June 27, 2008

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of Duke Energy Carolinas Combined License Application For William States Lee III Units 1 and 2	))))))	Dockets No. 52-018, 52-019

PETITION FOR INTERVENTION AND REQUEST FOR HEARING BY THE BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE

Introduction

Pursuant to 10 C.F.R. § 2.309, 10 C.F.R. § 52.21 and a notice published by the Nuclear Regulatory Commission ("NRC" or "Commission") at 73 Fed. Reg. 22978 (April 28, 2008), the Blue Ridge Environmental Defense League ("BREDL") hereby petitions for leave to intervene and requests a hearing in the above-captioned matter. This petition sets forth with particularity the contentions we seek to raise. As demonstrated below, Blue Ridge Environmental Defense League has representational standing through its members to make this request.

Description of the Proceeding

This proceeding is concerned with the application for a combined construction and operation license ("COL") for William States Lee III Units 1 and 2 ("WS Lee") filed pursuant to 10 CFR Part 52 Subpart C by Duke Energy Carolinas ("Duke") on December 12, 2007 and supplemented by letters dated January 28, February 26 and February 8,

2008. Acceptance of the application for docketing by the NRC was published in 73 Fed. Reg. 11156 (February 29, 2008). Notice of hearing and opportunity to petition for leave to intervene was published in 73 Fed. Reg. 22978 (April 28, 2008). The COL application incorporates by reference 10 CFR § 52 Appendix D which includes the AP1000 pressurized water reactor Design Control Document through Revision 15 as amended by Revision 16. The AP1000 DCD Revision 16 remains subject to an ongoing NRC rulemaking under Docket No. 52-006.

Description of Petitioners

Blue Ridge Environmental Defense League is a regional, community-based non-profit environmental education organization founded in 1984 and today has members and projects in Virginia, North Carolina, South Carolina, Tennessee, Alabama and Georgia. BREDL's founding principles are earth stewardship, environmental democracy, social justice, and community empowerment. BREDL encourages government agencies and citizens to take responsibility for conserving and protecting our natural resources and protecting public health. BREDL also functions as a "watchdog" of the environment, monitoring issues and holding government officials accountable for their actions.

Standing

Pursuant to 10 CFR § 2.309, a request for hearing or petition for leave to intervene must address (1) the nature of the petitioner's right under the Atomic Energy Act to be made a party to the proceeding, (2) the nature and extent of the petitioner's property, financial, or other interest in the proceeding, and (3) the possible effect of any order that may be entered in the proceeding on the petitioner's interest.

Other standing requirements are found in NRC case law. As summarized by the Atomic Safety and Licensing Board ("ASLB"), these standing requirements are as follows:

> In determining whether a petitioner has sufficient interest to intervene in a proceeding, the Commission has traditionally applied judicial concepts of standing. *See Metropolitan Edison Co.* (Three Mile Island Nuclear station, Unit 1), CLI-83-25, 18 NRC 327, 332 (1983) (citing *Portland General Electric Co.* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610 (1976)). Contemporaneous judicial standards for standing require a petitioner to demonstrate that (1) it has suffered or will suffer a distinct and palpable harm that constitutes injury-in-fact within the zone of interests arguably protected by the governing statutes (e.g., the Atomic Energy Act of 1954 (AEA), the National Environmental Policy Act of 1969 (NEPA)); (2) the injury can be fairly traced to the challenged action; and (3) the injury is likely to be redressed by a favorable decision. *See Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plants), LBP-99-25, 50 NRC 25, 29 (1999). An organization that wishes to intervene in a proceeding may do so either in its own right by demonstrating harm to its organizational interests, or in a representational capacity by demonstrating harm to its members. *See Hydro Resources, Inc.* (2929 Coors Road, Suite 101, Albuquerque, NM 87120), LBP-98-9, 47 NRC 261, 271 (1998). To intervene in a representational capacity, an organization must show not only that at least one of its members would fulfill the standing requirements, but also that he or she has authorized the organization to represent his or her interests. *See Private Fuel Storage, L.L.C.* (Independent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 168, *aff'd on other grounds*, CLI-98-13, 48 NRC 26 (1998).

Pacific Gas & Electric Co. (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), LBP-02-23, 56 NRC 413, 426 (2002)

Standing to participate in this proceeding is demonstrated by the declarations of the following members of the Blue Ridge Environmental Defense League, people who live within 50 miles of the proposed site and who have authorized Petitioner to represent their interests in this proceeding.

Diane Biggs, Pauline, South Carolina

Mary B. Connolly, York, South Carolina

Stephen A. Laurence, Simpsonville, South Carolina

Charles Moss, Sharon, South Carolina

Joseph Zdenek, Rock Hill, South Carolina

As demonstrated by the attached declarations, Petitioner's members live near the proposed site, i.e., within 50 miles. Thus, they have presumptive standing by virtue of their proximity to the two new nuclear plants that may be constructed on the site. *Diablo Canyon, supra,* 56 NRC at 426-427, citing *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-01-6, 53 NRC 138, 146, *aff'd,* CLI-01-17, 54 NRC 3 (2001) In *Diablo Canyon,* the Licensing Board noted that petitioners who live within 50 miles of a proposed nuclear power plant are presumed to have standing in reactor construction permit and operating license cases, because there is an "obvious potential for offsite consequences" within that distance. *Id.* Here, the granting of a combined license COL to Duke would permit the construction and operation of two nuclear reactors on the WS Lee site near Gaffney, South Carolina. Thus, the same standing concepts apply.

The Petitioner's members seek to protect their lives and health by opposing the issuance of a COL to Duke. Petitioner seeks to ensure that no COL is issued by the U.S. Nuclear Regulatory Commission unless Duke demonstrates full compliance with the Atomic Energy Act, the National Environmental Policy Act and all applicable laws and regulations.

Further, *locus standi* is based on three requirements: injury, causation and redressability. Petitioners hereby request to be made a party to the proceeding because (1) Construction and operation of a nuclear reactor at WS Lee would present a tangible and particular harm to the health and well-being of our members living within 50 miles of the site, (2) The NRC has initiated proceedings for a combined license, the granting of which would directly affect our members, and (3) The Commission is the sole agency with the power to approve, to deny or to modify a license to construct and operate a commercial nuclear power plant.

Related Procedural Matters

The federal register notice which announced opportunity to request leave to intervene in WS Lee COL imposed a 10-day window for gaining access to so-called sensitive unclassified non-safeguards information. 73 FR 22980 (April 28, 2008) Petitioner believes that this is an abrogation of the letter and the spirit of the laws of privacy and access to information. Moreover, the NRC's requirements of non-disclosure affidavits and protective orders necessary for us to gain access to information which is neither classified nor safeguards are contrary to the purposes of a non-profit educational organization. Therefore, despite the fact that the information would be for the purpose of official business and that the Petitioner has a need-to-know, we have nevertheless abstained from subjecting our organization to the requirements of fingerprinting, credit checks and other invasions of privacy.[1]

[1] Memorandum from Luis Reyes, "Policy Regarding Revision, handling, marking and protecting sensitive unclassified non-safeguards information (SUNSI)," COMSECY-05-0054, October 26, 2005

Overview of the Contentions to be Raised in this Petition

A combined license is authorization from the NRC to construct and operate a nuclear power plant at a specific site. Before issuing a COL, the NRC staff must complete safety and environmental reviews of the application. The COL must comply with provisions of the Atomic Energy Act, the National Environmental Policy Act and NRC regulations. Petitioners wish to intervene because the operation of two nuclear reactors would endanger over a 2.3 million people in two states living within 50 miles of the plant. Furthermore, the risk is unnecessary and wholly out of proportion to any possible benefit.

Petitioner hereby sets forth with particularity our proposed contentions. We incorporate into our contentions the specific issues of law or fact to be raised, the bases for our contentions and statements of fact or expert opinion in support of our contentions. Further, we demonstrate that the issues we raise are within the scope of the proceeding, that the issues are material to the Commission's licensing responsibilities, and that there exists a genuine dispute between Petitioners and the licensee.

Contention—Page

1—8. The NRC cannot hold a fair hearing at this time because the application adopts by reference a design and operational practices that have not been certified by the NRC or accepted by the applicant.

2—11. The applicant fails to analyze the "carbon – footprint" of the construction and operation of the William States Lee nuclear reactors 1 & 2 in its environment report.

3—14. Duke's COLA does not identify the plans for meeting its water requirements with sufficient detail in order to determine if there will be adequate water during adverse weather conditions such as droughts.

4—19. The applicant has not demonstrated that it is and financially qualified to engage in the activities authorized by the operating license in accordance with the regulations of 10 CFR § 50.57 (a)(4)

5—21. The COLA does not provide reasonable assurance of adequate protection of public health and safety required by 10 CFR. § 50.57 (a)(3). The FSAR insufficiently analyzes reactor units' 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 of potential earthquakes in violation of 10 CFR PART 100, APPENDIX A.

6—27. Whether William States Lee III Will Improve the General Welfare, Increase the Standard of Living, or Strengthen Free Competition in Private Enterprise

7—35. The NRC Fails to Execute Constitutional Due Process and Equal Protection

8—37. The assumption that uranium fuel is a reliable source of energy is not supported in the combined operating license application submitted by Duke Energy to the U.S. Nuclear Regulatory Commission

9—41. Duke and NRC Fail to Include Adequate Protections from Aircraft Impacts at the WS Lee site

10A—43. Failure to Evaluate Whether and in What Time Frame Spent Fuel Generated by Bellefonte Units 3 and 4 Can Be Safely Disposed Of

10B—49. Even if the Waste Confidence Decision Applies to This Proceeding, It Should be Reconsidered.

Proposed Contentions

<u>CONTENTION ONE</u>

The NRC cannot hold a fair hearing at this time because the application adopts by reference a design and operational practices that have not been certified by the NRC or accepted by the applicant.

The WS Lee COLA relies upon Appendix D to 10 C.F.R. Part 52 and the AP1000 Design Control Document ("DCD") Revision 16. However, NRC staff has stated that the certification for the AP1000 revision 16 would not be completed until 2011. The NRC staff's Safety Evaluation Report on Revision 16 is scheduled to be completed by March 2010 with the rule-making completed a year later. Modifications to the design or operational procedures for the AP1000 revision 16 would require changes in Duke application.

Discussion

The NRC should suspend the Duke COL proceeding until the AP-1000 design control document is finalized. It is fundamentally unfair for the NRC to require Petitioner and other interested parties to perform a review of the application and

preparation of contentions when the application is not complete. The policy of "fair hearings" as stated by the NRC: [2]

> In the contest of new reactor licensing under 10 C.F.R. Part 52 members of the public should be afforded an opportunity for hearing on each genuine issue in dispute that is material to the particular agency action subject to adjudication. By the same token, however, applicants for a license should not have to litigate each such issue more than once.

The only way to meet both of these goals is to have a complete application; Petitioners should not be subject to multiple litigation on the same issue.

The most significant elements of the proposed reactors, i.e., the certified design and operational practices, are lacking in the Duke COLA. The AP1000 DCD Revision16 (ADAMS Accession No. ML071580939) has been adopted by reference for the WS Lee reactors and is, as such, part of the application. It is impossible to conduct a meaningful technical and safety review of the COLA without knowing the final design of the AP1000 revision 16. On its face, the design control document ("DCD") is incomplete; even after the certification of several "Tier 1" components in December 2005, there remain a number of serious safety inadequacies in the AP1000 revision 16 design that have not been satisfactorily addressed. For example, in the January 18, 2008 letter to Westinghouse docketing AP1000 revision 16 (ADAMS Accession No. ML073600743), there was discussion of an incomplete recirculation screen design, a necessary component to the emergency cooling system that will affect the design for WS Lee. And the sump problem is not the only design consideration that will ultimately affect the facility.

The AP1000 DCD Revision 16 currently lists 172 separate documents concerning various aspects of the AP1000 reactor. Duke Energy and other companies including Progress Energy and Southern Company have submitted Westinghouse's technical

[2] *Statement of Policy on Conduct of New Reactor Licensing Proceedings*, 72 FR at 20969.

designs with their applications for new plants. But of the 172 interconnected Westinghouse design documents, totaling more than 6,500 pages, only 21 of the components appear to have been certified by the NRC. And most of those rely on systems reflected in the remaining, non-certified design documents. These documents contain Tier 1 information, i.e., components of the design that have been certified, and Tier 2 information, i.e., components that have not been certified as complying with Appendix D to 10 C.F.R. Part 52 (the AP-1000 Certification Rule). Importantly, the Tier 1 design descriptions, interface requirements and site parameters are derived from the Tier 2 information. AP1000 DCD Revision 16, Introduction, paragraph 1.3 In other words, not even the so-called "certified" components have been fully approved as they depend on the interaction with non-certified components.

The Tier 2 components are not trivial, but run the gamut of containment, control room set up, seismic qualifications, fire areas, heat removal, human factors engineering design, plant personnel requirements, operator decision-making, alarms and piping.[3] These non-certified components interact with Tier 1 components and each other to a significant degree. During the certification process, any or all of these may be modified by the Commission, and as a result, require the applicant to modify its application. These lead to one of the basic problems for all reviewers of the COLA for Duke and other utilities: it is impossible to conduct the probabilistic risk assessment ("PRA") under the current status of the AP1000 DCD Revision 16.

An assessment of risk is required for a COLA review, and that depends on the ultimate design of the reactor and how all of the components interact with each other. Likewise, the environmental review culminates in the assessment of design basis accidents, and then the severe accidents to develop the severe accident mitigation design

[3] AP1000 DCD Revision16, Introduction; Table 1-1 provides a listing of Tier 2 information

alternatives ("SAMDAS") pursuant to 10 C.F.R. 51.30. The NRC staff's Environmental Assessment on the AP 1000 Revision 16 was conducted in 2005, prior to the submittal of the WS Lee application. Without having the current configuration, design and operating procedures in the application, the risk assessment and SAMDAS cannot be determined. Until major components are certified and incorporated into the COLA for a full review, much of the interaction between the various components cannot be resolved.

To put it plainly, the AP1000 is a "pig in a poke" which may be modified by either the applicant or the NRC at some point in the future. Reliance on provisions allowing late-filed contentions would result in piecemeal litigation, which is disfavored by the Commission; further, it would undermine public participation in the licensing process.

Conclusion

The deficiencies in the DCD for the WS Lee COLA are manifold. The lack of information about the basic design and operating requirements for the AP1000 reactor will not allow a full and meaningful review. Neither the NRC staff, Duke nor the Petitioner know at this time what the final design will be. Fairness requires that the proceeding be suspended.

CONTENTION TWO

The applicant fails to analyze the "carbon – footprint" of the construction and operation of the William States Lee nuclear reactors 1 & 2 in its environment report.

The applicant fails to include any discussion of Green House Gas emissions or "Carbon Foot-print" in its environment report.

Discussion

Greenhouse gases rank among the top environmental concerns today. The release of greenhouse gases is part of any major construction operation – as the production of cement, steel, copper and other raw materials and components all contribute to what is generically called the "carbon-footprint" though more accurately, it would referred to as the "Greenhouse Gas footprint." These emissions from many sources, in aggregate, are contributing to the destabilization of climate on planet Earth. The applicant fails to include an analysis of the emission of Greenhouse gases in the process of the production of raw materials and components, and the transportation of these materials and components and the construction processes required to build and operate the William States Lee nuclear power station.

A second analysis of Greenhouse gas emissions, associated with each and every step in the uranium fuel chain is similarly lacking. The mining of uranium is accomplished using fossil fuels. The many transportation links in the 6 uranium processing steps (mining, milling, conversion, enrichment, re-conversion, fuel fabrication) prior to shipment to the Bellefonte site have not been analyzed for Greenhouse gas emissions and associated climate impacts. Today there are sometimes additional steps when down-blending and other feedstock sources are utilized in uranium fuel production. Each and every one of the 6 uranium processing steps requires power—

and most are currently powered with fossil fuels. The back-end of the nuclear fuel chain also involves transportation and therefore combustion of fossil fuels in moving the so-called low-level waste, and someday the high-level waste. Any plans for additional steps of storage or processing of these wastes will increase the associated transportation generated greenhouse gas emissions! In addition, the reprocessing of nuclear fuel generates large quantities of gaseous emissions, all of which need to be evaluated for whether they contribute to climate destabilization.

Our members are at risk from this lack of analysis since the justification for federal subsidy for construction of new nuclear power reactors is its putative contribution to reversing climate change and they are taxpayers, as well as potential victims of an inadequate federal response to the Climate Crisis. Impacts from a failure to avert the climate crisis are varied, but include the potential for severe consequences to society, and therefore these individuals.

A recommended resource for conducting such an analysis is the work of Phillip Smith and Willem Storm van Leeuwen, in their report entitled Nuclear Power -- Energy Balance, newly updated in 2008 and posted at: http://www.stormsmith.nl/. Their findings include the determination that a key limiting variable in the nuclear fuel cycle impacts on Greenhouse Gas emissions is the relative ease with which uranium is obtained – the harder the rock, the deeper the deposits, the greater the Greenhouse gas emissions. Therefore, a flat-line projection for Greenhouse Gas emissions from the nuclear fuel cycle is not likely to be an accurate representation.

While the applicant makes no claim that building the Lee reactors, or nuclear energy will contribute to a “solution” to the climate crisis, many nuclear energy advocates, including those in the Administration and Congress supplying funding do. It is important that all public investment in climate crisis solutions rest on scientifically solid ground. It is therefore important to include the “carbon-footprint” of construction and operation and dealing with the wastes of the Lee reactors in the consideration of environmental impact.

Conclusion

The review of environmental impacts of the William States Lee project is not complete. Admission of this contention would aid in the development of a more complete record.

CONTENTION THREE

Duke.s COLA does not identify the plans for meeting its water requirements with sufficient detail in order to determine if there will be adequate water during adverse weather conditions such as droughts.

Issue

The availability of cooling water is a significant constraint to the safe shutdown of the proposed reactors and without a clear plan on how that water will be provided, the application is incomplete. The COLA does not satisfy the requirement for completeness of 10 C.F.R. § 2.101(a)(3).

Discussion

Annual temperatures in the Southeast region are increasing and are projected to continue to do so over a relatively short period of time. The applicant fails to fully analyze the following potential impacts of elevated water temperatures in the Broad River and its water shed:

a) The impact of reactor thermal discharge (warmed water) on water that is already elevated in temperature – looking at both additive and synergistic impacts on the local and down-river ecosystem
b) The impact of warmed water on condenser cooling – nuclear power reactors around the world in increasing numbers[i], including TVA's Brown's Ferry nuclear reactor in 2007, have gone to low-power or off-line due to elevated cooling water temperatures and the loss of efficiency in power production due to loss of effective condensation of steam used to generate power
c) The evaluation of increasingly warmed water on tech specs for reactor cooling
d) The evaluation of the impact of warmer ambient water temperatures on total withdrawal, consumption and evaporation
e) The impact on other facilities – the need to provide cool water to the two William States Lee reactors could impact operations at other facilities up-stream from the facility, as well as the issue of whether heat generated at the Lee site would impact operations at facilities down-stream
f) The impact of pollution in water at warmer temps on the ecology of the site and also down-stream – most chemical reactions are facilitated by elevated

temperatures; a full analysis of the impact of reactor heat in hotter water on the other pollutants in the water from any source must be considered, including implications for the food chain

g) The impact of reactors going off-line on overall power and reliability – when the water is too warm, reactors worldwide have been taken off-line or put at very low power – the applicant fails to project the impact on its customers, business and energy supply by the projected rise in water temperatures over the period of operation

h) The impact of reactors going off-line during heat wave on customers – specifically, the loss of power during a heat-wave should be factored in terms of impact on customers

i) The impact of reactors going off-line on regional grid stability

j) The the potential for extended drought locally, and in the region to exacerbate all of the issues identified above.

The applicant offers one brief report on a longitudinal analysis of flow-rates in the Broad River, supporting our contention that there are real issues to be examined here. Section 5.2.2.1 states:

> Additional evaluation indicated that had a hypothetical Lee Nuclear Station operated during the 81-year period of record, operations would have been curtailed only once. During the 1998-2002 drought, operations would have been curtailed for 42 days during June-September 2002, which was the worst year of the drought. Part of this outage would have coincided with the summer peak power demand.

This statement confirms that even based on historical data, rather than the projected trends for increasing temperatures and more prolonged periods of drought, there are some

very serious questions that need to be answered. The applicant fails to fully address the host of issues associated with the problem of rising temperatures. This renders the COLA incomplete and opens the possibility that the conclusions are incorrect.

The WS Lee Environment Report also fails to provide the necessary information. ER Section 2.3.1 Hydrology – the description of the Broad River does not explicate any of the issues raised here. In section 2.3.1.2.1.3 – drought is reported, and 1998 – 2002 noted, however the year emphasized in the figure is 2005, after the on-set of abnormally wet conditions traveling with the remains of hurricanes that swept through the region that year. No discussion is included on the intersection of drought and water temperature.
In section 2.7.1 – Climatology and subsequent sections – a detailed enumeration of historical climate data is given. No mention is made of the potential for current and future climatological conditions to depart from the past (also known as "climate change") nor is there any discussion of any of the issues raised in here.

Chapter 5.2.2.1 Makeup Water and Consumptive Use –

The mean annual flow of the Broad river based on historical is cited for the consumption of 2% of the Broad River. No analysis is included on the impact of higher ambient water temperature due to increased temperatures in the region on either water withdrawal or consumption. It is important that projections be made in a "snap-shot" manner focused on the outcomes of a hot spell in conjunction with a drought, rather than only aggregate (annual means, etc). Such an analysis may show a significantly greater water consumption in these periods, and may not support the statement made in this

section: “There is sufficient water in the onsite ponds for the station to operate at full power for approximately four weeks during low flow conditions.”

Duke reports the following; however, we suggest that this is merely the “tip of the iceberg” in terms of what the next four to eight decades are likely to hold:

> Duke Energy first calculated a long-term 7Q10 flow for the Broad River. Details of the 7Q10 calculation and the following evaluation are presented in Subsection 5.3.1.1.3. The 7Q10 calculated for the Broad River at Gaffney is 479 cfs. This value is within the FERC minimum flow requirement for the Ninety-Nine Islands Hydroelectric Station (July through November) of 483 cfs. Using this minimum flow requirement of 483 cfs and the projected Lee Nuclear Station cooling water consumptive water use of 55 cfs, Duke Energy defined the sum of the FERC requirement and consumptive water use (538 cfs) as a trigger to define the minimum flow in the Broad River that would support current water use and quality for downstream users. Duke Energy plans to use the Make-Up Pond B to supplement river flows during low-flow conditions. A study was conducted to estimate how often this would occur and recurrence intervals were calculated based on the FERC required minimum continuous flow of 483 cfs established for Ninety-Nine Islands Hydro.
>
> The results of the study indicate that Lee Nuclear Station may have to partially align to the Make-Up Pond B for a 7-day period every 1.5 years. Lee Nuclear Station may have to partially align to the Make-Up Pond B for one month every 6.4 years. Lee Nuclear Station may have to completely align to the Make-Up Pond B for one month every 10.3 years. Lee Nuclear Station may have to partially align to the Make-Up Pond B for 90 consecutive days every 12.2 years. This indicates that for the combination of projected operations and historical low-flow conditions, the capacity of the Broad River and Make-Up Pond B might be exceeded once every 12.2 years. Station operations would potentially have to be curtailed at this frequency.
>
> Additional evaluation indicated that had a hypothetical Lee Nuclear Station operated during the 81-year period of record, operations would have been curtailed only once. During the 1998-2002 drought, operations would have been curtailed for 42 days during June-September 2002, which was the worst year of the drought. Part of this outage would have coincided with the summer peak power demand.

The lack of further analysis to address all points of concern, and the insufficiency of remedies offered result in an application that has failed to sufficiently address the scope of likely impacts to the human environment and could result in harm to our members

directly through loss of power and increased potential for accidents, as well as loss of water resource.

5.2.3.1 Thermal Impacts – the description of the system does not include a consideration of the projected increase in overall temperatures anticipated during the decades of operation. Synergistic interactions of thermal impacts and other factors are also not included.

5.3.1.1.3 Operating During Low Flow Conditions –During the 1998-2002 drought, operations would have been curtailed for 42 days during June-September 2002, which was the worst year of the drought. Part of this outage would have coincided with the summer peak power demand.

Duke analysis does not include many salient features, particularly the impact of elevated water temperatures on flow, and consumption and operation of the reactors.

7.2 Severe Accidents: Fails to mention the potential for increased risks associated with loss of off-site power that could result from the failure of the reactors to operate in peak heat periods.

Chapter 5 – Environmental Impacts Station Operation discusses some thermal issues, but fails to address the concerns raised in this contention.

19 Probabilistic Risk Assessment: Fails to address the potential for increased risks associated with loss of off-site power that could result from the failure of the reactors to operate in peak heat periods. Loss of off-site power is the root cause of station blackout. Station blackout is associated with 50% of the risk of a major reactor accident (NUREG-1150, 1990)

Conclusion

Our members in this region will be adversely impacted if a facility is built that is vulnerable to reduced capacity and or increased chance of a major reactor accident due to heat impacts. Further, members shall be impacted if the Broad River and other water resources in the area are substantially reduced or compromised by this proposal and the current analysis lacking these elements does not assure that such impacts will not occur.

> ...when you're developing an ER upon which the EIS will be based...it would be good science, to be looking at the new projections for changes in coastline, increased storms, changes in water levels, changes in flood patterns. I don't see it happening and I think this Agency needs to get moving on forcing the licensees to confront these new realities. [Comments/Suggestions from December 6, 2007 Meeting on Enhancing the Efficiency and Effectiveness of the NRC Environmental Review Process, Jon Block, UCS, Transcript at 90]

<u>CONTENTION FOUR</u>

The applicant has not demonstrated that it is and financially qualified to engage in the activities authorized by the operating license in accordance with the regulations of 10 CFR § 50.57 (a)(4)

Issue

The granting of operating license may be done only upon a finding by the NRC that t the owner-operator is financially sound. The COL may be issued for a fixed period up to 40 years as authorized by 10 CFR § 50.51.

Discussion

The current macro economy\'s influence on nuclear power in US may be ambiguous. On one hand, it is very probably that US has stepped into a recession since the subprime mortgage crisis in 2006. The decrease in economy growth would decrease demand for energy significantly. This is surely bad news for building new nuclear plants in the next few years. For taxpayers, it is certainly not beneficial to build nuclear power. According to Dave Hamilton, director of global warming and energy programs for the Sierra Club, "By and large the environmental community is united in thinking that nuclear power is a bad idea that causes more problems than it solves."

According to our economist Xuan Chi, Duke anticipates capital expenditure of $23 billion on future expansion from 2008 to 2012.[4] She adds that Duke expects that the fluctuation of exchange rates may cause great losses of about $145 million.[5]

As we know, the US dollar is experiencing devaluation which may last for a long time. Chi adds that if a large part of Duke's capital expenditure is out of US, i.e. buying nuclear reactors, they may fall into financial crisis soon. Another related concern: since the US economy is still in recession and no signals in macro economics can prove that situation would be better in a few years, Duke's anticipation of future financial benefits maybe a little too optimistic.

Conclusion

Nuclear powers may cause profits for the owners in the future, although not predictably, and the loan guarantees recently enacted by Congress mean that it is probably not a good idea for tax payers either. Before issuing a COL, the NRC must

[4] Duke Energy Form 10K 2007, pg 26
[5] *Id.* pg 28

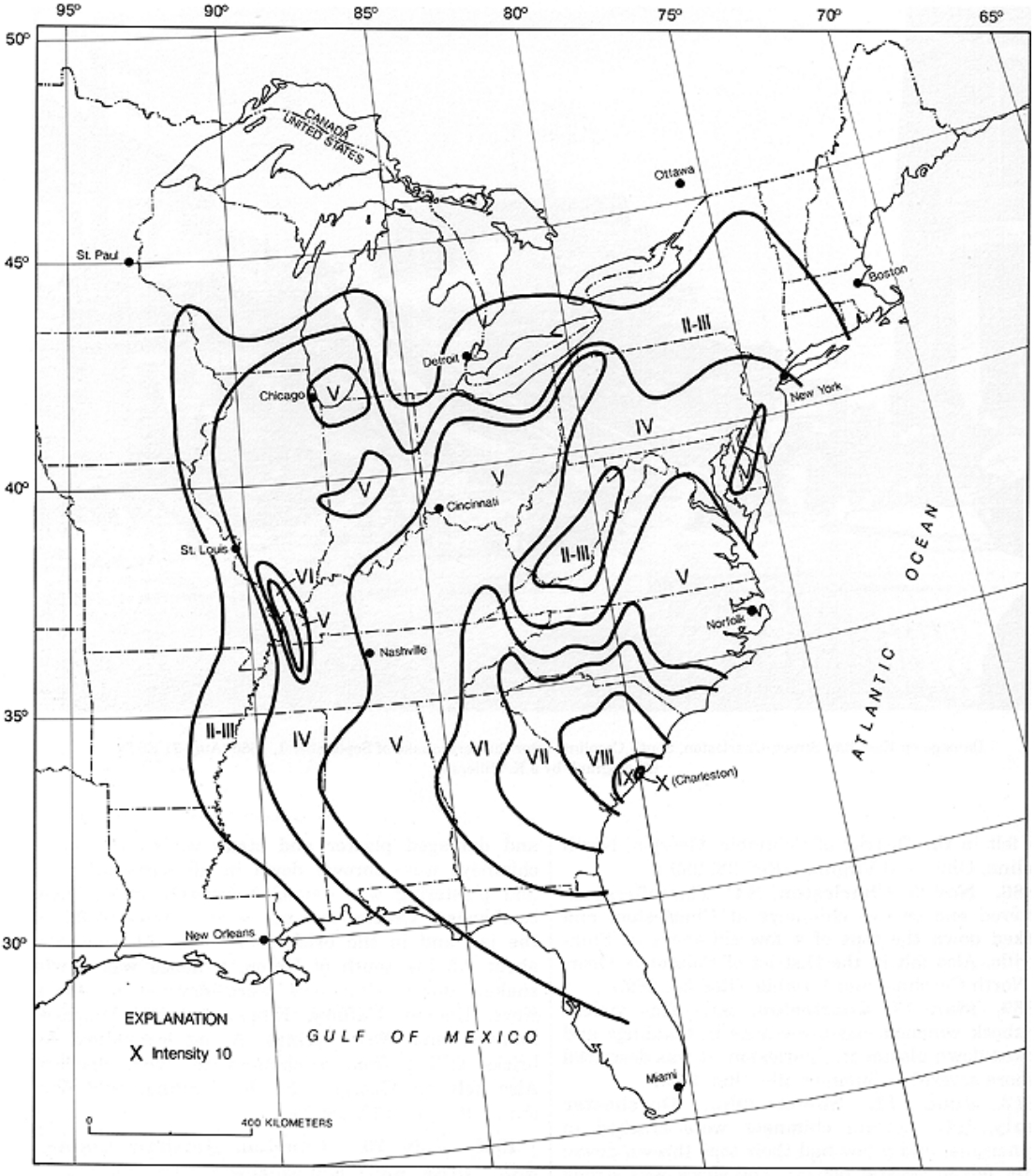
determine whether Duke is financially qualified to engage in the activities authorized by the operating license in accordance with 10 CFR § 50.57 (a)(4).

CONTENTION FIVE

The COLA does not provide reasonable assurance of adequate protection of public health and safety required by 10 CFR. § 50.57 (a)(3). The FSAR insufficiently analyzes reactor units' 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 of potential earthquakes in violation of 10 CFR PART 100, APPENDIX A.

Discussion

South Carolina is in an active earthquake zone. The National Earthquake Information Center reports over 20 earthquakes of intensity V or greater (5 or more on a scale of 10 in the Modified Mercalli scale) have been centered in the state. The famous Charleston earthquake of 1886 was an intensity X which damaged building 100 miles away. The map below indicates the magnitude and the extent of the 1886 quake.



Map source: http://neic.usgs.gov/neis/eqlists/USA/1886_09_01_iso.html

The University of South Carolina's Seismic Network contains comprehensive data on earthquake history. The following report is available at their website: http://scsn.seis.sc.edu/html/eqchas.html

The Charleston Earthquake of 1886

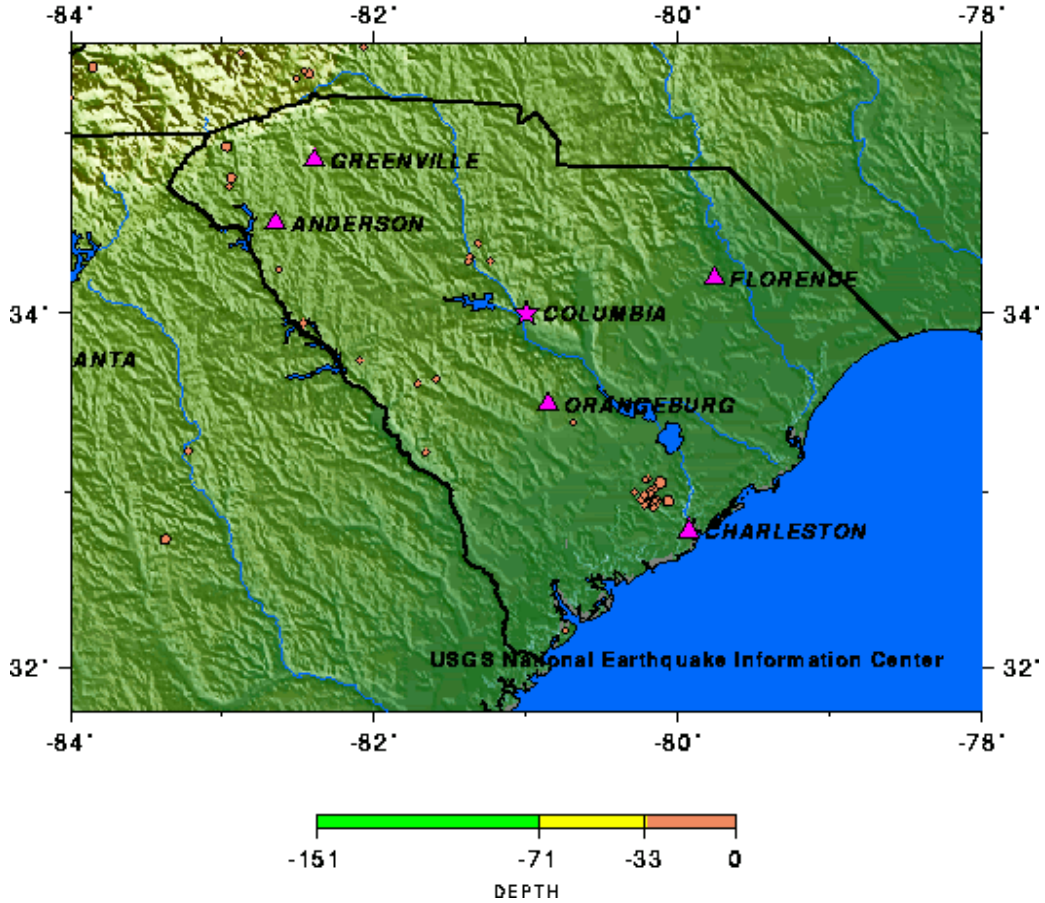
> The seismic history of the southeastern United States is dominated by the 1886 earthquake that occurred in the Coastal Plain near Charleston, South Carolina. It was one of the largest historic earthquakes in eastern North America, and by far the largest earthquake in the southeastern United States. A major shock, occurred August 31, 1886 at approximately 9:50 p.m. and lasted less than one minute, but resulted in about sixty deaths and extensive damage to the city of Charleston. Because the event took place before seismological instrumentation, estimates of its location and size must come from observations of the damage and effects caused by the earthquake. Most of what we know of the even and the resulting damage comes from a comprehensive report by C.E. Dutton of the U.S. Geological Survey published in 1889. The meizoseismal area (area of maximum damage) of the 1886 earthquake is an elliptical area roughly 20 by 30 miles trending northeast between Charleston and Jedburg and including Summerville and roughly centered at Middleton Place.

The 1886 earthquake was followed by a series of aftershocks. Of 435 or more earthquakes reported to have taken place in South Carolina between 1754 and 1975, more than 300 were aftershocks that occurred in the first 35 years following 1886. The 1886 earthquake and its aftershocks dominate the seismic record of the southeast.

The historic record suggest the Charleston-Summerville area had a continuum of low level seimicity prior to 1886, and a low-level activity continues in the same area today. In 1903 a quake centered in the Savannah River area was recorded at an intensity of VI. In 1907 a quake again affected Charleston, Augusta, and Savannah. Quakes occurred in 1912, 1913 and 1914. In 1924 an earthquake affecting an area of 50,000 square miles shook most of South Carolina. In 1945 a shock centered west of Columbia was felt as far away as Georgia and Tennessee. More quakes occurred in 1952, 1959, 1960 and 1967. A magnitude 3.4 (Richter scale) earthquake centered near Orangeburg in 1971. The map below illustrates seismic events from 1977 to 1996.

Seismicity of South Carolina

1977 - 1996



Depth is in kilometers.

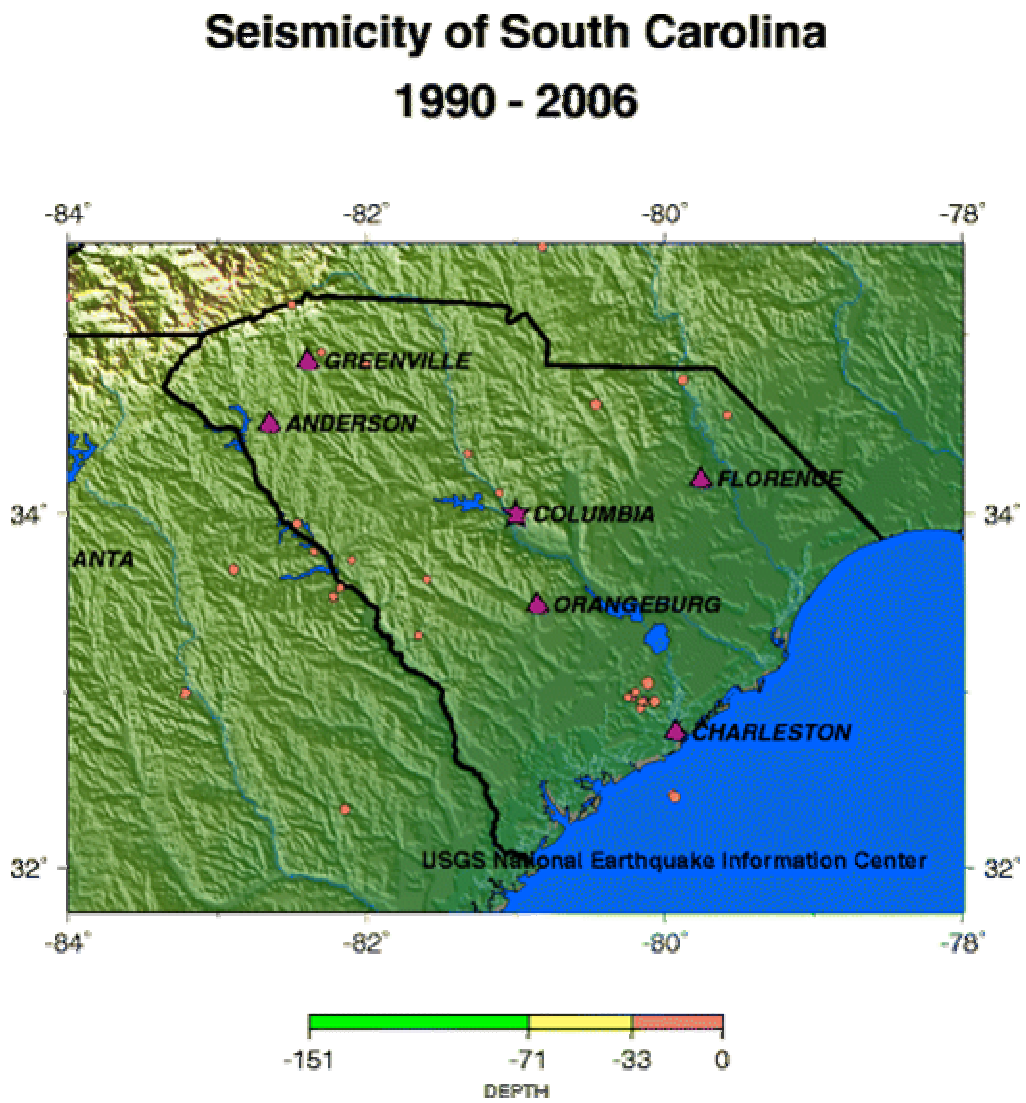
Purple Triangles: Cities

Purple Star: Capital City

Circles: Earthquakes (color represents depth range)

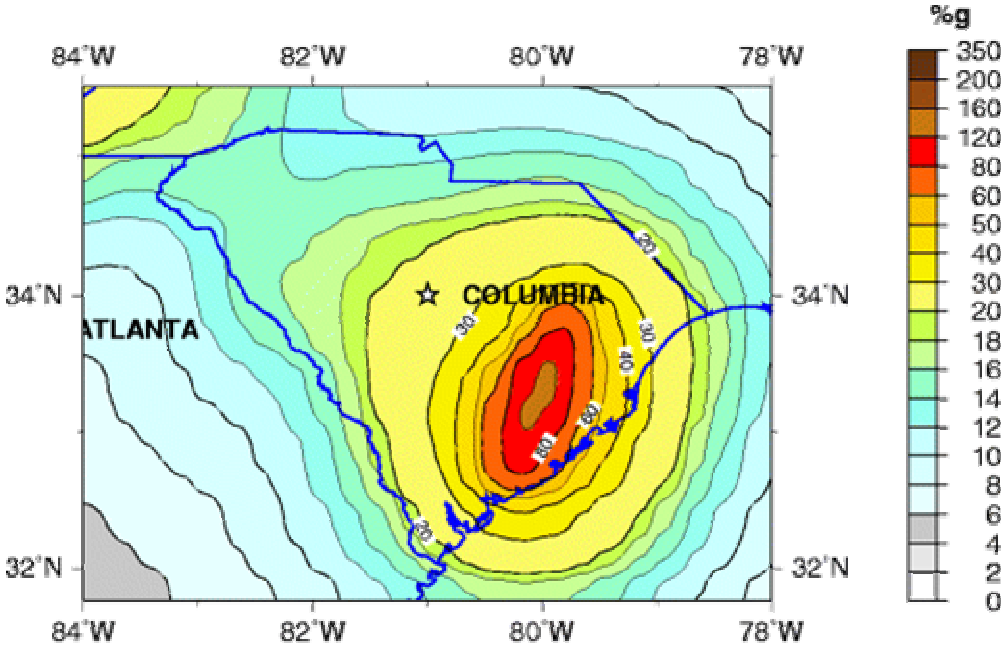
Earthquake locations are from the USGS/NEIC PDE catalog.

Accessed 8 November 2006



http://neic.usgs.gov/neis/states/south_carolina/south_carolina_seismicity.html
Accessed 26 June 2008

South Carolina Seismic Hazard Map



Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years
site: NEHRP B-C boundary
National Seismic Hazard Mapping Project (2008)

http://earthquake.usgs.gov/regional/states/south_carolina/hazards.php
Accessed 14 June 2008

> During an earthquake when the ground is shaking, it also experiences acceleration. The **peak acceleration** is the largest acceleration recorded by a particular station during an earthquake.
>
> A fault that is likely to have another earthquake sometime in the future. Faults are commonly considered to be active if they have moved one or more times in the last 10,000 years.
>
> Earthquake risk is the probable building damage, and number of people that are expected to be hurt or killed if a likely earthquake on a particular fault occurs. Earthquake risk and earthquake hazard are occasionally incorrectly used interchangeably

(emphasis added)

Yet the COLA for WS Lee seems to suggest no active faults:

> Based on recent and past subsurface investigations at the Lee Nuclear Site, no active faults exist in the general location of the site. According to published documents from the USGS, several inactive faults are within the vicinity of the site, with the closest being approximately 2 mi. westsouthwest of the Lee Nuclear Site (Reference 2).[Reference 2= Duke Power Company (DPC), Cherokee Nuclear Station - Environmental Report, Amendment No. 4, revised 1975] [COLA ER 2.6.2 REGIONAL AND LOCAL GEOLOGY, page 2.6-2]

Experts at the University of South Carolina maintain that a nuclear power plant in upstate South Carolina should be designed to withstand another Charleston Earthquake. This would seem to be at odds with the Duke application. Under 10 CFR § 100.20 and the Environmental Standard Review Plan, the NRC must independently determine what is the true nature of the hazard and what would be required. Admission of this contention would allow the development of a full record in this matter.

CONTENTION: SIX

Whether William States Lee III Will Improve the General Welfare, Increase the Standard of Living, or Strengthen Free Competition in Private Enterprise

NRC fails to enforce the existing regulations required to implement the fundamental purpose of the Atomic Energy Act. Further, granting Duke Energy's COL would not improve the general welfare, increase the standard of living or strengthen free competition in private enterprise.

Issue

A half century ago, when the United States Congress established the Atomic Energy Act, the science and technology of atomic energy were in their infancy. Within a decade the first commercial nuclear power reactors had been built. But after only two decades of operational experience the nuclear power industry was already in decline. The disasters at Three Mile Island and Chernobyl provided virtual bookends to the devastation of Hiroshima and Nagasaki. The Nuclear Regulatory Commission, the scion

of the original Atomic Energy Commission, was formed during the period of waning nuclear fortunes. The current nuclear renascence is an ill-fated attempt to revive the nuclear dinosaur. The public monies directed to the overweening nuclear industry would be better spent on less costly, cleaner forms of electric power generation.

Rule

After years of rulemakings, NUREGs and lessons learned, Congress's declared policy is unaltered: "[T]he development, use, and control of atomic energy shall be directed so as to promote world peace, improve the general welfare, increase the standard of living, and strengthen free competition in private enterprise." See 42 U.S.C. 2011.

Discussion

In the eyes of many, the Nuclear Regulatory Commission suffers from major flaws in carrying out its mission. New reactors suffer from major weaknesses including (1) hardware failures and (2) human error. But the Commission itself is critically flawed as a regulatory body. The public's perception is that the agency lacks true independence; that the NRC staffs' review of license applications and other nuclear industry documents is incomplete and perfunctory; that the procedural process lacks the essential element of justice and impartiality.

1. Hardware failures

The US Government Accountability Office and the NRC Inspector General have issued reports which identify repeated failures in enforcement by the NRC. In 2002 FirstEnergy Nuclear Operating Company discovered a large hole in the Davis-Besse

nuclear plant's reactor vessel. The General Accounting Office labeled this "the most serious safety issue confronting the nation's commercial nuclear power industry since the accident at Three Mile Island in 1979." The GAO concluded, "NRC should have but did not identify or prevent the vessel head corrosion at Davis-Besse because both its inspections at the plant and its assessments of the operator's performance yielded inaccurate and incomplete information on plant safety conditions." [6] A nuclear catastrophe was averted by sheer luck.

Early in 2008 the NRC Office of the Inspector General issued a report which detailed the history of the agency's repeated failure to enforce fire barrier regulations for nuclear reactors. Tests completed in 1993 revealed that fire barriers used in 17 nuclear reactors did not meet federal standards. But the NRC balked and did not order its own tests until 2005; Sandia National Labs determined that the fire barriers supposed to last one hour would fail in just 13 minutes. The Inspector General concluded: "As of December 2007, no fire-endurance tests have been conducted to qualify Hemyc as an NRC-approved 1-hour or 3-hour fire barrier for installation at [nuclear power plants]." [7] The problem remains uncorrected.

Petitioners would agree that enforcement failures at NRC are matters requiring agency-wide correction. However, the immanent nature of failure has particular implications for South Carolina because inadequate Commission oversight may lead to safety lapses resulting in accidents and negative economic impacts. A COL granted by

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[6] *Nuclear Regulation: NRC Needs to More Aggressively and Comprehensively Resolve Issues Related to the Davis-Besse Nuclear Power Plant's Shutdown*, General Accounting Office Report, May 2004, http://www.gao.gov/new.items/d04415.pdf

[7] *NRC's Oversight of Hemyc Fire Barriers*, Case No. 05-46, Special Inquiry, Office of the Inspector General, January 2008 http://www.nrc.gov/reading-rm/doc-collections/insp-gen/2008/el-05-46.pdf

NRC must, *inter alia*, fulfill the Congressional mandate in 42 U.S.C. 2011, but Petitioners are aware of no agency-wide action which would properly oversee Duke's operation. Fifty-one reactor shut-downs longer than one year have occurred; 36 were for safety-related causes which, on average, cost nearly $1.7 billion each to repair. Dave Lochbaum of the Union of Concerned Scientists reported that "Year-plus outages represent prima facie evidence of how far safety levels have been allowed to drop below acceptable levels." [8]

2. Human Factors

Human frailty is a constant companion; however, regarding nuclear technology it is the fatal flaw. People have good days and bad days; they suffer from stress, overwork, fatigue and more. Recently, NRC Chairman Klein, speaking about human error, said: "It should be recalled that the most significant nuclear event in the U.S.—the Three Mile Island incident in 1979—was a result of operator error resulting from inadequate training, and not a faulty design." [9] Moreover, the extent of the human error problem is difficult if not impossible to quantify. A 2001 NRC research document compares the engineering problem to the human failure uncertainties and concludes: "The percentage of hardware unavailability due to human error as opposed to random hardware failures is not known."[10]

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[8] *Walking a Nuclear Tightrope: Unlearned Lessons of Year-plus Reactor Outages*, Dave Lochbaum, Union of Concerned Scientists, September 2006

[9] Chairman Dale E. Klein No. S-08-018, Remarks at the North American Energy Summit, University of Texas, San Antonio, May 1, 2008

[10] NRC, *Review of Finding for Human Error Contribution to Risk ion Operating Events*," August 2001, (INEEL/EXY-01-01166)

If operator error was indeed blameworthy for the accident at TMI, such failure would not be unique to that incident because all reactors have human operators and are therefore susceptible to error. Moreover, the new AP-1000 reactor design and its associated DCD and training regimes have not been tested in the real world. In effect, Duke is asking to conduct an experiment in Cherokee County, South Carolina. The NRC is obligated by the Congressional mandate embodied in the Atomic Energy Act to establish and to enforce standards "the Commission may deem necessary or desirable in order to protect health and safety and minimize danger to life or property." How will the NRC prevent human frailty from turning a mishap at the proposed facility into a catastrophe? What has the NRC done to eliminate the problem identified in its August 2001 review (*supra*) and what assurances has Duke provided in its COL for operator safety in the licensing of William States Lee III? As discussed below, the issue is particularly relevant to the Lee Nuclear Site because the proposed reactors constitute an Advanced Nuclear Facility pursuant to Section 638 of the Energy Policy Act of 2005: Standby Support for Certain Nuclear Plant Delays. Public Law 109-58 (August 8, 2005) 119 STAT. 791, 42 USC 16014

3. Threats to NRC Independent Review

The NRC's independence as a regulatory agency suffered a body blow with the enactment of federal risk insurance requirements by Congress. The 2005 Energy Bill has a provision for federal risk insurance to COL license applicants. It states: [11]

(c) COVERED DELAYS.—

[11] 119 STAT. 791 Section 638, Standby Support for Certain Nuclear Stations, 42 USC 16014

(1) INCLUSIONS.—Under each contract authorized by this section, the Secretary shall pay the costs specified in subsection (d), using funds appropriated or collected for the covered costs, if full power operation of the advanced nuclear facility is delayed by—

(A) the failure of the Commission to comply with schedules for review and approval of inspections, tests, analyses, and acceptance criteria established under the combined license or the conduct of preoperational hearings by the Commission for the advanced nuclear facility; or

(B) litigation that delays the commencement of fullpower operations of the advanced nuclear facility.

Under the law, a delay caused by the Commission and its staff, consultants and contractors is a "failure" for which the licensee must be compensated up to a half a billion dollars. Paragraph (d) of the energy bill details the out-of-pocket cost to the Commission:

(d) COVERED COSTS.—

(1) IN GENERAL.—Subject to paragraphs (2), (3), and (4), the costs that shall be paid by the Secretary pursuant to a contract entered into under this section are the costs that result from a delay covered by the contract.

(2) INITIAL 2 REACTORS.—In the case of the first 2 reactors that receive combined licenses and on which construction is commenced, the Secretary shall pay—

(A) 100 percent of the covered costs of delay; but

(B) not more than $500,000,000 per contract.

Petitioners submit that the Energy bill has imposed upon the Nuclear Regulatory Commission legal requirements which militate against its mandate to ensure public health and safety and protect the environment. For example, a half-billion dollars worth of pressure would be brought to bear if the NRC staff review of Duke's COLA was about to cause delay. Moreover, our Petition in this matter is litigation covered by the energy bill. Can the Commission grant Petitions for Leave to Intervene and Requests for Hearing without regard to this half-billion dollar Sword of Damocles?

4. Procedural Shell Games

The adjudicatory licensing process is an opaque, stilted process that has the trappings of a courtroom but too often lacks the element of impartiality. Public hearings are held to satisfy the National Environmental Policy Act, comments are submitted, and the paper exercise seems to be the beginning and the end of the procedure. The following excerpt from an Atomic Safety and Licensing Board Panel transcript is instructive. The ASLBP chairman is addressing an NRC staff attorney during oral arguments in January 2008. [12]

9 ADMIN. JUDGE FARRAR: And you wouldn't say
10 that's speculative because we haven't resolved it yet.
11 MR. MARTIN: Well, it depends. It depends
12 what the answer to the RAT was.
13 ADMIN. JUDGE FARRAR: Do you see why
14 Intervenors have trouble? I mean I hate to say this,
15 but he word, the phrase has been roaming around my
16 mind in the last three minutes. Shell game. There's
17 no way for an Intervenor to sit there and -- if they
18 had the three of us, the whole Licensing Board Panel
19 advising them, they'd have no idea when they have to
20 come *in, when it's premature and when it's untimely.
21 They'd have no way of knowing because none of you will
22 give them a straight answer *on when they have to come
23 in and we don't want to sit here until the year 2014
24 with endless contentions coming at us and your saying
25 they're premature and/or untimely which we'll get to

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205
1 in a minute on your brief.

234
1 ADMIN. JUDGE FARRAR: Mr. Martin, pages 5-
2, 10, I guess, of your -- no, 5-11 of your brief. Part
3 One, you do a remarkable job of saying that this
4 contention is premature, without using the word

[12] 70-3098; ASLBP No.: 07-856-02-MLA-BD01, Rockville, Maryland, January 8, 2008

5 "premature", which was a good thing, because in pages
6 9 and 10, Part Two, you do a remarkable job of showing
7 how it's untimely. Which is it, is it both premature
8 and untimely? And where I'm headed is, can we do this
9 to these people?
10 I quoted Commissioner Merrifield several
11 times, former Commissioner Merrifield several times in
12 the prior decision, because he said how important it
13 was to deal fairly with the people. So first tell me
14 how it could be both premature and untimely.
15 MR. MARTIN: And I apologize for the
16 confusion that obviously created. I think the issue
17 in the first part of the pleading we were mainly going
18 for is that we don't believe that this issue is ripe
19 for review.
20 ADMIN. JUDGE FARRAR: Fine. Okay.
21 MR. MARTIN: Okay.
22 ADMIN. JUDGE FARRAR: I'll give you that.
23 MR. MARTIN: However, the second part
24 we're saying if you accept this really is an issue,
25 this issue should have been brought up earlier,

235
1 because if you accept that this -- we didn't feel in
2 any part of the issue --
3 ADMIN: JUDGE FARRAR: If anyone from the
4 English-speaking world, any other legal system were in
5 this room, they'd run out screaming hearing you say
6 that. You all have created this system that you don't
7 think has to be consistent with the Common Law, the
8 Principles of Fairness, or the Constitution of the
9 United States. And you think it's.fine to get up here
10 with these comments.
11 ADMIN. JUDGE McDADE: Was that a question?
12 ADMIN. JUDGE FARRAR: No. That was my
13 view, half-baked though it may be, but we get these
14 briefs that have these arguments that have nothing to
15 do with what any of us have studied in law school.

To be sure, the frustration evident in the transcript was shared by the *pro se* intervenors in the licensing matter before the judges that day.

Conclusion

The NRC Office of Public Affairs says that it strives to build public confidence in the nuclear regulatory system and that public involvement is a cornerstone of strong, fair regulation. Why encourage participation if it is deemed an expensive delay? Why does the Office of General Counsel sit at the table next to license applicants? What do representatives of the Commission mean when they say the NRC is an independent agency? Will the NRC adhere to its own Principles of Good Regulation which state: [13]

> Independence: Nothing but the highest possible standards of ethical performance and professionalism should influence regulation. However, independence does not imply isolation. All available facts and opinions must be sought openly from licensees <u>and other interested members of the public</u>. The many and possibly conflicting public interests involved must be considered. Final decisions must be based on objective, unbiased assessments of all information, and must be documented with reasons explicitly stated. (emphasis added)

<u>CONTENTION SEVEN</u>

The NRC Fails to Execute Constitutional Due Process and Equal Protection

The Fifth Amendment to the US Constitution states, "No person shall…be deprived of life, liberty, or property, without due process of law." The Fourteenth Amendment adds that the States may not, "deny to any person within its jurisdiction the equal protection of the laws." In addition to the Atomic Energy Act, the National Environmental Policy Act and other statutes the Nuclear Regulatory Commission must certainly abide by the highest law in the land. However, the agency has violated these

[13] NRC website at http://www.nrc.gov/about-nrc/values.html

rights by applying inequitable standards of protection by treating different people differently and depriving them of Constitutional guarantees.

NRC regulations will not prevent these elevated levels of exposure. The limits for radiation dose to individual members of the public is 100 millirem, a dose which equates to an annual risk of 5 in 100,000 (5.0xE-05) and a lifetime risk of 3.5 in 1,000 (3.5-E03). This means that 5 persons could die for every 100,000 members of the public exposed the plant's ionizing radiation for a year; 3 to 4 persons per 1,000 could die if exposed over a lifetime. Table of Fatal Cancer Risk from Ionizing Radiation, NRC Below Regulatory Concern Policy, 22 June 1990

Unequal Protection Under the Law: Radioactive exposure standards do not protect all members of the public fairly.

The BEIR VII Committee published morbidity and mortality data in 2006 which show that children have a significantly higher risk of developing cancer from radiation than adults do and women have a higher risk of radiation-induced cancer than men do. BEIR VII found that a lifetime dose of one million person-rem results in a cancer incidence rate of 900 for men and 1370 for women; mortality rates for the same dose are 480 and 660 for men and women, respectively. See Richard R. Monson (Chair) et al. Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII – Phase 2. Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, Board on Radiation Effects Research, National Research Council of the National Academies. Washington, DC: National Academies Press, 2006, page 15.

Regulations limiting carcinogens in other federal agencies are set at much more protective levels. Equal protection under the law must mean that equal standards for protecting public health. The National Research Council published the following analysis:

> "Rather than gear criteria to an analytic technique, the agency defined its standards in terms of risk. It proposed that any assay approved for controlling a carcinogenic drug must be capable of measuring residues that present more than an insignificant risk of cancer, and specified a 10^{-6} lifetime risk of cancer as a quantitative criterion of insignificance."

See *Risk Assessment in the Federal Government: Managing the Process*, Committee on the Institutional Means for Assessment of Public Health, Commission on Life Sciences, National Research Council (1983) ISBN 0-309-03349-7

In a Fourth Circuit Court decision challenging the Price Anderson Nuclear Industries Indemnity Act, plaintiffs raised *inter alia* the issue of due process. In 1978 the Supreme Court overturned the decision of the lower court. Justice John Paul Stevens concurred in the judgment but in a separate opinion said:

> With some difficulty I can accept the proposition that federal subject-matter jurisdiction under 28 U.S.C. 1331 (1976 ed.) exists here, at least with respect to the suit against the Nuclear Regulatory Commission, the agency responsible for the administration of the Price-Anderson Act. The claim under federal law is to be found in the allegation that the Act, if enforced, will deprive the appellees of certain property rights, in violation of the Due Process Clause of the Fifth Amendment. One of those property rights, and perhaps the sole cognizable one, is a state-created right to recover full compensation for tort injuries. The Act impinges on that right by limiting recovery in major accidents. [438 U.S. 59, 95] … <u>But there never has been such an accident</u>, and it is sheer speculation that one will ever occur. For this reason I think there is no present justiciable

> controversy, and that the appellees were without standing to initiate this litigation. (emphasis added)

Now, there has been such an accident. The Supreme Court decision occurred the year before the partial meltdown at Three Mile Island and the release of the eponymous "China Syndrome." Justice Stevens continued:

> The Court's opinion will serve the national interest in removing doubts concerning the constitutionality of the Price-Anderson Act. I cannot, therefore, criticize the statesmanship of the Court's decision to provide the country with an advisory opinion on an important subject. Nevertheless, my view of the proper function of this Court, or of any other federal court, in the structure of our Government is more limited. We are not statesmen; we are judges. When it is necessary to resolve a constitutional issue in the adjudication of an actual case or controversy, it is our duty to do so. <u>But whenever we are persuaded by reasons of expediency to engage in the business of giving legal advice, we chip away a part of the foundation of our independence and our strength</u>.

Duke Power Co. v. Carolina Environmental Study Group, 438 U.S. 59 (1978)

Petitioner believes that after thirty years it is time to revisit the issues of due process, equal protection and "the business of giving legal advice."

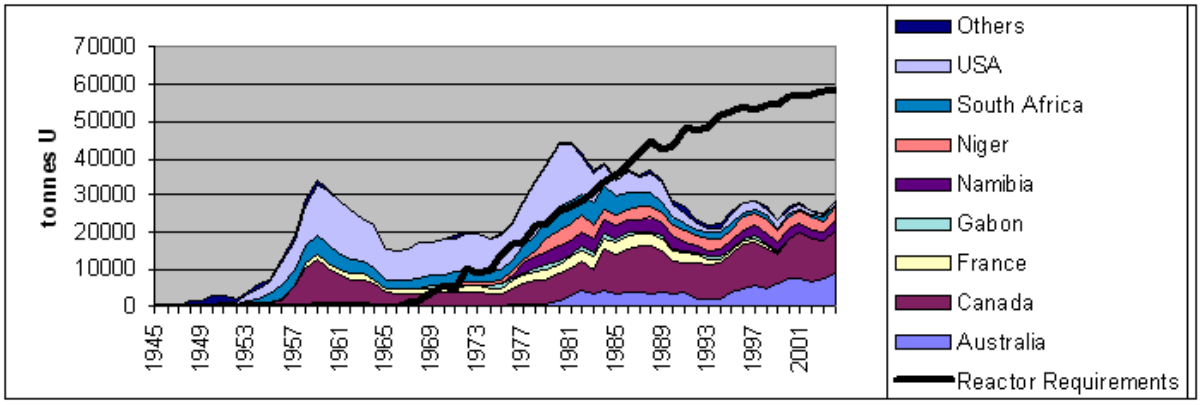
<u>CONTENTION: EIGHT</u>

The assumption that uranium fuel is a reliable source of energy is not supported in the combined operating license application submitted by Duke Energy to the U.S. Nuclear Regulatory Commission

Discussion

The applicant fails to fully and credibly discuss the matter of reliability of uranium fuel supply in the COL when asserting that building new nuclear power reactors is a means of achieving a reliable and cost-effective supply of electricity. The cost of the power from a power plant that has no fuel is effectively infinite, therefore our members as ratepayers are in grave risk of increased power costs. In addition, as tax payers our members are at risk of a major federal action that does not deliver its stated goals, and for which they will have to pay significant costs in any case.

Worldwide uranium consumption (about 67,000 tonnes[14] per year) has exceeded worldwide uranium production for some time. Only about 60% of consumption is currently supplied by annual production;[15] further, actual production of uranium has been effectively level for the last twenty years, as can be seen in the graph below from the World Nuclear Association.[16]



[14] World Nuclear Association backgrounder on Uranium Supply posted at: http://www.world-nuclear.org/info/inf75.html?terms=uranium+supply

[15] The same authority quotes the production of uranium from mines as being 40,251 tonnes for 2004; 41,702 tonnes for 2005 and 39,429 tonnes for 2006. This leaves a shortfall of uranium to fuel the existing reactors of about 26,000 tonnes. This shortage is being made up by consuming former stockpiles, reprocessing of nuclear weapons uranium, longer reactor cycles and more efficient enrichment processes. The former stockpiles and weapons reprocessing are short term stopgaps and are failing fast.

[16] See World Nuclear Association graph posted at http://www.world-nuclear.org/info/inf23.html.

While there are various short-term supplies of uranium such as down-blending from nuclear weapons inventories, none of these are projected to last indefinitely. It is incumbent upon the applicant to address these issues and to support the statements cited below which imply that uranium availability will be sufficient to service the existing worldwide fleet of nuclear power reactors over the current periods of license, and in addition, the proposed William States Lee units 1 & 2.[17]

If there is a plan to address the failure of uranium supply during the license period for Willian States Lee with a substitution of plutonium fuel (MOX or mixed-oxide), this information is also missing from the COL application as filed by the applicant. This is not an undue possibility since Duke Energy is currently supporting a partnership with Shaw Areva MOX services and holds a contract with the US Department of Energy to use its McGuire and Catawba nuclear power stations as “mission reactors” in the Department’s surplus plutonium disposition program that, as currently configured would produce plutonium fuel to be used in commercial nuclear reactors.

Citations within the COL that are examples of where the applicant fails to address these issues:

Tech Specs: Technical Specifications Bases –

4.2.1 – states LEU fuel will be used; no other mention of uranium.

Environment Report:

Chapter 5

5.7 – Fuel Cycle Impacts – while giving description of some of the impacts of creating uranium fuel, there is no discussion of the projected availability of uranium over the operating period for William States Lee 1 & 2.

Chapter 9

9.1.2 – A clear example of the blind assumption that uranium will, automatically provide a "reliable" source of power:

> Duke Energy's current future electric service forecasts and the resources necessary to maintain its reserve margin requirement (Section 8.1.4) are reflected in Table 8.2-1. Table 8.4-2 shows the proposed additional generating units. Assuming the proposed 800 MW Cliffside coal unit and the proposed peaking intermediate units shown in Table 8.4-2 are built, and that the Lee Nuclear Station is not built, then Duke Energy would fail to meet its 17 percent planning reserve margin in the summer of 2018. For example, Duke Energy's projected peak demand for the summer of 2018 is 21,643 MWs (Table 8.2-1). A 17 percent reserve margin represents 3700 MWs. To the extent the Lee Nuclear Station was planned as part of the overall resource mix to meet the 17 percent reserve margin but does not materialize, Duke Energy's reserve margin would drop to 7 percent. At this point in time, absent any other alternative, Duke Energy would not have met its 2018 target planning reserve margin. Should this occur without mitigation, Duke Energy would be in danger of being in breach of its statutory obligation to provide adequate and reliable electric service in its North and South Carolina service areas.

There are numerous other examples of these assertions and assumptions throughout the COL. Nowhere in the COL does the applicant support these assertions.

CONTENTION: NINE

Duke and NRC Fail to Include Adequate Protections from Aircraft Impacts at the WS Lee site

The NRC should require that all new reactors built in the U.S. be designed to withstand an airliner impact.

> Now, in the post-11 September era, the unpalatable likelihood of an intentional aircraft crash into a nuclear plant has to be considered and accounted for as a Design Basis Threat (DBT). [John Large, *The implications of 11 September for the nuclear industry*, Nuclear Terrorism, Disarmament Forum, p. 35 http://www.largeassociates.com/terrorismUNDisarmament.pdf]

Discussion

In 1982 Argonne National Laboratories published a study ("Argonne Study") on air craft impacts to nuclear power plants. It states:

> The impact of an aircraft upon a concrete containment of a nuclear power plant generally may result in the damage to concrete walls….if the damage is sufficient, the missile (i.e. the airplane turned into a weapon) may perforate and pass through the target." [Kot, C. A.; Lin, H. C.; van Erp, J. B.; Eichler, T. V.; Wiedermann, A. H.; 1982. *Evaluation of Aircraft Crash Hazards Analyses for Nuclear Power Plants.* Argonne National Laboratory report NUREG/CR-2859 prepared for the Nuclear Regulatory Commission (NRC). June. p. 61]

The Argonne Study compared the impacts of military and commercial aircraft and concluded that the commercial airliner would present the greater threat:

> These spectra clearly show that the effect of impact by a Multi-Role Combat Aircraft at 215 m/s is considerably less severe than a modest Safe Shutdown Earthquake (SSE) as represented by the Parkfield earthquake. On the other hand, the effect due to the impact of a Boeing 707-320 at 103 m/s is clearly more severe than that due to an earthquake." [Argonne Study at p. 70]

Also, the direct effect of an aircraft's impact on reactor containment is not the sole concern of the Argonne Study.

> If only one percent of the fuel, say 500 lb. for the FB-111 fighter plane, is involved in such an event, the blast environment will be equivalent to the detonation of approximately 1000 lb. of TNT. [Argonne Study at pp. 76 –77]

The NRC does not disagree that aircraft present a threat. After years of deliberation, the NRC said: "the Commission believes that it is prudent for nuclear power plant designers to take into account the potential effects of the impact of a large commercial aircraft." 72 FR 56288 (October 3, 2007) However, the Commission wrongly decided not to apply this wisdom to the four currently approved standard design certifications, notably the AP1000 Revision 16. The logic employed by the Commission to is specious and contrary to the law.

> The Commission has determined that the impact of a large, commercial aircraft is a beyond-design-basis event. For this reason, the Commission approved final design basis threat (DBT) does not include an aircraft attack. The NRC published its final DBT rule, Title 10, Section 73.1, "Purpose and Scope," of the Code of Federal Regulations (10 CFR 73.1), in the Federal Register on March 19, 2007 (72 FR 12705). Two well-established bases support the exclusion of aircraft attacks from the DBT. [72 FR 56288 (October 3, 2007)]

In the Federal Register notice *supra* the NRC makes an unfounded assumption which would appear to relieve it and Duke from applying sensible safety requirements for the protection of WS Lee from commercial aircraft. The Commission's FR notice continues:

> [S]uch an act is in the nature of an attack by an enemy of the United States. Power reactor licensees are not required to design their facilities or otherwise provide measures to defend against such an attack, as provided by 10 CFR 50.13, ''Attacks and Destructive Acts by Enemies of the United States; and Defense Activities.'' (72 FR 56288)

The lessons of September 11, 2001 have been misapplied in this matter. The assumption that a hostile act of this nature may only brought by "an enemy of the United States" is unsupported and unfounded. The questions the ASLBP must answer are: (a) May only

foreign nationals hijack airliners? (b) Are American citizens incapable of sabotage? (c) Are strategic military goals the only rationale for mayhem? (d)Will mere pecuniary rewards never be the driver for aggressive acts against vulnerable facilities? and (e) What is the NRC's responsibility in this matter? Petitioner submits that in light of the inadequacies of the DBT, it is the responsibility of the NRC, not the Federal Aviation Administration or the commercial airlines, to ensure that Duke's reactors at WS Lee do not pose an undue risk to the public.

CONTENTION TEN:

Contention A: Failure to Evaluate Whether and in What Time Frame Spent Fuel Generated by Bellefonte Units 3 and 4 Can Be Safely Disposed Of

The ER for the proposed new reactors does not contain any discussion of the environmental implications of the lack of options for permanent disposal of the irradiated fuel to be generated by North Anna site. Therefore, it is fatally deficient. *State of Minnesota v. NRC,* 602 F.2d at 416-17.

Discussion

The Environmental Report for COLA is deficient because it fails to discuss the environmental implications of the lack of options for permanent disposal of the irradiated (*i.e,* "spent") fuel that will be generated by the proposed reactors if built and operated. Nor has the NRC made an assessment on which Duke can rely regarding the degree of assurance now available that radioactive waste generated by the proposed reactors "can

be safely disposed of [and] when such disposal or off-site storage will be available." Final Waste Confidence Decision, 49 Fed. Reg. 34,658 (August 31, 1984), citing *State of Minnesota v. NRC*, 602 F.2d 412 (D.C. Cir. 1979). Accordingly, the ER fails to provide a sufficient discussion of the environmental impacts of the proposed new nuclear reactors.

First, the U.S. Department of Energy recognizes that significant radioactivity releases from a Yucca Mountain repository would in fact occur over time. See, for example, U.S. DOE Office of Civilian Radioactive Waste Management, "NWTRB Repository Panel meeting: Postclosure Defense in Depth in the Design Selection Process," presentation for the Nuclear Waste Technical Review Board Panel for the Repository, January 25, 1999. Also, the U.S. Environmental Protection Agency's proposed Yucca Mountain radiation release regulations, offering that such regulations extend out to a million years post waste burial, shows that such releases will continue for many hundreds of thousands of years into the future. See United States. Environmental Protection Agency. "40 CFR Part 197: Public Health and Environmental Radiation Protection Standards for Yucca Mountain , Nevada : Proposed Rule." Federal Register, v.70, no.161, August 22, 2005, pages 49014-49065. On the Web at http://a257.g.akamaitech.net/7/257/2422/01jan20051800/edocket.access.gpo.gov/2005/pdf/05-16193.pdf.

While Duke may have intended to rely on the NRC's Waste Confidence decision, issued in 1984 and most recently amended in 1999, that decision is inapplicable because it applies only to plants which are currently operating, not new plants. The second

finding of the Waste Confidence Decision, as amended in 1999, is that the Commission has

> reasonable assurance that at least one mined geologic repository will be available within the first quarter of the twenty-first century, and that sufficient repository capacity will be available within 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of any reactor to dispose of the commercial high-level radioactive waste and spent fuel originating in such reactor and generated up until that time.

Waste Confidence Decision Review: Status, 64 Fed. Reg. 68,005, 68,006 (December 6, 1999). This finding revised the finding in the original decision that a mined geologic repository would be available by the years 2007 to 2009. Clearly, the Commission's finding applies to any existing reactor, including reactors whose licenses are revised or renewed. The Commission gives no indication that it has confidence that repository space can be found for spent fuel and other high-level radioactive waste from new reactors licensed after December 1999.

Moreover, the revised second finding in the 1999 Waste Confidence review statement conspicuously fails to assert confidence in the likelihood that more than one repository will be licensed. In fact, the Commission has backtracked on its original 1984 "Nuclear Waste Confidence Decision," in which the Commission expressed confidence that "one or more" repositories would open between 2007 and 2009. Waste Confidence Decision, 49 Fed. Reg. at 34,673. The 1999 Status Report states merely that "at least one" repository will open by 2025. 64 Fed. Reg. at 68,006.

It is also clear that the inventory of spent fuel and other high-level radioactive waste being generated by the *current* generation of nuclear reactors is far greater than what can be accommodated in the single repository in which the Commission places its

confidence, Yucca Mountain, Nevada. The proposed Yucca Mountain repository can only accept 63,000 metric tons of commercial high-level radioactive waste and irradiated nuclear fuel, at least until a second national repository became operational.[18] Even assuming only 40 years of operations with no operating license renewals and no new nuclear reactors, the U.S. Department of Energy (DOE) has known since at least the mid-1990's—since before the most recent (1999) NRC review of its "Nuclear Waste Confidence Decision"—that by the year 2030 or so well over 80,000 metric tons of irradiated nuclear fuel generated at commercial nuclear reactors will exist in the U.S. U.S. Nuclear Waste Technical Review Board ("NWTRB") "Disposal and Storage of Spent Nuclear Fuel: Finding the Right Balance," Figure 2 at page 11 (March 1996). This is significantly in excess of the "disposal" capacity at Yucca Mountain.

As recently as March, 2008, at the U.S. Nuclear Regulatory Commission's Regulatory Information Conference, the director of the U.S. Department of Energy's Office of Civilian Radioactive Waste Management, Ward Sproat III, announced that 63,000 metric tons of commercial irradiated nuclear fuel—enough to fill Yucca to its

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[18] Under the Nuclear Waste Policy Act ("NWPA"), 63,000 metric tons is the legal limit for commercial waste storage that can be "disposed of" at Yucca Mountain, Nevada, at least until a second repository is operational elsewhere in the U.S. As the NWPA states at Section 114(d):

> The [NRC] decision approving the first such application [for a license to open and operate a repository] shall prohibit the emplacement in the first repository of a quantity of spent fuel containing in excess of 70,000 metric tons of heavy metal or a quantity of solidified high-level radioactive waste resulting from the reprocessing of such a quantity of spent fuel until such time as a second repository is in operation…"

42 U.S.C. § 10134(d). By long-established DOE policy, the first 70,000 metric tons of irradiated nuclear fuel and solidified high-level radioactive waste "disposed of" at Yucca Mountain, Nevada would include 90% commercial nuclear reactor waste, and 10% DOE waste from the nuclear weapons production complex and nuclear energy research activities. 90% of 70,000 metric tons means that only 63,000 metric tons of commercial irradiated nuclear fuel could be "disposed of" at Yucca Mountain, Nevada, at least until a second national repository is operational in the United States. ***See*** Yucca Mountain EIS at A-1.

legal limit—will exist in the U.S. by the spring of 2010. He added that in two to three months, the U.S. Department of Energy will issue a report on the need for a second repository, as called for by the Nuclear Waste Policy Act as Amended. Unless something changes between now and then, Sproat announced, then DOE will find that a second repository is indeed needed.

NRC's now-routine approval of 20-year license extensions to old commercial nuclear reactors will only increase the quantity of high-level radioactive waste that exceeds the capacity limits at the proposed Yucca Mountain, Nevada repository. In its "Final Environmental Impact Statement for a Repository for Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada," (Feb. 2002) (hereinafter "Yucca Mountain EIS"), DOE predicted the generation of over 105,000 metric tons of commercial irradiated nuclear fuel by the year 2046. *Id.*, Table A-8, page A-16. While NRC's standard license extension term is 20 years, the DOE prediction assumed that the term of license extensions would be only 10 years. DOE also assumed no new commercial nuclear reactors in the U.S. Thus, the high-level waste and spent fuel generated by the *current* generation of reactors will far exceed the capacity of the single repository that the NRC has identified as feasible and likely.[19]

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[19] Experience also shows that the NRC has been overly optimistic about the opening of the first repository. It took from 1982 (the year the Nuclear Waste Policy Act was passed) until 2002 – 20 full years -- just for the DOE to recommend Yucca Mountain as "suitable" for repository development. This finding, however, has been consistently challenged by the State of Nevada, environmental groups, and numerous scientists. Even before DOE's suitability determination, the U.S. General Accounting Office (GAO) reported that a repository at Yucca Mountain, Nevada probably could not open to receive waste shipments till 2015 at the earliest, given nearly 300 unfinished scientific and technical studies. GAO-02-191, "Nuclear Waste: Technical, Schedule, and Cost Uncertainties of the Yucca Mountain Repository Project" (December, 2001). DOE later admitted that 2017 was the "best achievable" date for opening Yucca. Currently, however, DOE has admitted that it has no projected opening date for the Yucca repository. *See, e.g.*, U.S. NWTRB, "Technical Report on Localized Corrosion" (November 25, 2003, and Allison M. Macfarlane and Rodney

Accordingly, the spent fuel and other high-level radioactive wastes generated at the proposed new reactors could not be "disposed of" at Yucca Mountain unless and until a second national repository is operating. But the Commission has not expressed confidence that a second repository will open. Any spent fuel or other high-level radioactive waste generated after the spring of 2010 (after 63,000 metric tons of commercial irradiated nuclear fuel has been generated) would have nowhere to go, would lack "disposal" space at a repository, unless and until a second repository is opened and operating in the U.S. somewhere other than Yucca Mountain, Nevada – a process that could very well take many decades, based on the experience of trying to open the first repository at Yucca Mountain, Nevada.

Moreover, Congress has not given the NRC any basis for assuming that a second repository will be opened. Section 161(b) of the NWPA provides that: "[t]he Secretary [of Energy] shall report to the President and to Congress on or after January 1, 2007, but not later than January 1, 2010, on the need for a second repository." 42 U.S.C. § 10172a(b). Section 161(a) also states that: "The Secretary [of Energy] may not conduct site-specific activities with respect to a second repository unless Congress has specifically authorized and appropriated funds for such activities." 42 U.S.C. § 10172a(a). The Department of Energy has not made a finding that a second repository is needed, nor has Congress specifically authorized or appropriated funds for site-specific

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C. Ewing, "Uncertainty Underground: Yucca Mountain and the Nation's High-Level Nuclear Waste," the MIT Press, Cambridge, MA, 2006). In addition, several legal challenges have been filed against the Yucca Mountain repository and the proposed standards for operation, including a successful State of Nevada/environmental coalition challenge to the U.S. Environmental Protection Agency's radiation release regulations for the Yucca repository. On July 9, 2004, the U.S. Circuit Court of Appeals for the District of Columbia ordered EPA to revise its regulations, which EPA has not yet finalized.

activities. However, as mentioned above, DOE OCRWM director Ward Sproat III announced at the NRC RIC in March 2008 that DOE will issue a report in two to three months stating that a second repository is needed.

The Commission's failure to express confidence that a second repository will be opened any time soon also implicates the third and fourth findings of the Waste Confidence Decision, *i.e,* that spent fuel and other high-level radioactive waste can be safely stored at reactor sites for up to 30 years. 64 Fed. Reg. at 68,006. If the Commission has no confidence that a repository will open at some reasonable time in the future, it must be assumed that spent fuel may sit at the proposed reactor site for an indefinite period of time. The environmental impacts of such indefinite storage must be evaluated before a Combined Operating License can be granted.

Contention B. Even if the Waste Confidence Decision Applies to This Proceeding, It Should be Reconsidered.

Even if the Waste Confidence Decision applies to this proceeding, it should be reconsidered, in light of significant and pertinent unexpected events that raise substantial doubt about its continuing validity, *i.e.,* the increased threat of terrorist attacks against U.S. facilities.

Discussion

In its 1999 "Nuclear Waste Confidence Decision" revision, NRC stated "the Commission would consider undertaking a comprehensive reevaluation of the Waste Confidence findings…if significant and pertinent unexpected events occur raising

substantial doubt about the continuing validity of the Waste Confidence findings." 64 Fed. Reg. at 68,007. Clearly, the catastrophic terrorist attacks upon the United States on September 11th, 2001 constituted significant and pertinent unexpected events that raise substantial doubts about the continuing validity of the third and fourth findings of the revised Waste Confidence Decision. These findings are:

> 3. The Commission finds reasonable assurance that high-level radioactive waste and spent fuel will be managed in a safe manner until sufficient repository capacity is available to assure the safe disposal of all high-level waste and spent fuel. (This finding is identical to the finding in the original Waste Confidence Decision in 1984).
>
> 4. The Commission finds reasonable assurance that, if necessary, spent fuel can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin, or at either onsite or offsite independent spent fuel storage installations. (This finding is basically identical to that in the original Waste Confidence Decision with the addition of the consideration of license renewal and spent fuel storage 30 years beyond the licensed life for operation of a reactor).

64 Fed. Reg. at 68,006. The terrorist threat to irradiated nuclear fuel and high-level radioactive waste – whether it is being stored on-site at commercial reactors in storage pools or dry casks; stored in away-from-reactor Independent Spent Fuel Storage Installations; or transported by truck, train, or barge between nuclear plants and off-site interim storage facilities – demands an evaluation of whether (a) it is appropriate to store spent fuel and other highly radioactive waste for 30 years or more pending availability of a permanent repository, and (b) whether nuclear power should be phased out as quickly as possible as a matter of environmental protection, national security, public safety, and common defense.

The homeland security risks posed by indefinite temporary storage of spent fuel have been recognized by former Energy Secretary Spencer Abraham:

> Yucca Mountain is an important component of homeland security. More than 161 million people live within 75 miles of one or more nuclear waste sites, all of which were intended to be temporary. We believe that today these sites are safe, but *prudence demands we consolidate this waste from widely dispersed, above-ground sites into a deep underground location that can be better protected.*

Statement of Spencer Abraham, Secretary of Energy, Before the Energy and Natural Resources Committee, U.S. Senate (May 16, 2002), (the full statement can be viewed and printed from: http://yuccamountain.org/abraham051602.htm)

It is undisputed that neither fuel storage pools nor dry storage facilities are designed to withstand the type of determined and sophisticated attack that was carried out on September 11, 2001. In fact, the U.S. National Academy of Sciences documented such security vulnerabilities in its report entitled "Safety and Security of Commercial Spent Nuclear Fuel," released on April 6, 2005.

To protect against and mitigate the impacts of terrorist attacks, the NRC has developed a system to maintain a constant state of alert, undertaken a comprehensive review of the adequacy of its safety and security regulations, and upgraded its security requirements for all operating nuclear facilities in the United States. Clearly, under NEPA it is also appropriate to consider whether the Commission continues to have a basis for expressing confidence that stored spent fuel and other high-level radioactive waste is safe from terrorist attacks.

Petitioner is aware that the Commission has ruled that environmental impacts of terrorist attacks are not cognizable under NEPA. *See, e.g., Pacific Gas & Electric Co.*

(Diablo Canyon Independent Spent Fuel Storage Installation), CLI-03-01, 57 NRC 1 (2003); *Private Fuel Storage, L.L.C.* (Independent Fuel Storage Installation), CLI-02-25, 56 NRC 340 (2002). Petitioner requests that the Commission reconsider this policy, in light of (a) the obvious attractiveness and vulnerability of spent fuel to terrorist attack; (b) the Secretary of Energy's recognition of the relationship between homeland security and assured capacity for timely spent fuel disposal; (c) the Commission's explicit statement in the Waste Confidence status review that it would undertake a comprehensive reevaluation of the Waste Confidence findings if "significant and pertinent unexpected events" occur raising substantial doubt about the continuing validity of the Waste Confidence findings; and (d) the decision of the 9th Circuit U.S. Court of Appeals. June 2, 2006 ruling by the U.S. Court of Appeals for the Ninth Circuit in San Luis Obispo Mothers for Peace (SLOMFP) v. NRC, 449 F.3d 1016.

Clearly, a Commission reconsideration is warranted.

CONCLUSION

We believe that the foregoing contentions should be admitted because they satisfy the Commission's requirements in 10 C.F.R. § 2.309 and 10 C.F.R. § 52.103; we request that a hearing be granted.

Respectfully submitted,

_____ June 27, 2008

Louis A. Zeller Date

June 27, 2008

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of Duke Energy Carolinas Combined License Application For William States Lee III Units 1 and 2	)	Dockets No. 52-018, 52-019

CERTIFICATE OF SERVICE

I hereby certify that copies of the June 27, 2008
PETITION FOR INTERVENTION AND REQUEST FOR HEARING
BY THE BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE

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