September 13, 2012

William M. Dean
Regional Administrator Region 1
United States Nuclear Regulatory Commission
2100 Renaissance Blvd., Suite 100
King of Prussia, PA 19406-2713

Dear Mr. Dean,

The C-10 Research and Education Foundation and the Union of Concerned Scientists (UCS) request the Nuclear Regulatory Commission (NRC) require NextEra, the operator of Seabrook Station, to begin a complete structural integrity evaluation during its September 23, 2012 refueling outage to determine the status and extent of Alkali-Silica Reaction (ASR) degradation present in Seabrook's containment building, and any accompanying corrosion to the containment liner plate or other steel structures, including embedded concrete reinforcing steel.

In the recently released Advisory Committee on Reactor Safeguards (ACRS) transcript (ML122070401), ACRS members requested of the applicant and of the NRC staff details concerning the extent of ASR at Seabrook since it remains an open and unresolved safety item three years after its discovery by NextEra. According to NRC staff there exists no difference of opinion that ASR is occurring in Seabrook's containment enclosure building. However, the extent of ASR, its effects on structural integrity of the concrete, and the extent of corrosion of embedded steel due to intrusion of aggressive ground water remain inadequately documented and characterized.

We are not aware of a failure modes and effects analysis (FMEA) for the ASR-affected areas at Seabrook. If a FMEA showed that the ASR degradation, even if progressing to the point of structural failure, would not result in any system, structure, or component from performing its safety function during design-basis transients and accidents, then uncertainty about the extent of degradation would have minimal consequences. But without a solid extent of condition assessment and/or a FMEA, there are legitimate questions about safety levels at Seabrook today and, even if safety margins are degraded yet still acceptable, whether Seabrook will be sufficiently safe in the future.

Initially, NextEra stated that ASR was not occurring in Seabrook's concrete containment structures, but recently in a response to a Request for Additional Information (RAI) NextEra has stated it has identified areas that were exposed to six feet of groundwater that may be indicative of ASR. The ASR concrete degradation is described as extensive and with moderate-to-severe mechanical consequence within the power block buildings, yet to-date NextEra has not performed any ASTM tests to evaluate the expansive potential of the aggregate. Nor has NextEra

systematically determined the extent to which ASR is presently affecting the properties of the concrete. Additionally, NextEra has not carried out a systematic evaluation to identify whether corrosion of embedded steel is accompanying the ASR concrete degradation

ASR concrete degradation at the Seabrook nuclear power plant was not discovered until 2009 at which point it was regarded as extensive and moderate-to-severe within most of Seabrook's safety related seismic Category 1 buildings and structures. To-date Seabrook's containment building has not been tested for ASR concrete degradation.

The NRC is obligated to determine the structural integrity of Seabrook's containment building as a priority according to NRC Regulatory Guide 1.216 and NRC NUREG-1800 Section: 3.5.2.2.1.4.

Two years into the Seabrook relicensing process, NextEra's extent of condition of ASR has still not included an investigation of Seabrook's containment building. Yet determining the extent of ASR concrete degradation on the structural capacity and the extent of an elevated risk to the reinforced concrete structures in Seabrook's containment building if a seismic event were to occur would seem to be a priority for relicensing since Seabrook was licensed under a non-ASR design basis.

UCS and the C-10 Foundation believe it is imperative for the NRC to determine the extent of ASR and corrosion degradation as soon as possible. To the extent that the affected structures are more accessible during the upcoming September 23rd refueling outage, this outage provides the opportunity for a baseline assessment of the degradation of Seabrook's containment structures.

Background

As you are aware, the NRC discovery and extent of Seabrook's ASR concrete degradation in multiple safety related buildings has resulted in an NRC stay of the safety portion of Seabrook's relicensing process secondary to this "unresolved safety item". The occurrence of ASR induced concrete degradation requires an extent of condition investigation under Seabrook's current license and under NRC NUREG-1800 Section: 3.5.2.2.1.4. as ASR concrete degradation is evidenced both below and above grade in multiple safety related buildings. Containment is the most critical building to test and systematically establish the extent of degradation accurately as it serves to shield and protect the public from radiation exposure.

According to Paul Brown, an expert retained by Union of Concerned Scientists, it is critical to establish the extent to which ASR has affected the mechanical properties of the concrete. Because of a brackish water exposure coupled with the lack of detection of this water ingress for approximately 20 years, the chloride-induced corrosion of embedded steel cannot be excluded. Such corrosion it is far more likely if ASR induced cracking is occurring. Thus, a systematic conditional assessment to establish the locations where these degradation mechanisms are active should be carried out. In addition, a systematic sampling and testing should be carried out to determine the extent to which ASR has reduced the mechanical properties of the concrete or the extent to which corrosion has reduced the tensile capacity of the embedded steel.

Professor Brown has stated that although NextEra's plan to utilize some non-standard tests may have merit, they are incomplete. In his opinion, NextEra must also systematically evaluate the concrete via petrography and physical testing of cores, and evaluate the expansive capacity of ASR based on ASTM standard tests as promulgated by ASTM Committee C-9 on Concrete and Aggregates.

According to Brown, the interior space of containment should be surveyed and photo documented, and the chemistry of the water entering this space should be tested to establish its alkali and chloride contents. In addition, the locations where standard ASME testing ultrasonic measurements were done should be mapped with respect to those locations where water invaded the dead space between the containment structures. This would assure that testing had been done at locations where the liner would be vulnerable to corrosion because it was in contact with up to 6 feet of groundwater since construction.

According to Brown, degradation due to ASR is not a linear phenomenon, as there is some period during which the occurrence of ASR does not cause cracking and actually results in higher strength when compared to a control sample not experiencing ASR. But as the available local pore volumes become filled, cracking initiates. Crack formation and growth are not linear with time. In concrete restrained by reinforcement, mechanical testing of extracted concrete cores to establish compressive strengths and Young's moduli are appropriate.

To-date, Seabrook's containment has not been tested systematically or by using current ASTM standard tests for ASR or any possible accompanying steel corrosion. Doing so is essential to permit evaluation of the concerns enumerated in NRC documents related to the following adverse findings in containment:

1.) NRC construction records reveal that cracks in containment through which water was leaking had been detected and repaired, but remained an NRC open unresolved item number 50-443/84-12-01. No root cause was required by the NRC. The NRC stated "future changes in groundwater chemistry and its effects on the concrete walls and on the concrete wall's reinforcing steel bars was considered an NRC open unresolved item number 50-443/84-12-01".

2.) Seabrook has documented water chemistry characterized as aggressive for years. ASR concrete degradation has been documented both below and above grade in multiple buildings and structures.

3.) Seabrook's containment building has historically had an accumulation of up to 6 feet of water in containment around the annulus since construction in the 1980's. Whether water migrated through the concrete to the backside of the steel plate and caused corrosion remains unknown. No testing of containment has been done to rule out ASR concrete degradation or any accompanying steel corrosion. Seabrook's containment building is an NRC open item-ASME Code Section XI, Subsection IWE Program 013.0.31.0-1. The NRC has not requested a root cause investigation to determine how or from where the water infiltration of the containment building is occurring.

4.) In October 2005, during an NRC audit of the certification of visual inspection results (VT-3C) for Seabrook's concrete containment identified numerous areas of spalled concrete that was equal to or exceeded a 1-inch depth. According to evaluation criteria in ACI349.3R, Sec.5.1, spalled areas that exceed a depth of 3/8-inch and 4-inch in dimension must be evaluated. Seabrook evaluated the containment concrete in September 2010 under ACI 349.3R and reported 84 deficient areas in the containment structure.

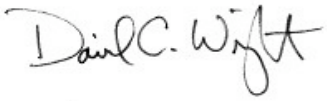
5.) In 2009, during the NRC-required IWE inspection at Seabrook, the containment liner plate had indications of heavy corrosion. NRC staff stated the augmented examination of the containment liner plate, and specifically from the affected area and tube fuel transfer tube area, was required to verify that the effects of aging could be managed to 2050.

NextEra has determined that there are cracks in containment in the area where the walls were submerged in water, but has not ruled in or out ASR through standard testing. NextEra has chosen non-standard tests to determine the presence of ASR, to be carried out at the University of Texas, instead of using the ASME standards. Paul Brown agrees with the NRC staff that visual examination of concrete cannot rule out ASR degradation.

For these reasons C-10 Foundation and UCS request that NextEra begin a systematic conditional assessment and systematic testing during Seabrook's refueling this September 23, 2012 in order to provide base-line analyses and results, which are needed to predict the consequences of future degradation due to ASR or corrosion of embedded reinforcement.

We look forward to your prompt response to our request.

Sincerely yours,



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- U.S. Senator Kelly Ayotte
- MA Assistant Attorney General Matthew Brock
- U.S. Senator Scott P. Brown
- Richard Conte, NRC Branch Chief, Division of Reactor Safety
- U.S. Representative Frank Guinta
- U.S. Senator John Kerry
- John Lamb, NRC Project Manager, Seabrook Station
- Governor John Lynch
- U.S. Representative Edward J. Markey
- Governor Deval Patrick
- U.S. Representative Chellie Pingree
- William Raymond, NRC Chief Resident Inspector, Seabrook Station
- U.S. Senator Jeanne Shaheen
- U.S. Representative John F. Tierney