

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

In the matter of

FirstEnergyNuclear Operating Company)	
(FENOC))	
Davis-Besse Nuclear Power Station)	May 20, 2013
License Amendment Steam Generator)	
Docket No. 50-346)	
License No. NPF-3)	

EXPERT WITNESS REPORT OF ARNOLD GUNDERSEN
TO SUPPORT THE PETITION
FOR LEAVE TO INTERVENE AND REQUEST FOR HEARING
BY BEYOND NUCLEAR (TAKOMA PARK, MD), CITIZENS ENVIRONMENT
ALLIANCE SW ONTARIO CANADA, DON'T WASTE MICHIGAN (MI), AND
SIERRA CLUB OHIO CHAPTER (OH)

- 1 I, Arnold Gundersen, declare as follows:
- 2 My name is Arnold Gundersen. I am sui juris. I am over the age of 18-years-old.
- 3 Beyond Nuclear (Takoma Park, MD), Citizens Environment Alliance SW Ontario
- 4 Canada, Don't Waste Michigan (MI), and Sierra Club Ohio Chapter (OH) have retained
- 5 Fairewinds Associates, Inc to issue an expert report in support of the Parties' Petition For
- 6 Leave To Intervene And Request For Hearing. I have specifically been retained to
- 7 examine the licensing basis for the First Energy Nuclear Operating Company (FENOC)
- 8 proposed Replacement Once Through Steam Generator (ROTSG) modification to its
- 9 Davis-Besse (D-B) nuclear plant.

1 I earned my Bachelor Degree in Nuclear Engineering from Rensselaer Polytechnic
2 Institute (RPI) cum laude. I earned my Master Degree in Nuclear Engineering from RPI
3 via an Atomic Energy Commission Fellowship. Cooling tower operation and cooling
4 tower plume theory was my area of study for my Master's Degree.

5 I began my career as a reactor operator and instructor in 1971 and progressed to the
6 position of Senior Vice President for a nuclear licensee prior to becoming a nuclear
7 engineering consultant and expert witness. I hold one nuclear plant patent. My
8 Curriculum Vitae is Attachment 1.

9 I have testified as an expert witness to the Nuclear Regulatory Commission (NRC)
10 Atomic Safety and Licensing Board (ASLB) and Advisory Committee on Reactor
11 Safeguards (ACRS), in Federal Court, the State of Vermont Public Service Board, the
12 State of Vermont Environmental Court, and the Florida Public Service Commission.

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

15 I have more than 40-years of professional nuclear experience *including and not limited*
16 *to:* Cooling Tower Operation, Cooling Tower Plumes, Consumptive Water Loss, Nuclear
17 Plant Operation, Nuclear Management, Nuclear Safety Assessments, Reliability
18 Engineering, In-service Inspection, Criticality Analysis, Licensing, Engineering
19 Management, Thermohydraulics, Radioactive Waste Processes, Decommissioning, Waste
20 Disposal, Structural Engineering Assessments, Nuclear Fuel Rack Design and
21 Manufacturing, Nuclear Equipment Design and Manufacturing, Prudency Defense,
22 Employee Awareness Programs, Public Relations, Contract Administration, Technical
23 Patents, Archival Storage and Document Control, Source Term Reconstruction, Dose
24 Assessment, Whistleblower Protection, and NRC Regulations and Enforcement.

25 I am employed as the chief engineer for Fairewinds Associates, Inc, an expert witness
26 and paralegal services firm specializing in nuclear engineering, nuclear operations, and
27 nuclear safety analysis and assessment.

1 My pertinent experience related to the Steam Generator matters being considered by this
2 proceeding include, but are not limited to:

- 3 • In my position as the Senior Vice President of Inspection Services, I was
4 responsible for a group of approximately 200-personnel performing ASME III
5 and ASME XI non-destructive piping inspections at nuclear plants throughout the
6 United States. These personnel used inspection techniques identical to those used
7 on steam generator tube inspections.
- 8 • As the Senior Vice President of Engineering Services, I was responsible for
9 the development of the first ever modern steam generator nozzle dams that were
10 sold to approximately 40-nuclear reactors in the US and Asia.

11 My declaration is intended to examine the licensing basis for the First Energy Nuclear
12 Operating Company (FENOC) proposed Replacement Once Through Steam Generator
13 (ROTSG) modification to its Davis Besse (D-B) nuclear plant.

14

15 **BACKGROUND**

16 There is a dearth of technical data in the Nuclear Regulatory Commission (NRC) Public
17 Document Room (PDR) regarding the First Energy Nuclear Operating Company
18 (FENOC) proposed Replacement Once Through Steam Generator (ROTSG) modification
19 to its Davis Besse (D-B) nuclear plant in Oak Harbor, Ohio. However, from published
20 reports it appears that FENOC placed its order for the Davis Besse replacement steam
21 generators with Babcock-Wilcox of Canada in early December of 2007.

22 Nuclear steam generators are critical, highly engineered pieces of
23 equipment that create the steam required for electrical power generation at
24 the nuclear plant. The Davis-Besse ROTSGs will weigh in excess of 450
25 tons each and require over five years to design and fabricate. The work on
26 these units will be completed at B&W's Cambridge, Ontario facility.¹

27 On December 5, 2007, via a Press Release in Reuters, McDermott International, Inc.
28 announced:

¹ Reuters, *B&W Awarded Nuclear Steam Generator Contract by FirstEnergy*, December 2007.
<http://www.reuters.com/article/2007/12/05/idUS141970+05-Dec-2007+BW20071205>

1 ...that a subsidiary of The Babcock & Wilcox Company ("B&W") has
2 been awarded a contract by FirstEnergy Nuclear Operation Company to
3 design, fabricate and deliver two replacement once-through steam
4 generators ("ROTSG") for the Davis-Besse Nuclear Power Station.²

5 The Press Release in Reuters implies that FENOC made the decision to replace its steam
6 generators at Davis-Besse and then developed a purchase specification and compared
7 bidders sometime in 2007 prior to awarding the contract to B&W Canada late that year.

8 The lack of publicly available technical analysis in the NRC PDR suggests that FENOC
9 made a secret determination under 10 C.F.R. § 50.59 that it was not necessary to apply
10 for a license amendment to replace the Davis-Besse steam generators. The lack of a
11 license application on file with the NRC also implies that Davis-Besse made the
12 determination that the "fit-form-function" of the replacement steam generators fell within
13 the licensing parameters of the original Davis-Besse license.

14 The first significant description revealing the true extent of the replacement steam
15 generator modifications appears to be in the 74-page PowerPoint entitled *Davis-Besse*
16 *Steam Generator Replacement Project: Project Overview/Public Meeting: NRC Region*
17 *III Office: March 20, 2013*, that FENOC submitted to the NRC.

18

19 **THE DAVIS-BESSE REPLACEMENT ONCE THROUGH STEAM**
20 **GENERATOR AND 10 C.F.R. § 50.59**

21 According to the PowerPoint presentation, FENOC had performed a 10 C.F.R. § 50.59
22 analysis that found that the RSG is "similar"³ to the OSG. Being "similar" to the original
23 steam generators without analyzing the impact so many changes from the original D-B
24 technical specifications is an inadequate criterion by which to determine if 10 C.F.R. §
25 50.59 has been assiduously applied.

26 A review by Fairewinds Associates of the critical design information first provided by
27 FENOC at the March 20, 2013 meeting with the NRC shows that the Davis-Besse

² Ibid.

³ *Davis-Besse Steam Generator Replacement Project: Project Overview/Public Meeting: NRC Region III Office: March 20, 2013*, Slides 10 and 31

1 ROTSG does not meet the criteria of 10 C.F.R. § 50.59. Moreover, the data reviewed
2 shows that FENOC should have applied for a license amendment with the requisite
3 public review six years ago when the ROTSG was originally designed, ordered, and
4 purchased.

5 Specifically, 10 C.F.R. § 50.59 requires that any licensee performing an experiment at a
6 licensed nuclear power plant must apply for a license amendment and include the
7 requisite public review. FENOC itself had acknowledged that the ROTSG design had
8 significant modifications in comparison to the original OTSG. More specifically, slides
9 10 through 13 identify the following significant, experimental modifications to the
10 original OTSG design:

- 11 1. The tube inspection lane was removed.
- 12 2. An additional tube support plate was added.
- 13 3. 150 additional tubes were added.
- 14 4. The tube alloy was changed.
- 15 5. The tube-to-tube sheet junction was modified extensively.
- 16 6. The overall design of the steam generator support structure was changed from
17 a cylindrical skirt to a pedestal cone.
- 18 7. The thickness of the pressure retaining walls of the ROTSG is two inches
19 thinner than the pressure retaining wall in the Original Once Through Steam
20 Generator.
- 21 8. The 180-degree elbow design will be extensively modified.
- 22 9. The alloy of the hot leg nozzles was also changed.

23 Each and every one of these aforementioned changes is significant individually, and
24 when taken together prove that the Replacement OTSG contains many experimental
25 parameters, especially in comparison to the Original OTSG.

26 Conveniently, the list of experimental changes identified by FENOC does not include the
27 additional modifications applied by FENOC to cut into the Davis-Besse containment for
28 the fourth time since it was constructed. To the best of Fairewinds' knowledge and
29 belief, no other containment structure has been cut open more than twice, yet Davis-

1 Besse's fourth containment perforation should have been identified by the 10 C.F.R. §
2 50.59 process as problematic and therefore requiring a license amendment review and
3 application.

4 Furthermore, 10 C.F.R. § 50.59 requires a formal license renewal application when a
5 license amendment change is required as a result of such a modification. The Atomic
6 Safety and Licensing Board (ASLB) has recently confirmed that Section 50.59
7 establishes standards for a licensee to request a license amendment before it may make

8 ... changes in the facility as described in the [updated] final safety analysis
9 report [UFSAR36], make changes in the procedures as described in the
10 [UFSAR], and conduct tests or experiments not described in the
11 [UFSAR]." 10 C.F.R. § 50.59(c)(1). Section 50.59 states that a licensee
12 need not request a license amendment pursuant to section 50.90 if "(i) A
13 change to the technical specifications incorporated in the license is not
14 required, and(ii) The change, test, or experiment does not meet any of the
15 criteria in paragraph (c)(2) of this section." Id. § 50.59(c)(1)(i)-(ii).

16 **Restated, a licensee must request a license amendment if the proposed**
17 **action requires that existing technical specifications be changed. If a**
18 **licensee is unable to operate a reactor in strict accordance with its**
19 **license, it must seek authorization from the NRC for a license**
20 **amendment (10 C.F.R. §§ 50.59, 50.90 to 50.92), which is a process that**
21 **triggers a right to request an adjudicatory hearing by persons whose**
22 **interests may be affected by the proceeding. [Emphasis Added]⁴**

23 The ASLB decision quoted above stresses that changing technical specifications
24 determine that the 50.59 criteria have not been met, and that a formal license amendment
25 is required. This point is so essential that the ASLB emphasized it by restating the
26 requirement for a formal license amendment review process if a technical specification
27 change were to be required. A review of the FENOC PowerPoint⁵ presentation submitted
28 to the NRC contains an extensive list of changes to the D-B Technical Specifications that
29 clearly identifies the necessity for complete technical review by the NRC via the formal
30 10 C.F.R. § 50.59-license amendment processes. It is evident that the formal license
31 amendment review is required due to the numerous and unreviewed proposed changes to
32 the D-B Technical Specifications.

⁴ *Southern California Edison Co.*, (San Onofre Nuclear Generating Station, Units 2 and 3), LBP-13-07, pp. 18-19 (May 13, 2013)

⁵ *Davis-Besse Steam Generator Replacement Project: Project Overview/Public Meeting: NRC Region III Office: March 20, 2013*, Slides 15 through 17

1 **INDUSTRY EXPERIENCE**

2 In 2007 Davis-Besse awarded the design and fabrication of its ROTSG to B&W Canada.
3 Since that time, there have been numerous significant problems with other steam
4 generators throughout the United States. FENOC acknowledges these problems in its
5 PowerPoint, *Davis-Besse Steam Generator Replacement Project: Project*
6 *Overview/Public Meeting: NRC Region III Office: March 20, 2013*, slides 18 through 25.
7 Significant problems have arisen at Oconee (slide 19), ANO (slide 20), TMI (slide 21),
8 and San Onofre (slide 24).

9 In an effort to avoid the participatory public review aspect of the 50.59 license
10 amendment process, the nuclear power licensees and their parent corporations have made
11 an alleged strategic choice to avoid the license amendment process by manipulating
12 loopholes in the 50.59 processes.

- 13 • The last three steam generator replacement projects orchestrated by licensees
14 sought to avoid the 10 C.F.R. § 50.59 license amendment process.
- 15 • By avoiding the 50.59 license amendment processes for Crystal River 3 in
16 Florida, and San Onofre 2 and San Onofre 3 in California, the owners, Progress
17 Energy (Crystal River) and Edison (San Onofre Units 2 and 3) caused all three
18 units to experience total mechanical failures.

19 Moreover, all three major replacement steam generator problems previously discussed
20 and the failures at ANO and TMI described by FENOC in its PowerPoint were not
21 identified at these nuclear power plants until significant damage to both the steam
22 generators and the plants themselves had already occurred. Ratepayers were stuck with
23 millions of dollars in payments for flawed equipment. All five-replacement steam
24 generator equipment failures can be attributed to failure of these licensees to apply the
25 appropriate 10 C.F.R. § 50.59 screening criteria. Evading the 10 C.F.R. § 50.59 license
26 amendment processes allowed design errors to reach through fabrication and into plant
27 operation before regulators even began examining these significant design and fabrication
28 failures.

1 **TIMING OF THE DISCOVERY OF RSG FAILURES AT SAN ONOFRE AND**
2 **LESSONS TO LEARN FOR DAVIS-BESSE**

3 The timing of the discovery of the failure of the Replacement Steam Generators at both
4 San Onofre Units 2 and 3 is important to review and discuss in order to determine the
5 likelihood of failure for the Davis-Besse ROTSG project. From the reports reviewed, it
6 appears that FENOC most likely completed the new design for the D-B ROTSGs during
7 2008, and fabrication appears to have begun in 2009. FENOC now claims that lessons
8 learned from the San Onofre failures have been incorporated into the D-B ROTSG design
9 and fabrication. Such a claim is impossible since the San Onofre RSGs failed in 2012,
10 well after the D-B ROTSGs were already in fabrication. Quite simply, the Davis-Besse
11 ROTSG could not have been modified to reflect any lessons learned from the technical
12 failures at San Onofre Units 2 and 3.

13

14 **SIGNIFICANCE OF DESIGN MODIFICATIONS ON SAFETY**⁶

15 The requirements for the process by which nuclear power plant operators and licensees
16 may make changes to their facilities and procedures as delineated in the safety analysis
17 report and without prior NRC approval are limited by specific regulations detailed in the
18 Nuclear Regulatory Commission's *10 CFR Part 50, Domestic Licensing of Production*
19 *and Utilization Facilities, Section 50.59, Changes, Tests and Experiments.*

20 The implementing procedures for the 10 C.F.R. § 50.59 regulations have eight criteria
21 that are important for nuclear power plant safety.

22 “(2) A licensee shall obtain a license amendment pursuant to § 50.90 prior to
23 implementing a proposed change, test, or experiment if the change, test, or
24 experiment would:

25 (i) Result in more than a minimal increase in the frequency of occurrence
26 of an accident previously evaluated in the final safety analysis report
27 (as updated);

⁶ Declaration Of Arnold Gunderson Supporting The Petition To Intervene By Friends Of The Earth Regarding The Ongoing Failure Of The Steam Generators At The San Onofre Nuclear Generating Station, Docket No. 50-361 and 50-362, May 31, 2012

- 1 (ii) Result in more than a minimal increase in the likelihood of occurrence
2 of a malfunction of a structure, system, or component (SSC) important
3 to safety previously evaluated in the final safety analysis report (as
4 updated);
- 5 (iii) Result in more than a minimal increase in the consequences of an
6 accident previously evaluated in the final safety analysis report (as
7 updated);
- 8 (iv) Result in more than a minimal increase in the consequences of a
9 malfunction of an SSC important to safety previously evaluated in the
10 final safety analysis report (as updated);
- 11 (v) Create a possibility for an accident of a different type than any
12 previously evaluated in the final safety analysis report (as updated);
- 13 (vi) Create a possibility for a malfunction of an SSC important to safety
14 with a different result than any previously evaluated in the final safety
15 analysis report (as updated);
- 16 (vii) Result in a design basis limit for a fission product barrier as described
17 in the FSAR (as updated) being exceeded or altered; or
- 18 (viii) Result in a departure from a method of evaluation described in the
19 FSAR (as updated) used in establishing the design bases or in the
20 safety analyses.”

21 These implementing procedures created for 10 C.F.R. § 50.59 require that the license be
22 amended unless none of these eight criteria are triggered by any change made by a
23 nuclear power plant licensee like FENOC’s Davis-Besse. If a single criterion is met, then
24 the regulation requires that the licensee pursue a license amendment process.

25 By claiming that the steam generator replacements were a *like-for-like* design and
26 fabrication, FENOC, like Edison at San Onofre Units 2 and 3, is attempting to avoid the
27 more rigorous license amendment process. From the evidence reviewed, it appears that
28 the NRC has accepted FENOC’s statement and documents without further independent
29 analysis, just as it did for Edison on San Onofre’s RSGs.

30 In the analysis detailed of the Edison RSGs, Fairewinds identified 39 separate safety
31 issues that failed to meet the NRC 50.59 criteria. Any one of those 39 separate safety
32 issues should have triggered the license amendment review process by which the NRC
33 would have been notified of the proposed significant design and fabrication changes.

1 Now it appears that FENOC is also attempting to skirt the 10 C.F.R. § 50.59 processes on
2 its Davis-Besse ROTSG project. As the NRC guidelines state:

3 “(c)(1) A licensee may make changes in the facility as described in the
4 final safety analysis report (as updated), make changes in the procedures
5 as described in the final safety analysis report (as 1.187-A-1 updated), and
6 conduct tests or experiments not described in the final safety analysis
7 report (as updated) without obtaining a license amendment pursuant to §
8 50.90 only if: (i) A change to the technical specifications incorporated in
9 the license is not required, and (ii) **The change, test, or experiment does**
10 **not meet any of the criteria in paragraph (c)(2) of this section.”⁷**
11 [Emphasis Added]

12 In its previous reports, Fairewinds identified at least 39 *unreviewed* modifications to the
13 original steam generators at San Onofre. Now Fairewinds’ preliminary review of the D-
14 B ROTSG shows that FENOC made *at least nine unreviewed technical specification*
15 *changes to the Systems, Structures and Components (SSC)*. These major design changes
16 are not *like-for-like* and clearly show that FENOC should have applied for a license
17 amendment review of the D-B ROTSG under 10 C.F.R. § 50.59.

18 Additionally, FENOC has failed to include the Crystal River 3 ROTSG experience in its
19 PowerPoint presentation to the NRC. Like Davis-Besse, the Crystal River 3 steam
20 generator replacement is a Babcock & Wilcox design.

- 21 • The Crystal River 3 Containment failed three times in less than one year after
22 being cut open during its ROTSG modification.
- 23 • It is important to compare the upcoming Davis-Besse ROTSG modification to the
24 Crystal River 3 RSG, because the Davis-Besse Containment will also be cut open
25 again during this outage.
- 26 • Like Crystal River 3, the Davis-Besse design is also a Babcock & Wilcox design,
27 and also the D-B Containment will be cut open for the fourth time since it was
28 constructed according to slides 47 and 51.
- 29 • Finally, FENOC’s PowerPoint presentation does not address the fact that Davis-
30 Besse’s containment integrity issues are compounded by the damage its

⁷ Regulatory Guide 1.187 Guidance For Implementation Of 10 CFR 50.59, Changes, Tests, And Experiments, 1.187-A-1, <http://pbdupws.nrc.gov/docs/ML0037/ML003759710.pdf>

1 containment already suffered during the blizzard of 1978, allegedly resulting in all
2 of the cracking that now compromises D-B's containment integrity.

3 Of all the nuclear plants in the world, the Davis-Besse containment is the only one that
4 has such a complicated history of storm damage and being split open repeatedly. These
5 facts alone require a thorough NRC license application review and public hearing. While
6 FENOC acknowledges that three containment incisions have occurred, it also claims that
7 in this fourth containment incision:

- 8 • "Laminar cracking is not expected..."⁸
- 9 • And that if the containment were to crack, "Any deficiencies will be documented
10 in the Corrective Action program."

11 *Waiting for cracks to occur and then entering them into the corrective action program is*
12 *the very definition of a 10 C.F.R. § 50.59-trigger for NRC licensing review. It appears*
13 *that cutting the Davis-Bessie containment for the fourth time will in fact be an*
14 *"experiment" as defined under 10 C.F.R. § 50.59.*

15

16 CONCLUSION

17 Fairewinds concludes that the Replacement Once Through Steam Generator
18 modifications at Davis-Bessie require a full NRC license application under the rules of 10
19 C.F.R. § 50.59 because:

- 20 1. There are extensive experimental modifications to both the ROTSGs and to the
21 containment structures.
- 22 2. There are extensive modifications to the Davis-Besse technical specifications.

23 In the event that experimental changes are made, or in the event that technical
24 specification changes are required, 10 C.F.R. § 50.59 makes it clear that a formal license
25 amendment with public participation is required. Davis-Besse failed to comply with its
26 responsibility under 10 C.F.R. § 50.59 to file a license amendment request and must do
27 so before replacing its steam generator.

28 *End*

⁸ *Davis-Besse Steam Generator Replacement Project: Project Overview/Public Meeting: NRC Region III
Office: March 20, 2013 Slide 48*

29

Attachments:

Attachment 1 – Curriculum Vitae

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

Executed this 20th day, May 2013 at Burlington, Vermont.

_____/s/_____

Arnold Gundersen, MSNE, RSO
Chief Engineer, Fairewinds Associates, Inc

CURRICULUM VITAE
Arnold Gundersen
Chief Engineer, Fairewinds Associates, Inc
May 20, 2013

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
- Atomic Energy Commission Fellow
- 40-years of nuclear industry experience and oversight
 - Nuclear engineering management assessment and prudence 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

Published Lecture — *The Lessons of the Fukushima Daiichi Nuclear Accident* published in the *International Symposium on the Truth of Fukushima Nuclear Accident and the Myth of Nuclear Safety*, August 30, 2012 University of Tokyo, Iwanami Shoten Publishers, Tokyo, Japan

- Author — *The Echo Chamber: Regulatory Capture and the Fukushima Daiichi Disaster, Lessons From Fukushima*, February 27, 2012, Greenpeace International
- Co-author — *Fukushima Daiichi: Truth And The Way Forward*, Shueisha Publishing, February 17, 2012, Tokyo, Japan.
- Co-author — *Fairewinds Associates 2009-2010 Summary to JFC, July 26, 2010* State of Vermont, Joint Fiscal Office, (<http://www.leg.state.vt.us/jfo/envy.aspx>).
- Co-author — *Supplemental Report of the Public Oversight Panel Regarding the Comprehensive Reliability Assessment of the Vermont Yankee Nuclear Power Plant July 20, 2010*, to the Vermont State Legislature by the Vermont Yankee Public Oversight Panel.
- 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*.
- Author — Fairewinds Associates, Inc *First Quarterly Report to the Joint Legislative Committee*, October 19, 2009.
- Co-author — *Report of the Public Oversight Panel Regarding the Comprehensive Reliability Assessment of the Vermont Yankee Nuclear Power Plant*, March 17, 2009, to the Vermont State Legislature by the Vermont Yankee Public Oversight Panel.
- Co-author — *Vermont Yankee Comprehensive Vertical Audit – VYCV – 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 — *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 — *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 — *DOE Decommissioning Handbook, First Edition*, 1981-1982, invited author.

Presentations & Media

Fairewinds Energy Education Corp 501c3 presentations:

- *What Did They Know And When? Fukushima Daiichi Before And After The Meltdowns*, Symposium: The Medical and Ecological Consequences of the Fukushima Nuclear Accident, The New York Academy of Medicine, New York City, NY, March 11, 2013
- *A Mountain of Waste 70 Years High*, Presentation: *Old and New Reactors*, University of Chicago, December 1, 2012
- Congressional Briefing September 20, 2012; invited by Representative Dennis Kucinich
- Presentations in Japan August/September 2012: Presentation at University of Tokyo (August 30, 2012), Presentation at Japanese Diet Building (members of the Japanese Legislature - August 31, 2012), Presentation to citizen groups in Niigata (September 1, 2012), Presentations to citizen groups in Kyoto (September 4, 2012), Presentation to Japanese Bar Association (September 2, 2012), and Presentation at the Tokyo Olympic Center (September 6, 2012)
- Multi-media Opera: *Curtain of Smoke*, by Filmmaker Karl Hoffman, Composer Andrea Molino, and Dramatist Guido Barbieri, Rome, Italy (2012-5-21,22)

- Curtain of Smoke Symposium (2012-5-21), with Dr. Sherri Ebadi 2004 Nobel Laureate
- The Italian National Press Club Rome (2012-5-21) with Dr. Sherri Ebadi 2004 Nobel Laureate: the relationship between nuclear power and nuclear weapons
- Radio 3 Rome (2012-5-21) Discussion of Three Mile Island and the triple meltdown at Fukushima Daiichi (Japan),
- Sierra Club Panel Discussions (2012-5-5): Consequences of Fukushima Daiichi with Paul Gunter and Waste Disposal with Mary Olson,
- Physicians for Social Responsibility Seattle (2012-3-17),
- Fukushima Daiichi Forum with Chiho Kaneko, Brattleboro, VT (2012-3-11),
- Physicians for Global Responsibility Vancouver (2012-3-11) Skype Video Lecture, University of Vermont (2 – 2011),
- Boston Nuclear Forum, Boston Library (6/16/11),
- Duxbury Emergency Management (6/15/11),
- Vermont State Nuclear Advisory Panel (VSNAP), Elder Education Enrichment,
- New Jersey Environmental Federation (5/14/11),
- Quaker Meeting House,
- Press Conference for Physicians for Social Responsibility (5/19/11),
- St. Johnsbury Academy – Nuclear Power 101.

Educational videos on nuclear safety, reliability and engineering particularly Fukushima issues.

Videos may be viewed @ fairewinds.org (501c3 non-profit)

Expert commentary (many more unnamed): CNN (6), The John King Show (14), BBC, CBC, Russia Today, Democracy Now, KPBS (Radio & TV) VPR, WPTZ, WCAX, WBAI, CCTV, NECN, Pacifica Radio, CBC (radio & TV) (4), Rachel Maddow Show, *Washington Post*, *New York Times*, *The Guardian*, *Bloomberg* (print & TV), *Reuters*, *Associated Press*, *The Global Post*, *Miami Herald*, *Tampa Times*, *Orange County Times*, *LA Times*, *Al Jazeera* (print), *The Tennessean*, The Chris Martinson Show, *Mainichi News*, TBS Japan, *Gendai Magazine*, NHK television, *Scientific American*. *Huffington Post* (Paris) named [Fairewinds.com](http://fairewinds.com) the best go to site for information about the Fukushima Daiichi accident (5/9/11).

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.”

Expert Witness Testimony and Nuclear Engineering Analysis and Consulting

Nuclear Regulatory Commission – May 6, 2013

Expert witness report Before The Secretary NRC: *Expert Witness Report Of Arnold Gundersen To Support The Petition For Leave To Intervene And Request For Hearing By The Blue Ridge Environmental Defense League, Bellefonte Efficiency And Sustainability Team, And Mothers Against Tennessee River Radiation*. Retained by BREDL et al.

Nuclear Regulatory Commission – April 30, 2013

Expert witness report to Atomic Safety and Licensing Board: *Testimony Of Arnold Gundersen Supporting Of Intervenors Contention 15: DTE Cola Lacks Statutorily Required Cohesive QA Program*. Retained by Don't Waste Michigan, Beyond Nuclear et al.

Canadian Nuclear Safety Commission (CNSC) – April 29, 2013

Expert witness report to Canadian Nuclear Safety Commission (CNSC): *Analysis Of The Relicensing Application For Pickering Nuclear Generating Station*. Retained by Durham Nuclear Awareness.

Nuclear Regulatory Commission – January 16, 2013

Expert witness presentation to NRC Petition Review Board: 2.206 Presentation San Onofre Units 2 and 3 Replacement Steam Generators Meeting With Petitioner Friends Of The Earth, Requesting Enforcement Action Against Southern California Edison Under 10 CFR 2.206

Expert Witness Report For Friends Of The Earth – July 11, 2012

San Onofre's Steam Generators: Significantly Worse Than All Others Nationwide

Expert Witness Report For Friends Of The Earth – May 15, 2012

San Onofre's Steam Generator Failures Could Have Been Prevented, Fairewinds Associates

Expert Witness Report For Friends Of The Earth – April 10, 2012

San Onofre Cascading Steam Generator Failures Created By Edison: Imprudent Design And Fabrication Decisions Caused Leaks, Fairewinds Associates

Expert Witness Report For Friends Of The Earth – March 27, 2012

Steam Generator Failures At San Onofre: The Need For A Thorough Root Cause Analysis Requires No Early Restart

Expert Witness Report For Greenpeace – February 27, 2012

Lessons From Fukushima: The Echo Chamber Effect, Fairewinds Associates

Nuclear Regulatory Commission – December 21, 2011

Expert witness report to Atomic Safety and Licensing Board: *Prefiled Direct Testimony of Arnold Gundersen Regarding Consolidated Contention RK-EC-3/CW-EC-1 (Spent Fuel Pool Leaks)*

New York State Department Of Environmental Conservation – November 15-16, 2011

Expert witness for Riverkeeper: hearing testimony regarding license extension application for Indian Point Units 2 and 3 – contention: tritium in the groundwater.

Nuclear Regulatory Commission – November 10, 2011

Expert witness report entitled: *Fukushima and the Westinghouse-Toshiba AP1000, A Report for the AP1000 Oversight Group by Fairewinds Associates, Inc.* and Video. Submitted to NRC by the AP1000 Oversight Group.

Nuclear Regulatory Commission – October 7, 2011

Testimony to the NRC Petition Review Board Re: Mark 1 Boiling Water Reactors, Petition for NRC to shut down all BWR Mark 1 nuclear power plants due to problems in containment integrity in the Mark 1 design.

New York State Department Of Environmental Conservation, October 4, 2011

Prefiled Rebuttal Testimony Of Arnold Gundersen On Behalf Of Petitioners Riverkeeper, Inc., Scenic Hudson, Inc., And Natural Resources Defense Council, Inc. To The Direct Testimony Of Matthew J. Barvenik (Senior Principal GZA Geoenvironmental, Inc.) Regarding Radiological Materials

Southern Alliance for Clean Energy (SACE) submission to TVA Board of Directors – August 3, 2011– Expert witness report entitled: *The Risks of Reviving TVA's Bellefonte Project*, and Video prepared for the Southern Alliance for Clean Energy (SACE).

New York State Department Of Environmental Conservation, July 22, 2011

Prefiled Direct Testimony Of Arnold Gundersen On Behalf Of Petitioners Riverkeeper, Inc., Scenic Hudson, Inc., And Natural Resources Defense Council, Inc. Regarding Radiological Materials

Nuclear Regulatory Commission – May 10, 2011

Comment to the proposed rule on the AP1000 Design Certification Amendment Docket ID NRC-2010-0131 As noticed in the Federal Register on February 24, 2011 Retained by Friends of the Earth as Expert Witness.

Nuclear Regulatory Commission – May 10, 2011

Comment to the proposed rule on the AP1000 Design Certification Amendment Docket ID NRC-2010-0131 As noticed in the Federal Register on February 24, 2011 Retained by Friends of the Earth as Expert Witness.

NRC Advisory Committee on Reactor Safeguards (ACRS) – May 26, 2011

Lessons learned from Fukushima and Containment Integrity on the AP1000.

Vermont Energy Cooperative (VEC) – April 26, 2011

Presentation to the Vermont Energy Cooperative Board of Directors, *Vermont Yankee – Is It Reliable for 20 more years?*

Vermont State Nuclear Advisory Panel (VSNAP) – February 22, 2011

Testimony and presentation entitled the *Vermont Yankee Public Oversight Panel Supplemental Report* regarding management issues at the Vermont Yankee Nuclear Power Plant to the reconvened Vermont State Nuclear Advisory Panel.

Vermont State Legislature Senate Committee On Natural Resources And Energy

February 8, 2011. Testimony: *Vermont Yankee Leaks and Implications*. (<http://www.leg.state.vt.us/jfo/envy.aspx>)

Vermont State Legislature – January 26, 2011

House Committee On Natural Resources And Energy, and Senate Committee On Natural Resources And Energy

Testimony regarding Fairewinds Associates, Inc's report: *Decommissioning the Vermont Yankee Nuclear Power Plant and Storing Its Radioactive Waste* (<http://www.leg.state.vt.us/jfo/envy.aspx>). Additional testimony was also given regarding the newest radioactive isotopic leak at the Vermont Yankee nuclear power plant.

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee Decommissioning the Vermont Yankee Nuclear Power Plant and Storing Its Radioactive Waste January 2011. (<http://www.leg.state.vt.us/jfo/envy.aspx>).

U.S. Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards (NRC-ACRS) AP1000 Sub-Committee

Nuclear Containment Failures: Ramifications for the AP1000 Containment Design, Supplemental Report submitted December 21, 2010. (<http://fairewinds.com/reports>)

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee Reliability Oversight Entergy Nuclear Vermont Yankee, December 6, 2010. Discussion regarding the leaks at Vermont Yankee and the ongoing monitoring of those leaks and ENVY's progress addressing the 90-items identified in Act 189 that require remediation. (<http://www.leg.state.vt.us/jfo/envy.aspx>).

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)

Declaration Of Arnold Gunderson Supporting Blue Ridge Environmental Defense League's Contention Regarding Consumptive Water Use At Dominion Power's Newly Proposed North Anna Unit 3 Pressurized Water Reactor in the matter of Dominion Virginia Power North Anna Power Station Unit 3 Docket No. 52-017 Combined License Application ASLBP#08-863-01-COL, October 2, 2010.

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB)

Declaration Of Arnold Gunderson Supporting Blue Ridge Environmental Defense League's

New Contention Regarding AP1000 Containment Integrity On The Vogtle Nuclear Power Plant Units 3 And 4 in the matter of the Southern Nuclear Operating Company Vogtle Electric Generating Plant, Units 3&4 Combined License Application, Docket Nos. 52-025-COL and 52-026-COL and ASLB No. 09-873-01-COL-BD01, August 13, 2010.

Vermont State Legislature Joint Fiscal Committee Legislative Consultant Regarding Entergy Nuclear Vermont Yankee – July 26, 2010

Summation for 2009 to 2010 Legislative Year For the Joint Fiscal Committee Reliability Oversight Entergy Nuclear Vermont Yankee (ENVY) Fairewinds Associates 2009-2010. This summary includes an assessment of ENVY's progress (as of July 1, 2010) toward meeting the milestones outlined by the Act 189 Vermont Yankee Public Oversight Panel in its March 2009 report to the Legislature, the new milestones that have been added since the incident with the tritium leak and buried underground pipes, and the new reliability challenges facing ENVY, Entergy, and the State of Vermont. (<http://www.leg.state.vt.us/jfo/envy.aspx>)

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) Declaration Of Arnold Gundersen Supporting Blue Ridge Environmental Defense League's Contentions in the matter of Dominion Virginia Power North Anna Station Unit 3 Combined License Application, Docket No. 52-017, ASLBP#08-863-01-COL, July 23, 2010.

Florida Public Service Commission (FPSC)

Licensing and construction delays due to problems with the newly designed Westinghouse AP1000 reactors in *Direct Testimony In Re: Nuclear Plant Cost Recovery Clause By The Southern Alliance For Clean Energy (SACE)*, FPSC Docket No. 100009-EI, July 8, 2010.

U.S. Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards (NRC-ACRS) AP1000 Sub-Committee

Presentation to ACRS regarding design flaw in AP1000 Containment – June 25, 2010
Power Point Presentation: <http://fairewinds.com/content/ap1000-nuclear-design-flaw-addressed-to-nrc-acrs>.

U.S. Nuclear Regulatory Commission Atomic Safety and Licensing Board (NRC-ASLB) Second Declaration Of Arnold Gundersen Supporting Supplemental Petition Of Intervenors Contention 15: DTE COLA Lacks Statutorily Required Cohesive QA Program – June 8, 2010.

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 Committee On Natural Resources And Energy – April 5, 2010

Testified to the House Committee On Natural Resources And Energy – regarding discrepancies in Entergy's TLG Services decommissioning analysis. See *Fairewinds Cost Comparison TLG Decommissioning* (<http://www.leg.state.vt.us/jfo/envy.aspx>).

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/envy.aspx>).

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/envy.aspx>).

Vermont State Legislature House Committee On Natural Resources And Energy – January 27, 2010 *A Chronicle of Issues Regarding Buried Tanks and Underground Piping at VT Yankee*. (<http://www.leg.state.vt.us/jfo/envy.aspx>).

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/envy.aspx>).

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/envy.aspx>).

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 (SACE)*, 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 Gunderson 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 Committee On Natural Resources And Energy March 19, 2009.

<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 Shumlin (now Vermont Governor Shumlin) 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
- House Committee on Natural Resources and Energy – 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.

Additional Education

Basic Mediation Certificate Champlain College, Woodbury Institute
28-hour Basic Mediation Training September 2010

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 Work Experience 1970 to Present

Expert witness testimony 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.

Media

Featured Nuclear Safety and Reliability Expert (1990 to present) for Television, Newspaper, Radio, & Internet – Including, and not limited to:

CNN: JohnKingUSA, CNN News, Earth Matters; DemocracyNow, NECN, WPTZ VT, WTNH, VPTV, WCAX, RT, CTV (Canada), CCTV Burlington, VT, ABC, TBS/Japan, Bloomberg: EnergyNow, KPBS, Japan National Press Club (Tokyo), Italy National Press Club (Rome), The Crusaders, Front Page, Five O’Clock Shadow: Robert Knight, Mark Johnson Show, Steve West Show, Anthony Polina Show, WKVT, WDEV, WVPR, WZBG CT, Seven Days, AP News Service, Houston Chronicle, Christian Science Monitor, Reuters, The Global Post, International Herald, The Guardian, New York Times, Washington Post, LA Times, Miami Herald, St. Petersburg 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, Vermont Daily Briefing, Green Mountain Daily, EcoReview, Huffington Post, DailyKos, Voice of Orange County, AlterNet, Common Dreams, and numerous other national and international blogs

Public Service, Cultural, and Community Activities

2009 to Present –Fairewinds Energy Education Corp 501(C)3 non-profit board member

2005 to Present – Public presentations and panel discussions on nuclear safety and reliability at

University of Vermont, Vermont Law School, NRC hearings, Town and City Select Boards, Legal Panels, Local Schools, 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 – 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
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

Personal

Married to Maggie Gundersen 1979. Two children: Eric, 33, president and founder of MapBox and Development Seed, and Elida, 30, paramedic in Florida. Enjoy sailing, walking, swimming, yoga, and reading.

End