

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

*In the matter of*

Dominion Virginia Power ) June 26, 2009  
North Anna Power Station Unit 3 ) Docket No. 52-017  
per NA3-09-015, May 21, 2009 )  
Combined License Application – Submission 4 )

**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 have a Bachelor's and a Master's Degree in Nuclear Engineering from Rensselaer Polytechnic Institute (RPI) cum laude.
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. A copy of my Curriculum Vitae is attached.
5. I have qualified as an expert witness before the NRC ASLB and ACRS, in Federal Court, before the State of Vermont Public Service Board and the State of Vermont Environmental Court.

6. I am an author of the first edition of the Department of Energy (DOE) Decommissioning Handbook.
7. I have more than 35-years of professional nuclear experience including and not limited to: 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, Cooling Tower Operation, Cooling Tower Plumes, Consumptive Water Loss, 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. 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) - Submission 4, Dominion Virginia Power North Anna Power Station Unit 3.
9. More specifically, in its May 9, 2008 Petition to NRC For Intervention And Request For Hearing, The Blue Ridge Environmental Defense League noted in Contention One, that Dominion Power Lacks a realistic Low level Radioactive Waste Plan for radioactive waste from the North Anna nuclear power reactors, including the proposed Unit 3, so stating:

“The applicant fails to offer a viable plan for how to dispose of Class B, C and Greater than C so called “low level” radioactive waste generated in the course of operations, closure and post closure of North Anna Unit 3. The statement of fact is that the applicant fails to address how NRC regulations for the disposal of so called “low level” radioactive waste will be met in the absence of a disposal facility (dump). This issue must be addressed in order for the US Nuclear Regulatory Commission to grant an operating license with credibility. If perpetual or extended onsite storage of these wastes is to be the “fall

back,” then this must be addressed in the COL application and is not. Since there is no offsite part 61 licensed disposal available, extended on site storage becomes defacto onsite disposal. This could significantly increase the safety and security risks of the North Anna site. Therefore serious consideration must be given to licensing the site itself under 10 CFR Part 61 (licensed permanent radioactive waste disposal) or Virginia’s compatible agreement state regulations. It is imperative that the safety and security issues of extended onsite storage, serious consideration must be given to licensing the site itself under 10 CFR Part 61 (licensed permanent radioactive waste disposal) or Virginia’s compatible agreement state regulations. It is imperative that the safety and security issues of extended onsite storage, defacto disposal, be addressed prior to generation of the waste because the “low level” radioactive waste for which there is no disposal available is the hottest, most concentrated 1 waste in the category.”<sup>1</sup>

10. In my opinion, Applicant Dominion Virginia Power’s Response to BREDL’s contention is misleading. Paragraph 11.4.1 (SWMS Design Basis) is ambiguous and in fact does not add any new information to refute BREDL’s original contention. Moreover, while achieving so-called improvements in some aspects of storage duration, the Applicant has definitely reduced other storage durations from Unit 3’s original design basis.
11. The Applicant Dominion Virginia Power states that that the ***“total combined volume of packaged Class A, B and C low-level radioactive waste estimated to be generated during six months of plant operation ...In the event that an offsite facility is not available to accept Class B and C waste, the Radwaste Building has been configured to accommodate at least 10 years of packaged B and C waste and approximately three months ... of packaged Class A waste...”***. While this statement certainly aims to satisfy the question raised by BREDL in its Contention 1, it does not.
12. In order to meet its goal to assure NRC that there is space to store Class B and C material for ten years, the *Applicant has correspondingly reduced its design basis for storage of Class A material from 6 months to 3 months*. This is simply “Robbing

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<sup>1</sup> Petition For Intervention And Request For Hearing By The Blue Ridge Environmental Defense League, May 9, 2008, Page 5.

Peter to pay Paul.” By creating such a paradigm, the Applicant therefore must make the assumption that a storage facility of some sort will quickly be made available for the Class A waste, all the while assuming that no such facility exists for both Class B and C waste. In following this current scenario, the Applicant’s new premise by which it creates only 3 months of storage for Class A waste is even less conservative than the original design basis assumptions of 6 months.

13. Furthermore, while the Applicant claims to be responding to BREDL’s contention with new analysis, Dominion Virginia Power has in fact reduced its original design basis assumptions in order to appear to be addressing BREDL’s original concern addressed delineated in Contention 1.
14. One of the hallmarks of NRC regulation is that licensees and applicants apply “conservative assumptions” or “conservative estimates” in order to meet its statutory requirement to protect public health and safety. The dictionary defines “conservative” as “*Moderate; cautious: a conservative estimate*”. The Applicant Dominion Virginia Power claims that its response to BREDL’s Contention 1 “**is based on a conservative estimate**”, when in fact its estimate is not at all moderate or cautious.
15. In paragraph 11.4.1 (SWMS Design Basis) the Applicant opines but does not prove that: “**This Class B and C waste is based on a conservative estimate... Good fuel performance will also reduce fission products in the reactor and spent fuel pool water and hence the volume of Class B and C waste generated. Implementation of these techniques could substantially extend the capacity of the Class B and C storage area.**”
16. There is nothing on the North Anna Unit 3 Docket that accounts for any assumption or estimate that there will in fact be good fuel performance. During my more than 35-years of engineering experience in the nuclear industry the history of new reactor designs has indicated that new fuel designs are less reliable and will leak more than

current designs upon which the Applicant is attempting to make its storage volume assumptions.

17. The applicants proposed reactor design for this COLA is new, has never been built before, and is untried. According to *Review of Fuel Failures in Water Cooled Reactors*<sup>2</sup>, new fuel designs initially leak more than, not less than, the fuel for which the applicant has based its volume assumptions.

*Page 7: "For BWRs and PWRs the rapid introduction of new fuel designs... as well as the introduction of long fuel cycles can significantly increase power peaking factors and thus may also influence fuel failure considerations."*

*Page 3: "In spite of all efforts to find adequate remedies, there seem to be several new aspects and problems that continue to challenge the industry."*

*Page 1: "Improving fuel reliability beyond current levels will be even more challenging for countries involved with programs to further increase fuel discharge burnup."*

*Page 163: "Failures or problems caused by the introduction of new or modified fuel designs and materials... did occur with partly high local failure rates or other severe consequences."*

18. Reliable scientific data and historical record therefore suggests that fuel failures in this new reactor design are more likely and that more radioactive material will be present in the reactor coolant and spent fuel pool, not less as the Applicant attempts to persuade. By applying the mathematical projections delineated by historical record, the evidence clearly shows that the Applicant's volume estimates for radioactive waste storage are in fact too small, and not at all the conservative estimates they attempt to portray.
19. In summation, BREDL's initial contention that the applicant lacks an adequate plan for the long term storage of Class A, B and C waste is confirmed by reliable scientific data and historical record regarding industry-wide fuel failures in newly designed plants.

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<sup>2</sup> *Review of Fuel Failures in Water Cooled Reactors*, International Atomic Energy Commission, IAEA technical report 388, 1998

20. *In conclusion*, my review of the factual evidence and Applicant Dominion Virginia Power's COLA disputes the Applicant's claim of "conservative estimates" applied in its COLA for North Anna Unit 3. Furthermore, it is my expert opinion that as alleged in BREDL's Contention 1,

20.1. ***"The applicant fails to offer a viable plan for how to dispose of Class B, C and Greater than C so called "low level" radioactive waste generated in the course of operations, closure and post closure of North Anna Unit 3".***

20.2. "The statement of fact is that the applicant fails to address how NRC regulations for the disposal of so called "low level" radioactive waste will be met in the absence of a disposal facility (dump)."

20.3. "This issue must be addressed in order for the US Nuclear Regulatory Commission to grant an operating license with credibility. If perpetual or extended onsite storage of these wastes is to be the "fall back," then this must be addressed in the COL application and is not. Since there is no offsite part 61 licensed disposal available, extended on site storage becomes defacto onsite disposal."

20.4. "This could significantly increase the safety and security risks of the North Anna site. Therefore serious consideration must be given to licensing the site itself under 10 CFR Part 61 (licensed permanent radioactive waste disposal) or Virginia's compatible agreement state regulations."

20.5. "It is imperative that the safety and security issues of extended onsite storage, serious consideration must be given to licensing the site itself under 10 CFR Part 61 (licensed permanent radioactive waste disposal) or Virginia's compatible agreement state regulations."

20.6. "It is imperative that the safety and security issues of extended onsite storage, defacto disposal, be addressed prior to generation of the waste because the "low

level” radioactive waste for which there is no disposal available is the hottest, most concentrated 1 waste in the category.”<sup>3</sup>

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<sup>3</sup> Petition For Intervention And Request For Hearing By The Blue Ridge Environmental Defense League, May 9, 2008, Page 5.

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

Executed this day, June 26, 2009 at Burlington, Vermont.



Arnold Gundersen, MSNE

I HEREBY CERTIFY that on this 26th day of June 2009, 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 Mary M. Montepaso NOTARY PUBLIC  
STATE OF VERMONT

MY COMMISSION EXPIRES: 2/10/11