

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of Tennessee Valley Authority Sequoyah Nuclear Plant Units 1 and 2 Docket Nos. 50-327 and 50-328 License Nos. DPR-77 and DPR-79 NRC-2013-0037
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May 6, 2013

PETITION FOR LEAVE TO INTERVENE AND REQUEST FOR HEARING  
BY THE BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE,  
BELLEFONTE EFFICIENCY AND SUSTAINABILITY TEAM, AND  
MOTHERS AGAINST TENNESSEE RIVER RADIATION

Pursuant to 10 CFR § 2.309, Parts 51 and 54 of the Code of Federal

Regulations and the Federal Register Notice of 5 March 2013, the Blue Ridge Environmental Defense League, its chapter Bellefonte Efficiency and Sustainability Team and its project Mothers Against Tennessee River Radiation (öBREDLö or öPetitionerö), hereby file this Petition for leave to intervene and request for hearing in the above captioned matter. This Petition states the the nature of the petitionerø right under the Atomic Energy Act to be made a party to the proceeding, the petitionerø property or other interest in the proceeding, and the possible effect of any decision that may be issued in the proceeding on the petitionerø interest. Further, the Petition sets forth with particularity the specific contentions we seek to raise. As demonstrated below, BREDL has representational standing through its members to make this request.

**Description of the Proceeding**

On January 13, 2013, the Nuclear Regulatory Commission received a license renewal application (öLRAö) for Sequoyah Nuclear Plant (öSQNö) submitted by Tennessee

Valley Authority (TVA). NRC approval of renewal for DPR-77 and DPR-79 would allow TVA to operate SQN for an additional 20 years beyond the expiration of the current licenses; i.e., September 17, 2020 and September 15, 2021 respectively. The Federal Register Notice of Opportunity for Hearing Regarding Renewal of Sequoyah Nuclear Plants Units 1 and 2 was published on March 5, 2013.<sup>1</sup> The deadline for filing hearing requests and petitions for intervention is May 6, 2013.

### **Background**

SQN Units 1 and 2 are located in Soddy-Daisy, Tennessee in Hamilton County on the banks of the Chickamauga Reservoir, an impoundment of the Tennessee River. Each plant is rated at 3,455 megawatts-thermal (and 1,160 megawatts-electric), for a total power of 6,910 MWth (and 2,320 MWe).

Construction of SQN began in 1969. Unit 1 began commercial operation July 1, 1981 and Unit 2 on June 1, 1982. According to the NRC, "Economic and antitrust considerations, not limitations of nuclear technology, determined the original 40-year term for reactor licenses. However, because of this selected time period, some systems, structures, and components may have been engineered on the basis of an expected 40-year service life."<sup>2</sup>

The safety questions for license renewal are: 1) Does the current regulatory process ensure that the licensing basis of the plant maintains an acceptable level of safety? and 2) Will the original plant licensing basis be maintained during the renewal term? According to NRC, TVA "must identify all plant systems, structures and components that are safety-

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<sup>1</sup> Fed. Reg. Vol. 78 No. 43, Tuesday, March 5, 2013, pp. 14362-14365

<sup>2</sup> NRC Fact Sheet: Reactor License Renewal, June 2012, accessed April 24, 2013 from <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-reactor-license-renewal.pdf>

related, or whose failure could affect safety-related functions, and that are relied on to demonstrate compliance with the NRC's regulations for fire protection, environmental qualification, pressurized thermal shock, anticipated transients without scram, and station blackout. See NRC Fact Sheet, *op cit*.

For environmental impacts, a plant-specific supplement to NUREG-1437, Generic EIS for License Renewal, must be prepared. The review includes impacts on endangered species, cooling water systems on fish and shellfish, ground water quality and environmental justice.

License renewal safety issues proceed under 10 CFR Part 54 and environmental issues under Part 51. Specifically, TVA must evaluate the technical aspects of a 60-year old SQN and describe how it will manage these effects. Further, TVA must evaluate environmental impacts through 2041.

### **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 Maryland, 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 BREDL, people who have authorized Petitioner to represent their interests in this proceeding. Their names, address and distance from SQN follow:

	<u>Declarant</u>	<u>Home Address</u>	<u>State</u>	<u>miles from SQN</u>
1.	Heather Bradley	Stevenson	Alabama	49
2.	Emily Marr Davis	Fort Oglethorpe	Georgia	22
3.	Phil Davis	Fort Oglethorpe	Georgia	22
4.	Keith Goodall	Chattanooga	Tennessee	15
5.	Erna Kawahito	Murfreesboro	Tennessee	85
6.	Barbara A. Kelly	Chattanooga	Tennessee	18
7.	Tom Kunesch	Chattanooga	Tennessee	18
8.	Sandra Kurtz	Chattanooga	Tennessee	12
9.	William Kurtz	Chattanooga	Tennessee	12
10.	Debra Lamb	Red Bank	Tennessee	15
11.	Nicole Milsaps	Soddy-Daisy	Tennessee	10
12.	Linda Modica	Jonesborough	Tennessee	160
13.	Brian Paddock	Chattanooga	Tennessee	18
14.	Sue H. Reynolds	Chattanooga	Tennessee	20
15.	William Reynolds	Chattanooga	Tennessee	20
16.	Patricia Sanders	Murfreesboro	Tennessee	85
17.	Megan Spooner	Chickamauga	Georgia	27
18.	Robert Stanley	Chattanooga	Tennessee	18
19.	Lauren Whaley	Ocoee	Tennessee	25

As demonstrated by the attached declarations, sixteen (16) of the Petitioner's members who live within 50 miles of SQN and three (3) who live farther than 50 miles have signed declarations in support of this petition. The Blue Ridge Environmental Defense League, Bellefonte Efficiency and Sustainability Team and Mothers Against Tennessee River Radiation have made this showing supporting their right to be made a party to the intervention in the license proceeding based on proximity, property and/or other interest, and the effect of the proceeding on the Petitioner's interest. BREDL and its members have presumptive standing by virtue of their proximity to SQN. *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 nuclear power plant are presumed to have standing in reactor operating license cases, because there is an obvious potential for offsite consequences within that distance. *Id.* Here, the granting of a license renewal to TVA would permit the operation of two nuclear reactors at SQN for 20 additional years. Thus, the same standing concepts apply.

The Petitioner's members seek to protect their lives and health by opposing the authorization of a license renewal at SQN. Petitioner seeks to ensure that no license renewal is issued by the U.S. Nuclear Regulatory Commission unless TVA 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. Petitioner hereby requests to be made a party to the proceeding because (1) Continued operation of SQN would present a tangible and particular harm to the health and well-being of our members, (2) The NRC has initiated proceedings for a license renewal, the approval 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 renewal for continued operation of a commercial nuclear power plant.

### **Contentions to be Raised in this Petition**

A license renewal is authorization from the NRC to operate a nuclear power plant at a specific site. Before approving a license renewal, the NRC staff must complete

safety and environmental reviews of the application. The license must comply with provisions of the Atomic Energy Act, the National Environmental Policy Act and NRC regulations.

Petitioners hereby request leave to intervene because the unsafe operation of two nuclear reactors at SQN would endanger nearly one million people in four states living within 50 miles of the plant. Based on the License Renewal Application and associated documents and the expertise of our members and consultants, we believe the LRA does not provide continued assurance, which must be demonstrated by TVA as required under 10 CFR § 54.21, § 54.22 and § 54.23, that the Current Licensing Basis (CLB) will maintain an acceptable level of safety for an additional 20 years of operation. By the contentions detailed within this petition, the Petitioner will show that TVA has failed to make the required demonstration. Furthermore, without said demonstration the risk of operating under the CLB presents an unnecessary level of risk which is wholly out of proportion to any potential benefit.

Petitioner herein 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.

### **Deficiencies in the License Renewal Common to Multiple Contentions**

Under 10 CFR Part 54, TVA's LRA must include an integrated plant assessment

(øIPAö). The IPA must provide enough information about systems, structures, and components (øSSCö) to demonstrate that the øeffects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation.ö See 10 CFR § 54.21(a) Contents of application-- technical information. Stated in the negative, NRC cannot renew the SQN license unless TVA can prove that it can continue to run it without failure. On this account, TVA fails in three cases, presented *infra* as Contentions F-1, F-2 and F-3. The structures and components identified include the reactor vessel, ice condensers, the reactor coolant system pressure boundary, steam generators, the core shroud, pressure retaining boundaries, heat exchangers, ventilation ducts, the containment, the containment liner, electrical and mechanical penetrations, equipment hatches, seismic Category I structures, electrical cables and connections, and other components.

Further, TVAø LRA failed to provide øtime-limited aging analysesö (øTLAAö) which show that øThe effects of aging on the intended function(s) will be adequately managed for the period of extended operation.ö See 10 CFR 54.21(c)(iii). Contentions F-1, F-2 and F-3.

### **Deficiencies in the Environmental Report Common to Multiple Contentions**

The citizens of the United States have a right under the National Environmental Protection Act of 1969 to request that the generic Environmental Impact Statement NUREG-1437 be discarded and revised and that a third-party comprehensive risk analysis be developed which takes all of the elements of risk to the community, to commerce and to the environment into account. Petitioner hereby requests that an

environmental report for license renewal be done that truly defines the human health effects of low dose exposures, the mental stress to the population living with such risk, low-income and disproportionately affected individuals and the full effect of cancer-causing agents emitted to the environment. Included should be a comprehensive assessment of the impacts of production and permanent storage of high level nuclear waste, a major federal action which therefore requires a new environmental impact statement under Section 102 [42 USC § 4332]. Authority: NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 et seq.), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609).

### **Brief List of Contentions and Page Numbers**

#### **Contention—Page**

Aô 10. TVA Fails to Adequately Address the Risks from Flooding at Sequoyah which could result from the failure of upstream dams. The consequences of such an event on the plant would be severe.

Bô 12. NRC Cannot Grant the Sequoyah License Renewal Without Conducting a Thorough Analysis of the Risks of the Long-term Storage of Irradiated Nuclear Fuel Generated by Sequoyah Units 1 and 2.

Cô 14. License renewal regulations at § 54.21 require reasonable assurance during the license term that activities will be conducted in accordance with the CLB, but four counties out of five within 50 Miles of Sequoyah have higher cancer death rates than the state average.

Dô 16. TVA's Integrated Plant Assessment (ôIPAö) for the LRA fails to identify and

assess safety-related incidents at SQN in its required time-limited aging analysis (øTLAAö). 10 CFR 54.21

Eö 18. The LRA fails to consider plutonium fuel use at SQN which would place it outside the current licensing basis.

F-1ö 21. TVA License Extension Application for the Sequoyah ReactorsøIce Condenser Containments lacks acceptable Aging Management Plans to adequately maintain critical components of the Ice Condenser Containment for 20 years of additional operation.

F-2ö 23. NRC must reject TVAø Application for a License Extension at the Sequoyah NPP due to the lack of supporting documentation providing the analysis detailing TVAø assumptions that prove that indeed the Sequoyah IC Containment can withstand severe accidents without leaking

F-3ö 25. TVAø long standing breakdown in dealing with the mismanagement of its whistleblower complaints is a reflection of the corporationø lack of integrity and insufficient adherence to regulatory statutes that demand nuclear power owners put safety first. Given these ongoing systemic problems the accuracy and validity of the License Renewal Application cannot be assured and therefore must be rejected.

## **CONTENTIONS**

**Contention A: TVA's LRA Fails to Adequately Address the Risks from Flooding at Sequoyah which could result from the failure of upstream dams. The consequences of such an event on the plant would be severe.**

Recently, NRC issued six citations to TVA and placed the plant under its øyellowö

safety flag, its second-highest level. A U.S. Nuclear Regulatory Commission Inspection Report issued March 12 states:

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. The enclosed inspection report discusses one finding with two Apparent Violations (AVs) associated with the site flood mitigation strategy.<sup>3</sup>

In 2012 the Nuclear Regulatory Commission issued an immediately effective order indicating that, as a result of the lessons learned from the March 2011 accident at Fukushima Dai-ichi, certain actions were required by nuclear power plant licensees.<sup>4</sup>

The order required new measures to reduce uncertainties resulting from "beyond-design-basis events." The NRC determined that all power reactor licensees and construction permit holders must "develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and SFP [spent fuel pool] cooling capabilities following a beyond-design-basis external event." TVA's updated calculations showed flooding at Sequoyah could rise 2.4 feet higher than that plant was designed to handle. Earlier assumptions were based on decades-old data which underestimated the potential severity of flooding. But TVA's remedy, sand and gravel baskets placed on upstream riverbanks, are stopgaps. More substantial measures for TVA's nuclear fleet would cost tens of millions of dollars, and flood-proof modifications could top a billion dollars.

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<sup>3</sup> Letter from NRC to TVA Re: Sequoyah Nuclear Plant - NRC Inspection Report 05000327/2013009, 05000328/2013009; Preliminary Yellow Finding, and Apparent Violations, March 12, 2013

<sup>4</sup> Order Number EA-12-049 "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies For Beyond-Design-Basis External Events" to "All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status," March 12, 2012

The Fukushima meltdown was caused by a flood of water, a tsunami, which disabled the emergency diesel backup generators necessary to keep the reactors from overheating when electric power failed. TVA has not implemented necessary precautions to prevent similar disaster in the Tennessee Valley. The NRC's spokesman agreed: "Our inspectors found that their [TVA's] strategies were not adequate."<sup>5</sup>

Under 10 CFR Part 54, TVA's LRA must include an integrated plant assessment. The IPA must provide enough information about systems, structures, and components to demonstrate that the "effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation." See 10 CFR § 54.21(a) Contents of application--technical information.

Under 10 CFR § 54.30(a), if the reviews required by § 54.21 (a) or (c) show that there is not reasonable assurance during the current license term that licensed activities will be conducted in accordance with the CLB, then the licensee shall take measures under its current license, as appropriate, to ensure that the intended function of those systems, structures or components will be maintained in accordance with the CLB throughout the term of its current license.

**Contention B: NRC Cannot Grant the Sequoyah License Renewal Without Conducting a Thorough Analysis of the Risks of the Long-term Storage of Irradiated Nuclear Fuel Generated by Sequoyah Units 1 and 2.**

On June 8, 2012, the U.S. Court of Appeals for the District of Columbia Circuit issued an order vacating the U.S. Nuclear Regulatory Commission's Waste Confidence

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<sup>5</sup> "TVA cited for flood prevention violations," *Chattanooga Times-Free Press*, March 19, 2013, <http://www.timesfreepress.com/news/2013/mar/19/tva-cited-for-flood-prevention-violations/>



Decision Update.<sup>6</sup> *See* 75 Fed. Reg. 81,037 (Dec. 23, 2010). Further, the Court vacated the Temporary Storage Rule. *See* 75 Fed. Reg. 81,032 (Dec. 23, 2010). Both rules were remanded to the NRC and remain in suspension until at least September 2014. These rules provide part of the licensing basis for SQN on issues regarding the safety and environmental impacts of irradiated reactor fuel storage and disposal. TVA's LRA does not provide continued assurance that the current licensing basis will maintain an acceptable level of safety for an additional 20 years of operation, which it must under 10 CFR 54. Regarding long-term waste storage, TVA's Environmental Report (ER) states:

NRC-evaluated decommissioning options include immediate decontamination and dismantlement and safe storage of the stabilized and defueled facility for a period of time, followed by additional decontamination and dismantlement. Regardless of the option chosen, decommissioning must be completed within the 60-year period following permanent cessation of operations and permanent removal of fuel.

SQN ER, Decommissioning, Section 7.2.2, page 7-2. But the NRC can no longer provide a legally sound basis for a licensing decision at SQN.

The assumption that decommissioning can be completed within 60 years of shut down was based on the Waste Confidence Rule, 10 CFR § 51.23 (most recently updated in December 2010, but years before TVA submitted the SQN LRA). Until it was vacated last year, 10 CFR § 51.23 enabled licensing decisions by making "uncontestable" general conclusions about the environmental effect of plant licensure that will apply in every licensing decision. *Id. New York v. NRC* at 9 (emphasis added). The court's order was quite clear, stating that irradiated reactor fuel "will seemingly be stored on site at nuclear plants on a permanent basis" unless and until the federal government established a

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<sup>6</sup> *State of New York v. Nuclear Reg. Comm.*, No. 11-1045, June 8, 2012

permanent repository. *Id.*, *New York v. NRC* at 13. The Court rejected the NRC's arguments against the vacatur, stating, "Overall, we cannot defer to the Commission's conclusions regarding temporary storage because the Commission did not conduct a sufficient analysis of the environmental risks." The Court specified that "a generic analysis must be forward looking and have enough breadth to support the Commission's [licensing] conclusions. Furthermore, as NEPA requires, the Commission must conduct a true EA regarding the extension of temporary storage." *Id.* *New York v. NRC* at 20

Further, SQN's ER 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 the Sequoyah Nuclear Plant. Therefore, it is fatally deficient. *State of Minnesota v. NRC*, 602 F.2d at 416-17.

A solution to the long-term disposal of highly radioactive "spent" nuclear fuel may still lie decades in the future. There was a period of twenty years— from 1982 to 2002— from the passage of the Nuclear Waste Policy Act to the US Department of Energy's recommendation of Yucca Mountain as a suitable site for repository development; this finding was itself overturned in 2010.

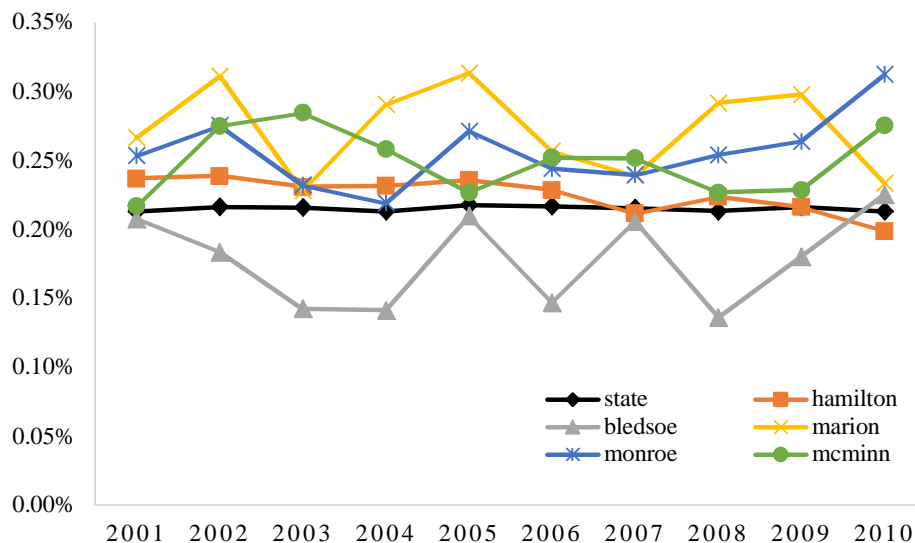
In light of the above, until there are new rules approved by the Commission and accepted by the Court, either NRC must suspend a final decision on the LR, or TVA must complete an environmental impact statement encompassing on-site and beyond-60 year high-level radioactive waste storage.

**Contention C. License renewal regulations at § 54.21 require reasonable assurance during the license term that activities will be conducted in accordance with the**

**CLB, but four counties out of five within 50 Miles of Sequoyah have higher cancer death rates than the state average.**

TVA's ER states that human health impacts from the license renewal would be "small." See ER Table 8.0-2. However, cancer statistics in counties within 50 miles around Sequoyah Nuclear Plant point to a relationship between cancer rates and SQN. Focusing on counties within the 50-mile zone around Sequoyah— Hamilton, Bledsoe, Marion, Monroe and McMinn— cancer data was gathered for the Petitioner by Changchang Zhou, of the Duke University Stanback Internship Program. These data are compiled from the annual Tennessee Vital Statistics Summary Resident Data Report, 2001 to 2010, which is released by Tennessee Department of Health, Division of Health Statistics. The cancer rate statistics from 2001 to 2010 are listed in Table 1, attached as Appendix A, and presented below in Figure 1:

**Figure 1 Cancer Statistics for Counties within 50 Miles of Sequoyah in Tennessee**



Looking at Figure 1, one can see that for Tennessee, the statewide average cancer death rate during 2001 to 2010 is stable at around 0.21 percent. For the five counties surrounding Sequoyah, the cancer death rate is much more variable during the same 10-

year period. In Figure 1, comparing the black line, representing the state cancer death rate, to the five nearby counties it is clearly demonstrated generally that four counties—Hamilton, Marion, Monroe and McMinn—have higher cancer death rates than the state average level during most years. In Bledsoe County, the least populated, the cancer death rate is largely below the state average. Is the observed fluctuation and general increase caused by SQN? Further study is needed to answer this question, but these data indicate the human health impact is not “small.” These observations are corroborated by data in other states’ data within the 50-mile radius.

Under 10 CFR § 54.30(a), if the reviews required by § 54.21 (a) or (c) show that there is not reasonable assurance during the current license term that licensed activities will be conducted in accordance with the CLB, then the licensee shall take measures under its current license, as appropriate, to ensure that the intended function of those systems, structures or components will be maintained in accordance with the CLB throughout the term of its current license.

**Contention D. TVA’s Integrated Plant Assessment (“IPA”) for the LRA fails to identify and assess safety-related incidents at SQN in its required time-limited aging analysis (“TLAA”). 10 CFR 54.21.**

According to TVA, “SQN QA procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of 10 CFR Part 50, Appendix B. The SQN Quality Assurance Program applies to SQN safety-related structures and components. Administrative (document) control for both safety-related and nonsafety-related structures and components is accomplished per the existing

document control program. The SQN administrative controls are consistent with NUREG-1801. See LRA Appendix B, Administrative Controls, page B-3

During the last fourteen years, Sequoyah's quarterly incident reports indicate an average of 7.14 safety-related findings per annum. In the beginning of this period, incidents trended towards fewer and less significant findings, but for the last six to eight years the trend has reversed and indicates increasing levels of safety-related incidents, both in frequency and severity.

Although many of the Incident Report findings are labeled "Green," there are several violations during past 14 years caused by natural or artificial factors which indicate age management problems outside the CLB. Below are the details three of the greater than green safety-related incidents at Sequoyah:

- Inadequacy of adverse weather preparations

On June 30, 1999, the Sequoyah plant experienced a turbine building railroad bay (TBRB) flooding event from heavy rainfall due to inadequate drainage and the non-vital 6.9kv unit boards were in danger of being flooded. As nuclear power plant is vulnerable to extreme weather conditions, effective adverse weather preparations are required, such as sensitive bus duct cooling system and adequate storm drain system.

- Loose access control

On April 19, 2000, the licensee at Sequoyah violated a physical security instruction that supplements the PSP/CP (Physical Security Plan and Contingency Plan) requiring that individuals should remove all metal items when entering into the nuclear site. A TVA employee was allowed to enter the site without removing his shoes after the first alarm was received on the access portal metal detector.

- Fail to detect problems

Several safety problems were caused by human negligence. First, in 2001 maintenance personnel incorrectly marked an out-of-specification condition as acceptable, supervisory reviews also failed to detect the error. Thus the emergency diesel generator (EDG) was returned to service without evaluation or investigation of the condition. The error was detected 5 months later, and caused severe component

degradation. In the same year, another violation also happened. The personnel failed to follow a procedure to reopen a manual valve to realign a boric acid tank flow path to the reactor coolant system (RCS), which resulted in the unavailability of a boric acid flow path to the RCS. Thus it failed to provide highly concentrated boric acid to the refueling water storage tank (RWST) during a steam generator tube rupture event. Second, in 2004, TVA Sequoyah personnel failed to promptly identify and correct problems with the Siemens breaker mechanism operated cell (MOC) slide assembly, which resulted in the failure of Residual Heat Removal Pump to start on demand. Since Siemens breakers were used in both trains of several emergency core cooling subsystems, this error potentially have greater safety significance because the loss of one train of residual heat removal would result in reduced sump re-circulation capability following a small or medium break size loss-of-coolant accident and no re-circulation capability.

These incidents should not have been neglected as these are the things that might could cause unimaginable destruction; i.e., they might lead to the next Chernobyl or Three Mile Island. Nuclear power plants are large and complex interactive systems, human error can contribute substantially to system failures. Unfortunately, it is demonstrated that human error accounts for a considerable proportion of safety-related incidents. Thus, having both safe operating systems and professional maintenance personnel are important issues in running a nuclear power plant.

The LRA is deficient. Under 10 CFR § 54.21(c)(iii), the TVA's Integrated Plant Assessment must demonstrate that, "The effects of aging on the intended function(s) will be adequately managed for the period of extended operation." The failures to detect problems, to prepare for storms and to maintain security are shortcomings of TVA management. Factors which further undermine adequate management are detailed *infra* in Contention F.

**Contention E: The LRA Fails to Consider Plutonium Fuel Use at SQN Which Would Place it Outside the Current Licensing Basis.**

SQN's nuclear reactors are under consideration for plutonium fuel. Currently, TVA is a "cooperating agency" in preparation of the US Department of Energy's *Final*

*Surplus Plutonium Disposition Supplemental Environmental Impact Statement*,<sup>7</sup> making Sequoyah central to the plutonium fuel program. Sequoyah is listed in the *SPD Supplemental EIS*, which supports the use of weapons-grade plutonium down-blended with uranium as a so-called mixed oxide fuel for disposition of plutonium. Two TVA nuclear power plants, Sequoyah and Browns Ferry, are listed in Appendix I of the SPD SEIS, yet critical information is labeled proprietary.<sup>8</sup> In the early days of the US Department of Energy's Surplus Plutonium Disposition Program, DOE contracted with two electric utilities to use plutonium fuel in their power plants: Duke Energy and Virginia Power, but both withdrew their reactors from the program. Now TVA appears to be stepping into the breach. However, there are critical differences between plutonium fuel and conventional uranium. The problem is that plutonium is fundamentally different from uranium. With plutonium fuel loaded into any commercial reactor, the power station becomes more dangerous because plutonium releases energy in a different way than uranium. Plutonium has a higher neutron flux, meaning higher energy particles at higher speeds. This and other nuclear phenomena break down metal reactor parts quicker; a process called embrittlement. This weakening of metal components would be accelerated in any reactor using plutonium fuel. Greater embrittlement means the reactor vessel may fail under circumstances which would otherwise not cause a problem. If and when failure happens and radioactive materials are released from the plant, more dangerous radionuclides are released from a reactor containing plutonium fuel, including greater quantities of radioactive elements which pose hazards to human health. The

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<sup>7</sup> SPD Supplemental EIS; DOE/EIS-0283-S2, Federal Register Volume 77, Number 145, Pages 44222-44224, July 27, 2012

<sup>8</sup> ORNL/TM-2012/93 Oak Ridge National Laboratory *Core Average (MOX/LEU) Nuclide Ratios for Sequoyah and Browns Ferry Reactors*, Oak Ridge, Tennessee, March 20. (Proprietary) Accessed May 3, 2013 at [http://nnsa.energy.gov/sites/default/files/nnsa/11-12-multiplefiles/449\\_ORNL%202012%20Core%20Inventories.pdf](http://nnsa.energy.gov/sites/default/files/nnsa/11-12-multiplefiles/449_ORNL%202012%20Core%20Inventories.pdf)

predicted human health impacts of plutonium at SQN include a 22% radiation dose increase to the maximally exposed individual during an early containment failure, 10% during late containment failure and a 24% increase during a steam generator tube rupture with the use of plutonium versus low-enriched uranium fuel. *Id.* SEIS Table I-5.

Embrittlement is a safety issue which must be addressed before license renewal at the aging Sequoyah plant. The failure of Sequoyah's ice condenser reactor containment brought about by the use of plutonium fuel would result in devastating consequences to public health. In its review of the program, the NRC's own reactor safety committee stated:

Public attention has been drawn to the higher actinide inventories available for release from MOX than from conventional fuels. Significant releases of actinides during reactor accidents would dominate the accident consequences. Models of actinide release now available to the NRC staff indicate very small releases of actinides from conventional fuels under severe accident conditions. (emphasis added)<sup>9</sup>

Radioactive isotopes— actinide elements such as Americium 241 and Curium 242— would increase the harmful radiation exposure to the public. Plutonium fuel's higher neutron flux would add to embrittlement risks during the 20-year license extension. Under 10 CFR Part 54, TVA's LRA must include an integrated plant assessment. The IPA must provide enough information about systems, structures, and components to demonstrate that the "effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation." See 10 CFR § 54.21(a) Contents of application--technical information. Yet neither the LRA nor the ER mentions plutonium fuel.

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<sup>9</sup> Letter from Advisory Committee on Reactor Safeguards to US Nuclear Regulatory Commission Chairman, May 17, 1999



**Contention F: The aging management programs associated with TVA's Sequoyah Ice Condenser systems are insufficient to assure safe operations and prevent design-basis and severe accidents.**

Aging management and time-limited aging management programs of numerous Ice Condenser systems and components are required to comply with 10CFR 54.4, 10CFR54.21(a)(1), and 10CFR54.21(a)(3) in order to insure safe operations and prevent design basis and severe accidents. Also, 10CFR51.53(c)(3)(ii)(L) requires "consideration of alternatives to mitigate severe accidents," which the licensee must submit as part of its Environmental Reports. 10CFR51.53(c)(3) requires the ER to "contain a consideration of alternatives for reducing adverse impacts, as required by §§51.45(c), for all Category 2 license renewal issues in Appendix B to subpart A of this part."

In short, the SQN Units 1 and 2 ice-condenser nuclear power plant containment systems are the most vulnerable to loss of containment accidents. The following three related contentions are based on the accompanying affidavit submitted by Arnold Gundersen.

**Containment Contention F-1: Aging Management Plans Lacking**

**TVA License Extension Application for the Sequoyah Reactors' Ice Condenser Containments lacks acceptable Aging Management Plans to adequately maintain critical components of the Ice Condenser Containment for 20 years of additional operation.**

The data reviewed by Fairewinds Associates shows that the NRC is clearly aware of the existing design flaws and inspection failures at Ice Condense ("IC") containment

nuclear power plants throughout the United States. For more than 15 years, the industry has known that Aging Management Programs (AMP) on IC containments are inadequate according to the Sandia National Laboratories Report entitled, *Analyses Of Containment Structures With Corrosion Damage*.<sup>10</sup> In the subsection entitled, *Analyses Of A “Typical” PWR Ice Condenser Containment*, the report states *inter alia* that:

- í In actual containments, the region around the ice basket has a high potential for corrosion, but the status is unknown because the <sup>11</sup>area is inaccessible for inspections.
- í The containment was modeled to determine failure level and location under several different degraded conditions.
- í Corrosion near the top of the ice basket, with a 10% through the thickness corroded area of 1.09 m high by 0.91 m circumferentially. In operational containments, this area is susceptible to corrosion, but is inaccessible and does not get inspected. Analyses show this is the area of highest strains on an uncorroded containment, and the expected failure location.
- í CONCLUSIONS í However, if a narrow band of corrosion occurred in the vertical direction on a cylindrical containment, the reduction in capacity would be more severe. This is because internal pressure causes a larger membrane force in the hoop direction than in the vertical direction. In the corrosion that was modeled around the ice basket, failure occurred through large plastic strains that grew circumferentially. The geometry of the structure caused large membrane hoop strains in the thinned area, and the structure expanded in the radial direction. Therefore, any amount of corrosion near the ice basket high strain region degraded the load-carrying capacity.

Given the critical safety importance of single-failure proof operation of the Sequoyah IC containment coupled with the long history of IC containment design flaws and failures, the Sequoyah Aging Management Plan should have specific action plans in place to address these aforementioned IC design and operational flaws.

The License Renewal Application for the Sequoyah reactors does not have any

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<sup>10</sup> *Analyses Of Containment Structures With Corrosion Damage*, Jeffery L. Cherry, Sandia National Laboratories, SAND96-0004C

<sup>11</sup> Ibid.

Sequoyah-specific Aging Management Plans addressing IC containment aging phenomena known to have occurred and postulated to occur in the future.

Lacking a Sequoyah-specific AMP focused on the design and operational flaws already known and proven to exist in Ice Condenser containments, the NRC must reject TVA's requested license extension for the two Sequoyah reactors until AMPs that address significant component aging management points in question have been addressed, reviewed, and put in place.

Without an application addressing the known AMP points in question and design and operational flaws, the TVA application for a license extension is incomplete and wholly inadequate.

**Containment Contention F-2: Severe Accident Mitigation Analysis Lacking**

**NRC must reject TVA's Application for a License Extension at the Sequoyah NPP due to the lack of supporting documentation providing the analysis detailing TVA's assumptions that prove that indeed the Sequoyah IC containment can withstand severe accidents without leaking.**

Actual events at the Fukushima Daiichi NPPs in Japan have proven that Nuclear Power Containments can fail during a LOCA and leak significant radiation into the environment. Three of the containments at the Fukushima Daiichi site failed causing extensive amounts of radiation to leak into the surrounding environment.

Less than two weeks before the Fukushima Daiichi accident, the NRC staff informed the Advisory Committee on Reactor Safeguards that during a design basis accident the

NRC *does* assume that the containment is leaktight.<sup>12</sup> Now that it has been proven wrong, the Nuclear Regulatory Commission staff has not remedied its error and corrected its mistaken assumption that a nuclear containment building will not leak.

Not only does TVA's License Renewal Application claim that its containment is designed to withstand a design basis accident (DBA) at SQN without leaking, the application also states that its containment is specifically able to withstand *severe accident* forces beyond its original DBA.

Accidents that exceed the DBA, like the one that occurred in three reactors at Fukushima Daiichi site, are termed "severe accidents" by the NRC and the nuclear industry. TVA's application for license extension at SQN claims that for even "severe accidents," like the ones that occurred at Fukushima Daiichi, the Sequoyah containment would retain all its radioactive fission products. Specifically, the TVA license extension application, *Sequoyah Nuclear Plant Applicant's Environmental Report Operating License Renewal Stage*, states: "The reactor containment is designed to adequately retain these fission products under the most severe accident conditions."<sup>13</sup> [emphasis added]

TVA has therefore claimed in its Sequoyah License Renewal Application that the IC containment has the ability to withstand not simply design-basis events, but also *severe accidents*. According to Gundersen's expert witness report, submitted in support of this contention, there is no analysis within the LRA to support this claim.

Therefore, the NRC must reject TVA's application for a License Renewal at SQN because it fails to provide any documentation or analysis regarding the Applicant's assumption that the Sequoyah IC Containment can withstand "severe accidents" without

<sup>12</sup> ACRS Transcript, February 2011, Page 69, <http://pbadupws.nrc.gov/docs/ML1104/ML110490121.pdf>

<sup>13</sup> TVA 2011p, Section 1.2.2.2, *Sequoyah Nuclear Plant Applicant's Environmental Report Operating License Renewal Stage* <http://pbadupws.nrc.gov/docs/ML1302/ML13024A007.pdf>

leaking.

Further, a Severe Accident Mitigation Analysis (SAMA) must include details with the exact sequences of events proving that the SQN Ice Condenser containment will withstand a severe accident without leaking any radiation. The LRA fails to provide such a SAMA and is therefore fatally deficient. The NRC must reject the LRA unless and until TVA can provide this information.

**Containment Contention F-3: Accuracy of Information Is Compromised**

**TVA's long standing breakdown in dealing with the mismanagement of its whistleblower complaints is a reflection of the corporation's lack of integrity and insufficient adherence to regulatory statutes that demand nuclear power owners put safety first. Given these ongoing systemic problems the accuracy and validity of the License Renewal Application cannot be assured and therefore must be rejected.**

The Ice Condenser containment design has been shown to be less robust than other containments in the United States, and given that the Sequoyah NPP design is less robust than other containment designs, it is imperative that the personnel who work on the flawed IC containment design do so in a manner guaranteeing that they are free from harassment.

Discrimination and retaliation against nuclear whistleblowers is detrimental to the safe operation of any nuclear power plant, and Tennessee Valley Authority's track record indicates a chilling effect on the continued safe operation of the Sequoyah Ice Condenser containment.

The record includes rising number of allegations at Sequoyah coinciding with the 2012 replacement of steam generators. An allegation is defined as "a declaration,

statement, or assertion of impropriety or inadequacy associated with NRC-regulated activities, the validity of which has not been established.ö For some reactor licensees and one vendor, the NRC received allegations in numbers that warranted additional analysis.<sup>14</sup> The Allegation Program states that TVA appears to have instituted a corrective action plan, but that continuing NRC oversight is necessary. But TVA whistleblower concerns have spanned more than 10 years, and are continuing to occur as recently as May 2013. Two examples are illustrative of the ongoing safety concern:

Two critical issues that should be taken into account by the NRC in deciding whether to take escalated enforcement action against TVA:

- (1) the continuing harassment of Mr. Overall for reporting of problems with the ice condenser system internally within TVA and externally, including actions so severe that they drove him off the job site; and
- (2) TVA's practices regarding managers who were found to have discriminated and retaliated against nuclear whistleblowers by the Department of Labor in the past.<sup>15</sup>

See Letter Re: EA-98-327, Apparent Violations of Employee Discrimination Requirements (US Dept. of Labor Case No. 1997-ERA-0053.

The latest incident occurred just days ago.

The Nuclear Regulatory Commission tracking of whistleblower complaints at nuclear plants lists both of TVA's plants in Tennessee among the top five. The Chattanooga Times Free Press reported the Tennessee Valley Authority's Browns Ferry Nuclear Plant in northern Alabama also had several internal complaints. The NRC report showed there were 21 complaints against Watts Bar, 19 on Sequoyah and 16 at Browns Ferry in 2012.<sup>16</sup>

<sup>14</sup> Allegation Program's 2012 Annual Trends Report, April 29, 2013, ADAMS Document No. ML13116A086

<sup>15</sup> Letter Re: EA-98-327, Apparent Violations of Employee Discrimination Requirements (US Dept. of Labor Case No. 1997-ERA-0053, July 2, 2001, accessed May 5 at <http://pbadupws.nrc.gov/docs/ML0123/ML012320261.pdf>

<sup>16</sup> *TVA Sequoyah, Watts Bar nuclear plants among top 5 in internal complaints, say regulators* Associated Press: May 3, 2013, [http://www.washingtonpost.com/local/tva-sequoyah-watts-bar-nuclear-plants-among-top-5-in-internal-complaints-say-regulators/2013/05/03/3fc6ad36-b405-11e2-9fb1-62de9581c946\\_story.html](http://www.washingtonpost.com/local/tva-sequoyah-watts-bar-nuclear-plants-among-top-5-in-internal-complaints-say-regulators/2013/05/03/3fc6ad36-b405-11e2-9fb1-62de9581c946_story.html)

See "TVA Sequoyah, Watts Bar nuclear plants among top 5 in internal complaints, say regulators," Associated Press, May 3, 2013.

TVA's Sequoyah has decade-long history of whistleblower complaints and safety concerns, and three TVA nuclear reactor sites top the US list for the most whistleblower complaints. TVA personnel have been harassed and intimidated for bringing forward legitimate safety and public health concerns. The NRC should reject the SQN License Renewal Application until such time as SQN plant safety can be independently assessed in light of whistleblowers' complaints which specifically targeted personnel responsible for the Sequoyah IC containment design.

### **CONCLUSION**

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. § 54; we request that a hearing be granted.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Louis A. Zeller", is written over a horizontal line.

Louis A. Zeller

May 6, 2013

Date

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79

Docket Nos. 50-327 and 50-328

**CERTIFICATE OF SERVICE**

I hereby certify that copies of the May 6, 2013  
PETITION FOR LEAVE TO INTERVENE AND REQUEST FOR HEARING  
BY THE BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE,  
BELLEFONTE EFFICIENCY AND SUSTAINABILITY TEAM, AND  
MOTHERS AGAINST TENNESSEE RIVER RADIATION  
was served on the following persons via Electronic Information Exchange  
this 6<sup>th</sup> day of May, 2013

U.S. Nuclear Regulatory Commission  
Office of the General Counsel  
Mail Stop - O-15 D21  
Washington, DC 20555-0001

OGC Mail Center: Members of this office have  
received a copy of this filing by EIE service.

ATTN: Docketing and Service  
Mail Stop 0-16C1  
US Nuclear Regulatory Commission  
Washington, DC 20555-0001  
(E-mail: [hearingdocket@nrc.gov](mailto:hearingdocket@nrc.gov))

U.S. Nuclear Regulatory Commission  
Office of Commission Appellate Adjudication  
Mail Stop: O-16C1  
Washington, DC 20555-0001  
E-mail: [ocaamail@nrc.gov](mailto:ocaamail@nrc.gov)

U.S. Nuclear Regulatory Commission  
Atomic Safety and Licensing Board Panel  
Mail Stop - T-3 F23  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Signed in Glendale Springs this day May 6, 2013



Louis A. Zeller  
Blue Ridge Environmental Defense League  
PO Box 88  
Glendale Springs, NC 28629  
(336) 982-2691  
E-mail: [BREDL@skybest.com](mailto:BREDL@skybest.com)



In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
Docket Nos. 50-327 and 50-328  
License Nos. DPR-77 and DPR-79  
NRC-2013-0037

May 6, 2013

## Blue Ridge Environmental Defense League

www.BREDL.org PO Box 88 Glendale Springs, North Carolina 28629 BREDL@skybest.com (336) 982-2691

### Appendix A

Table 1: Cancer Statistics for Counties within 50 Miles of Sequoyah in Tennessee

	TN State		Hamilton		Bledsoe		Marion		Monroe		McMinn	
year	Pop	Cancer death rate	Pop	Cancer death rate	Pop	Cancer death rate	Pop	Cancer death rate	Pop	Cancer death rate	Pop	Cancer death rate
2001	5,740,021	0.21%	307,377	0.24%	12,516	0.21%	27,750	0.27%	39,846	0.25%	49,857	0.22%
2002	5,786,527	0.22%	309,389	0.24%	12,540	0.18%	27,964	0.31%	39,973	0.28%	49,813	0.28%
2003	5,840,260	0.22%	310,300	0.23%	12,647	0.14%	28,087	0.23%	40,514	0.23%	50,251	0.28%
2004	5,897,306	0.21%	311,334	0.23%	12,748	0.14%	28,225	0.29%	41,078	0.22%	50,719	0.26%
2005	5,958,085	0.22%	312,491	0.24%	12,868	0.21%	28,380	0.31%	41,669	0.27%	51,196	0.23%
2006	6,004,724	0.22%	313,194	0.23%	12,940	0.15%	28,440	0.26%	42,178	0.24%	51,614	0.25%
2007	6,090,043	0.22%	313,761	0.21%	13,119	0.21%	28,023	0.24%	44,694	0.24%	52,460	0.25%
2008	6,144,738	0.21%	314,710	0.22%	13,212	0.14%	28,112	0.29%	45,273	0.25%	52,913	0.23%
2009	6,202,803	0.22%	315,785	0.22%	13,315	0.18%	28,208	0.30%	45,875	0.26%	53,410	0.23%
2010	6,346,105	0.21%	336,463	0.20%	12,876	0.23%	28,237	0.23%	44,519	0.31%	49,857	0.22%

NB: Cancer death rate is calculated by using the total cancer death divided by its population

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Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Heather Bradley and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.

2. I live at 103 Harris Ave. Stevenson, AL 35772  
Physical address

3. My home lies within 50 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.

4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.

5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.

6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Heather Bradley  
(Signature)

Date April 25, 2013

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Emily Marr Davis and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.
2. I live at 116 Hays St Ft. Oglethorpe, GA 30742  
Physical address
3. My home lies within 25 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.
4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.
5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.
6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

  
(Signature)

Date 4-29-13



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION


BEFORE THE SECRETARY

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Tennessee Valley Authority  
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License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Phil Davis and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.
2. I live at 116 Hays St Ft. Oglethorpe GA 30742  
Physical address
3. My home lies within 2.5 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.
4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.
5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.
6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

  
(Signature)

Date 04/29/2013

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Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
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DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Keith Goodall and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.
2. I live at 206 W. Leewood, Chattanooga, TN 37415  
Physical address
3. My home lies within 20 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.
4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.
5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.
6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Keith Goodall  
(Signature)

Date 4/29/13

UNITED STATES OF AMERICA  
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Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
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DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is ERNA KAWAHITO and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.

2. I live at 202 EVENTIDE DR MURFREESBORO TN 37130  
Physical address

3. My home lies within 12.5 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.

4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.

5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.

6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Erna Kawahito  
(Signature)

Date 04/30/13



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Barbara A. Kelly and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.
2. I live at 3524 Pinellas Lane, Chattanooga, TN 37412  
Physical address
3. My home lies within 50 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.
4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.
5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.
6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Barbara A. Kelly Date ~~3~~4/29/13  
(Signature)

UNITED STATES OF AMERICA  
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Tennessee Valley Authority  
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NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Tom Kunesch and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.
2. I live at 209 Morningside Drive, Chattanooga TN  
Physical address
3. My home lies within 20 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.
4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.
5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.
6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Thomas Peter Lang  
(Signature)

Date 30 April 2013



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is SANDRA KURTZ and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.

2. I live at 3701 SKYLARK TRAIL, CHATTANOOGA, TN 37416  
Physical address

3. My home lies within 12 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.

4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.

5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.

6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Sandra L. Kurtz  
(Signature)

Date 4/29/13

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is WILLIAM L KURTZ and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.

2. I live at 3701 SKYLARK TRAIL CHATTANOOGA, TN 37416.  
Physical address

3. My home lies within 12 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.

4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.

5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.

6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

William L Kurtz  
(Signature)

Date 29 APRIL 2013

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Debra Lamb and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.

2. I live at 206 W. Leawood Ave, Red Bank TN 37415  
Physical address

3. My home lies within 20 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.

4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.

5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.

6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Debra Lamb  
(Signature)

Date 4/29/13



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Nicole Millsaps and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.
2. I live at 2137 S. Shore Acres Road Soddy Daisy, TN 373  
Physical address
3. My home lies within 10 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.
4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.
5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.
6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Nicole Millsaps  
(Signature)

Date 5/1/13

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Linda C. Modica and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.

2. I live at 266 Mayberry Rd., Jonesborough, TN 37659.  
Physical address

3. My home lies within 7.5% miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.

4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.

5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.

6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Linda C. Modica  
(Signature)

Date 30 April 2013



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

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In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

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DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Brian Paddock and I am a member of the Blue Ridge Environmental Defense League.

2. My wife and I own and sometimes reside at condominium unit 512 at One North Shore which is located at 200 Manufacturers Road in Chattanooga, TN about 18 miles from the Sequoyah Nuclear Plant Units 1 and 2 and directly on the north shore of the Tennessee River. I own a home located at 360 Roberts Hollow Lane, Cookeville TN, 38501.

3. My condominium unit which my wife and I use on weekends and vacations as well as when we do business in Chattanooga, such as meetings with TVA, (and which is regularly occupied by my stepson and his children) is about 18 miles from the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.

4. I attended and made oral comments on the scope of the EIS for this requested license renewal. I have attended several NRC meetings with the TVA nuclear division concerning the Watts Bar Unit 1 and Watts Bar Unit 2 (under construction) which are almost identical designs to the Sequoyah units. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.

5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my condominium could pose a grave risk to my property, health and safety. In particular, I am concerned that if

an accident involving release of radioactive material were to occur, I or my stepson and grandchildren could be killed or become very ill.

6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Brian Paddock

Date: April 29, 2013

Brian Paddock



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is SUE H. Reynolds and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.
2. I live at 3529 Dell Trail Chattanooga, TN. 37411  
Physical address
3. My home lies within 20 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.
4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.
5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.
6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Sue H. Reynolds  
(Signature)

Date

4/30/13

FRN v.78, n. 43, p. 14362, 5 March 2013



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is William F. Reynolds and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.

2. I live at 3529 Dell Trail, Chattanooga, TN 37411.  
Physical address

3. My home lies within 20 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.

4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.

5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.

6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

William F. Reynolds  
(Signature)

Date 04/26/2013

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Patricia Sanders and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.
2. I live at 2568 Armstrong Valley Road; M. TN.  
Physical address 125 37128
3. My home lies within 1.25 miles of the site in Soddy-Daisy, Tennessee in  
~~1.00~~  
Hamilton County where Tennessee Valley Authority operates two nuclear power plants  
and for which the U.S. Nuclear Regulatory Commission has received a license renewal  
application for an additional 20-year period of operation.
4. The design of the Sequoyah reactors has a particular weakness in its construction  
which reduces its ability to withstand accidents. Only nine such reactors have ever been  
completed in the United States. Aging of the plant may only increase the danger.
5. Based on historical experience with nuclear reactors, I believe that these facilities are  
inherently dangerous. An accident at these nuclear reactors so close to my home could  
pose a grave risk to my property, health and safety. In particular, I am concerned that if  
an accident involving release of radioactive material were to occur, I could be killed or  
become very ill.
6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent  
my interests in this proceeding as to whether good cause exists for the renewal of the  
operating licenses to the Tennessee Valley Authority.

Patricia Sanders  
(Signature)

Date Apr. 30, '13



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Megan Spooner and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.

2. I live at 229 Plantation Dr. Chickamauga, GA 30707  
Physical address

3. My home lies within 50 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.

4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.

5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.

6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Megan Spooner  
(Signature)

Date 4.30.13

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Robert Stanley and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.
2. I live at 870 Vine Street, Chatt, TN 37403  
Physical address
3. My home lies within 50 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.
4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.
5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.
6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Robert Stanley  
(Signature)

Date April 29, 2013



## BEFORE THE SECRETARY

In the Matter of  
Tennessee Valley Authority  
Sequoyah Nuclear Plant Units 1 and 2  
License Nos. DPR-77 and DPR-79  
Docket Nos. 50-327 and 50-328  
NRC-2013-0037

## DECLARATION OF STANDING

Under penalty of perjury, I declare as follows:

1. My name is Lauren Whaley and I am a member of  
Print your name  
the Blue Ridge Environmental Defense League.
2. I live at 289 Daughtery Rd. Dooce, TN 37361  
Physical address
3. My home lies within 40 miles of the site in Soddy-Daisy, Tennessee in Hamilton County where Tennessee Valley Authority operates two nuclear power plants and for which the U.S. Nuclear Regulatory Commission has received a license renewal application for an additional 20-year period of operation.
4. The design of the Sequoyah reactors has a particular weakness in its construction which reduces its ability to withstand accidents. Only nine such reactors have ever been completed in the United States. Aging of the plant may only increase the danger.
5. Based on historical experience with nuclear reactors, I believe that these facilities are inherently dangerous. An accident at these nuclear reactors so close to my home could pose a grave risk to my property, health and safety. In particular, I am concerned that if an accident involving release of radioactive material were to occur, I could be killed or become very ill.
6. Therefore, I have authorized Blue Ridge Environmental Defense League to represent my interests in this proceeding as to whether good cause exists for the renewal of the operating licenses to the Tennessee Valley Authority.

Lauren Whaley  
(Signature)

Date

5/1/13

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the Matter of

Tennessee Valley Authority

Sequoyah Nuclear Plant Units 1 and 2

Docket Nos. 50-327 and 50-328

License Nos. DPR-77 and DPR-79

NRC-2013-0037

May 6, 2013

EXPERT WITNESS REPORT OF ARNOLD GUNDERSEN TO SUPPORT THE  
PETITION FOR LEAVE TO INTERVENE AND REQUEST FOR HEARING  
BY THE BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE,  
BELLEFONTE EFFICIENCY AND SUSTAINABILITY TEAM, AND  
MOTHERS AGAINST TENNESSEE RIVER RADIATION

I, Arnold Gundersen, declare as follows:

1. My name is Arnold Gundersen. I am sui juris. I am over the age of 18-years-old.
2. The Blue Ridge Environmental Defense League (BREDL), Bellefonte Efficiency And Sustainability Team, and Mothers Against Tennessee River Radiation have retained Fairewinds Associates, Inc to issue an expert report in support of the Parties' Petition For Leave To Intervene And Request For Hearing. I have specifically been retained to examine the Aging Management Program at the Tennessee Valley Authority Sequoyia Nuclear Power Plant as it relates to its ice containment system.

3. I earned my Bachelor Degree in Nuclear Engineering from Rensselaer Polytechnic Institute (RPI) cum laude. I earned my Master Degree in Nuclear Engineering from RPI via an Atomic Energy Commission Fellowship. Cooling tower operation and cooling tower plume theory were my area of study for my Master's Degree.
4. I began my career as a reactor operator and instructor in 1971 and progressed to the position of Senior Vice President for a nuclear licensee prior to becoming a nuclear engineering consultant and expert witness. My Curriculum Vitae is Attachment 1.
5. I have testified as an expert witness to the Nuclear Regulatory Commission (NRC) Atomic Safety and Licensing Board (ASLB) and Advisory Committee on Reactor Safeguards (ACRS), in Federal Court, the State of Vermont Public Service Board, the State of Vermont Environmental Court, and the Florida Public Service Commission.
6. I am an author of the first edition of the Department of Energy (DOE) Decommissioning Handbook.
7. I have more than 40-years of professional nuclear experience *including and not limited to*: Cooling Tower Operation, Cooling Tower Plumes, Consumptive Water Loss, Nuclear Plant Operation, Nuclear Management, Nuclear Safety Assessments, Reliability Engineering, In-service Inspection, Criticality Analysis, Licensing, Engineering Management, Thermohydraulics, Radioactive Waste Processes, Decommissioning, Waste Disposal, Structural Engineering Assessments, Nuclear Fuel Rack Design and Manufacturing, Nuclear Equipment Design and Manufacturing, Prudency Defense, Employee Awareness Programs, Public Relations, Contract Administration, Technical Patents, Archival Storage and Document Control, Source Term Reconstruction, Dose Assessment, Whistleblower Protection, and NRC Regulations and Enforcement.
8. I am employed as the chief engineer for Fairewinds Associates, Inc, an expert witness and paralegal services firm specializing in nuclear engineering, nuclear operations, and nuclear safety analysis and assessment.

9. My declaration is intended to examine the Aging Management Program at the Tennessee Valley Authority Sequoya Nuclear Power Plant as it relates to its ice containment system.

### **Background**

10. The last line of defense to prevent the release of radiation from a design basis nuclear loss-of-coolant-accident (LOCA) is the nuclear containment that surrounds the nuclear reactor and the nuclear fuel. The nuclear containment is normally a passive structure, simply designed to absorb the energy of hot steam if a pipe inside containment were to rupture.
11. The containment at the Sequoya Nuclear Power Plant in Tennessee has a unique containment design called an *Ice Condenser* (IC). Of the 103 currently operating nuclear reactors in the United States, only 9% of the operating reactors, including the two at Sequoya, have been built with this unique design.
12. The *Ice Condenser* (IC) design is considered unique for two reasons:
  - 12.1. Most nuclear reactor Containments are passive with no moving parts. The IC Containment has internal active components including doors and hinges that must operate correctly during an accident in order to channel the hot steam through large baskets containing ice that in theory cool the steam and prevent Containment failure.
  - 12.2. The IC Containment design is very small in comparison to other Containments housing similar sized reactors. Rather than rely upon a large volume of space within the Containment to reduce steam pressure in the event of a design basis accident, the IC Containment design relies upon ice to melt the steam.



13. In Information Notice 2004-09, *Corrosion of Steel Containment and Containment Liner*, the NRC has identified that all types of reactor containments have a history of significant containment integrity problems.<sup>1</sup>
14. Fairewinds Associates, Inc has briefed the NRC's Advisory Committee on Reactor Safeguards (ACRS) and written extensively on the history of containment failures in United States reactors in *Nuclear Containment Failures*<sup>2</sup> and *Post Accident AP1000 Containment Leakage*<sup>3</sup>.
15. The IC Containment design has numerous critical design defects of which the NRC is already aware, including and not limited to:
  - 15.1. First, that ice condenser plants are substantially more sensitive to early containment failure than those at PWRs with large dry or sub-atmospheric containments.

*Assessment of the DCH Issue for Plants with Ice Condenser Containments:* Consistent with perceptions of the technical community, this study shows that **ice condenser plants are substantially more sensitive to early containment failure than PWRs with large dry or subatmospheric containments.** A plant-specific evaluation of the containment event tree showed that all plants, except McGuire, have an early failure probability within the range 0.35% to 5.8% for full power internal events.<sup>4</sup>  
[Emphasis Added]
  - 15.2. Second, because actual operational experience has shown that some of the original design assumptions are faulty, the ice condenser is subjected to significant maintenance and operational challenges.

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<sup>1</sup> *Corrosion of Steel Containment and Containment Liner*, April 2004 <http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/2004/in200409.pdf>

<sup>2</sup> *Nuclear Containment Failures*, December 2, 2010  
[http://fairewinds.org/sites/fairewinds.org/files/reports/Fairewinds%20AP1000%20Supplemental%20Report%2012-21-2010\\_0.pdf](http://fairewinds.org/sites/fairewinds.org/files/reports/Fairewinds%20AP1000%20Supplemental%20Report%2012-21-2010_0.pdf)

<sup>3</sup> *Post Accident AP1000 Containment Leakage*, April 21, 2010  
[http://fairewinds.org/sites/fairewinds.org/files/reports/AP1000\\_Containment\\_Leakage\\_Report\\_Gundersen\\_Hausler\\_4-7-2010.pdf.pdf](http://fairewinds.org/sites/fairewinds.org/files/reports/AP1000_Containment_Leakage_Report_Gundersen_Hausler_4-7-2010.pdf.pdf)

<sup>4</sup> *Assessment of the DCH Issue for Plants with Ice Condenser Containments*, September 1999, Page iii  
<http://pbadupws.nrc.gov/docs/ML0037/ML003712849.pdf>

*Topical Report ICUG-001, Rev. 2.0-2*: The design of the ice condenser system constantly challenges industry initiative, given that operational experience has rewritten some of the original assumptions regarding ice bed behavior. While the ice condenser itself appears passive, sublimation, frost build-up, and a saturated environment all take their toll over the course of an operational cycle. Ice bed maintenance processes contribute further; the use of vibrators and thermal drills to replenish sublimated ice baskets creates an outfall of ice/water, which, while expected, tends to make other maintenance-related activities more time-consuming.<sup>5</sup>

- 15.3. Third, the design is not single-failure proof. For a design basis LOCA accident, industry data appears to show that there would be insufficient time available for the operators to respond to a loss of containment spray before the ice melted and could no longer cool the reactor.

*Response to Request for Additional Information, NRC Bulletin 2003-01, Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized Water Reactors*: The Westinghouse ice condenser containment plants are especially sensitive to the single failure of the operating spray pump once ice condenser heat removal capability is exhausted. The sensitivity is driven by containment size, lower containment design pressure, and available containment heat removal systems.

For a large-break LOCA, preliminary evaluations indicate that insufficient time would be available for the operator to respond to the loss of the operating containment spray following the exhaustion of heat removal capability by the ice condenser system.<sup>6</sup>

- 15.4. Fourth, industry evaluated data shows that a core damage event would most likely result in a hydrogen explosion, like one that occurred at Fukushima Daiichi, and render the Containment unable to perform its function of containing radiation in the event of an accident.

*(Discussed) Hydrogen Igniter Backup Power –Generic Safety Issue-189 (Inspection Procedure 35007)*: An evaluation was performed for the

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<sup>5</sup> *Application of the Active Ice Mass Management Concept to the Ice Condenser Ice Mass Technical Specification: Topical Report ICUG-001, Rev. 2.0-2*, May 2003, ML032340563, page O-2.

<sup>6</sup> *Response to Request for Additional Information, NRC Bulletin 2003-01, Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized Water Reactors*, June 2005, Page 1  
<http://pbadupws.nrc.gov/docs/ML0516/ML051660328.pdf>

potential of early failure of containment during very low probability events involving damage to the reactor core as discussed in NUREG/CR-6427, *Assessment of the Direct Containment Heat Issue for Plants with Ice Condenser Containments*. The results of the evaluation revealed an early containment failure probability of ice condenser containments, dominated by hydrogen combustion following core damage events.<sup>7</sup>

15.5. Fifth, in addition to the aforementioned design and operational defects, the IC Containment design has a long history of repeated containment inspection failures associated with its unique design. These inspection failures include, and are not limited to the following Nuclear Power Plants (NPP):

15.5.1. The McGuire NPP in Huntersville, North Carolina

The Nuclear Regulatory Commission staff will hold a pre-decisional enforcement conference with Duke Power Company on Wednesday, October 1, to discuss apparent violations of NRC regulations involving ice condenser doors at the McGuire nuclear power plant near Huntersville, North Carolina. The apparent violations involve the company's failure to ensure that ice condenser inlet doors on Unit 2 would be able to open if needed and a failure to perform adequate corrective actions based on industry experience and operational events at McGuire.<sup>8</sup>

15.5.2. The DC Cook NPP in Bridgeman, Michigan

In February and March of 1998, at the D. C. Cook Nuclear Power Plant, the licensee identified corrosion (pitting) of the containment liner at the moisture barrier seal areas of both units. At Unit 1, the licensee identified more than 60 areas in which the thickness (1 cm [3/8 inch] nominally) of the steel liner plate had been reduced below the minimum design thickness value of (0.6 cm [0.25 inch]).<sup>9</sup>

15.5.3. The Catawba NPP in York, South Carolina

NRC officials said the apparent violations include the potential inoperability of the Unit 2 ice condenser doors due to ice buildup, the failure to promptly identify and correct ice condenser blockage and damaged ice containers in both units, the failure to perform adequate

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<sup>7</sup> (Discussed) *Hydrogen Igniter Backup Power – Generic Safety Issue-189 (Inspection Procedure 35007)* December 2012, Page 13 <http://pbadupws.nrc.gov/docs/ML1235/ML12356A073.pdf>

<sup>8</sup> *NRC Staff to hold conference with Duke Power Company to discuss apparent violations at McGuire Nuclear Plant*, September 1997, page 1. <http://pbadupws.nrc.gov/docs/ML0037/ML003706619.pdf>

<sup>9</sup> May 1998, DC Cook, *Corrosion of Steel Containment and Containment Liner*, April 2004, page 3. <http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/2004/in200409.pdf>

inspections for foreign debris in the ice condensers, and the failure to properly install ice condenser components as designed.<sup>10</sup>

### **Containment Contention #1: Aging Management Plans Lacking**

16. The data reviewed by Fairewinds Associates shows that the NRC is clearly aware of the existing design flaws and inspection failures at IC Containment NPPs throughout the United States

17. For more than 15-years, the industry has known that Aging Management Programs on IC Containments are inadequate according to the Sandia National Laboratories Report entitled *Analyses Of Containment Structures With Corrosion Damage*<sup>11</sup>. In the subsection entitled, *Analyses Of A "Typical" PWR Ice Condenser Containment*, the report states that:

... In actual containments, the region around the ice basket has a high potential for corrosion, but the status is unknown because the<sup>12</sup> area is inaccessible for inspections.

... The containment was modeled to determine failure level and location under several different degraded conditions.

... Corrosion near the top of the ice basket, with a 10% through the thickness corroded area of 1.09 m high by 0.91 m circumferentially. In operational containments, this area is susceptible to corrosion, but is inaccessible and does not get inspected. Analyses show this is the area of highest strains on an uncorroded containment, and the expected failure location.

...CONCLUSIONS ... However, if a narrow band of corrosion occurred in the vertical direction on a cylindrical containment, the reduction in capacity would be more severe. This is because internal pressure causes a larger membrane force in the hoop direction than in the vertical direction. In the corrosion that was modeled around the ice basket, failure occurred through large plastic strains that grew circumferentially. The geometry of the structure caused large membrane hoop strains in the thinned area, and the structure expanded in the radial direction. Therefore, any

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<sup>10</sup> NRC staff sets enforcement conference with Duke Energy to discuss apparent violations at Catawba Nuclear Station, July 1999, page 1. <http://pbadupws.nrc.gov/docs/ML0036/ML003696909.pdf>

<sup>11</sup> *Analyses Of Containment Structures With Corrosion Damage*, Jeffery L. Cherry, Sandia National Laboratories, SAND96-0004C <http://www.osti.gov/energycitations/servlets/purl/441095-JUcbqP/webviewable/441095.pdf>

amount of corrosion near the ice basket high strain region degraded the load-carrying capacity.

18. Given the critical safety importance of single-failure proof operation of the Sequoya IC Containment coupled with the long history of IC Containment design flaws and failures, the Sequoya Aging Management Plan (AMP) should have specific action plans in place to address these aforementioned Containment design and operational flaws.
19. Fairwinds thorough review of the proposed License Renewal Application for the Sequoya reactors was unable to find any Sequoya-specific Aging Management Plans (AMPs) addressing IC Containment aging phenomena known to have already occurred and postulated to occur in the future.
20. Due to the lack of a Sequoya-specific AMP focused on the design and operational flaws already known and proven to exist in Ice Condenser Containments, the NRC should reject TVA's requested license extension for the two Sequoya reactors until adequate AMPs that address significant component aging management points in question have been addressed, reviewed, and put in place.
21. Without an application addressing the known AMP points in question and design and operational flaws, the TVA application for a license extension is incomplete and wholly inadequate.

## **Containment Contention #2: Severe Accident Mitigation Analysis Lacking**

22. Actual events at the Fukushima Daiichi NPPs in Japan have proven that Nuclear Power Containments *can fail during a LOCA and leak significant radiation into the environment*. Three of the Containments at the Fukushima Daiichi site failed causing extensive amounts of radiation to leak into the surrounding environment.
23. Less than two weeks before the Fukushima Daiichi accident, the NRC staff informed the Advisory Committee on Reactor Safeguards (ACRS) that during a design basis

accident the NRC “...does assume that the containment is leaktight.”<sup>13</sup> Now that it has been proven wrong, the Nuclear Regulatory Commission (NRC) staff has not remedied its error and corrected its myth and mistaken assumption that a nuclear containment building will not leak.

24. The NRC staff decision to promulgate such a technical misconception in order to facilitate relicensing and operation of flawed Containments by the nuclear industry reminds one of an ostrich sticking its head in the sand so that it will not see any sign of danger.
25. Not only does TVA’s Sequoya License Renewal Application claim that its Containment is designed to withstand a design basis accident (DBA) at either Sequoya NPP without leaking, the application also states that its Containment is specifically able to withstand *severe accident* forces beyond its original DBA.
26. Accidents that exceed the DBA, like the one that occurred in three reactors at Fukushima Daiichi site, are termed “*severe accidents*” by the NRC and the nuclear industry. TVA’s application for license extension at the two Sequoya NPPs claims that for even “*severe accidents*”, like the ones that occurred at Fukushima Daiichi, the Sequoya Containment would retain all its radioactive fission products. Specifically, the TVA license extension application, *Sequoyah Nuclear Plant Applicant’s Environmental Report Operating License Renewal Stage* states:

The reactor containment is designed to adequately retain these fission products under the most *severe accident* conditions.<sup>14</sup>  
[Emphasis added]
27. TVA has therefore claimed in its Sequoya NPP License Renewal Application that the IC Containment has the ability to withstand not simply design-basis events, but also *severe accidents*. Fairewinds has been unable to locate any analysis within the License Extension application to support this claim.

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<sup>13</sup> *ACRS Transcript*, February 2011, Page 69, <http://pbadupws.nrc.gov/docs/ML1104/ML110480828.pdf>

<sup>14</sup> *Sequoyah Nuclear Plant Applicant’s Environmental Report Operating License Renewal Stage*, TVA 2011p, Section 1.2.2.2, page 3-2. <http://pbadupws.nrc.gov/docs/ML1302/ML13024A007.pdf>

28. Therefore, the NRC must reject TVA's Application for a License Renewal at the Sequoya NPP due to the lack of supporting documentation providing an analysis detailing TVA's assumptions proving that the Sequoya IC Containment can withstand "severe accidents" without leaking.
29. *Furthermore, a Severe Accident Mitigation Analysis (SAMA) must include details with the exact sequences of events showing TVA's proof that the Sequoya Ice Condenser Containment will in fact withstand a severe accident without leaking any radiation.*

### **Containment Contention 3- Accuracy of Information Is Compromised**

30. The Ice Condenser Containment design has been shown to be less robust than other containments in the United States, and given that the Sequoya design is less robust than other Containment designs, it is imperative that the personnel who work on the flawed IC Containment design do so in a manner guaranteeing that they are free from harassment.
31. It is disturbing and a detriment to the safe operation of the Sequoya NPP, that the Tennessee Valley Authority has along history of discrimination and retaliation against nuclear whistleblowers that have worked on design and operation of the Sequoya Ice Condenser Containment.
32. These whistleblower concerns have spanned more than 10-years, and are continuing to occur as recently as May 2013, the date of this expert report. The following two examples are illustrative of the ongoing safety concern retaliation:

Two critical issues that should be taken into account by the NRC in deciding whether to take escalated enforcement action against TVA  
(1) the continuing harassment of Mr. Overall for reporting of problems with the ice condenser system internally within TVA and externally, including actions so severe that they drove him off the job site; and

(2) TVA's practices regarding managers who were found to have discriminated and retaliated against nuclear whistleblowers by the Department of Labor in the past.<sup>15</sup>

33. *TVA Sequoyah, Watts Bar nuclear plants among top 5 in internal complaints, say regulators* Associated Press: May 3, 2013

CHATTANOOGA, Tenn. — The Nuclear Regulatory Commission tracking of whistleblower complaints at nuclear plants lists both of TVA's plants in Tennessee among the top five. The Chattanooga Times Free Press (<http://bit.ly/120KQv8>) reported the Tennessee Valley Authority's Browns Ferry Nuclear Plant in northern Alabama also had several internal complaints. The NRC report showed there were 21 complaints against Watts Bar, 19 on Sequoyah and 16 at Browns Ferry in 2012.<sup>16</sup>

34. In my opinion, the NRC should reject the Sequoia License Renewal Application until such time as the accuracy of the data therein can be independently assessed especially in light of the whistleblower complaints that date back more than a decade and have specifically targeted personnel responsible for the Sequoia IC Containment design.

35. Furthermore, it is even more alarming that TVA's Sequoia Units should have a decade long history of whistleblower complaints and safety concerns, and it is abysmal that three TVA nuclear reactor sites totaling seven separate nuclear power reactors top the US list for the most whistleblower complaints.

36. Given the thousands of TVA employees coupled with the extraordinarily large number of TVA personnel who have been harassed and intimidated for bringing forward legitimate safety and public health concerns, the veracity of TVA's License Renewal Application process is in doubt.

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<sup>15</sup> *Apparent violations of employee discrimination requirements* (U.S. Department of Labor Case No. 1997-ERA-0053), July 2001, page 1. <http://pbadupws.nrc.gov/docs/ML0123/ML012320261.pdf>

<sup>16</sup> *TVA Sequoyah, Watts Bar nuclear plants among top 5 in internal complaints, say regulators* Associated Press: May 3, 2013, [http://www.washingtonpost.com/local/tva-sequoyah-watts-bar-nuclear-plants-among-top-5-in-internal-complaints-say-regulators/2013/05/03/3fc6ad36-b405-11e2-9fb1-62de9581c946\\_story.html](http://www.washingtonpost.com/local/tva-sequoyah-watts-bar-nuclear-plants-among-top-5-in-internal-complaints-say-regulators/2013/05/03/3fc6ad36-b405-11e2-9fb1-62de9581c946_story.html)



## **Conclusion**

37. First, the TVA License Extension Application for the Sequoya Reactors' Ice Condenser Containments lacks acceptable Aging Management Plans to adequately maintain critical components of the Ice Condenser Containment for the next 20-years.
38. Second, TVA's long standing breakdown in dealing with the mismanagement of its whistleblower complaints is a reflection of the corporation's lack of integrity and insufficient adherence to regulatory statutes that demand nuclear power owners put safety first. Given these ongoing systemic problems the accuracy and validity of the Licensee's Application cannot be assured and therefore should be rejected.
39. Finally, TVA claims that the Sequoya Ice Condenser Containments can withstand *severe accidents without leaking radiation into the environment*. Therefore, the NRC must reject TVA's Application for a License Extension at the Sequoya NPP due to the lack of supporting documentation providing the analysis detailing TVA's assumptions that prove that indeed the Sequoya IC Containment can withstand *severe accidents* without leaking. *In conclusion, a Severe Accident Mitigation Analysis (SAMA) must include details with the exact sequences of events showing TVA's proof that the Sequoya Ice Condenser Containment will in fact withstand a severe accident without leaking any radiation.*

*End*

## **Attachments:**

Attachment 1 – Curriculum Vitae

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 6<sup>th</sup> day, May 2013 at Burlington, Vermont.

\_\_\_\_\_/s/\_\_\_\_

Arnold Gundersen, MSNE, RSO  
Chief Engineer, Fairewinds Associates, Inc

**CURRICULUM VITAE**  
**Arnold Gundersen**  
**Chief Engineer, Fairewinds Associates, Inc**  
May 2013

**Education and Training**

ME NE	Master of Engineering Nuclear Engineering Rensselaer Polytechnic Institute, 1972 U.S. Atomic Energy Commission Fellowship Thesis: Cooling Tower Plume Rise
BS NE	Bachelor of Science Nuclear Engineering Rensselaer Polytechnic Institute, Cum Laude, 1971 James J. Kerrigan Scholar
RO	Licensed Reactor Operator, U.S. Atomic Energy Commission License # OP-3014

**Qualifications – including and not limited to:**

- Chief Engineer, Fairewinds Associates, Inc
- Nuclear Engineering, Safety, and Reliability Expert
- Federal and Congressional hearing testimony and Expert Witness testimony
- Former Senior Vice President Nuclear Licensee
- Former Licensed Reactor Operator
- Atomic Energy Commission Fellow
- 40-years of nuclear industry experience and oversight
  - Nuclear engineering management assessment and prudence assessment
  - Nuclear power plant licensing and permitting – assessment and review
  - Nuclear safety assessments, source term reconstructions, dose assessments, criticality analysis, and thermohydraulics
  - Contract administration, assessment and review
  - Systems engineering and structural engineering assessments
  - Cooling tower operation, cooling tower plumes, thermal discharge assessment, and consumptive water use
  - Nuclear fuel rack design and manufacturing, nuclear equipment design and manufacturing, and technical patents
  - Radioactive waste processes, storage issue assessment, waste disposal and decommissioning experience
  - Reliability engineering and aging plant management assessments, in-service inspection
  - Employee awareness programs, whistleblower protection, and public communications
  - Quality Assurance (QA) & records

**Publications**

Published Lecture — *The Lessons of the Fukushima Daiichi Nuclear Accident* published in the *International Symposium on the Truth of Fukushima Nuclear Accident and the Myth of Nuclear Safety*, August 30, 2012 University of Tokyo, Iwanami Shoten Publishers, Tokyo, Japan

- Author — *The Echo Chamber: Regulatory Capture and the Fukushima Daiichi Disaster, Lessons From Fukushima*, February 27, 2012, Greenpeace International
- Co-author — *Fukushima Daiichi: Truth And The Way Forward*, Shueisha Publishing, February 17, 2012, Tokyo, Japan.
- Co-author — *Fairewinds Associates 2009-2010 Summary to JFC*, July 26, 2010 State of Vermont, Joint Fiscal Office, (<http://www.leg.state.vt.us/jfo/envy.aspx>).
- Co-author — *Supplemental Report of the Public Oversight Panel Regarding the Comprehensive Reliability Assessment of the Vermont Yankee Nuclear Power Plant July 20, 2010*, to the Vermont State Legislature by the Vermont Yankee Public Oversight Panel.
- Co-author — The Second Quarterly Report by Fairewinds Associates, Inc to the Joint Legislative Committee regarding buried pipe and tank issues at Entergy Nuclear Vermont Yankee and Entergy proposed Enexus spinoff. See two reports: *Fairewinds Associates 2nd Quarterly Report to JFC* and *Enexus Review by Fairewinds Associates*.
- Author — Fairewinds Associates, Inc *First Quarterly Report to the Joint Legislative Committee*, October 19, 2009.
- Co-author — *Report of the Public Oversight Panel Regarding the Comprehensive Reliability Assessment of the Vermont Yankee Nuclear Power Plant*, March 17, 2009, to the Vermont State Legislature by the Vermont Yankee Public Oversight Panel.
- Co-author — *Vermont Yankee Comprehensive Vertical Audit – VYCVA – Recommended Methodology to Thoroughly Assess Reliability and Safety Issues at Entergy Nuclear Vermont Yankee*, January 30, 2008 *Testimony to Finance Committee Vermont Senate*.
- Co-author — *Decommissioning Vermont Yankee – Stage 2 Analysis of the Vermont Yankee Decommissioning Fund – The Decommissioning Fund Gap*, December 2007, Fairewinds Associates, Inc. Presented to Vermont State Senators and Legislators.
- Co-author — *Decommissioning the Vermont Yankee Nuclear Power Plant: An Analysis of Vermont Yankee's Decommissioning Fund and Its Projected Decommissioning Costs*, November 2007, Fairewinds Associates, Inc.
- Co-author — *DOE Decommissioning Handbook, First Edition*, 1981-1982, invited author.

### **Presentations & Media**

Fairewinds Energy Education Corp 501c3 presentations:

- *What Did They Know And When? Fukushima Daiichi Before And After The Meltdowns*, Symposium: The Medical and Ecological Consequences of the Fukushima Nuclear Accident, The New York Academy of Medicine, New York City, NY, March 11, 2013
- *A Mountain of Waste 70 Years High*, Presentation: *Old and New Reactors*, University of Chicago, December 1, 2012
- Congressional Briefing September 20, 2012; invited by Representative Dennis Kucinich
- Presentations in Japan August/September 2012: Presentation at University of Tokyo (August 30, 2012), Presentation at Japanese Diet Building (members of the Japanese Legislature - August 31, 2012), Presentation to citizen groups in Niigata (September 1, 2012), Presentations to citizen groups in Kyoto (September 4, 2012), Presentation to Japanese Bar Association (September 2, 2012), and Presentation at the Tokyo Olympic Center (September 6, 2012)
- Multi-media Opera: *Curtain of Smoke*, by Filmmaker Karl Hoffman, Composer Andrea Molino, and Dramatist Guido Barbieri, Rome, Italy (2012-5-21,22)

- Curtain of Smoke Symposium (2012-5-21), with Dr. Sherri Ebadi 2004 Nobel Laureate
- The Italian National Press Club Rome (2012-5-21) with Dr. Sherri Ebadi 2004 Nobel Laureate: the relationship between nuclear power and nuclear weapons
- Radio 3 Rome (2012-5-21) Discussion of Three Mile Island and the triple meltdown at Fukushima Daiichi (Japan),
- Sierra Club Panel Discussions (2012-5-5): Consequences of Fukushima Daiichi with Paul Gunter and Waste Disposal with Mary Olson,
- Physicians for Social Responsibility Seattle (2012-3-17),
- Fukushima Daiichi Forum with Chiho Kaneko, Brattleboro, VT (2012-3-11),
- Physicians for Global Responsibility Vancouver (2012-3-11) Skype Video Lecture, University of Vermont (2 – 2011),
- Boston Nuclear Forum, Boston Library (6/16/11),
- Duxbury Emergency Management (6/15/11),
- Vermont State Nuclear Advisory Panel (VSNAP), Elder Education Enrichment,
- New Jersey Environmental Federation (5/14/11),
- Quaker Meeting House,
- Press Conference for Physicians for Social Responsibility (5/19/11),
- St. Johnsbury Academy – Nuclear Power 101.

Educational videos on nuclear safety, reliability and engineering particularly Fukushima issues. Videos may be viewed @ [fairewinds.org](http://fairewinds.org) (501c3 non-profit)

Expert commentary (many more unnamed): CNN (6), The John King Show (14), BBC, CBC, Russia Today, Democracy Now, KPBS (Radio & TV) VPR, WPTZ, WCAX, WBAI, CCTV, NECN, Pacifica Radio, CBC (radio & TV) (4), Rachel Maddow Show, *Washington Post*, *New York Times*, *The Guardian*, *Bloomberg* (print & TV), *Reuters*, *Associated Press*, *The Global Post*, *Miami Herald*, *Tampa Times*, *Orange County Times*, *LA Times*, *Al Jazeera* (print), *The Tennessean*, The Chris Martinson Show, *Mainichi News*, TBS Japan, *Gendai Magazine*, NHK television, *Scientific American*. *Huffington Post* (Paris) named [Fairewinds.com](http://fairewinds.com) the best go to site for information about the Fukushima Daiichi accident (5/9/11).

### **Patents**

Energy Absorbing Turbine Missile Shield – U.S. Patent # 4,397,608 – 8/9/1983

### **Committee Memberships**

Vermont Yankee Public Oversight Panel, appointed 2008 by President Pro-Tem Vermont Senate  
National Nuclear Safety Network – Founding Board Member  
Three Rivers Community College – Nuclear Academic Advisory Board  
Connecticut Low Level Radioactive Waste Advisory Committee – 10 years, founding member  
Radiation Safety Committee, NRC Licensee – founding member  
ANSI N-198, Solid Radioactive Waste Processing Systems

### **Honors**

U.S. Atomic Energy Commission Fellowship, 1972  
B.S. Degree, Cum Laude, RPI, 1971, 1<sup>st</sup> in nuclear engineering class  
Tau Beta Pi (Engineering Honor Society), RPI, 1969 – 1 of 5 in sophomore class of 700

James J. Kerrigan Scholar 1967–1971

Teacher of the Year – 2000, Marvelwood School

Publicly commended to U.S. Senate by NRC Chairman, Ivan Selin, in May 1993 – “It is true...everything Mr. Gundersen said was absolutely right; he performed quite a service.”

### **Expert Witness Testimony and Nuclear Engineering Analysis and Consulting**

Nuclear Regulatory Commission – April 30, 2013

Expert witness report to Atomic Safety and Licensing Board: *Testimony Of Arnold Gundersen Supporting Of Intervenors Contention 15: DTE Cola Lacks Statutorily Required Cohesive QA Program*. Retained by Don't Waste Michigan, Beyond Nuclear et al.

Canadian Nuclear Safety Commission (CNSC) – April 29, 2013

Expert witness report to Canadian Nuclear Safety Commission (CNSC): *Analysis Of The Relicensing Application For Pickering Nuclear Generating Station*. Retained by Durham Nuclear Awareness.

Nuclear Regulatory Commission – January 16, 2013

Expert witness presentation to NRC Petition Review Board: 2.206 Presentation San Onofre Units 2 and 3 Replacement Steam Generators Meeting With Petitioner Friends Of The Earth, Requesting Enforcement Action Against Southern California Edison Under 10 CFR 2.206

Expert Witness Report For Friends Of The Earth – July 11, 2012

*San Onofre's Steam Generators: Significantly Worse Than All Others Nationwide*

Expert Witness Report For Friends Of The Earth – May 15, 2012

*San Onofre's Steam Generator Failures Could Have Been Prevented*, Fairewinds Associates

Expert Witness Report For Friends Of The Earth – April 10, 2012

*San Onofre Cascading Steam Generator Failures Created By Edison: Imprudent Design And Fabrication Decisions Caused Leaks*, Fairewinds Associates

Expert Witness Report For Friends Of The Earth – March 27, 2012

*Steam Generator Failures At San Onofre: The Need For A Thorough Root Cause Analysis Requires No Early Restart*

Expert Witness Report For Greenpeace – February 27, 2012

*Lessons From Fukushima: The Echo Chamber Effect*, Fairewinds Associates

Nuclear Regulatory Commission – December 21, 2011

Expert witness report to Atomic Safety and Licensing Board: *Prefiled Direct Testimony of Arnold Gundersen Regarding Consolidated Contention RK-EC-3/CW-EC-1 (Spent Fuel Pool Leaks)*

New York State Department Of Environmental Conservation – November 15-16, 2011

Expert witness for Riverkeeper: hearing testimony regarding license extension application for Indian Point Units 2 and 3 – contention: tritium in the groundwater.

Nuclear Regulatory Commission – November 10, 2011

Expert witness report entitled: *Fukushima and the Westinghouse-Toshiba AP1000, A Report for the AP1000 Oversight Group by Fairewinds Associates, Inc.*, and Video. Submitted to NRC by the AP1000 Oversight Group.

Nuclear Regulatory Commission – October 7, 2011

*Testimony to the NRC Petition Review Board Re: Mark 1 Boiling Water Reactors*, Petition for NRC to shut down all BWR Mark 1 nuclear power plants due to problems in containment integrity in the Mark 1 design.

New York State Department Of Environmental Conservation, October 4, 2011

*Prefiled Rebuttal Testimony Of Arnold Gundersen On Behalf Of Petitioners Riverkeeper, Inc., Scenic Hudson, Inc., And Natural Resources Defense Council, Inc. To The Direct Testimony Of Matthew J. Barvenik (Senior Principal GZA Geoenvironmental, Inc.) Regarding Radiological Materials*

Southern Alliance for Clean Energy (SACE) submission to TVA Board of Directors – August 3, 2011– Expert witness report entitled: *The Risks of Reviving TVA's Bellefonte Project*, and Video prepared for the Southern Alliance for Clean Energy (SACE).

New York State Department Of Environmental Conservation, July 22, 2011

*Prefiled Direct Testimony Of Arnold Gundersen On Behalf Of Petitioners Riverkeeper, Inc., Scenic Hudson, Inc., And Natural Resources Defense Council, Inc. Regarding Radiological Materials*

Nuclear Regulatory Commission – May 10, 2011

*Comment to the proposed rule on the AP1000 Design Certification Amendment Docket ID NRC-2010-0131 As noticed in the Federal Register on February 24, 2011* Retained by Friends of the Earth as Expert Witness.

Nuclear Regulatory Commission – May 10, 2011

*Comment to the proposed rule on the AP1000 Design Certification Amendment Docket ID NRC-2010-0131 As noticed in the Federal Register on February 24, 2011* Retained by Friends of the Earth as Expert Witness.

NRC Advisory Committee on Reactor Safeguards (ACRS) – May 26, 2011

Lessons learned from Fukushima and Containment Integrity on the AP1000.

Vermont Energy Cooperative (VEC) – April 26, 2011

Presentation to the Vermont Energy Cooperative Board of Directors, *Vermont Yankee – Is It Reliable for 20 more years?*

Vermont State Nuclear Advisory Panel (VSNAP) – February 22, 2011

Testimony and presentation entitled the *Vermont Yankee Public Oversight Panel Supplemental Report* regarding management issues at the Vermont Yankee Nuclear Power Plant to the reconvened Vermont State Nuclear Advisory Panel.

Vermont State Legislature Senate Committee On Natural Resources And Energy

February 8, 2011. Testimony: *Vermont Yankee Leaks and Implications*.

(<http://www.leg.state.vt.us/jfo/envy.aspx>)

Vermont State Legislature – January 26, 2011

House Committee On Natural Resources And Energy, and

Senate Committee On Natural Resources And Energy

Testimony regarding Fairewinds Associates, Inc's report: *Decommissioning the Vermont Yankee Nuclear Power Plant and Storing Its Radioactive Waste*

(<http://www.leg.state.vt.us/jfo/envy.aspx>). Additional testimony was also given regarding the newest radioactive isotopic leak at the Vermont Yankee nuclear power plant.

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy

Nuclear Vermont Yankee Decommissioning the Vermont Yankee Nuclear Power Plant and

*Storing Its Radioactive Waste* January 2011. (<http://www.leg.state.vt.us/jfo/envy.aspx>).

U.S. Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards (NRC-ACRS) AP1000 Sub-Committee

*Nuclear Containment Failures: Ramifications for the AP1000 Containment Design*,

Supplemental Report submitted December 21, 2010. (<http://fairewinds.com/reports>)

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy

Nuclear Vermont Yankee Reliability Oversight Entergy Nuclear Vermont Yankee, December 6,

2010. Discussion regarding the leaks at Vermont Yankee and the ongoing monitoring of those leaks and ENVY's progress addressing the 90-items identified in Act 189 that require remediation. (<http://www.leg.state.vt.us/jfo/envy.aspx>).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)

*Declaration Of Arnold Gunderson Supporting Blue Ridge Environmental Defense League's*

*Contention Regarding Consumptive Water Use At Dominion Power's Newly Proposed North*

*Anna Unit 3 Pressurized Water Reactor* in the matter of Dominion Virginia Power North Anna

Power Station Unit 3 Docket No. 52-017 Combined License Application ASLBP#08-863-01-COL, October 2, 2010.

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)

*Declaration Of Arnold Gunderson Supporting Blue Ridge Environmental Defense League's*

*New Contention Regarding AP1000 Containment Integrity On The Vogtle Nuclear Power Plant Units 3 And 4* in the matter of the Southern Nuclear Operating Company Vogtle Electric Generating Plant, Units 3&4 Combined License Application, Docket Nos. 52-025-COL and 52-026-COL and ASLB No. 09-873-01-COL-BD01, August 13, 2010.

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee – July 26, 2010

Summation for 2009 to 2010 Legislative Year For the Joint Fiscal Committee Reliability Oversight Entergy Nuclear Vermont Yankee (ENVY) Fairewinds Associates 2009-2010. This summary includes an assessment of ENVY's progress (as of July 1, 2010) toward meeting the milestones outlined by the Act 189 Vermont Yankee Public Oversight Panel in its March 2009 report to the Legislature, the new milestones that have been added since the incident with the tritium leak and buried underground pipes, and the new reliability challenges facing ENVY, Entergy, and the State of Vermont. (<http://www.leg.state.vt.us/jfo/envy.aspx>)

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)  
*Declaration Of Arnold Gundersen Supporting Blue Ridge Environmental Defense League's Contentions* in the matter of Dominion Virginia Power North Anna Station Unit 3 Combined License Application, Docket No. 52-017, ASLB#08-863-01-COL, July 23, 2010.

Florida Public Service Commission (FPSC)

Licensing and construction delays due to problems with the newly designed Westinghouse AP1000 reactors in *Direct Testimony In Re: Nuclear Plant Cost Recovery Clause By The Southern Alliance For Clean Energy (SACE)*, FPSC Docket No. 100009-EI, July 8, 2010.

U.S. Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards (NRC-ACRS) AP1000 Sub-Committee

Presentation to ACRS regarding design flaw in AP1000 Containment – June 25, 2010  
Power Point Presentation: <http://fairewinds.com/content/ap1000-nuclear-design-flaw-addressed-to-nrc-acrs>.

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)  
*Second Declaration Of Arnold Gundersen Supporting Supplemental Petition Of Intervenors Contention 15: DTE COLA Lacks Statutorily Required Cohesive QA Program* – June 8, 2010.

NRC Chairman Gregory Jaczko, ACRS, Secretary of Energy Chu, and the White House Office of Management and Budget

*AP1000 Containment Leakage Report Fairewinds Associates - Gundersen, Hausler, 4-21-2010.*  
This report, commissioned by the AP1000 Oversight Group, analyzes a potential flaw in the containment of the AP1000 reactor design.

Vermont State Legislature House Committee On Natural Resources And Energy – April 5, 2010  
Testified to the House Committee On Natural Resources And Energy – regarding discrepancies in Entergy's TLG Services decommissioning analysis. See *Fairewinds Cost Comparison TLG Decommissioning* (<http://www.leg.state.vt.us/jfo/envy.aspx>).



Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee – February 22, 2010

The Second Quarterly Report by Fairewinds Associates, Inc to the Joint Legislative Committee regarding buried pipe and tank issues at Entergy Nuclear Vermont Yankee and Entergy proposed Enexus spinoff. See two reports: *Fairewinds Associates 2nd Quarterly Report to JFC* and *Enexus Review by Fairewinds Associates*. (<http://www.leg.state.vt.us/jfo/envy.aspx>).

Vermont State Legislature Senate Natural Resources – February 16, 2010

Testified to Senate Natural Resources Committee regarding causes and severity of tritium leak in unreported buried underground pipes, status of Enexus spinoff proposal, and health effects of tritium.

Vermont State Legislature Senate Natural Resources – February 10, 2010

Testified to Senate Natural Resources Committee regarding causes and severity of tritium leak in unreported buried underground pipes. <http://www.youtube.com/watch?v=36HJiBrJSxE>

Vermont State Legislature Senate Finance – February 10, 2010

Testified to Senate Finance Committee regarding *A Chronicle of Issues Regarding Buried Tanks and Underground Piping at VT Yankee*. (<http://www.leg.state.vt.us/jfo/envy.aspx>).

Vermont State Legislature House Committee On Natural Resources And Energy – January 27, 2010 *A Chronicle of Issues Regarding Buried Tanks and Underground Piping at VT Yankee*. (<http://www.leg.state.vt.us/jfo/envy.aspx>).

Submittal to Susquehanna River Basin Commission, by Eric Epstein – January 5, 2010  
*Expert Witness Report Of Arnold Gundersen Regarding Consumptive Water Use Of The Susquehanna River By The Proposed PPL Bell Bend Nuclear Power Plant In the Matter of RE: Bell Bend Nuclear Power Plant Application for Groundwater Withdrawal Application for Consumptive Use BNP-2009-073.*

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)  
*Declaration of Arnold Gundersen Supporting Supplemental Petition of Intervenors Contention 15: Detroit Edison COLA Lacks Statutorily Required Cohesive QA Program*, December 8, 2009.

U.S. NRC Region III Allegation Filed by Missouri Coalition for the Environment

Expert Witness Report entitled: *Comments on the Callaway Special Inspection by NRC Regarding the May 25, 2009 Failure of its Auxiliary Feedwater System*, November 9, 2009.

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee

Oral testimony given to the Vermont State Legislature Joint Fiscal Committee October 28, 2009. See report: *Quarterly Status Report - ENVY Reliability Oversight for JFO* (<http://www.leg.state.vt.us/jfo/envy.aspx>).

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee

The First Quarterly Report by Fairewinds Associates, Inc to the Joint Legislative Committee regarding reliability issues at Entergy Nuclear Vermont Yankee, issued October 19, 2009.

See report: *Quarterly Status Report - ENVY Reliability Oversight for JFO* (<http://www.leg.state.vt.us/jfo/envy.aspx>).

Florida Public Service Commission (FPSC)

Gave direct oral testimony to the FPSC in hearings in Tallahassee, FL, September 8 and 10, 2009 in support of Southern Alliance for Clean Energy (SACE) contention of anticipated licensing and construction delays in newly designed Westinghouse AP 1000 reactors proposed by Progress Energy Florida and Florida Power and Light (FPL).

Florida Public Service Commission (FPSC)

NRC announced delays confirming my original testimony to FPSC detailed below. My supplemental testimony alerted FPSC to NRC confirmation of my original testimony regarding licensing and construction delays due to problems with the newly designed Westinghouse AP 1000 reactors in *Supplemental Testimony In Re: Nuclear Plant Cost Recovery Clause By The Southern Alliance For Clean Energy*, FPSC Docket No. 090009-EI, August 12, 2009.

Florida Public Service Commission (FPSC)

Licensing and construction delays due to problems with the newly designed Westinghouse AP 1000 reactors in *Direct Testimony In Re: Nuclear Plant Cost Recovery Clause By The Southern Alliance For Clean Energy (SACE)*, FPSC Docket No. 090009-EI, July 15, 2009.

Vermont State Legislature Joint Fiscal Committee Expert Witness Oversight Role for Entergy Nuclear Vermont Yankee (ENVY)

Contracted by the Joint Fiscal Committee of the Vermont State Legislature as an expert witness to oversee the compliance of ENVY to reliability issues uncovered during the 2009 legislative session by the Vermont Yankee Public Oversight Panel of which I was appointed a member along with former NRC Commissioner Peter Bradford for one year from July 2008 to 2009.

Entergy Nuclear Vermont Yankee (ENVY) is currently under review by Vermont State Legislature to determine if it should receive a Certificate for Public Good (CPG) to extend its operational license for another 20-years. Vermont is the only state in the country that has legislatively created the CPG authorization for a nuclear power plant. Act 160 was passed to ascertain ENVY's ability to run reliably for an additional 20 years. Appointment from July 2009 to May 2010.

U.S. Nuclear Regulatory Commission

Expert Witness Declaration regarding Combined Operating License Application (COLA) at North Anna Unit 3 *Declaration of Arnold Gundersen Supporting Blue Ridge Environmental Defense League's Contentions* (June 26, 2009).

U.S. Nuclear Regulatory Commission

Expert Witness Declaration regarding Through-wall Penetration of Containment Liner and Inspection Techniques of the Containment Liner at Beaver Valley Unit 1 Nuclear Power Plant

*Declaration of Arnold Gundersen Supporting Citizen Power's Petition* (May 25, 2009).

U.S. Nuclear Regulatory Commission

Expert Witness Declaration regarding Quality Assurance and Configuration Management at Bellefonte Nuclear Plant *Declaration of Arnold Gundersen Supporting Blue Ridge Environmental Defense League's Contentions in their Petition for Intervention and Request for Hearing*, May 6, 2009.

Pennsylvania Statehouse

Expert Witness Analysis presented in formal presentation at the Pennsylvania Statehouse, March 26, 2009 regarding actual releases from Three Mile Island Nuclear Accident. Presentation may be found at: <http://www.tmia.com/march26>

Vermont Legislative Testimony and Formal Report for 2009 Legislative Session

As a member of the Vermont Yankee Public Oversight Panel, I spent almost eight months examining the Vermont Yankee Nuclear Power Plant and the legislatively ordered Comprehensive Vertical Audit. Panel submitted Act 189 Public Oversight Panel Report March 17, 2009 and oral testimony to a joint hearing of the Senate Finance and House Committee On Natural Resources And Energy March 19, 2009.

<http://www.leg.state.vt.us/JFO/Vermont%20Yankee.htm>

Finestone v FPL (11/2003 to 12/2008) Federal Court

Plaintiffs' Expert Witness for Federal Court Case with Attorney Nancy LaVista, from the firm Lytal, Reiter, Fountain, Clark, Williams, West Palm Beach, FL. This case involved two plaintiffs in cancer cluster of 40 families alleging that illegal radiation releases from nearby nuclear power plant caused children's cancers. Production request, discovery review, preparation of deposition questions and attendance at Defendant's experts for deposition, preparation of expert witness testimony, preparation for Daubert Hearings, ongoing technical oversight, source term reconstruction and appeal to Circuit Court.

U.S. Nuclear Regulatory Commission Advisory Committee Reactor Safeguards (NRC-ACRS)

Expert Witness providing oral testimony regarding Millstone Point Unit 3 (MP3) Containment issues in hearings regarding the Application to Uprate Power at MP3 by Dominion Nuclear, Washington, and DC. (July 8-9, 2008).

Appointed by President Pro-Tem of Vermont Senate Shumlin (now Vermont Governor Shumlin) to Legislatively Authorized Nuclear Reliability Public Oversight Panel

To oversee Comprehensive Vertical Audit of Entergy Nuclear Vermont Yankee (Act 189) and testify to State Legislature during 2009 session regarding operational reliability of ENVY in relation to its 20-year license extension application. (July 2, 2008 to present).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)

Expert Witness providing testimony regarding *Pilgrim Watch's Petition for Contention 1 Underground Pipes* (April 10, 2008).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)

Expert Witness supporting *Connecticut Coalition Against Millstone In Its Petition For Leave To Intervene, Request For Hearing, And Contentions Against Dominion Nuclear Connecticut Inc.'s Millstone Power Station Unit 3 License Amendment Request For Stretch Power Uprate* (March 15, 2008).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)

Expert Witness supporting *Pilgrim Watch's Petition For Contention 1: specific to issues regarding the integrity of Pilgrim Nuclear Power Station's underground pipes and the ability of Pilgrim's Aging Management Program to determine their integrity.* (January 26, 2008).

Vermont State House – 2008 Legislative Session

- House Committee on Natural Resources and Energy – Comprehensive Vertical Audit: *Why NRC Recommends a Vertical Audit for Aging Plants Like Entergy Nuclear Vermont Yankee (ENVY)*
- House Committee on Commerce – Decommissioning Testimony

Vermont State Senate – 2008 Legislative Session

- Senate Finance – testimony regarding Entergy Nuclear Vermont Yankee Decommissioning Fund
- Senate Finance – testimony on the necessity for a Comprehensive Vertical Audit (CVA) of Entergy Nuclear Vermont Yankee
- House Committee on Natural Resources and Energy – testimony regarding the placement of high-level nuclear fuel on the banks of the Connecticut River in Vernon, VT

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)

MOX Limited Appearance Statement to Judges Michael C. Farrar (Chairman), Lawrence G. McDade, and Nicholas G. Trikouros for the “Petitioners”: Nuclear Watch South, the Blue Ridge Environmental Defense League, and Nuclear Information & Resource Service in support of *Contention 2: Accidental Release of Radionuclides, requesting a hearing concerning faulty accident consequence assessments made for the MOX plutonium fuel factory proposed for the Savannah River Site.* (September 14, 2007).

Appeal to the Vermont Supreme Court (March 2006 to 2007)

Expert Witness Testimony in support of *New England Coalition's Appeal to the Vermont Supreme Court Concerning: Degraded Reliability at Entergy Nuclear Vermont Yankee as a Result of the Power Uprate.* New England Coalition represented by Attorney Ron Shems of Burlington, VT.

State of Vermont Environmental Court (Docket 89-4-06-vtec 2007)

Expert witness retained by New England Coalition to review Entergy and Vermont Yankee's analysis of alternative methods to reduce the heat discharged by Vermont Yankee into the Connecticut River. Provided Vermont's Environmental Court with analysis of alternative methods systematically applied throughout the nuclear industry to reduce the heat discharged by nuclear power plants into nearby bodies of water and avoid consumptive water use. This report included a review of the condenser and cooling tower modifications.

U.S. Senator Bernie Sanders and Congressman Peter Welch (2007)

Briefed Senator Sanders, Congressman Welch and their staff members regarding technical and engineering issues, reliability and aging management concerns, regulatory compliance, waste storage, and nuclear power reactor safety issues confronting the U.S. nuclear energy industry.

State of Vermont Legislative Testimony to Senate Finance Committee (2006)

Testimony to the Senate Finance Committee regarding Vermont Yankee decommissioning costs, reliability issues, design life of the plant, and emergency planning issues.

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)

Expert witness retained by New England Coalition to provide Atomic Safety and Licensing Board with an independent analysis of the integrity of the Vermont Yankee Nuclear Power Plant condenser (2006).

U.S. Senators Jeffords and Leahy (2003 to 2005)

Provided the Senators and their staffs with periodic overview regarding technical, reliability, compliance, and safety issues at Entergy Nuclear Vermont Yankee (ENVY).

10CFR 2.206 filed with the Nuclear Regulatory Commission (July 2004)

Filed 10CFR 2.206 petition with NRC requesting confirmation of Vermont Yankee's compliance with General Design Criteria.

State of Vermont Public Service Board (April 2003 to May 2004)

Expert witness retained by New England Coalition to testify to the Public Service Board on the reliability, safety, technical, and financial ramifications of a proposed increase in power (called an uprate) to 120% at Entergy's 31-year-old Vermont Yankee Nuclear Power Plant.

International Nuclear Safety Testimony

Worked for ten days with the President of the Czech Republic (Vaclav Havel) and the Czech Parliament on their energy policy for the 21st century.

Nuclear Regulatory Commission (NRC) Inspector General (IG)

Assisted the NRC Inspector General in investigating illegal gratuities paid to NRC Officials by Nuclear Energy Services (NES) Corporate Officers. In a second investigation, assisted the Inspector General in showing that material false statements (lies) by NES corporate president caused the NRC to overlook important violations by this licensee.

State of Connecticut Legislature

Assisted in the creation of State of Connecticut Whistleblower Protection legal statutes.

Federal Congressional Testimony

Publicly recognized by NRC Chairman, Ivan Selin, in May 1993 in his comments to U.S. Senate, "It is true...everything Mr. Gundersen said was absolutely right; he performed quite a service." Commended by U.S. Senator John Glenn for public testimony to Senator Glenn's NRC Oversight Committee.

PennCentral Litigation

Evaluated NRC license violations and material false statements made by management of this nuclear engineering and materials licensee.

Three Mile Island Litigation

Evaluated unmonitored releases to the environment after accident, including containment breach, letdown system and blowout. Proved releases were 15 times higher than government estimate and subsequent government report.

Western Atlas Litigation

Evaluated neutron exposure to employees and license violations at this nuclear materials licensee.

Commonwealth Edison

In depth review and analysis for Commonwealth Edison to analyze the efficiency and effectiveness of all Commonwealth Edison engineering organizations, which support the operation of all of its nuclear power plants.

Peach Bottom Reactor Litigation

Evaluated extended 28-month outage caused by management breakdown and deteriorating condition of plant.

**Special Remediation Expertise:**

Director of Engineering, Vice President of Site Engineering, and the Senior Vice President of Engineering at Nuclear Energy Services (NES) Division of Penn Central Corporation (PCC)

- NES was a nuclear licensee that specialized in dismantlement and remediation of nuclear facilities and nuclear sites. Member of the radiation safety committee for this licensee.
- Department of Energy chose NES to write *DOE Decommissioning Handbook* because NES had a unique breadth and depth of nuclear engineers and nuclear physicists on staff.
- Personally wrote the “Small Bore Piping” chapter of the DOE’s first edition Decommissioning Handbook, personnel on my staff authored other sections, and I reviewed the entire Decommissioning Handbook.
- Served on the Connecticut Low Level Radioactive Waste Advisory Committee for 10 years from its inception.
- Managed groups performing analyses on dozens of dismantlement sites to thoroughly remove radioactive material from nuclear plants and their surrounding environment.
- Managed groups assisting in decommissioning the Shippingport nuclear power reactor. Shippingport was the first large nuclear power plant ever decommissioned. The decommissioning of Shippingport included remediation of the site after decommissioning.
- Managed groups conducting site characterizations (preliminary radiation surveys prior to commencement of removal of radiation) at the radioactively contaminated West Valley site in upstate New York.

- Personnel reporting to me assessed dismantlement of the Princeton Avenue Plutonium Lab in New Brunswick, NJ. The lab's dismantlement assessment was stopped when we uncovered extremely toxic and carcinogenic underground radioactive contamination.
- Personnel reporting to me worked on decontaminating radioactive thorium at the Cleveland Avenue nuclear licensee in Ohio. The thorium had been used as an alloy in turbine blades. During that project, previously undetected extremely toxic and carcinogenic radioactive contamination was discovered below ground after an aboveground gamma survey had purported that no residual radiation remained on site.

### **Additional Education**

Basic Mediation Certificate    Champlain College, Woodbury Institute  
28-hour Basic Mediation Training September 2010

### **Teaching and Academic Administration Experience**

Rensselaer Polytechnic Institute (RPI) – Advanced Nuclear Reactor Physics Lab  
Community College of Vermont – Mathematics Professor – 2007 to present  
Burlington High School

Mathematics Teacher – 2001 to June 2008

Physics Teacher – 2004 to 2006

The Marvelwood School – 1996 to 2000

*Awarded Teacher of the Year – June 2000*

Chairperson: Physics and Math Department

Mathematics and Physics Teacher, Faculty Council Member

Director of Marvelwood Residential Summer School

Director of Residential Life

The Forman School & St. Margaret's School – 1993 to 1995

Physics and Mathematics Teacher, Tennis Coach, Residential Living Faculty Member

### **Nuclear Engineering Work Experience**    1970 to Present

Expert witness testimony in nuclear litigation and administrative hearings in federal, international, and state court and to Nuclear Regulatory Commission, including but not limited to: Three Mile Island, US Federal Court, US NRC, NRC ASLB & ACRS, Vermont State Legislature, Vermont State Public Service Board, Florida Public Service Board, Czech Senate, Connecticut State Legislature, Western Atlas Nuclear Litigation, U.S. Senate Nuclear Safety Hearings, Peach Bottom Nuclear Power Plant Litigation, and Office of the Inspector General NRC.

### **Nuclear Engineering, Safety, and Reliability Expert Witness 1990 to Present**

- Fairewinds Associates, Inc – Chief Engineer, 2005 to Present
- Arnold Gundersen, Nuclear Safety Consultant and Energy Advisor, 1995 to 2005
- GMA – 1990 to 1995, including expert witness testimony regarding the accident at Three Mile Island.



Nuclear Energy Services, Division of PCC (Fortune 500 company) 1979 to 1990

Corporate Officer and Senior Vice President - Technical Services

Responsible for overall performance of the company's Inservice Inspection (ASME XI), Quality Assurance (SNTC 1A), and Staff Augmentation Business Units – up to 300 employees at various nuclear sites.

Senior Vice President of Engineering

Responsible for the overall performance of the company's Site Engineering, Boston Design Engineering and Engineered Products Business Units. Integrated the Danbury based, Boston based and site engineering functions to provide products such as fuel racks, nozzle dams, and transfer mechanisms and services such as materials management and procedure development.

Vice President of Engineering Services

Responsible for the overall performance of the company's field engineering, operations engineering, and engineered products services. Integrated the Danbury-based and field-based engineering functions to provide numerous products and services required by nuclear utilities, including patents for engineered products.

General Manager of Field Engineering

Managed and directed NES' multi-disciplined field engineering staff on location at various nuclear plant sites. Site activities included structural analysis, procedure development, technical specifications and training. Have personally applied for and received one patent.

Director of General Engineering

Managed and directed the Danbury based engineering staff. Staff disciplines included structural, nuclear, mechanical and systems engineering. Responsible for assignment of personnel as well as scheduling, cost performance, and technical assessment by staff on assigned projects. This staff provided major engineering support to the company's nuclear waste management, spent fuel storage racks, and engineering consulting programs.

New York State Electric and Gas Corporation (NYSE&G) — 1976 to 1979

Reliability Engineering Supervisor

Organized and supervised reliability engineers to upgrade performance levels on seven operating coal units and one that was under construction. Applied analytical techniques and good engineering judgments to improve capacity factors by reducing mean time to repair and by increasing mean time between failures.

Lead Power Systems Engineer

Supervised the preparation of proposals, bid evaluation, negotiation and administration of contracts for two 1300 MW NSSS Units including nuclear fuel, and solid-state control rooms. Represented corporation at numerous public forums including TV and radio on sensitive utility issues. Responsible for all nuclear and BOP portions of a PSAR, Environmental Report, and Early Site Review.

Northeast Utilities Service Corporation (NU) — 1972 to 1976

Engineer

Nuclear Engineer assigned to Millstone Unit 2 during start-up phase. Lead the high velocity flush and chemical cleaning of condensate and feedwater systems and obtained discharge permit for chemicals. Developed Quality Assurance Category 1 Material, Equipment and Parts List. Modified fuel pool cooling system at Connecticut Yankee, steam generator blowdown system and diesel generator lube oil system for Millstone. Evaluated Technical Specification Change Requests.

Associate Engineer

Nuclear Engineer assigned to Montague Units 1 & 2. Interface Engineer with NSSS vendor, performed containment leak rate analysis, assisted in preparation of PSAR and performed radiological health analysis of plant. Performed environmental radiation survey of Connecticut Yankee. Performed chloride intrusion transient analysis for Millstone Unit 1 feedwater system. Prepared Millstone Unit 1 off-gas modification licensing document and Environmental Report Amendments 1 & 2.

Rensselaer Polytechnic Institute (RPI) — 1971 to 1972

Critical Facility Reactor Operator, Instructor

Licensed AEC Reactor Operator instructing students and utility reactor operator trainees in start-up through full power operation of a reactor.

Public Service Electric and Gas (PSE&G) — 1970

Assistant Engineer

Performed shielding design of radwaste and auxiliary buildings for Newbold Island Units 1 & 2, including development of computer codes.

**Media**

Featured Nuclear Safety and Reliability Expert (1990 to present) for Television, Newspaper, Radio, & Internet – Including, and not limited to:

CNN: JohnKingUSA, CNN News, Earth Matters; DemocracyNow, NECN, WPTZ VT, WTNH, VPTV, WCAX, RT, CTV (Canada), CCTV Burlington, VT, ABC, TBS/Japan, Bloomberg: EnergyNow, KPBS, Japan National Press Club (Tokyo), Italy National Press Club (Rome), The Crusaders, Front Page, Five O’Clock Shadow: Robert Knight, Mark Johnson Show, Steve West Show, Anthony Polina Show, WKVT, WDEV, WVPR, WZBG CT, Seven Days, AP News Service, Houston Chronicle, Christian Science Monitor, Reuters, The Global Post, International Herald, The Guardian, New York Times, Washington Post, LA Times, Miami Herald, St. Petersburg Times, Brattleboro Reformer, Rutland Herald, Times-Argus, Burlington Free Press, Litchfield County Times, The News Times, The New Milford Times, Hartford Current, New London Day, Vermont Daily Briefing, Green Mountain Daily, EcoReview, Huffington Post, DailyKos, Voice of Orange County, AlterNet, Common Dreams, and numerous other national and international blogs

**Public Service, Cultural, and Community Activities**

2009 to Present –Fairewinds Energy Education Corp 501(C)3 non-profit board member

2005 to Present – Public presentations and panel discussions on nuclear safety and reliability at

University of Vermont, Vermont Law School, NRC hearings, Town and City Select Boards, Legal Panels, Local Schools, Television, and Radio.  
2007-2008 – Created Concept of Solar Panels on Burlington High School; worked with Burlington Electric Department and Burlington Board of Education Technology Committee on Grant for installation of solar collectors for Burlington Electric peak summer use  
Vermont State Legislature – Public Testimony to Legislative Committees  
Certified Foster Parent State of Vermont – 2004 to 2007  
Mentoring former students – 2000 to present – college application and employment application questions and encouragement  
Tutoring Refugee Students – 2002 to 2006 – Lost Boys of the Sudan and others from educationally disadvantaged immigrant groups  
Designed and Taught Special High School Math Course for ESOL Students – 2007 to 2008  
NNSN – National Nuclear Safety Network, Founding Advisory Board Member, meetings with and testimony to the Nuclear Regulatory Commission Inspector General (NRC IG)  
Berkshire School Parents Association, Co-Founder  
Berkshire School Annual Appeal, Co-Chair  
Sunday School Teacher, Christ Church, Roxbury, CT  
Washington Montessori School Parents Association Member  
Marriage Encounter National Presenting Team with wife Margaret  
Provided weekend communication and dialogue workshops weekend retreats/seminars  
Connecticut Marriage Encounter Administrative Team – 5 years  
Northeast Utilities Representative Conducting Public Lectures on Nuclear Safety Issues

### **Personal**

Married to Maggie Gundersen 1979. Two children: Eric, 33, president and founder of MapBox and Development Seed, and Elida, 30, paramedic in Florida. Enjoy sailing, walking, swimming, yoga, and reading.

*End*