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

July 8, 2010

LICENSEE: NextEra Energy Point Beach, LLC

FACILITY: Point Beach Nuclear Plant, Units 1 and 2

SUBJECT: SUMMARY OF MARCH 17, 2010, MEETING WITH NEXTERA ENERGY POINT BEACH, LLC, REGARDING RESPONSE TO GENERIC LETTER 2004-02 (TAC NOS. MC4705 AND MC4706)

On March 17, 2010, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of NextEra Energy Point Beach, LLC (NextEra, licensee), at NRC Headquarters, One White Flint North, 11555 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to discuss NextEra's planned approach to address the NRC's request for additional information (RAI) dated March 3, 2010 (Agencywide Documents Access and Management System Accession No. ML100570321). The RAI pertains to information submitted by NextEra in response to Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors," for Point Beach Nuclear Plant, Units 1 and 2.

The licensee's draft response is attached as Enclosure 1. A list of attendees is attached as Enclosure 2.

The following summarizes the outcome discussed for each of the proposed RAI responses:

RAI 1

The licensee is re-evaluating their test protocol, which may affect debris assumed to reach the strainer, which could cause additional evaluation. The licensee intends to follow the safety evaluation (SE) for NEI 04-07 and the NRC's March 2008 review guidance with respect to this area.

RAI 2

The licensee should show the installed configuration is at least as robust as the Ontario Power Generation test that supported 5.45 D for CalSil. The licensee will clearly state that the zone of influence (ZOI) for NUKON will be 17D (remove note and asterisk). The licensee will add that the ZOI for inorganic zinc is 10D.

RAI 3

The licensee's response is acceptable as is.

RAI 4

The licensee's response is acceptable as is.

RAI 5

The licensee's response is acceptable as is.

RAI 6

The NRC staff has an action to provide feedback on what the staff has viewed as acceptable regarding fraction generated and eroded for CalSil within the ZOI. More justification is needed for the current numbers if the licensee chooses to stick with the current numbers. The licensee should clearly state that 15 percent applies to initially generated material. The licensee should justify any assumption that small and large pieces would transport to inactive locations.

RAI 7

The NRC staff has an action to verify that the 50 percent small debris transport assumption is acceptable.

RAI 8

This is an open item until the licensee decides on and communicates with the NRC staff regarding its path forward. Asbestos 100 percent fines would be acceptable, as would Alion NUKON erosion testing. The licensee should refocus its response on transporting, not testing.

RAI 9

This is an open item depending on the licensee's test plan decision. The NRC staff stated that a decision to not credit settlement would render this RAI moot.

RAI 10

The licensee should state that they are not crediting debris trapped in eddies. The licensee needs to verify that this is their intent and add it to their response.

RAI 11

The licensee's response is acceptable as is.

RAI 12

This is an open item depending on the licensee's decision on retesting. The licensee will then determine which assumptions to credit and will justify those it does credit.

RAI 13

The licensee's response is acceptable as is.

RAI 14

This is an open item depending on the licensee's decision on path forward on testing. The NRC staff stated that a decision to not credit settlement would render this RAI moot.

RAI 15

This is an open item depending on the licensee's decision on path forward on testing. The NRC staff stated that a decision to not credit settlement would render this RAI moot.

RAI 16

If the licensee decides that it will no longer credit settlement, then the licensee needs to state that it will retest with a protocol that does not credit settlement and that is consistent with the March 2008 review guidance, otherwise, further discussion is needed.

RAI 17

This is an open item depending on the licensee's decision on path forward on testing. The NRC staff stated that a decision to not credit settlement would render this RAI moot.

RAI 18

The licensee will provide detail on how procedural controls will prevent structural issues, if structural criteria remain limiting.

RAI 19

b) The licensee will provide additional details on how amounts of miscellaneous debris could reach the strainer, and how that affects sacrificial area assumptions.

c) This is an open item depending on the licensee's decision on path forward on testing. The NRC staff stated that a decision to not credit settlement would render this RAI moot.

d) This is an open item depending on the licensee's decision on path forward on testing. The NRC staff stated that a decision to not credit settlement would render this RAI moot.

RAI 20

The licensee will send in calculations and sketches to clarify its answer.

RAI 21

The licensee will respond similarly to RAI 1, but will include a statement that transport will be done per the SE on NEI 04-07.

RAI 22

The licensee's response is acceptable as is.

RAI 23

The licensee's response is acceptable as is.

RAI 24

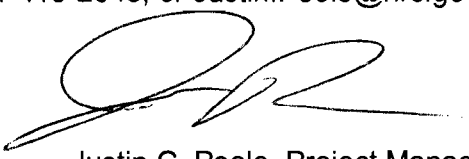
The licensee's response is acceptable as is.

Following the discussion on the specific RAI responses, the licensee discussed possible ways to avoid removal of fibrous insulation from the regenerative heat exchanger due to asbestos and high dose levels. The NRC staff stated that a limited-offset break may be a possible path forward but additional information would need to be provided for the staff to evaluate.

The licensee and the staff then discussed the need for a follow-up call once the licensee had made their decision on settlement credit. This call would be to notify the NRC staff of the licensee's plan with regard to settlement credit, a proposed date for revised draft RAI responses, next steps for rationale to retain asbestos around the regenerative heat exchanger, and a timeline for further meetings.

No members of the public were in attendance. No Public Meeting Feedback forms were received.

Please direct any inquiries to me at 301-415-2048, or Justin.Poole@nrc.gov.



Justin C. Poole, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-266 and 50-301

Enclosures:
1. Licensee Draft RAI response
2. List of Attendees

cc w/encls: Distribution via Listserv

Enclosure 1

Draft RAI Responses

DRAFT RESPONSES TO GL 2004-02 RAIs
POINT BEACH NUCLEAR PLANT

On January 4, 2010, an e-mail was received by NextEra that contained a draft Request for Additional Information on GL 2004-02 for Point Beach Nuclear Plant (PBNP). The draft was subsequently discussed during a teleconference on January 11 between representatives of the NRC and NextEra.

There are outstanding questions associated with the testing protocol to assess the settling behavior of debris in the vicinity of the containment sump strainers.

Until more detailed assessments of the impacts can be completed, the issues fully evaluated, and firm schedules developed, NextEra cannot formally respond to questions that pertain to testing protocols. Accordingly, the draft response addresses the RAI questions that are not related to previously completed settling behavior of debris.

Attachment

NEXT ERA ENERGY POINT BEACH, LLC
RESPONSES TO RAI QUESTIONS

Question 1

Please provide an updated debris generation evaluation based on the insulation configuration determined to provide an acceptable overall head loss evaluation. The licensee should provide the information requested in the content guide for the debris generation area. For areas where the evaluation and assumptions are unchanged, the licensee may state that there are no changes from the original debris generation evaluation provided to the staff for review.

NextEra Response

NextEra is evaluating the recent NRC position that insufficient testing and data is available to justify crediting settling during strainer testing. Should NextEra determine that retesting the strainer with a protocol acceptable to the NRC that does not credit settling is required, this RAI would be resolved.

Question 2

Please provide the zones of influence (ZOIs) used for the final debris generation calculation. If the ZOIs are not those specified by the safety evaluation (SE) on NEI Guidance Report 04-07, provide a justification for the ZOI used. The following issues should be addressed for any ZOIs that use the Westinghouse testing or other testing that has not been evaluated by the NRC staff.

NextEra Response

The following table summarizes the zones of influence (ZOIs) used for the debris generation calculations most recently completed. The same ZOIs are expected to be used in future analyses:

Debris Type	ZOI (L/D)
Transco RMI	R
Asbestos	17
CalSil	5.45
Fiberglass	17
NUKON®	17*
Mineral Wool	17
Temp Mat w/ wire mesh retainer	11.7
Qualified Concrete Coatings	4
Qualified Steel Coatings	10

*NextEra has committed to remove all Nukon and other fibrous insulation from major components and piping within the ZOI of postulated large diameter pipe breaks. At the current time, the only NRC accepted ZOI for NUKON® on major components is 17D. Design, procurement, and planning is proceeding to remove Nukon from within a 17D ZOI. However, if an applicable reduced ZOI is reviewed and endorsed by the NRC with sufficient time to reduce the scope of NUKON® insulation replacement during the currently committed outages, NextEra may elect to reduce the replacement efforts in order to minimize ionizing radiation exposure to the personnel performing the removal and

replacement work. To date, insulation replacements involving ~35% of the scoped work on a single unit have resulted in a combined exposure of over 20 Rem to personnel.

With the exceptions of the ZOIs for qualified coatings, each of the above ZOIs have been endorsed by the NRC in NEI 04-07, Volume II. The bases for the ZOIs used for qualified coatings on steel and concrete was provided in previous submittals, and rests on applicable results from "JOGAR" testing.

Question 3

The set (9 sub-parts) of issues listed below constitute a generic RAI that is asked for licensees that credit ZOI reductions based on Westinghouse testing conducted at Wyle Laboratories. Some questions may not apply to all licensees as they are dependent on the type of insulations for which ZOI reduction are being credited. If the licensee believes that a particular question is not applicable to its use of the test results, this should be stated and a short reasoning provided. The PWROG has committed to consider resolving some of the issues generically. The success of this effort is not clear as of this time. The staff notes that the licensee's July 31, 2009, supplemental response stated that it is supporting industry efforts to substantially reduce the ZOI for jacketed NUKON® insulation and that then-current efforts would eliminate NUKON® to the extent necessary to ensure it does not remain within the ZOI of large diameter, limiting pipe breaks.

NextEra Response

As discussed in the response to Question 2 above, NextEra is not currently crediting use of reduced ZOIs based on Westinghouse testing conducted at Wyle Laboratories. Should the NRC approve the use of a reduced ZOI in the future, and the reduced ZOI is applicable to currently installed insulation configurations at PBNP, NextEra may elect to reduce the replacement efforts in order to minimize ionizing radiation exposure to the personnel performing the removal and replacement work.

Therefore, none of the subparts of Question 3 are currently applicable to PBNP.

Question 4

For any reduced ZOIs that are credited that are less than the size specified in the SE on NEI 04-07, please discuss whether the corresponding debris size distribution was assumed to have an increased generation of fines and small pieces that is sufficient to account for the higher destruction pressures that would exist within the smaller ZOIs relative to the larger SE-approved ZOIs.

NextEra Response

As discussed in the response to Question 2 above, NextEra is currently not crediting use of reduced ZOIs based on Westinghouse testing conducted at Wyle Laboratories. Should the NRC approve the use of a reduced ZOI in the future, and the reduced ZOI is applicable to currently installed insulation configurations at PBNP, NextEra may elect to reduce the replacement efforts in order to minimize ionizing radiation exposure to the personnel performing the removal and replacement work.

Therefore, Question 4 is currently not applicable to PBNP.

Question 5

The July 31, 2009, supplemental response states that 30% of mineral wool was assumed to be destroyed into fines due to exposure to the blowdown from a ruptured pipe, based on the similarity of this material to low-density fiberglass. Specifically, this comparison was based on relating mineral wool to Kaowool, which is actually a type of ceramic fiber. However, evidence exists that mineral wool can be more fragile than low-density fiberglass, as discussed in NEA/CSNI/R (95)11, "Knowledge Base for Emergency Core Cooling System Recirculation Reliability," and NUREG/CR-6224. In light of this evidence of the potential for increased fragility of mineral wool as compared to low-density fiberglass, please provide a basis for concluding that the mineral wool installed at Point Beach would generate a quantity of fine debris equivalent to that of fiberglass.

NextEra Response

The previous response was prepared and submitted prior to PBNP completing the debris generation and transport analyses that evaluated the configuration after eliminating major fibrous debris sources in the potential LOCA ZOIs. Since that time, the large majority of mineral wool has been (or will be) eliminated.

In the future, analyses of debris sources inside of containment, will assume that 100% of the mineral wool that still resides in the ZOI is reduced to fines.

Question 6

The July 31, 2009, supplemental response states in response to RAI 2 that calcium silicate was conservatively assumed to be 100% reduced to particulates to bound erosion effects that may occur. The staff does not understand this statement in light of the information presented on page 26 of the July 31, 2009, supplemental response. The table on page 26 appears to indicate that only about 35% of the calcium silicate was assumed to be destroyed into fine particulate, whereas the majority was assumed to be small pieces (i.e., non-particulate), 85% of which were assumed to settle to the containment pool floor. Although it appeared that the analytically transported debris (a mixture of fines along with some small pieces) may have been modeled using fine particulate for head loss testing, it did not appear to the staff that erosion effects could be considered bounded, since no erosion appeared to be assumed for the majority of the calcium silicate small pieces of debris generated that was assumed to be settled in the containment pool. Please clarify the size distribution assumed for calcium silicate debris and provide justification for the assumed distribution.

NextEra Response

The previous response to Question 2 was an error that resulted from misreading the previous debris generation analysis.

In future analyses, the fraction of CalSil that is reduced to fines will be 30% generated directly from the LOCA blowdown, with an additional 10% of the remaining 70% (7%) eroded into fines, for a total of 37%. This amount of fines will be used in any future testing (less that portion allocated to inactive sumps, subject to a limit of 15% consistent with previously established precedent).

Question 7

The July 31, 2009, supplemental response did not adequately describe the assumptions made concerning the washdown mechanism of debris transport. Please describe any credit taken for retention of debris in upper containment (e.g., on gratings, structures, floors, etc.), such that, after the completion of the blowdown and washdown processes, the retained debris is assumed not to reach the containment sump pool. Please identify the types, sizes, and quantities of the debris assumed to be retained above the containment sump pool.

NextEra Response

The small debris (defined as ≤ 4" along its longest dimension) are expected to be carried away from the break in all directions through any openings in robust barriers surrounding the break location much like dust that is suspended in the air. The pressure wave will likely carry the small debris quite some distance from the break.

Though the small debris originating in the RCS loop compartments will distribute widely throughout containment, it is also expected that a portion of it will be impeded by physical obstructions within the loop compartment and in other locations. Such obstructions include the compartment walls, the steam generators, reactor coolant pumps, and various piping. In addition, the RCS loop compartments contain extensive bar grate work platforms. These grates overlie the RCS components and will tend to catch small debris that is blasted up toward the refueling floor (El. 66').

Additionally, a portion of the small debris will be distributed to locations that are not exposed to spray wash-down (e.g. intermediate elevation floors beneath the refueling floor and above the sump, piping, structural members, valving, above the sump and at intermediate elevations of containment) as the initial blowdown pressure front propagates throughout the containment and pressurizes all compartments.

Also, containment spray does not continue indefinitely. Containment spray is secured when the RWST has been depleted (~65 minutes for a large break LOCA). NextEra has submitted an application to implement the Alternative Source Term (AST) methodology. If AST is approved for implementation at PBNP, spray may be continued for a period of ~4 hours post-event to provide continued iodine scrubbing from the containment atmosphere. Thereafter, it would be secured in order to provide additional flow margin to support flushing boron concentrations from the core. Therefore, the exposure of retained smalls to containment spray is limited.

To account for the inertial deposition on obstructions sequestering of deposition in unsprayed locations and inactive sumps, 50% of the total small debris generated are removed from further participation, while the remaining 50% are assumed to eventually reach the sump and be available during recirculation. The erosion fraction is applied to 100% of the small and large debris (if any), regardless whether they are held up, and all of the eroded fines are assumed to transport to the sump.

Other than the fraction of small debris that is assumed to be held up on internal structures described above, all of the debris generated by an analyzed break will be assumed to reach the sump.

Question 8

The July 31, 2009, supplemental response included some discussion of the erosion of frangible debris (e.g., fiber, calcium silicate, asbestos). However, based on the staff's review of the information provided on pages 13 and 14, it appeared that, while erosion due to exposure to a blowdown jet had been considered, erosion due to exposure of settled debris to water flows in the containment sump pool over the sump mission time had not been adequately considered. Please describe how erosion of frangible debris settled in the containment pool resulting from pool flows was addressed in the analysis and provide a justification for assumptions that deviate from the SE on NEI 04-07. If erosion testing was performed to support the assumptions being made, please also provide the following information:

a. *Please describe the test facility used and demonstrate the similarity of the flow conditions (velocity and turbulence), chemical conditions, and debris material present in the erosion tests to the analogous conditions applicable to the plant condition.*
b. *Please provide justification for any erosion tests conducted at a minimum tumbling velocity if debris settling was credited in the test flume for velocities in excess of this value.*
c. *Please identify the duration of the erosion tests and how the results were extrapolated to the sump mission time.*

NextEra Response

NextEra is evaluating the recent NRC conclusion that insufficient testing and data is available to justify crediting settling during strainer testing. Should NextEra determine that retesting the strainer with a protocol acceptable to the NRC which does not credit settling is required, this RAI would be resolved.

Question 9

Please describe whether/how erosion of debris that settles in the test flume is accounted for in the sump performance evaluation. The July 31, 2009, supplemental response indicates that a significant percentage of small and large pieces of debris were analytically assumed to transport to the strainers. For example, in one case for which results were reported in the supplemental response, approximately 60% of large pieces of Temp-Mat® were analytically assumed to reach the strainers, as were 30% of large pieces of Nukon and 34% of small pieces of fiberglass. These analytical assumptions reduced the quantity of settled small and large pieces of frangible debris that were analytically assumed to erode in the containment pool. However, for the strainer head loss testing conducted by Performance Contracting, Inc. (PCI), the NRC staff considers it likely that a significant fraction of large and small debris pieces that were analytically considered transportable actually settled in the test flume rather than transporting to the test strainer. The head loss testing did not model the erosion of this debris that was analytically assumed to have transported. The licensee's consideration of debris erosion, therefore, appears to be non-conservative, because neither the analysis nor the head loss testing accounted for the erosion of debris that settled during the head loss testing. Please estimate the quantity of eroded fines from small and large pieces of frangible debris (e.g., fiber, calcium silicate, and asbestos) that would result, had erosion of the debris settled in the head loss test flume been accounted for, and justify the neglect of this material in the head loss testing program. If this eroded debris is not accounted for in a prototypical or conservative manner, then please provide a basis for the conservatism of the analytical debris erosion results given that the analysis may significantly underestimate the total quantity of settled debris (when debris that settled in the test flume is considered).

NextEra Response

NextEra is evaluating the recent NRC conclusion that insufficient testing and data is available to justify crediting settling during strainer testing. Should NextEra determine that retesting the strainer with a protocol acceptable to the NRC which does not credit settling is required, this RAI would be resolved.

Question 10

The July 31, 2009, supplemental response states on page 14 that streamline and vector plots were used to identify isolated eddies that had velocities higher than the incipient tumbling velocity but did not contribute to debris transport from the zone. Please identify the types and quantities of debris assumed to be trapped in eddies of this sort, and provide the basis for considering debris assumed to be present in these areas at the switchover to recirculation to not transport to the strainers...

NextEra Response

NextEra is evaluating the recent NRC conclusion that insufficient testing and data is available to justify crediting settling during strainer testing. Should NextEra determine that retesting the strainer with a protocol acceptable to the NRC which does not credit settling is required, this RAI would be resolved.

Question 11

Based upon the information provided on page 26 of the July 31, 2009, supplemental response, it appeared to the staff that higher debris transport fractions were calculated for large pieces of Nukon and Temp-Mat debris than for small pieces of these debris types. This result is unexpected, since small pieces of debris typically are more transportable. Please provide the basis for the calculated transport fraction for small debris pieces being lower than that of large debris pieces for Nukon and Temp-Mat.

NextEra Response

The apparent disparity was the result of assuming that all large pieces fell directly to the sump, while small debris transported throughout the containment. Since a portion of the small debris is retained above the sump pool, the fraction that reaches the sump is less than 100% of the small debris generated. However, 100% of all fines generated are assumed to reach the sump.

With the replacement of NUKON® and Temp-Mat (the only fibrous sources that result in "large" debris) in the various analyzed ZOIs, the results of future analyses will not reflect any large debris pieces.

Question 12

A number of assumptions were made in the transport analysis that are not consistent with, or are not included in, the baseline guidance approved in the SE on NEI 04-07 and for which insufficient justification was provided, including the following…

NextEra Response

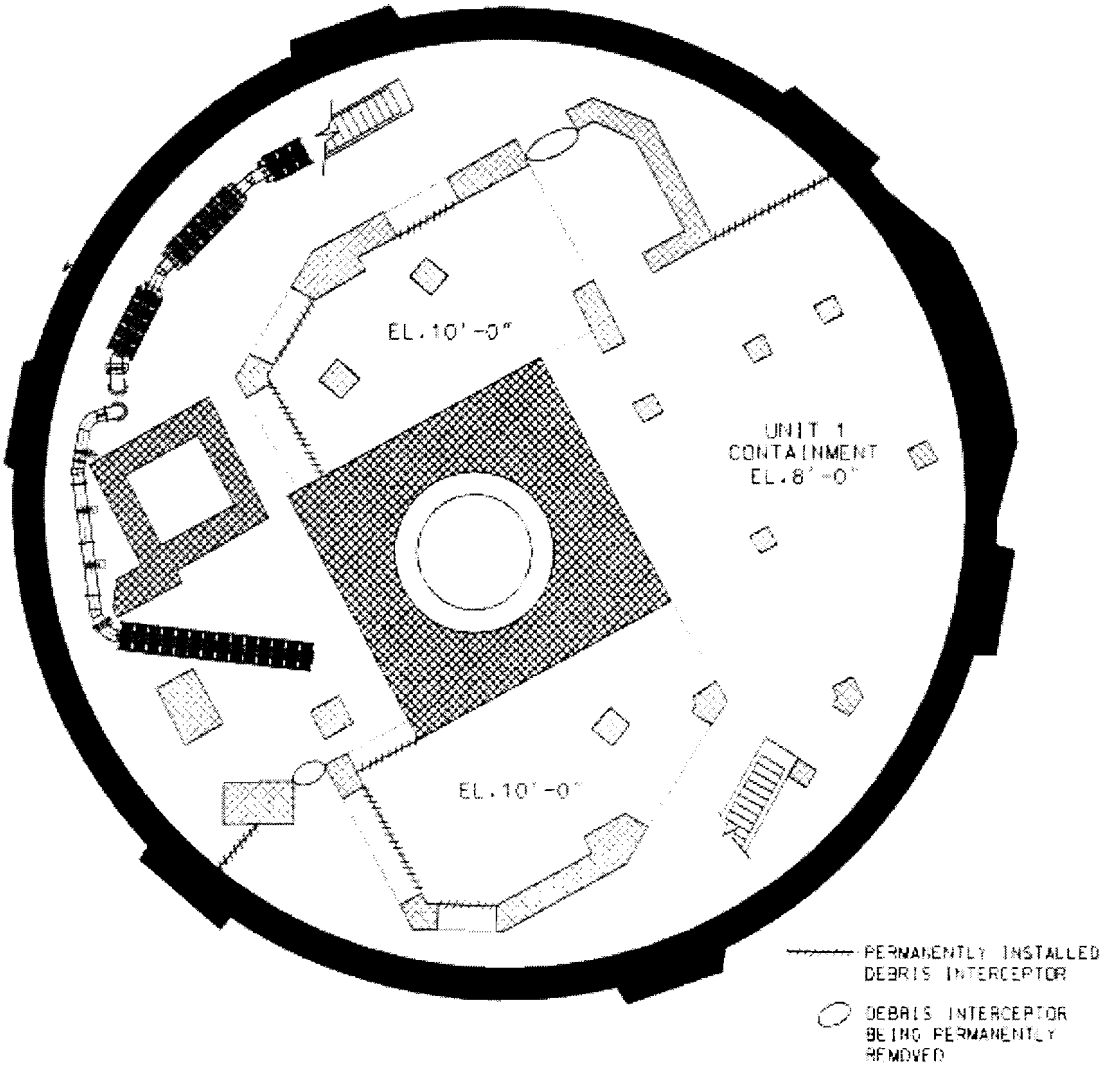
NextEra is evaluating the recent NRC conclusion that insufficient testing and data is available to justify crediting settling during strainer testing. Should NextEra determine that retesting the strainer with a protocol acceptable to the NRC which does not credit settling is required, this RAI would be resolved.

Question 13

Please provide the basis for concluding that debris blockage will not occur at the debris interceptors (including the submerged perforated surface area and 4-inch slots) at Unit 1 to an extent that would result in starvation of flow to the sump strainers.

The question of potential DI blockage is being eliminated entirely by the removal of two of the DIs. The two DIs being removed are an impediment to efficient outage execution because they block access to significant parts of the containment lower elevation and must be physically removed and re-installed each outage. The DIs are not credited for holding back debris. In the future, all of the DIs, as well as other modifications that no longer serve any purpose that can be credited in the sump screen performance analyses and testing (e.g., the re-routed cavity drain line away from the strainers) may be removed.

Please refer the annotated drawing of Unit 1 on the next page that shows the DIs being removed.


EL. 10'-0"
UNIT 1
CONTAINMENT
EL. 8'-0"
EL. 10'-0"
PERMANENTLY INSTALLED
DEBRIS INTERCEPTOR
DEBRIS INTERCEPTOR
BEING PERMANENTLY
REMOVED

Question 14

Sufficient information was not provided in the July 31, 2009, supplemental response to provide assurance that the flow conditions simulated in the strainer head loss test flume are prototypical or conservative with respect to the plant conditions. Therefore, please provide plots of velocity and turbulence contours in the containment pool for the bounding computational fluid dynamics cases with respect to these two parameters that include the entire pool and which are based on the computational fluid dynamics model used in the debris transport analysis. Please also provide close--up plots of the velocity and turbulence contours in the region of the strainer and its immediate surroundings from the computational fluid dynamics model, showing the flow streams that were used to determine the flume velocities and turbulence levels for head loss testing. Please identify the bounding break scenario that was used to derive the flow parameters (e.g., velocity and turbulence) that were simulated in the head loss test and identify which of the strainers is modeled in the test. Please identify the velocity and turbulence values used for the strainer qualification testing and provide the basis for concluding that they are prototypical or conservative with respect to the plant condition.

NextEra Response

NextEra is evaluating the recent NRC conclusion that insufficient testing and data is available to justify crediting settling during strainer testing. Should NextEra determine that retesting the strainer with a protocol acceptable to the NRC which does not credit settling is required, this RAI would be resolved.

Question 15

The July 31, 2009, supplemental response indicates that debris was added to the test flume approximately 20 ft from the strainers. Due to transport modes not modeled by the head loss test protocol (e.g., blowdown, washdown, and pool fill), a fraction of the debris could be within one flume-length of the strainers at the initiation of recirculation. As a result of adding all the debris at a distance of one flume-length from the strainer, the head loss test may under predict debris transport. Please provide justification for adding essentially all of the test debris one flume-length away from the strainer during head loss testing.

NextEra Response

NextEra is evaluating the recent NRC conclusion that insufficient testing and data is available to justify crediting settling during strainer testing. Should NextEra determine that retesting the strainer with a protocol acceptable to the NRC which does not credit settling is required, this RAI would be resolved.

Question 16

Please provide a photograph or diagram of the ramp used to introduce debris slurries into the head loss test flume and provide further information that demonstrates that the simulated entry of debris into the test flume via the ramp was prototypical or conservative with respect to the plant condition.

NextEra Response

NextEra is evaluating the recent NRC conclusion that insufficient testing and data is available to justify crediting settling during strainer testing. Should NextEra determine that retesting the strainer with a protocol acceptable to the NRC which does not credit settling is required, this RAI would be resolved.

Question 17

In response to Question 6 in the July 31, 2009, supplemental response, the licensee indicated that water streams splashing down into the containment pool are located significantly further than 2 inches from strainer surfaces. However, it was not clear to what extent streams of water splashing down into the containment pool would exist within the range of distances modeled in the head loss test flume used for the strainer qualification test (i.e., roughly 20 ft). Please discuss any sources of drainage that enter the containment pool within the range of distances modeled in the head loss test flume. Please identify whether the drainage would occur in a dispersed form (e.g., droplets) or a concentrated form (e.g., streams of water running off of surfaces). Please discuss how these sources of drainage are modeled in the test flume to create a prototypical level of turbulence in the test flume.

NextEra Response

NextEra is evaluating the recent NRC conclusion that insufficient testing and data is available to justify crediting settling during strainer testing. Should NextEra determine that retesting the strainer with a protocol acceptable to the NRC that does not credit settling is required, this RAI would be resolved.

Question 18

The licensee stated that the head loss would be limited to less than 10 ft by one of three methods. These are (1) limiting cooldown, (2) requiring flow reduction, or (3) re-testing. The licensee did not provide information such that the staff has assurance that adequate provisions have been made to assure that the 10 ft limit on head loss is not exceeded. Please provide information demonstrating that measures have been taken to ensure that the limit is not exceeded.

NextEra Response

The response previously provided is no longer applicable because previously completed testing is no longer acceptable. After completion of testing determined to acceptable to the NRC, if it is determined that a reduction in screen differential pressure is required at cooler sump temperatures, then the preferred means would be reducing core injection flow. This would be accomplished consistent with submittals made pursuant to the Alternative Source Term (AST) licensing action. The license amendment request is currently being reviewed by the Commission. If AST is not approved, or not approved by the time that GSI-191 is resolved, the next preferable option is suspension of sump cool down.

Preliminary reviews have determined that the core decay heat remains substantially greater than heat losses to ambient through the containment shell throughout the 30 day post-LOCA period, and all cooling flows to the containment (e.g., service water to the component cooling

heat exchangers and to the containment fan coolers) can be throttled or secured as necessary to limit containment heat removal over the long term.

These actions can be completed from accessible locations outside of the affected units containment, using safety related components and controls, and are reasonably achievable within the long period of time available.

Maintaining the sump (and potentially the containment atmosphere) temperatures slightly above 100°F for the 30-day duration will not challenge the environmentally qualified equipment in the containment.

If reduction in strainer differential pressure at reduced temperature is necessary, further details of how this will be performed will be provided in the final submittals in response to GL 2004-02.

Question 19

RAI 4 requested that the licensee provide head loss and vortexing testing-related information. In general, the information provided in the licensee's response is acceptable. However, the additional information led the staff to question some areas of the testing. The testing was conducted at Alden Laboratory and allowed debris settling. Some issues, listed below, that have been identified by previous staff review of testing that allows near-field settling are applicable to the Point Beach testing...

NextEra Response

NextEra is evaluating the recent NRC conclusion that insufficient testing and data is available to justify crediting settling during strainer testing. Should NextEra determine that retesting the strainer with a protocol acceptable to the NRC which does not credit settling is required, this RAI would be resolved.

Question 20

In its response to RAI 8, the licensee provided clean strainer head loss (CSHL) and total head loss values for multiple temperatures. The information supplied for this RAI is acceptable. However, during review of the vendor head loss calculation the staff questioned the methodology used to calculate the total strainer head loss. The question is with respect to the CSHL portion of the overall head loss. In Table 7 of the PCI calculation attached to the RAI responses (TDI-6007-06), the total debris laden head loss (TDLHL) is calculated by adding the debris head loss, the plenum head loss, and the Alden Research Laboratory CSHL. According to the calculation definitions, the TDLHL is the total corrected clean strainer head loss (TCCSHL) added to the Alden test results debris laden head loss (A-DLHL). For example, the table 7 value for the TDLHL at 212 °F is listed at 3.474 ft. If TDLHL is calculated using the TCCSHL added to the A-DLHL the value is 3.626. Please provide an explanation for the methodology used to calculate the TDLHL and verify that all components of head loss are included in the calculation.

NextEra affirms that the methodology used by the vendor in the calculation previously provided is correct, and it is subject for continued use regardless of changes in test protocol. The document provided is potentially confusing because of ambiguity in the terms used. The following explanation is evident from a careful reading of the full text of the calculation.

In Table 7 of the calculation, the starting point is "TCCSHL" ("total corrected clean strainer head loss"). This is the total head loss for a clean strainer, as well as the connecting piping, elbows, etc., corrected to a temperature of 212°F. This is a calculated number obtained from a generic regression formula, and may not accurately reflect minor differences between the actual clean strainer design and the generic design.

To account for this, PCI then subtracted out the calculated clean strainer head loss, CSHL ("Clean Strainer Head Loss"; second column of Table 7) to obtain the "Plenum Head Loss" as shown in the third column of Table 7.

The Plenum Head Loss representing the head loss in the connected piping and fittings is then added to the *as-measured* clean strainer head loss from the test using a prototypical full scale strainer module identical to those that have been installed at PBNP (CSHL, 4th column of Table 7) and the Actual Debris Loaded Head Loss ("A-DLHL", 5th column of Table 7) to obtain the Total Debris Loaded Head Loss ("TDLHL", 6th column of Table 7). Both the CSHS and the A-DLHL were previously corrected to 212°F.

If the TCCSHL was added to the as-measured CSHL without first subtracting out the calculated CSHL, the clean strainer head losses would have been erroneously double counted, with the resulting predicted head loss erroneously high by 0.1935 ft (2.3 inches).

This same calculation will be revised to reflect the results of pending future testing, but the methodology will not be affected.

Question 21

Regarding RAI 9, the final debris generation and transport calculations had not been completed at the time of the licensee's submittal. Because the testing credited near-field settling, the size debris distribution assumed and used in the testing are critical to the test result. Please verify that the debris amounts and size distribution used in the head loss testing bound those predicted to reach the strainer after the final design configuration has been determined. In addition, the licensee stated that the amount of latent fibrous debris assumed to reach the strainer during testing was less than the amount assumed in the design basis. This discrepancy is being resolved through the removal of insulation from the plant. Please state how this issue has been resolved.

NextEra Response

NextEra is evaluating the recent NRC conclusion that insufficient testing and data is available to justify crediting settling during strainer testing. Should NextEra determine that retesting the strainer with a protocol acceptable to the NRC which does not credit settling is required, this RAI would be resolved.

Question 22

In response to RAI 25, the licensee provided the calculated deaeration for both hot and cold conditions. However, the licensee did not provide information regarding how any required correction to net positive suction head required ($NPSH_R$) would affect the margin available for the emergency core cooling pumps. Please provide information that describes how NPSH margin is affected by the $NPSH_R$ correction described in Regulatory Guide 1.82, Revision 3, Appendix A.

NextEra Response

The NPSH available ($NPSH_A$) to the RHR pumps has historically been calculated by crediting only atmospheric pressure (14.7 psig) inside of the containment, regardless of calculated containment conditions. This has been performed consistent with Item 1.3.1.1 of Regulatory Guide 1.82, Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident, Revision 3, Appendix A.

When in an alignment to support simultaneous core outlet plenum and cold leg injection for boric acid concentration concerns, RHR flow must be throttled to prevent $NPSH_R$ from exceeding $NPSH_A$ using the above approach. This is before consideration of the deleterious effect of entrained vapor voids on $NPSH_R$, the $NPSH_A$ just meets the design $NPSH_R$ of the RHR pumps.

With the previously submitted calculated entrained void fraction of ~0.6% under these conditions, the $NPSH_R$ should be increased by 30%. Under the above set of assumptions, there is inadequate $NPSH_A$ to ensure proper operation of the RHR pumps.

It has been suggested that accounting for the compression of the voids due to the increased elevation head as sump water descends to the pump suctions may be sufficient to counter the adverse effect of the voids on $NPSH_R$. However, compression effects alone is inadequate to recover the 30% increase in $NPSH_R$.

Theoretically, the elevation head increase at lower elevations of the RHR suction piping would be sufficient to drive all of the entrained gas back into solution. However, the rate of this diffusion controlled process is highly dependent on the size of the entrained voids, and it would be difficult to conclusively demonstrate that all entrained voids would be re-dissolved during the brief transit time to the pump suctions.

It is impractical to alter the existing RHR pump suction configuration (including sump strainers) to meet the guidance of Reg Guide 1.82, Appendix A, Section 1.3.1.1. Section 1.3.1.2 of the same document provides guidance to demonstrate adequate $NPSH_A$, even under the most limiting conditions. It should be noted that the partial pressure of the water vapor ("steam") in the containment will be at least the saturation pressure of the sump pool. If it was lower, the pool would flash and rapidly cool down to re-establish thermodynamic equilibrium.

By adding the partial pressure of the water vapor to the partial pressure of air and non-condensable gasses in the fixed volume containment that existed prior to the postulated event, a total pressure head considerably greater than Regulatory Guide 1.82, Appendix A, Section 1.3.1.1 is available. This pressure would be always be available following an accident.

The table below illustrates that the minimum $NPSH_A$ in the containment using this modeling of available pressure head is always well in excess of $NPSH_R$, even when voiding effects are considered. The table does not credit the additional pressure caused by compression of the containment gasses from the injection of RWST water. It assumes an initial (pre-accident) containment pressure of 12.7 psia (2 psig vacuum) and a pre-accident containment temperature of 120°F (both are Technical Specification limits that minimize the pre-accident gas inventory in the containment). The nominal $NPSH_R$ is 15 ft at the maximum design flow rate of 2200 gpm, and the minimum level of the sump pool is approximately 28 feet above the RHR pump suctions.

Sump Temp	Cont. Air Partial Press. (psia)	Cont. Total Pressure (psia)	Total Pressure Head (ft)	Screen Head Losses (ft)*	Approx. Piping Head Losses (ft)	$NPSH_A$ (ft)	Void Fraction	Corrected $NPSH_R$ (ft)
212	14.7	29.4	70.8	3.5	7.3	52.6	0.06%	15.5
192	14.3	24.1	57.5	3.9	7.3	50.9	0.07%	15.5
172	13.8	20.2	48.0	4.4	7.2	49.2	0.09%	15.7
152	13.4	17.3	40.8	5.1	7.2	47.3	0.13%	16.0
132	13.0	15.4	36.0	5.9	7.1	45.3	0.17%	16.3
112	12.5	13.9	32.4	7.1	7.1	43.0	0.25%	16.9
92	12.1	12.8	29.8	8.6	7.1	40.4	0.37%	17.8
72	11.6	12.0	27.8	10.9	7.0	37.0	0.64%	19.8

*These values of screen head loss are from previous tests, and would have to be revised to reflect any re-test results with a different methodology.

A review of the above table shows that $NPSH_A$ will always exceed $NPSH_R$ by a large margin. The margin provides assurance that the minimal effects of containment leakage over time will not invalidate the conclusion that $NPSH_A$ will remain adequate for the 30-day mission time of the ECCS systems.

Question 23

RAI 21 requested additional information demonstrating that the maximum aluminum concentration in the containment sump will be less than 20 parts per million (ppm). The July 31, 2009, response Enclosure 6 Table 1 showed 12 different calculations of aluminum concentrations, some of which are not credible since they combine accident scenarios that are not possible. The response identifies case 2.5 as the limiting credible case. However, the aluminum concentration for case 2.5 is 30 ppm, which contradicts the licensee's statement that the concentration will be less than 20 ppm. Please address the discrepancy.

NextEra Response

Enclosure 6 transmitted a copy of the complete analysis. This analysis was provided per NRC request and was not revised, corrected or abridged to enhance readability.

The question stems from a deficiency in the presentation of data that was identified by NextEra when reviewing the vendor-prepared document, but did not require correction because sufficient information was included in the document for it to be acceptable.

Note 4 of the owner's review comments ("Design Review Comment Form") on Page 5 of the enclosure states:

> "When using table 6-1, care should be taken to **not use the concentrations listed.** These concentrations were derived using the maximum sump volume to establish the total mass, but then divided the mass of chemical precipitants by the mass in the minimum sump volume (this approach is noted at the bottom of the page). This produces an erroneous and excessively high chemical concentration. If chemical

concentrations are desired, then they must be calculated from the chemical masses listed in the table and then divided by the mass of the maximum sump level. Both can be obtained from within the calculation." [The bold emphasis exists in original document and was not added by this response]

For the limiting case (case 2.5), the table lists a total mass of aluminum of 19.97 kg, and a maximum sump volume of 43317 ft^3. Converting to a correct concentration:

$$[Ppt] = 20\ kg \times 2.2\ lb/Kg \,/\, (43317\ ft^3 \times 62\ lb/ft^3\ for\ H_2O) \approx 16.4\ ppm$$

Therefore, the previous statement that the concentration would be less than 20 ppm was correct.

Note that because additional testing will be necessary, and because the dominant sources (fiberglass and mineral wool) of the limiting reagent in forming precipitants (the aluminum ion) has been substantially reduced, NextEra may elect to revise the previously completed chemical analysis to obtain a new, reduced chemical source term prior to performance of the next test.

Question 24

The response to RAI 22 in the July 31, 2009, submittal includes a table that provides a measure of precipitate as a function of sump volume but did not relate this back to the sump pH. Please clarify how the mass of precipitate formed varies as a function of sump volume and pH.

NextEra Response

The previous RAI response indicated that the analyses were performed using a single, conservative, bounding value of pH. Therefore, it is not possible to provide a response illustrating how the volume of precipitate varies as a function of sump pH.

During a subsequent telephone conference with the NRC the intent of this question was clarified. It was determined that information should be provided that illustrates the range of sump pH that may be expected in the sump and how the single value used was both conservative and bounding.

The analysis previously provided assumed a maximum sump pH of 9.5 for the entire 30 day post-accident duration. Since a high pH favors the dissolution of aluminum (the limiting reagent), and no credit was taken for the solubility of precipitant species of interest as a function of pH, this is conservative provided that the pH cannot credibly exceed 9.5.

The analysis of post-accident sump pH concluded that the maximum sump pH that could be attained would be 9.4, without including the acidic effects of core inventory release and / or radiolysis of cable insulation materials.

In contrast, the same analysis concluded that the minimum sump pH would be as low as 7.65, with an additional reduction of 0.23 pH units due to the effects of released core inventory (Hyrdoionic acid, CsOH, etc.) and radiolysis of cable insulation materials.

Therefore, the assumption of a constant pH of 9.5 conservatively bounds the full range of possible sump pH.

Enclosure 2

List of Attendees

LIST OF ATTENDEES

FOR MEETING WITH POINT BEACH NUCLEAR PLANT

REGARDING GL 2004-02/GSI-191

FOR UNITS 1 AND 2

Name	Title	Organization
Justin Poole	Project Manager	NRR/DORL/LPL3-1
Steve Smith	Rx Systems Engineer	NRR/DSS/SSIB
Mike Scott	Branch Chief	NRR/DSS/SSIB
Brian Dunn *	Director	NextEra
Jim Costedio *	Licensing Manager	NextEra
Fritzie Flentje *	Licensing Supervisor	NextEra
Tom Kendall *	Engineer	NextEra

* Per Teleconference

Enclosure 2

RAI 23

The licensee's response is acceptable as is.

RAI 24

The licensee's response is acceptable as is.

Following the discussion on the specific RAI responses, the licensee discussed possible ways to avoid removal of fibrous insulation from the regenerative heat exchanger due to asbestos and high dose levels. The NRC staff stated that a limited-offset break may be a possible path forward but additional information would need to be provided for the staff to evaluate.

The licensee and the staff then discussed the need for a follow-up call once the licensee had made their decision on settlement credit. This call would be to notify the NRC staff of the licensee's plan with regard to settlement credit, a proposed date for revised draft RAI responses, next steps for rationale to retain asbestos around the regenerative heat exchanger, and a timeline for further meetings.

No members of the public were in attendance. No Public Meeting Feedback forms were received.

Please direct any inquiries to me at 301-415-2048, or Justin.Poole@nrc.gov.

Justin C. Poole, Project Manager **/RA/**
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-266 and 50-301

Enclosures:
1. Licensee Draft RAI response
2. List of Attendees

cc w/encls: Distribution via Listserv

DISTRIBUTION:

PUBLIC	RidsNrrPMPointBeach Resource	CSteger, NRR
LPL3-1 R/F	RidsNrrLABTully Resource	MScott, NRR
RidsAcrsAcnw_MailCTR Resource	RidsOgcRp Resource	SSmith, NRR
RidsNrrDorlLpl3-1 Resource	RidsRgn3MailCenter Resource	SBagley, EDO Region III

ADAMS Accession No. PKG ML101930305 Meeting Notice ML100570454 Meeting Summary ML101600292

OFFICE	DORL/LPL3-1/PM	DORL/LPL3-1/LA	NRR/SSIB/BC	DORL/LPL3-1/PM	DORL/LPL3-1/BC
NAME	JPoole	BTully	MScott	TBeltz	RPascarelli */TBeltz for*
DATE	06/21/10	06/21/10	06/23/10	07/08/10	07/08/10

OFFICIAL RECORD COPY