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From: Raymond, William -R1
Sent: Tuesday, March 08, 2011 9:55 AM
To: Burritt, Arthur; DeFrancisco, Anne; Conte, Richard
Cc: Cline, Leonard; Johnson, Jonathan; Bowen, Jeremy; Schroeder, Daniel; Welling, Blake
Subject: Seabrook Proposed Presentation for MR Violation
Attachments: MR NCV R201102r1.docx

Art,
The attached file provides the revised presentation paper for the March 15th enforcement panel. I am ready to discuss your comments. Although still long, I think we could focus on the cover page and Attachment 1 during the panel discussions since I pulled the essential thought from Attachment 2 into the cover page. The details in Attachment 2 are available to anyone who needs to see the rationale for the conclusions.

Anne - this reflects your comments – emphasize why licensee identified and focus on structure degradation versus ASR.
Rich – I am still supportive of including any issue not resolved in March 15th in a URI / TIA.

I am sending the file out to the broader distribution list to invite any feedback or comments.
Thanks for your time,
Bill

William J. Raymond
USNRC-Nuclear Engineer
Seabrook Resident Office
william.raymond@nrc.gov
603-474-3580 (work)
(b)(6) (cell)
603-474-9018 (fax)

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Proposed Enforcement for Seabrook Degraded Concrete Issue
Presentation to Region I Enforcement Panel – March 15, 2011

Background

In August 2010, NextEra determined during Part 54 inquires that below grade concrete walls in the Control Building / Electric Tunnel (CB) had experienced a reduction in concrete properties. The adverse concrete condition was due to distress from alkali-silica reaction (ASR). NRC reviewed NextEra's operability determination for the CB (Report 201004), and the structures monitoring program under CFR 50.65, the Maintenance Rule (Report 201005). The latter review was performed to fulfill Acton Plan[1] Line Item 5 - "determine what NextEra concrete assessment programs should have identified the ASR condition."

Problem Statement

Report 201005 inspections identified performance deficiencies in NextEra's failure to implement self-imposed and industry standards for monitoring concrete structures, to adequately implement structures monitoring procedures (PEG04) under the Maintenance Rule, and to evaluate the results of structure inspections to identify CB structural degradation and determine the extent and rate of degradation. A licensee-identified Criterion V NCV was proposed but not issued ~~when it was noted that~~because the Enforcement Policy ~~explicitly~~ prohibited ~~Criterion V~~ citations for inadequate ~~procedures under the~~ Maintenance Rule procedures. An additional impediment was ~~recognized in~~ the inability to enforce an "engineering guideline." ~~as a procedure.~~

Possible Enforcement Options

After further reviews in consultation with Region I DRS:EB1, the Enforcement Office and the NRR Program Office, DRP Branch 3 identified possible enforcement options under Part 50, including a citation against 50.65(a)(2); 50.65(a)(1), Appendix B, Criterion V for inadequate procedures; Appendix B, Criterion XVI for inadequate corrective actions to assess degraded conditions; and, Appendix B for multi-level QA breakdowns during construction which failed to prevent / predict reactive aggregate in Seabrook structures.

Proposed Enforcement

~~Of these options,~~ DRP Branch 3 proposes enforcement under 50.65(a)(2) for ~~NextEra's~~the failure to "demonstrate that the performance or condition of a structure is being effectively controlled through performance of appropriate preventive maintenance." ~~A proposed feeder to Report 201102 is provided in~~ Attachment 1 ~~which~~ summarizes the violation and its basis. Attachment 2 discusses the other ~~potential~~ enforcement options and why these ~~options~~ were not chosen:

- 50.65(a)(1) – not chosen because the CB was operable and an (a)(1) violation is subordinate to an (a)(2) violation
- Appendix B, Criterion V - not chosen because of Enforcement Policy prohibition.
- Appendix B, Criterion XVI - not chosen because a Criterion XVI violation is subordinate to an (a)(2) violation and Enforcement Policy prohibition.
- Appendix B, for construction QA breakdowns – not chosen because construction era activities are not indicative of current performance

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Recommendation

Attachment 2 recommends~~also discusses a recommendation for~~ an ROP feedback to the NRR Program Office ~~whose purpose would be~~ to request review of the ~~appropriateness of the~~ Enforcement Policy as ~~it~~ appliesd to the Maintenance Rule structures monitoring program ~~under the Maintenance Rule~~.

[1] Reference: Memorandum to Division Directors, Enclosure 2 dated 12/2/2010

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Attachment 1 – Proposed Feeder to Seabrook Report 201102

4OA7 Licensee-Identified Violations

The following violation of NRC requirements was identified by NextEra. It was determined to have very low significance (Green) and to meet the criteria of Section 2.3.2of the NRC Enforcement Policy for being dispositioned as a non-cited violation.

.1 Inadequate Monitoring of Maintenance Rule In-Scope Structures Under PEG04

10 CFR 50.65(a)(2) requires, in part, that it must demonstrated that the performance or condition of a structure is being effectively controlled through performance of appropriate preventive maintenance, such that the structure remains capable of performing its intended function. Contrary to the above, the licensee failed to demonstrate that Control Building performance was effectively controlled through the performance of appropriate maintenance. Specifically, the licensee failed to evaluate the results of their periodic inspections of the condition of the Control Building to determine the extent and rate of degradation to the structure. Degradation which reduced the concrete strength of the Control Building, and could potentially have caused the structure to not have met its design basis function, was not identified or evaluated by NextEra until the implementation of license renewal initiatives in 2010.

NextEra implemented plant engineering guideline PEG04, Building/Structures Surveillance Inspections, to evaluate the condition of structures that were in-scope pursuant to 10CFR50.65 (the Maintenance Rule). PEG04 Section 4.1.1 states that inspections are "intended *to preserve and protect structural integrity," "ensure deficiencies are corrected in a timely manner" and "be sensitive to degrading conditions such that corrective actions can be taken before loss of function occurs.*" Since the inception of the PEG04 program in 1995, observed deficiencies were recorded and tracked, but no evaluations to ascertain whether a "major structural deficiency" as defined in Section 4.1.3 (namely, a condition that did not represent a loss of design function, but if left uncorrected, could result in a failure over time, as described in PEG04 Section 4.1.2.1.b), had occurred. NextEra evaluations under PEG04 were inadequate because concrete visual conditions (patterned cracks, spalling, popouts) were not further investigated to identify the underlying distress causing the structural degradation and reduction in concrete material properties.

The issue is classified as a licensee-identified finding per IMC 0612 because NextEra identified the degraded structural conditions in 2010, and identified the need to improve the structures monitoring program in 2009. As a result of inquiries to support license renewal per 10 CFR Part 54, NextEra analyzed concrete core samples from exterior walls of the Control Building (CB) and changes to material properties were identified in August 2010. Specifically, the analysis showed moderate to severe alkali-silica-reaction (ASR) in chronically wetted areas with reductions in the concrete compressive strength (AR574120) and the modulus of elasticity (AR581434), which demonstrated a potential that the CB may not have met its design basis function, and therefore, required further evaluation. Further, based on industry initiatives in 2009 (AR199563), NextEra replaced the structures monitoring program under PEG04 by Technical Procedure 36180 and implemented a baseline inspection of structures by September 2010. Procedure 36180

incorporates the enhanced (quantified) criteria described in American Concrete Institute Standard ACI 349.3R to evaluate degraded concrete conditions for acceptability.

The performance deficiency is the failure to evaluate the results of the periodic inspections of the condition of the CB to determine the extent and rate of degradation to the structure. The issue is more than minor because if left uncorrected, the condition could have resulted in the loss of function due to degrading concrete material properties of structures and systems designed to mitigate design basis events. NextEra completed an operability determination for the CB (reference CR 574120 and NRC Inspection 201004). The CB continued to meet the licensing basis requirements with reduced margin (6.6 %), and thus remained operable for design loads inclusive of site extreme environmental conditions as described in FSAR Sections 2.4 and 3.8.4.2. The finding had very low safety significance because despite degraded concrete conditions and loss of design margin, the control building remained operable. The issue was entered into the corrective action program to address the extent of condition and establish mitigative measures (ARs 199563, 574120 and 581434).

Attachment 2 - Evaluation of Other Enforcement Options & Recommendation

The ~~potential~~ enforcement options ~~that were~~ considered are summarized in Part A ~~below~~ along with the reasons ~~the reasons~~ several were not pursued. Part B recommends an ~~provides the basis for an~~ ROP feedback to the NRR Program Office to review the appropriateness of the Enforcement Policy as it applies to certain Maintenance Rule ~~V~~violations.

Regardless of the ~~which~~ enforcement option ~~NRC~~ choosens ~~for the concrete issue~~, the ~~matter~~issue is appropriately classified as a "licensee-identified finding" per IMC 0612 because: ~~of two key facts.~~ (1) In 2010, NextEra found the degraded structural conditions and initiated corrective action to investigate~~determine its extent and degree,~~ and ~~to~~ mitigate the adverse condition; and, ~~(~~2) In 2009, through an industry initiative (INPO E&A ~~visit &~~ Performance Deficiency - AR199563), NextEra identified that the PEG04 structures monitoring program was behind industry standards, and took ~~corrective~~ actions to enhance the program by ~~developing and~~ implementing TP 36180.

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A. Evaluation of Potential Enforcement Options

Option Chosen

1. Violation of CFR 50.65(a)(2)
   In consultation with the NRR program Office, Branch 3 determined that the circumstances at Seabrook constitute an example of a failure to meet CFR 50.65(a)(2). The basis is presented in Attachment 1 as the proposed write up for Report 201102.

   10 CFR 50.65(a)(2) requires that NextEra ~~to~~ demonstrate ~~that~~ the performance or condition of a structure is being effectively controlled through performance of appropriate preventive maintenance, such that the structure remains capable of performing its intended function. Contrary to (a)(2) and absent the Part 54 initiative, NextEra failed to demonstrate that Control Building performance was effectively controlled through the performance of appropriate maintenance. The performance deficiency was NextEra's failure to evaluate the results of the periodic inspections of the condition of the CB to determine the extent and rate of degradation to the structure. -This approach focuses on the performance criteria for the structure(s) without reliance on procedural requirements ~~or adequacy of same~~.

Options NOT Chosen

2. Violation of CFR 50.65(a)(1) – not chosen because no loss of function occurred and an (a)(1) violation is subordinate to an (a)(2) violation.

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   This ~~citation~~ violation is predicated on either: (a) the occurrence of condition(s) in which the CB concrete degraded to the extent that the design basis function was lost (concrete strength reduced to the point that allowable shear stress for licensing basis hydrostatic loads was not met), or (b) the design function would be lost during the next inspection interval for the structures. Based on data available in 2010, NextEra determined the CB continued to meet the licensing basis requirements with reduced margin (6.6 %), and thus remained operable for design loads ~~inclusive of site extreme environmental conditions as described in FSAR Sections 2.4 and 3.8.4.2~~. As to~~regards~~ option (b), whether the CB design function would be lost during the next inspection interval is speculative. As such, this approach is a less desirable option since is depends on condition yet to occur rather conditions already known to exist.

While NRC could conclude that NextEra failed to place the CB into (a)(1) because a "major structural deficiency" as defined in PEG04 Section 4.1.3 had occurred (by citing concrete conditions as analogous to 4.1.3.1.c – ground water inleakage causing severe corrosion to structural members), the argument is predicated on NextEra having recognized that structural degradation was evident in concrete visual conditions (cracks, scaling and popouts). Through lack of expertise and/or adequate procedure guidance in the (a)(2) monitoring program to drive such a conclusion, NextEra staff did not establish the connection between concrete visual conditions and the structural degradation. Citing a violation of (a)(1) is both speculative and predicated on an (a)(2) violation having first existed. Citing (a)(1) if valid would be subordinate to citing (a)(2).

3. Violation of CFR 50, Appendix B, Criterion V - not chosen because of prohibitions in the Enforcement Policy.

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A violation of Criterion V was first proposed because it was deemed directly causal to NextEra's failure to effectively monitor the category I structures as required under the Maintenance Rule. The proposed violation cited that PEG04, was inadequate because it contained only qualitative evaluation criteria insufficient to drive further investigation of concrete visual conditions (patterned cracks, spalling, popouts) to identify the underlying distress from ASR causing the structural degradation and reduction in concrete material properties. PEG04 specifically lacked the quantitative acceptance criteria of the industry standards provided in ACI 349.3R was available to NextEra since 2002. The violation was not pursued when it was recognized that citations for Maintenance Rule procedural inadequacy / implementation was explicitly prohibited by the Enforcement Policy.

The initial proposed violation was revised to eliminate reference to the Maintenance Rule. The premise of the citation was that since PEG04 provided instructions for ~~described~~ activities affecting quality ~~but~~which failed to incorporate industry operating experience to effectively monitor category I structures, it was not "appropriate to the circumstances," ~~and~~ thus placing NextEra ~~was~~ in violation of Criterion V. This approach was not pursued ~~under the objection that~~because PEG04, ~~as~~ an "engineering guideline," contained instructions that were recommendations versus requirements, which could not be enforced as a procedure. However, the circumstance at Seabrook was different than one in which one or more steps ~~within a engineering guideline~~ were taken as recommendations and not completed based on engineering judgment. ~~In the~~At Seabrook, ~~case of PEG04,~~ the ~~entire~~ PEG04 guideline and thence the structures monitoring program was proven inadequate to achieve it stated objectives~~, namely~~ to perform inspections that ~~were~~would identify degrading structural conditions (namely "~~intended to~~ *preserve and protect structural integrity," "ensure deficiencies are corrected in a timely manner" and "be sensitive to degrading conditions such that corrective actions can be taken before loss of function occurs.*"). ~~Thus,~~ A~~a~~ Criterion V citation ~~against Criterion V~~ would ~~still~~ be valid since~~from the perspective that~~ PEG04, ~~when~~ taken in its entirety, was not effective ~~as a set of instructions~~ to adequately monitor~~/investigate~~ concrete conditions ~~so as~~ to identify the underlying structural degradation.

After Seabrook Report 200105 was issued in February 2011 without enforcement ~~no violation~~, Region I became aware of an enforcement action taken at Grand Gulf (Report 201004). At Grand Gulf, Region IV found that procedures for monitoring the condition structures were only partially followed such that some in-scope structures were not

inspected by the licensee. Once the structures were inspected by the NRC, deficiencies were identified and entered into the corrective action program. Region IV issued an NRC-identified NCV against Criterion V for Grand Gulf's failure to adequately implement procedures affecting quality. It is not known to Region I how the Grand Gulf procedure may have differed from an "engineering guideline." Regardless, the point is that ~~at~~ both Seabrook and Grand Gulf Maintenance Rule procedures ~~to implement~~for ~~the~~ structures monitoring program ~~under the Maintenance Rule were~~were either inadequate or not adequately implemented.

On the one hand, one could~~an~~ make the case ~~conclude~~ that a Criterion V citation ~~against Criterion V~~ is appropriate for ~~the circumstances~~ both ~~at~~ Seabrook and Grand Gulf without reference to the Maintenance Rule. Conversely, since both enforcement actions involve ~~enforcement involving procedures for~~ Maintenance Rule implementing procedures ~~the Maintenance Rule~~ (whether explicitly stated nor not), both could be viewed a circumventing the Enforcement Policy. For this reason, a Criterion V citation is not being pursued ~~at Seabrook~~. Rather, it is recommended that NRC review the appropriateness of the Enforcement Policy as it applies to the structures monitoring program under 50.65 (see Part B below).

4. Violation of CFR 50, Appendix B, Criterion XVI - not chosen because a Criterion XVI violation is subordinate to an (a)(2) violation and Enforcement Policy prohibitions.

NextEra's failure to thoroughly evaluate degraded concrete conditions was an example of a violation of Appendix B, Criterion XVI for inadequate corrective actions taken in response to conditions adverse to quality. This conclusion follows easily once it is recognized that the visual concrete deficiencies (patterned cracks, spalling, popouts) were indicative of concrete distress and degrading material properties. However, a problem sustaining this violation stems from the same facts described in Section A.2 above. Namely, through lack of an effective (a)(2) monitoring program, NextEra did not establish the connection between concrete visual conditions and the underlying structural degradation. NextEra staff recognized ~~the~~ concrete deficiencies as a condition adverse to quality but catalogued the deficiencies for trending and future evaluation. Absent more intrusive testing and evaluation, the underlying concrete distress and structural degradation was not recognized. Since a violation of Criterion XVI is predicated on an (a)(2) violation having first existed, citing Criterion XVI would be subordinate to citing (a)(2). Further, a Criterion XVI violation could be ~~more~~ supportable if the situation at Seabrook rose to the level of being an SCAQ – as would occur if structural concrete had degraded to the point that a loss of function exists. This enforcement option should be considered as NextEra continues the ASR extent of condition investigations and evaluates the associated impact on building operability.

Lastly, a citation against Appendix B cannot be pursued since Criterion XVI citations for inadequate corrective actions for implementing the Maintenance Rule are explicitly prohibited by the Enforcement Policy. Rather, it is recommended that NRC review the appropriateness of the Enforcement Policy as it applies to the structures monitoring program under 50.65 (see Part B below).

5. Violation of CFR 50, Appendix B, for multiple construction QA breakdowns – not chosen because activities from the construction phase not indicative of current performance.
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NextEra's failure to produce and test structural concrete in such a manner to preclude and/or predict reactive aggregate was an example of a break down in construction QA at multiple levels. This line of inspection has not been pursued as the focus thus far has been on the implementation of the Part 50 requirements under the operational phase of the Seabrook license, and specifically the implementation of the Maintenance Rule. DRP would require assistance from DRS to further develop the procedures and requirements from the construction phase.

However, it is not recommended that this approach be taken at this time for two reasons. (1) A violation of QA requirements from the construction phase would not be indicative of current performance. (2) NRC preliminary reviews have determined, and it is likely that NextEra's root cause evaluations would confirm, that ACI construction standards and ASTM test methods in place during the 1970s-1980s have since been found inadequate to preclude and predict ~~ASR on~~reactive concrete. The industry has put new standards in place to better address ~~prevent~~ ASR distress in concrete.

B. Recommendation – ROP Feedback Form to Review Enforcement Policy

The NRC Enforcement Policy prohibits issuing violations against 10 CFR 50, Appendix B Criterion V for deficient Maintenance Rule procedures / processes. There is a similar prohibition against Criterion XVI violations. There is a question whether the policy is correct or should be applied to issues presented in the current Seabrook finding where inadequate NextEra procedures / processes under CFR 50.65 failed to timely identify structural degradation in concrete building(s) housing redundant trains of safety related systems. As presently written / implemented, it appears the would allow for an entire category I structure(s) housing safety related SSCs to become inoperable before the issue becomes of regulatory concern under 50.65. A regulatory position / policy that allows for such an outcome is untenable. While the policy seems appropriate when applied to with the multiple redundant and diverse systems and components contained within the structures, it is questionable whether the policy is appropriate for passive structures housing those multiple trains of systems and components. This issue should be referred to the NRR Program Office for review and resolution. Branch 3 could assist in writing the appropriate ROP feedback form.