

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

<p>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</p>
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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 (öBREDL 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, 2013.¹ 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."²

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-

¹ Fed. Reg. Vol. 78 No. 43, Tuesday, March 5, 2013, pp. 14362614365

² 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 Kunesh	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

(IPAO). The IPA must provide enough information about systems, structures, and components (SSCO) 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. 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, TVA's LRA failed to provide time-limited aging analyses (TLAA) which show that The effects of aging on the intended function(s) will be adequately managed for the period of extended operation. 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 (50 CFR 54.21).

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

F-21. 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.

F-23. 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.

F-25. 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.

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 yellow

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.³

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.⁴

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.

³ 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

⁴ 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."⁵

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

⁵ "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.⁶ *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

⁶ *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.

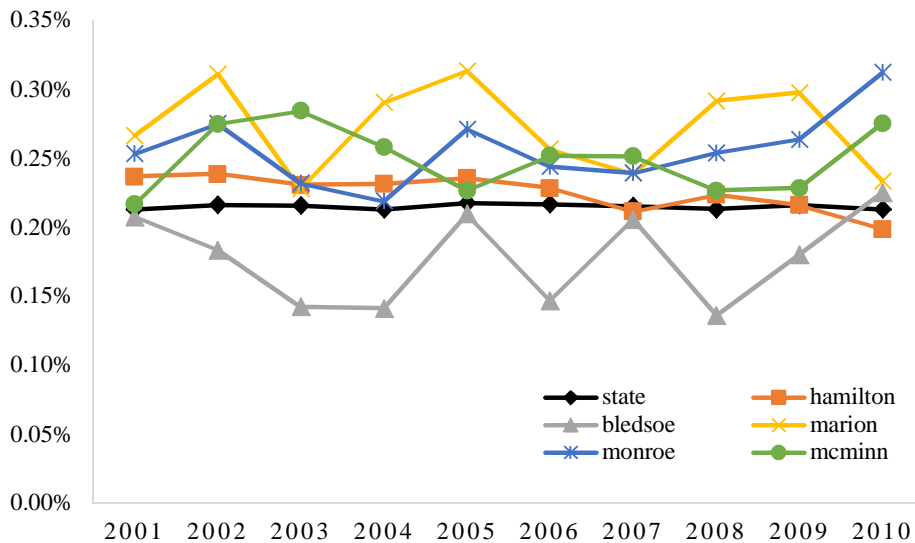
In light of the above, until there are new rules approved by the Commission and accepted by the Court, either NRC must suspend a final decision on the LR, or TVA must complete an environmental impact statement encompassing on-site and beyond-60 year high-level radioactive waste storage.

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,⁷ 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.⁸ 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

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

⁸ 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

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)⁹

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.

⁹ 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*.¹⁰ 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 ¹¹area 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

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

¹¹ *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.¹² 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."¹³ [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

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

¹³ 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 ða 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.¹⁴ 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.¹⁵

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 2012.¹⁶

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

¹⁵ 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>

¹⁶ *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


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,



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 6th day of May, 2013

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Signed in Glendale Springs this day May 6, 2013



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