of the new information available regarding earthquakes in the area of Indian Point. By the same token the assertion that "Conservative assumptions in the seismic PSA analysis" (*id.*) were used is not supported.

8. In order to ensure that the earthquake risk for IP2 and IP3 is at acceptable levels, it may be necessary to improve the ability of critical components of the facility to withstand the effects of an earthquake, or for the LRA to show that such improvements have actually been carried out. Because of the deficiencies in the UFSAR as noted *supra*, it is not possible to verify either what improvements have been made to IP2 or IP3 or even to determine what

improvements applicant alleges have been implemented. The IPEEE discloses only that Surge Tank Anchor Bolts (*see* IPEEE Vol. 2 (NUREG 1742) at 2-13) have been upgraded at IP2 and that a new actuation panel for CO2 Systems was "suggested" (*id*.) at IP3.

9. The rigorous requirements of 10 C.F.R. Part 100, Appendix A, particularly Sections iv, v and vi, impose a duty on applicant to thoroughly analyze the available seismic data in determining the design necessary for a safe response to the design basis and safe shutdown earthquake. 10 C.F.R. § 100.10(c)(1) provides:

> Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants," describes the nature of investigations required to obtain the geologic and seismic data necessary to determine site suitability and *to provide reasonable assurance that a nuclear power plant can be constructed and operated at a proposed site without undue risk to the health and safety of the public*. It describes procedures for determining the quantitative vibratory ground motion design basis at a site due to earthquakes and describes information needed to determine whether and to what extent a nuclear power plant need be designed to withstand the effects of surface faulting.

Id. (Emphasis added.).

10. Among the requirements imposed by 10 C.F.R. Part 100, Appendix A are:

> **Section iv**: The geologic, seismic and engineering characteristics of a site and its environs shall be investigated in sufficient scope and detail to provide reasonable assurance that they are sufficiently well understood to permit an adequate evaluation of the proposed site, and to provide sufficient information to support the determinations required by these criteria and to permit adequate engineering solutions to actual or potential geologic and seismic effects at the proposed site.
>
> **Section iv(a)**:*Required Investigation for Vibratory Ground Motion* [including] . . . (1) Determination of the lithologic, stratigraphic, hydrologic, and structural geologic conditions of the site and the region surrounding the site, including its geologic history . . . (2) Identification and evaluation of tectonic structures

> underlying the site and the region surrounding the site, whether buried or expressed at the surface. . . . (3) Evaluation of physical evidence concerning the behavior during prior earthquakes of the surficial geologic materials and the substrata underlying the site from the lithologic, stratigraphic, and structural geologic studies . . . (5) Listing of all historically reported earthquakes which have affected or which could reasonably be expected to have affected the site, including the date of occurrence and the following measured or estimated data: magnitude or highest intensity, and a plot of the epicenter or location of highest intensity. . . .

Id.

11. The information identified in the attached declarations and reports by Dr. Sykes and Mr. Seeber is the type of information required to be evaluated and which has not been evaluated for IP2 or IP3 in determining whether these reactors can be operated at this site without undue risk to the public health and safety.

SUPPORTING EVIDENCE

12. New engineering seismological findings, that have accumulated since the IP2 and IP3 licenses were granted in the 1970s, include - but are not limited to - the following:

a. Higher peak ground acceleration (PGA) for the IP site (given by the USGS as 0.19g at a probability level commonly used as the basis for seismic building code applications), compared to 0.1g used for the old OBE design, and 0.15g for SSE safety analyses of IP2 and IP3.

b. A peak of 1.5 to 4 times higher response spectral amplitudes for seismic ground motions for the range of high frequencies (HF) between 10 and 100 Hz compared to spectra used by the original OBE and SSE design. Despite assertions by Entergy that IP1, IP2, and IP3 structures and components are not sensitive to such HF motions, its submitted UFSARs

and other documents themselves clearly indicate that many Seismic Category 1 Structures at IP2 and IP3 have their basic (and some higher) mode responses in this high-frequency range, and thus cannot be treated as if behaving rigidly. They are oscillating, subject to response amplifications at these high frequencies.

c. Many modern seismic design aspects of ground motions were not considered in the old OBE and SSE designs for IP2 and IP3. They include - but are not limited to: different ratios of Horizontal to Vertical (H/V) ground motions as a function of frequency; incoherency of ground motions leading to torsional seismic loads not previously considered; and, to a lesser degree, actual geological bedrock conditions and how structures interact with these site conditions, essentially having been assumed to be behaving seismically quasi-rigidly.

13. Given these apparent engineering seismological deficiencies and other omissions in the submitted LRA, including missing references to important documents used for the LRA, or avoidance of referring to modern seismological findings and seismic hazard assessments, our experts find that Entergy's LRA has failed to transparently demonstrate that the operations of IP2 and IP3 and related support functions by the otherwise "mothballed" IP1, are not posing any undue risks to public safety and the environment under the latest most informed seismic scenarios as given by independent agencies such as the USGS.

14. Some of the information that should have been included in the LRA and some of the implications of such information which should have been discussed by the Applicant in its UFSARs' analysis of the potential hazard from a severe earthquake, are contained in the attached

Report of Lynn R. Sykes, Higgins Professor Emeritus of Earth and Environmental Science, Lamont-Doherty Earth Observatory, of Columbia University.

15. The analysis prepared by Leonardo Seeber, Doherty Senior Research Scientist at Lamont-Doherty Earth Observatory of Columbia University, a copy of which is attached, summarily characterizes earthquake activity in intraplate continental regions such as eastern North America, with emphasis on issues directly relevant to earthquake hazard in the greater New York City seismic zone (NYCSZ) and at the Indian Point site. Mr. Seeber points out that knowledge about earthquakes in intraplate regions and their relation to geologic features have substantially improved during the last three decades. This progress includes generalities about intraplate areas, where earthquake activity is relatively subdued yet poses significant hazard, as well as specifics about the NYCSZ. Particularly relevant are differences in understanding between the present and the time IP2 and IP3 were licensed. Some of these differences would unambiguously increase the estimated seismic hazard at Indian Point.

16. As Mr. Seeber explains, generally, earthquake activity and tectonics along active plate-boundaries and in intraplate zones were thought to differ in rate, but otherwise to stem from the same fundamental process and thus to resemble one another qualitatively. Improved observations and understanding revealed distinctions in both the spatiotemporal distribution of earthquakes and their source characteristics. These differences affect algorithms used to derive ground motion from earthquake parameters and thus have important implications for hazard analysis.

17. The CDF numbers used in the ER for IP3 are actually different and lower than those disclosed in the IPEEE and the underlying calculations to support those changes, which involved at most, a new actuation panel for the CO2 system, appear to be primarily based on "updated random component failure probabilities and to model recovery of onsite power and local operation of the turbine-driven AFW pump" (*id*.) which are not disclosed. *See* IPEEE Vol. 2 (NUREG 1742) at 2-13. In addition, IPEEE notes that NRC Seismic Review Team "identified several 'seismic vulnerabilities' regarding seismically induced fire" but there was "no discussion ... provided in the submittal on improvements for the identified seismic-fire 'vulnerabilities'." *Id.* and IPEEE Vol 2 at 2-78 ("the seismic 'vulnerabilities' identified are: (1) the CO2 system whose rupture poses little risk; (2) the low seismic fragility level of the two 350,000-gallon fire water tanks; (3) the availability of the FPS pumps which are housed in the FPS pump house with masonry block walls; and (4) the marginal lateral support capacity of the fuel tank for the diesel pump.").

18. In addition, the IPEEE for IP3 identifies mean seismic CDF as 5.90E-05 as calculated by EPRI (IPEEE Vol. 2 at 2-5) but the ER starts at the much lower LLNL value of 4.40E-05 (*id*. and ER at p. 4-68) without any explanation of why the EPRI value was inapplicable or inappropriate, particularly since Entergy claims the calculation it made was "conservative." *Id.*

19. Some of the CDF numbers used in the ER for IP2 are actually different and lower than those disclosed in the IPEEE, which apparently involved strengthening Surge Tank Anchor Bolts for IP2 (*see* IPEEE Vol. 2 (NUREG 1742) at 2-13). ER at pp. 4-64 to 4-67 and E. 1-72 to

1-73. No calculations are provided to justify the assumed favorable impact of the Surge Tank Anchor Bolt improvement on CDF, but the change does underscore the kind of mitigation measures that should have been considered if the ER SAMA analysis had properly evaluated the earthquake risk.

20. In addition, the IPEEE for IP2 identifies mean seismic CDF as 1.50E-05 (IPEEE Vol. 2 at 2-5) but the ER starts at 1.46E-05 (ER at p. 4-66).

CONTENTION 23

THE LICENSE RENEWAL APPLICATION FOR IP2 AND IP3 FAILS TO COMPLY WITH THE REQUIREMENTS OF 10 C.F.R. § 54.21(a) BECAUSE THE APPLICANT HAS NOT PROPOSED COMPREHENSIVE BASELINE INSPECTIONS TO SUPPORT ITS RELICENSING APPLICATION AND PROPOSED 20-YEAR LIFE EXTENSIONS

BASIS

1. The applicable regulations, 10 C.F.R. § 54.21, require a preapplication audit and inspection by the applicant and the NRC.

2. The purpose of the integrated plant licensee assessment is to identify those systems, structures and components that fall within the scope of § 54.21(a), and thus are subject to an aging management review to determine the functionality of those structures, systems and components. 10 C.F.R. § 54.3(a).

3. The integrated plant assessment is intended to ensure that the effects of aging on the functionality of such structures, systems and components will be managed to maintain the NRC's current licensing basis. 10 C.F.R. § 54.3(a).

4. The integrated plant assessment is intended to ensure that the effects of aging on the functionality of such structures, systems and components will maintain an "acceptable level of safety" during the period of the facilities' extended operation. 10 C.F.R. § 54.3(a).

5. Entergy's license renewal application fails to provide meaningful inspection data and lacks a comprehensive inspection program for the proposed life extensions. Accordingly, NRC is obligated to conduct a hearing for Entergy's relicensing application for IP2 and IP3. *See* Declaration of Richard T. Lahey, Jr., Ph.D. ¶ 24.

6. As part of the relicensing review, and prior to the commencement of any extended operations, the NRC should require Entergy to conduct a thorough baseline inspection of both IP2 and IP3. These inspections should involve both visual and physical characterization and the non-destructive testing (NDT) of structures and components, including but not limited to the RPV, the RPV heads/fittings, the control rod drive mechanisms and associated RPV penetrations, most RPV internal hardware, and all key welds and fittings in the primary and secondary systems of the reactors. *See* Declaration of Richard T. Lahey, Jr., Ph.D. ¶ 24.

7. Basic engineering principles dictate that any nuclear facility seeking to extend its operations for 20 years beyond its 40-year design life period should be subjected to rigorous inspection and testing by the NRC. *See* Declaration of Richard T. Lahey, Jr., Ph.D. ¶ 25.

SUPPORTING EVIDENCE

8. Conducting baseline inspections of IP2 and IP3 is critical to the aging analysis required by the NRC. Thorough baseline inspections should examine the changes that the plants' systems, structures, and components have experienced during the first three and a half decades of operation. Without proper inspections, the NRC, the applicant, and the public will not have the necessary information to assess whether these plants are in any condition to continue to operate for an additional 20 years. If the answer to that question – whether they can continue to operate for 20 more years – is yes, then the baseline inspections are not wasted since they provide valuable data with which to assess the performance of these already aging plants as they continue to operate and age for 20 more years beyond their original design life of 40 years. Routine, sound engineering practice requires a thorough baseline inspection for the license extension of a nuclear power plant to establish the state of the reactor facility, systems, structures and components at the end of their design life and disclose degradation which may have occurred. The failure to conduct thorough baseline inspections prior to life extension is reckless and runs counter to rudimentary engineering practice. *See* Declaration of Richard T. Lahey, Jr., Ph.D. ¶ 25.

9. The inspection program that Entergy proposes in the license renewal application is vague and ill-defined. *See* LRA Appendix B - Aging Management Programs and Activities. Entergy's license renewal applications state that for most of the facility components, Entergy will "participate in the industry programs for investigating and managing aging effects on reactor

internals and evaluate and implement the results of the industry programs as applicable to the reactor internals." This is inadequate. Absent further detail, there is no way for the State of New York to know what these "industry programs" are, much less to determine whether they are sufficient or effective. This vague, "to-be-determined-later" proposal postpones Entergy's commitment until after the deadline by which all intervenors are scheduled to file their contentions, prejudicing the intervenors, the NRC's regulatory process and monitoring programs, and the public. *See* Lahey Declaration ¶ 26.

10. Moreover, Entergy proposes to delay any inspection process well into the relicensing process, no later than twenty-four months before it starts its extended operations at IP2 and IP3. Again, the lack of data regarding the state of the facility structures and components at the time of application prejudices the NRC regulatory process. ConEd designed IP2 and IP3 in the 1960s. IP1 was designed in the 1950s. The nuclear plants were designed to operate for 40 years, not 60 years. Prior to any decision on relicensing, NRC, the State of New York, other intervenors and the public must be able to evaluate and have confidence in the proposed inspections and the inspection methods to be used to assess baseline information on the condition of IP2 and IP3 at the end of their 40-year design lives. *See* Lahey Declaration ¶ 26.

CONTENTION 24

THE LICENSE RENEWAL APPLICATION FOR IP2 AND IP3 FAILS TO COMPLY WITH 10 C.F.R. § 54.21(a)(1)(i) BECAUSE THE APPLICANT HAS NOT CERTIFIED THE PRESENT INTEGRITY OF THE CONTAINMENT STRUCTURES AND HAS NOT COMMITTED TO AN ADEQUATE AGING MANAGEMENT PROGRAM TO ENSURE THE CONTINUED INTEGRITY OF THE CONTAINMENT STRUCTURES DURING THE PROPOSED LIFE EXTENSIONS

BASIS

1. 10 C.F.R. § 54.21(a)(1)(i) defines systems, structures, and components to include containment systems and structures.

2. The concrete containment domes of IP2 and IP3 constitute nonmoving structures subject to aging management analysis and review by the NRC as part of this proceeding.

3. The NRC current regulations regarding the minimally acceptable water/cement ratio did not exist when the former Atomic Energy Commission issued the initial construction licenses to IP2 and IP3 in the late 1960's.

4. NRC should exercise its regulatory discretion and common sense to require Entergy to conduct enhanced inspections because Entergy's application discloses significant concerns regarding the continuing integrity of the containment structures. *See* Lahey Declaration ¶ 28; LRA, Appendix B, § B.1.7 (Containment Leak rate Program), § B.1.8 (Containment Inservice inspection).

SUPPORTING EVIDENCE

5. Significant concerns exist regarding the continued integrity of the containment due to the water/cement ratio in the IP2 and IP3 containment structures and the proposed aging management and monitoring of those structures during any license renewal term. *See* Lahey Declaration ¶ 28; LRA, Appendix B, § B.1.7 (Containment Leak rate Program), § B.1.8 (Containment Inservice inspection).

6. The water/cement ratio is a measure of the density and strength of the concrete used in steel-lined containment structures; the lower the ratio, the stronger the concrete. After IP2 and IP3 were constructed, the NRC established an acceptable water/cement ratio range of 0.35 to 0.45. When the water/cement ratio exceeds this range, the facility is expected to conduct enhanced inspections to confirm the integrity of concrete in the containment structures. *See* LRA 3.5-6; NUREG 1801 (GALL Report). If enhanced inspections reveal a structural problem, the NRC should order corrective measures and evaluate whether the plant operate safely. *See* Lahey Declaration ¶ 29.

7. According to Entergy, the water/cement ratio for the containment structures at IP2 and IP3 is within the ratio of up to 0.57, *beyond* the NRC's acceptable range of 0.35 to 0.45. LRA at 3.5-6, § 3.5.2.2.1.1. Containment structures, by their very nature, play a critical role in the safe operation of a nuclear power facility. This is particularly important for the two operating reactors at the Indian Point Nuclear Power Station, which has the highest population density of any nuclear power plant operated in the United States. *See, e.g.*, AEC, Population Distribution

Around Nuclear Power Plant Sites (April 17, 1973) at Appendix B. The integrity of the 40-year old concrete containment structures, identified by Entergy in its application, not only immediates enhanced inspections of the two separate containment structures, but also necessitates frequent and regular inspection intervals throughout any license renewal term for each reactor. Entergy has not proposed to conduct enhanced inspections of the containment structures in its relicensing application. NRC should exercise its regulatory authority and discretion to require Entergy to conduct a more thorough and frequent monitoring protocol at IP2 and IP3. *See* LRA, Appendix B, § B.1.7 (Containment Leak Rate Program), § B.1.8 (Containment Inservice inspection).

CONTENTION 25

ENTERGY'S LICENSE RENEWAL APPLICATION DOES NOT INCLUDE AN ADEQUATE PLAN TO MONITOR AND MANAGE THE EFFECTS OF AGING DUE TO EMBRITTLEMENT OF THE REACTOR PRESSURE VESSELS ("RPVs") AND THE ASSOCIATED INTERNALS.

A. Specific Statement of the Issue of Law or Fact to Be Raised or Controverted

1. The LRA does not include an adequate plan to monitor and manage the effects of aging due to embrittlement of the reactor pressure vessels ("RPVs") and the associated internals at both plants, pursuant to 10 C.F.R. § 54.21(a), and an evaluation of time limited aging analysis, pursuant to 10 C.F.R. § 54.21(c).

B. Brief Explanation of the Basis for the Contention

2. As demonstrated in the Declaration of Richard T. Lahey, Jr., Ph.D., submitted in

support of this contention, "embrittlement of the RPVs and their associated internals is one of the most important age-related phenomena that the USNRC must consider in its review of Entergy's relicensing application. Failure to carefully consider the effects of embrittlement could result in a meltdown of the core and a release of a significant amount of radiation subsequent to various accident scenarios." Lahey Declaration, ¶ 6.

3. Although the LRA briefly mentions thermal shocks in Sections A.2.2 (Evaluation of Time-Limited Aging Analysis - Unit 2) and A.3.2 (Evaluation of Time-Limited Aging Analysis - Unit 3) of Appendix A, it does not include any mention that Entergy performed any age-related accident analyses, or that it took embrittlement into account when it assessed the effect of transient loads. As Dr. Lahey stated, "[e]ven more significantly, Entergy's failure to discuss how embrittled RPVs and RPV internal structures and components would respond to the highly transient severe decompression shock loads associated with a [design basis accident] DBA [loss of coolant accident] LOCA is a very serious omission from its relicensing application." Lahey Declaration, ¶ 15. In other words, brittle components cannot withstand shock loads well, and when the shock loads change dramatically, the embrittled components may fail. This, in turn, could mean that the plant could not maintain a coolable geometry of the core. The core could then melt, which would release a significant amount of radiation and possibly cause "a breach of the lower head of the RPV, which would represent a serious challenge to the integrity of the containment structure." Lahey Declaration, ¶ 16.

C. The Issue Raised Is Within the Scope of the Proceeding

4. The State of New York has raised a contention that certain plant systems, structures, and components that require an aging management review will in fact suffer the effects of embrittlement. Concerns over embrittlement apply to the following metal internal RPV structures: "the core barrel, particularly in the 'belt-line' region of the reactor core; the thermal shield; the baffle plates and formers (and the loads on the associated bolts); and the intermediate shells in the core." Lahey Declaration, ¶ 15. Because the issue of embrittlement of the RPV and associated internals requires aging management review as contemplated by section 54.4, this contention is within the scope of this license renewal proceeding.

D. The Issue Raised Is Material to the Findings that the NRC Must Make to Support the Action that is Involved in this Proceeding

5. The issue of embrittlement is material to this relicensing proceeding because, if the petitioner is correct in its contention, the NRC must make certain findings to protect the public health and safety, and the environment, and either deny the license extension, or impose significant modifications on the applicant's operations.

E. Concise Statement of the Facts or Expert Opinion Supporting the Issue and on Which Petitioner Intends to Rely at the Hearing

6. Metals in a pressurized water nuclear reactor need to deform without experiencing failure. Lahey Declaration, ¶ 10. When neutrons bombard metals in the core, which occurs during nuclear fission, those metals can become embrittled. *Id.* When metals become embrittled, they may fail when they are faced with a thermal shock event. *Id.* ¶ 11. In other

words, embrittled metals cannot withstand the thermal shock loads. Experiments have demonstrated that when metals fail in a nuclear power plant, particularly the metals that are in the RPV and the internals closest to the core (e.g., those located in the belt-line region), the core may not be able to maintain a "coolable geometry" and it may melt. *Id.* ¶ 15. The result could be a release of a significant amount of radiation and perhaps breach "the lower head of the RPV, which would represent a serious challenge to the integrity of the containment structure." *Id.* ¶ 16.

7. Entergy's tests (known as "Charpy tests") of in core samples, demonstrate that an intermediate shell in IP2 will not meet the upper shelf energy acceptance criterion of 50ft-lb. Moreover, RPV internals in IP3 imply operational limits for extended life operations due to the high [nil ductility temperature] NDT associated with the predicted irradiation-induced embrittlement.

F. A Genuine Dispute Exists with the Applicant on a Material Issue of Law or Fact

8. The State of New York has provided sufficient information to demonstrate that a genuine dispute exists with the applicant on the material issue of the facts of material fatigue. As set forth above, Entergy has failed to demonstrate that it has considered the effects of embrittlement on the RPV and associated internals.

9. Although Entergy's own data demonstrates that the intermediate shell in IP2 and other internals in IP3 will experience embrittlement concerns, Entergy has not presented any experiments or analysis to justify that the embrittled RPV internal structures will not fail and that a coolable core geometry will be maintained subsequent to a DBA LOCA.

10. In sum, Entergy and the State differ significantly about the appropriate response to known embrittlement concerns at Indian Point. Entergy's approach hardly fosters confidence in its management and operation of these aging plants, and to the contrary, raises serious safety concerns.

CONTENTION 26

ENTERGY'S LICENSE RENEWAL APPLICATION DOES NOT INCLUDE AN ADEQUATE PLAN TO MONITOR AND MANAGE THE EFFECTS OF AGING DUE TO METAL FATIGUE ON KEY REACTOR COMPONENTS.

A. Specific Statement of the Issue of Law or Fact to Be Raised or Controverted

1. The LRA does not include an adequate plan to monitor and manage the effects of aging due to metal fatigue on key reactor components that are subject to an aging management review, pursuant to 10 C.F.R. § 54.21(a), and an evaluation of time limited aging analysis, pursuant to 10 C.F.R. § 54.21(c).

B. Brief Explanation of the Basis for the Contention

2. As demonstrated in the Declaration of Richard T. Lahey, Jr., Ph.D., submitted in support of this contention, "a common figure of merit used to appraise the possibility of fatigue failure is the cumulative usage factor (CUF), which is the ratio of the number of cycles experienced by a structure or component divided by the number of allowable cycles for that structure or component. At a nuclear power plant, the maximum number of cycles that should be

experienced by any structure or component should always result in a CUF of less than 1.0. In other words, the number of actual cycles experienced should always be less than the number of allowable cycles."

3. The data that Entergy provided in the LRA indicate that key components have CUF of greater than 1.0 and thus will have a greater potential to crack and/or fail due to metal fatigue during the proposed license renewal term. This could potentially result in catastrophic failure during steady state, or more likely during anticipated or unanticipated transients. As demonstrated in "D" below, Entergy's response does not adequately respond to this increased potential for catastrophic failure.

C. The Issue Raised Is within the Scope of the Proceeding

4. The State of New York has raised a contention that certain plant systems, structures, and components that require an aging management review will in fact suffer the effects of metal fatigue. Specifically, the applicant's own data demonstrates that (a) the pressurizer surge line piping for IP2 and IP3, (b) the reactor coolant system piping charging system nozzle for IP2, and (c) the pressurizer surge line nozzle for IP3 have exceeded the applicable CUF criterion and thus are at a higher risk for failure due to metal fatigue. Because the issue of metal fatigue of plant systems requires aging management review as contemplated by section 54.4, this contention is within the scope of this license renewal proceeding.

D. The Issue Raised Is Material to the Findings that the NRC Must Make to Support the Action that is Involved in this Proceeding

5. The issue of metal fatigue is material to this relicensing proceeding because, if the petitioners are correct in their contention, the NRC must make certain findings to protect the public health and safety, and the environment, and either deny the license extension, or impose significant modifications on the applicant's operations.

E. Concise Statement of the Facts or Expert Opinion Supporting the Issue and on Which Petitioner Intends to Rely at the Hearing

6. Section 4.3 of the LRA discusses Entergy's time-limited aging analyses ("TLAA") for metal fatigue at IP2 and IP3, and Entergy's compliance with the following requirements of 10 C.F.R. § 54.21(c)(1):

> **54.21 Contents of application--technical information.**
>
> Each application must contain the following information:
> * * *
> (c) An evaluation of time-limited aging analyses.
> (1) A list of time-limited aging analyses, as defined in § 54.3, must be provided. The applicant shall demonstrate that--
> (I) The analyses remain valid for the period of extended operation;
> (ii) The analyses have been projected to the end of the period of extended operation; or
> (iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.
>
> * * *

10 C.F.R. § 54.21(c)(1).

7. Data stated in Tables 4.3-13 (IP2) and 4.3-14 (IP3) of the LRA indicate that some key reactor components will have a greater potential for cracking due to metal fatigue before the years 2033 and 2035, during the period of extended plant operation for each reactor. Entergy's data is summarized as follows:

Component	**Plant**	**Environmentally Adjusted CUF (Entergy's data)**	**Amount of exceedence of 1.0 CUF criterion**
Pressurizer surge line piping	IP2	9.21	nearly 10 times
Pressurizer surge line piping	IP3	9.21	nearly 10 times
Reactor coolant system (RCS) piping charging system nozzle	IP2	15.20	over 15 times
Pressurizer surge line nozzles	IP3	2.35	more than double

8. Component fatigue, which can lead to ultimate failure, is an aging phenomena that results from cyclic mechanical and thermal stresses. Failure from fatigue can result in dangerous pipe ruptures, component malfunction, or the migration of loose pieces of metal through the reactor system, which can interfere with safe operation of a plant.

9. Data stated in Tables 4.3-13 and 4.3-14 indicate that the requirements of 10 C.F.R.§§ 54.21(c)(1)(I) and (ii) are not satisfied because they exceed the CUF on their face.

10. To satisfy section 54.21(c)(1)(iii) – that "the effect of aging on the intended functions(s) will be adequately managed for the period of extended operation" – Entergy states that it will implement one or more of the following:

> (1) Refine the fatigue analyses to determine valid CUFs less than 1 when accounting for the effects of reactor water environment. This includes applying the appropriate Fen factors to valid CUFs determined in accordance with one of the following.
>
> For locations, including NUREG/CR-6260 locations, with existing fatigue analysis valid for the period of extended operation, use the existing CUF to determine the environmentally adjusted CUF.
>
> More limiting IPEC-specific locations with a valid CUF may be added in addition to the NUREG/ CR-6260 locations. In particular, the pressurizer lower shell will be reviewed to ensure the surge nozzle remains the limited component.
>
> Representative CUF values from other plants, adjusted to or enveloping the IPEC plant-specific external loads may be used if demonstrated applicable to IPEC.
>
> An analysis using an NRC-approved version of the ASME code or NRC-approved alternative (e.g., NRC approved code case) may be performed to determine a valid CUF.
>
> (2) Manage the effects of aging due to fatigue at the affected locations by an inspection program that has been reviewed and approved by the NRC (e.g., periodic nondestructive examination of the affected locations at inspection intervals to be determined by a method acceptable to the NRC).
>
> (3) Repair or replace the affected locations before exceeding a CUF of 1.0.

LRA at 4.3-22.

11. Entergy's proposals are vague, incomplete, and lacking in transparency. First, Entergy's proposal to further refine fatigue analysis to lower the predicted CUFs to less than 1.0 suggests that it uses analytical techniques that lend themselves to arbitrary adjustments. Valid scientific techniques do not support adjustments to obtain a predetermined outcome – responding to alarming test results by changing the test is absurd. Second, Entergy's "plan to develop a plan" to manage fatigue at affected locations is too vague to evaluate. Finally, Entergy's

statement that it will "repair or replace" affected components is also an impermissibly vague "plan to develop a plan." The components that are now known to exceed the CUF factor of 1.0 should be replaced immediately. Indeed, it is telling that Entergy admits it has known of these conditions and has failed to make the necessary repairs and replacements.

12. Moreover, an adequate program to identify other components at risk of metal fatigue would include a monitoring plan with a clear inspection schedule. However, Entergy does not commit to this approach in the LRA. A plan to obtain NRC's future approval of a yet-to-be-determined program does not constitute an adequate aging management plan consistent with the intent of 10 C.F.R. §§ 54.21(c)(1)(iii) and 54.21(a)(3).

13. In sum, Entergy has not demonstrated that the TLAA for metal fatigue will remain valid for the entire period of extended operation or that the "effects of aging on the intended functions will be adequately managed for the period of extended operation." 10 C.F.R. §§ 54.21(c)(1), 54.21(a)(3).

F. A Genuine Dispute Exists with the Applicant on a Material Issue of Law or Fact

14. The State of New York has provided sufficient information that a genuine dispute exists with the applicant on the material issue of the facts of material fatigue. As demonstrated above, Entergy has admitted that four key components exceed the CUF criterion of 1.0. Entergy and the State, however, differ as to the legal and factual implications of this admission.

15. To illustrate, Entergy mentions that it will repair or replace these components only as a last resort, not the most obvious and prudent first resort. Moreover, Entergy states that it will

"rework the numbers" (or, in Entergy's words, "refine the fatigue analyses") to "determine valid CUFs less than 1 when accounting for the effects of reactor water environment." By its own words ("determine valid CUFs"), Entergy has prejudged the outcome. This smacks of gaming the license renewal review process. Indeed, Entergy did just this after it filed its license renewal application for the Vermont Yankee Nuclear Power Station. This reworking of the numbers prompted the filing of an additional contention on metal fatigue, which the ASLB admitted in the license renewal proceeding. *See Mtr. of Entergy Nuclear Vermont Yankee, LLC (Vermont Yankee Nuclear Power Station)*, ASLBP No. 06-849-03-LR (Nov. 7, 2007).

16. Finally, Entergy fails to provide any details now – during its license renewal review – of an inspection plan. This hardly provides the State, other intervenors, or the affected public with any meaningful information upon which to critique and comment.

17. In sum, Entergy and the State differ significantly about the appropriate response to known metal fatigue problems at Indian Point. Entergy's approach here hardly fosters confidence in its management and operation of these aging plants.

CONTENTION 27

THE NRC SHOULD REVIEW IN THIS RELICENSING PROCEEDING THE SAFETY OF THE ON-SITE STORAGE OF SPENT FUEL AND THE CONSEQUENCES OF A TERRORIST ATTACK ON ANY OF THE THREE SPENT FUEL POOLS AT INDIAN POINT.

A. Specific Statement of the Issue of Law or Fact to Be Raised or Controverted

1. The NRC should conduct a hearing on Entergy's relicensing application for IP2 and IP3 on the safety of the storage of spent fuel and on the consequences of a terrorist attack on the spent fuel pools at all three of the Indian Point reactors. The three spent fuel pools, which are outside the reinforced containment structure, are vulnerable to a terrorist attack. Should such an attack be successful, it could result in a substantial off-site radiological release that could threaten public health and safety, and the environment – in one of the most heavily populated areas of the western hemisphere and the financial capital of the world.

B. Brief Explanation of the Basis for the Contention

2. This issue arises from the USNRC's severe accident mitigation alternatives analysis (SAMA) and its review of environmental impacts under the National Environmental Policy Act (NEPA). A terrorist attack on the spent fuel pools is a very real possibility. Because the pools are located outside the containment structures, they make attractive targets to terrorists. An attack could result in radiation releases that could cause significant adverse environmental and health effects and property damage in one of the most populated areas of the country – the New York metropolitan area.

3. This contention is based on the experience of the State's expert, Dr. Richard T. Lahey, who served on a committee of the National Research Council of the National Academy of Sciences that studied the issue of the vulnerability of spent fuel pools at nuclear power plants around the United States. The committee was officially called the "Committee on the Safety and Security of Commercial Spent Nuclear Fuel Storage of the Board of Radioactive Waste Management," and it reported directly to the United States Congress.

4. In 2005, the National Research Council published both public and classified reports of the Committee's study, which Dr. Lahey co-authored. For this proceeding, the State of New York requests that the ASLB be allowed to review the National Research Council's confidential report during the license renewal proceedings. The public report, "Safety and Security of Commercial Spent Nuclear Fuel Storage," is attached to Dr. Lahey's Declaration as Exhibit A (National Research Council of the National Academies, *Safety and Security of Commercial Spent Nuclear Fuel Storage: Public Report*, (copyright 2006) (hereinafter *NAS Study*). The Committee studied various possible terrorist attack scenarios and concluded that spent fuel pools, such as those at Indian Point, are indeed vulnerable to such attacks.

5. Specifically, based upon information provided by the NRC, the National Academy of Sciences judged that "attacks with civilian aircraft remain a credible threat." *Id.* at 30. It noted that terrorists might choose to attack spent fuel pools because they are "less well protected structurally than reactor cores" and "typically contain inventories of medium- and long-lived radionuclides that are several times greater than those contained in individual reactor cores." *Id.*

at 36. The National Academy of Sciences concluded that the storage pools are susceptible to fire and radiological release from a wide range of conditions, including intentional attacks with large civilian aircraft. *Id.* at 49, 57.

C. The Issue Raised Is within the Scope of the Proceeding

6. This issue arises from the NRC's severe accident mitigation analysis (SAMA) and its review of environmental impacts under the National Environmental Policy Act (NEPA). A terrorist attack on the spent fuel pools could result in potentially significant off-site radiological releases that could cause significant adverse environmental public health effects and property damage in one of the most populated areas of the country – the New York metropolitan area.

7. The State of New York has raised an environmental contention that falls within the NRC denominated Category 2 list of environmental impacts. Under the heading "Postulated Accidents," the NRC has included a Category 2 impact of "offsite radiological impacts (individual effects from other than the disposal of spent fuel and high level waste)." *Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants,"* 10 C.F.R. Part 51, App. B to Subpart A.

The NRC's explanatory note for the Category 2 issue of "Severe accidents" states:

> The probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to ground water, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives. See [10 C.F.R.] § 51.53(c)(3)(ii)(L).

Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants," 10 C.F.R. Part 51, App. B to Subpart A.

8. The tragic events on September 11, 2001, palpably demonstrate the incorrectness of the NRC's characterization of the "probability weighted consequences" as "small." On September 11, 2001, terrorists hijacked four jet airliners and crashed three of them into their intended targets. The impact of the fuel-laden planes caused explosions and large, long-lasting fires. Those explosions and fires destroyed a portion of the Pentagon in northern Virginia and caused the collapse of the World Trade Center towers and nearby buildings in New York City. *See* Nat'l Comm'n on Terrorist Attacks Upon the U.S. ("9/11 Commission"), *The 9/11 Commission Report* (2004).

9. Two of the hijacked planes flew near or over Indian Point, located a mere twenty-four miles north of New York City. *See id.* at 32. The wind direction at the time of the attacks was towards the southeast – that is, from Indian Point towards New York City. *See id.* at 285. Extrapolating from 2000 census information, more than seventeen million people live within fifty miles of the Indian Point reactors and spent fuel pools. *See* Edwin Lyman, *Chernobyl on the Hudson? The Health & Economic Impacts of a Terrorist Attack at the Indian Point Nuclear Plant* 23 (2004).

10. 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. *The 9/11 Commission Report*, at 154. 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." *Id.* at 245. This was most likely Indian Point.

11. New Yorkers are painfully aware of the vulnerability of the State's infrastructure, and of their own mortality at the hands of terrorists. What happened once can happen again. Government agencies should not turn a blind eye to these very real probabilities and consequences. Even if the NRC's characterization of impacts as improbable or "small" could ever be appropriate in the generic sense, from the State of New York's achingly painful experience and perspective, there is nothing improbable or small about the impacts from a terrorist attack on the spent fuel pools at Indian Point.

12. 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. For instance:

- On January 23, 2002, the NRC issued an alert to the nation's nuclear power plants warning of the potential for an attack by terrorists who planned to crash a hijacked airliner into a nuclear facility. Kenneth R. Bazinet & Richard Sisk, *Plant Attacks Feared*, N.Y. Daily News (Feb. 1, 2002), at 5, *available at* 2002 WL 3165383.

- In his 2002 State of the Union address, President Bush stated that "diagrams of American nuclear power plants" had been found in Afghanistan, suggesting that Al-Qaeda may have been planning attacks on those facilities. *The President's State of the Union Address* (Jan. 29, 2002), *available at* http://www.whitehouse.gov/news/releases/2002/01/20020129-11.html.

- On May 14, 2002, Gordon Johndroe, a spokesman for the Office of Homeland Security, noted that "we know that Al-Qaeda has been gathering information and looking at nuclear facilities and other critical infrastructure as potential targets." Bill Gertz, *Security Boosted at Nuke Facilities*, Wash. Times (May 14, 2002), *available at* http://www.ohiocitizen.org/campaigns/electric/pre2003/ boosted.htm.

- On May 24, 2002, the NRC reported that the nation's nuclear power plants had been placed on heightened alert as a result of information gained by the intelligence community. *Wide-Ranging New Terror Alerts*, CBS News.com (May 26, 2002), *available at* http://www.cbsnews.com/stories/2002/05/24/attack/ main510054.shtml.

- On November 15, 2002, the FBI sent a bulletin to law enforcement agencies, warning them that Al-Qaeda's "highest priority targets remain within the aviation, petroleum, and nuclear sectors." *Text of FBI Terror Warning*, CBSNews.com (Nov. 15, 2002), *available at* http://www/cbsnews.com/stories/2002/ 11/15/attack/main529501.shtml.

- On May 1, 2003, the FBI issued a Threat Communication warning the nuclear plant operators to remain vigilant about suspicious activity that could signal a potential terrorist attack. *FBI Warns of Nuke Plant Danger*, CBS News.com (May 1, 2003), *available at* http://www.cbsnews.com/stories/ 2003/09/04/attack/main571556.shtml.

- On September 4, 2003, the United States General Accounting Office ("GAO") issued a report noting that the nation's commercial nuclear power plants are possible terrorist targets and criticizing the NRC's oversight and regulation of nuclear power plant security. GAO, *Nuclear Regulatory Commission: Oversight of Security at Commercial Nuclear Power Plants Needs to Be Strengthened*, GAO-03-752 (2003); *see also* GAO, Testimony Before the Subcomm. on Nat'l Security, Emerging Threats, & Int'l Relations, House Comm. on Gov't Reform, *Nuclear Power Plants Have Upgraded Security, But the NRC Needs to Improve Its Process for Revising the DBT*, GAO-06-555T, at 1 (2006) [hereinafter "2006 GAO Testimony"] (stating that, "[a]ccording to the [NRC] . . . , there continues to be a general credible threat of a terrorist attack on the nation's commercial nuclear power plants, in particular by al Qaeda and like-minded Islamic terrorist groups").

- On July 1, 2004, the FBI issued a bulletin to 18,000 law enforcement agencies nationwide warning that recent intelligence continued to show al-Qaeda's interest in attacking a range of facilities, including nuclear plants. *FBI's 4th Warning*, CBSNews.com (July 2, 2004), *available at* http://www.cbsnews.com/stories/2004/07/08/national/printable628204.shtml.

13. The Federal Emergency Management Agency, another federal agency responsible for assessing terrorist threats and for assuring the safety and security of the public, has taken actions signifying that it considers an aircraft attack on a nuclear power plant to be a credible threat. For instance, during a June 2004 exercise to assess emergency preparedness at Indian Point, the agency simulated a suicide attack by a large cargo jet. Fed. Emergency Mgmt. Agency, *Final Exercise Report: Indian Point Energy Center* at 101-02 (Oct. 25, 2004)(ML043370046).

14. Additionally, post-9/11 scientific studies confirm that nuclear plants remain vulnerable to airborne attacks that could have catastrophic results. These studies include the 2005 National Academy of Sciences study, cited above. Additionally, the German Reactor Safety Organization, a scientific-technical research group that works primarily for nuclear regulators in Germany, found that large jetliners crashing into nuclear facilities under a variety of scenarios could cause uncontrollable situations and the release of radiation. German Reactor Safety Org., *Protection of German Nuclear Power Plants Against the Background of the Terrorist Attacks in the U.S. on Sept. 11, 2001* (Nov. 27, 2002) [hereinafter GRS Study], *translation available at* http://www.greenpeace.org/raw/content/international/press/reports/protection-of-german-nuclear-p.2.pdf. The NRC received a copy of this document in 2004. *See* March 2, 2004 letter from James Riccio to NRC

Commissioner Nils Diaz, *available at* http://www.greenpeace.org/raw/content/usa/press-center/reports4/letter-to-nrc-regarding-german.pdf (last visited Nov. 29, 2007).

15. The terrorist attacks of 9/11 caused nearly 3,000 deaths. *The 9/11 Commission Report*, at 311. In comparison, a 2004 study by the Union of Concerned Scientists concluded that a major release of radiation from the Indian Point nuclear power plant could kill as many as 44,000 people within a week and more than 500,000 people over time. *See* Lyman, *supra*, at 23.

16. Thus, because the petitioner State of New York has raised an issue of the consequences of a severe accident arising from a terrorist attack on the spent fuel pools at Indian Point, which without question would result in "atmospheric releases, fallout onto open bodies of water, releases to ground water, and societal and economic impacts," this contention is within the scope of this license renewal proceeding.

D. The Issue Raised Is Material to the Findings that the NRC Must Make to Support the Action that is Involved in this Proceeding

17. The National Environmental Policy Act of 1969 ("NEPA") "places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action," and "ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Baltimore Gas & Elec. Co. v. Natural Res. Def. Counsel, Inc.,* 462 U.S. 87, 97 (1983). NEPA requires that federal agencies, including the NRC, take a "hard look" at the environmental impacts of proposed actions, specifically

(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 if the proposed action should be implemented.

42 U.S.C. § 4332.

18. The Ninth Circuit has held that NEPA requires the NRC to study how its actions affect the risk of terrorism. *See San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006), *cert. denied*, 127 S. Ct. 1124 (2007).

19. The NRC's regulations require the applicant include in its Environmental Report a consideration of alternatives to mitigate severe accidents if the NRC 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."

20. Regarding the potential of an attack on the three spent fuel pools at the Indian Point plants, the Generic EIS state that "if such an event were to occur, the resultant damage and radiological release would be no worse than expected from internal events." *See* NRC's Generic Environmental Impact Statement (NUREG-1437 Vol. 1): § 5.3.3.1 (Review of Existing Impact Assessments). The Generic EIS conclusion may be true for a terrorist attack on or within the primary containment, but it is most certainly not true for a terrorist attack on any or all of the three spent fuel pools at Indian Point. Indeed, as Dr. Lahey states, far more radioactivity is present in the spent fuel located in the three spent fuel storage pools at Indian Point than there is in the active core of the two nuclear reactors. Lahey Declaration, ¶ 34.

21. Second, the spent fuel pools are *not* enclosed by a leak-tight containment structure. *Id.* ¶ 35. Rather, they are surrounded by only a confinement building, which is not a leak-tight containment structure. *Id.* Thus, a terrorist attack that leads to pool drainage and a propagating zirconium fire would disperse a significant amount of radiation to the environment. *Id.* The plume of radiation could create significant adverse environmental and health effects and property damage in and around the Indian Point plants and the immediate tri-state area, especially New York City, the financial capital of the world. *Id.* The approximately twenty million people who reside or work within a 50-mile radius of NYC, as well as the trillions of dollars of property in the tri-state region could be seriously disrupted. *Id.*

22. In conclusion, because the State of New York has exposed the fallacy of the premise of the NRC's position – that the possibility of a terrorist attack on spent fuel pools is unlikely and in any event would not produce significant environmental impacts – this issue is material to the environmental and safety findings that the NRC must make to support the action that is involved in this proceeding. Plainly stated, the NRC *cannot* issue a license for an additional 20 years without critically examining the real possibility of a terrorist attack at spent fuel pools that are outside containment at a site located only minutes from Ground Zero.

E. Concise Statement of the Facts or Expert Opinion Supporting the Issue and on Which Petitioner Intends to Rely at the Hearing

23. As set forth in the Declaration of Richard T. Lahey, Ph.D., the potential for a terrorist attack on the spent fuel pools at Indian Point are real, and the consequences are severe. The following summarizes Dr. Lahey's expert opinion:

- The three Indian Point spent fuel pools are located outside the containment buildings and contain large quantities of radioactive material. Lahey Declaration, ¶¶ 32, 35.

- Spent nuclear fuel remains extremely radioactive after it is used in nuclear reactors to generate energy. *Id*. ¶ 32.

- Far more radioactivity is present in the spent fuel located in the three spent fuel storage pools at Indian Point than there is in the active core of the two nuclear reactors. *Id*. ¶ 34.

- Spent fuel pools (large "swimming-pool-like structures") were intended to only store fuel temporarily, to allow the fuel to cool sufficiently so that it could then be transferred to a final disposal site in the United States. *Id*. ¶ 32.

- A terrorist attack could lead to pool drainage and a propagating zirconium fire, which means that a significant amount of radiation could be released to the environment. *Id*. ¶¶ 32, 35.

24. Dr. Lahey's expert opinions are formed from his years of experience and his recent tenure on the Committee of the National Research Council that examined the safety of on-site storage of spent fuel at nuclear power plants in the United States and their very real susceptibility to the threat of a terrorist attack.

F. Genuine Dispute Exists with the Applicant on a Material Issue of Law or Fact

25. The LRA fails to give credence to this critical issue, therefore, a genuine dispute with the Applicant exists on a material issue of law or fact.

26. Moreover, although the NAS Study, co-authored by the State's expert, made several recommendations for mitigation, including the rearrangement of the spent fuel in the storage pools and spray cooling, Entergy has not indicated in its relicensing application that it has adopted these mitigation measures for any of the spent fuel pools at Indian Point. Moving some

spent fuel from the spent fuel pools to dry cask storage will not completely mitigate the threat outlined above as the most highly radioactive fuel generates the most decay heat and thus must remain in the spent fuel pools. In Dr. Lahey's words,

> the two active reactors will continually generate more spent fuel during the proposed renewal period, and because of its decay heat and radioactivity, this spent fuel must remain in the spent fuel pools for some time before it can be moved to dry cask storage (i.e., the natural convective cooling by air in dry cask storage can not keep this fuel cool enough).

Lahey Declaration, ¶ 36.

27. In sum, notwithstanding the uniquely catastrophic consequences, Entergy has shown a remarkable lack of prudence in not taking this threat seriously and in not evaluating mitigation alternatives.

CONTENTION 28

RADIONUCLIDES LEAKING FROM THE IP1 AND IP2 SPENT FUEL POOLS ARE CONTAMINATING GROUNDWATER AND THE HUDSON RIVER, AND NEPA REQUIRES THAT THE NRC EXAMINE THE ENVIRONMENTAL IMPACTS OF THESE LEAKS IN THE CONTEXT OF THIS LICENSE RENEWAL PROCEEDING.

A. Specific Statement of the Issue of Law or Fact to Be Raised or Controverted

1. Radioactive substances – radionuclides – are currently leaking from both the IP1 and IP2 spent fuel pools at Indian Point and are flowing first into groundwater on-site and then off-site into the Hudson River. NEPA requires that the NRC assess the on-site and off-site environmental impacts of these leaks in the context of this license renewal proceeding.

B. Brief Explanation of the Basis for the Contention

2. Entergy acknowledges that a variety of radionuclides are leaking from the spent fuel pools at IP1 and IP2. *See* Environmental Report, Section 5.1 New and Significant Information: Groundwater Contamination, p. 5-4. While the NRC is currently conducting an investigation of these leaks, that inquiry is a separate matter, divorced from the comprehensive, coordinated, long-term inquiry that NEPA requires the NRC to undertake in a license renewal proceeding. Here, the applicant seeks to continue to operate two aging nuclear power plants for an additional 20 years. The NRC's reliance on a separate investigation of a single environmental condition that is conducted outside of the NEPA process is akin to impermissible segmentation under NEPA.

3. As a matter of law, while the NRC may be authorized or required to conduct the investigation for other immediate and obvious reasons, that effort does not and cannot take the place of a comprehensive longer-view NEPA inquiry – with its consideration of the synergistic effects of myriad environmental impacts – attendant to the request for a 20-year license extension of two nuclear power plants.

C. The Issue Raised Is within the Scope of the Proceeding

4. As of 1996 – when the NRC completed the generic EIS for the relicensing of plants – the former operator of Indian Point thought that the corrective actions that it took to address the leak from the IP1 spent fuel pool and from the liner of the IP2 spent fuel pool were in fact abated. Rice Declaration, ¶¶ 15,18. The current leaks, however, which were detected in 2005,

demonstrated that this belief was not in fact correct. In any event, even if the NRC addressed leaks from spent fuel pools in the abstract in its generic EIS, there is nothing generic about leaking radionuclides at Indian Point, which are contaminating both groundwater and an historic and ecologically significant surface water body – the Hudson River. NEPA requires a site specific inquiry into these leaks in the broader context of the relicensing of IP2 and IP3.

5. Additionally, the NRC's regulations require that a draft EIS include an applicant's status of compliance. 10 C.F.R. § 51.71(c). Certainly, the applicant here is not authorized to leak radionuclides either into groundwater or into the Hudson River. Moreover, a cornerstone of NEPA concerns the analysis of alternatives. Radionuclides will continue to leak from the operation of this plant. NEPA requires that the alternative of a denial of the license renewal application – and its meaning for the dissipation of radioactive leaks – must be analyzed. For example, once the reactors are no longer operating, all of the spent fuel can be removed from the spent fuel pools. Thus, the continuing source of the leak from the IP2 spent fuel pool – which cannot be fully abated during active plant operation – would be removed, leaving the residual contamination.

6. In sum, leaking radionuclides produce environmental impacts and, while the leaks may not fit neatly into the NRC's Category 1 or Category 2 issues, NEPA nonetheless requires that the NRC assess those impacts in the context of this license renewal proceeding. The current side investigation of the leaks is not a part of the Indian Point license renewal proceeding and does

not constitute or even contemplate a 20-year long-term view that NEPA mandates the NRC to perform for this action.

D. The Issue Raised Is Material to the Findings that the NRC Must Make to Support the Action that is Involved in this Proceeding

7. The National Environmental Policy Act of 1969 ("NEPA") "places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action," and "ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Baltimore Gas & Elec. Co. v. Natural Res. Def. Counsel, Inc.,* 462 U.S. 87, 97 (1983). NEPA requires that federal agencies, including the NRC, take a "hard look" at the environmental impacts of proposed actions, specifically

> (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 if the proposed action should be implemented.

42 U.S.C. § 4332.

8. Further, federal agencies may not defer consideration of impacts identified in the NEPA process to post-NEPA process studies. This proposition was clearly stated in *National Wildlife Federation v. Andrus*, 440 F. Supp. 1245 (D.D.C. 1977), where the Department of the Interior proposed to construct a 23-megawatt power plant at an existing dam on the San Juan River in New Mexico. In that case, the plaintiffs raised concerns about the power plant's impact

on aquatic and other wildlife below the dam. While the issue was mentioned in the EIS as one of concern, the Department of the Interior chose to defer its consideration of the issue to studies that would not be completed until completion of the NEPA process and construction of the power plant. The Court rejected the Department of the Interior's deferral of the issue and held that it ran counter to the very purpose of the NEPA process, which was to inform the decision maker before a decision had been rendered. Paraphrasing the Court, by merely recognizing a problem and agreeing to study it after a decision to construct the project had already been made would turn the EIS process into a "useless ritual, defeating the purpose of NEPA, and rather making a mockery of it." *Id.* at 1252.

9. Here, the NRC would be engaging in a form of segmentation if it failed to consider the radioactive storage and leak problem in the NEPA process for the Indian Point LRA. The storage of spent fuel and the leak problem are a direct effect of Indian Point's operations. *See* 40 CFR § 1508.8. The Department of Energy, the NRC's sister agency, on its website, provides an example of segmentation that is nearly on point. It states:

> Think of a proposed action expansively, at least initially, and aim to include rather than exclude activities from the scope of a proposed action. Explanation: If a proposed action involves the generation of waste and could not be implemented without construction of a waste storage facility that otherwise would not be needed, the proposed action must include the storage facility...

http://www.eh.doe.gov/nepa/tools/guidance/reccom/4_4.htm. The DOE's statement can only be distinguished from the Indian Point relicensing matter by the insertion of the word "nuclear power plant" in place of "action."

10. The fact that radionuclides are leaking into groundwater and the Hudson River raises two issues. The first issue concerns what it means for this applicant that the leaks are even occurring. In other words, the question becomes whether a plant operator that cannot prevent multiple leaks of radioactive substances should even qualify for a 20-year license extension. The second issue that the leaks present is their implication for the environmental impacts into groundwater on-site and then to the Hudson River over the next 20 years of plant operation that the applicant now seeks from the NRC.

11. The mere existence of the leaks and their environmental impacts are material to the findings that the NRC must make to support the action that is involved in this license renewal proceeding. These findings are based both on NEPA and the NRC's regulations implementing NEPA. Simply stated, before the NRC can grant a license extension, it must ensure that the operator will operate the plant in a safe and environmentally sound manner. The existence of leaks from spent fuel pools certainly calls into question both safety and environmental impacts and thus the leaks fall within NEPA's mandate to the NRC for a thorough review under NEPA.

E. Concise Statement of the Facts or Expert Opinion Supporting the Issue and on Which Petitioner Intends to Rely at the Hearing

12. As set forth in the Declaration of Timothy B. Rice, no one knows when the leaks began or when they will end. *Id.* ¶¶ 15, 27. Once the spent fuel is completely removed from the IP1 spent fuel pool, residual contamination will continue to occur. *Id.* ¶ 26. Additionally, the leak from the IP2 spent fuel pool will continue because the spent fuel pool will remain in active use. *Id.* ¶ 27. The inability to inspect a large portion of the liner will prevent Entergy from

definitively concluding that no other leaks in the IP2 spent fuel pool exist. *Id.* ¶ 25. Even if the IP2 pool were not in use, residual contamination would continue to occur, as it will for the IP1 spent fuel pool. *Id.* ¶ 27. In any event, the full extent of the leaks in the IP2 spent fuel pool is not known. *Id.* ¶ 25.

13. The leaks present a range of additional environmental and public health impacts:

- Plumes of strontium and tritium had been mapped under the facility. *Id*. ¶ 13.
- Other radioactive constituents, including cesium, cobalt, and nickel, are being released from the IP1 spent fuel pool into groundwater. *Id*. ¶ 20.
- Tritium exposure increases the risk of developing cancer. *Id*. ¶ 10.
- Strontium-90 exposure has been linked to bone cancer, cancer in tissue near contaminated bone, and leukemia. *Id*. ¶ 10.
- Concentrations of tritium from the IP2 spent fuel pool leak were detected in the monitoring wells closest to the IP2 spent fuel pool at levels as high as 30 times the drinking water standard. *Id*. ¶ 16.
- Concentrations of strontium-90 from the IP1 spent fuel pool leak have been detected at almost 14 times the drinking water standard at the monitoring well closest to the IP1 spent fuel pool. *Id*. ¶ 19.
- Concentrations of strontium-90 at a monitoring well close to the Hudson River have been detected at approximately 3.4 times the drinking water standard. *Id.* ¶ 19.
- The presence of these radioactive contaminants beneath and around Indian Point site structures will likely increase the cost and extent of the eventual decommissioning of the reactor facilities. *Id*. ¶ 21.

F. Genuine Dispute Exists with the Applicant on a Material Issue of Law or Fact

14. In the Environmental Report (p. 5-3) submitted with the LRA, Entergy states that the NRC examined tritium contamination of groundwater in section 4.8.2 of the 1996 GEIS. According to Entergy, this means that the leaks from the spent fuel pools cannot be deemed withing the scope of this proceeding. *Id.*

15. Entergy's position is incorrect for a number of reasons. First, NRC's 1996 GEIS review was *not* an inquiry into leaks from spent fuel pools. Second, a number of other radionuclides in addition to tritium are leaking here. These radionuclides include strontium-90, cesium, nickle, and cobalt. As stated above, strontium-90 has been linked to bone cancer, cancer in tissue near contaminated bone, and leukemia. Third, these radionuclides are leaking not only into groundwater, but also into the Hudson River, a magnificent and historic resource of this State. Fourth, the levels of contamination are higher than acceptable limits at various data points on site: tritium at 30 times the drinking water standard, and strontium-90 at almost 14 times, and 3.4 times the drinking water standard.

16. In sum, the leaks into both groundwater and surface water have gone way beyond what the NRC reviewed in the generic EIS in 1996. The extent of the leaks from two spent fuel pools, the variety of radionuclides leaking, the uniqueness of this site and the pathway to the Hudson River, mean that these impacts are significant and render them reviewable under NEPA in this proceeding.

CONTENTION 29

THE ENVIRONMENTAL REPORT FAILS TO ADDRESS EMERGENCY PREPAREDNESS AND EVACUATION PLANNING FOR INDIAN POINT, AND THUS VIOLATES THE REQUIREMENTS OF THE NATIONAL ENVIRONMENTAL POLICY ACT.

1. There has been no catastrophic radiological release from Indian Point requiring evacuation of the surrounding communities in the three plus decades it has been operating. These surrounding communities are home to twenty million people and include the financial capital of the world, New York City. It is fortuitous that no such disaster has occurred. Any radiation release scenario is sure to be a complex and profound event, particularly if it is sudden and fast moving. The law, prudence, and common sense dictate that the applicant account for its evacuation plans under the environmental review of the license renewals and to address precisely how it plans to react to and protect these communities and their families and children should the unthinkable event happen at Indian Point. The law requires these plans, and it also requires that they work. The applicant's Environmental Report has not addressed evacuation planning. This is not an issue that should be allowed to fall to chance, nor succumb to circular legal reasoning about why a full review and analysis of evacuation issues is not necessary. The NRC rules and regulations create a legal fiction that has allowed evacuation planning to become categorized and compartmentalized, but never specifically and directly addressed for each nuclear facility. In fact, despite efforts to do so, those members of the public and their governments seeking full review have been unable to do so because of NRC actions and conclusions. Before the Board

and Commission determine whether a license renewal application should be approved for operation of Indian Point for another twenty years, the State of New York contends that such review must be conducted as a matter of law to protect the health and safety of the public.

A. Specific Statement of the Issue of Law or Fact to Be Raised or Controverted.

2. Entergy's license renewal application fails to discuss or analyze the Indian Point Radiological Emergency Preparedness Plan ("Evacuation Plan") in the Environmental Report submitted by the applicant. An off-site radiological release from Indian Point, depending on degree and severity, may trigger the need to use the evacuation plan to protect local residents and families. The evacuation plan is an important component of the mitigation of the significant adverse environmental impacts of such a release. An evacuation plan is a condition of the license for operation of nuclear generating facilities. 10 C.F.R. § 50.47. Furthermore, a full review of environmental impacts in a license renewal proceeding is required by NRC regulations. 10 C.F.R. § 51. There is no analysis or discussion of the evacuation plan for Indian Point in the Environmental Report submitted by the applicant, and thus, the applicant's license renewal application fails to meet the requirements of NRC regulations and NEPA.

B. Brief Explanation of the Basis for the Contention.

3. The Environmental Report is submitted by the applicant as part of the NEPA environmental review of the license renewal application. The Environmental Report becomes part of the basis of the Environmental Impact Statement that NRC is required to produce as part of the license renewal process. NRC regulations implement the National Environmental Policy

Act of 1969 ("NEPA") which "places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action," and "ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Baltimore Gas & Elec. Co. v. Natural Res. Def. Counsel, Inc.,* 462 U.S. 87, 97 (1983). The law clearly requires the existence of an evacuation plan and the consideration of the environmental impacts associated with it in the license renewal process. 10 C.F.R. § 50.47; 10 C.F.R. § 51. The only reference to evacuation planning in the applicant's Environmental Report is found in a discussion of "MACCS2 consequence analysis software code to estimate the hypothetical impacts of severe accidents on the surrounding environment and members of the public." Environmental Report § 4.21.5.1.3. These analyses are part of the Severe Accident Mitigation Alternatives ("SAMA") analysis, and are part of the "estimation of the risk reductions attributable to implementation of potential SAMA candidates." Environmental Report § 4.21.5.1. The residents, children, tourists, and business people who regularly use the Emergency Planning Zone ("EPZ") surrounding Indian Point, however, are not hypothetical considerations in the "estimation" of "hypothetical impacts" of a radiological emergency at Indian Point. The protection of public health and safety and the NRC requirement of "reasonable assurance" that such protection "will be taken" are the legal obligations placed under law upon the NRC for the operation of nuclear generating facility. 10 C.F.R. § 50.47. The complete failure of the applicant to address the real world questions and consequences regarding the

effectiveness (or failures) of their own evacuation plan at Indian Point, plainly violates the expansive review required by NEPA.

C. The Issue Raised Is Within the Scope of the Proceeding.

4. Here, the State of New York has raised a contention that the emergency evacuation plan for Indian Point has not been analyzed, discussed, or reviewed as required by NEPA and NRC regulations to determine if it can effectively evacuate the population surrounding the facility in the event of a radiological emergency. The evacuation plan is a requirement of the operator license. Emergency situations arising from the operation of Indian Point is also an area for analysis under NEPA. There is no dispute on either of these points. As a proper subject for environmental review under NEPA, such review is required to be fully analyzed because it is a significant aspect of the environmental impacts of the facility. The NRC, as it has promulgated and implemented its own regulations, has concluded that analysis of evacuation plans is not a site-specific area that needs to be addressed in the Environmental Report submitted as part of the license renewal. This conclusion, however, violates NEPA and is contrary to NRC's own basis for the "generic" analysis undertaken by the NRC in 1996.

D. Evacuation Planning Is Not a Category 1 Issue That Can Avoid Full Environmental Review.

5. In May 1996, the NRC produced a Generic Environmental Impact Statement ("Generic EIS") for License Renewal of Nuclear Plants. *See* NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (May 1996); *see also* 61 Fed. Reg. 28,469 (June 5, 1996); 61 Fed. Reg. 66,546 (Dec. 18, 1996). In this process, the

NRC categorized impacts as either Category 1 – "generic" impacts or Category 2 – "plant specific" impacts. Footnote 2, 10 C.F.R. § 51, Subpt. A, App. B. The NRC regulations specifically categorize "Postulated Accidents" which include Design Basis Accidents and Severe Accidents. *Id*. Such "design basis accidents" are those against which a nuclear plant must be designed under the Atomic Energy Act's requirement to protect public health and safety against "undue risk" and must be included in the environmental analysis. *Limerick Ecology Action v NRC*, 869 F.2d 719, 726 (3rd Cir. 1989). The severe or "beyond design basis accidents must also be included in the environmental analysis." Statement of Interim Policy, Nuclear Power Plant Accident Considerations Under the National Environmental Policy Act of 1969, 45 Fed. Reg. 40,101 (1980). There is no categorization of emergency evacuation.

6. The Generic EIS reviewed the "Environmental Impacts of Postulated Accidents," which includes evacuation planning and acknowledges the importance of this issue regarding license renewal application for nuclear facilities. As the Generic EIS makes clear:

> Each licensee is required to establish emergency preparedness plans to be implemented in the event of an accident, including protective action measures for the public. The NRC, as well as other federal and state regulatory agencies, review the subject plans to ensure the condition of on- and off-site emergency preparedness provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. Among the standards that must be met by these plans are provisions for two emergency planning zones (EPZs). A plume exposure pathway EPZ (requiring preplanned evacuation procedures) of about 16 km (10 miles) in radius and an ingestion exposure pathway EPZ (where interdiction of foodstuffs is planned) of about 80 km (50 miles) in radius are required. Other standards include appropriate ranges of protective actions for each of these zones; provisions for dissemination to the public of basic emergency planning information; provisions for rapid notification of the public during a serious reactor emergency; and methods, systems, and equipment for assessing and

> monitoring actual or potential off-site consequences in the event of a radiological emergency condition.

Generic EIS, § 5, NUREG-1437 Vol. 1 at 5.2.3.3. The analysis of accidents at nuclear generating facilities in the Generic EIS is replete with a statistical and analytical approach to the probability of accidental release, not the consequences of how a community is going to react or be directed. Generic EIS §§ 5.3.2; 5.3.3. The Generic EIS specifically notes that "For Indian Point units, NRC staff evaluations also indicated that external events could significantly contribute to severe accident risks." *Id.* at § 5.3.3.1. The Generic EIS discusses the emergency planning and factors it into these risk calculations but fails to directly address the mechanisms, efficacy, and effectiveness of actual evacuation plans. The methodology taken, and the discussion of evacuation planning in these generic EIS analysis underscores the point.

> Evacuation can have a significant influence on early fatality risk but a much more limited impact on latent fatality risk. Generic EIS § 5.3.3.2.1.

> Although there are other secondary factors (e.g. source term and dose response relationship) that can influence risk and were not specifically analyzed on a plant-specific basis in this GEIS, these factors were not ignored as their impact is included in the FES analysis whose results are the basis for the GEIS analysis. Consequently, their effects are indirectly considered in the prediction of future risks and are reflected within the uncertainty bounds generated by the regression of the FES risk values. To ensure that the existing FES analyses cover a range of secondary factors representative of the total population of plants, the more significant secondary factors were examined as discussed below. The secondary factors area as follows:
>
> > Average annual precipitation,
> > Residential population within a 50-mile (80km) radius of the plan,
> > General terrain, and
> > Emergency planning.

> **Evacuation Planning**. Even in the event of a release of radioactive material from a plant, protective actions can be taken to move or shelter members of the public in the projected path of the radioactive cloud. The success of these actions in preventing exposure of members of the public to the radioactive material is dependent upon the warning time available prior to the release and the time it takes to carry out the protective actions. In general, this latter item (the time to carry out the protective action) is mostly influenced by the size of the population around the plant. Each FES that addresses severe accidents considers the effects of site-specific emergency planning in calculating exposures and risks to the public. Since the FES plants include sites with populations that reasonably cover the range of populations at all 74 sites, a range of emergency planning is considered in the data used for the predictions of early and latent fatalities during the license renewal period. Thus, the GEIS analysis should reasonably account for the effects of emergency planning.

Id. Thus, as the Generic EIS makes clear, there has been no full analysis of the efficacy and effectiveness of evacuation planning for Indian Point. As is set forth more fully below, in addition to the significant failings of the evacuation plan itself, the location of Indian Point is unique among licensed nuclear generating facilities in the United States. Such unique attributes and their implications for emergency planning were not addressed in the Generic EIS. Nor do they fall within the stated scope of such a document. For the purposes of the applicant's submission in the Environmental Report, evacuation planning is a factor in calculating the risk of fatalities should an off-site radioactive release emergency occur; how effective the emergency plan is to reduce or mitigate severe adverse environmental and public health impacts is never analyzed.

The Generic EIS Does Not Address the Unique Challenges Posed by Indian Point

7. By most measures, Indian Point is not a generic nuclear generating facility. Indian Point is unique by virtue of where it is located, and a generic analysis of evacuation issues

applied to 74 nuclear facilities across the United States cannot account for these unique local characteristics. The siting of the facility in a location with a tangle of roads, the population density, and the major transportation challenge posed by corridors that are easily rendered impassable demonstrates that Indian Point is unique by virtue of where it is. The 2003 independent review of the off-site emergency preparedness at Indian Point produced a report that methodically analyzed the evacuation plan and sets forth its major deficiencies. *Review of Emergency Preparedness of Areas Adjacent to Indian Point and Millstone* by James Lee Witt Associates; Declaration of Raymond C. Williams ("Williams Declaration,"), ¶ 6.

> Our traffic studies, and extensive travel in the area while preparing the 2003 Witt Report, highlighted the inadequacy of the road system to handle a sizeable evacuation. Thus the road system made the implementation of evacuation difficult as a protective action strategy. At the same time the population density made the consequences of ineffective implementation of protective action strategies more serious.

Williams Declaration, at ¶ 21.

> The dose saving standard used by NRC makes sense and on its face may seem to be uniformly applicable to all nuclear power plants in the United States. But the barriers to effective evacuation plans must be taken into account, particularly with regard to unique situations posed by nuclear facilities like Indian Point. Thus, if the barriers to attaining dose savings through effective evacuation are greater at Indian Point, then the evacuation plans and actions taken need to be more effective and fully reflective of the unique challenges posed by Indian Point.

Williams Declaration, ¶ 24. Evacuation planning failures at Indian Point must not be sidestepped, ignored or concluded away in a maze of Byzantine NRC technical regulations.

8. The underlying rationale regarding the failure to fully discuss and analyze the evacuation planning in the environmental report is rooted in the legal basis for NRC actions

regarding evacuation planning – if locals will not approve, then the federal government will act. The local county governments have repeatedly refused to submit annual certification concerning the evacuation plan. *See, e.g.*, January 17, 2003 letter from E. Diana, Orange County Executive, to E. Jacoby, New York State Emergency Management Office (referencing Witt Report conclusions), ML030350231. But this is of no consequence or consideration in the Applicant's Environmental Report. Experts who have reviewed in detail the evacuation planning for Indian Point stand by the conclusion that the infrastructure and roadways renders the evacuation plan almost meaningless. These conclusions are also of no consequence or consideration in the applicant's Environmental Report. These same experts have also concluded that in major evacuation scenarios, even first responders presumed to remain where directed and perform their duties, may not heed or obey direction, but instead flee the vicinity of the disaster with their family and seek shelter elsewhere.

> We were surprised how many first responders within the EPZ told us in 2002 that, because they believe that the evacuation plans cannot work, they intend to get their family to safety before performing the emergency related requirements of their position. Making the situation worse and more complicated is the notable degree to which the local populace indicates that they will not take actions recommended by the plant and/or local jurisdictions.

Williams Declaration,¶ 23. This reality is also of no consequence or consideration in the applicant's Environmental Report.

D. The Evacuation Plan is Material to the Findings that NRC Must Make on the License Renewal Application for Indian Point.

9. Evacuation planning is a requirement of both NRC rules and regulations. *See* Generic EIS § 5, 10 CFR Part 51. It is also a requirement of Federal Emergency Management Agency ("FEMA") rules and regulations. 44 C.F.R. § 350. The requirement for an emergency evacuation plan for nuclear generating facilities dates back to1979, when the NRC promulgated 10 CFR § 50.47, which made the existence of an evacuation plan a condition of the license granted to the private operator of each nuclear power plant in the nation; it is an ongoing requirement. Subsequently, in 1979, Executive Order Number 12148 instructed the FEMA to coordinate and review State and Local evacuation plans. In 1983, these efforts resulted in the promulgation of FEMA regulation 44 CFR § 350, which incorporated and added to the requirements of guidance document "*Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants*," NUREG 0654/ FEMA REP-1, Rev. 1, March 1987 ("overall objective of emergency response plans is to provide **dose saving** (and in some cases **immediate life savings**) for a spectrum of accidents that could produce off-site doses in excess of Protective Action Guides") (emphasis added); Williams Declaration, ¶ 21. The NRC must conclude that regarding the evacuation plan, there is "reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency." 10 C.F.R.
§ 50.47(a)(1)(ii). Since "variations in plants and surrounding communities … make dose savings [from radiation release] through application of existing standards problematic." Williams Declaration,

¶ 21. In the case of Indian Point, there are unique considerations that make protective actions more difficult and further unique considerations that make the consequences of failure greater. Williams Declaration, ¶ 21. The ten- and fifty-mile Emergency Planning Zones were designated based upon a joint NRC – EPA study entitled, "*Planning Basis for the Development of State and Local Government Radiological Emergency Preparedness Plans in Support of Light Water Nuclear Power Plants*," NUREG-0396, 12/78; 10 CFR § 50.47(c)(2).

10. In the case of the Indian Point license renewal application, there has been no comprehensive analysis of the emergency evacuation plan as part of the environmental review. The NRC in its Generic EIS concludes that evacuation planning is a Category 1 issue – which means that no site specific review or analysis would be required beyond the Generic EIS. Such site specific evacuation plan analysis, however, is critical. The NRC also stated that evacuation planning is more appropriately addressed on an ongoing basis instead of as part of the license renewal process. There is no discussion by the applicant regarding the efficacy, effectiveness, and adequacy of the evacuation plan in the license renewal submission to the NRC, with such plans relegated to factors in risk calculations and discussed on a single page of the Environmental Report. Environmental Report at 4-52. Contrary to the legal conclusions of the NRC, and contrary to the complete failure by the applicant to analyze or even discuss the evacuation plan, the State of New York contends that not only are there several specific failings of the Evacuation Plan, but that when analyzed for the practical effectiveness, it has not been demonstrated to result

in timely evacuation of the population surrounding the nuclear facility as required by NRC and FEMA regulations.

E. Concise Statement of the Facts or Expert Opinion Supporting the Issue and on Which Petitioner Intends to Rely at the Hearing.

11. The population and infrastructure challenges facing the Indian Point site would result in a denial of the new license application if it was pending today. If Entergy were currently seeking a nuclear facility operating license for the Indian Point facilities, it would not be able to meet key license criteria, particularly with regard to population density and its implications for evacuation planning. 10 C.F.R. 100.21(h). "I think it is insane to have a three-unit reactor on the Hudson River in Westchester County, 40 miles from Times Square, 20 miles from the Bronx . . . [it is] one of the most inappropriate sites in existence," Robert Ryan, NRC's Director of the Office of State Programs, *Report of the Office of the Chief Counsel on Emergency Preparedness to the President's Commission on the Accident at Three Mile Island, October 31, 1979.* Events that have occurred since this NRC official's statement in 1979 demonstrate this position even more palpably.

The Population and Transportation Constraints Unique to Indian Point Likely Will Result in Failure of the Evacuation Plan.

12. In 2003, a comprehensive review was undertaken of the effectiveness of the evacuation plans for Indian Point. These efforts resulted in the issuance of the report entitled *Review of Emergency Preparedness of Areas Adjacent to Indian Point and Millstone* by James Lee Witt Associates ("2003 Witt Report"). Since the 2003 Witt Report, JLWA conducted

another review of the emergency plans for Indian Point to determine if there has been any change to the conclusions about the failures of the evacuation plan originally identified in the 2003 Witt Report. Many such deficiencies remain.

> [T]here were substantial issues with planning, training, and exercises that had to be resolved to ensure the safety of citizens in the surrounding areas from a significant radiological release from Indian Point. In particular, JLWA raised issues about outdated and ineffective aspects of the planning process, inadequate public outreach and education, outdated communications systems and hazard assessment technologies, lack of first responder confidence in plans, problems associated with spontaneous evacuation, the inadequacy of the road system, and the high population density within the ten-mile Emergency Planning Zone.

Williams Declaration, ¶ 7.

13. The 2003 Witt Report highlighted "significant planning inadequacies, expected parental behavior that would compromise school evacuation, difficulties in communications, outdated vulnerability assessment, the use of outdated technologies, lack of first responder confidence in the plan(s), problems caused by spontaneous evacuation, the nature of the road system, the thin public education effort, and how these issues may impact an effective response in a high population area." The report concluded that

> [N]one of these problems, when considered in isolation, precludes effective response. When considered together, however, it is our conclusion that the current radiological response system and capabilities are not adequate to overcome their combined weight and protect the people from an unacceptable dose of radiation in the event of a release from Indian Point. We believe this is especially true if the release is faster or larger than the typical exercise scenario.

Williams Declaration, ¶ 8. As was the case in 2003, the emergency evacuation plan fails to adequately address the challenges of an evacuation response to an off-site radiological release from Indian Point.

> The issues that the 2003 Witt Report raised about the road infrastructure surrounding Indian Point still exist. Based on information received by the counties, the road system around Indian Point is still not sufficient for a large-scale evacuation.
>
> The most recent figures from 2006 indicate that in aggregate the counties grew 4.49 percent from 2000 to 2006, with Orange County experiencing the greatest growth at 10.26 percent and Westchester the least at 2.8 percent. Population growth in areas served by rural roads makes the evacuation problems more difficult.

Williams Declaration, ¶ 11. Detailed analysis has concluded that the constraints of the roadways are significantly greater than earlier believed and that increases in population and population density further exacerbate the inability of the plan to adequately evacuate the population surrounding Indian Point. As a 2003 evacuation time estimate makes clear, "a 66% increase in the estimated time an evacuation would require in favorable weather conditions." Williams Declaration, ¶ 12. The conclusions regarding the inadequacies in the evacuation plan, and the further increase in population and the implications and complications it brings regarding additional and unique challenges for Indian Point underscore the need for a full analysis in the license renewal proceeding because these issues will increase and worsen over the next twenty years. The timeliness of evacuation warnings due to the failure of siren systems and the narrow roads and hilly terrain within the ten-mile Emergency Planning Zone would make safe evacuation highly unlikely, if not impossible. The level of detail and analysis regarding the location specific characteristics of Indian Point was neither available nor used during the original

license proceeding, nor was such information used in the 1996 Generic EIS. Thus, the conclusions reached in that Generic EIS based upon lack of information that makes the unique attributes of Indian Point plain and evident and that categorizes emergency planning as an area not needing site specific review must be rejected.

Local and State Emergency Officials Will Not Certify the Evacuation Plans for Indian Point, and the Legal Conclusions in NRC Regulations and Executive Orders that These Plans Will Be Implemented Anyway Is an Unsustainable Legal Fiction.

14. In 1988, President Reagan signed Executive Order No. 12657, that applies "whenever State or local governments, either individually or together, decline or fail to prepare commercial nuclear power plant radiological emergency preparedness plans," and specifically requires that "FEMA shall substitute its own resources for those of the State and local governments only to the extent necessary to compensate for the nonparticipation or inadequate participation of those governments." Exec. Order No. 12657, Section 2 (b)(2) (November 18, 1988). The local host community's views, New York State's views, and the expressed views of first responders cannot simply be ignored by the NRC. The facts of this license renewal directly contradict the legal conclusions in the Executive Order and they cannot be reconciled. The Executive Order's logic is circular and not sustainable when applied to the Indian Point license renewal application. Federal officials implementing the evacuation plan for Indian Point is not a realistic possibility and may not evacuate the population in the Emergency Zone. The views of the local emergency officials and real world experiences in State and Federal evacuation initiatives must not be ignored by NRC.

> It is reasonable to assume that County Leaders take annual certification of evacuation plans for Indian Point seriously, and therefore, their refusal to certify the plan is quite significant. The State and Federal Governments are not in a position to step in and implement evacuation plans for the Counties. FEMA and NRC may think they can confidently certify in the absence of local certification, but Hurricane Katrina exposed such judgments as very risky and questionable. Even the White House's report on Katrina noted that "With respect to evacuation—fundamentally a State and local responsibility—the Hurricane Katrina experience demonstrates that the Federal government must be prepared to fulfill the mission if State and local efforts fail. Unfortunately, a lack of prior planning combined with poor operational coordination generated a weak Federal performance in supporting the evacuation …

Williams Declaration, ¶ 20. The NRC and FEMA contend that it really does not matter if locals will not perform first responder / rescue duties because Exec Order No. 12657 essentially eliminated the need for consideration of such issues. Since 2003, the Counties of Westchester, Rockland, and Orange have refused to provide the annual certification for the emergency plans. Nonetheless, in 2003, FEMA made such certification to the NRC. Williams Declaration, ¶ 19. The potential failure of first responders and emergency professionals to respond to catastrophic emergencies in a timely way, and the possibility of the panic ensuing from a fast breaking emergency scenario directly undermines and renders meaningless the legal conclusion underlying the Executive Order's conclusion that the federal government or other localities will just get the evacuation 'job' done regardless of reality. Williams Declaration, ¶¶ 26, 28.

The Legal Conclusion that First Responders Will Perform as Trained Is Undercut by Actual Experience during Hurricane Katrina and by Information Received from First Responders Located in the Indian Point EPZ.

15. The emergency planning and evacuation failures experienced during Hurricane Katrina further demonstrate the real world inadequacies of Indian Point's evacuation plan and the

assumptions underlying it. *See generally* Cooper and Block, *Disaster, Hurricane Katrina and the Failure of Homeland Security*, Times Books (2006); *A Failure of Initiative, Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina*, Report No. 109-377 (2006). There are serious questions about how first responders would react in responding to a radiological release based upon the Hurricane Katrina disaster.

> [T]he Katrina event validates our findings in the 2003 Witt Report, to the effect that first responders might provide for the safety of their families before they responded to the event. In this connection, it is interesting to note that, in general, the public is more fearful about radiation and radiological releases, particularly from nuclear power plants, than about the consequences to them and their families from hurricanes.

Williams Declaration, ¶ 29. A survey of local emergency responders further demonstrates the potentially significant challenges facing the effective implementation of the evacuation plan.

> A survey was conducted by Ecology and Environment, Inc. for the New York State Emergency Management Office in July 2004 and February 2005 to provide a baseline, and again in July 2006 to determine changes. In 2004, 69 percent of respondents indicated that they would not follow advice from public authorities. The follow-on survey conducted in 2006 saw that number drastically increase to 91 percent. First responder intentions and attitudes found among the general populace work together to make it even less likely that the evacuation plans will be effectively implemented.

Williams Declaration, ¶ 23. For these reasons, legal and factual conclusions asserting that the first responders will respond appropriately and according to plan are of questionable value.

F. A Genuine Dispute Exists with the Applicant on a Material Issue of Law or Fact.

16. In this case, the State of New York has provided sufficient information establishing that a genuine dispute exists with the applicant, and the NRC, on the material issue of evacuation planning. There is no analysis from the applicant on this crucial issue anywhere in its license

renewal application. The applicant has not addressed the effectiveness of the Evacuation Plan in any way in the Environmental Report. There is no discussion of how the area surrounding Indian Point will react should there be an off-site radiological release. The analysis provided does little more than offer risk assessments in a Generic EIS produced in 1996 that is meant to provide the NEPA environmental review for 74 nuclear generating facilities in the United States. As demonstrated above and in the Declaration of Raymond Williams, the State of New York has provided detailed analysis regarding the deficiencies and failures of the evacuation plan.

17. The reasons that the evacuation plan must be subject to full NRC public review are many, and include complexity and questionable assumptions regarding the evacuation of school children, the impacts of shadow and spontaneous evacuation of people and families living and working in areas surrounding the nuclear power plant, and go to the significant and dramatic lack of faith of the emergency services providers that the plan can be implemented. The applicant's failure to address these issues relies upon ill considered and long standing dubious legal conclusions of the NRC regarding evacuation planning and who rightfully has the responsibilities implementing these plans. Most important for the purposes of the Indian Point license renewal is the applicant's reliance upon a "Generic" EIS when the unique challenges of the population, geography, and ill-suited roadway demonstrate that the areas surrounding Indian Point are unique from all other nuclear power plants in this county, and must be considered on their own merits. Thus, the State of New York has met its burden with respect to this evacuation contention - the

failings and shortcomings of the evacuation plan are plain and evident for the NRC to see, and as a matter of law, must be fully and openly considered in the Indian Point license renewal process.

CONTENTION 30

NEPA REQUIRES THAT THE NRC REVIEW THE ENVIRONMENTAL IMPACTS OF THE OUTMODED ONCE-THROUGH COOLING WATER INTAKE SYSTEM USED AT INDIAN POINT, WHICH CAUSES SIGNIFICANT HEAT SHOCK/THERMAL DISCHARGE IMPACTS.

A. Specific Statement of the Issue of Law or Fact to Be Raised or Controverted

1. Entergy's operation of IP2 and IP3 creates an impact of "heat shock" on fish and other aquatic organisms in the Hudson River. This occurs because of the massive discharges of heated water into the Hudson River. These discharges occur because with the once-through cooling water intake system currently in place at Indian Point, the massive amounts of water taken into the plants means that there is more heated water discharged after that water runs through the plant. Stated another way, plants that operate with closed-cycle cooling water intake systems do not create heat shock or thermal impacts to such a destructive magnitude. The discharges here do not meet New York State water quality criteria, and the applicant has failed to demonstrate either that it meets the water quality standard for thermal discharges or that it has received a waiver pursuant to Clean Water Act section 316(a) (33 U.S.C. 1326(b)).

2. Accordingly, because closed-cycle cooling creates such adverse thermal impacts to the fish in the Hudson River, the NRC should deny Entergy's license renewal application outright.

In the alternative, even if the NRC were to grant the license renewal application, it could only do that by conditioning the renewal on the construction and use of closed-cycle cooling water intake systems at IP2 and IP3. As was stated in the above contention on impingement and entrainment, the perpetuation of once-through cooling here, with its long history of massive injury and destruction of tens of millions of Hudson River fish, is simply no longer tenable, either in fact or in law.

B. Brief Explanation of the Basis for the Contention

3. Unlike a number of other nuclear power plants around the country, the Indian Point plants use a once-through cooling water intake system, which provides the least protection to the aquatic ecology. Once-though cooling systems suck in massive amounts of water from the nearest river, lake, or other water body, cycle that water through the plant, and discharge it back into the water body. The water returned to the waterbody is hotter than the water that is sucked in from the water body because it runs through the heated operations of the plant.

4. Here, IP2 and IP3 take in *2.5 billion gallons of Hudson River water each day*, and they have operated in this fashion for nearly 40 years. This use of massive amounts of Hudson River means that most of it is discharged as hotter water back into the Hudson River. Fish are adversely affected by thermal discharges.

5. Tens of millions of fish are adversely affected from this outdated, technologically obsolete, once-through cooling system. No mitigation measures could ever address the severity of what these once-through cooling systems – by design – do to the Hudson River.

6. The State seeks full NRC review of this destructive cooling water intake system at Indian Point. As stated in the above contention for impingement and entrainment, the only answer here is the imposition of the final and complete solution, which is for Entergy to stop using it altogether.

C. The Issue Raised Is within the Scope of the Proceeding

7. Here, the State of New York has raised an environmental contention that falls within the NRC denominated Category 2 list of environmental impacts. Under the heading "Aquatic Ecology (for plants with once-through and cooling pond heat dissipation systems," the NRC has included three Category 2 impacts, one of which is relevant to this Contention: "heat shock." *See Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants,"* 10 C.F.R. Part 51, App. B to Subpart A.

> The NRC's explanatory note for the Category 2 issue of "Heat shock" states: Because of continuing concerns about heat shock and the possible need to modify thermal discharges in response to changing environmental conditions, the impacts may be of moderate or large significance at some plants. See [10 C.F.R.] § 51.53(c)(3)(ii)(B).

Table B-1, *"Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants,"* 10 C.F.R. Part 51, App. B to Subpart A.

8. Thus, because the petitioner State of New York has raised an issue of heat shock effects from the once-through cooling water intake systems at the Indian Point plants – a Category 2 issue – this contention is within the scope of this license renewal proceeding.

D. The Issue Raised Is Material to the Findings that the NRC Must Make to Support the Action that is Involved in this Proceeding

9. The issue of the impacts of impingement and entrainment from the once-through cooling systems at IP2 and IP3 is material to the findings that the NRC must make to support the action that is involved in this license renewal proceeding. These findings are based both on NEPA and the NRC's regulations.

10. The National Environmental Policy Act of 1969 ("NEPA") "places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action," and "ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Baltimore Gas & Elec. Co. v. Natural Res. Def. Counsel, Inc.,* 462 U.S. 87, 97 (1983). NEPA requires that federal agencies, including the NRC, take a "hard look" at the environmental impacts of proposed actions, specifically

(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 if the proposed action should be implemented.

42 U.S.C. § 4332.

11. Additionally, the NRC regulations on post-construction environmental reports, i.e., for license renewal applications, provide that for plants that use once-through cooling systems,

> [T]he 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 cannot 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.

10 C.F.R. § 51.53 (c)(3)(ii)(B).

12. To obtain a Clean Water Act section 316(b) determination, the applicant would have to demonstrate that the cooling water intake structure that the applicant uses at a plant "reflect[s] the best technology available for minimizing adverse environmental impacts." As set forth in sections "E" and "F" below, Entergy has not and could not demonstrate that its once-through cooling water intake structures at IP2 and IP3 reflects the best technology available for minimizing adverse environmental impacts. Indeed, the New York State Department of Environmental Conservation has determined in the pending SPDES permit renewal proceeding that closed-cycle cooling, and not once-through cooling, represents the best technology available for minimizing adverse environmental impacts. In any event, Entergy's assessment of the impacts of heat shock from its thermal discharges at IP2 and IP3 demonstrates that those adverse impacts cannot be effectively mitigated with such outdated and destructive technology.

13. As discussed more fully below, Entergy's thermal discharges have not and currently do not meet New York State water quality criteria for thermal discharges. Because those discharges do not meet water quality criteria, this means that Entergy is required to demonstrate that it has received a waiver from those criteria, pursuant to Clean Water Act section 316(a), 33 U.S.C. § 1326(a). Entergy, however, has received no such waiver from the State of New York.

E. Concise Statement of the Facts or Expert Opinion Supporting the Issue and on Which Petitioner Intends to Rely at the Hearing

14. As set forth in the Declaration of Roy Jacobson, Jr., the once-through cooling system that Entergy uses at IP2 and IP3 uses 2.5 billion gallons of water each day. Jacobson Declaration, ¶ 4. This is the equivalent of using all the water in a 450-acre, 15-foot deep, lake *each day*. *Id.* The Hudson River is an incredibly rich, historic, valuable estuarine resource. *Id.* ¶¶ 5-7. It provides an estuarine habitat for an aquatic ecosystem that, in the vicinity of Indian Point and other nearby power plants, is greatly impaired by the intake facilities and discharges of those plants. *Id*. ¶¶ 5-7.

15. Nearly all of this water that this plant takes in is eventually discharged into the Hudson River. The discharged water, however, is at a much higher temperature because it has been used to cool the plants' operations. According to Dr. Dilks: "Collectively, the maximum permitted thermal discharge for IP2 and IP3 is for trillions of BTUs of total heat per year. Based on my review of the EPA Permit Compliance System, these BTU limits are hundreds of times larger than most power facilities." Dilks Decl. ¶ 6.

16. Increases in water temperature can produce numerous biological consequences in the receiving waterbody. These include:

- Lethal effects: High or low temperatures, which kill an organism within a finite time. Low temperature lethality can happen when plant operations shut down temporarily during cold water periods, exposing warm water acclimated fish to cod water.

- Controlling effects: Non-lethal temperatures which affect biological processes such as growth or reproduction.

- Directive effects: Changes in behavioral responses or migrations.

- Indirect effects: Changes in some other factor (e.g., oxygen), which in turn affect aquatic life.

Dilks Declaration, ¶¶ 7, 8.

17. New York State regulations set forth a narrative water quality standard for thermal discharges:

> (a) All thermal discharges to the waters of the State shall assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife and on the body of water.

6 N.Y.C.R.R. § 704.1(a).

18. The special criteria for estuaries applies to the Hudson River where the Indian Point plants are located. Those special criteria set forth the following requirements:

> (5) Estuaries or portions of estuaries.
>
> (i) The water temperature at the surface of an estuary shall not be raised to more than 90 degrees Fahrenheit at any point.
>
> (ii) At least 50 percent of the cross sectional area and/or volume of the flow of the estuary including a minimum of one-third of the surface as measured from water edge to water edge at any stage of tide, shall not be raised to more than four Fahrenheit degrees over the temperature that existed before the addition of heat of artificial origin or a maximum of 83 degrees Fahrenheit whichever is less.
>
> (iii) From July through September, if the water temperature at the surface of an estuary before the addition of heat of artificial origin is more than 83 degrees Fahrenheit an increase in temperature not to exceed 1.5 Fahrenheit degrees at any point of the estuarine passageway as delineated above, may be permitted.
>
> (iv) At least 50 percent of the cross sectional area and/or volume of the flow of the estuary including a minimum of one-third of the surface as measured from water

> edge to water edge at any stage of tide, shall not be lowered more than four Fahrenheit degrees from the temperature that existed immediately prior to such lowering.

6 N.Y.C.R.R. § 704.2(5).

19. As set forth in the Declaration of David Dilks, the thermal discharges from IP2 and IP3 do not meet the special water quality criteria for estuaries in 6 N.Y.C.R.R. sections 704.2(5)(ii), (iii), and (iv). Specifically, the thermal discharges from Indian Point alone violates 6 N.Y.C.R.R. § 704.2(5)(ii). Dilks Declaration, ¶¶ 16, 19. Moreover, the thermal discharges from Indian Point and other nearby power plants together violate 6 N.Y.C.R.R. § 704.2(5)(iii) and (iv). *Id.* ¶¶ 16, 20.

20. Moreover, the modeling conducted by Entergy contains significant flaws which means that the violations of the criteria could be much greater, leading to a violation of the water quality standard itself. Dilks Decl. ¶ 21.

21. In any event, the review by the State's expert of Entergy's own data, as well as the data from its predecessors, demonstrates that the thermal discharges from IP2 and IP3 do not meet New York's water quality criteria. Dilks Decl. ¶ 16. When a plant operator cannot demonstrate that it meets water quality criteria for thermal discharges, the Clean Water Act requires the operator to then demonstrate that it has a valid waiver under section 316(a). Entergy, however, does not possess such a waiver from the water quality criteria. *Id.* ¶ 38.

F. Genuine Dispute Exists with the Applicant on a Material Issue of Law or Fact

22. Entergy's Environmental Report submitted with its license renewal application does not adequately account for thermal discharges from IP2 and IP3. Dilks Declaration, ¶ 17.

23. Entergy does not adequately or accurately address the impacts from the thermal discharges from IP2 and IP3 in its Environmental Report, which relies on the 1999 DEIS that it submitted in the NYS Clean Water Act (SPDES) permit proceeding. In the DEIS, Entergy claimed that "[t]he surface orientation of the plume allows a zone of passage in the lower portions of the water column, the preferred habitat for many of the indigenous species." DEIS, p. VI-29. This claim, however, focuses only on the plume itself and does not adequately consider the temperature impacts on bottom waters that occur outside of the plume. Dilks Declaration, ¶ 17. According to Dr. Dilks, "If the heated plume does contact the bottom for a significantly larger area than defined in the DEIS, the thermal impacts of the plume on benthic species would need to be examined before a conclusion regarding the biological impact of the discharge could be made." *Id.* ¶ 35.

24. Entergy's reliance on a variety of modeling is also misplaced. In fact, a review of the thermal modeling analysis indicates the following:

- The DEIS overstates the degree of accuracy contained in the model predictions.
- Many underlying assumptions of the CORMIX model are violated.
- CORMIX model results were not calibrated to Indian Point data.

. The linkage between the CORMIX and FFTM models is very simplistic.

. DEIS overstates the degree of protectiveness contained in the model predictions.

. Better models and data are currently available to assess temperature impacts.

Dilks Declaration, ¶ 22, 23-31.

25. Given the complexities of Hudson River ecology and the data currently available, Entergy has no basis to conclude that continuing the thermal discharges at Indian Point will assure the protection and propagation of a balanced biological community. Moreover, the following are specific weaknesses or oversights in the analysis that Entergy used to support the its original assessment:

- Thermal effects on benthos and benthic species are not adequately considered.
- Background temperatures in the river may be underestimated.
- Use of the 30 minute TL95 is not as protective as stated.
- Indirect temperature affects are not fully considered.

Dilks Declaration, ¶ 34, 35-38.

CONTENTION 31

NEPA REQUIRES THAT THE NRC REVIEW THE ENVIRONMENTAL IMPACTS OF THE OUTMODED ONCE-THROUGH COOLING WATER INTAKE SYSTEM USED AT INDIAN POINT, WHICH CAUSES MASSIVE IMPINGEMENT & ENTRAINMENT OF FISH & SHELLFISH.

A. Specific Statement of the Issue of Law or Fact to Be Raised or Controverted

1. Entergy's operation of IP2 and IP3 harms massive numbers of fish because they become impinged and entrained by the intake structures of the once-through cooling systems. Accordingly, because closed-cycle cooling wreaks such injury and death – on an order of magnitude – to the fish in the Hudson River, the NRC should deny Entergy's license renewal application outright. In the alternative, even if the NRC were to grant the license renewal application, it could only do so by conditioning the renewal on the construction and use of closed-cycle cooling systems at IP2 and IP3. The perpetuation of once-through cooling here, with its long history of massive injury and destruction of tens of millions of Hudson River fish, is simply no longer tenable, either in fact or in law.

B. Brief Explanation of the Basis for the Contention

2. Unlike a number of other nuclear power plants around the country, the Indian Point plants use a once-through cooling system, which provides the least protection to the aquatic ecology. Once-though cooling systems suck in massive amounts of water from the nearest river, lake, or other water body, cycle that water through the plant, and discharge it back into the water body. Larger fish can get "impinged," which means that they get caught on the screens that are placed between the river and the water intake pumps. The screens are there to trap debris; in the

process, they trap fish. These fish suffer stress and become injured by the caught debris and the screens. They also lose oxygen when the screens are lifted out of the water to remove the debris, and then they die from suffocation. Smaller fish, and fish eggs and larvae, can become "entrained," which means that they pass right through the screens and get caught up in the plant operations. The impacts to these fish are beyond stress and injury – they die.

3. Here, IP2 and IP3 suck in up to *2.5 billion gallons of Hudson River water each day*, and they have operated in this fashion for nearly 40 years. This use of massive amounts of Hudson River water has a profound effect on the Hudson River fishery. Tens of millions of fish suffer and die from this outdated, technologically obsolete, once-through cooling system. Although over the years various mitigation measures have been implemented at Indian Point, such as Ristroph screens and variable speed pumps, these needed changes have not and indeed could not ever address the severity of what these once-through cooling systems – by design – do to the Hudson River ecosystem. The State seeks full NRC review of this destructive cooling system at Indian Point. The only answer here is the imposition of the final solution, which is for Entergy to stop using it altogether.

C. The Issue Raised Is within the Scope of the Proceeding

4. Here, the State of New York raises an environmental contention that falls within the NRC denominated Category 2 list of environmental impacts. Under the heading "Aquatic Ecology (for plants with once-through and cooling pond heat dissipation systems)," the NRC has included three Category 2 impacts, two of which are relevant to this Contention: "Entrainment

of fish and shellfish in early life stages," and "Impingement of fish and shellfish." *See Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants,"* 10 C.F.R. Part 51, App. B to Subpart A.

5. The NRC's explanatory note for the Category 2 issue of "Entrainment of fish and shellfish in early life stages" states

> The impacts of entrainment are small at many plants but may be moderate or even large at a few plants with once-through and cooling-pond cooling systems. Further, ongoing efforts in the vicinity of these plants to restore fish populations may increase the numbers of fish susceptible to intake effects during the license renewal period, such that entrainment studies conducted in support of the original license may no longer be valid. See [10 C.F.R.] § 51.53(c)(3)(ii)(B).

Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants," 10 C.F.R. Part 51, App. B to Subpart A.

6. The NRC's explanatory note for the Category 2 issue of "Impingement of fish and shellfish" states

> The impacts of impingement are small at many plants but may be moderate or even large at a few plants with once-through and cooling-pond cooling systems. See [10 C.F.R.] § 51.53(c)(3)(ii)(B).

Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants," 10 C.F.R. Part 51, App. B to Subpart A.

7. Thus, because the petitioner State of New York has raised an issue of the impingement and entrainment effects from the once-through cooling intake systems at the Indian Point plants – both of which are Category 2 issues – this contention is within the scope of this license renewal proceeding.

D. The Issue Raised Is Material to the Findings that the NRC Must Make to Support the Action that is Involved in this Proceeding

8. The issue of the impacts of impingement and entrainment from the once-through cooling systems at IP2 and IP3 is material to the findings that the NRC must make to support the action that is involved in this license renewal proceeeding. These findings are based both on NEPA and the NRC's regulations.

9. The National Environmental Policy Act of 1969 ("NEPA") "places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action," and "ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Baltimore Gas & Elec. Co. v. Natural Res. Def. Counsel, Inc.,* 462 U.S. 87, 97 (1983). NEPA requires that federal agencies, including the NRC, take a "hard look" at the environmental impacts of proposed actions, specifically

> (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 if the proposed action should be implemented.

42 U.S.C. § 4332.

10. Additionally, the NRC regulations on post-construction environmental reports, i.e., for license renewal applications, provide that for plants that use once-through cooling systems,

> [T]he applicant shall provide a copy of current Clean Water Act 316(b) determinations and, if necessary, a 316(a)[40] variance in accordance with 40 CFR Part 125, or equivalent State permits and supporting documentation. If the applicant cannot 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.

10 C.F.R. § 51.53 (c)(3)(ii)(B).

11. To obtain a Clean Water Act section 316(b) determination, the applicant would have to demonstrate that the cooling water intake structure that the applicant uses at a plant "reflect[s] the best technology available for minimizing adverse environmental impacts." As set forth in sections "E" and "F" below, Entergy has not and could not demonstrate that its cooling water intake structures at IP2 and IP3 reflects the best technology available for minimizing adverse environmental impacts. Indeed, the New York State Department of Environmental Conservation has determined in the pending SPDES permit renewal proceeding that closed-cycle cooling, and not once-through cooling, represents the best technology available for minimizing adverse environmental impacts. In any event, Entergy's assessment of the impacts of impingement and entrainment from once-through cooling demonstrates that those adverse impacts cannot be effectively mitigated with such outdated and destructive technology.

[40] The reference to Clean Water Act section 316(a) refers to thermal discharges, which are addressed separately in the "Heath Shock/Thermal Discharges" Contention.

E. Concise Statement of the Facts or Expert Opinion Supporting the Issue and on Which Petitioner Intends to Rely at the Hearing

12. As set forth in the Declaration of Roy Jacobson, Jr., the once-through cooling system that Entergy uses at IP2 and IP3 uses 2.5 billion gallons of water each day. Jacobson Decl. ¶ 4. This is the equivalent of using all the water in a 450-acre, 15-foot deep, lake *each day*. *Id*. The Hudson River is an incredibly rich, historic, valuable estuarine resource. *Id*. ¶¶ 5-7. It provides an estuarine habitat for an aquatic ecosystem that, in the vicinity of Indian Point and other nearby power plants, is greatly impaired by the intake facilities and discharges of those plants. *Id*. ¶¶ 5-17.

13. The adverse conditions present in the Hudson River are summarized as follows:

- The millions of fish that are killed each year from operations at Indian Point represent a significant mortality and a stress on the River's fish community (*Id*. ¶ 15).
- 1.2 to 1.3 *billion* fish eggs and larvae are entrained at Indian Point each year (*Id*. ¶ 20).
- An average of 1.18 million fish are impinged per year over the sampling years of 1986-1990 (*Id*. ¶ 17)
- Loss of fish and aquatic organisms to entrainment and impingement upsets the food web because they are no longer available as food for other species (*Id*. ¶ 14).
- Diversity of the Hudson River fishery is low, and continues to decline(*Id*. ¶ 8).
- The population of American shad in the Hudson River has declined since the early 1990s (*Id*. ¶ 16).
- Indices of young-of-year and older white perch have declined since the late 1970s (*Id*. ¶ 16).

- Adult Atlantic tomcod abundance over the last ten years has been lower than in previous years and continues to show high annual variability (*Id*. ¶ 16).

- Rainbow smelt have been virtually absent from the collections from the fisheries surveys since 1995 (*Id*. ¶ 16).

F. Genuine Dispute Exists with the Applicant on a Material Issue of Law or Fact

14. Entergy's Environmental Report submitted with its license renewal application does not provide any estimate of the actual numbers of fish impinged or entrained at either IP2 or IP3. This omission is a major omission because it fails to acknowledge the significant and obvious environmental impacts of once-through cooling. Jacobson Decl. ¶ 18.

15. Additionally, according to the State's expert, some representations on impingement and entrainment in Entergy's Environmental Report are misleading and self-serving:

Impingement

> Misleading - The report concludes on pages 4-19 that given several things, including the outcome of the draft SPDES permit proceeding, impingement impacts will *remain* SMALL. While I agree that provisions in the draft SPDES permit will provide for the eventual attainment of a SMALL impact from impingement (i.e., after the installation of closed-cycle cooling), current impingement impacts are far from small. Even considering the survival of impinged fish resulting from the use of Ristroph-modified traveling screens, hundreds of thousands of fish die annually from impingement at IP2 and IP3. This impact is not small.
>
> Self-serving - The final sentence in Section 4.3.6 concludes that additional mitigation measures are not warranted. This conclusion is in direct opposition to the conclusion of Department staff. When considering all the available data regarding impingement and entrainment, Department staff concluded that additional measures, namely closed-cycle cooling, were legally required to fulfill New York State water quality requirements and the requirements of the Clean Water Act.

Jacobson Decl. ¶ 18.

Entrainment

> Misleading - The report concludes on pages 4-13 that given several things, including the outcome of the draft SPDES permit proceeding, entrainment impacts will *remain* SMALL. While I agree that provisions in the draft SPDES permit will provide for the eventual attainment of a SMALL impact from entrainment (i.e., after the installation of closed-cycle cooling), current entrainment impacts are in the billions and are far from small.
>
> Self-serving - The final sentence in Section 4.2.6 of the Environmental Report concludes that additional mitigation measures are not warranted. This conclusion is in direct opposition to the conclusion of Department staff. When considering all the available data regarding impingement and entrainment, Department staff concluded that additional measures, namely closed-cycle cooling, were legally required to fulfill New York State water quality requirements and the requirements of the Clean Water Act.

Jacobson Decl. ¶ 21.

16. Entergy also attempts to discount the injury and death to the fish in the Hudson River by relying on the various mitigation measures arising from the Hudson River Settlement Agreement (HRSA). *See, e.g.*, Entergy Envt'l Rep. pp. 4-10, 4-11, 4-15. That agreement was a global agreement to address, inter alia, the impacts from once-through cooling not only from Indian Point, but from other Hudson River power plants, as well. Little Decl. ¶¶ 13-20. Although that agreement is continued as the basis for certain conditions in the current SPDES permit, the Department never intended the agreement to provide mitigation of injury or death to fish for such a long period of time. The Department has clearly turned the page on those measures by producing the draft SPDES permit, with its more stringent conditions for protecting fish.

17. Entergy's reliance on the HRSA and its SPDES permit is misplaced. The HRSA no longer has any basis in the reality of the once-through cooling operations at Indian Point. The HRSA has expired in its original form as an agreement among the various parties. *Id*. ¶ 23. The only vestige of that agreement is the current SPDES permit that Indian Point holds and has held since 1987. *Id*. ¶¶ 19-20. That permit, however, has been stretched to the breaking point and does not reflect the need to rectify the current reality of the harm to the Hudson River fishery by once-through cooling. Entergy simply has the benefit of a legal extension of its permit, under New York's State Administrative Procedures Act (SAPA). *Id*. ¶ 20. This SAPA extension, however, should not and cannot be read to mean that once-through cooling should be perpetuated at this plant. Indeed, the draft permit that Entergy is currently challenging in an administrative proceeding before the State DEC is requiring closed-cycle cooling. *Id*. ¶ 32.

18. While Entergy and its predecessors, by agreeing to the HRSA, may have benefitted by the decades of delay of constructing closed-cycle cooling, the data from the HRSA studies demonstrates that the time has now come to impose closed-cycle cooling. Based on the data, the implications of which Entergy chooses to ignore, closed cycle cooling – not mitigation measures of Ristroph screens or variable speed pumps – is the only answer here.

CONTENTION 32

NEPA REQUIRES THAT THE NRC REVIEW THE ENVIRONMENTAL IMPACTS OF THE OUTMODED ONCE-THROUGH COOLING WATER INTAKE SYSTEM USED AT INDIAN POINT, WHICH HARMS ENDANGERED SPECIES AND CANDIDATE THREATENED SPECIES.

A. Specific Statement of the Issue of Law or Fact to Be Raised or Controverted

1. The NRC has an obligation under section 7 of the federal Endangered Species Act to ensure that, if it were to grant the additional 20-year license, its action will not "jeopardize the continued existence of an endangered species." 16 U.S.C. § 1536(a)(2). An endangered species, the shortnose sturgeon, become impinged on the intake screens at IP2 and IP3, and the NRC has to determine, through the ESA consultative process, if this impingement will jeopardize the continued existence of this endangered species. Entergy's operation of IP2 and IP3 also violates section 9 of the ESA (16 U.S.C. § 1538(a)(1)(b)) because a listed endangered species, the shortnose sturgeon, becomes impinged on the intake screens at Indian Point, and Entergy does not possess an incidental takings permit for this activity. Additionally, the intake structures at IP2 and IP3 also impinge and entrain the Atlantic sturgeon, which is a candidate for listing as threatened species under the ESA.

2. Both NEPA and the ESA require the NRC to assess these environmental impacts in the context of this license renewal proceeding.

B. Brief Explanation of the Basis for the Contention

3. According to NRC regulations, the impact of an additional 20 years of operation on threatened or endangered species is a Category 2 environmental issue that must be considered at the time of license renewal. *See Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants,"* 10 C.F.R. Part 51, App. B to Subpart A. Under the ESA, it is unlawful to "take" a threatened or endangered species. 16 U.S.C. § 1538(a)(1)B). The ESA broadly defines "take "as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect." 16 U.S.C. § 1532(19). However, a party does not violate the ESA if he or she has an "incidental take" permit, also granted pursuant to the ESA. 16 U.S.C. § 1539(a)(1)B).

4. The burden under the ESA is not only placed on the applicant. Here, the NRC, as the reviewing agency, also has an obligation to ensure that, if it were to grant the additional 20-year license, its action will not "jeopardize the continued existence of an endangered species." 16 U.S.C. § 1536(a)(2).

5. As demonstrated in the Declaration of Roy A. Jacobson, Jr., submitted in support of this contention (¶¶ 27-30), the applicant is violating the ESA because it is "taking" a federally listed endangered species by operation of the two plants at Indian Point, and it does not have a incidental takings permit to allow it to do so. Moreover, if the NRC were to grant the application for a 20-year license renewal, that action might jeopardize the continued existence of the shortnose sturgeon, which become impinged on the intake screens at IP2 and IP3.

6. Additionally, the NRC should also consider the impacts of an additional 20 years of plant operation on a candidate threatened species, the Atlantic sturgeon.

C. The Issue Raised Is within the Scope of the Proceeding

7. The State of New York has raised an environmental contention that falls within an NRC denominated Category 2 environmental impact: "Threatened or Endangered Species (for all plants)." *See Table B-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants,"* 10 C.F.R. Part 51, App. B to Subpart A. Thus, because the petitioner State of New York has raised an issue of an effect of the operations of the Indian Point plants on a federally listed endangered species as well as a candidate threatened species – a Category 2 issue – this contention is within the scope of this license renewal proceeding.

D. The Issue Raised Is Material to the Findings that the NRC Must Make to Support the Action that is Involved in this Proceeding

8. The issue of the effects on both a federally listed endangered species and a candidate threatened species of an additional 20 years of operation of the Indian Point plants is material to this relicensing proceeding because, if the petitioners are correct in their contention, the NRC must make certain findings to ensure either that no jeopardy of the species exists (16 U.S.C. § 1536(a)(2)), or that if a species will be in jeopardy, to either deny the license extension, or to impose significant modifications on the applicant's operations. Indeed, in commenting on the DEC's position that a closed cycle cooling system represents "best technology available" (BTA), the NMFS has stated that "the closed cycle cooling system would dramatically decrease the

amount of water withdrawn from the Hudson River and, as such, is likely to greatly decrease the number of organisms impinged and entrained at the facility's intakes." Jacobson Decl., Exh. J, p. 2. This cooling water intake solution would reduce the impacts on the endangered and candidate threatened species of concern here.

E. Concise Statement of the Facts or Expert Opinion Supporting the Issue and on Which Petitioner Intends to Rely at the Hearing

9. The applicant is taking a threatened or endangered species by operation of the intake structures at Indian Point. The applicant is also adversely affecting a candidate threatened species. 10. Specifically, shortnose sturgeon in the Hudson River, a species protected as listed "endangered" species under the ESA (50 C.F.R. § 17.11(h)), are impinged on the intake screens at Indian Point. Jacobson Decl. § 26, Entergy Envt'l Report p. 2-24. Impingement of fish on screens at power plants harasses, harms, wounds, kills, traps, captures, and collects fish and thus qualifies as an activity that can "take" an endangered species. Entergy has no incidental take permit. Jacobson Decl. § 28; Entergy Envt'l Report, p. 2-25. Thus, Entergy is violating of the ESA.

11. On November 20, 2000, the National Marine Fisheries Service ("NMFS") issued a Biological Opinion Report for the review of the Incidental Take permit (*see* Jacobson Decl., Exhibit I) sought by the operators of two other Hudson River power plants, Roseton and Danskammer. This Opinion provides information that is relevant to Indian Point. Specifically, the Biological Opinion

- referenced the shortnose sturgeon recovery plan (National Marine Fisheries Service Final Recovery Plan for the Shortnose Sturgeon, December 1998) that identifies habitat degradation and mortality as principal threats to the species survival;

- identified impingement of shortnose sturgeon on the screens covering cooling water intake structures as a prime reason for mortality (p. 16); and

- stated that while levels of entrainment and impingement for shortnose sturgeon at the power plants on the Hudson River "are relatively small…the fact remains that these (and other plants) have previously impinged shortnose sturgeon and may have impacted the Hudson River population."

12. The Biological Opinion concluded that the issuance of the Incidental Take permit to the two upstream power plants, Roseton and Danskammer, would not have a significant impact on the shortnose sturgeon population in the Hudson River. However, the Biological Opinion also included a discussion of the mitigation measures employed at these two facilities, which of course, it could not have included for the Indian Point mitigation measures. Further, the Incidental Take permits issued to the other two plants include an adaptive management clause that allows the NMFS to require additional mitigation if the impact to the shortnose sturgeon population in the Hudson River from the facilities is greater than anticipated. This currently is not an option at Indian Point Units 2 and 3 because Entergy does not have an incidental take permit for the shortnose sturgeon. In any event, it is speculative to assume that the NMFS would determine that impingement of shortnose sturgeon at the Indian Point plants, which operate at a greater magnitude than the two non-nuclear plants, would result in the granting of an incidental takings permit.

13. As a matter of law and fact, pursuant to section 9 of the ESA, *any* impingement of shortnose sturgeon at Indian Point violates the Endangered Species Act. 16 U.S.C. § 1538(a)(1)(b). Entergy fails in its attempt to discount this undeniable factual and legal consequence.

14. Additionally, the impingement of shortnose sturgeon at Indian Point could be determined to jeopardize the species, rendering it premature to assume that Entergy would receive an incidental takings permit. Jacobson Decl. ¶¶ 29-30, 16 U.S.C. § 1536(a)(1).

15. Concerning the impacts on Atlantic sturgeon, the NMFS has recently announced that this species is a "candidate species" because the NMFS has initiated a status review to determine if listing as threatened or endangered is warranted. Jacobson Decl. ¶ 31, Exhibit J. The NMFS is concerned that Atlantic sturgeon are impinged and entrained at IP2 and IP3. Because Atlantic sturgeon yolk sac larvae and post yolk sac larvae have been identified in the vicinity of the Indian Point plants, the NMFS stated that "entrainment is a significant concern for Atlantic sturgeon in this area of the [Hudson] river." Jacobson Decl., Exhibit J.

F. A Genuine Dispute Exists with the Applicant on a Material Issue of Law or Fact

16. The State of New York has provided sufficient information that a genuine dispute exists with the applicant on the material issue of the law of taking an endangered species, as well as the specific facts of the taking here. A genuine dispute also exists as to the factual and legal significance of the effects on Atlantic sturgeon, a candidate species.

17. In section 2.5 of the Environmental Report, Entergy admits that the intake screens at the Indian Point plants impinge shortnose sturgeon, a federally listed endangered species. Entergy further admits that it does not possess an incidental takings permit. By both accounts, Entergy has admitted a violation of the ESA.

18. Entergy attempts to downplay its plain violation of the ESA by stating that the numbers of fish that are impinged are minimal and further that "there is a well established population of shortnose sturgeon in the Hudson River." Entergy Envt'l Report, § 2.5, p. 2-23. Neither of these representations has any relevance in law. Nor are they factually correct. As demonstrated in the Declaration of Roy Jacobson (¶ 29), the life history of the shortnose sturgeon renders any impingement and mortality of that endangered species a concern.

19. Moreover, Entergy downplays the impacts of the intake structures of its once-through cooling system at Indian Point to the Atlantic sturgeon. Entergy dismisses the NMFS concerns by stating that "Atlantic sturgeon eggs are large, demersal, and adhesive, and attach within about 20 minutes to rocks, gravel, plants, roots, and other objects . . . By the time their yolk sac is absorbed (about 9-10 days posts-hatch), the larvae clearly exhibit a predominately benthic behavior, swimming on the bottom or near the bottom with increased scouring activity." Entergy then concludes that "the potential impact from entrainment or impingement for the Atlantic sturgeon is SMALL." Envt'l Report § 4.10.5, p. 4-30.

THE CONTENTIONS MEET ALL THE REQUIREMENTS OF 10 C.F.R. § 2.309(f) AND ARE ADMISSIBLE

A. Contentions 1-17 and 21-26 Are Plainly Admissible

For most of the above Contentions there is no serious question of their admissibility.

Those contentions that directly challenge the aging management plans (Contentions 1-3, 5-8, and 23-26) fit squarely within the scope of obligations imposed upon applicant under 10 C.F.R. §§ 54.21(a) and 54.29(a) and those obligations are identified with specificity. Each contention identifies specific shortcomings of the applicant's aging management plan for a component or system defined in 10 C.F.R. § 54.4 or notes that no such plan is proposed. The bases and supporting evidence for the contention provide reasoning and evidentiary documentation such that the Board can determine that the contention is material to the issues in this proceeding and that a dispute exists as to that issue between Petitioner, New York State, and Applicant.

Those contentions that directly challenge the ER for its failure to fully examine and consider the environmental benefits and costs, as part of the no action alternative, of all viable energy options and fail to fully consider the adverse impacts on energy options of license renewal (Contentions 4 and 9-11) fit squarely within the requirements of the GEIS (Sections 8.1 and 8.2) and NRC regulations (10 C.F.R. § 51.53(c)(2)). Each contention specifically identifies the analyses that should have been considered and provides substantial evidence to support the statement that viable and feasible alternatives to relicensing IP2 and IP3 exist and that relicensing

IP2 and IP3 will inhibit the development of alternatives whose environmental impacts will be considerably less than IP2 and IP3.

Those contentions that directly challenge the SAMA analysis in the ER for failing to evaluate a particular severe accident risk or for failing to properly analyze and calculate the consequences of a severe accident (Contentions 12-16 and 21-22) fit squarely within the requirements of 10 C.F.R. § 51.53(c)(3)(ii)(L). These contentions identify with specificity the deficiency in the ER analysis, provide evidence to support the claim that an unexplored severe accident risk exists and/or that the quantification of the consequences of severe accidents in the ER fail to accurately calculate such consequences. The contentions also demonstrate that a genuine dispute exists with the ER because the required analyses on accurate calculations of impacts were not conducted and thus the consideration of feasible mitigation measures was defective.

However, there are some contentions for which admissibility is not self-evident, although equally admissible, for which a more extended discussion is warranted.

B. Contentions 18-20 and 27-29 Are Also Admissible

These contentions are each based on the failure of the LRA to demonstrate that IP2 and IP3 comply with explicit safety requirements. In all respects, save one, they are clearly admissible. Each contention identifies with specificity a safety issue, identifies a specific NRC regulation that requires an applicant to address and resolve that issue and identifies how the applicant has failed to adequately address that issue. Each contention is supported by substantial

evidence that the claim made is correct - *i.e.* that there is a serious and as yet unresolved safety problem at IP2 and IP3. The license renewal regulations explicitly require that each plant seeking a license renewal must prove that it is in compliance with NRC safety requirements. 10 C.F.R. §§ 54.33(a) and 54.35. The only remaining issue is whether there is any barrier to consideration of these extremely important and serious safety concerns in this license renewal proceeding.

When certain preconditions are met, the Commission's regulations exclude from consideration in a license renewal proceeding some safety issues:

> (a) If the reviews required by §54.21 (a) or (c) show that there is not reasonable assurance during the current license term that licensed activities will be conducted in accordance with the CLB, *then the licensee shall take measures under its current license, as appropriate, to ensure that the intended function of those systems, structures or components will be maintained in accordance with the CLB throughout the term of its current license.*
>
> (b) *The licensee's compliance with the obligation under Paragraph (a) of this section to take measures under its current license is not within the scope of the license renewal review*.

10 C.F.R. § 54.30 (emphasis added). This provision, which is the only NRC regulation that limits the issues that can be considered in the license renewal proceeding, prohibits consideration in a hearing of the issue of whether an applicant is taking the measures necessary "to ensure that the intended function of those systems, structures or components will be maintained in accordance with the CLB." Thus, the prohibition only applies where there is a CLB and where the issue is whether the applicant will be taking the steps necessary to demonstrate compliance

with its CLB. However, where, as here, the applicant has no ascertainable CLB, the provisions of 10 C.F.R. § 54.30 do not apply.

The Commission defines current licensing basis as follows:

> When the Commission issues an initial license, it makes a "comprehensive determination that the design, construction, and proposed operation of the facility satisfied the Commission's requirements and provided reasonable assurance of adequate protection to the public health and safety and common defense and security." 56 Fed. Reg. at 64,947. Each nuclear power plant also has a "current licensing basis," a term of art comprehending the various Commission requirements applicable to a specific plant that are in effect at the time of the license renewal application. The current licensing basis consists of the license requirements, including license conditions and technical specifications. *It also includes the plant-specific design basis information documented in the plant's most recent Final Safety Analysis Report*, and any orders, exemptions, and licensee commitments that are part of the docket for the plant's license, *i.e.*, responses to NRC bulletins, generic letters, and enforcement actions, and other licensee commitments documented in NRC safety evaluations or licensee event reports. See 10 C.F.R. § 54.3. The current licensing basis additionally includes all of the regulatory requirements found in Parts 2, 19, 20, 21, 30, 40, 50, 55, 72, 73, and 100 with which the particular applicant must comply. *Id.*

In the Matter of Florida Power & Light Company (Turkey Point Nuclear Generating Plant, Units 3 and 4), 54 N.R.C. 3, 8-9 (2001)(emphasis added).

As amply demonstrated in several Contentions there is no ascertainable “current licensing basis” for either IP2 or IP3 because the UFSARs do not contain the information required by 10 C.F.R. § 50.71(e) and because the General Design Criteria to which the plants were designed are not legally relevant to these plants, having been those *proposed* by a nuclear trade association, and not adopted by the NRC. The deficiencies in the UFSAR noted *supra* are not mere

bookkeeping mistakes but go to the heart of the analysis of whether IP2 and IP3 can be safely operated:

NEI 98-03 Rev. 1. described the FSAR's role:

> UFSARs provide a description of each plant and, per the Supplementary Information for the FSAR update rule, serve as a "reference document to be used for recurring safety analyses performed by licensees, the Commission, and other interested parties." The UFSAR is used by the NRC in its regulatory oversight of a nuclear power plant, including its use as a reference for evaluating license amendment requests and in the preparation for and conduct of inspection activities. For licensees, portions of the UFSAR are used as a reference in evaluating changes to the facility and procedures under the 10 C.F.R. 50.59 change process. The UFSAR also serves to provide the general public a description of the plant and its operation.

Id.

10 C.F.R. § 54.30 cannot be read to exclude consideration of significant safety issues in a license renewal proceeding where there is no current licensing basis because in such a case there is no way that "the licensee . . . [could] take measures under its current license, as appropriate, to ensure that the intended function of those systems, structures or components will be maintained in accordance with the CLB throughout the term of its current license".[41] The regulation is based on the premise that compliance with the CLB is an ongoing obligation that need not be addressed at the license renewal stage. But where, as here, no CLB exists, §54.30 is simply inapplicable.

The NRC Staff recently succinctly stated the reasoning behind 10 C.F.R. § 54.30:

[41]The argument advanced here is not a challenge to 10 C.F.R. § 54.30 and thus does not implicate 10 C.F.R. § 2.335(a), which prohibits challenges to NRC regulations absent a waiver. In addition, any application for waiver of any regulation would be premature at this time since that provision only applies to a"party," a status that is yet to be determined by the Board for New York State (or any petitioner).

> The NRC's license renewal process relies on two key principles. The first principle is that the NRC's existing regulatory processes are adequate to ensure the safety of operating plants. The second principle is that the current licensing basis is adequate and carries forward into the period of extended operation.

In the Matter of Carolina Power & Light Company (Shearon Harris Nuclear Power Plant, Unit 1), 65 N.R.C. 643,657 (Office of Nuclear Reactor Regulation, June 13, 2007). Thus, when there is no CLB, the threshold requirement of § 54.30 - an existing CLB - does not exist and its provisions are not applicable.

The Federal Register Notice for these two license renewal applications is based on the premise that there is a CLB:

> In accordance with 10 CFR 54.29, the NRC may issue a renewed license on the basis of its review if it finds that actions have been identified and have been or will be taken with respect to: (1) managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified as requiring aging management review, and (2) time-limited aging analyses that have been identified as requiring review, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted *in accordance with the current licensing basis (CLB)*, and that any changes made to the plant's CLB comply with the Act and the Commission's regulations.

72 Fed. Reg. 42,134-01 (Aug. 1, 2007)(emphasis added).

If a renewal license were to be issued for either IP2 or IP3, the license would have to comply with the provisions of 10 C.F.R. § 54.33(d), which provides:

> (d) The licensing basis for the renewed license includes the CLB, as defined in §54.3(a); the inclusion in the licensing basis of matters such as licensee commitments does not change the legal status of those matters unless specifically so ordered pursuant to paragraphs (b) or (c) of this section.

Id. In this case there is no CLB so no license can be issued unless and until the CLB is established. The only way to do that at this stage of the process is to allow the relevant safety issues to be determined by the Board, to grant judgment for New York State on Contentions 1, 2, 4 and 18 and require the applicant to submit a complete and adequate UFSAR that establishes a CLB.

Since 10 C.F.R. § 54.30 is not applicable, the controlling regulatory language is contained in 10 C.F.R. § 54.33(a), which states:

> (a) Whether stated therein or not, each renewed license will contain and otherwise be subject to the conditions set forth in 10 CFR 50.54.

Id. The provisions of 10 C.F.R. § 50.54 encompass all safety standards applicable to operating nuclear power plants including earthquake protection (10 C.F.R. § 100.10(c) and Part 100, Appendix A), adequate and effective evacuation planning (10 C.F.R. § 50.47), protection from malevolent acts (10 C.F.R. § 73.1(a)), protection against embrittlement and metal fatigue (10 C.F.R. § 10 C.F.R. § 50.66 and fire protection (10 C.F.R. Part 50, Appendix R). Without a CLB, as noted in 10 C.F.R. § 54.33(d), there is no way to identify precisely how these and other safety requirements will be met or to impose on the licensee the obligation to comply with certain safety requirements since those requirements depend on a showing that they are consistent with the CLB.

No reasonable reading of 10 C.F.R. § 54.30 supports the proposition that if there is no current licensing basis, raising safety issues at the license renewal stage is forbidden. Allowing a license renewal to proceed without addressing the safety issues whose resolution is essential to

establishing a CLB is not only legally impossible - as noted above the license must be conditioned on compliance with the CLB and all the aging management programs must be sufficient to assure that the extended operation will be in compliance with the CLB - but it would abrogate the most fundamental safety obligations of the NRC, which provide that "no license may be issued to any person within the United States if, in the opinion of the Commission, the issuance of a license to such person would be inimical to the common defense and security or to the health and safety of the public." 42 U.S.C. § 2133(d).

Allowing the license IP2 or IP3 to be extended for an additional 20 years when there is no CLB for either plant is "inimical to the common defense and security or to the health and safety of the public" at least where, as here,

1) the safety systems for each plant are vulnerable to earthquake damage that has not been fully evaluated or addressed and for which mitigation measures have not been considered;

2) each plant is vulnerable to a terrorist attack that may disable critical safety systems and release massive quantities of radioactivity, but viable measures to mitigate and/or prevent such damage have not been considered;

3) IP3 is vulnerable to a fire that would destroy redundant electrical systems that are essential for the safe shutdown and continued safe shutdown of the plant;

4) the evacuation planning system for each plant fails to provide an effective system to evacuate the population that could be impacted by an accident at the plant; and

5) key structural components are susceptible to metal fatigue and embrittlement and effective system have not been designed to remedy those problems.

16. As the Commission has observed, an essential component of the CLB is a legally sufficient UFSAR which would enable the Staff, the parties and the Board to evaluate these and other safety issues against the plant as built and currently operating. Without a current and accurate UFSAR and CLB, such an evaluation is not possible. For example, the damage that an earthquake can cause is directly dependent on precisely what structures are within the plant, how they were built and how their structural integrity is linked to the structural integrity and operation of other critical safety systems. This analysis is not possible without a current and accurate UFSAR and CLB. Similarly, the damage that could be done by a terrorist attack to the reactor buildings and internals is directly dependent upon the actual structures that exist at each plant and how much protection or vulnerability they have to such an attack. This analysis is not possible without a current and accurate UFSAR and CLB.

Thus, the safety contentions submitted in the Petition are within the scope of this license renewal proceeding because there is no regulation that excludes them from the hearing and they are all issues which are required to be addressed as part of the decision on whether to grant or deny the license renewal request.

C. Contentions 17-20 and 27-32 Are Admissible

These contentions address the question of the completeness of the application and the impact of the incomplete application on the rights of New York State and other parties. The

contentions are specific, identify the bases and evidence that support the bases. They are material - i.e. their resolution is essential to a fair and complete hearing process - and there is a genuine dispute between New York State and the applicant on the issue of whether the application is complete. The one complicating issue is whether these contentions are within the purview of the Board. There is no specific regulation that forbids the Board from considering these issues and there are regulations that provide the Board with the authority to address these issues.

Whether the LRA is complete and accurate is not merely an academic matter of no concern to the ASLB or the parties. Whether the LRA is complete and accurate is a condition precedent to the extension of the license beyond its expiration date:

> (b) If the licensee of a nuclear power plant licensed under 10 CFR 50.21(b) or 50.22 files a sufficient application for renewal of either an operating license or a combined license at least 5 years before the expiration of the existing license, the existing license will not be deemed to have expired until the application has been finally determined.

10 C.F.R. § 2.109(b). Thus, the decision by NRC Staff that the LRA is complete and accurate, and thus "sufficient," is the functional equivalent of a decision to issue an indefinite extension of the existing operating license for IP2 and IP3, such extension to last until a final decision is reached on the LRA.[42] That decision could take years when the time for appeal, possible remand and further appeal is considered. Depriving a party to the LRA proceeding of the right to

[42]The decision by the NRC Staff on the completeness and accuracy of the LRA, and the implications of that decision, are governed by the Administrative Procedure Act (APA) which allows the filing of a timely application for renewal of a license to act to extend the license until such time as a final and no longer appealable decision on renewal is issued but only if "the licensee has made timely and sufficient application for a renewal or a new license in accordance with agency rules." 5 U.S.C. § 558(c).

challenge the completeness and accuracy of the LRA, in the proceeding in which the issuance of the LRA is to be decided, denies the party a right to contest a licensing decision of the NRC Staff in direct contravention of the rights secured under 42 U.S.C. § 2239(a). It also denies the State of New York additional rights secured under 42 U.S.C. § 2021(l):

> With respect to each application for Commission license authorizing an activity as to which the Commission's authority is continued pursuant to subsection (c) of this section, the Commission shall give prompt notice to the State or States in which the activity will be conducted of the filing of the license application; and shall afford reasonable opportunity for State representatives to offer evidence, interrogate witnesses, and advise the Commission as to the application without requiring such representatives to take a position for or against the granting of the application.

Id. The LRA hearing is the proceeding in which the State of New York exercises the rights granted to it under 42 U.S.C. § 2021(l).[43]

An intervenor is authorized by 10 C.F.R. § 2.309(f)(vi) to raise in any duly noticed hearing a contention that the "application fails to contain information on a relevant matter as

[43]There is no legal authority to support a view that by seeking to appear as a party in the licensing proceeding the State of New York loses the rights it already possesses under the AEA. Those rights are coextensive with the rights given to all potential parties, including states, under 42 U.S.C. § 2239(a). Although the NRC may have discretion on what kind of hearing to provide, it may not refuse to allow any hearing at all on matters that fall within the ambit of 42 U.S.C. § 2239(a) and the Administrative Procedure Act (5 U.S.C. § 556(d):

> In specific terms, the APA requires only that the agency provide a hearing before a neutral decisionmaker and allow each party an opportunity "to present his case or defense by oral or documentary evidence, to submit rebuttal evidence, and to conduct such cross-examination as may be required for a full and true disclosure of the facts." 5 U.S.C. § 556(d).
>
> *Citizens Awareness Netwrok Inc. V. NRC,* 391 F.3d 338, 349 (1st Cir. 2004). (footnote omitted).

required by law." Unless a contention based on completeness and accuracy of the LRA is raised in this proceeding, intervenors will not have exhausted their administrative remedies and may be denied judicial review of any decision based on an incomplete and inaccurate application. *See Concerned Citizens of Rhode Island v. Nuclear Regulatory Commission*, 430 F.Supp. 627 (D.R.I. 1978). By raising the claim that the application is incomplete and inaccurate, New York State is not asking the Board to review or even comment upon the Staff's decision to accept the application. The Staff's view that the application is complete and accurate is no more dispositive of a contention based on that issue than is the Staff's view on any other matter to be decided by the Board. The Staff is a party, but not a super party or a special party, and its views on issues, whether expressed in the form of regulatory guides or a staff decision to accept an application, are at most a statement of their position.

In *Matter of Nuclear Management Company, LLC* (Monticello Nuclear Generating Plant), 62 N.R.C. 735, 743 (ASLB 2005) the Board rejected an attempt by a proposed intervenor (intervention was denied for lack of standing) to use a motion to force withdrawal of an application because there was no contention filed and it was not the responsibility of the Board to review the decision of the Staff to accept an application for filing. *Id*. However, the Board noted that the issue could have been raised as a contention. *Id*. In addition, the decision relies on the *CCRI* decision, which stands for the proposition that because there are administrative remedies before the NRC to challenge the completeness of a license application, the District Court does not have jurisdiction to decide the question.

Here New York State is seeking the administrative remedy of having this Board decide that the LRA is so deficient that the hearing process must be suspended until such time as Entergy files an LRA that meets the minimum requirements of completeness, accuracy and sufficiency required by the NRC regulations and the APA. *See In the Matter of Duke Energy Corporation* (Oconee Nuclear Station, Units 1, 2, and 3), CLI 99-11, 49 N.R.C. 328, 335-40 (1999), where the Commission affirms rejection of a contention based on the incompleteness of the application and seeking dismissal of the application, not because such a contention is inadmissible, but because the intervenor failed to provide any substantive basis or evidence that the application was legally deficient. "A contention alleging that an application is deficient must identify 'each failure and the supporting reasons for the petitioner's belief.' 10 C.F.R. § 2.714(b)(2)(iii)." *Id*. at 336-37.

Allowing an intervenor to challenge the completeness and accuracy of the LRA is a corollary of the obligation imposed on intervenors to strictly comply with the specificity and basis requirements of 10 C.F.R. § 2.309(f). If, as the regulation requires, an intervenor must plead contentions with sufficient specificity to put 'other parties in the proceeding on notice of the petitioners' specific claims' in order to 'give[] them a good idea of the claims they will be either supporting or opposing' (*Matter of Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2 and 3), 49 NRC 328, 333 (NRC Apr. 15, 1999)), the LRA must be sufficiently complete and accurate to allow such specific pleading to occur. The LRA in this proceeding falls far short of that requirement, forcing New York State and other intervenors to plead contentions based on the

absence of information in the LRA rather than being able to challenge directly, or accept as adequate, the specific claims made by the applicant and the specific programs proffered by the applicant. This two step process saps the resources of intervenors and wastes the ASLB's.

There can be no question that the Board possesses the legal authority to suspend the hearings where, as here, the application is incomplete and inaccurate. Pursuant to 10 C.F.R. § 2.319 the Board has "all the powers necessary" "to control the prehearing and hearing process, to avoid delay and to maintain order." *Id*. Among the enumerated powers of the Board are to "[r]egulate the course of the hearing and the conduct of the participants" and "[s]et reasonable schedules for the conduct of the proceeding and take actions reasonably calculated to maintain overall schedules." 10 C.F.R. §§ 2.319(g), and (k). As noted in the contention, basis and supporting evidence, allowing the hearings to proceed before a complete and accurate LRA is filed will needlessly delay resolution of the issues and waste the limited resources of the Board and the intervening parties.

Since a condition precedent to a finding on the LRA is a finding that the LRA is complete and accurate, a contention challenging that assertion by the applicant is material to findings that the Board must make, and admissible. *In the Matter of Nuclear Management Company*, 62 N.R.C. at 743 ("If NAWO believed there were deficiencies in the LA that it wished to raise before this Board, it should have identified them in a proposed contention and, if the contention were admitted and found meritorious, the license application would not be granted." *Id*. (footnote omitted)). In this case, New York State has identified, with specificity, basis and

evidence, deficiencies in the LRA because of the failure to comply with 10 C.F.R. § 50.71(e), because of the failure to identify legally relevant GDC and then demonstrate that the plant has been designed and operated in compliance with those GDC and because the application impermissibly combines the environmental evaluation into a single ER that obscures mitigation measures that could be taken to reduce impacts from one of the units and distorts the evaluation of alternatives, particularly the no action alternative.

CONTENTIONS SUBMITTED BY OTHER INTERESTED PETITIONERS

The State of New York hereby adopts and incorporates by references the following contentions submitted by Riverkeeper, Inc.: Contention EC-2, pursuant to 10 C.F.R. §2.309(f)(3).

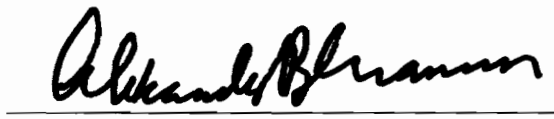
CONCLUSION

The issues raised in the New York State's contentions are material to the findings the NRC must make to support the applicant's request. For all the reasons stated, the New York State, requests that its contentions be admitted and that New York State be granted party status.

Respectfully submitted,
Dated: December 3, 2007
Sincerely,

Andrew M. Cuomo
Attorney General
for the State of New York
and the People of the State of New York

Andrew J. Spano
Westchester County Executive



Alexander B. Grannis
Commissioner
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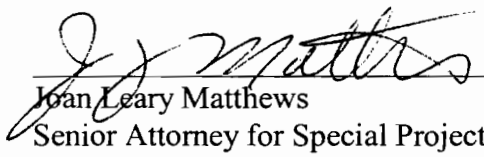

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