DOCKET NOS. 50-438 and 50-439
BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE
EXHIBIT ONE

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of		
Tennessee Valley Authority (TVA)	)	May 6, 2009
Bellefonte Units 1 and 2	)	Docket Nos. 50-438 and 50-439
per 74 FR 10969, March 13, 2009	)	
Construction Permit License Reinstatement	)	

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 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 NRC Reinstatement of TVA's Construction Permits for Bellefonte Units 1 and 2.

9. The NRC has ignored, or minimized without justification, regulations as codified in the Federal Code of Regulations. I am particularly concerned with the following issues:

    9.1. First, in 1988 TVA halted construction of its Bellefonte Units 1 and 2 due to a decreased growth in power demand and rapidly escalating construction costs. TVA let the Bellefonte plants sit idle for almost 20 years before deliberately choosing to withdraw from the confines and conditions of its NRC Construction Permit in 2005.

    9.2. Second, the conditions and constraints TVA chose to abrogate are codified into law for every nuclear plant in 10 CFR. When NRC allowed TVA to abrogate the conditions of its Construction Permits at Bellefonte Units 1

and 2, these nuclear plants ceased to comply with the regulations codified in 10 CFR 50.

9.3. Third, in his dissenting opinion, NRC Commissioner Jaczko noted that TVA's Bellefonte Units have had no NRC oversight nor have they been under any NRC review, rules or regulations since they chose to cancel their construction permit three years ago.

> "To say that a withdrawal does not matter is saying that not having a permit for over two years is the same as having had a permit for those two years ... A regulatory agency should, at a minimum, defend its regulations and the need for them."

9.4. Finally, on Page 3 of his review of TVA's application for reinstatement of its construction permit, Joseph Williams, NRC Senior Project Manager[1] said that TVA has not continued to implement Federal requirements, nor were their activities conducted in accordance with NRC-approved programs and were not subject to NRC inspection.

> "Contrary to the Policy Statement expectations, TVA has not continued to implement the various requirements described in Section III.A.3 of the Policy Statement. Instead, TVA's August 26, 2008, letter describes "investment recovery" activities, including removal of steam generator tubing and sections of reactor coolant system piping. TVA has subsequently taken action "to inspect, clean, cap off, and stabilize those systems." These activities were not conducted in accordance with NRC-approved programs, and were not subject to NRC inspection. Further, TVA states that it is in the process of performing repairs to the site to eliminate water intrusion, indicating the facility has not been maintained in a manner that would prevent serious degradation. It appears that the activities TVA describes are within the scope of the definition of construction as given in 10 CFR 50.2,' but have not been conducted in accordance with NRC-approved programs. These activities are not consistent with section lli.B.2(b) of the Policy Statement, and need to be evaluated before the construction permits can be reissued."

10. After abrogating its construction permit in 2005, TVA cannibalized its Bellefonte Units 1 and 2 by transferring equipment valued at approximately

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[1] NON-CONCURRENCE, 11/20/08

$49 Million to other TVA nuclear and fossil plants, while at the same time allowing contractors to rip out steam generators, main condensers, and steel tubes from heat exchangers and sell such equipment to scrap vendors for about $16 Million.

11. The Nuclear Regulatory Commission chose to reinstate the TVA's construction permits for Bellefonte Units 1 and 2 in spite of the facts that:

    11.1. both Units were partially dismantled and cannibalized when significant pieces of equipment were sold off for scrap,

    11.2. members of the NRC staff and a NRC Commissioner disagreed with the decision and wrote dissenting opinions,

    11.3. the NRC performed no inspections for the three years following the termination of Bellefonte's construction permits

    11.4. and TVA followed no required quality assurance procedures, federal regulations, or industry protocol for more than three years.

12. On Page 6 of his dissenting opinion, Joseph Williams, NRC Senior Project Manager also noted, that since the circumstances for Bellefonte Units 1 and 2 are so unique, a complete evaluation by NRC of TVA's activities should be completed prior to the reconsideration of any permits. In his analysis, Williams said,

> "The circumstances for Bellefonte Units 1 and 2 are unique; no other licensee has ever given up its construction permits, partially dismantled the plant and allowed the facility to degrade, then requested that the permits be reissued. The NRC must evaluate TVA's activities since the permits were terminated to determine their effect on the safety of structures, systems, and components before the permits are reissued. This evaluation must be completed so that the criteria for an effective inspection program can be determined and procedures developed so inspectors have the necessary tools in place for their work."

13. The hallmark of any nuclear power plant construction, in fact the item that most distinguishes a nuclear plant construction process from a coal or oil construction

process is its Nuclear Quality Assurance. Nuclear Quality Assurance is codified in law in numerous places within 10 CFR 50. The single most important reference to Nuclear Quality Assurance is within the General Design Criteria (GDC) in 10 CFR 50 Appendix A.

14. Criterion 1 of the GDC demands Quality Assurance. It is critical to note that of all 64 General Design Criteria, regulators deliberately chose Nuclear Quality Assurance to be the first Criterion. Without Criterion 1, without nuclear grade quality, there can be no nuclear construction. Moreover, Criterion 1 demands that "Appropriate records…shall be maintained by or under the control of the nuclear power unit licensee throughout the life of the unit". Given TVA's three-year hiatus of Nuclear Quality Assurance at the Bellefonte Units, TVA does not comply with Criterion 1.

15. Criterion 1 of the GDC is not the only quality related federal regulation with which Bellefonte Units 1 and 2 have not complied. 10 CFR 50 Appendix B also applies in its entirety to Quality Assurance for Nuclear Plants such as Bellefonte. According to 10CFR50 Appendix B: Criterion 1:

> "The applicant shall be responsible for the establishment and execution of the quality assurance program."

16. To reinstate the Construction Permit license more than three years after it was terminated implies that the quality assurance program at Bellefonte was continuously executed while its construction permit was not in force. Instead of following regulations during the past three years, the plant stripped and cannibalized its equipment and the NRC stopped inspecting the Bellefonte site activities. Therefore, it is a fact that due to the lack of ongoing audits and inspections, neither the NRC nor the licensee TVA is able to confirm compliance with strict requirements of TVA's Nuclear Power Plant Construction Permit for Bellefonte Units 1 and 2 and in my opinion rendering "reinstatement" impossible.

17. On Page 4 of his dissenting opinion, Joseph Williams, NRC Senior Project Manager acknowledged that the degraded condition of the Bellefonte Units have not been categorized or fully evaluated by TVA.

> "Given that TVA has allowed the facility to degrade, has conducted other activities affecting the condition of the facility, and is obligated to demonstrate how it will comply with regulatory requirements, TVA should fully describe the changes to the facility since the construction permits were terminated, including TVA's investment recovery actions, stabilization efforts, degradation of the facility, and any other changes to the facility. It also appears that these changes are reportable under 10 CFR 50.55(e), and that TVA is obligated to complete an evaluation of these deviations from the approved design. Therefore, TVA must fully document how it will ensure compliance with all applicable regulatory requirements, if and when the construction permits are reissued. A commitment to document these issues in a corrective action program, as proposed in TVA's August 26, 2008, letter, is not sufficient, because it defers demonstration of compliance to some later date, and does not appear to be in compliance with 10 CFR 50.55(e)."

18. The evidence shows that there are yet other portions of 10 CFR 50 to which Bellefonte is unable to show compliance. Since its construction license termination Bellefonte has not maintained the "special protective environments" required by10 CFR 50 Appendix B Criterion 13.

> "Handling, Storage and Shipping, Measures shall be established to control the handling, storage, shipping, cleaning and preservation of material and equipment... When necessary…special protective environments...shall be specified and provided."

19. Due to its terminated license and cannibalized plants, TVA is unable provide a trail of documents for audit proving that proper storage and preservation were met after termination of its construction license. No NRC approved QA program was in place and no NRC audits were performed. Therefore, when the plant was stripped of its valuable and critical equipment, TVA clearly violated the regulations requiring the creation and continued maintenance of special protective environments for critical components.

    19.1. For example, at a nuclear power plant with the requisite QA program in place, there are strict controls on the type of light bulbs allowed inside the containment.

19.2. Such controls are required in order to prevent halogen contamination of the reactor vessel that may cause the vessel to fail when it is pressurized, and this is just one of thousands of critical regulations which must be enforced in order to assure nuclear safety and reliability.

19.3. TVA is unable to give quantifiable assurance that every light bulb stayed in compliance with the halogen restrictions during the past three years after the license was terminated and the unsupervised cannibalization had begun, just as it is unable to delineate that thousands of other critical maintenance requirements were performed in its unsupervised and unmonitored environment.

20. On Page 13 of his dissenting opinion, NRC Senior Project Manager Joseph Williams also identified these very same broad quality assurance weaknesses in reinstating the construction permits for Bellefonte Units 1 and 2. In his analysis Williams said,

> " *"TVA's August 26, 2008, letter claims that it is "maintaining the site in a stable condition."* However, the letter also states that TVA has taken action to dismantle parts of the facility, and describes how TVA has taken action to end degradation of the facility, including repairs to eliminate water intrusion and to seal off equipment affected by its investment recovery efforts. Therefore, the meaning of TVA's statement regarding the stable condition of the facility is not clear. However, it is apparent that the facility has not been preserved in the same state it was when the construction permits were terminated. As noted, these activities were not conducted in a manner consistent with NRC regulations. Furthermore, as discussed above, these activities appear to be reportable in accordance with 10 CFR 50.55(e) in the event the construction permits are reissued; this regulation also obligates TVA to identify all such deficiencies and to assess their effects. This situation is unlike Comanche Peak Unit 1, because the licensee in that case was continually subject to the requirements of 10 CFR 50.55(e) and other regulations applicable to holders of construction permits.
>
> As discussed above, TVA's proposal and handling of the facility since the construction permits were terminated is not consistent with the Commission Policy Statement on Deferred Plants, in that TVA did not continue its regulatory compliance throughout the period of termination, and TVA has not provided information

> needed to demonstrate compliance with regulatory requirements, as expected by the Policy Statement. In contrast, the permit holder for Comanche Peak Unit 1 continued to conduct construction, and to implement quality and maintenance programs in accordance with NRC requirements.
>
> No new safety or policy issues were created when the Comanche Peak Unit 1 construction permit was extended in early 1986. In contrast, as discussed above, for BLN Units 1 and 2, there are a number of safety and policy issues that must be addressed. In addition, the NRC needs to determine what regulations and standards will apply to BLN Units 1 and 2 if the construction permits are reissued."

21. By willingly and deliberately choosing not to comply with 10 CFR 50 for the last three years, TVA cannot provide adequate assurance that Bellefonte Units 1 and 2 will ever comply again. A continuity of records is required by 10 CFR 50, Appendix A Criterion 1. When the continuity of records is lost, the history of the nuclear industry has shown that it is impossible to recreate such enormous Quality Assurance. Published accounts show that members of TVA's own staff questioned the foolishness of stripping the Bellefonte Units of their valuable nuclear components and leaving the plant open to natural environmental degradation.

> Dr. Bob Doggart, a former senior engineering specialist at TVA who now serves as the managing lead assessor for the British Institute of Nondestructive Testing LLC said. "To allow outsiders to come in and remove key equipment for virtually nothing was unbelievably foolish." *Chattanooga Times Free Press on March 29, 2009*

22. The William H. Zimmer Nuclear Power Plant in Ohio is an historical example of a complete breakdown in Quality Assurance. However, unlike TVA Bellefonte Units 1 and 2, Zimmer was operating under a continuously in force Construction Permit when it was forced shut down permanently because of problems with its Quality Assurance records. Moreover, the NRC itself said that the quality of work at Zimmer was "indeterminate" because of breakdowns in the Quality Assurance records system. Much like TVA's Bellefonte Units 1 and 2, the Zimmer plant was more than 50% complete when the Quality Assurance record problems surfaced and were so problematic and irreparable that Zimmer had to terminate its construction permit. Because the systems, structures and components at Zimmer were unable to

meet the strict Nuclear Quality Assurance Standards, Zimmer could not be operated as a nuclear power plant and was forced to convert to a coal-fired station. While the Quality Assurance record trail for Zimmer did not meet the rigor of Nuclear Quality Assurance Standard, it did meet the requirements for conversion to a coal-fired plant with its more lenient records requirements.

23. The question of the adequacy of Quality Assurance records that Zimmer faced is similar to the condition today of the Quality Assurance Records at TVA's Bellefonte Units 1 and 2. There has been no NRC approved quality assurance records system at Bellefonte for almost 3-years, and reconstituting such step by step critical assessment of every piece of equipment within the plant, as is required by law, would be impossible to achieve without dismantling the entire plant and beginning again. Zimmer had hundreds of QA staff working under an NRC approved and supervised plan, while without its construction permit in place, TVA has not had any plan in place. More importantly, critical equipment, pipes, etc. at Zimmer were not stripped as at TVA's Bellefonte Units 1 and 2, but Zimmer retained its NRC approved records system until well after the decision was made to terminate its nuclear construction permit.

24. In summation, due to the lack of a viable and rigorous Quality Assurance Program for more than 3 years, it is my professional opinion that Reinstatement of TVA's Bellefonte Units 1 and 2 Construction Permits without an entirely new Construction Permit process constitutes a grave risk to public safety.

25. TVA's lack of adequate Quality Assurance Controls and the scavenging of the plants during the 3-year period following the termination of the construction permit has so violated 10 CFR 50, that in addition to TVA's Quality Assurance issues at Bellefonte Units 1 and 2 as described in 10 CFR 50 Appendices A and B, there are other critical construction permit issues, which, in my opinion, must be stringently reviewed and considered *prior* to the consideration of any possible construction permit reinstatement. Since TVA willingly and deliberately terminated the Bellefonte construction permits more than three years ago, I believe it is imperative

that TVA and the NRC conduct an in-depth review of TVA's original 1974 Construction Permit *prior* to any consideration of reinstatement of TVA's construction permit. TVA's Bellefonte Units 1 and 2 were designed during the late 1960's and early 1970's and the units received their construction permit in 1974. Not only are the mechanical equipment, containment, piping, and other physical features more than 30-years-old, but the design itself is already 40-years old, and does not meet today's safety criteria or knowledge base.

26. In 10 CFR 100, the NRC's regulations, (or worse) the Code of Federal Regulations contains numerous requirements for complete collection and analysis of demographic, seismic, hydrological, and meteorological data prior to submission of the application for any nuclear power plant construction permit. TVA's 1974 construction permit is based upon 40-year-old outdated demographic, seismic, hydrological and meteorological data and analyses, which do not hold up under the scrutiny of the current and more stringent environmental standards of 10 CFR 100.

> 10 CFR 100.20 Factors to be considered when evaluating sites.
>
> "The Commission will take the following factors into consideration in determining the acceptability of a site for a stationary power reactor:
>
> (a) Population density and use characteristics of the site environs, including the exclusion area, the population distribution, and site-related characteristics must be evaluated to determine whether individual as well as societal risk of potential plant accidents is low, and that physical characteristics unique to the proposed site that could pose a significant impediment to the development of emergency plans are identified.
>
> (b) The nature and proximity of man-related hazards (e.g., airports, dams, transportation routes, military and chemical facilities) must be evaluated to establish site parameters for use in determining whether a plant design can accommodate commonly occurring hazards, and whether the risk of other hazards is very low.
>
> (c) Physical characteristics of the site, including seismology, meteorology, geology, and hydrology.
>
> (1) Section 100.23, "Geologic and seismic siting factors," describes the criteria and nature of investigations required to obtain the geologic and seismic data necessary to determine the suitability

> of the proposed site and the plant design bases.
>
> (2) Meteorological characteristics of the site that are necessary for safety analysis or that may have an impact upon plant design (such as maximum probable wind speed and precipitation) must be identified and characterized.
>
> (3) Factors important to hydrological radionuclide transport (such as soil, sediment, and rock characteristics, adsorption and retention coefficients, ground water velocity, and distances to the nearest surface body of water) must be obtained from on-site measurements. The maximum probable flood along with the potential for seismically induced floods discussed in § 100.23 (d)(3) must be estimated using historical data."

27. The data collected in order to receive the 1974 construction permit no longer meets geologic and seismic siting factors important to hydrological radionuclide transport which must be obtained from on-site measurements and must be estimated using historical data. More specifically (1) Section 100.23 *"Geologic and seismic siting factors,"* "describes the criteria and nature of investigations required to obtain the geologic and seismic data necessary to determine the suitability of the proposed site and the plant design bases, (2) Meteorological characteristics of the site that are necessary for safety analysis or that may have an impact upon plant design (such as maximum probable wind speed and precipitation) must be identified and characterized, and (3) <u>Factors important to hydrological radionuclide transport</u> (such as soil, sediment, and rock characteristics, adsorption and retention coefficients, ground water velocity, and distances to the nearest surface body of water) <u>must be obtained from on-site measurements.</u> The maximum probable flood along with the potential for seismically induced floods discussed in § 100.23 (d)(3) <u>must be estimated using historical data.</u>" Emphasis is added, resulting in "<u>Factors important to hydrological radionuclide transport …must be obtained from on-site measurements….must be estimated using historical data.</u>

27.1. For example, the Bellefonte Units are located within the influence of the New Madrid earthquake zone, which in the 19th century caused the largest

recorded earthquake ever on the east coast. Since 1974, when the original TVA construction permit was granted, more than 6,800 newly recorded earthquakes have occurred within a 300 mile (500 km) radius of Hollywood, Alabama, and 20 of these earthquakes exceeded Richter 4. (Source: Center of Earthquake Research and Information, http://www.ceri.memphis.edu/seismic/catalogs/cat_nm.html).

28. Factors important to hydrological radionuclide transport (such as soil, sediment, and rock characteristics, adsorption and retention coefficients, ground water velocity, and distances to the nearest surface body of water) must be obtained from on-site measurements. In my expert opinion, additional demographic changes since 1974, which have not yet been analyzed, have also impacted the original hydrological and water-use data making therefore negatively impacting critical safety analysis factors.

    28.1. On Page 4 of his dissenting opinion, NRC Senior Project Manager Joseph Williams agrees with my opinion. Williams specifically states that the site's ability to withstand flooding must be reanalyzed due to previous errors TVA made when originally evaluating the Bellefonte site.

    > "One of the issues addressed in the safety evaluation for a construction permit is ability of the reactor design to withstand events such as floods or earthquakes, in accordance with 10 CFR 100.20 and 10 CFR Part 50 Appendix A, General Design Criterion 2. In the course of the Bellefonte Units 3 and 4 combined license review, the NRC staff has identified errors and quality control problems with the Tennessee Valley Authority's evaluation of the Bellefonte site hydrology. The NRC staff is concerned that the site may be vulnerable to flood levels higher than calculated by TVA, so the acceptability of the site and the adequacy of design features protecting the site have not yet been determined."

29. Due to the availability of newly-discovered data and errors in past TVA analyses, it is my opinion that it is not appropriate to reinstate TVA's Bellefonte construction permits for Units 1 and 2. I believe that a completely new environmental impact review must be conducted prior to the issuance of a new or reinstated construction permit. Furthermore, on Page 9 of his dissenting opinion, NRC Senior Project

Manager Joseph Williams said a complete environmental review should be required prior to any reinstatement of TVA's Bellefonte construction permits.

> "Reissuance of the BLN Unit 1 and 2 construction permits will also require environmental review. NRC regulations in 10 CFR Part 51 describe requirements for such reviews. For example, 10 CFR 51.20(b)(I) states that an EIS or supplement is required for "Issuance of a limited work authorization or a permit to construct [emphasis added] a nuclear power reactor, testing facility, or fuel reprocessing plant under part 50 of this chapter, or issuance of an early site permit under part 52 of this chapter." Presently, TVA does not hold permits for BLN Units 1 and 2. If NRC reissues the permits, an EIS appears to be required per this regulation before those permits could be issued to TVA.
>
> The existing environmental review for BLN Units 1 and 2 does not include the possible alternative of completing advanced reactors of a different design; the AP 1000 and other designs currently being considered for deployment did not exist at the time that evaluation was completed. As stated in the August 26,2008, letter, TVA has also conducted activities at the site, such dismantling some components and site structures, which may not be within the scope of the environmental review NRC completed for the construction permit. The existing environmental review was completed in the early 1970s, so it does not reflect any changes to the site environment over the past 30+ years. Therefore, reinstatement of the BLN Unit 1 and 2 construction permits as they previously existed would not reflect current information pertinent to the environment on or around the site. A similar issue has arisen in combined license applications under 10 CFR Part 52, where combined license applicants must provide any "new or significant information" pertinent to the environmental review even if an early site permit has been Issued, In accordance with 10 CFR 51.50(c)(I)(ill)."

30. Finally, 10 CFR 50.49(e)(5) states *"Aging. Equipment qualified by test must be preconditioned by natural or artificial (accelerated) aging to its end-of-installed life condition"*. TVA's Bellefonte Units were designed more than 40 years ago, and should construction of the existing units be completed, fuel load and initial startup is not anticipated for another 10 years. Therefore, the Systems, Structures and Components within the Bellefonte Units 1 and 2 would be 40 to 50-years-old even before initial operation. TVA's Bellefonte Units 1 and 2 were constructed to conform to a 40-year operating life, which means that should TVA's Bellefonte Units 1 and 2

begin operation with its original 40-year-old Systems, Structures and Components (SSC's), the plants will be 80 to 90-years-old at the end of a first operating license and the same 40-year-old Systems, Structures and Components would actually be105-years-old at the end life if they were granted a license extension. Since the industry, TVA, and the NRC have no available data regarding components older than 60-years, the evidence shows that the TVA Bellefonte Units 1 and 2 construction permit application is incomplete because it lacks critical research and development information on its aging equipment and no aging management plan to deal with, what is in my professional opinion, a significant reliability and safety issue.

31. In summation and based upon the facts delineated in this Declaration, it is my expert opinion that TVA must conduct a completely new environmental analysis prior to the issuance of any construction permit for Bellefonte Units 1 and 2.

32. *In conclusion*, the evidence clearly shows that the Reinstatement of the Construction Permits for Bellefonte Units 1 and 2, NRC has allowed TVA to violate both 10 CFR 50 and 10 CFR 100. Furthermore, in my opinion, licensure and operation of TVA's Bellefonte Units 1 and 2 pose a grave risk to public health and safety without an entirely new construction permitting process, Quality Assurance Program, and environmental data analysis due to:

    32.1. the degraded condition of the plant,

    32.2. lack of a viable and rigorous Quality Assurance Program for almost 3-years,

    32.3. the lack of a complete in-depth analysis of all new and historical environmental data, like critical seismic, hydrological, and demographic impact data, beginning with the plant's conceptual design more than 40-years ago up to and including all currently applicable environmental data,

    32.4. and the lack of consideration for the age of Systems, Structures, and Components (SSC's) that will be almost 40-years old before the plant even begins operation.

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

Executed this day, May 6, 2009 at Burlington, Vermont.

Arnold Gundersen, MSNE

I HEREBY CERTIFY that on this 6th day of May 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 Margaret Gundersen NOTARY PUBLIC
STATE OF VERMONT

MY COMMISSION EXPIRES: 2/10/2011