BEFORE THE UNITED STATES
NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF	)	
	)	Docket No. 50-458
ENTERGY OPERATIONS, INC.	)	
	)	
(River Bend Station, Unit 1)	)	October 12, 2017

PETITION TO INTERVENE AND REQUEST FOR ADJUDICATORY HEARING BY SIERRA CLUB

INTRODUCTION

Entergy Operations, Inc. has filed an application for license renewal for the River Bend Station, Unit 1, in St. Francisville, Louisiana. If the application is granted, the license for River Bend, Unit 1 would be extended to 2045.

Concurrently with the application for a license renewal, Entergy has submitted a License Renewal Application (LRA) and an environmental report (ER). Sierra Club presents herein contentions challenging certain aspects of the ER and the LRA.

Based on the foregoing, Sierra Club requests that the NRC deny the application submitted by Entergy in this proceeding.

STANDING

Pursuant to the Atomic Energy Act, the Commission must grant a hearing in a licensing proceeding "upon the request of any person whose interest may be affected by the

proceeding, and shall admit any such person as a party to such proceeding." 42 U.S.C. § 2239(a)(1)(A). To support the request, a petitioner must provide the Commission with information regarding "(1) the nature of the petitioner's right under the governing statutes to be made a party; (2) the nature of the petitioner's property, financial, or other interest in the proceeding; (3) the possible effect of any decision or order on the petitioner's interest." Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc. (Vermont Yankee Nuclear Power Station), 60 N.R.C. 548, 552 (2004)(citing 10 C.F.R. § 2.309(d)(1). "The NRC generally uses judicial concepts of standing in interpreting this regulation." Entergy Nuclear Vermont Yankee, 60 N.R.C. at 552. Thus, a petitioner may intervene if it can specify facts showing "that (1) it has suffered or will suffer a distinct and palpable harm constituting injury-in-fact within the zone of interests arguably protected by the governing statutes, (2) the injury is fairly traceable to the action being challenged, and (3) the injury will likely be redressed by a favorable determination." Id. at 552-553. In determining whether a petitioner has met the requirements for establishing standing, the Commission "construe[s] the petition in favor of the petitioner." Id. at 553.

Member organizations such as Sierra Club may intervene on behalf of their members if they can "demonstrate that the licensing action will affect at least one of [their] members, . . . identify that member by name and address, and . . . show that [they are] authorized by that member to request a hearing on his or her behalf." In cases involving reactors, members of an organization who live within 50 miles of the reactor have presumptive standing.

The declaration of William Fontenot is hereto attached to establish standing for Sierra Club in this proceeding.

LEGAL STANDARDS GOVERNING LICENSE APPLICATIONS

Pursuant to 10 C.F.R. § 54.29, the Commission may issue a renewed license only if there is reasonable assurance that the activities authorized by the renewed license will be conducted in accordance with the current licensing basis. Specifically, the effects of aging during the extended license period must be properly managed, and a proper time-limited aging analysis has been conducted.

License application proceedings must also comply with the requirements of the National Environmental Policy Act, as set forth in 10 C.F.R. Part 51.

STANDARD FOR ADMISSIBILITY OF CONTENTIONS

Pursuant to 10 C.F.R. § 2.309(f), a petitioner's contentions must: (1) provide a specific statement of the

issue of law or fact to be raised or controverted; (2) provide a brief explanation of the basis for the contention; (3) demonstrate that the issue raised in the contention is within the scope of the proceeding; (4) demonstrate that the issue raised in the contention is material to the findings the NRC must make to support the action that is involved in the proceeding; (5) provide a concise statement of the alleged facts or expert opinions which support the petitioner's position on the issue and on which the petitioner intends to rely at hearing, together with reference to specific sources and documents on which the petitioner intends to rely; (6) provide sufficient information to show that a genuine dispute exists with the licensee on a material issue of law or fact.

The NRC has made clear that the burden on a petitioner in stating its contentions is not heavy. In Dominion Nuclear Conn., Inc. (Millstone Nuclear Power Station, Units 2 & 3), CLI-01-24, 54 NRC 349, the NRC described the contention admissibility standards as "insist[ing] upon some 'reasonably specific factual and legal basis' for the contention." Id., 54 349,359. The NRC further explained in Millstone that the standards for contention admissibility were meant to prevent contentions based on "little more than speculation" and intervenors who had "negligible

knowledge of nuclear power issues and, in fact, no direct case to present." Id. at 358. Rather, petitioners are required only to 'articulate at the outset the specific issues they wish to litigate." Id. at 359.

The NRC and the courts have also made clear that the burden of persuasion is on the licensee, not the petitioner. The petitioner only needs to "com[e] forward with factual issues, not merely conclusory statements and vague allegations." Northeast Nuclear Energy Company, 53 NRC 22, 27 (2001). The NRC described the threshold burden in stating a contention as requiring a petitioner to "raise any specific, germane, substantial, and material factual issues that are relevant to the . . . request for a license . . . and that create a basis for calling on the [licensee] to satisfy the ultimate burden of proof." Id.

Courts have found, however, that this threshold burden may not be appropriate where the information was in the hands of the licensee or NRC staff and was not made available to the petitioner. See, e.g., York Comm. for a Safe Env't. v. NRC, 527 F.2d 812, 815 n. 12 (D.C. Cir. 1975)(where the information necessary to make the relevant assessment is "readily accessible and comprehensible to the license applicant and the Commission staff but not to petitioners, placing the burden of going forward on

petitioners appears inappropriate."). Also, in Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 554 (1978), the United States Supreme Court affirmed the NRC in finding that the proper standard to apply required intervenors to simply make a "showing sufficient to require reasonable minds to inquire further," a burden the NRC found to be significantly less than that of making a prima facie case.

PETITIONER'S CONTENTIONS AND SUPPORTING INFORMATION

CONTENTION 1

The environmental report submitted by Entergy Operations does not properly and adequately state a purpose and need for the relicensing of River Bend Station.

Basis for Contention

The National Environmental Policy Act (NEPA) requires that there must be a statement of purpose and need for the proposed action. 40 C.F.R. § 1502.13. The environmental report, Section 1.0, relies on an NRC guidance document that says the purpose and need for a license renewal will be determined by decisionmakers other than the NRC. Reliance on other decisionmakers to determine purpose and need is an abdication of the NRC's duty under NEPA and contrary to the requirements of NEPA.

Facts Upon Which Petitioner Intends to Rely In Support of This Contention

The statement of purpose and need is important because it "necessarily dictates the range of 'reasonable' alternatives." Carmel-By-The-Sea v. U.S. Dep't. of Transp., 123 F.3d 1142 (9th Cir. 1997). The definition of purpose and need must be reasonable; it must be discussed in detail in relation to the alternatives; and the alternatives must be discussed in light of the purpose and need. Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190 (D.C. Cir. 1991).

Furthermore:

> [A]n agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action, and the EIS would become a foreordained formality. . . . Nor may an agency frame its goals in terms so unreasonably broad that an infinite number of alternatives would accomplish these goals and the project would collapse under the weight of the possibilities.

Id. at 196.

The environmental report submitted by Entergy Operations does not actually state a purpose and need for the relicensing of the River Bend Station. There is certainly nothing in the report that would influence the range of alternatives to be considered. It seems that the purpose and need for the relicensing of River Bend is - the relicensing of River Bend. That is little more than a

tautology that leads to only one conclusion. As described in Citizens Against Burlington, supra, that is a purpose and need "so unreasonably narrow that only one alternative" will satisfy it.

The real purpose and need should be to provide the citizens of Louisiana with safe, clean, and affordable power. Using that purpose and need, the alternatives to be evaluated would include renewable energy and energy efficiency, as discussed in more detail in Contention 2.

CONTENTION 2

In examining the no action alternative, the ER improperly failed to include renewable energy and energy efficiency as a consequence of the River Bend license not being renewed.

Basis for the Contention

NEPA requires a discussion of reasonable alternatives "to the proposed action." 42 U.S.C. § 4332(2)(C)(iii). That discussion must include a discussion of a no-action alternative. 40 C.F.R. § 1502.14(d). This discussion would be included in the "substantial treatment of each alternative" required to be considered in an EIS. 40 C.F.R. § 1502.14(b); see also, Southeast Alaska Conservation Council v. FHWA, 649 F.3d 1050 (9th Cir. 2011).

Facts Upon Which Petitioner Intends to Rely In Support of This Contention

The purpose and need statement under the National Environmental Policy Act (NEPA) is important because the purpose and need statement "necessarily dictates the range of 'reasonable' alternatives." Carmel-by-the-Sea v. U.S. Dep't. of Transp., 123 F.3d 1142 (9th Cir. 1997). The definition of purpose and need must be reasonable. Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190 (D.C. Cir. 1991). There is no way to know if the statement of purpose and need is reasonable unless it is supported by data and evidence.

Furthermore, the agency must not accept out of hand the applicant's statement of purpose and need. In ELPC v. NRC, 470 F.3d 676, 683 (7th Cir. 2006), quoting Simmons v. Corps of Engineers, 120 F.3d 664, 666 (7th Cir. 1997), the court said:

> We have held that blindly adopting the applicant's goals is a "losing proposition" because it does not allow for the full consideration of alternatives required by NEPA. NEPA requires an agency to "exercise a degree of skepticism in dealing with self-serving statements from a prime beneficiary of the project" and to look at the general goal of the project rather than only those alternatives by which a particular applicant can reach its own specific goals.

If there is no action, i.e., the River Bend license is not renewed, the ER must discuss whether the River Bend Station is needed to produce the power required to serve the people of Louisiana and whether there is another,

perhaps better, way to deliver that power. Sierra Club contends that renewable energy (primarily wind and solar) and energy efficiency are viable alternatives to nuclear power that must be considered in a discussion of the no action alternative.

Numerous studies have shown that renewable energy and energy efficiency can satisfy all of our electricity demand. In 2007, Mark Jacobson and Cristina Archer, from Stanford University, published an article showing how wind power, when interconnected with adequate transmission infrastructure, can replace conventional baseload power. Christina Archer and Mark Jacobson, Supplying Baseload Power and Reducing Transmission Requirements by Interconnecting Wind Farms, Journal of Applied Meteorology and Climatology, v. 46, Nov. 2007.

In 2009, Mark Jacobson reviewed solutions to global warming, air pollution and energy security. Mark Jacobson, Review of Solutions to Global Warming, Air Pollution, and Energy Secutity, Energy & Environmental Science, v. 2, p. 148-173, 2009. Professor Jacobson concluded that wind energy was the best solution, with other renewable sources coming in just below wind. Nuclear power was ranked lower than any of the renewable sources. It is important to note that Professor Jacobson was considering the impacts of

energy sources on a number of environmental values, such as global warming, air pollution, energy security, water supply, land use, wildlife, resource availability, thermal pollution, water pollution, nuclear proliferation, and undernutrition. This is an important point that underscores our previous comments that the EPA must consider the impacts of energy sources beyond just the carbon content of emissions from a specific source.

With respect to just climate-relevant emissions, however, the aforementioned article has this to say about nuclear power:

> Nuclear power plant emissions include those due to uranium mining, enrichment, and transport and waste disposal as well as those due to construction, operation, and decommissioning of the reactors. We estimate the lifecycle emissions of new nuclear power plants as 9–70 g CO_2e kWh^{-1}, with the lower number from an industry estimate and the upper number slightly above the average of 66 g CO_2e kWh^{-1} from a review of 103 new and old lifecycle studies of nuclear energy. Three additional studies estimate mean lifecycle emissions of nuclear reactors as 59, 16–55, and 40 g CO_2e^{-1}, respectively; thus, the range appears within reason.

In 2011, Mark Jacobson and another colleague carried their research further to show how all global energy needs can be supplied by renewable energy, referred to by Jacobson et al. as wind, water and sun (WWS). Mark Jacobson and Mark Delucchi, Providing All Global Energy with Wind, Water, and Solar Power, Part I: Technologies, Energy

Resources, Quantities and Areas of Infrastructure, and Materials, Energy Policy, v. 39, p. 1154-1169, 2011; Mark Jacobson and Mark Delucchi, Providing All Global Energy with Wind, Water, and Solar Power, Part II: Reliability, System and Transmission Costs, and Policies, Energy Policy, v. 39, p. 1170-1190, 2011. Importantly, for our comments, the article had this to say about nuclear power:

> For several reasons we do not consider nuclear energy (conventional fission, breeder reactors, or fusion) as a long-term global energy source. First, the growth of nuclear energy has historically increased the ability of nations to obtain or enrich uranium for nuclear weapons, and a large-scale worldwide increase in nuclear energy facilities would exacerbate this problem, putting the world at greater risk of a nuclear war or terrorism catastrophe. The historic link between energy facilities and weapons is evidenced by the development or attempted development of weapons capabilities secretly in nuclear energy facilities in Pakistan, India, Iraq, Iran and to some extent North Korea. Feiveson (2009) writes that "it is well understood that one of the factors leading several countries now without nuclear power programs to express interest in nuclear power is the foundation that such programs could give them to develop weapons. Kessides (2010) asserts, "a robust global expansion of civilian nuclear power will significantly increase proliferation risks unless the current non-proliferation regime is substantially strengthened by technical and institutional measures and its international safeguards system adequately meets the new challenges associated with a geographic spread and an increase in the number of nuclear facilities". Similarly, Miller and Sagan (2009) write, "It seems almost certain that some new entrants to nuclear power will emerge in the coming decades and that the organizational and political challenges to ensure the safe and secure spread of nuclear technology into the developing world will be substantial and potentially grave."

If the world were converted to electricity and electrolytic hydrogen by 2030, the 11.5 TW in resulting power demand would require ~ 15,800 850 MW nuclear power plants, or one installed every day for the next 43 years. Even if only 5% of these were installed, that would double the current installations of nuclear power worldwide. Many more countries would possess nuclear facilities, increasing the likelihood that these countries would use the facilities to hide the development of nuclear weapons as has occurred historically.

Second, nuclear energy results in 9-25 times more carbon emissions than wind energy, in part due to emissions from uranium refining and transport and reactor construction, in part due to the longer time required to site, permit, and construct a nuclear plant compared with a wind farm (resulting in greater emissions from the fossil-fuel electricity sector during this period, and in part due to the greater loss of soil carbon due to the greater loss in vegetation resulting from covering the ground with nuclear facilities relative to wind turbine towers, which cover little ground. Although recent construction times worldwide are shorter than the 9-year median construction times in the U.S. since 1970, they still averaged 6.5 years worldwide in 2007, and this time must be added to the site permit time (~3 years in the U.S.) and construction permit and issue time (~3 years). The overall historic and present range of nuclear planning-to-operation times for new nuclear plants has been 11-19 years, compared with an average of 2-5 years for wind and solar installations. Feiversen (2009) observes that "because wind turbines can be installed much faster than could nuclear, the cumulative greenhouse gas savings per capital invested appear likely to be greater for wind." The long time required between planning and operation of a nuclear power plant poses a significant risk to the Arctic sea ice. Sea ice records indicate a 32% loss in the August 2010 sea ice area relative to the 1979-2008 mean. Such rapid loss indicates that solutions to global warming must be implemented quickly. Technologies with long lead times will allow the high-albedo Arctic ice to disappear, triggering more rapid positive feedbacks to

warmer temperatures by uncovering the low-albedo ocean below.

> Third, conventional nuclear fission relies on finite stores of uranium that a large-scale nuclear program with a "once through" fuel cycle would exhaust in roughly a century. In addition, accidents at nuclear power plants have been either catastrophic (Chernobyl) or damaging (Three-Mile Island) [of course, this was before Fukushima], and although the nuclear industry has improved the safety and performance of reactors, and has proposed new (but generally untested) "inherently" safe reactor designs, there is no guarantee that the reactors will be designed, built, and operated correctly. For example, Pacific Gas and Electric Company had to redo some modifications it made to its Diablo Canyon nuclear power plant after the original work was done backwards, and French nuclear regulators recently told the firm Areva to correct a safety design flaw in its latest-generation reactor. Further, catastrophic scenarios involving terrorist attacks are still conceivable. Even if the risks of catastrophe are very small, they are not zero, whereas with wind and solar power, the risk of catastrophe is zero. Finally, conventional nuclear power produces radioactive waste, which must be stored for thousands of years, raising technical and long-term cost questions.

There were two related reports issued in 2011 by the American Council for an Energy-Efficient Economy. R. Neal Elliott, Rachel Gold, and Sara Hayes, Avoiding a Train Wreck: Replacing Old Coal Plants With Energy Efficiency, 2011; Dan York and Martin Kushler, The Old Model Isn't Working: Creating the Energy Utility for the 21st Century, 2011. These reports emphasized the benefits of energy efficiency in replacing fossil fuels. The first report made the following findings:

The untapped potential for increased efficiency savings is massive, with the projected range of available efficiency consistently falling within (or exceeding) the range of estimated capacity needed to address forecasted coal retirement.

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[T]he average cost to a utility for energy efficiency measures is 2.5 cents per kWh, in comparison to new generation sources, which can range from 6 to 15 cents per kWh.

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One . . . analysis estimated that by 2018 new energy efficiency programs could decrease summer peak capacity demand by 20,000 MW of the 40,000 MW that may be needed. An ACEEE meta-analysis of 48 studies on the potential for energy efficiency in the U.S. indicates that given the right choices and investments, the U.S. could cost-effectively reduce energy consumption by 20 to 30% or more over the course of the next 20 years.

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States and localities that invest in efficiency profit from a range of secondary economic benefits as well. Energy efficiency investments directly reduce utility bills and operating costs for consumers. This effectively reduces dollars spent for the purchase of fuel and the costs of operating a coal plant, and redirects those dollars into new jobs in other sectors of the local economy. Most of these sectors create more local jobs than the fossil-fueled electric generating sector where significant dollars flow out of the local economy. In addition, utilizing energy efficiency resources to enable the retirement of older coal plants helps reduce risk by significantly reducing the amount of future costs that ratepayers would face if a policy to impose a cost for carbon emissions was enacted.

Efficiency can be deployed quickly.

The second ACEEE report describes how a new public utility model can implement energy efficiency programs for the benefit of all. So, energy efficiency is practical, achievable, and decreases the reliance on fossil fuels and nuclear power.

Another source considering the ability of renewable energy and energy efficiency to provide all needed electric power, is Arjun Makhijani, Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy, 2007, available for download at www.ieer/carbon-free/. In that book Dr. Makhijani shows how:

> It is technologically and economically feasible to phase out CO_2 emissions and nuclear power at the same time. The analysis in this report indicates that it can be done at reasonable cost by 2050.

Dr. Makhijani describes a nuclear-free and carbon-free energy future as follows:

> The U.S. renewable energy resource base is vast and practically untapped. Available wind energy resources in 12 Midwestern and Rocky Mountain states equal about 2.5 times the entire electricity production of the United States. North Dakota, Texas, Kansas, South Dakota, Montana, and Nebraska each have wind energy potential greater than the electricity produced by all 103 [in 2007] U.S. nuclear power plants. Solar energy resources on just one percent of the area of the United States are about three times as large as wind energy, if production is focused in the high isolation areas in the Southwest and West.
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> Just the parking lots and rooftops in the United States could provide most of the U.S. electricity supply. This also has the advantage of avoiding the

need for transmission line expansion, though some strengthening of the distribution infrastructure may be needed. Wind energy is already more economical than nuclear power. In the past two years, the costs of solar cells have come down to the point that medium-scale installations, . . . , are economical in sunny areas, since they supply electricity mainly during peak hours.

The main problem with wind and solar energy is intermittency. This can be reduced by integrating wind and solar energy together into the grid - for instance, wind energy is often more plentiful at night. Geographic diversity also reduces the intermittency of each source and for both combined.

Finally, the book summarizes the analysis with 12 recommendations for a clean and renewable energy future:

1. Enact a physical limit of CO_2 emissions for all large users of fossil fuels (a "hard cap") that steadily declines to zero prior to 2060, with the time schedule being assessed periodically for tightening according to climate, technological, and economic developments. The cap should be set at the level of some year prior to 2007, so that early implementers of CO_2 reductions benefit from the setting of the cap. Emission allowances would be sold by the U.S. government for use in the United States only. There would be no free allowances, no offsets and no international sale or purchase of CO_2 allowances. The estimated revenues - approximately $30 to $50 billion per year - would be used for demonstration plants, research and development, and worker and community transition.
2. Eliminate all subsidies and tax breaks for fossil fuels and nuclear power (including guarantees for nuclear waste disposal from new power plants, loan guarantees, and subsidized insurance).
3. Eliminate subsidies for biofuels from food crops.
4. Build demonstration plants for key supply technologies, including central station solar thermal with heat storage, large- and intermediate-scale solar photovoltaics, and CO_2 capture in microalgae for liquid fuel production (and production of a high solar energy capture aquatic

plants, for instance in wetlands constructed at municipal wastewater systems).

5. Leverage federal, state and local purchasing power to create markets for critical advanced technologies, including plug-in hybrids.
6. Ban new coal-fired power plants that do not have carbon storage.
7. Enact at the federal level high efficiency standards for appliances.
8. Enact stringent building efficiency standards at the state and local levels, with federal incentives to adopt them.
9. Enact stringent efficiency standards for vehicles and make plug-in hybrids the standard U.S. government vehicle by 2015.
10. Put in place federal contracting procedures to reward early adopters of CO_2 reductions.
11. Adopt vigorous research, development, and pilot plant construction programs for technologies that could accelerate the elimination of CO_2, such as direct electrolytic hydrogen production, solar hydrogen production (photolytic, photochemical, and other approaches), hot rock geothermal power, and integrated gasification combined cycle plants using biomass with a capacity to sequester the CO_2.
12. Establish a standing committee on Energy and Climate under the U.S. Environmental Protection Agency's Science Advisory Board.

The foregoing discussion makes it clear that there are numerous ways to get to a clean and renewable energy future without nuclear power.

The foregoing discussion also emphasizes that renewable energy requires expansion of the transmission grid. Expanded transmission is occurring right now. The Federal Energy Regulatory Commission (FERC) has over the past few years adopted policies to promote expansion of transmission lines. The most recent FERC action is Order

1000 adopted on July 21, 2011. The Order summarizes its contents as follows:

> With respect to transmission planning, this Final Rule: (1) requires that each public utility transmission provider participate in a regional transmission planning process that produces a regional transmission plan; (2) requires that each public utility transmission provider amend its OATT to describe procedures that provide for the consideration of transmission needs driven by public policy requirements in the local and regional transmission planning processes; (3) removes from Commission-approved tariffs and agreements a federal right of first refusal for certain new transmission facilities; and (4) improves coordination between neighboring transmission planning regions for new Docket No. RM10-23-000 - 2 - interregional transmission facilities. Also, this Final Rule requires that each public utility transmission provider must participate in a regional transmission planning process that has: (1) a regional cost allocation method for the cost of new transmission facilities selected in a regional transmission plan for purposes of cost allocation; and (2) an interregional cost allocation method for the cost of certain new transmission facilities that are located in two or more neighboring transmission planning regions and are jointly evaluated by the regions in the interregional transmission coordination procedures required by this Final Rule. Each cost allocation method must satisfy six cost allocation principles.

There are also regional transmission planning organizations that monitor and regulate access to the grid. These organizations can ensure that renewable energy is available from the sources that are producing power at a certain time. This will address the issue of intermittency.

The issues of grid coordination and intermittency were addressed in a report in 2010. George Crabtree and Jim

Misewich, Integrating Renewable Resources on the Grid, 2010, found at www.aps.org/policy/reports/popa-reports/upload/integratingelec.pdf. The report summarized its conclusions as follows:

> The demand for carbon-free electricity is driving a growing movement of adding renewable energy to the grid. Renewable Portfolio Standards mandated by states and under consideration by the federal government envision a penetration of 20-30% renewable energy in the grid by 2020 or 2030. The renewable energy ultimately could grow well beyond these initial goals.
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> The grid faces two new and fundamental technological challenges in accommodating renewables: location and variability. Renewable resources are concentrated at mid-continent far from population centers, requiring additional long distance, high-capacity transmission to match supply with demand. The variability of renewables due to the characteristics of weather is high, up to 70% for daytime solar due to passing clouds and 100% for wind on calm days, much larger than the relatively predictable uncertainty in load that the grid now accommodates by dispatching conventional resources in response to demand.
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> Solutions to the challenges of remote location and variability of generation are needed. The options for DC transmission lines, favored over AC lines for transmission of more than a few hundred miles, need to be examined. Conventional high voltage DC transmission lines are a mature technology that can solve regional transmission needs covering one- or two-state areas. Conventional high voltage DC has drawbacks, however, of high loss, technically challenging and expensive conversion between AC and DC, and the requirement of a single point of origin and termination. Superconducting DC transmission lines lose little or no energy, produce no heat, and carry higher power density than conventional lines. They operate at moderate voltage, allowing many "on-ramps" and "off-ramps" in a single network and reduce the technical and cost challenges of AC and DC conversion. A network of superconducting DC cables overlaying the existing

patchwork of conventional transmission lines would create an interstate highway system for electricity that moves large amounts of renewable electric power efficiently over long distances from source to load. Research and development is needed to identify the technical challenges associated with DC superconducting transmission and how it can be most effectively deployed.

The challenge of variability can be met (i) by switching conventional generation capacity in or out in response to sophisticated forecasts of weather and power generation, (ii) by large scale energy storage in heat, pumped hydroelectric, compressed air or stationary batteries designed for the grid, or (iii) by national balancing of regional generation deficits and excesses using long distance transmission. Each of these solutions to variability has merit and each requires significant research and development to understand its capacity, performance, cost and effectiveness. The challenge of variability is likely to be met by a combination of these three solutions; the interactions among them and the appropriate mix needs to be explored.

The long distances from renewable sources to demand centers span many of the grid's physical, ownership and regulatory boundaries. This introduces a new feature to grid structure and operation: national and regional coordination. The grid is historically a patchwork of local generation resources and load centers that has been built, operated and regulated to meet local needs. Although it is capable of sharing power across moderate distances, the arrangements for doing so are cumbersome and inefficient. The advent of renewable electricity with its enormous potential and inherent regional and national character presents an opportunity to examine the local structure of the grid and establish coordinating principles that will not only enable effective renewable integration but also simplify and codify the grid's increasingly regional and national character.

One final point needs to be made here. The electric utilities and energy companies assert that in order to

provide baseload power they have to use coal, natural gas or nuclear power. The GEIS adopts this assertion. But baseload as viewed by the utilities and power companies is an outdated concept. They are stuck in the narrow view of electric power coming from power plants. But rather than referring to the term baseload we are really talking about energy and capacity. Energy is the total amount of electricity that is being supplied to consumers. Capacity is the highest level of electricity that can be supplied at any one time to meet peak demand. As discussed above, renewable energy and energy efficiency can supply the energy and capacity needed to serve our needs.

Renewable energy has been making great strides in the last few years. It is fast becoming an increasing share of the energy mix and its cost is significantly decreasing. A recent publication describes the renewable energy landscape as follows:

> The American investment in wind energy continues to pay off in the form of reduced costs, improved efficiency, and lower prices for consumers. The beginning of 2014 marked a record wave of new construction, and the American Wind Energy Association reported that wind power continues to lead the way in affordable, reliable renewable energy.
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> "In many parts of the country today [...] wind is the most economic form of new energy generation," as NextEra Energy Chief Financial Officer Moray P. Dewherst said in a recent earnings call.

Investments in technological advancements and stable policy have helped drive down the cost of wind energy by 43% in four years, and the industry remains on schedule to grow to supply 20% of the U.S. Power grid by 2030, and beyond.

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Wind energy prices and wind energy costs have dropped sharply in recent years. . . . DOE Wind Technologies Market Report 2012 confirms that the cost of wind energy has declined by 43% over the last four years.

As the report explains:

1. The capital cost to develop wind power continues to drop
2. The average cost to purchase electricity provided by wind is falling
3. The productivity of wind turbines continues to increase
4. 70% of the value of wind turbines installed in the U.S. now carries a "Made-in-the-USA" label

Zero-fuel-cost wind energy directly displaces the output of the most expensive and least efficient power plants currently operating. . . .

Significant water savings come along with those for fuel. . . .

More than a dozen studies conducted by independent grid operators, state governments, academic experts, and others have found that wind energy benefits consumers by reducing electricity prices, and utilities are taking note:

> "Wind prices are extremely competitive right now, offering lower costs than other possible resources, like natural gas plants," David Sparby, President and CEO of Xcel Energy's Northern States Power, announcing 600 MW of new wind power contracts in 2013.
>
> "The expansion is planned to be built at no net cost to the company's customers and will help stabilize electric rates over the long term by

providing a rate reduction totaling $10 million per year by 2017, commencing with a $3.3 million reduction in 2015." MidAmerican Energy Co., 2013 press release, after the Iowa Utilities Board approved the addition of 1,050 MW of wind generation in Iowa.

Cost savings with wind power are apparent across the country. Newly released DOE data shows that consumers in the states that use the most wind energy have fared far better than consumers in states that use less wind energy.

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[In 2013][p]hotovoltaic (PV) installations continued to proliferate, increasing 41% over 2012 to reach 4,751 MW, and 410 MW of concentrating solar power (CSP) plants also came online. Solar was the second-largest source of new electricity generating capacity in the U.S., exceeded only by natural gas. And the cost to install solar fell throughout the year, with average system prices ending the year 15% below the mark set at the end of 2012.

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Increasingly, solar is not bound by its cost, but rather by its role in the electricity sector. And as solar continues along its path toward the mainstream, its integration with the broader electricity market from a technical, market and regulatory perspective will become one of the most important issues in the industry.

Key Figures:

- The U.S. installed 4,751 MW of solar PV in 2013, up 41% over 2012 and nearly fifteen times the amount installed in 2008.

- There is now a total of 12.1 GW of PV and 918 MW of CSP operating in the U.S.

- More solar has been installed in the U.S. in the last eighteen months than in the 30 years prior.

- Solar accounted for 29% of all new electricity generation capacity in 2013, up from 10% in 2012. This made solar the second-largest source of new generating capacity behind natural gas.

- The wave of concentrating solar power installations slated for completion at the end of 2013 into 2014 kicked off with the 280 MW Solana project and the Genesis Solar project's initial 125 MW phase. In early 2014, BrightSource's notable Ivanpah project also began operating and SolarReserve's Crescent Dunes began commissioning.

- Each year approximately 30,000 solar water heating and cooling (SHC) systems are installed in the U.S., generating an estimated $435 million in annual revenue. There is currently 9 GWth of SHC capacity installed in the U.S., and the country ranks 36th in the world in installed capacity relative to its population.

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For 2014, our forecast calls for 26% overall growth in the U.S. solar market.

American Council On Renewable Energy, The Outlook For Renewable Energy in America, 2014.

As further evidence of the viability of renewable energy, over half of the states have renewable electricity standards that require a certain amount of the power produced in the state to be generated by renewable energy.

Another aspect of renewable energy should not be overlooked - distributed generation (DG). Distributed generation is the generation of electricity from sources near the point of consumption. American Council for an Energy-Efficient Economy, www.aceee.org/topics/distributed-

generation. In almost all cases, distributed generation is an energy production facility, primarily solar and wind, owned by the entity consuming the power. Over the past few years the installation of distributed generation facilities has increased and the cost of those power sources, especially solar, has decreased. In addition, states have passed laws and regulations making distributed generation more affordable and more accessible.

The Department of Energy issued a report highlighting the benefits of distributed generation:

> DG offers potential benefits to electric system planning and operations. On a local basis there are opportunities for electric utilities to use DG to reduce peak loads, to provide ancillary services such as reactive power and voltage support, and to improve power quality.
>
> DG can also be used to decrease the vulnerability of the electric system . . . . There are many examples of customers who own and operate facilities in these sectors who are using DG to maintain operations when the grid is down during weather-related outages and regional blackouts.
>
> Under certain circumstances, and depending on the assumptions, DG can also have beneficial effects on land use and needs for rights-of-way for electric transmission and distribution.

U.S. Department of Energy, The Potential Benefits of Distributed Generation and Rate-Regulated Issues That May Impede Their Expansion, 2007.

States can do much to encourage and support distributed generation. These efforts would include tax

credits, net metering requirements, and feed-in tariffs. States can adopt, and many states have adopted, interconnection standards that make it easier for distributed generation facilities to connect to the electric grid.

Energy efficiency, likewise, has clearly demonstrated its reliability, efficacy and cost effectiveness. In fact, energy efficiency is the most readily available and least expensive way to reduce our dependence on fossil fuels and to meet energy capacity needs. R. Neal Elliott, Rachel Gold, and Sara Hayes, Avoiding a Train Wreck: Replacing Old Coal Plants With Energy Efficiency, 2011.

A recent report by the International Energy Agency, Capturing the Multiple Benefits of Energy Efficiency, 2014, describes the viability of energy efficiency as follows:

> As energy efficiency continues to gain attention as a key resource for economic and social development across all economies, understanding its real value is increasingly important. The multiple benefits approach to energy efficiency policy seeks to expand the perspective of energy efficiency beyond the traditional measures of reduced energy demand and lower greenhouse gas (GHG) emissions by identifying and measuring its impacts across many different spheres.
>
> The term "multiple benefits" aims to capture a reality that is often overlooked: investment in energy efficiency can provide many different benefits to many different stakeholders. Whether by directly reducing energy demand and associated costs (which can enable investment in other goods and services) or

> facilitating the achievement of other objectives (e.g., making indoor environments healthier or boosting industrial productivity), recent research acknowledges the enormous potential of energy efficiency. [Energy efficiency has a] role as a major contributor to strategic objectives across five main themes: enhancing the sustainability of the energy system, economic development, social development, environmental sustainability and increasing prosperity.
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> **********
>
> Energy efficiency is taking its place as a major energy resource in the context of national and international efforts to achieve sustainability targets. This reflects a paradigm shift that is beginning to give credence to actions on both the supply and the demand side in the quest to achieve economic growth while supporting energy security, competitiveness and environmental sustainability.
>
> In effect, attention to energy efficiency has begun to evolve, progressing from the lack of visibility inherent in its identification as "the hidden fuel" (i.e., measured and valued only as the negative quantity of energy not used) to an increasing recognition of its role as the "first fuel." Energy use avoided by International Energy Agency (IEA) member countries in 2010 (generated from investments over the preceding 1974 to 2010 period), was larger than actual demand met by any other single supply-side resource, including oil, gas, coal, and electricity - making energy efficiency the largest or "first" fuel.

Another recent report by the American Council for an Energy-Efficient Economy was based on a study to assess the costs of energy efficiency programs and cost effectiveness of those programs from 2009 to 2012. Maggie Molina, The Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs, 2014.

The study reviewed energy efficiency programs in 20 states. The finding was that each dollar invested by utilities and participants in energy efficiency measures yields $1.24 to $4.00 in benefits. The study concluded:

> In summary, the results of this analysis clearly demonstrate that energy efficiency programs are the least-cost resource option available to utilities. . . . [E]lectricity efficiency programs, at a range of about 2 to 5 cents per kWh and an average of 2.8 cents per kWh, are about one half to one third the levelized cost of alternative new electricity resource options.

Although Louisiana has not thus far been a leader in developing renewable energy and energy efficiency, the foregoing discussion clearly shows that renewable energy and energy efficiency is available. If the River Bend license is not renewed, the plant would still operate until 2025. That gives the State of Louisiana 8 years to develop renewable energy and energy efficiency.

A 2004 study of the potential for offshore wind projects off the coast of Louisiana concluded:

> Offshore wind energy offers Louisiana an opportunity to sustain the oil and gas service industry as many of the same service industries and technologies used in the construction of offshore oil and gas structures can be utilized directly, or easily be adapted to construct offshore wind farms. Louisiana has a long history of being a leader in energy production and technology. As oil and gas production in the state continue to decline, offshore wind energy could help Louisiana maintain its leadership role in the energy industry.

Bryan Crouch, Offshore Louisiana Wind Power, Louisiana Department of Natural Resources, 2004.

A subsequent report considered the economics of offshore wind power in Louisiana. The report concluded that:

> Wind turbine capacity will become less expensive as turbine efficiencies improve, and turbine prices will come down as economics of scale materialize. As these happen, wind farms may become viable in less that class 5 wind resources.

Bob Spreche and Bryan Crouch, Economics of Offshore Wind Power, Louisiana Department of Natural Resources, 2005.

Louisiana is also making strides in developing solar energy. The state has adopted a solar tax credit that provides an incentive to install solar energy. Between 2008 and 2012 the Louisiana solar industry had grown from 5 firms to approximately 200 firms. In addition, in fiscal 2012, just over 630 solar projects were initiated in Louisiana, compared to 217 in 2010. This is according to the Gulf States Renewable Energy Industries Association at www.gsreia.org.

At this point, until an environmental impact statement (EIS) is prepared by the NRC, the discussion of alternatives in the ER is inadequate.

CONTENTION 3

The LRA does not undertake an adequate aging management review of the concrete on the containment vessel.

Basis for the Contention

The containment vessel in the River Bend Station includes a concrete drywell of the GE Mark III design. This concrete structure is susceptible to alkali-silica reaction (ASR)-induced concrete degradation. The license renewal application submitted for River Bend Station does not address the degradation of the concrete drywell due to ASR.

Facts Upon Which Petitioner Intends to Rely In Support of This Contention

10 C.F.R. § 54.21(a)(3) requires that each license renewal application demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation. This would include the concrete drywell.

After an ASR-induced concrete degradation of a structure was identified in 2011 at the Seabrook Station, the NRC sent an information notice (ML112241029) to all nuclear reactor licensees, including River Bend Station, advising licensees to take appropriate actions to avoid similar problems. The information notice made clear that the ASR-induced degradation must be considered in the context of a license renewal.

ASR is one type of alkali-aggregate reaction that can degrade concrete structures. ASR is a slow chemical process in which alkalis, usually predominantly from the cement, react with certain reactive types of silica in the aggregate, when moisture is present. This reaction produces an alkali-silica gel that can absorb water and expand to cause micro-cracking of the concrete.

ASR can be identified as a likely cause of degradation during visual inspection by the unique pattern of cracking and the presence of alkali-silica gel. However, ASR-induced degradation can only be confirmed by optical microscopy performed as part of petrographic examination of concrete core samples.

The information notice described above identifies several sources for standards to be used to test for and confirm the presence of ASR-induced degradation. These standards go beyond visual inspection. The information notice further indicates that a license renewal application should include a discussion of aging management programs and actions to manage the effects of ASR-induced degradation. The license renewal application for River Bend does not include any discussion of ASR-induced degradation.

CONCLUSION

Based on the foregoing, Sierra Club has established that it has standing to intervene in this relicensing proceeding and that its contentions should be admitted. Therefore, Sierra Club should be permitted to intervene in this proceeding and is entitled under 10 C.F.R. § 2.309 to a hearing on its contentions.

/s/ *Wallace L. Taylor*

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ATTORNEY FOR SIERRA CLUB

DECLARATION OF WILLIAM FONTENOT

WILLIAM FONTENOT declares as follows:

1. I live at 632 Drehr Ave., Baton Rouge, Louisiana 70806. I have lived there since June of 1975. My home is approximately 30 miles from the River Bend Station nuclear plant.

2. I am a member of the Delta (Louisiana) Chapter of the Sierra Club. I have been a member since 1971.

3. I am currently the Conservation Chair for the Delta Chapter of the Sierra Club. In that capacity I know that the Sierra Club opposes nuclear power. Personally, and specifically with respect to the River Bend Station, I am concerned about the safety of the River Bend plant. As the plant ages, the likelihood of an accident from failing structures and components of the plant increases. I believe the Sierra Club should intervene in the relicensing proceedings for the River Bend Station to ensure that renewing the River Bend license will not increase that likelihood of an accident.

4. I believe the Nuclear Regulatory Commission should not renew the River Bend license because renewable energy sources and energy efficiency are a safer and less expensive means of ensuring an adequate supply of

electricity than nuclear power. Given that fact, there is no justifiable purpose and need for renewing the River Bend license.

5. I am also concerned about the spent nuclear fuel being stored at the site. Renewal of the River Bend license will result in 20 more years of spent fuel being stored on the reactor site, increasing the risk of radiation release from the stored fuel.

6. I request that the Nuclear Regulatory Commission allow the Sierra Club to intervene in the River Bend relicensing proceedings and hold an adjudicative hearing on the relicensing application.

7. I authorize the Sierra Club to represent my interests in the River Bend relicensing proceedings.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated this 14th day of September, 2017.

William Fontenot

WILLIAM FONTENOT