

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

*In the matter of*

Dominion Virginia Power ) July 23, 2010  
North Anna Power Station Unit 3 ) Docket No. 52-017  
Combined License Application ) ASLBP#08-863-01-COL

DECLARATION OF ARNOLD GUNDERSEN SUPPORTING  
BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE'S  
CONTENTIONS

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) has retained me as an expert witness in the above captioned matter, and my declaration is intended to support the Contentions of Blue Ridge Environmental Defense League.
3. I earned my Bachelor's Degree in Nuclear Engineering from Rensselaer Polytechnic Institute (RPI) cum laude. I earned my Master's 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. An updated Curriculum Vitae is attached as Exhibit 2.
5. I have qualified as an expert witness before the Nuclear Regulatory Commission (NRC) Atomic Safety and Licensing Board (ASLB) and Advisory Committee on

Reactor Safeguards (ACRS), the State of Vermont Public Service Board, the State of Vermont Environmental Court, the Florida Public Service Commission, and in Federal Court.

6. I am an author of the first edition of the Department of Energy (DOE) Decommissioning Handbook.
7. As an appointee of Vermont State Legislature for the past two years, I am charged with serving in an oversight role of Entergy Nuclear Vermont Yankee and an advisory role on nuclear reliability issues to the Vermont State Legislature.
8. I have more than 38-years of professional nuclear experience *including and not limited to*: Nuclear Power Operations, Nuclear Safety Assessments, Nuclear Power Management, Nuclear Quality Assurance, Archival Storage and Document Control, NRC Regulations and Enforcement, Licensing, Engineering Management, Contract Administration, Reliability Engineering, In-service Inspection, Thermohydraulics, Criticality Analysis, Radioactive Waste Processes, Decommissioning, Waste Disposal, Cooling Tower Operation, Cooling Tower Plumes, Consumptive Water Use, Source Term Reconstruction, Dose Assessment, Technical Patents, Structural Engineering Assessments, Nuclear Fuel Rack Design and Manufacturing, Nuclear Equipment Design and Manufacturing, Public Relations, Prudency Defense, Employee Awareness Programs, and Whistleblower Protection.
9. My declaration is intended to support Contentions of the Blue Ridge Environmental Defense League and is specific to issues regarding the Combined License Application (COLA), Dominion Virginia Power North Anna Power Station Unit 3.

## **BACKGROUND**

10. This proceeding concerns the application for a combined license (“COL”) filed pursuant to 10 CFR Part 52 Subpart C by Virginia Electric and Power Company (d/b/a Dominion Virginia Power) (“Dominion” or “Applicant”) on November 26, 2007 and supplemented by letters dated January 17 and 28, 2008. The application

was accepted for docketing on January 28, 2008; its design basis was the Economic Simplified Boiling Water Reactor (“ESBWR”).

11. On May 9, 2008 pursuant to 10 CFR § 2.309, BREDL filed a petition for intervention and request for hearing. On August 15, 2008 the Atomic Safety and Licensing Board issued a Memorandum and Order admitting one contention in part and granting a hearing. On November 18, 2008 BREDL submitted an Intervenor’s Request to the ASLB asking it to consider the legal and factual issues regarding the design certification rulemaking for the ESBWR.
12. On May 18, 2010 Dominion informed the Nuclear Regulatory Commission that it had selected a new Advanced Pressurized Water Reactor (“APWR”) design as the basis for its Combined License (10 CFR Part 52) for its proposed North Anna Unit 3.
13. Given my unique background in licensing, engineering, and operations, it is my professional opinion that the ASLB should open an entirely new docket in order to assure that no files or design elements get mixed together thereby leading to an inadequate ASLB review and creating a significant risk to public health and safety.
14. There are significant design, engineering, and operating differences between Boiling Water Reactors (BWR’s) and Pressurized Water Reactors (PWR’s). These differences are not merely cosmetic but rather are real physical differences brought on by the different theories upon which these types reactors were designed, engineered, and built to operate.
15. For example in a BWR, the control rods go in from the bottom; while on a PWR, the control rods go in from the top.
16. Beyond the reactor design, physical components within the containment building are also dramatically different.
  - 16.1. The containment on a PWR operates at a much higher-pressure level than the containment in a BWR.

- 16.2. Since a BWR has no steam generators, its containment design is not as tall as a pressurized water reactor.
- 16.3. Additionally, a PWR has many more structural components within the containment, including its steam generators.
17. The net effect of all these differences is that the weight of the containment and the seismic response of each type of containment are dramatically different when comparing a BWR to a PWR.
18. The dramatic difference between BWR's and PWR's are not just limited to the containment building and the reactor.
  - 18.1. All ancillary buildings are also a dramatically different. Auxiliary facilities as well as the turbine hall and main steam piping are all significantly dissimilar from one design to the other.
  - 18.2. The amount of gamma radiation emitted from the turbine hall of each reactor is also significantly different.
  - 18.3. The thermal output of each reactor is also quite unlike thereby leading to different heat removal capabilities of the condenser as well as the circulating water system.

## **CONCLUSION**

19. It is impossible in a short period of time to outline all the opposite and differing design, engineering, and operating disparities between PWR and BWR nuclear power plants. As an engineer with more than 38-years nuclear engineering experience with both PWR's and BWR's, I am confident that the number of differences between the two reactor styles is enormous and the time required to analyze these differences will be significant.

20. In my opinion, the information initially provided on this docket regarding the original ESBWR design is wholly inadequate for any application to the newly proposed APWR design now desired by Dominion.
21. Since there is very little similarity between a ESBWR and an APWR, very little of the original proposed design for Unit 3 at North Anna would be applicable in any review.
22. To begin, engineers, geologists, hydrologists, meteorologists, and environmental engineers must start almost all of the site analysis from scratch to determine whether or not the new APWR design will even be compatible with the North Anna location.
23. Clearly, the COLA in Docket No. 52-017 must be begun anew, or an entirely new docket should be opened. In my experience, having worked in licensing and knowing the extreme and distinct variations existing in the engineering design and operating capability of each type of plant, I believe it is critical to open a clean docket, so that no mix up of files and subsequent errors could occur that might ultimately negatively impact public health and safety.

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

Executed this day, July 23, 2010 at Burlington, Vermont.



Arnold Gundersen, MSNE  
*Chief Engineer, Fairwinds Associates, Inc*

I HEREBY CERTIFY that on this 23rd day of July 2010, personally appeared Arnold Gundersen resident of Burlington Vermont, who is personally known to me or who produced the following identification, and he swore, subscribed, and acknowledged before me that he executed the foregoing as his free act and deed as an expert witness of said case, for the uses and purposes therein mentioned, and that he did take an oath.

In witness whereof, I have hereunto set my hand and seal in the County and State aforesaid.

OFFICIAL NOTARY Margaret Gundersen NOTARY PUBLIC  
STATE OF VERMONT

MY COMMISSION EXPIRES: 2/11/2011