UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 18, 2010

Mr. Paul Freeman
Site Vice President
c/o Mr. Michael O'Keefe
NextEra Energy Seabrook, LLC
P.O. Box 300
Seabrook, NH 03874

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE REVIEW OF THE SEABROOK STATION LICENSE RENEWAL APPLICATION (TAC NO ME4028) – AGING MANAGEMENT PROGRAMS

Dear Mr. Freeman:

By letter dated May 25, 2010, NextEra Energy Seabrook, LLC submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the Operating License No. NPF-86 for Seabrook Station, Unit 1 (Seabrook) for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

The request for additional information was discussed with Mr. Rick Cliche, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-1427 or by e-mail at Richard.Plasse@nrc.gov.

Sincerely,

Richard Plasse, Project Manager
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure:
As stated

cc w/encl: Distribution via Listserv

Seabrook Station
License Renewal Application
Request for Additional Information (RAI) Set 1
Aging Management Programs

RAI B.2.1.2-1

Background
Generic Aging Lessons Learned (GALL) aging management program (AMP) XI.M2, "Water Chemistry" Program element 5, "monitoring and trending" states that whenever corrective actions are taken to address an abnormal chemistry condition, increased sampling is utilized to verify the effectiveness of these actions. The applicant's Aging Management Program Basis Document for Water Chemistry stated that its program specifies the frequency of sampling. This document also stated that routine primary and secondary system sampling frequencies are specified in station procedures in accordance with Electric Power Research Institute water chemistry guidelines. The applicant further stated that its Primary Chemistry Control Program document states that the Water Chemistry Program contains guidance on increasing sampling frequency to address an abnormal chemistry condition.

Issue
The staff reviewed the applicant's chemistry guidelines and could not identify any statements that indicated that under abnormal chemistry conditions the sampling frequency should be increased.

Request
Describe how the Water Chemistry Program will verify the effectiveness of corrective actions when an abnormal chemistry conditions occurs.

RAI B.2.1.2-2

Background
The Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants states that past operating experience would not necessarily invalidate an AMP because the feedback from operating experience should have resulted in appropriate program enhancements or new programs. A review of past operating experience has indicated a reoccurring condition in the condensate storage tank (CST) where the specific conductivity is high and out of specification. This type of occurrence was observed in 2005 (Condition Report (CR) 05-12035), early 2007 (CR 07-02531), and late 2007 (CR 07-15493).

Issue
It was not clear to the staff if the applicant has evaluated these incidents to determine if the cause of these conductivity spikes were related. If the causes were determined to be the same, it is not clear how the applicant has incorporated enhancements into its Water Chemistry Program to reduce the occurrence of any future CST conductivity excursions.

ENCLOSURE

Request
Provide additional information if the CST conductivity excursions were evaluated for similar root causes. If the root cause is the same for the three instances reference previously, provide additional information on what steps have been taken to reduce the occurrence of any future CST conductivity excursions.

RAI B.2.1.9-1

Background
Program element 3, "Parameters Monitored/Inspected," of GALL AMP XI.M18, "Bolting Integrity," states that the program monitors the effects of aging on the intended function of bolting. Specifically, bolting for safety-related pressure retaining components is inspected for leakage, loss of material, cracking, and loss of preload/loss of prestress. Bolting for other pressure retaining components is inspected for signs of leakage.

License renewal application (LRA) Section B.2.1.9 states "The program includes periodic inspection of closure bolting assemblies to detect signs of leakage that may be indicative of loss of preload, loss of material, or crack initiation. Periodic inspection of bolted closures in conjunction with the Seabrook Station (Seabrook) Inservice Inspection Program and Seabrook External Surfaces Monitoring Program will detect the aging effects and joint leakage. Operator rounds and system walkdowns will also identify joint leakage."

Issue
There are in-scope components in the applicant's fire protection system, service water system, and spent fuel pool cooling system that are in wet or submerged environments. Visual inspections conducted during operator rounds and system walkdowns to detect leakage which indicate a loss of preload may not be feasible due to these environmental conditions.

Request
Explain how the in-scope bolting components in wet or submerged environments will be inspected to effectively manage the loss of preload aging effect.

RAI B.2.1.14-1

Background
Program element 5, "Monitoring and Trending," of the GALL AMP XI.M24, "Compressed Air Monitoring," states that the effects of corrosion and the presence of contaminants are monitored by visual inspection and periodic system and component tests.

LRA Section B.2.1.14 describes the inspection criteria as being set by New Hampshire state inspection requirements. The inspection methods to be used are not specified in the LRA. Furthermore, the LRA does not clarify whether there are additional visual inspections credited by this AMP which monitor the effects of corrosion and the presence of contaminants.

Issue
The inspections conducted in accordance with the New Hampshire state inspection requirements may or may not be equivalent to the specifications for inspection stated in the GALL Report. Furthermore, even if the current New Hampshire state inspection requirements are equivalent to those recommendations stated in the GALL Report, there is no assurance that they will not become divergent in the period of extended operations.

Request

Provide an explanation of how the in-scope components in the compressed air system will be inspected, consistent with the recommendations defined in GALL AMP XI.M24.

RAI B.2.1.16-1

Background
GALL AMP XI.M27, Fire Water System Program description states that the fire protection system piping is to be subjected to required flow testing in accordance with guidance in National Fire Protection Association 25 to verify design pressure or evaluated for wall thickness (e.g., nonintrusive volumetric testing or plant maintenance visual inspections) to ensure that aging effects are managed and that wall thickness is within acceptable limits. The GALL Report also states that these inspections are performed before the end of the current operating term and at plant-specific intervals thereafter during the period of extended operation.

LRA Section B2.1.16 states that "the Fire Water System Program will be enhanced to perform periodic visual inspection or volumetric inspection, as required, of the internal surface of the fire protection system" and that "this inspection will be performed no earlier than 10 years before the period of extended operation."

Issue
The LRA only indicates when the inspections will not be conducted and does not indicate whether the visual inspection or volumetric inspection will be implemented prior to the period of extended operation. It is not clear to the staff if the intent of the enhancement is to have the inspections conducted prior to the period of extended operation, as recommended by the GALL Report.

Request
Confirm whether the inspection activities are planned to start before or after the period of extended operations. If inspections will be not be conducted prior to entering the period of extended operation, provide technical justification for not conducting the inspections until after entering the period of extended operation.

RAI B.2.1.16-2

Background
Standard Review Plan for Review of License Renewal Application for Nuclear Power Plants (SRP-LR) Table 3.3-2, "UFSAR Supplement for Aging Management of Auxiliary Systems" states that the Fire Water System Program Updated Final Safety Analysis Report (UFSAR) Supplement should include periodic full flow flush tests and system performance testing to prevent corrosion due to biofouling. The SRP also states that portions of the fire protection system exposed to water should be visually inspected.

GALL AMP XI.M27, Fire Water System Program, element 4, "detection of aging effects" states that as an alternative to non-intrusive testing, the plant maintenance process may include a visual inspection of the internal surface of the fire protection piping upon each entry to the system for routine or corrective maintenance, as long as it can be demonstrated that inspections are performed on a representative number of locations on a reasonable basis. The GALL Report also states that these inspections must be capable of evaluating (1) wall thickness to ensure against catastrophic failure and (2) the inner diameter of the piping as it applies to the design flow of the fire protection system.

The applicant's UFSAR Supplement states that the Fire Water System Program manages loss of material and reduction of heat transfer due to fouling of the Fire Water System components through detailed inspections via the Seabrook Surveillance Test Procedures.

Issue
The applicant's UFSAR supplement for the Fire Water System Program does not indicate that periodic full flow flush tests and system performance testing are performed or that the visual inspections included in the program will be able to detect wall thickness and the inner diameter of the piping.

Request
Modify the UFSAR supplement to indicate that periodic full flow flush tests and system performance testing are performed and that the visual inspections in the program will be able to detect wall thickness and the inner diameter of the piping.

RAI B.2.1.16-3

Background
GALL AMP XI.M27, Fire Water System Program, element 4, "detection of aging effects" states that as an alternative to non-intrusive testing, the plant maintenance process may include a visual inspection of the internal surface of the fire protection piping upon each entry to the system for routine or corrective maintenance, as long as it can be demonstrated that inspections are performed on a representative number of locations on a reasonable basis.

Issue
Neither the applicant's Fire Water System Program description in LRA Section B2.1.16 nor the program basis documentation provide any indication of how the inspections will be conducted on a representative number of locations on a reasonable basis.

Request
Provide information on how the Fire Water System Program inspects a representative number of locations on a reasonable basis, including both opportunistic and directed inspections.

RAI B.2.1.17-1

Background
The program description of GALL AMP XI.M29 "Aboveground Steel Tanks" states that the program relies on periodic system walkdowns to monitor degradation of the protective paint or coating. LRA Section B.2.1.17 states that visual inspection of the external surface of the protective coatings on exterior surface of the in-scope tanks will be conducted in accordance with its Structural Monitoring Program.

Issue
LRA AMP B.2.1.31, Seabrook Structural Monitoring Program, does not state that coating inspections of aboveground steel tanks is within its scope.

Request
Confirm that the Seabrook Structural Monitoring Program includes coating inspection of aboveground steel tanks.

RAI B.2.1.17-2

Background
SRP Table 3.3-2, "UFSAR Supplement for Aging Management of Auxiliary Systems," states that the applicant's UFSAR supplement for the Aboveground Steel Tanks Program should include a statement that visual inspections of sealant and caulking inspections are included in the program.

Issue
The Seabrook UFSAR Supplement does not include a statement that visual inspections of sealant and caulking are in the scope of the Aboveground Steel Tanks Program.

Request
Revise the Aboveground Steel Tanks Program UFSAR Supplement, Section A.2.1.17 to include a statement that visual inspections of sealant and caulking are in the scope of the program.

RAI B.2.1.17-3

Background
The "detection of aging effects" program element of GALL AMP XI.M29 "Aboveground Steel Tanks" states that periodic system walkdowns confirm that the sealant, and caulking are intact and they are an effective method to manage the effects of corrosion on the external surface of tanks. LRA Section B.2.1.17 states that visual inspection will be performed to detect drying, cracking, or missing sealant and caulking applied along the tank and ground interface.

Issue
In order to detect hardening and loss of strength in elastomeric materials it is necessary to supplement the visual inspection with physical manipulation of the sealant and caulking.

Request
Confirm that the Aboveground Steel Tanks Program includes manual manipulation of elastomeric sealant and caulking material to detect hardening and loss of strength.

RAI B.2.1.17-4

Background
The "acceptance criteria" program element of the GALL AMP XI.M29 "Aboveground Steel Tanks" states that, "Any degradation of paint, coating, sealant, and caulking is reported and will require further evaluation. Degradation consists of cracking, flaking, or peeling of paint or coatings, and drying, cracking or missing sealant and caulking." LRA Section B.2.1.17 states an enhancement to the Aboveground Steel tanks Program by adding paint flaking and drying, cracking, or missing sealant and caulking as examples of minor structural deficiencies.

Issue
The staff requires clarification of the meaning of the term "minor structural deficiencies."

Request
Does the term "minor structural deficiency" imply that no further evaluation of the degraded condition will occur? If no further evaluation will occur, justify this as an exception to GALL AMP XI.M29.

RAI B.2.1.17-5

Background
The "monitoring and trending" program element of GALL AMP XI.M29, Aboveground Steel Tanks, states, "The effects of corrosion of the underground external surface are detectable by thickness measurement of the tank bottom and are monitored and trended if significant material loss is detected." LRA Section B.2.1.17, Enhancement No. 2 states that for the two fire protection water storage tanks, the program will be enhanced to include the performance of an ultrasonic (UT) examination of the internal tank bottom surface within 10 years prior to the period of extended operation.

Issue
The staff is not clear whether the UT examination is a one-time or periodic inspection.

Request
Clarify whether the UT examination specified in LRA Section B.2.1.17, Enhancement No. 2 is a one-time measurement or periodic inspection. If it is a one-time UT inspection, justify how the one-time measurement can be used for monitoring and trending of aging effects.

RAI B.2.1.21-1

Background
The "parameters monitored or inspected" element of the GALL AMP XI.M33 "Selective Leaching of Materials" recommends a possible expansion of the inspection sample size and location if selective leaching has occurred. The detection of aging effects element recommends the initiation of an engineering evaluation to determine the acceptability of the affected components if selective leaching has occurred. LRA Section B.2.1.21 states that if it is determined that selective leaching is occurring, then an engineering evaluation will be initiated to determine acceptability of the affected components for continued service. Follow-up of unacceptable inspection findings will include an expansion of the inspection sample size and location. LRA Section B.2.1.21 also states that Seabrook has experienced instances of de-aluminization of aluminum bronze components having an internal environment of raw sea water.

Issue
Given that selective leaching of aluminum bronze components has occurred, it is unclear how an expansion of the inspection sample sizes and locations are being implemented at Seabrook.

Request
1) Describe the methodology and criteria for selecting a representative sample population that envelop all plant systems and working conditions in materials where selective leaching has occurred. Describe any planned inspection and associated activities ahead.

2) Provide justification for the methodology, sample size and location used for selecting components with different material and environment combinations for selective leaching inspections.

RAI B.2.1.24-1

Background
The GALL Report XI.M36, "External Surfaces Monitoring" states that for program element 5, "monitoring and trending," visual inspection activities are performed and associated personnel are qualified in accordance with site controlled procedures and processes. LRA section B.2.1.24 states that the program inspects for hardening and loss of strength in components made from elastomers by visual examinations to detect discontinuities and imperfections of the

surface of the component, and non-visual examinations such as tactile techniques, which include scratching bending, folding, stretching and pressing in conjunction with the visual examinations.

Issue
The applicant's AMP has in-scope components that cannot be reached for hands-on inspection and therefore are not accessible for the tactile inspection described in the LRA AMP.

Request
Provide details describing how the inspections tactile techniques would be applied for the in-scope elastomeric components that are inaccessible for physical manipulation.

RAI B.2.1.24-2

Background
The program description in GALL Report XI.M36, "External Surfaces Monitoring," states that the program consists of periodic visual inspections of steel components such as piping, piping components, ducting, and other components within the scope of license renewal and subject to aging management review (AMR) in order to manage aging effects. The program manages aging effects through visual inspection of external surfaces for evidence of material loss." LRA Section B.2.1.24 states that in addition to steel, components of other construction materials will be covered. Specifically, LRA Section B.2.1.24 states "The Seabrook Station program will also apply to components made from other materials such as aluminum, cast austenitic stainless steel, copper alloy, copper alloy >15% Zn, elastomer, galvanized steel, gray cast iron, nickel alloy, and stainless steel."

Issue
The applicant's AMP is being applied to materials beyond steel, which is the material specified in the GALL Report for this AMP. The additional materials exhibit different aging mechanisms than steel, and the observable indications of corrosion are substantially different from those of steel. For example, the oxidation of in-scope aluminum components can not be identified by the discoloration and appearance of rust which is the visual indicator of corrosion on steel. Therefore the inspections must be adapted to address detection of aging for the additional in-scope materials.

Request
Provide details on the additional inspection methods to be used to ensure that the AMP will adequately address potential aging effects on the additional in-scope materials.

RAI B.2.1.25-1

Background
The GALL Report XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components" states in Program element 4, "detection of aging effects," the applicant should justify the inspection technique used for detecting the aging effects of concern. The applicant's AMP states that "The program will be used to detect hardening and loss of strength in

components made from elastomers by visual examinations and non-visual examinations such as tactile techniques, which include scratching, bending, folding, stretching and pressing in conjunction with the visual examinations."

Issue
The management of aging effects of elastomers is covered by this AMP with the addition of non-visual examinations such as tactile techniques. However, there are instances of in-scope components that are not accessible for physical manipulations.

Request
Provide an explanation of how the tactile examinations described in the AMP will be applied to in-scope components that are not accessible for physical manipulations.

RAI B.2.1.25-2

Background
The GALL Report XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components" states that the acceptance criteria are established in the maintenance and surveillance procedures or other established plant procedures. In LRA Section B.2.1.25, it states "Visual inspection will monitor parameters such as corrosion, corrosion byproducts, coating degradation, discoloration on the surface, scale/deposits, pits and surface discontinuities." In LRA Section B.2.1.25, it also states that "The degree to which these conditions exist will be used to establish baseline acceptance criteria for future inspections."

Issue
The statement in LRA Section B.2.1.25 indicates that the results of the applicant's inspections will be used to establish acceptance criteria.

Request
Provide details on the process to be used for establishing new acceptance criteria based on the results of the inspections. Details should include how the establishment of new acceptance criteria will be done in a manner that will assure the applicant's AMP is effective to detect aging effects prior to loss of component function.

RAI B.2.1.25-3

Background
The GALL Report XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components" Program element 3, "parameters monitored/inspected," states that "visible evidence of corrosion may indicate possible loss of materials." In LRA Section B.2.1.25, it states "A thin, light, even layer of oxidation provides protection against further corrosion."

Issue
The statement in LRA Section B.2.1.25 regarding a layer of oxidation proving protection against further corrosion is not accurate for most of the in-scope materials. Therefore, taken in the general context as it appears in the applicant's AMP, the statement is not accurate.

Request
Provide technical clarification on the specific in-scope materials to which the subject statement is intended to describe. Also, provide an explanation of how this statement pertains to monitoring of oxidation by the inspections in this program.

RAI B.2.1.27-1

Background
GALL Report AMP XI.S1, "ASME Section XI, Subsection IWE," recommend that the applicant is to consider the liner plate and containment shell corrosion concerns described in generic communications. In June 2010, the U.S. Nuclear Regulatory Commission (NRC) issued Information Notice (IN) 2010-12 to inform the holders of an operating license or construction permit for a nuclear power reactor about recent issues involving through wall corrosion of the steel reactor containment building liner. The recipients of this IN 2010-12 are expected to review the information for applicability to their facilities and to consider actions, as appropriate, to avoid similar problems.

Issue
During the AMP audit at Seabrook, the staff interviewed the applicant staff and reviewed documentation about the ground water seepage in different plant structures. The staff found that ground water infiltrated into the annular space between the concrete enclosure building and concrete containment. The bottom six feet of the concrete containment wall was in contact with the ground water for a long period of time. In addition, cracks due to Alkali-Silica Reaction (ASR) have been observed in different Seabrook plant concrete structures, including the concrete enclosure building. Therefore, the ground water may have penetrated the concrete containment wall and come into contact with the containment liner plate. This can result in through wall corrosion of the containment liner plate.

Request
Please provide the details of any plans to perform nondestructive examinations, such as UT, of the containment liner to demonstrate that the effects of prolonged exposure of bottom portion of the concrete containment to ground water have not introduced corrosion on the concrete side of the liner plate. Corrosion on the concrete side of the containment liner could affect its ability to perform its intended design function during the period of extended operation.

RAI B.2.1.27-2

Background
GALL AMP XI.S1, "ASME Section XI, Subsection IWE," states that Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a imposes the inservice inspection (ISI) requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, Subsection IWE for steel containments (Class MC) and steel liners for concrete containments (Class CC). The full scope of IWE includes steel containment shells and their integral attachments; steel liners for concrete containments and their integral attachments; containment hatches and airlocks; seals, gaskets and moisture barriers; and pressure-retaining bolting. This evaluation covers the 2001 edition including the 2002 and 2003 Addenda, as

approved in 10 CFR 50.55a. ASME Code Section XI, Subsection IWE and the additional requirements specified in 10 CFR 50.55a(b)(2) constitute an existing mandated program applicable to managing aging of steel containments, steel liners of concrete containments, and other containment components for license renewal.

Seabrook requested and received approval from the NRC on August 30, 2000 to implement the 1995 Edition with 1996 Addenda for ASME Section XI for second inspection interval between 2000 and 2010.

Article IWE-3122.3 of the 1995 Edition with 1996 Addenda for ASME Section XI states, "when flaws or areas of degradation are accepted by engineering evaluation, the area containing the flaw or degradation shall be reexamined in accordance with IWE-2420(b) and (c)." IWE -2420 requires that the flaws or areas of degradation remain essentially unchanged for three consecutive inspection periods before these areas no longer require augmented examination in accordance with Table IWE-2500-1, Examination Category E-C.

Issue
During the site audit, the NRC staff reviewed documentation concerning the corrosion of containment liner plate around the fuel transfer tube vault documented during the 2009 IWE inspection. The containment liner plate had indications of heavy corrosion. UT examination of containment liner indicated that liner plate thickness varied between 0.484 to 0.411 inches (variation of 18 percent) within a small area.

The applicant accepted this degradation of the liner plate based on engineering evaluation. The applicant justification for acceptance was that the measured thickness of the liner plate was still greater than the 0.375 inch nominal thickness of the liner plate. However, the NRC staff did not find any requirement in the applicant's engineering evaluation that requires UT reexamination of the affected portion of the liner plate for three consecutive periods in accordance with IWE-2420.

Request
Provide the details of any actions planned for augmented examination of the containment liner plate around the fuel transfer tube where the corrosion was detected during the 2009 inspection. The staff needs this information to verify that the effects of aging on the intended function of the containment liner plate will be adequately managed for the period of extended operation.

RAI B.2.1.28-1

Background
GALL AMP XI.S2, "ASME Section XI, Subsection IWL" Element 6 states that ASME Section XI, Subsection IWL, Article IWL-3000 provides acceptance criteria for concrete containments. The GALL Report further states that quantitative acceptance criteria based on the "Evaluation Criteria" provided in Chapter 5 of American Concrete Institute (ACI) 349.3R may also be used to augment the qualitative assessment of the responsible engineer. In addition, IN 2010-14, "Containment Concrete Surface Condition Examination Frequency and Acceptance Criteria"

describes recent issues identified by the NRC staff during license renewal application review audits at different nuclear power plant sites concerning the containment concrete surface condition examination frequency and acceptance criteria.

Issue
The following statement is provided in LRA Section B2.1.28.

> Acceptance criteria in accordance with IWL-3000 for concrete containment are provided in Seabrook Station procedures. For concrete surfaces, the acceptance criteria rely on the determination of the "*Responsible Engineer*" regarding whether there is any evidence of damage or degradation sufficient to warrant further evaluation or repair in accordance with IWL-3300. The acceptance criteria are qualitative. Seabrook Station procedures also require that the Responsible Engineer be a registered professional engineer experienced in evaluating the inservice condition of structural concrete and knowledgeable of the design and construction codes and other criteria used in design and construction of concrete containments.

In addition, during the audit, the staff reviewed the applicant's implementing procedure for ASME Section XI, Subsection IWL program. The staff found that the AMP implementing procedure did not have any quantitative acceptance criteria for concrete surface examination similar to one described in ACI 349.3R-02.

Request
1) Provide information on how the degradation of concrete containment is quantified, tracked, and trended for use as a baseline for the period of extended operation.
2) Provide a description of actions taken to address issues identified in NRC Information Notice 2010-14, "Containment Concrete Surface Condition Examination Frequency and Acceptance Criteria."

The staff needs the above information to confirm that the effects of aging of the concrete containment will be adequately managed so that it's intended function will be maintained consistent with the current licensing basis for the period of extended operation, as required by 10 CFR 54.21(a)(3).

RAI B.2.1.28-2

Background
GALL AMP XI.S2, "ASME Section XI, Subsection IWL" Element 6 states that ASME Section XI, Subsection IWL, Article IWL-3000 provides acceptance criteria for concrete containments and that quantitative acceptance criteria based on the "Evaluation Criteria" provided in Chapter 5 of ACI 349.3R may also be used to augment the qualitative assessment of the responsible engineer. LRA Section B2.1.28 states that preventive maintenance work orders are used for tracking and identifying conditions identified during surveillances. Issues and events, whether external or plant-specific, that are potentially significant to containment reinforced concrete at Seabrook, or which show deficiencies in excess of acceptance criteria are evaluated.

Issue
During the audit, the staff reviewed results of visual examination of concrete containment surface (VT-3C) performed in October, 2005, provides VT-3C visual inspection results for the concrete containment. These results identified numerous areas of spalled concrete that equal or exceeded a depth of 1 in. According to evaluation criteria in ACI 349.3R-02, Sect. 5.1, spalled areas that exceed a depth of 3/8 inch and 4 inches in any dimension must be evaluated.

Request
The applicant is requested to provide the following information.

1) A description of the methods used to evaluate spalled areas that exceed a depth of 3/8 inch and 4 inches in any dimension in accordance with "Acceptance After Review" criteria in ACI 349.3R-02, Section 5.2, the acceptance criteria for spall size and depth, and results of the engineering evaluation.

2) A description of the methods used to evaluate spalled areas that exceed a depth of 3/4 inch and 8 inches in any dimension in accordance with "Conditions Requiring Further Evaluation" criteria in ACI 349.3R-02, Section 5.3, the acceptance criteria for spall size and depth that do not require repair, and results of the engineering evaluation.

3) The findings from the most recent Engineering Evaluation Report that was prepared to comply with ASME Section XI, Subsection IWL-3310 requirements.

The staff needs the above information to confirm that the effects of aging of the concrete containment will be adequately managed so that it's intended function will be maintained consistent with the current licensing basis for the period of extended operation, as required by 10 CFR 54.21(a)(3).

RAI B.2.1.28-3

Background
LRA Section 3.5.2.2.1.1 states that degradation of concrete due to aggressive chemical attack is applicable to the Seabrook and that groundwater analyses confirm that the Seabrook site groundwater is aggressive. Testing performed from November 2008 to September 2009 found pH values between 5.8 and 7.5, chloride values between 19 ppm and 3900 ppm, and sulfate values between 10 ppm and 100 ppm. The applicant further stated that corrosion of embedded steel becomes significant if environmental conditions are found to be aggressive. According to the applicant, concrete cracking due to expansion and reaction with aggregates is managed through the ASME Section XI, Subsection IWL Program, B.2.1.28 and the Structures Monitoring Program, B.2.1.31.

Issue
Concrete containment surfaces that are exposed to groundwater are susceptible to cracking due to expansion and reaction with aggregates because the Seabrook site groundwater is aggressive. In addition, steel reinforcing bars embedded in concrete that is exposed to groundwater are susceptible to chloride-induced corrosion. Degradation of reinforced concrete

on the outside of the containment in the annulus between the containment and the enclosure building from elevation -30 feet to +20 feet is possible if groundwater accumulates in this space. During the audit, the staff learned that the applicant observed water accumulation in the annulus between the containment and the enclosure building but the containment concrete does not exhibit evidence of cracking due to expansion and reaction with aggregates.

Request
The applicant is requested to provide the following information.

1) The test method or procedure used to confirm that the exterior containment concrete surface between elevation -30 feet and +20 feet is not experiencing cracking due to expansion and reaction with aggregates.

2) The test method or procedure used to verify that the compressive strength and modulus of elasticity of the containment concrete between elevation -30 feet and +20 feet are not affected by cracking due to expansion and reaction with aggregates.

3) Results of any existing or planned compressive, tensile, and modulus elasticity of concrete core samples taken from the concrete containment between elevation -30 feet and +20 feet.

The staff needs the above information to confirm that the effects of aging of the concrete containment will be adequately managed so that it's intended function will be maintained consistent with the current licensing basis for the period of extended operation, as required by 10 CFR 54.21(a)(3).

RAI B.2.1.28-4

Background
During the audit, the staff learned that the concrete containment is susceptible to cracking due to expansion and reaction with aggregates because the groundwater is aggressive. According to the applicant, concrete cracking due to expansion and reaction with aggregates is managed through the ASME Section XI, Subsection IWL Program, B.2.1.28 and the Structures Monitoring Program, B.2.1.31.

Issue
A review of Seabrook condition reports by the staff did not identify inspection findings that discussed cracking of concrete due to expansion and reaction with aggregates or nondestructive or destructive test data that quantify the magnitude or extent of cracking of accessible above-grade and below-grade portions of the concrete containment. In order to monitor and trend changes in the condition of the concrete, a baseline condition assessment should be performed and documented to serve as a reference for future containment concrete inspections and evaluations.

Request
The applicant is requested to provide the following information.

1) The plans and schedule for conducting a baseline inspection of the condition of accessible above-grade and below-grade portions of the concrete containment in accordance with ACI 349.3R requirements.

2) The plans and schedule for obtaining nondestructive or destructive test data for quantifying the mechanical properties (compressive strength, tensile strength, and modulus of elasticity) of concrete in areas that have experienced cracking due to expansion and reaction with aggregates.

The staff needs the above information to confirm that the effects of aging of the concrete containment will be adequately managed so that it's intended function will be maintained consistent with the current licensing basis for the period of extended operation, as required by 10 CFR 54.21(a)(3).

RAI B.2.1.29-1

Background
10 CFR 50.55a imposes the ISI requirements of the ASME B&PV Code, Section XI, for Class 1, 2, 3, and Class MC piping and components and their associated supports. The LRA states that the Seabrook AMP B.2.1.29, "ASME Section XI, Subsection IWF" is consistent with GALL AMP XI.S3, "ASME Section XI, Subsection IWF". The GALL AMP XI.S3 states that the IWF scope of inspection for supports is based on sampling of the total support population. Discovery of support deficiencies during regularly scheduled inspections triggers an increase of the inspection scope, in order to ensure that the full extent of deficiencies is identified. IWF-2430 provides guidance on how to increase the sample size in case deficiencies are identified during examination of the supports.

Issue
During the audit, the NRC staff reviewed documentation related to Seabrook operating experience and found that ISI inspections conducted during 1997 and 1999 identified 36 and 5 support conditions with deficient conditions respectively. During its review, the NRC staff did not find any documentation which indicated that support sample size was increased in accordance with IWF-2430. In addition, the staff review of the implementing procedures for IWF inspection did not find any guidance for increasing the sample size in accordance with IWF-2430.

Request
Please provide documentation that demonstrates the IWF support inspections are performed in accordance with the recommendations of the GALL AMP XI.S3 regarding increase in the sample size in case deficiencies are identified during examination of supports.

RAI B.2.1.31-1

Background
In the LRA and multiple condition reports, the applicant stated that below-grade concrete structures have experienced groundwater infiltration. During walkdowns, the staff observed indications of leaching and alkali-aggregate reactions in below-grade concrete structures.

Issue
To understand the possible effects of the groundwater infiltration on concrete structures, testing of affected concrete was scheduled for 2010. The LRA did not include the results of this concrete testing.

Request
1) Provide a summary of the results of the concrete testing performed to date. Results should include information on mechanical properties (e.g. compressive strength, modulus of elasticity, tensile strength, etc.). Explain how the properties of the cores can be correlated to the properties of the in-place concrete, and how this will be factored into the evaluation.

2) Explain if/why the samples are representative of affected concrete throughout the plant, including foundations and the containment enclosure building.

3) Discuss the root cause of any degradation (e.g. Alkali-Aggregate Reaction, leaching, etc.), and explain how it will be addressed in preparation for the period of extended operation.

4) Explain how future degradation will either be prevented, or managed during the period of extended operation.

5) Explain how structural stability will be maintained during the period of extended operation if concrete mechanical properties have been reduced by groundwater infiltration.

RAI B.2.1.31-2

Background
In the LRA and multiple condition reports, the applicant stated that below-grade concrete structures have experienced groundwater infiltration. During walkdowns, the staff also observed multiple locations of groundwater infiltration.

Issue
The groundwater infiltration has caused accelerated degradation of plant structures, supports and components as noted in multiple condition reports.

Request
Explain how plant structures and components (i.e. supports, baseplate, cable trays, etc.) throughout the plant will be managed for accelerated, or additional, aging effects due to exposure to groundwater infiltration, during the period of extended operation.

RAI B.2.1.31-3

Background
During the audit, the staff learned that below-grade concrete structures have experience groundwater infiltration which has led to concrete degradation.

Issue
The staff was unable to locate any inspection reports which identified and tracked the degradation in a quantitative manner. A baseline quantitative concrete inspection of in-scope structures is necessary for monitoring and trending degradation during the period of extended operation.

Request
Provide plans for conducting a quantitative baseline inspection, in accordance with ACI 349.3R, prior to the period of extended operation.

RAI B.2.1.31-4

Background
A review of plant-specific operating experience indicated that the spent fuel pool and transfer canal have shown indications of borated water leakage.

Issue
Leakage from the spent fuel pool may migrate through the concrete walls and cause degradation of the concrete and reinforcing steel.

Request
Clearly explain the operating experience related to the spent fuel pool leakage. Include the following in the response:

1) Historical data on the leakage occurrence and volume, including information on the assumed leakage path and structures that could potentially be affected by the presence of borated water. Provide the justification for assuming this leakage path.

2) Whether or not the leakage has stopped and justification for this conclusion. If the leakage has not stopped, discuss plans for remedial actions or repairs to address leakage through the spent fuel pool liner. In the absence of a commitment to fix the leakage prior to the period of extended operation, explain how the structures monitoring program, or other plant-specific program, will address the leakage to ensure that aging effects, especially in inaccessible areas, will be effectively managed during the period of extended operation.

3) Provide background information and data to demonstrate that the concrete and embedded steel reinforcement have not been degraded by exposure to the borated water and will continue to perform their intended function during the period of extended operation.

November 18, 2010

Mr. Paul Freeman
Site Vice President
c/o Mr. Michael O'Keefe
NextEra Energy Seabrook, LLC
P.O. Box 300
Seabrook, NH 03874

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE REVIEW OF THE SEABROOK STATION LICENSE RENEWAL APPLICATION (TAC NO ME4028) – AGING MANAGEMENT PROGRAMS

Dear Mr. Freeman:

By letter dated May 25, 2010, NextEra Energy Seabrook, LLC submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the Operating License No. NPF-86 for Seabrook Station, Unit 1 (Seabrook) for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

The request for additional information was discussed with Mr. Rick Cliche, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-1427 or by e-mail at Richard.Plasse@nrc.gov.

Sincerely,

/RA/

Richard Plasse, Project Manager
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure:
As stated

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DATE	11/9/10	11/9/10	11/15/10	11/18/10	11/18/10

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Letter to Paul Freeman from Richard A. Plasse dated November 18, 2010

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE REVIEW OF THE SEABROOK STATION, LICENSE RENEWAL APPLICATION (TAC NO ME4028) – AGING MANAGEMENT PROGRAMS

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