UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of		
The Detroit Edison Company	)	June 8, 2010
Fermi Nuclear Power Plant Unit 3	)	Docket No. 52-033
Combined License Application	)	

SECOND DECLARATION OF ARNOLD GUNDERSEN SUPPORTING SUPPLEMENTAL PETITION OF INTERVENORS CONTENTION 15: DTE COLA LACKS STATUTORILY REQUIRED COHESIVE QA PROGRAM

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. I have been retained by Petitioners Beyond Nuclear, Citizens for Alternatives to Chemical Contamination, Citizens Environmental Alliance of Southwestern Ontario, Don't Waste Michigan, and the Michigan Chapter of the Sierra Club to determine the root cause of Quality Assurance (QA) problems that the NRC has recently identified on the Fermi 3 COL application. If the QA problems are indeed significant, I have been asked to determine what remedies might be applicable to mitigate those Root Cause deficiencies.

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 1.

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

6. I am an author of the first edition of the Department of Energy (DOE) Decommissioning Handbook.

7. 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.

Introduction

9. The undersigned Declarant, Arnold Gundersen, hereby proffers the following statements in support of Contention No. 15 submitted by the Intervenor parties in this Fermi 3 Nuclear Power Plant licensing proceeding. My declaration is intended to

specifically address quality assurance issues relative to the Combined Operating License Application (COLA) for Detroit Edison's proposed Economic Simplified Boiling Water Reactor (ESBWR) at its Fermi Nuclear Power Plant (NPP) Unit 3.

10. More specifically, I reviewed the Detroit Edison (DTE) May 10, 2010 Reply Response to Request for Additional Information (RAI) Letter No. 26 regarding Fermi 3 Docket No. 52-033. RAI Letter No. 26 and compared it to my earlier expert report: *Declaration Of Arnold Gundersen Supporting Supplemental Petition Of Intervenors Contention 15: DTE COLA Lacks Statutorily Required Cohesive QA Program*. To date, I uncovered five inconsistencies and flaws in DTE's RAI Reply.

11. In its November 6, 2009 *Supplemental Petition to NRC for Admission of a Newly-Discovered Contention, and for Partial Suspension of NRC's DTE COLA Adjudication*, Intervenors noted that Detroit Edison lacks a complete and cohesive QA program as required by Appendix B to 10 CFR Part 50, so stating:

> "Detroit Edison has failed to comply with Appendix B to 10 CFR Part 50 to establish and maintain a quality assurance (QA) program since March 2007 when it entered into a contract with Black and Veatch (B&V) for the conduct of safety-related combined license (COL) application activities and to retain overall control of safety-related activities performed by B&V. DTE further has failed to complete any internal audits of QA programmatic areas implemented for Fermi 3 COLA activities performed to date. And DTE also has failed to document trending of corrective actions to identify recurring conditions adverse to quality since the beginning of the Fermi 3 project in March 2007."[1]

12. During my 38-year professional career, including my position as a Senior Vice

[1] *Supplemental Petition* of Beyond Nuclear, Citizens for Alternatives to Chemical Contamination, Citizens Environmental Alliance of Southwestern Ontario, Don't Waste Michigan, Sierra Club, Keith Gunter, Edward McArdle, Henry Newman, Derek Coronado, Sandra Bihn, Harold L. Stokes, Michael J. Keegan, Richard Coronado, George Steinman, Marilyn R. Timmer, Leonard Mandeville, Frank Mantei, Marcee Meyers, and Shirley Steinman for Admission *of a Newly-Discovered Contention, and for Partial Suspension of COLA Adjudication*, to US NRC Atomic Safety and Licensing Board (ASLB), Docket No. 52-033, Regarding the Detroit Edison Company Fermi Nuclear Power Plant Unit 3, November 6, 2009, Page 2.

President for a NRC licensee, I have been responsible for personnel who worked at more 70-NPPs throughout United States. I am therefore intimately familiar with the nuclear industry's desire to achieve high levels of quality through cohesive Quality Assurance (QA) plans and organizations. As I stated in my December 9, 2009 *Declaration Of Arnold Gundersen Supporting Supplemental Petition Of Intervenors Contention 15: DTE COLA Lacks Statutorily Required Cohesive QA Program***,** during my 38-year career, I have never witnessed a nuclear reactor program that did not have a fully operational Quality Assurance Program in place at the onset of its design process. The complete involvement of a QA program and its substantiating design review, document control, and rigorous process must begin several years prior to an application for a NRC license.

RAI QUESTION # 17.5-16 (E RAI TRACKING #4408)

13. Obviously my biggest concern, as reviewed in my earlier submittal is the lack of a bona-fide QA program. In my search of the RAI reply by Detroit Edison, I searched for the title of "New Plant Oversight Manager" that was submitted in the DTE COLA as the person responsible for QA for the proposed design of Fermi 3, and I was unable to find any references.

14. First, I found it disturbing that the key person identified by DTE as having the overall responsibility for QA in the Fermi Unit 3 COLA application was not mentioned at all in the RAI reply. Instead, it appears that the RAI introduces a new position that was not discussed in the DTE COLA application. The DTE RAI introduces a new role entitled "Nuclear Development QA Manager" that was not discussed in the Fermi COLA application. The RAI reply stated:

> "In March 2008, a Nuclear Development QA Manager was established and was responsible to develop the Nuclear Development QAPD and to independently plan and perform activities to verify the development and effective implementation of the QAPD to those activities that support the COLA. The Nuclear Development QA Manager was also responsible to evaluate compliance with regulatory requirements and procedures through audits and technical reviews, monitor organization processes to ensure conformance to licensing document requirements,

> and to ensure that vendors providing quality services to Detroit Edison in support of the COLA are meeting the requirements of 10 CFR 50 Appendix B." *Page 13 DTE Reply*

15. The newly referred to position of Nuclear Development QA Manager was not discussed in the Detroit Edison COLA Application yet the RAI states that the position existed prior to submittal of the COLA. Rather, in its COLA Detroit Edison claimed that these QA responsibilities were assigned to the "New Plant Oversight Manager" as discussed on page 25 of my earlier expert report:

> "1.4.1 New Plant Oversight Manager
> The new plant oversight manager is responsible for developing and maintaining the Fermi 3 QAPD, evaluating compliance to the programs, and managing QA resources. The new plant oversight manager is responsible for assuring compliance with regulatory requirements and procedures through audits and technical reviews; for monitoring organization processes to ensure conformance to commitments and licensing document requirements; for ensuring that vendors providing quality services, parts and materials to Fermi 3 are meeting the requirements of 10 CFR 50, Appendix B through NUPIC or Fermi 3 vendor audits.
>
> The new plant oversight manager has sufficient independence from other department priorities to bring forward issues affecting safety and quality and makes judgments regarding quality in all areas necessary regarding Fermi 3 nuclear activities. The new plant oversight manager may make recommendations to management regarding improving the quality of work processes. If the new plant oversight manager disagrees with any actions taken by other Fermi 3 organizations and is unable to obtain resolution, the new plant oversight manager shall bring the matter to the attention of the executive in charge of the MEP organization who will determine the final disposition." *(page 25, December Gundersen Expert Report)*

15.1. In its COLA application, DTE claimed that the New Plant Oversight Manager had the responsibilities it now claims in its RAI response belong to the newly created role of Nuclear Development QA Manager. A comparison of the COLA and the RAI reply is included in Table 1 below:

Table 1 Comparison DTE COLA and RAI Reply

COLA	RAI Reply
The COLA stated that the position entitled New Plant Oversight Manager is: *"responsible for assuring compliance with regulatory requirements"*	The RAI reply states that the Nuclear Development QA Manager is: *"responsible to evaluate compliance with regulatory requirements"*
The COLA stated that the position entitled New Plant Oversight Manager is responsible for: *"monitoring organization processes to ensure conformance to commitments and licensing document requirements"*	The RAI reply states that the Nuclear Development QA Manager is responsible to: *"monitor organization processes to ensure conformance to licensing document requirements."*
The COLA stated that the position entitled New Plant Oversight Manager is responsible *"for ensuring that vendors providing quality services, parts and materials to Fermi 3 are meeting the requirements of 10 CFR 50, Appendix B".*	The RAI reply states that the Nuclear Development QA Manager is responsible *"to ensure that vendors providing quality services to Detroit Edison in support of the COLA are meeting the requirements of 10 CFR 50 Appendix B".*

15.2. It appears that there is confusion within Detroit Edison over the conflicting roles of these two positions. DTE's RAI Reply said that the Nuclear Development QA Manager held that position in March of 2008 yet the COLA makes no reference to that role. The RAI and the COLA do not portray the same organizational philosophy for the role of Quality Assurance on the Fermi 3 Project. This confusion of the importance of QA in the early phases of the Fermi 3 Project may be a contributing factor to the confusion within DTE and the NRC that I discussed in my earlier expert report and may be contributing to the QA problems that Fermi 3 has already encountered.

RAI Question # 17.5-17 (e RAI tracking #4410)

16. On Page 3 to Attachment 2 to the RAI reply Detroit Edison stated:

> "Nuclear Development QA Manager, March 2008 - April 2009. An engineer with twenty plus years of nuclear experience including four years experience as lead auditor was responsible to maintain the Nuclear Development QAPD and to independently plan and perform activities to verify the development and effective implementation of the QAPD for those activities that support the COLA. The Nuclear Development QA Manager was also responsible to evaluate compliance with regulatory requirements and procedures through audits and technical reviews, to monitor organizational processes to ensure conformance to licensing document requirements, and to ensure that vendors providing quality services to Detroit Edison in support of the COLA are meeting the requirements of 10 CFR 50 Appendix B. [Full time]
>
> In June 2009, the QA function was transitioned from reporting to the Director, Nuclear Development to the Sr. Vice President, Major Enterprise Projects."
>
> *Page 3, Attachment 2 RAI Reply (RAI question No. 17.5-17, eRAI No. 4410)*

17. <u>There are four additional major concerns with the Detroit Edison (DTE) May 10, 2010 Reply Response to Request for Additional Information (RAI) Letter No. 26:</u>

17.1. The second concern with the DTE May 10, 2010 Reply Response is that there is a three-month long gap from April 2009 through June 2009 during which Detroit Edison admits that it had no personnel in charge of Quality Assurance. The lack of any Detroit Edison personnel assigned to the Fermi Unit 3 design and engineering process, makes any and all quality assurance work performed during this three-month period suspect as well as not in compliance with federal law.

17.2. My third concern, according to DTE May 10, 2010 Reply Response, the Nuclear Development QA Manager reported to the Director of Nuclear Development between March of 2008 and April of 2009. In the DTE May 10, 2010 Reply Response, DTE said that after June 2009, the Nuclear Development QA Manager reported to the Sr. Vice President, Major Enterprise Projects. However, according to Fermi's COLA, the New Plant Oversight Manager's reporting relationship is:

> "The new plant oversight manager has sufficient independence from other department priorities to bring forward issues affecting safety and quality and makes judgments regarding quality in all areas necessary regarding Fermi 3 nuclear activities. The new plant oversight manager may make recommendations to management regarding improving the quality of work processes. If the new plant oversight manager disagrees with any actions taken by other Fermi 3 organizations and is unable to obtain resolution, the new plant oversight manager shall bring the matter to the attention of the executive in charge of the MEP[2] organization who will determine the final disposition." [Emphasis Added]

17.2.1. Whatever the official title may be for the person in charge of QA at Fermi 3, it is clear that DTE's new description of reporting relationships for the Nuclear Development QA Manager as defined in the DTE May 10, 2010 Reply Response does not provide the Quality Assurance mission with adequate functional separation. It is critical in nuclear QA that there be complete separation and independence between QA and other line functions, and this separation that is a hallmark of nuclear safety in nuclear power plant construction does not seem to exist within the Fermi 3 organization.

17.2.2. Moreover, in its DTE May 10, 2010 Reply Response, DTE acknowledged that for a 13-month period between March of 2008 and April of 2009 the Quality Assurance Department actually reported directly to the Director of Nuclear Development, and from April 2009 to June 2009 QA reported to no one in any chain of command.

17.2.3. It appears that NEI criteria are violated when the QA function reports to the Director of Nuclear Projects as suggested in the RAI reply. This reporting relationship does not provide the Quality Assurance function with adequate functional separation to assure the clear separation and independence between QA and other line functions within the Fermi 3

[2] MEP organization – MEP is the acronym for Major Enterprise Projects, which is a business development arm of DTE, not a QA or Engineering division.

organization. As I stated in Paragraph 57 of my original expert testimony:

> "Specifically, NEI and the industry have highlighted the role of the QA Project Manager as a key contributor to the successful implementation of a valid and operational QA Program. In its QA Program Description, NEI further elaborates on the necessity of an operational QA Program directed by a Quality Assurance Program Manager prior to COLA submission. In Paragraph 1.5.2.1.1 of its *Quality Assurance Program Description* NEI describes the role of the QA manager thus:
> "***1.5.2.1.1 [Nuclear Development] Quality Assurance Project Manager***
>
> *The [Nuclear Development] Quality Assurance Project Manager (QAPM) reports administratively to the [CA] QA Manager and functionally to the Senior Nuclear Development Officer, and is responsible for the development and verification of implementation of the QAPD described in this document. The QAPM is responsible for assuring compliance with regulatory requirements and procedures through audits and technical reviews; ensuring that vendors providing quality services, parts and materials to [CA] are meeting the requirements of 10 CFR 50, Appendix B through NUPIC or [CA] vendor audits. The QAPM has sufficient independence from other [Nuclear Development] priorities to bring forward issues affecting safety and quality and makes judgments regarding quality in all areas necessary regarding [CA]'s [Nuclear Development] activities. The QAPM may make recommendations to the [Nuclear Development]management regarding improving the quality of work processes. If the QAPM disagrees with any actions taken by the [ND] organization and is unable to obtain resolution, the QAPM shall inform the QA Manager and bring the matter to the attention of the Senior Nuclear Development Officer] who will determine the final disposition.*"

17.2.4. In its RAI, Detroit Edison said that between March of 2008 and April of 2009, Fermi's QA function for the entire project reported only to the Director of Nuclear Development. Such an organizational chain of command clearly violates the NEI approved reporting relationships as defined above, and as I previously identified in my earlier declaration.

17.3. My fourth regards Detroit Edison's original filing for its original COLA for Fermi Unit 3, in which it should have alerted the NRC that it had taken exception to the NEI approved reporting relationship for its QA function. DTE did not notify the NRC in its original COLA filing for Fermi 3, that it had arbitrarily chosen to modify the NEI approved reporting relationship approved by NRC for this new generation of reactors.

17.4. Fifth and finally, DTE has said that as of March 2008, the Nuclear Development QA Manager was assigned to the Fermi 3 project, however, during my review of Revision 0 of DTE Energy's "Quality Assurance Program Description" (EF3 QAPD Rev0)[3], I am unable to find any reference to a Nuclear Development QA Manager anywhere throughout the entire text of this document regarding DTE's Fermi 3 QA Program. The EF3 QAPD Rev 0 is dated September 2008 and DTE's RAI reply said that the Nuclear Development QA Manager role was put in place in March 2008.

SUMMARY

18. As I stated in my original December 2009 declaration: "Since assuming the Chairmanship of the U.S. Regulatory Commission, The Honorable Gregory B. Jaczko, has taken on the challenge of bringing nuclear power plant design and QA to a new level of coherency and NRC regulation as evidenced by the series of speeches he has given during the October and November 2009. In *Moving Safety and Security to the Front Edge of Design*, his prepared remarks given October 8, 2009 at the Workshop on Small- and Medium-Sized Nuclear Reactors, The Honorable Chairman Jaczko said,

> "The NRC is a regulatory agency. <u>We license and regulate the commercial use of nuclear materials to ensure adequate protection of public health and safety, promote the common defense and security,</u>

[3] DTE Energy's "Quality Assurance Program Description" (EF3 QAPD Rev0) was submitted as part of the Combined License Application, Part 2 Final Safety Analysis Report dated September 2008.

> and protect the environment. With that as our mission, the NRC does not develop or promote reactor designs, nor participate in the selection of one reactor design over another. That is the responsibility of other organizations. We are focused on safety and security of the public and environment. **One licensing process lesson that we can learn, from the ongoing new reactor design certification and combined license reviews, is that timely and effective licensing reviews not only require the regulator to be ready, but it also requires the applicant to be ready**. Prospective applicants, whether they are seeking a design certification, a design approval, or a combined license, need to ensure that their design is sufficiently complete to support a licensing review. **The application needs to be complete when it is initially submitted to the NRC**. I know that the staff plans to address this subject sometime during the next day and a half. The SMR community should give careful consideration to their advice on the importance of sufficiently completing the design and any testing needed to support the application prior to the submittal of an application." *Moving Safety and Security to the Front Edge of Design* Prepared Remarks for The Honorable Gregory B. Jaczko Chairman U.S. Regulatory Commission at the Workshop on Small- and Medium-Sized Nuclear Reactors October 8, 2009, Document No. S-09-28. *[Emphasis Added]*

19. The Honorable Gregory B. Jaczko makes it clear that for "new reactor design certification and combined license reviews …The application needs to be complete when it is initially submitted to the NRC." *[Emphasis Added]* With such a position clearly articulated by the Commission Chairman, it is unsatisfactory for Detroit Edison to have provided an incomplete and poorly developed COLA for Fermi Unit 3. Moreover, NRC and the Intervenors rightfully expected that initial COLA submittal filed in 2008 to be complete. According to the NRC's Notice of Violation (NOV)[4], DTE lacked a QA program to oversee site-specific engineering prior to license submittal. Therefore, DTE's Fermi Unit 3 COLA does not meet the NRC requirement for a complete filing that has been clearly delineated by NRC Chairman The Honorable Gregory B. Jaczko."

20. The original COLA omitted the key position of Nuclear Development QA Manager. Either the original COLA was filed with a major inaccuracy or the current RAI reply

[4] NRC Inspection Report 05200033/2009-201 and Notice of Violation October 5, 2009.

is wrong. In either even this major incongruity speaks to the overall quality of DTE's entire application.

21. Not only do NRC regulations require a fully functional QA program be in place and be the responsibility of the applicant prior to developing a license application, but the best practices within the nuclear industry also support the same conclusion.

22. As I stated in my original December 2009 declaration, "It is an incontrovertible fact that the entire nuclear industry, through its trade organization, the Nuclear Energy Institute (NEI), so undeniably recognizes and emphasizes the need to implement a Quality Assurance Program before applying to the NRC for a license that NEI has developed its own *Quality Assurance Program Description.* Moreover, NEI has written a boilerplate template for license applicants, like DTE Fermi Unit 3, in a simplified fill-in-the-blanks format so that a COLA is almost assuredly guaranteed if each step in the COLA process is followed as NEI has outlined."

23. As the evidentiary trail of emails, delineated in my December 2009 Declaration, has proven, a thorough reading of the DTE Fermi Unit 3 COLA makes it clear that DTE knew and acknowledged its QA responsibilities, and now having been caught without implementation of GDC Criterion 1, the corporation is attempting to obfuscate the entire process rather than go back to the beginning and start over with a valid QA Program in place.

CONCLUSION

24. The RAI response, when compared to DTE Fermi Unit 3's COLA, shows that the QA function on the Fermi 3 project was and continues to be wholly inadequate. This expert report, entitled *Second Declaration Of Arnold Gundersen Supporting Supplemental Petition Of Intervenors Contention 15: DTE COLA Lacks Statutorily Required Cohesive QA Program,* confirms and amplifies the concerns I expressed in my December 2009 Declaration. Those original concerns are:

24.1. "First, based upon NRC emails beginning in June 2009, it is abundantly clear

to me that the NRC has been and is fully aware that the Intervenors Petition is factually accurate and poses grave concerns about the quality of the Detroit Edison Fermi Unit 3 COLA.

24.2. Second, the Code of Federal Regulations makes it abundantly clear that a formal QA Program must be in place well before the Detroit Edison Fermi Unit 3 COLA was to be reviewed by the NRC.

24.3. Third, further factual evidence reviewed and presented in this report show that the Detroit Edison Fermi Unit 3 actually has agreed that a complete and thorough Quality Assurance Program is required for site-specific activities well prior to its COLA submittal to the NRC as it wrote in its COLA in the very language articulated for the nuclear industry by NEI.

24.4. Fourth, the factual record shows that the actual Root Cause of the DTE Fermi Unit 3 QA Program failure is the direct result of significant differences between the critical position of "Quality Assurance Project Manger" as envisioned by the nuclear industry and articulated by NEI and the dramatically weaker and limited role of "Plant Oversight Manager" that has been created by Detroit Edison at Fermi Unit 3 as a vehicle to escape required nuclear regulation.

24.5. As a result, this weakened role for the Quality Assurance organization is the Root Cause of the current hole in a statutorily mandated Quality Assurance Program at the DTE Fermi Unit 3, and it also portends serious problems in the future of Fermi Unit 3 if construction is permitted. Such a weakened and happenstance QA program in comparison to NEI articulated industry standards foretells of Unit-wide QA issues should the NRC look the other way and not fulfill its statutory obligations.

24.6. Consequently, the differences in the organizational approaches toward QA well articulated by NEI compared to that created by Detroit Edison at its Fermi Unit 3 are not merely semantic nuances. Quite simply, the weakened role that

DTE has chosen to give to its "Oversight Manager" indicates that the very senior levels of Detroit Edison do not comprehend the importance of a fully independent QA Organization as envisioned the nuclear industry, articulated by NEI and mandated by statute.

24.7. Naturally, the independence of the role of the Quality Assurance Project Manager as envisioned by NEI places Quality before Profit. The role of "Plant Oversight Manager" as limited by the Senior Management at Detroit Edison emasculates Quality Assurance and appears to place a premium on speed and profitability rather than public health and safety.

24.8. After all, the factual evidence and evidentiary trail exposed and detailed within my December 9, 2009 expert report clearly supports the Intervenors' *Supplemental Petition For Admission Of A Newly- Discovered Contention, And For Partial Suspension Of COLA Adjudication.*

25. **Therefore**, Detroit Edison's Reply to RAI Letter 26 simply confuses the Fermi 3 QA organizational structure further as evidenced in Table 1 (page 6 of this Declaration) and highlights the QA organizational weaknesses I identified earlier.

26. Finally, this significant disparity over the role and independence of QA among Detroit Edison, the NRC, and the nuclear industry must be addressed by the NRC and rectified by Detroit Edison. Clearly, Detroit Edison was responsible for identifying any and all areas where it was in noncompliance with NEI industry-wide criteria when it submitted its original application, and therefore DTE failed to meet its legal obligation and burden of proof.

27. In the NRC's enforcement of its stringent regulations, NRC must review the entire Fermi 3 COLA in light of DTE's decision to ignore the statutory requirements of filing its COLA.

28. Should the NRC and DTE determine that DTE does in fact wish to proceed with the COL process, then all work done to date requires serious review and the pedigree of

the Quality Assurance supporting that work must be clearly evident. This inadequacy of Quality Assurance cannot be remedied simply through the hiring of additional personnel or appearing to put a new position in place as evidenced by the Reply to RAI Letter 26, and shown in Table 1 of this Declaration.

29. Consequently, in my opinion, all work on the Detroit Edison Fermi Unit 3 should stop and not be reinstated until a bona fide QA Program is fully implemented as mandated by the Code of Federal Regulations.

End

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

Executed this day, June 8, 2010 at Burlington, Vermont.

Arnold Gundersen, MSNE
Chief Engineer, Fairewinds Associates, Inc

CURRICULUM VITAE
Arnold Gundersen
Chief Engineer, Fairewinds Associates, Inc
June 2010

Education and Training

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

Qualifications – including and not limited to:

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

Publications

Co-author — *DOE Decommissioning Handbook, First Edition*, 1981-1982, invited author.

Co-author — *Decommissioning the Vermont Yankee Nuclear Power Plant: An Analysis of Vermont Yankee's Decommissioning Fund and Its Projected Decommissioning Costs*, November 2007, Fairewinds Associates, Inc.

Co-author — *Decommissioning Vermont Yankee – Stage 2 Analysis of the Vermont Yankee Decommissioning Fund – The Decommissioning Fund Gap*, December 2007, Fairewinds

Associates, Inc. Presented to Vermont State Senators and Legislators.

Co-author — *Vermont Yankee Comprehensive Vertical Audit – VYCVA – Recommended Methodology to Thoroughly Assess Reliability and Safety Issues at Entergy Nuclear Vermont Yankee*, January 30, 2008 Testimony to Finance Committee Vermont Senate

Co-author — *Act 189 Public Oversight Panel Report*, March 17, 2009, to the Vermont State Legislature by the Vermont Yankee Public Oversight Panel.

Author — Fairewinds Associates, Inc *First Quarterly Report to the Joint Legislative Committee*, October 19, 2009.

Co-author — The Second Quarterly Report by Fairewinds Associates, Inc to the Joint Legislative Committee regarding buried pipe and tank issues at Entergy Nuclear Vermont Yankee and Entergy proposed Enexus spinoff. See two reports: *Fairewinds Associates 2nd Quarterly Report to JFC* and *Enexus Review by Fairewinds Associates*.

Patents

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

Committee Memberships

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

Honors

U.S. Atomic Energy Commission Fellowship, 1972
B.S. Degree, Cum Laude, RPI, 1971, 1st in nuclear engineering class
Tau Beta Pi (Engineering Honor Society), RPI, 1969 – 1 of 5 in sophomore class of 700
James J. Kerrigan Scholar 1967–1971
Teacher of the Year – 2000, Marvelwood School
Publicly commended to U.S. Senate by NRC Chairman, Ivan Selin, in May 1993 – "It is true...everything Mr. Gundersen said was absolutely right; he performed quite a service."

Nuclear Consulting and Expert Witness Testimony

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

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

Vermont State Legislature House Natural Resources – April 5, 2010

Testified to the House Natural Resources Committee regarding discrepancies in Entergy's TLG Services decommissioning analysis. See *Fairewinds Cost Comparison TLG Decommissioning* (http://www.leg.state.vt.us/JFO/Vermont%20Yankee.htm).

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

The Second Quarterly Report by Fairewinds Associates, Inc to the Joint Legislative Committee regarding buried pipe and tank issues at Entergy Nuclear Vermont Yankee and Entergy proposed Enexus spinoff. See two reports: *Fairewinds Associates 2nd Quarterly Report to JFC* and *Enexus Review by Fairewinds Associates*.
(http://www.leg.state.vt.us/JFO/Vermont%20Yankee.htm).

Vermont State Legislature Senate Natural Resources – February 16, 2010
Testified to Senate Natural Resources Committee regarding causes and severity of tritium leak in unreported buried underground pipes, status of Enexus spinoff proposal, and health effects of tritium.

Vermont State Legislature Senate Natural Resources – February 10, 2010
Testified to Senate Natural Resources Committee regarding causes and severity of tritium leak in unreported buried underground pipes. http://www.youtube.com/watch?v=36HJiBrJSxE

Vermont State Legislature Senate Finance – February 10, 2010
Testified to Senate Finance Committee regarding *A Chronicle of Issues Regarding Buried Tanks and Underground Piping at VT Yankee.*
*(*http://www.leg.state.vt.us/JFO/Vermont%20Yankee.htm)

Vermont State Legislature House Natural Resources – January 27, 2010
A Chronicle of Issues Regarding Buried Tanks and Underground Piping at VT Yankee.
(http://www.leg.state.vt.us/JFO/Vermont%20Yankee.htm)

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

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

U.S. NRC Region III Allegation Filed by Missouri Coalition for the Environment
Expert Witness Report entitled: *Comments on the Callaway Special Inspection by NRC Regarding the May 25, 2009 Failure of its Auxiliary Feedwater System,* November 9, 2009.

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee
Oral testimony given to the Vermont State Legislature Joint Fiscal Committee October 28, 2009. See report: *Quarterly Status Report - ENVY Reliability Oversight for JFO*
(http://www.leg.state.vt.us/JFO/Vermont%20Yankee.htm).

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee
The First Quarterly Report by Fairewinds Associates, Inc to the Joint Legislative Committee

regarding reliability issues at Entergy Nuclear Vermont Yankee, issued October 19, 2009. See report: *Quarterly Status Report - ENVY Reliability Oversight for JFO* (http://www.leg.state.vt.us/JFO/Vermont%20Yankee.htm).

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

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

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

Vermont State Legislature Joint Fiscal Committee Expert Witness Oversight Role for Entergy Nuclear Vermont Yankee (ENVY)
Contracted by the Joint Fiscal Committee of the Vermont State Legislature as an expert witness to oversee the compliance of ENVY to reliability issues uncovered during the 2009 legislative session by the Vermont Yankee Public Oversight Panel of which I was appointed a member along with former NRC Commissioner Peter Bradford for one year from July 2008 to 2009. Entergy Nuclear Vermont Yankee (ENVY) is currently under review by Vermont State Legislature to determine if it should receive a Certificate for Public Good (CPG) to extend its operational license for another 20-years. Vermont is the only state in the country that has legislatively created the CPG authorization for a nuclear power plant. Act 160 was passed to ascertain ENVY's ability to run reliably for an additional 20 years. Appointment from July 2009 to May 2010.

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

U.S. Nuclear Regulatory Commission
Expert Witness Declaration regarding Through-wall Penetration of Containment Liner and Inspection Techniques of the Containment Liner at Beaver Valley Unit 1 Nuclear Power Plant *Declaration of Arnold Gundersen Supporting Citizen Power's Petition* (May 25, 2009).

U.S. Nuclear Regulatory Commission
Expert Witness Declaration regarding Quality Assurance and Configuration Management at

Bellefonte Nuclear Plant *Declaration of Arnold Gundersen Supporting Blue Ridge Environmental Defense League's Contentions in their Petition for Intervention and Request for Hearing*, May 6, 2009.

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

Vermont Legislative Testimony and Formal Report for 2009 Legislative Session
As a member of the Vermont Yankee Public Oversight Panel, I spent almost eight months examining the Vermont Yankee Nuclear Power Plant and the legislatively ordered Comprehensive Vertical Audit. Panel submitted Act 189 Public Oversight Panel Report March 17, 2009 and oral testimony to a joint hearing of the Senate Finance and House Natural Resources March 19, 2009. (See: http://www.leg.state.vt.us/JFO/Vermont%20Yankee.htm)

Finestone v FPL (11/2003 to 12/2008) Federal Court
Plaintiffs' Expert Witness for Federal Court Case with Attorney Nancy LaVista, from the firm Lytal, Reiter, Fountain, Clark, Williams, West Palm Beach, FL. This case involved two plaintiffs in cancer cluster of 40 families alleging that illegal radiation releases from nearby nuclear power plant caused children's cancers. Production request, discovery review, preparation of deposition questions and attendance at Defendant's experts for deposition, preparation of expert witness testimony, preparation for Daubert Hearings, ongoing technical oversight, source term reconstruction and appeal to Circuit Court.

U.S. Nuclear Regulatory Commission Advisory Committee Reactor Safeguards (NRC-ACRS)
Expert Witness providing oral testimony regarding Millstone Point Unit 3 (MP3) Containment issues in hearings regarding the Application to Uprate Power at MP3 by Dominion Nuclear, Washington, and DC. (July 8-9, 2008).

Appointed by President Pro-Tem of Vermont Senate to Legislatively Authorized Nuclear Reliability Public Oversight Panel
To oversee Comprehensive Vertical Audit of Entergy Nuclear Vermont Yankee (Act 189) and testify to State Legislature during 2009 session regarding operational reliability of ENVY in relation to its 20-year license extension application. (July 2, 2008 to present).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)
Expert Witness providing testimony regarding *Pilgrim Watch's Petition for Contention 1 Underground Pipes* (April 10, 2008).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)
Expert Witness supporting *Connecticut Coalition Against Millstone In Its Petition For Leave To Intervene, Request For Hearing, And Contentions Against Dominion Nuclear Connecticut Inc.'s Millstone Power Station Unit 3 License Amendment Request For Stretch Power Uprate* (March 15, 2008).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)
Expert Witness supporting *Pilgrim Watch's Petition For Contention 1*: *specific to issues regarding the integrity of Pilgrim Nuclear Power Station's underground pipes and the ability of Pilgrim's Aging Management Program to determine their integrity*. (January 26, 2008).

Vermont State House – 2008 Legislative Session
- House Committee on Natural Resources and Energy – Comprehensive Vertical Audit: *Why NRC Recommends a Vertical Audit for Aging Plants Like Entergy Nuclear Vermont Yankee (ENVY)*
- House Committee on Commerce – Decommissioning Testimony

Vermont State Senate – 2008 Legislative Session
- Senate Finance – testimony regarding Entergy Nuclear Vermont Yankee Decommissioning Fund
- Senate Finance – testimony on the necessity for a Comprehensive Vertical Audit (CVA) of Entergy Nuclear Vermont Yankee
- Natural Resources Committee – testimony regarding the placement of high-level nuclear fuel on the banks of the Connecticut River in Vernon, VT

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

Appeal to the Vermont Supreme Court (March 2006 to 2007)
Expert Witness Testimony in support of *New England Coalition's Appeal to the Vermont Supreme Court Concerning: Degraded Reliability at Entergy Nuclear Vermont Yankee as a Result of the Power Uprate*. New England Coalition represented by Attorney Ron Shems of Burlington, VT.

State of Vermont Environmental Court (Docket 89-4-06-vtec 2007)
Expert witness retained by New England Coalition to review Entergy and Vermont Yankee's analysis of alternative methods to reduce the heat discharged by Vermont Yankee into the Connecticut River. Provided Vermont's Environmental Court with analysis of alternative methods systematically applied throughout the nuclear industry to reduce the heat discharged by nuclear power plants into nearby bodies of water and avoid consumptive water use. This report included a review of the condenser and cooling tower modifications.

U.S. Senator Bernie Sanders and Congressman Peter Welch (2007)
Briefed Senator Sanders, Congressman Welch and their staff members regarding technical and engineering issues, reliability and aging management concerns, regulatory compliance, waste storage, and nuclear power reactor safety issues confronting the U.S. nuclear energy industry.

State of Vermont Legislative Testimony to Senate Finance Committee (2006)
Testimony to the Senate Finance Committee regarding Vermont Yankee decommissioning costs, reliability issues, design life of the plant, and emergency planning issues.

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

U.S. Senators Jeffords and Leahy (2003 to 2005)
Provided the Senators and their staffs with periodic overview regarding technical, reliability, compliance, and safety issues at Entergy Nuclear Vermont Yankee (ENVY).

10CFR 2.206 filed with the Nuclear Regulatory Commission (July 2004)
Filed 10CFR 2.206 petition with NRC requesting confirmation of Vermont Yankee's compliance with General Design Criteria.

State of Vermont Public Service Board (April 2003 to May 2004)
Expert witness retained by New England Coalition to testify to the Public Service Board on the reliability, safety, technical, and financial ramifications of a proposed increase in power (called an uprate) to 120% at Entergy's 31-year-old Vermont Yankee Nuclear Power Plant.

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

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

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

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

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

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

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

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

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

***Special Remediation Expertise*:**

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

- NES was a nuclear licensee that specialized in dismantlement and remediation of nuclear facilities and nuclear sites. Member of the radiation safety committee for this licensee.
- Department of Energy chose NES to write *DOE Decommissioning Handbook* because NES had a unique breadth and depth of nuclear engineers and nuclear physicists on staff.
- Personally wrote the "Small Bore Piping" chapter of the DOE's first edition Decommissioning Handbook, personnel on my staff authored other sections, and I reviewed the entire Decommissioning Handbook.
- Served on the Connecticut Low Level Radioactive Waste Advisory Committee for 10 years from its inception.
- Managed groups performing analyses on dozens of dismantlement sites to thoroughly remove radioactive material from nuclear plants and their surrounding environment.
- Managed groups assisting in decommissioning the Shippingport nuclear power reactor. Shippingport was the first large nuclear power plant ever decommissioned. The decommissioning of Shippingport included remediation of the site after decommissioning.
- Managed groups conducting site characterizations (preliminary radiation surveys prior to commencement of removal of radiation) at the radioactively contaminated West Valley site in upstate New York.
- Personnel reporting to me assessed dismantlement of the Princeton Avenue Plutonium Lab in New Brunswick, NJ. The lab's dismantlement assessment was stopped when we uncovered extremely toxic and carcinogenic underground radioactive contamination.
- Personnel reporting to me worked on decontaminating radioactive thorium at the Cleveland Avenue nuclear licensee in Ohio. The thorium had been used as an alloy in turbine blades. During that project, previously undetected extremely toxic and carcinogenic radioactive contamination was discovered below ground after an aboveground gamma survey had purported that no residual radiation remained on site.

Teaching and Academic Administration Experience

Rensselaer Polytechnic Institute (RPI) – Advanced Nuclear Reactor Physics Lab
Community College of Vermont – Mathematics Professor – 2007 to present
Burlington High School
Mathematics Teacher – 2001 to June 2008
Physics Teacher – 2004 to 2006
The Marvelwood School – 1996 to 2000
Awarded Teacher of the Year – June 2000
Chairperson: Physics and Math Department
Mathematics and Physics Teacher, Faculty Council Member
Director of Marvelwood Residential Summer School
Director of Residential Life
The Forman School & St. Margaret's School – 1993 to 1995
Physics and Mathematics Teacher, Tennis Coach, Residential Living Faculty Member

Nuclear Engineering 1970 to Present

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

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

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

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

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

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

Vice President of Engineering Services
Responsible for the overall performance of the company's field engineering, operations engineering, and engineered products services. Integrated the Danbury-based and field-based

engineering functions to provide numerous products and services required by nuclear utilities, including patents for engineered products.

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

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

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

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

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

Northeast Utilities Service Corporation (NU) — 1972 to 1976

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

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

Rensselaer Polytechnic Institute (RPI) — 1971 to 1972

Critical Facility Reactor Operator, Instructor

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

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

Assistant Engineer

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

Public Service, Cultural, and Community Activities

2005 to Present – Public presentations and panel discussions on nuclear safety and reliability at University of Vermont, NRC hearings, Town and City Select Boards, Legal Panels, Television, and Radio

2007-2008 – Created Concept of Solar Panels on Burlington High School; worked with Burlington Electric Department and Burlington Board of Education Technology Committee on Grant for installation of solar collectors for Burlington Electric peak summer use

Vermont State Legislature – Ongoing Public Testimony to Legislative Committees

Certified Foster Parent State of Vermont – 2004 to 2007

Mentoring former students – 2000 to present – college application and employment application questions and encouragement

Tutoring Refugee Students – 2002 to 2006 – Lost Boys of the Sudan and others from educationally disadvantaged immigrant groups

Designed and Taught Special High School Math Course for ESOL Students – 2007 to 2008

Featured Nuclear Safety and Reliability Expert (1990 to present) for Television, Newspaper, Radio, & Internet – Including, and not limited to: CNN (Earth Matters), NECN, WPTZ VT, WTNH, VPTV, WCAX, Cable Channel 17, The Crusaders, Front Page, Mark Johnson Show, Steve West Show, Anthony Polina Show, WKVT, WDEV, WVPR, WZBG CT, Seven Days, AP News Service, Houston Chronicle, Christian Science Monitor, New York Times, Brattleboro Reformer, Rutland Herald, Times-Argus, Burlington Free Press, Litchfield County Times, The News Times, The New Milford Times, Hartford Current, New London Day, evacuationplans.org, Vermont Daily Briefing, Green Mountain Daily, and numerous other national and international blogs

NNSN – National Nuclear Safety Network, Founding Advisory Board Member, meetings with and testimony to the Nuclear Regulatory Commission Inspector General (NRC IG)

Berkshire School Parents Association, Co-Founder

Berkshire School Annual Appeal, Co-Chair

Sunday School Teacher, Christ Church, Roxbury, CT

Washington Montessori School Parents Association Member

Marriage Encounter National Presenting Team with wife Margaret

Provided weekend communication and dialogue workshops weekend retreats/seminars

Connecticut Marriage Encounter Administrative Team – 5 years

Northeast Utilities Representative Conducting Public Lectures on Nuclear Safety Issues

End