



August 11, 2011

SBK-L-11154
Docket No. 50-443

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Seabrook Station
Response to Request for Additional Information
NextEra Energy Seabrook License Renewal Application
Request for Additional Information – Set 15

References:

1. NextEra Energy Seabrook, LLC letter SBK-L-10077, "Seabrook Station Application for Renewed Operating License," May 25, 2010. (Accession Number ML101590099)
2. NRC Letter "Request for Additional Information For the Review of the Seabrook Station License Renewal Application" (TAC NO. ME4028) – Request for Additional Information Set 15," June 29, 2011. (Accession Number ML11178A338)
3. NextEra Energy Seabrook, LLC letter SBK-L-10204, "Seabrook Station Response to Request for Additional Information, NextEra Energy Seabrook License Renewal Application Aging Management Programs – Set 1", December 17, 2010. (Accession Number ML103540534)
4. NextEra Energy Seabrook, LLC letter SBK-L-11063, "Seabrook Station Response to Request for Additional Information, NextEra Energy Seabrook License Renewal Application – Set 13", April 14, 2011. (Accession Number ML111108A131)
5. NextEra Energy Seabrook, LLC letter SBK-L-11015, "Seabrook Station Response to Request for Additional Information, NextEra Energy Seabrook License Renewal Application – Sets 6, 7 and 8", February 3, 2011. (Accession Number ML110380081)

In Reference 1, NextEra Energy Seabrook, LLC (NextEra) submitted an application for a renewed facility operating license for Seabrook Station Unit 1 in accordance with the Code of Federal Regulations, Title 10, Parts 50, 51, and 54.

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In Reference 2, the NRC requested additional information in order to complete its review of the License Renewal Application (LRA). The requests are a follow-up to responses provided in References 3 and 4. Enclosure 1 contains NextEra's response to the request for additional information and associated changes made to the LRA. For clarity, deleted LRA text is highlighted by strikethroughs and inserted texts highlighted by bold italics.

In Reference 5, the response to RAI 3.3.2.15-1 was inadvertently duplicated as the same response to RAI 3.3.2.15-01. The correct response to RAI 3.3.2.15-1 is provided in Enclosure 2 of this letter.


Commitment numbers 50 and 51 are revised and commitments 67 and 68 added. There are no other new or revised regulatory commitments contained in this letter. Enclosure 3 provides a revised LRA Appendix A - Final Safety Report Supplement Table A.3, License Renewal Commitment List, updated to reflect the license renewal commitment changes made in NextEra Energy Seabrook correspondence to date.

If there are any questions or additional information is needed, please contact Mr. Richard R. Cliche, License Renewal Project Manager, at (603) 773-7003.

If you have any questions regarding this correspondence, please contact Mr. Michael O'Keefe, Licensing Manager, at (603) 773-7745.

Sincerely,

NextEra Energy Seabrook, LLC.

 *Kenneth J. Browne*
Plant General Manager For

Paul O. Freeman
Site Vice President

Enclosures:

- Enclosure 1- Response to Request for Additional Information Seabrook Station License Renewal Application, Set # 15 and Associated LRA Changes
- Enclosure 2- Revised NextEra Energy Seabrook response to RAI 3.3.2.15-1 provided in letter SBK-L-11015 dated February 3, 2011
- Enclosure 3- LRA Appendix A - Final Safety Report Supplement Table A.3, License Renewal Commitment List, updated to reflect the license renewal commitment changes made in NextEra Seabrook correspondence to date.

cc:

W.M. Dean,	NRC Region I Administrator
G. E. Miller,	NRC Project Manager, Project Directorate I-2
W. J. Raymond,	NRC Resident Inspector
R. A. Plasse Jr.,	NRC Project Manager, License Renewal
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I, Kenneth J. Browne, Plant General Manager of NextEra Energy Seabrook, LLC hereby affirm that the information and statements contained within are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

Sworn and Subscribed

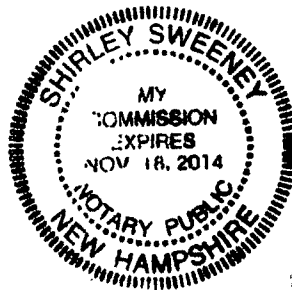
Before me this 11th day of August, 2011

A handwritten signature in black ink, appearing to read "K. Browne", written over a horizontal line.

Kenneth J. Browne
Plant General Manager

A handwritten signature in black ink, appearing to read "Shirley Sweeney", written over a horizontal line.

Notary Public



Enclosure 1 to SBK-L-11154

**Response to Request for Additional Information
Seabrook Station License Renewal Application
Set 15 and Associated LRA Changes**

Request for Additional Information (RAI) Follow-up B.2.1.27-1:

Background:

By letter dated April 14, 2011, NextEra Energy Seabrook (the applicant) responded to a staff request for additional information (RAI) regarding testing of the containment liner for possible loss of material from the concrete side of the liner. In the response, the applicant committed to ultrasonic testing (UT) of the containment liner at 10° intervals around the accessible circumference of the containment near the moisture barrier at the -26' elevation. The applicant committed to finishing the UT no later than December 31, 2015. The applicant further stated that in accordance with ASME Section XI, Subsection IWE 1241(a), Seabrook will designate the area of the containment liner that is within 10 inches of the moisture barrier at the containment basement floor for examination.

Issue:

IWE 1241(a) requires augmented examination of the containment liner surface area in accordance with Table IWE-2500-1, examination category E-C. Item E.4.12 of Table IWE-2500-1 requires 100% UT measurement of the area designated for augmented examination during each inspection period until the areas examined remain essentially unchanged for three consecutive inspection periods. In the RAI response, the applicant did not explain why a one-time UT examination at 10° increments (-36 measurements) to be completed by December 31, 2015, was appropriate in lieu of IWE-1241(a) and Table IWE-2500-1 requirements.

Request:

Provide technical justification for not following the requirements of IWE-1241(a) and Table IWE-2500-1 for performing UT examination of 100% of the area designated for augmented examination during each inspection period until the area remains essentially unchanged for three consecutive inspection periods. The staff is concerned that the December 31, 2015, deadline for one-time UT examination and the spacing of the UT measurements at 10° increments around the containment circumference may not be able to detect and establish a trend of the potential degradation of the liner plate over the long term.

NextEra Energy Seabrook Response

The containment liner plate in the vicinity of the moisture barrier at Seabrook Station has not exhibited any evidence indicative of loss of material or conditions likely to cause accelerated degradation that would require an ASME Section XI, Subsection IWE repair or augmented examination per IWE 1241(a).

Seabrook Station, refueling outage 14 (OR14) Containment Liner Examination Summary, dated May 1, 2011 reported 83 indications found in the vicinity of the moisture barrier. These 83 indications in the vicinity of the moisture barrier were on the concrete floor, the moisture barrier, and the containment liner. They consisted of: 1)

apparent lack of bonding, and degradation of the moisture barrier, 2) concrete spalling and chipping, and coating chipping and blistering on the floor; and 3) coating chipping, blistering/cracking, and in 5 indications of minor surface corrosion on the liner plate. All of the indications were minor in nature less than 1 sq. inch area and does not meet the requirements of IWE -1240 for augment examination.

All OR14 indications have been evaluated and accepted by engineering, corrective measures, such as recoating performed, or approved by engineering for remediation during refueling outage OR15 in 2012. The evaluations and corrective actions are documented in the corrective action process.

As stated above Seabrook Station performed an inspection of the containment liner around the moisture barrier in 2011 during OR14, and found no areas that required IWE repairs or augmented examination. Seabrook Station will additionally confirm no loss of material of the liner plate around the moisture barrier. This confirmatory process will include ultrasonic thickness (UT) examinations of 360° of the accessible liner plate in a band extending from the moisture barrier at el. -26', to ten inches above the moisture barrier. The examination process will perform 50 UT's at approximately equal spacing around the accessible circumference of the liner plate.

There are no current indications that require ASME Section XI, Subsection IWE repair or augmented examination. To allow for process development, planning, and scheduling, the initial confirmatory examination will be conducted within the next two refueling outages, OR15 in 2012 and OR16 in 2014. In the absence of any positive indication of material loss being identified during the initial examination, confirmatory examinations will be repeated on an interval of every five refueling outages. Based on the above discussion, the following changes are made to the LRA:

- 1) License Renewal Application Appendix B, Section B.2.1.27, page B-151, as changed by RAI B2.1.27-1 in SBK-L-11063, is further changed to read as follows:

Enhancements

~~Seabrook will perform ultrasonic thickness (UT) testing of the liner plate inside containment for loss of material on the concrete side of the liner. The testing will be subject to ASME Section XI, Subsection IWE acceptance criteria. The UT testing targets the area near the moisture barrier at el. -26 and at nominal 10° increments around the accessible circumference of containment. This will be completed by December 31, 2015 and at intervals of no more than five refueling outages thereafter.~~

NextEra Energy Seabrook commits to initiating a confirmatory examination process to initially and periodically verify the soundness of the liner plate. The confirmatory process will include ultrasonic thickness (UT) examinations of 360° of the accessible liner plate in a band extending from the moisture barrier at el. -26', to ten inches above the moisture barrier. The examination process will perform 50 UT's at approximately equal spacing around the accessible circumference of the liner plate as discussed above.

NextEra Energy Seabrook will conduct confirmatory UT examinations of the containment liner plate in the vicinity of the moisture barrier for loss of material within the next two refueling outages, OR15 or OR16. In the absence of any positive indication of material loss being identified during the initial examination, confirmatory examinations will be repeated at five refueling outage intervals.

- 2) License Renewal Application Appendix A, Section A.3, page A-43, as changed by RAI B2.1.27-1 in SBK-L-11063, is further changed and added to, as follows:

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
50.	ASME Section XI, Subsection IWE	Perform UT testing of the containment liner plate in the vicinity of the moisture barrier for loss of material.	A.2.1.27	No later than December 31, 2015 <i>Within the next two refueling outages, OR15 or OR16</i> , and repeated at intervals of no more than five refueling outages

Request for Additional Information (RAI) Follow-up B.2.1.27-2:

Background:

By letter dated April 14, 2011, the applicant responded to a staff RAI regarding UT examinations of the containment liner below the fuel transfer tube which had been exposed to borated water leakage. In the response, the applicant stated that the area was subject to UT examinations and had been examined and accepted.

Issue:

The applicant provided no information about when the UT examinations had been conducted or the results of the examinations. It is not clear if the containment liner plate below the fuel transfer tube that has been exposed to the borated water leakage was designated for augmented examination in accordance with IWE-1241(a). In addition, the RAI response did not provide the timing for the initial, and three subsequent consecutive, examinations to comply with IWE-1240 and Table IWE-2500-1 requirements.

Request:

Provide the dates and results of the UT examinations of the containment liner plate area below the fuel transfer tube. If any of the values were below the minimum wall thickness, explain how the areas were repaired or evaluated.

NextEra Energy Seabrook Response

The containment liner plate at the fuel transfer tube penetration (PEN-X62) was subject to a VT-3 examination under Subsection IWE on October 15, 2009. Five indications were subjected to UT examination, power tool cleaned, and recoated. None of these indications had measured values less than nominal wall thickness, however, the area was incorrectly designated for ASME Section XI, Subsection IWE-1241 augmented inspection.

The first of three planned consecutive augmented inspections was performed in April 2011. The entire surface area at fuel transfer tube penetration (PEN-X62) was subjected to visual examination, and areas around the five indications identified in October 2009 were subjected to UT scans. The area of the prior minimum thickness reading of 0.411 inches was re-measured as ranging from 0.400 to 0.409 inches. The thickness measured is greater than t_{nom} (0.375 inches); no repairs are required.

Request for Additional Information (RAI) Follow-up B.2.1.31-1:

Background:

By letter dated April 14, 2011, the applicant responded to a staff RAI regarding concrete degradation due to groundwater in-leakage and the occurrence of Alkali-Silica Reaction (ASR) in the concrete. The applicant stated that an extent of condition investigation regarding the ASR degradation was on-going, along with the development of a long range aging management plan. The applicant explained that the plan would not be fully developed and implemented until December 2013. The applicant's response also listed several American Society for Testing and Materials (ASTM) standards that would be used to estimate the ASR reaction rate.

Issue:

The applicant provided no specific information about the applicability of the original operability determination conducted when ASR was initially identified. The response also lacked specific information about what tests (laboratory and in-situ) would be conducted and when. The response also made no mention of how possible reductions in concrete shear strength were being estimated and addressed. In addition, the RAI response stated that cores were being taken in accordance with American Concrete Institute (ACI) 228.1R-03; however, it did not address the statistical validity and size of core samples taken or planned at each location.

Request:

1. Explain if the current operability determination remains valid until the long term aging management plan is developed and implemented.

2. Explain how the concrete tests and evaluations performed so far can be used to establish a trend in degradation of the affected structures until the long term aging management plan is implemented.
3. Provide detailed and comprehensive information regarding the planned approach to addressing ASR degradation throughout the site. The description of the actions planned to test, evaluate, and mitigate ASR in the RAI response do not provide sufficient details for the staff to determine if the aging of the structures will be adequately managed during the period of extended operation.

At a minimum include a discussion of the following:

- a. The locations where monitoring or sampling will be conducted, and how these results will be used to address other susceptible locations.
- b. The frequency of the monitoring and sampling to establish a trend in degradation of the structures and rate of ASR, and why the provided frequency is adequate.
- c. Detailed information about the planned in-situ monitoring or testing and laboratory testing. This should include the test method, frequency, and schedule.
- d. How the number of concrete samples taken or planned from each structure will ensure statistical validity.
- e. How the length of core samples taken or planned will account for variation of ASR across the wall thickness.
- f. How the extent of degradation/corrosion of rebars will be established in the ASR affected areas during the period of extended operation.
- g. How the reduction in load carrying capacity in the steel embedments and anchors be established in the ASR affected areas during the period of extended operation.
- h. How the results of the petrographic examination will be used to determine quantitative damage in concrete and rate of degradation for the period of extended operation.
- i. Plans, if any, for relative humidity and temperature measurements of affected concrete areas over the long term.
- j. Plans to perform stiffness damage tests to estimate the expansion attained to date in ASR affected concrete.
- k. How the current and future rate of expansion of concrete will be determined to ensure that bond between the rebar and concrete is effective over the long term.
- l. How the results of concrete compressive strength and modulus of elasticity conducted so far will be adjusted to account for future degradation during the

period of extended operation.

4. Explain how the possibility of a reduction in shear strength capacity due to ASR degradation is being evaluated and addressed since core samples are not being used to establish the tensile strength of concrete. The response should include a discussion of how the possible reduction is being quantified and how the reduction is shown to be acceptable for the period of extended operation.

NextEra Energy Seabrook Response

1. The current operability determination is expected to remain valid but may require modification, as discussed below. A comprehensive plan to evaluate and address ASR concrete degradation, and develop and implement a long term monitoring plan is ongoing, (See Item 2 response below).

As required by 10 CFR § 54.30(a), if information / results are identified, that impact the current operability determination, they will be evaluated and addressed accordingly. If the reviews show that there is not reasonable assurance that during the current license term, concrete affected by Alkali Silica Reaction is in compliance with applicable design codes, then NextEra Energy Seabrook will take measures under its current license, as appropriate, to ensure that the intended function of those systems, structures or components will be maintained in accordance with the current licensing basis ("CLB") throughout the term of its current license. Thus, by regulation, compliance with the CLB must be maintained until the long term aging management plan is developed and implemented.

As noted in the current operability determination, the areas of concrete affected by Alkali Silica Reaction are in compliance with the applicable design codes stated in the CLB. Structural integrity of the affected structures is fully qualified and all system, structures, and components housed within the structures are capable of performing their design function. The long term effects of the ASR condition are being monitored by the Structures Monitoring Program and the status of the condition is included in the Structures Health Report which, reports the results of subsequent investigations and testing to the Plant Health Committee. Should the condition degrade further, a higher level of qualification analysis will be employed to demonstrate that significant margin exists for operability.

2. Detailed and comprehensive information regarding the planned approach to addressing ASR degradation throughout the site will be included in an engineering evaluation scheduled to complete in March 2012. The content of the evaluation will include: discussion of degradation mechanisms in concrete, identification of areas susceptible to ASR, progress of in-situ testing of concrete and impact on current licensing basis calculations and analyses, progress of lab testing to establish ASR degradation rates in concrete, and mitigation techniques. Specific questions presented in Follow-up RAI B.2.1.31-1, items 2 through 4, will be addressed in this evaluation.

NextEra Energy Seabrook plans to update the structures monitoring program, as

appropriate, to manage aging related to ASR in concrete structures based on the engineering evaluation results.

3. Discussion Items 3a through 3l will be addressed in the evaluation described in Item 2 above.
4. See Item 2 response above.

Request for Additional Information (RAI) Follow-up B.2.1.31-4:

Background:

By letter dated April 14, 2011, the applicant responded to a staff RAI regarding past spent fuel pool (SFP) leakage and explained that a concrete core would be taken by December 31, 2015, in an area that had been wetted by the leakage. The applicant further stated that the SFP leak-off system is routinely hydro-lazed to ensure that it is free-flowing. During a conference call on May 31, 2011, the applicant also noted that SFP leakage had been detected during the spring 2011 refueling outage.

Issue:

1. The applicant did not explain why December 31, 2015, was an acceptable deadline for the concrete core, nor did they commit to taking the core.
2. The applicant did not identify, or justify, a frequency for hydro-lazing the leak-off system. The applicant also did not commit to continuing the hydro-lazing during the period of extended operation.
3. The applicant has not provided the staff with information on the new operating experience regarding the recent SFP leakage.

Request:

1. Provide technical justification for the adequacy of the December 31, 2015, deadline for the SFP concrete core, or provide a new deadline and appropriate justification. Commit to complete the core by the proposed deadline.
2. Identify the frequency that the leak-off system is ensured to be free-flowing. Provide technical justification for the frequency and commit to maintain the leak-off system free-flowing for the remainder of the operating term, including the period of extended operation.
3. Provide information on the recent leakage from the SFP. Include when the leakage was identified, the amount of leakage, the probable leakage path and source, and how the leakage is being addressed. Explain whether or not the leakage is contained within the leak-off system and provide technical justification for this conclusion. Also

provide results of any chemical analysis (e.g., pH, iron content, etc.) that has been done on the leakage in the past and whether or not periodic chemical analysis will be performed on the leakage in the future.

NextEra Energy Seabrook Response

1. Seabrook Station does not have continuous borated water leakage from the spent fuel pool. Currently, any leakage from the spent fuel pool collects in a steel catch basin installed in the sump and does not come in contact with concrete.

NextEra Energy Seabrook commits to confirm the absence of embedded steel corrosion by performing a shallow core sample in an area subjected to wetting of borated water during the time frame of the spent fuel pool leakage. The core samples will be examined for degradation of concrete from borated water and also expose rebar to detect any degradation such as loss of material.

As demonstrated by examination of concrete cores from the Connecticut Yankee spent fuel pool and Salem Nuclear Generating Station referenced in the "Safety Evaluation Report Related to the License Renewal of Salem Nuclear Generating Station Units 1 and 2" (ADAMS Accession Number ML11164A051), the structural capacity will not be significantly affected by exposure to borated water. In addition, borated water is not in continuous contact with concrete at Seabrook Station. Hence performing a confirmatory core bore and exposing rebar by December 31, 2015 is adequate.

2. Seabrook Station currently performs hydro-lazing of the spent fuel pool leakoff lines at a 4 ½ year frequency and will maintain this throughout the period of extended operation. Leak-off is recorded once a month on a spent fuel pool leakage spread sheet. The System Engineer monitors the leak-off telltale drains via the spread sheet for unusual leakage or lack thereof, which could be an indicator of blockage. Monitoring will continue throughout the period of extended operation.
3. Currently the spent fuel pool leakoff collection is analyzed for gamma and tritium activity monthly. On April 6, 2011, tritium activity concentration measured in Spent Fuel Pool (SFP) zone 6 tell-tale leakage collection pipe indicated a step increase from $2.58\text{E-}5$ $\mu\text{Ci/ml}$ to $7.87\text{E-}3$ $\mu\text{Ci/ml}$.

The increased leak rate occurred coincident with refilling of the cask loading pool which had previously been drained to support maintenance and testing of the spent fuel transfer system equipment. The tritium activity concentration increased by about a factor of 300 and the calculated pool leak rate was 1.2 gpd. Subsequent measurements identified the leak rate peaked at approximately 2.57 gpd on 4/10/2011, after which leakage decreased to the current level of 0.016 gpd (approximately 2oz. per day) by 5/9/2011.

On average, about 10 gallons per day of groundwater leaks out of the zone 6 tell-tale collection pipe. This groundwater has background contamination from tritium that is diffusing out of the concrete that was originally contaminated from the pool leakage identified in 1999. That leakage was terminated in 2004 with the application of the first non-metallic liner. Groundwater leakage is monitored by the Structures Monitoring Program.

Fuel pool volumetric leakage is estimated by taking the ratio of the leak-off line tritium concentration to the pool tritium concentration and multiplying that value by the amount of zone 6 leakage pumped out from the collection tank. In this particular instance, the only leak-off line that indicated any leakage was zone 6.

There are several potential causes for the increased leakage, and each is discussed below. Those include:

- A new SS liner plate leak in an area not lined with the non-metallic liner.
- A failure in the new non-metallic liner at the same location as a SS liner failure.
- A skimmer pit leak

Corrective actions are being implemented and are on going, such as:

- Determining if the skimmer pit(s) are the source of the current leakage.
- Verifying integrity of cask loading area non-metallic liner through drain down and inspection.
- Revising procedures for cask filling to limit pool level.
- Revising the maintenance work order for removal sequence of the weir gate, or reduce the height of the weir gate.
- Determining whether the current design of skimmer pits is appropriate and what changes need to be made to prevent leakage out of the pit.
- Perform a qualified visual inspection of the weld at the skimmer plate to discharge line interface to determine whether there is actually a seal weld.

The above corrective actions are scheduled to be completed by 12/31/2011.

As explained in response #2, the leakoff lines are hydro-lazed every 4 ½ years and the System Engineer monitor's the leak-off telltale drains via a collection spread sheet for unusual leakage conditions.

Currently the spent fuel pool leakoff collection is analyzed for gamma and tritium monthly. The program will be enhanced to perform sampling for chlorides, sulfates, pH and iron for four quarters (for seasonal variations) of one year once every 5 years. The information from these samples will be incorporated into the Structures Monitoring Program assessments.

Based on the above discussion, the following changes are made to the LRA:

- 1) License Renewal Application Appendix B, Section B.2.1.31, page B-169, is revised to add Enhancement 1d and 3 as follows:

1.d Perform a confirmatory core bore and expose rebar in an area under the catch basin in spent fuel pool leakage sump.

- 3. Enhance procedure to perform chemistry sample of the spent fuel pool leakoff collection points.***

a. Procedure CP 3.1, "Primary Chemistry Control Program" will be enhanced to include chemistry sampling of the spent fuel pool leakoff collection point for chlorides, sulfates, pH and iron for four quarters of one year once every 5 years.

- 2) License Renewal Application Appendix A, Section A.3, , is revised to add commitments as follows:

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
67	Structures Monitoring Program	<i>Perform one shallow core bore in an area that was continuously wetted from borated water to be examined for concrete degradation and also expose rebar to detect any degradation such as loss of material.</i>	A.2.1.31	<i>No later than December 31, 2015</i>
68	Structures Monitoring Program	<i>Perform sampling at the spent fuel pool leakoff collection point for chlorides, sulfates, pH and iron for four quarters of one year once every 5 years.</i>	A.2.1.31	<i>Starting January 2014</i>

Request for Additional Information (RAI) Follow-up B.2.1.28-3:

Background:

By letter dated December 17, 2010, the applicant responded to RAI B.2.1.28-3 regarding possible testing of the containment concrete. In the response, the applicant enhanced the ASME Section XI, Subsection IWL AMP to include confirmatory testing of the containment concrete to determine the compressive strength, the presence or absence of ASR, the concrete modulus of elasticity, and the presence or absence of rebar degradation. The applicant committed to complete the testing prior to the period of extended operation.

Issue:

During several conversations with the staff during the license renewal inspection the week of April 4, 2011, as well as conference calls on April 27, and May 31, 2011, the applicant indicated that they did not want to remove core bores from the containment. However, the staff is unaware of any method other than core bores that can be used to determine all the concrete properties discussed in Commitment 51 in the letter dated December 17, 2010. In addition, it is not clear how the possible degradation/corrosion of the rebar will be established. Furthermore, one time tests prior to the period of extended operation in 2030 can be used to establish a trend during the period of extended operation.

Request:

1. Verify whether or not the enhancement, and Commitment 51, regarding testing to confirm containment concrete properties, made in the letter dated December 17, 2010, is still valid.
2. If Commitment 51 is still valid as stated in the letter dated December 17, 2010, explain how these properties (compressive strength, presence of ASR, modulus of elasticity, presence of rebar degradation) can be verified without taking core samples.
3. Provide details of the plans to monitor the extent of cracking and expansion in concrete.

Justify why it is appropriate to wait until the period of extended operation, in 2030, to verify whether or not ASR is occurring in the containment and to begin trending possible degradation.

NextEra Energy Seabrook Response:

1. Program enhancements and commitment to confirmatory testing cannot be made until the aging effects of ASR are fully understood. Information regarding the planned approach to addressing ASR degradation throughout the site will be included in an engineering evaluation scheduled to complete in March 2012. The content of the evaluation will include: discussion of degradation mechanisms in concrete,

identification of areas susceptible to ASR, results of in-situ testing of concrete and impact on current licensing basis calculations and analyses, progress of lab testing to establish ASR degradation rates in concrete, and mitigation techniques. Specific questions presented in Follow-up RAI B.2.1.31-1, items 2 through 4, and Follow-up RAI B.2.1.28-3 will be addressed in this evaluation.

Based on this discussion, the following changes are made to the LRA, as amended by previous correspondence:

- 1) Program enhancement made in NextEra Seabrook letter SBK-L-10204 (Reference 3) to License Renewal Application Appendix B, Section B.2.1.28, page B-156 is revised as follows:

- ~~2. Seabrook will perform confirmatory testing and evaluation of the Containment Structure concrete. The testing and evaluation will determine the concrete compressive strength, the presence or absence of Alkali Silica Reaction (ASR), the concrete modulus of elasticity, and the presence or absence of rebar degradation. The testing and evaluation will be completed prior to the period of extended operation.~~

~~— Program Elements Affected: Element 3 (Parameters Monitored or Inspected).~~

- 2) Commitment No. 51 made in NextEra Seabrook letter SBK-L-10204 (Reference 3) to License Renewal Application Appendix A, Section A.3, page A-43 is revised as follows:

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
51	Number Not Used ASME Section XI, Subsection IWL	Perform confirmatory testing and evaluation of the Containment Structure concrete	A.2.1.28	Prior to the period of extended operation

2. See response to item 1.
3. Plans to monitor the extent of cracking and expansion in concrete will be included in the engineering evaluation described in item 1.

Enclosure 2 to SBK-L- 11154

**Changes to the
Seabrook Station License Renewal Application
Revised NextEra Energy Seabrook response to RAI 3.3.2.15-1
provided in letter SBK-L-11015 dated February 3, 2011**

The following NextEra Energy Seabrook response replaces the response to RAI 3.3.2.15-1 provided in Reference 5.

In NRC Letter "Request for Additional Information Related to the Review of the Seabrook Station License Renewal Application (TAC NO. ME4028) – Aging Management Review – Set 6" dated January 5, 2011 (ML 103420585), there were two RAIs with similar numbering. One was RAI 3.3.2.15-1 and the second one was RAI 3.3.2.15-01. The response to RAI 3.3.2.15-1 was inadvertently duplicated as the same response to RAI 3.3.2.15-01. The correct response to RAI 3.3.2.15-1 is as follows:

Request for Additional Information (RAI) 3.3.2.15-1

Background:

The GALL Report does not contain an aging management review for heat exchangers exposed to steam affected by reduction in heat transfer. For other materials and environments, the GALL Report typically suggests using a water chemistry program in conjunction with an inspection program for managing the reduction of heat transfer aging effect. In LRA Table 3.3.2-15, the applicant has indicated that reduction of heat transfer is an aging effect relevant to heat exchanger tubes exposed to steam. The applicant has indicated it plans to use the Water Chemistry Program to manage this aging effect.

Issue:

The applicant has indicated in the LRA that it plans to only use a water chemistry program to manage the reduction of heat transfer for heat exchanger tubes exposed to reactor coolant. This appears to be in contrast to the GALL Report typical management of this aging effect. It is not clear to the staff how management of water chemistry alone will ensure that reduction of heat transfer is appropriately managed.

Request:

Justify how the Water Chemistry Program alone is sufficient to determine that heat exchanger tubes are not affected by reduction of heat transfer when exposed to steam.

NextEra Seabrook Station Response

The Fire Protection system heat exchanger tubes for FP-E-46 & FP-E-47 have an external environment of steam, which is converted from potable water. PWR secondary plant water chemistry program is not applicable to potable water. Therefore, instead of the Water Chemistry Program, the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is a more appropriate program for age managing these heat exchangers. Seabrook Station has a preventive maintenance activity already in place to clean and inspect the external surfaces of these heat exchanger tubes. The frequency of this maintenance activity is approximately every 4 years. Cleaning and inspection of the

external surfaces of the heat exchanger tubes ensure that reduction of heat transfer is managed. Based on this discussion, the following changes were made to the License Renewal Application.

In Table 3.3.2-15, on page 3.3-304, the 7th row is revised as follows:

Heat Exchanger Components (FP-E-46 & 47 Tubes)	Heat Transfer Pressure Boundary	Stainless Steel	Steam (External)	Reduction of Heat Transfer	<i>Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Water Chemistry Program</i>	None	None	G, 8
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Please reference response to RAI 3.3.2.15-01 for additional changes that were made to heat exchanger FP-E-46 and 47 components. Additionally, Note 8 in the above table was added in response to RAI 3.3.2.15-01.

Enclosure 3 to SBK-L-11154

LRA Appendix A - Final Safety Report Supplement

Table A.3 License Renewal Commitment List

A.3 LICENSE RENEWAL COMMITMENT LIST

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
1.	PWR Vessel Internals	An inspection plan for Reactor Vessel Internals will be submitted for NRC review and approval.	A.2.1.7	Program to be implemented prior to the period of extended operation. Inspection plan to be submitted to NRC not later than 2 years after receipt of the renewed license or not less than 24 months prior to the period of extended operation, whichever comes first.
2.	Closed-Cycle Cooling Water	Enhance the program to include visual inspection for cracking, loss of material and fouling when the in-scope systems are opened for maintenance.	A.2.1.12	Prior to the period of extended operation
3.	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Enhance the program to monitor general corrosion on the crane and trolley structural components and the effects of wear on the rails in the rail system.	A.2.1.13	Prior to the period of extended operation
4.	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Enhance the program to list additional cranes for monitoring.	A.2.1.13	Prior to the period of extended operation
5.	Compressed Air Monitoring	Enhance the program to include an annual air quality test requirement for the Diesel Generator compressed air sub system.	A.2.1.14	Prior to the period of extended operation
6.	Fire Protection	Enhance the program to perform visual inspection of penetration seals by a fire protection qualified inspector.	A.2.1.15	Prior to the period of extended operation.

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
7.	Fire Protection	Enhance the program to add inspection requirements such as spalling, and loss of material caused by freeze-thaw, chemical attack, and reaction with aggregates by qualified inspector.	A.2.1.15	Prior to the period of extended operation.
8.	Fire Protection	Enhance the program to include the performance of visual inspection of fire-rated doors by a fire protection qualified inspector.	A.2.1.15	Prior to the period of extended operation.
9.	Fire Water System	Enhance the program to include NFPA 25 guidance for "where sprinklers have been in place for 50 years, they shall be replaced or representative samples from one or more sample areas shall be submitted to a recognized testing laboratory for field service testing".	A.2.1.16	Prior to the period of extended operation.
10.	Fire Water System	Enhance the program to include the performance of periodic flow testing of the fire water system in accordance with the guidance of NFPA 25.	A.2.1.16	Prior to the period of extended operation.
11.	Fire Water System	Enhance the program to include the performance of periodic visual or volumetric inspection of the internal surface of the fire protection system upon each entry to the system for routine or corrective maintenance. These inspections will be documented and trended to determine if a representative number of inspections have been performed prior to the period of extended operation. If a representative number of inspections have not been performed prior to the period of extended operation, focused inspections will be conducted. These inspections will be performed within ten years prior to the period of extended operation.	A.2.1.16	Within ten years prior to the period of extended operation.
12.	Aboveground Steel Tanks	Enhance the program to include components and aging effects required by the Aboveground Steel Tanks.	A.2.1.17	Prior to the period of extended operation.
13.	Aboveground Steel Tanks	Enhance the program to include an ultrasonic inspection and evaluation of the internal bottom surface of the two Fire Protection Water Storage Tanks.	A.2.1.17	Within ten years prior to the period of extended operation.

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
14.	Fuel Oil Chemistry	Enhance program to add requirements to 1) sample and analyze new fuel deliveries for biodiesel prior to offloading to the Auxiliary Boiler fuel oil storage tank and 2) periodically sample stored fuel in the Auxiliary Boiler fuel oil storage tank.	A.2.1.18	Prior to the period of extended operation.
15.	Fuel Oil Chemistry	Enhance the program to add requirements to check for the presence of water in the Auxiliary Boiler fuel oil storage tank at least once per quarter and to remove water as necessary.	A.2.1.18	Prior to the period of extended operation.
16.	Fuel Oil Chemistry	Enhance the program to require draining, cleaning and inspection of the diesel fire pump fuel oil day tanks on a frequency of at least once every ten years.	A.2.1.18	Prior to the period of extended operation.
17.	Fuel Oil Chemistry	Enhance the program to require ultrasonic thickness measurement of the tank bottom during the 10-year draining, cleaning and inspection of the Diesel Generator fuel oil storage tanks, Diesel Generator fuel oil day tanks, diesel fire pump fuel oil day tanks and auxiliary boiler fuel oil storage tank.	A.2.1.18	Prior to the period of extended operation.
18.	Reactor Vessel Surveillance	Enhance the program to specify that all pulled and tested capsules, unless discarded before August 31, 2000, are placed in storage.	A.2.1.19	Prior to the period of extended operation.
19.	Reactor Vessel Surveillance	Enhance the program to specify that if plant operations exceed the limitations or bounds defined by the Reactor Vessel Surveillance Program, such as operating at a lower cold leg temperature or higher fluence, the impact of plant operation changes on the extent of Reactor Vessel embrittlement will be evaluated and the NRC will be notified.	A.2.1.19	Prior to the period of extended operation.

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
20.	Reactor Vessel Surveillance	Enhance the program as necessary to ensure the appropriate withdrawal schedule for capsules remaining in the vessel such that one capsule will be withdrawn at an outage in which the capsule receives a neutron fluence that meets the schedule requirements of 10 CFR 50 Appendix H and ASTM E185-82 and that bounds the 60-year fluence, and the remaining capsule(s) will be removed from the vessel unless determined to provide meaningful metallurgical data.	A.2.1.19	Prior to the period of extended operation.
21.	Reactor Vessel Surveillance	Enhance the program to ensure that any capsule removed, without the intent to test it, is stored in a manner which maintains it in a condition which would permit its future use, including during the period of extended operation.	A.2.1.19	Prior to the period of extended operation.
22.	One-Time Inspection	Implement the One Time Inspection Program.	A.2.1.20	Within ten years prior to the period of extended operation.
23.	Selective Leaching of Materials	Implement the Selective Leaching of Materials Program. The program will include a one-time inspection of selected components where selective leaching has not been identified and periodic inspections of selected components where selective leaching has been identified.	A.2.1.21	Within five years prior to the period of extended operation.
24.	Buried Piping And Tanks Inspection	Implement the Buried Piping And Tanks Inspection Program.	A.2.1.22	Within ten years prior to entering the period of extended operation
25.	One-Time Inspection of ASME Code Class 1 Small Bore-Piping	Implement the One-Time Inspection of ASME Code Class 1 Small Bore-Piping Program.	A.2.1.23	Within ten years prior to the period of extended operation.
26.	External Surfaces Monitoring	Enhance the program to specifically address the scope of the program, relevant degradation mechanisms and effects of interest, the refueling outage inspection frequency, the inspections of opportunity for possible corrosion under insulation, the training requirements for inspectors and the required periodic reviews to determine program effectiveness.	A.2.1.24	Prior to the period of extended operation.

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
27.	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	Implement the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program.	A.2.1.25	Prior to the period of extended operation.
28.	Lubricating Oil Analysis	Enhance the program to add required equipment, lube oil analysis required, sampling frequency, and periodic oil changes.	A.2.1.26	Prior to the period of extended operation.
29.	Lubricating Oil Analysis	Enhance the program to sample the oil for the Switchyard SF ₆ compressors and the Reactor Coolant pump oil collection tanks.	A.2.1.26	Prior to the period of extended operation.
30.	Lubricating Oil Analysis	Enhance the program to require the performance of a one-time ultrasonic thickness measurement of the lower portion of the Reactor Coolant pump oil collection tanks prior to the period of extended operation.	A.2.1.26	Prior to the period of extended operation.
31.	ASME Section XI, Subsection IWL	Enhance procedure to include the definition of "Responsible Engineer".	A.2.1.28	Prior to the period of extended operation.
32.	Structures Monitoring Program	Enhance procedure to add the aging effects, additional locations, inspection frequency and ultrasonic test requirements.	A.2.1.31	Prior to the period of extended operation.
33.	Structures Monitoring Program	Enhance procedure to include inspection of opportunity when planning excavation work that would expose inaccessible concrete.	A.2.1.31	Prior to the period of extended operation.

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
34.	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Implement the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program.	A.2.1.32	Prior to the period of extended operation.
35.	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Implement the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits program.	A.2.1.33	Prior to the period of extended operation.
36.	Inaccessible Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Implement the Inaccessible Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program.	A.2.1.34	Prior to the period of extended operation.
37.	Metal Enclosed Bus	Implement the Metal Enclosed Bus program.	A.2.1.35	Prior to the period of extended operation.
38.	Fuse Holders	Implement the Fuse Holders program.	A.2.1.36	Prior to the period of extended operation.
39.	Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Implement the Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program.	A.2.1.37	Prior to the period of extended operation.
40.	345 KV SF ₆ Bus	Implement the 345 KV SF ₆ Bus program.	A.2.2.1	Prior to the period of extended operation.

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
41.	Metal Fatigue of Reactor Coolant Pressure Boundary	Enhance the program to include additional transients beyond those defined in the Technical Specifications and UFSAR.	A.2.3.1	Prior to the period of extended operation.
42.	Metal Fatigue of Reactor Coolant Pressure Boundary	Enhance the program to implement a software program, to count transients to monitor cumulative usage on selected components.	A.2.3.1	Prior to the period of extended operation.
43.	Pressure – Temperature Limits, including Low Temperature Overpressure Protection Limits	Seabrook Station will submit updates to the P-T curves and LTOP limits to the NRC at the appropriate time to comply with 10 CFR 50 Appendix G.	A.2.4.1.4	The updated analyses will be submitted at the appropriate time to comply with 10 CFR 50 Appendix G, Fracture Toughness Requirements.
44.	Environmentally-Assisted Fatigue Analyses (TLAA)	<p>NextEra Seabrook will perform a review of design basis ASME Class 1 component fatigue evaluations to determine whether the NUREG/CR-6260-based components that have been evaluated for the effects of the reactor coolant environment on fatigue usage are the limiting components for the Seabrook plant configuration. If more limiting components are identified, the most limiting component will be evaluated for the effects of the reactor coolant environment on fatigue usage. If the limiting location identified consists of nickel alloy, the environmentally-assisted fatigue calculation for nickel alloy will be performed using the rules of NUREG/CR-6909.</p> <p>(1) Consistent with the Metal Fatigue of Reactor Coolant Pressure Boundary Program Seabrook Station will update the fatigue usage calculations using refined fatigue analyses, if necessary, to determine acceptable CUFs (i.e., less than 1.0) when accounting for the effects of the reactor water environment. This includes applying the appropriate F_{en} factors to valid CUFs determined from an existing fatigue analysis valid for the period of extended operation or from an analysis using an NRC-approved version of the ASME code or NRC-approved alternative (e.g., NRC-approved code case).</p> <p>(2) If acceptable CUFs cannot be demonstrated for all the selected locations, then additional plant-specific locations will be evaluated. For the additional plant-specific locations, if CUF,</p>	A.2.4.2.3	At least two years prior to entering the period of extended operation.

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
		including environmental effects is greater than 1.0, then Corrective Actions will be initiated, in accordance with the Metal Fatigue of Reactor Coolant Pressure Boundary Program, B.2.3.1. Corrective Actions will include inspection, repair, or replacement of the affected locations before exceeding a CUF of 1.0 or the effects of fatigue will be managed by an inspection program that has been reviewed and approved by the NRC (e.g., periodic non-destructive examination of the affected locations at inspection intervals to be determined by a method accepted by the NRC).		
45.	Number Not Used			
46.	Protective Coating Monitoring and Maintenance	Enhance the program by designating and qualifying an Inspector Coordinator and an Inspection Results Evaluator.	A.2.1.38	Prior to the period of extended operation
47.	Protective Coating Monitoring and Maintenance	Enhance the program by including, "Instruments and Equipment needed for inspection may include, but not be limited to, flashlight, spotlights, marker pen, mirror, measuring tape, magnifier, binoculars, camera with or without wide angle lens, and self sealing polyethylene sample bags."	A.2.1.38	Prior to the period of extended operation
48.	Protective Coating Monitoring and Maintenance	Enhance the program to include a review of the previous two monitoring reports.	A.2.1.38	Prior to the period of extended operation
49.	Protective Coating Monitoring and Maintenance	Enhance the program to require that the inspection report is to be evaluated by the responsible evaluation personnel, who is to prepare a summary of findings and recommendations for future surveillance or repair.	A.2.1.38	Prior to the period of extended operation
50.	ASME Section XI, Subsection IWE	Perform UT testing of the containment liner plate in the vicinity of the moisture barrier for loss of material.	A.2.1.27	No later than December 31, 2015 <i>Within the next two refueling outages, OR15 or OR16</i> , and repeated at intervals of no more than five refueling outages

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
51.	<i>Number Not Used</i> ASME Section XI, Subsection IWL	Perform confirmatory testing and evaluation of the Containment Structure concrete	A.2.1.28	Prior to the period of extended operation
52.	ASME Section XI, Subsection IWL	Implement measures to maintain the exterior surface of the Containment Structure, from elevation -30 feet to +20 feet, in a dewatered state.	A.2.1.28	By 2013
53.	Reactor Head Closure Studs	Replace the spare reactor head closure stud(s) manufactured from the bar that has a yield strength > 150 ksi with ones that do not exceed 150 ksi.	A.2.1.3	Prior to the period of extended operation.
54.	Steam Generator Tube Integrity	Unless an alternate repair criteria changing the ASME code boundary is permanently approved by the NRC, or the Seabrook Station steam generators are changed to eliminate PWSCC-susceptible tube-to-tubesheet welds, submit a plant-specific aging management program to manage the potential aging effect of cracking due to PWSCC at least twenty-four months prior to entering the Period of Extended Operation.	A.2.1.10	Program to be submitted to NRC at least 24 months prior to the period of extended operation.
55.	Steam Generator Tube Integrity	Seabrook will perform an inspection of each steam generator to assess the condition of the divider plate assembly.	A.2.1.10	Prior to entering the period of extended operation
56.	Closed-Cycle Cooling Water System	Revise the station program documents to reflect the EPRI Guideline operating ranges and Action Level values for hydrazine and sulfates.	A.2.1.12	Prior to entering the period of extended operation.
57.	Closed-Cycle Cooling Water System	Revise the station program documents to reflect the EPRI Guideline operating ranges and Action Level values for Diesel Generator Cooling Water Jacket pH.	A.2.1.12	Prior to entering the period of extended operation.
58.	Fuel Oil Chemistry	Update Technical Requirement Program 5.1, (Diesel Fuel Oil Testing Program) ASTM standards to ASTM D2709-96 and ASTM D4057-95 required by the GALL XI.M30 Rev 1	A.2.1.18	Prior to the period of extended operation.
59.	Nickel Alloy Nozzles and Penetrations	The Nickel Alloy Aging Nozzles and Penetrations program will implement applicable Bulletins, Generic Letters, and staff accepted industry guidelines.	A.2.2.3	Prior to the period of extended operation.
60.	Buried Piping and Tanks Inspection	Implement the design change replacing the buried Auxiliary Boiler supply piping with a pipe-within-pipe configuration with leak indication capability.	A.2.1.22	Prior to entering the period of extended operation.
61.	Compressed Air Monitoring Program	Replace the flexible hoses associated with the Diesel Generator air compressors on a frequency of every 10 years.	A.2.1.14	Within ten years prior to entering the period of extended operation.

No.	PROGRAM or TOPIC	COMMITMENT	UFSAR LOCATION	SCHEDULE
62.	Water Chemistry	Enhance the program to include a statement that sampling frequencies are increased when chemistry action levels are exceeded.	A.2.1.2	Prior to entering the period of extended operation.
63.	Flow Induced Erosion	Ensure that the quarterly CVCS Charging Pump testing is continued during the PEO. Additionally, add a precaution to the test procedure to state that an increase in the CVCS Charging Pump mini flow above the acceptance criteria may be indicative of erosion of the mini flow orifice as described in LER 50-275/94-023.	N/A	Prior to the period of extended operation
64.	Buried Piping and Tanks Inspection	Soil analysis shall be performed prior to entering the period of extended operation to determine the corrosivity of the soil in the vicinity of non-cathodically protected steel pipe within the scope of this program. If the initial analysis shows the soil to be non-corrosive, this analysis will be re-performed every ten years thereafter.	A.2.1.22	Prior to entering the period of extended operation.
65.	Flux Thimble Tube	Implement measures to ensure that the movable incore detectors are not returned to service during the period of extended operation.	N/A	Prior to entering the period of extended operation
66.	Operating Experience Reviews	Enhance the current station operating experience review process implemented in response to NUREG 0737 Task I.C.5. Procedures for Feedback of Operating Experience to Plant Staff (UFSAR §1.9.1) to include future reviews of plant-specific and industry operating experience in order to confirm the effectiveness of the license renewal aging management programs and to determine the need for programs to be enhanced or the need to develop new aging management programs.	N/A	Within ten years prior to entering the period of extended operation.
67.	Structures Monitoring Program	Perform one shallow core bore in an area that was continuously wetted from borated water to be examined for concrete degradation and also expose rebar to detect any degradation such as loss of material.	A.2.1.31	No later than December 31, 2015
68.	Structures Monitoring Program	Perform sampling at the spent fuel pool leakoff collection point for chlorides, sulfates, pH and iron for four quarters of one year once every 5 years.	A.2.1.31	Starting January 2014