Blue Ridge Environmental Defense League

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Chief, Rulemaking and Directives Branch
Division of Administrative Services
Mailstop TWB-05-B01M
US Nuclear Regulatory Commission
Washington, DC 20555-0001
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RE: Docket No. NRC-2008-0170, NUREG-2111

On behalf of the Blue Ridge Environmental Defense League, I write to provide comments on the draft environmental impact statement. Plainly stated, the operation of two nuclear reactors at this location would endanger over a 2.3 million people in two states living within 50 miles of the plant including the cities of Gaffney, Spartanburg, Greenville, Rock Hill, Gastonia, Charlotte and Hickory.

> Whatever safety measures are in place can never be sufficient because these facilities are, after all, operated by human beings. We have persistently cautioned against the arrogant notion, promoted by those with a disproportionate confidence in technology, that humanity can completely control nuclear power.[1]

In light of recent events in Japan and Virginia, the risk is unnecessary and wholly out of proportion to any possible benefit.

Background

The draft EIS is concerned with the proposed combined construction and operation license for William States Lee III Units 1 and 2 filed pursuant to 10 CFR Part 52 Subpart C by Duke Energy Carolinas 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.

A combined license under Part 52 is an 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 implementing NRC regulations.

[1] GENSUIKIN 原水爆禁止日本国民会議 http://www.gensuikin.org/english/

Comments

The NRC incorrectly assesses greenhouse gas emissions and impacts on global warming

Greenhouse gases rank among the top environmental concerns today. These emissions from many sources, in aggregate, are contributing to the destabilization of climate on planet Earth. Yet, regarding greenhouse gas emissions, the draft EIS states:

> ñThe review team concluded that the atmospheric impacts of the emissions associated with each aspect of building, operating, and decommissioning a single plant are minimal. The review team also concluded that the impacts of the combined emissions for the full plant life cycle would be minimal.ò[2]

These statements are fundamentally incorrect because the full range of alternatives was summarily dismissed. In the comparison of greenhouse gas impacts by power source, the draft EIS states:

> However, because these alternatives were determined by the review team not to meet the need for baseload power generation, the review team has not evaluated the CO2 emissions quantitatively.[3]

Phillip Smith and Willem Storm van Leeuwen report that a variety of negative factors, including the greenhouse gas emissions, make modern nuclear power plants a bad bargain:

> The exceedingly large and long-term energy debt, combined with the insecurities of the nuclear energy system will seriously delay the transition of the world energy supply to a really sustainable one. A delay we cannot afford. The nuclear option would absorb a disproportionate part of the *ability to cope* of the society in a ever diverging need for energy, high quality materials and human skills.[4]

William States Lee III would not help the climate crisis, despite Duke Energyôs claims. It is important that all public investment in global warming solutions rest on scientifically solid ground. NRCôs draft EIS fails to include a proper analysis of the global warming environmental impacts of construction, operation and nuclear waste management from of these reactors.

Water Supply Problems Plague Thermoelectric Nuclear Power Plants

Annual temperatures in the Southeast region are increasing and are projected to continue to do so. The NRC fails to fully analyze the following potential impacts of elevated

[2] NUREG-2111, December 2011, Section 7.6.2, Greenhouse Gas Emissions, page 7-42
[3] NUREG-2111, December 2011, Section 9.2.5, Summary Comparison of Energy Alternatives, page 9-39
[4] *Nuclear power–the energy balance*, Jan Willem Storm van Leeuwen, Senior Scientist, Ceedata Consultancy, Chaam, Netherlands, posted at: http://www.stormsmith.nl/

water temperatures in the Broad River and its water shed:

- The impact of the reactorsô thermal discharge (warmed water) on water that is already elevated in temperature ï looking at both additive and synergistic impacts on the local and down-river ecosystem
- The evaluation of increasingly warmed water on tech specs for reactor cooling
- The evaluation of the impact of warmer ambient water temperatures on total withdrawal, consumption and evaporation
- The impact of warmed water on condenser cooling ï nuclear power reactors around the world 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
- The impact on other facilities ï 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
- The impact of pollution in water at warmer temps on the ecology of the site and also down-stream ï 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
- The impact of reactors going off-line during heat wave on customers ï specifically, the loss of power during a heat-wave should be factored in terms of impact on customers
- The impact of reactors going off-line on regional grid stability
- The potential for extended drought locally and in the region to exacerbate all of the issues identified above.

Duke Energyôs own environmental report includes a longitudinal analysis of flow-rates in the Broad River, which shows that there are potential problems with water supply:

> 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.[5]

This reveals that based on historical data there are water supply uncertainties. The NRC fails to fully address the host of issues associated with the problem of rising temperatures. No mention is made of the potential for current and future climatological conditions to depart from the past. The agency was advised of this problem years ago by a knowledgeable critic:

> ...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,

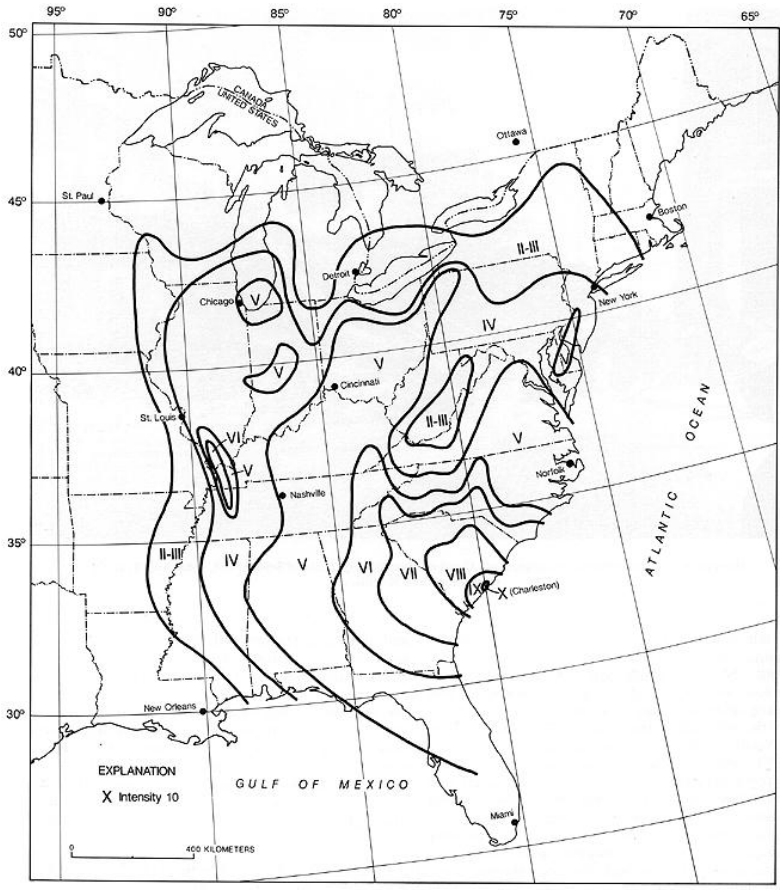
[5] William States Lee III Nuclear Station, Environmental Report, Revision 0, Section 5.2.2.2 Potential Impacts on Water Use, page 5.2-9

> 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.[6]

People 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, local residents would be affected if the Broad River and other water resources in the area are substantially reduced or compromised by the operation of Dukeôs WS Lee. NRCôs EIS analysis is insufficient and therefore will not mitigate such impacts.

South Carolina is 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 at right indicates the magnitude and the extent of the 1886 quake.[7]



The University of South Carolinaôs Seismic Network contains comprehensive data on earthquake history:[8]

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,

[6] Comments/Suggestions from December 6, 2007 Meeting on Enhancing the Efficiency and Effectiveness of the NRC Environmental Review Process, Jon Block, Union of Concerned Scientists, Transcript at 90
[7] National Earthquake Information Center, http://neic.usgs.gov/neis/eqlists/USA/1886_09_01_iso.html
[8] University of South Carolinaôs Seismic Network: http://scsn.seis.sc.edu/html/eqchas.html

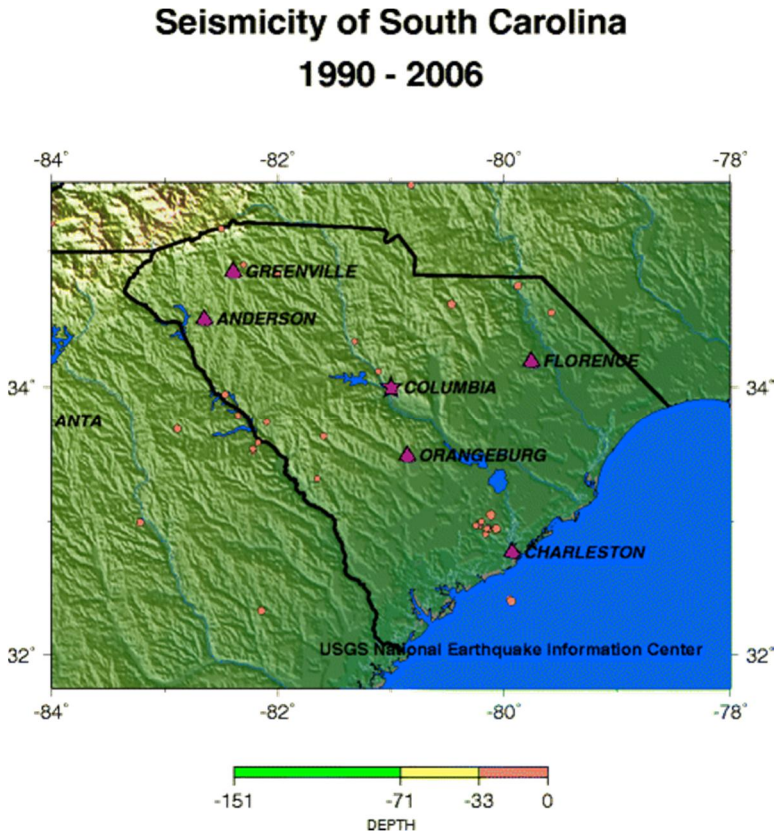
estimates of its location and size must come from observations of the damage and effects caused by the earthquake. Most of what we know of the even and the resulting damage comes from a comprehensive report by C.E. Dutton of the U.S. Geological Survey published in 1889. The meizoseismal area (area of 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 suggests the Charleston-Summerville area had a continuum of low level seismicity 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.

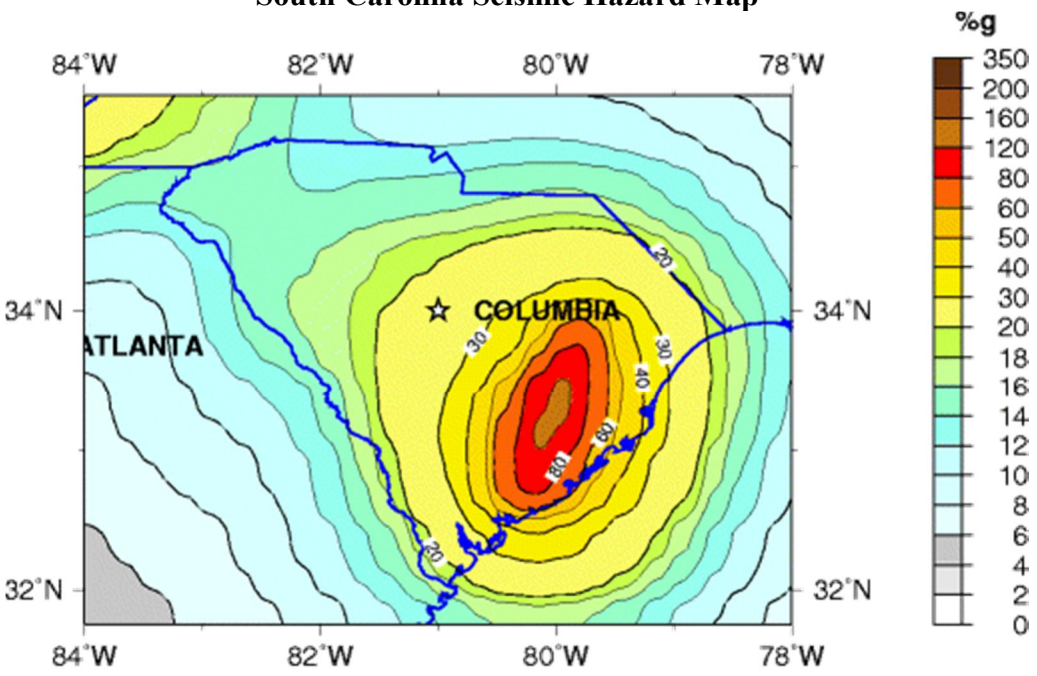
The map at right illustrates seismic events from 1990 to 2006.[9] On the map, circles are earthquakes, color represents depth range and depth is in kilometers. Purple indicates cities. Earthquake locations are from the USGS/NEIC PDE catalog.



Earthquakes are measured in terms of acceleration with respect to gravity. Gravityôs acceleration is 32 feet per second per second. The peak acceleration is the largest recorded during a particular earthquake. Geologic faults are commonly considered to be active if they have moved one or more times in the last 10,000 years.

[9] US Geological Survey Seismicity Map, accessed March 5, 2012, http://neic.usgs.gov/neis/states/south_carolina/south_carolina_seismicity.html

South Carolina Seismic Hazard Map[10]



The South Carolina Geological Survey states:

> When will the next strong quake occur? The ability to accurately predict when and where earthquakes will occur is not yet available. South Carolinians need to realize that South Carolina faces the possibility of the occurrence of a strong quake having its epicenter within our borders. We also need to realize that a major earthquake anywhere in the Eastern United States could adversely affect us, causing damage.[11]

Nuclear engineers use ñprobabilisticò techniques to describe ground motion potential. They attempt to account for all potential seismic sources in the region around the plant. The standard is ground motion with an annual frequency of $1x10^{-4}$/year, or ground motion that occurs every 10,000 years on average.[12] Probabilistic assessments take into account what can go wrong, how bad and how likely based on current information. The problem is that probabilistic risk assessments do not account for unexpected failures. A physicist writing for the Bulletin of the Atomic Scientists said:

> The lesson from the Fukushima, Chernobyl, and Three Mile Island accidents is

[10] US Geological Survey Seismic Hazard Map, accessed March 5, 2012, http://earthquake.usgs.gov/earthquakes/states/south_carolina/hazards.php
[11] South Carolina Geological Survey, Columbia, SC, http://www.dnr.sc.gov/geology/earthquake.htm
[12] NRC frequently asked questions related to the March 11, 2011 Japanese Earthquake and Tsunami, available at http://www.nrc.gov/japan/faqs-related-to-japan.pdf

> simply that nuclear power comes with the inevitability of catastrophic accidents. While these may not be frequent in an absolute sense, there are good reasons to believe that they will be far more frequent than quantitative tools such as probabilistic risk assessments predict. Any discussion about the future of nuclear power ought to start with that realization.[13]

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. The NRC fails to determine the reactorsô 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 CFR PART 100, APPENDIX A, and cannot provide protection of public health and safety as required by 10 CFR. § 50.57.

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 is at odds with the NRCôs oversight of Dukeôs license application.

Radioactive exposure standards do not protect all members of the public

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.[14]

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

[13] Ramana, NV, ñBeyond our imagination: Fukushima and the problem of assessing risk,ò *Bulletin of the Atomic Scientists*, April 19, 2011. M. V. Ramana, a physicist, is with the Nuclear Futures Laboratory and the Program on Science and Global Security, both at Princeton University, and works on the future of nuclear energy in the context of climate change and nuclear disarmament. He is the author of *The Power of Promise: Examining Nuclear Energy in India*. Ramana is a member of the Bulletin of Atomic Scientists Science and Security Board.

[14] Richard R. Monson (Chair) et al. Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII ï 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

> an insignificant risk of cancer, and specified a 10^{-6} lifetime risk of cancer as a quantitative criterion of insignificance.[15]

NRC regulations will not prevent 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 plantôs ionizing radiation for a year; 3 to 4 persons per 1,000 could die if exposed over a lifetime.[16]

Who Pays for Nuclear Accidents?

The Price-Anderson Act protects the nuclear industry from liability claims arising from nuclear incidents. The Act establishes a no fault insurance-type system in which the first approximately $12.6 billion is industry-funded; claims above the $12.6 billion would be covered by a Congressional mandate to retroactively increase nuclear utility liability or would be covered by the federal government.

In a Fourth Circuit Court decision challenging the Price-Anderson Nuclear Industries Indemnity Act, plaintiffs raised the issue of due process.[17] 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] é But there never has been such an accident, 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 have been such accidents. The Supreme Court decision occurred the year before the partial meltdown at Three Mile Island and the release of the eponymous ñChina Syndrome.ò Tokyo Electric Power Companyôs government bailout may reach

[15] 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

[16] Table of Fatal Cancer Risk from Ionizing Radiation, NRC Below Regulatory Concern Policy, 22 June 1990

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

$137 billion for the Fukushima nuclear disaster.[18] 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. 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. [emphasis added]

The Blue Ridge Environmental Defense League believes that after thirty-four years it is time to revisit the issues of due process, equal protection and ñthe business of giving legal advice.ò

Respectfully submitted,

Louis A. Zeller

[18] Bloomberg News, February 24, 2012, http://www.bloomberg.com/news/2012-02-24/tepco-bailout-largest-in-japan-since-rescue-of-banking-industry.html