FRIENDS/NEC PETITION SUPPLEMENT – ATTACHMENT ONE

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of FPL Energy Seabrook, LLC (NextEra, Inc) (Seabrook Station, Unit 1 – License Renewal Application	December 6, 2010 Docket No. 50-443

DECLARATION OF PAUL BLANCH

I, Paul Blanch hereby declare under penalty of perjury that the following is true and correct.

I have been retained by Friends of the Coast and New England Coalition to provide expert services in connection with the above captioned matter, an application to add 20 years to the operating license of Seabrook Station, from 2030, its current year of expiration, to 2050.

Experience

Beginning in 1964, I served in the U.S. Navy as both a nuclear reactor operator and electric plant operator on Polaris class submarines for seven years. These submarines typically were at sea for extended tours of duty. During my Navy service, I and my fellow crew members were routinely in close proximity to the submarines’ nuclear reactors that powered the vessels whether they were under the sea or on the surface.

As a qualified Reactor and Electric Plant Operator, I was responsible for the operation of the reactor and supporting safety systems including, piping, valves, radiation monitoring systems, chemical monitoring systems, reactor protection and control systems, cable and cable termination systems, turbines, generators, power supplies, inverters, breakers, switchgear, battery chargers, motor and steam-powered electric generators (AC and DC), and transformers and other components and systems required to support the safe operation of the submarine’s nuclear power plant.

I graduated from the U.S. Navy Electronics Technician School in 1964; the U.S. Navy Nuclear Power School, in 1966; and the U.S. Navy Submarine School, in 1968.

As part of my Navy duties, I was certified as an operator/instructor at the Navy prototype reactor (S1C) in Windsor Locks, Connecticut. I instructed Navy officers and enlisted personnel on reactor operations and maintenance including the subjects of reactor systems and electrical theory related to nuclear systems, power generation, emergency core cooling systems, emergency power systems, diesel generators, water supplies and all other systems required for the operation of the nuclear reactor.

I received an honorable discharge from the Navy in 1971. In 1972, I received a Bachelor of Science in Electrical Engineering from the University of Hartford. This curriculum included numerous courses in thermal and mechanical engineering.

I have more than 40 years of engineering, design, operations, maintenance, engineering management, and project coordination experience for the construction maintenance and operation of nuclear power plants. This includes positions at Northeast Utilities that involved in the design, construction, operation, and maintenance of Millstone Units 1, 2, and 3 and Connecticut Yankee (Haddam Neck). During this period, I was under the direction of the Nuclear Engineering Department within Northeast Utilities.

I have also been employed by Consolidated Edison and Entergy at Indian Point Unit 2 as an advisor to the Chief Nuclear Officer (CNO) at that facility. I served in a similar position at Maine Yankee reporting to the CNO of Maine Yankee Atomic Power Company.

My duties at Northeast Utilities included piping system designs and also all Instrument and control systems. I also served as Nuclear Operations Engineer providing liaison services between the NU headquarter and Millstone Unit 2 responsible for coordination of all system design, operation and backfits of operating systems.

I am a registered professional engineer in the State of California. Certificate Number 2235 (currently inactive)

I have actively participated in industry standards writing activities with the American Nuclear Society (ANS), Instrumentation Society of America (ISA), and the Institute of Electrical and Electronics Engineers, Inc. (IEEE) for use by the nuclear industry.

I have been employed as a contractor for the Electric Power Research Institute (EPRI) for the development of computerized monitoring systems for nuclear power plants including monitoring the performance of safety systems and devices including pressure and level monitoring systems.

I have been engaged as a contractor to Nuclear Energy Institute (NEI, previously NUMARC) to educate Chief Nuclear Officers on the attributes of a Safety Conscious Work Environment (SCWE).

In 1993, I was named "Engineer of the Year" by Westinghouse Electric and Control magazine for my efforts in identifying the subtle failures of active electrical devices such as pressure, level, and flow transmitters and indicators. These failures included generic design deficiencies of piping and mechanical systems in reactor level monitoring systems.

I have reviewed applicable portions of “Renewal Application Nextera Energy Seabrook, LLC, et al. Docket no. 50-443 Seabrook Station, Unit No. 1 Facility Operating License No. NPF-86

Non-environmentally-qualified inaccessible medium and low voltage cables and wiring.

Cables play vital roles in the operation of a nuclear power plant. This is clearly recognized by 10 CFR 54.4 and 54.21.

Low voltage and medium voltage cables are clearly defined in NUREG 1801 (GALL) as follows: “The power cables and connections addressed are low-voltage (<1000V) and medium-voltage (2 kV to 35 kV). High voltage (>35 kV) power cables and connections have unique, specialized constructions and must be evaluated on an application specific basis”

10 CFR 54.21 addresses electrical cables and connections and does not differentiate between low, medium and high voltage cables and connections. It is only the GALL document that makes the differentiation. All cables meeting the requirements of 10 CFR 54.21 must be addressed and provided with an aging management program (AMP).

Based upon more than 40 years of engineering, operation and design experience, I am aware there are cables within the scope of 10 CFR 54.4 and 10 CFR 54.21 that operate from less than 1000 volts to 35,000 volts.

Safety-related systems, structures, and components are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 54.4) to ensure the following functions:

> (a) Plant systems, structures, and components within the scope of this part are--
>
> (1) Safety-related systems, structures, and components which are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49 (b)(1)) to ensure the following functions--
>
> (i) The integrity of the reactor coolant pressure boundary;
>
> (ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or
>
> (iii) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in § 50.34(a)(1), § 50.67(b)(2), or § 100.11 of this chapter, as applicable.
>
> (2) All nonsafety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1)(i), (ii), or (iii) of this section.
>
> (3) All systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).
>
> (b) The intended functions that these systems, structures, and components must be shown to fulfill in § 54.21 are those functions that are the bases for including them

> within the scope of license renewal as specified in paragraphs (a)(1) - (3) of this section.

I also reviewed 10 C.F.R. § 54.21. Specifically, § 54.21(a)(1) provides:

> (1) For those systems, structures, and components within the scope of this part, as delineated in § 54.4, identify and list those structures and components subject to an aging management review. Structures and components subject to an aging management review shall encompass those structures and components--
>
> (i) That perform an intended function, as described in § 54.4, without moving parts or without a change in configuration or properties. These structures and components include, but are not limited to, the reactor vessel, the reactor coolant system pressure boundary, steam generators, the pressurizer, piping, pump casings, valve bodies, the core shroud, component supports, pressure retaining boundaries, heat exchangers, ventilation ducts, the containment, the containment liner, electrical and mechanical penetrations, equipment hatches, seismic Category I structures, electrical cables and connections, cable trays, and electrical cabinets, excluding, but not limited to, pumps (except casing), valves (except body), motors, diesel generators, air compressors, snubbers, the control rod drive, ventilation dampers, pressure transmitters, pressure indicators, water level indicators, switchgears, cooling fans, transistors, batteries, breakers, relays, switches, power inverters, circuit boards, battery chargers, and power supplies; and
>
> (ii) That are not subject to replacement based on a qualified life or specified time period.

Based on my review of 10 C.F.R. § 54.21(a)(1), and 10 CFR § 54.4, electrical cables are clearly included within the scope of § 10 CFR 54, irrespective of the applied voltage.

A review of the Seabrook LRA Appendix B finds no Aging Management Program (AMP) for inaccessible cables designed to operate in the voltage range of less than 1000 to 2000 volts; thus I am led to conclude that the LRA is deficient with respect to TLAA or AMP of below-grade, buried, underground, or otherwise inaccessible safety-related electrical cables. There is no assurance that cables not designed to operate while submerged or subsequent to moisture or submergence are capable of performing the functions within the scope of 10 CFR 54.4.

An effective Aging Management Program (AMP) would take into account the potential physical degradation effects of submergence in water on those electrical cables and components which are susceptible to flooding but which have not been environmentally qualified for submergence.

The failure to properly manage aging of Electrical Cables at Seabrook may compromise plant safety discussed within 10 CFR 54.4.

Failure to properly manage aging of electrical cables could result in loss of emergency power to safety equipment including station blackout loads as discussed in § 10 CFR 50.63.

The inaccessible cables within the scope of 10 CFR 54 are not identified and not inspected or maintained by any aging management program. Many of these cables may be periodically submerged and not qualified for this environment.

Seabrook has experienced submerged cables within the scope of 10 CFR 54.

The polymers used for the insulation and jacket materials for electric cables, cable splices, and terminations are susceptible to aging and degradation mechanisms caused by exposure to many of the stressors encountered in nuclear power plant service environments. Longer cable circuits may pass through several different operating environments over the length of their routing throughout the plant. Portions of a cable circuit may pass through areas experiencing more harsh environmental conditions, such as high temperature, high radiation, high humidity, or flooding of underground cables. There has been concern that such local adverse environmental stressors can cause excessive aging and degradation in the exposed sections of a cable that could significantly shorten its effective service life and cause unexpected early failures.

Cables are monitored indirectly through the performance of in-service testing of safety-related systems and components. These tests may demonstrate the function of the cables only under test conditions.

These tests do not provide assurance that they will continue to perform successfully when they are called upon to operate fully loaded for extended periods as they would under design basis conditions. In-service testing of a cable does not provide specific information on the status of cable aging degradation processes nor the physical integrity and dielectric strength of its insulation and jacket materials. Consequently, a cable circuit with undetected damage or degraded insulation could pass an in-service functional test, but still fail unexpectedly when called upon to operate under anticipated environmental conditions or the severe stresses encountered during a design basis event (i.e., fully loaded equipment, more extreme environmental conditions, extended operation in a heavily loaded state).

10 CFR Part 50 including Appendix A and B regulations require licensees to assess the condition of their components, to monitor the performance or condition of structures, systems, and components in a manner sufficient to provide reasonable assurance that they are capable of fulfilling their intended functions, and to establish a test program to ensure that all testing required to demonstrate that components will perform satisfactorily in service is identified and performed. Recent incidents involving early failures of electric cables and cable failures leading to multiple equipment failures, as cited in Information Notice 2002-12, "Submerged Safety-Related Cables," and Generic Letter 2007-01, "Inaccessible or Underground Power Cable Failures That Disable Accident Mitigation Systems or Cause Plant Transients," suggest that licensee approaches to cable testing, such as in-service testing, surveillance testing, preventive maintenance, maintenance rule, etc., do not fully characterize the condition of cable insulation nor provide information on the extent of aging and degradation mechanisms that can lead to cable failure. Analysis of the summary of licensee responses to GL 2007-01 inquiries on licensees' experiences regarding cable failures and cable condition monitoring activities revealed wide variations to the approaches and comprehensiveness of cable testing activities. Analysis of the reported cable failures also indicated a trend

toward early cable failures occurring prior to the end of the original 40-year license period. These data prompted the NRC to consider whether "...licensees should have a program for using available diagnostic cable testing methods to assess cable condition."

Characterization of cables by commodity grouping is an acceptable practice only if the location where each cable type is used is also identified. The LRA should include the drawings identified in this section so that reviewers can identify locations of cables that may be subjected to moisture and submergence. Again, these materials are not in the public domain and the LRA is therefore opaque and incomplete.

Electrical Transformers

There are numerous electrical transformers that perform functions described in 10 CFR 54.4(a)(1)/(2) and (3). Transformers function without moving parts or without a change in configuration or properties as defined in that regulation and are passive devices.

Failure to properly manage aging of Electrical Transformers may compromise:

The integrity of the reactor coolant pressure boundary;

> The capability to shut down the reactor and maintain it in a safe shutdown condition; or
>
> The capability to prevent or mitigate the consequences of accidents, which could result in potential offsite exposures comparable to those referred to in §§ 50.34(a)(1), 50.67(b) (2), or § 100.11 of this chapter, as applicable. 10 C.F.R. §§ 54.4(a)(1)(2) and (3).

The consequence of failures of Electrical Transformers may result in accidents beyond the Design Basis Accidents resulting in exposures to the public exceeding 10 C.F.R. § 100 limits.

The role of most of the transformers in providing power for safety functions is normally described in Chapter 8 of the UFSAR. The Seabrook LRA provides an FSAR supplement as required by 10 CFR 54.21.

While other License renewal applications contained a copy of relevant sections of the UFSAR, Seabrook did not provide such copy and only referenced applicable sections of the UFSAR. This UFSAR is not readily available for review.

Without a copy of the UFSAR it is not possible to identify all of the transformers within the scope of 10 CFR 54.4, however it is known that many transformers perform functions described in 10 CFR 54.

Transformers are passive devices within the scope of 10 CFR 54.4 yet the licensee has not provided any AMP to assure compliance with the requirements of 10 CFR 54.21.

For purposes of the license renewal rule, the staff has determined that the plant system portion of the offsite power system that is used to connect the plant to the offsite power source should be included within the scope of the rule.

This path typically includes switchyard circuit breakers that connect to the offsite system *power transformers (startup transformers), the transformers themselves*[1], the intervening overhead or underground circuits between circuit breaker and transformer and transformer and onsite electrical system, and the associated control circuits and structures. Ensuring that the appropriate offsite power system long-lived passive structures and components that are part of this circuit path are subject to an AMR will assure that the bases underlying the SBO requirements are maintained over the period of extended license.

For the electrical scoping effort, the LRA states,

"For the electrical scoping effort, boundary drawings were not necessary since commodity grouping was used in the scoping process. The SBO Offsite Recovery

1 Gall Report NUREG 1801

Path License Renewal Drawing, Figure 2.5-1, was created to depict the in-scope portion of the off-site power system for Station Blackout (SBO). Seabrook Station has chosen two paths for the recovery of off-site power in the event of a Station Blackout (SBO). Path 1 is colored green. Path 2 is colored red."

Figure 2.5-1 clearly illustrates that transformers are part of the SBO recovery path and there are numerous additional transformers within the scope of 10 CFR 54.4 that are not discussed in the LRA. There is no proposed AMP for these transformers.

Buried, Below Grade, Inaccessible Pipes and Tanks

Page 2.1-6 of the Seabrook LRA states the following:

> "Scoping Boundaries
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> For the mechanical scoping effort, summary level boundary descriptions were developed and included in Section 2.3. License renewal drawings/diagrams were also created from plant controlled PID's (e.g. PID- 1 -FW-20686) to illustrate in-scope mechanical systems, structures and components subject to an aging management review (AMR). These AMR boundaries are depicted on color coded license renewal drawings (e.g. PID-1-FWLR20686) and contain system boundary flags. The "RED" colored portions of the drawings indicate system components in scope for criteria (a) (1) and (a) (3) that are subject to an AMR. The "GREEN" colored portions indicate system components in scope for criterion (a)(2) that are subject to an AMR."

While numerous drawings were discussed and referenced in the LRA, few of these actual piping drawings and diagrams are available for review. Without these drawings the LRA is incomplete and does not permit the reviewer to determine if buried pipes and tanks are properly addressed.

In addressing Buried Piping and Tanks Surveillance or Buried Piping and Tanks Inspection in LRA Table_3.2.1-17, the Licensee concludes that the AMP is "not applicable" because "The Engineering Safety Features systems do not contain steel piping (with or without coating or wrapping), piping components, and piping elements buried in soil. See Subsection 3.2.2.2.9."

10 CFR 54 does not differentiate between steel and non-steel piping and tanks. Stainless steel, fiberglass, PVC, concrete and other materials are employed and are subject to degradation and must be addressed. Again, the LRA is deficient.

The Aging Management program proposed in the license renewal application for Seabrook buried pipes is inadequate because: (1) there is no adequate leak prevention or detection programs designed to inspect/repair such systems, structures, and components before leaks occur; and (2) there is no adequate monitoring to determine if and when leakage from these systems, structures, and components occurs. (3) There is no identification within the LRA of the specific piping systems and tanks covered by this AMP.

In order to renew its licenses for another 20 years, 10 C.F.R. § 54.21 requires Seabrook to demonstrate that for each system, structure, and component included within the scope of Part 54.4 the effects of aging will be adequately managed for the period of extended operation. 10 C.F.R. § 54.21 specifically includes "piping" as one of the systems, structures and components included within Part 54. The transfer canal between a reactor and an associated spent fuel pool is another system, structure, or component that falls within Part 54.

Pipes perform a critical role in the following systems: (1) safety injection; (2) service water (SW); (3) fire protection; (4) diesel fuel oil; (5) security generator; (6) ECCS and (7) auxiliary feedwater and other systems within the scope of 10 CFR 54.4. These pipes and tanks– whether by design or a structural or system failure within the nuclear power station – may contain radioactive water

In addition, the refueling water cavities, and spent fuel pool transfer canals that connect each unit's reactor core with the unit's associated spent fuel pool are included within in the scope of Part 54*'s s*ystems, structures, and components. *See* 10 C.F.R. § 54.2 1(a)(1)(I). These transfer canals and water cavities contain radioactive water during refuelings. The adequacy of the AMPs for these components cannot be determined from the information provided in the LRA.

Deficiencies in the Aging Management Plan that encompass the detection of corrosion or leaks in underground buried pipes and tanks, the transfer canals, and essential service water systems could endanger the safety and welfare of the public and are therefore within the scope of a relicensing hearing. In addition, deficiencies in the Aging Management Plan concerning the detection of leaks or corrosion in other systems, structures, and components containing radioactive water could endanger the safety and welfare of the public and therefore also are within the scope of a re-licensing hearing.

Recent events[2] at nuclear power plants as well as at the Seabrook Nuclear Power Station have demonstrated that various in scope piping systems have experienced leaks and/or corrosion. These leaks and corrosion threaten the integrity of such systems and compromise their ability to achieve their intended function. The existence of these leaks demonstrates that aging management of the piping systems is absolutely essential for extended operation of Seabrook.

In addition, reports have also confirmed that leaks of underground pipes and tanks can result in the release of significant amounts of radioactive materials into the groundwater or the atmosphere. Exposure to this radiation can threaten human health.

Despite the substantial evidence of the dangers of underground leaks from pipes, the LRA fails to include a comprehensive program of leak detection and prevention. Rather, the Applicant's Aging Management Program for pipes consists of no preventative measures and no leak tests any more frequently than every 10 years unless, by happenstance (opportunistic), the opportunity to look at a pipe arises for

2 Indian Point failure of Condensate Storage Tank buried piping and severe degradation of Salem Unit 1 AFW buried discharge piping

some other reason. There is substantial evidence that such a laissez-faire inspection program will be ineffective at prevention or early detection of leaks from pipes that carry radioactive water or are otherwise important for plant safety.

Inspections that might only occur every ten years are insufficient if there is a potential leak of radioactive water from corroded components that could be migrating off-site. "Opportunistic inspections" that might occur no more often than ten years give the appearance that the matter of discovering leaks is being left to chance. There should be regular and frequent inspections of all components that contain radioactive water in this aging plant, including all weld junctures.

Seabrook's License Renewal Application and proposed Aging Management Plan are deficient because they do not provide any evaluation of the baseline conditions of buried systems or their many weld junctures, nor do they provide any support for postulated or "typical" corrosion rates within the facility.

The LRA contains no plan or discussion of cathodic protection or other methods to prevent leaks from occurring. Prevention is the best protection against leakage from pipes. 49 CFR 195 provides reasonable requirements for the protection of buried pipes for the transportation industry, yet Seabrook and the NRC have failed to consider the "lessons learned" from these important requirements.

Seabrook makes no commitment to comply with the National Association of Corrosion Engineers (NACE) corrosion control standards.

There is no assurance that the backfill of buried pipes and tanks is consistent with SP0169-2007[3]section 5.2.3.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed in Accord with 10CFR 2.304(d),

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December 6, 2010
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3 NACE "Control of External Corrosion on Underground or Submerged Metallic Piping Systems"