

From: Poole, Justin
Sent: Thursday, May 13, 2010 1:06 PM
To: Hale, Steve; COSTEDIO, JAMES
Subject: DRAFT Request for additional information from Mechanical and Civil Branch on AST

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Steve,

By letter dated December 8, 2008, FPL Energy Point Beach, LLC, submitted a license amendment application for Point Beach Nuclear Plant Units 1 and 2 to revise the current licensing basis to implement the alternate source term through reanalysis of the radiological consequences of the FSAR Chapter 14 accidents.

The NRC staff has reviewed the information provided and determined that in order to complete its evaluation, additional information is required. We would like to discuss the questions, in draft form below, with you in a conference call.

This e-mail aims solely to prepare you and others for the proposed conference call. It does not convey a formal NRC staff position, and it does not formally request for additional information.

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EMCB HVAC RAI 1

Reference 2 (pages 3, 8 and 131) states that :

“[T]he HVAC ductwork and plena for most of the CREFS are covered with a lightweight insulating material that obstructs viewing of some of the duct supports and duct stiffeners... the recirculation duct for the CREFS is un-insulated which allowed the Seismic Review Team (SRT) to examine the construction, stiffener spacing, hanger spacing and type, and material condition of the ductwork. This examination of the recirculation duct indicated the same type and quality of construction as that found for the VNPAB system; therefore the SRT considered it reasonable to adjudge that the number and location of CREFS stiffeners and duct supports within the insulated CREFS systems conform to the SMACNA code (Reference 4) and PBNP Ventilation System Design Specification (Reference 3) requirements and that the duct construction is adequate. The dead load, seismic and pressure stresses in the CREFS ducts, duct stiffeners, and duct supports were evaluated based on this approach.”

Reference 2 makes a similar assumptions (on page 15 and in SEWS page 122) for judging acceptable the structural integrity of inaccessible ducts and duct supports located “in locked radiation areas or visually blocked by overhead items and construction scaffolds.” Also, on page 141 because duct support anchorage is blocked by fireproofing, the assumption of welding is made for anchorage and the support has been called acceptable. The welding though is of unknown size and quality.

Please consider that:

- a) The SRT has reported in the Screening and Evaluation Worksheets (SEWS) and Section 9.0, Outliers (OLs) of Reference 2, that the accessible ductwork, which they were able to examine, requires additional supports, duct stiffeners and repairs for existing supports and anchorage in order that the AST credited HVAC SSCs will be able to maintain their structural integrity and perform their intended function during and after a seismic event.
- b) The SRT found and recorded (see table in page 7 of Ref 2) that the gage of some of the examined installed ductwork does not appear to be in conformance with the PBNP Ventilation System Design Specification 6118-M-41. Some of the as-installed tested ductwork profile (4/5 tested) was found to be of lesser thickness than the 6118-M-41 specified duct gage.
- c) Experience has shown that inadequate welding (such as field welding without design documentation for size and control) can cause brittle type failure of duct supports. Without inspection of non-designed welds, how can assurance be provided that poor quality or inadequate welding does not exist in these inaccessible areas?

Based on the above, the assumption made in Reference 2, that, by comparison to the accessible and examined ductwork, the inaccessible ducts, duct stiffeners, and duct supports are structurally adequate to withstand an earthquake and perform their intended function during and after a seismic event is not regarded as a sound engineering judgment. Provide a technical justification for the structural adequacy of the AST credited SSCs that were not examined during the walkdowns of Reference 2.

#### EMCB HVAC RAI 2

- a) Please verify that the SRT, prior to their walkdowns, for all duct sizes involved in this project, prepared duct span table(s) that were used for screening during their walkdowns.
- b) Provide a summary table which shows the allowable horizontal and vertical spans (and or horizontal to vertical span relationships) along with allowable cantilevered duct lengths for all circular and rectangular duct sizes involved in this project and confirm that these data were calculated using the guidance and criteria provided by Reference 4.
- c) Provide assurance that duct spans nonconforming to these allowable values were further evaluated and found acceptable by analysis or by modification using guidance and criteria contained in Reference 4.

#### EMCB HVAC RAI 3

Reference 2, Section 6.1.2, states that “The last hangers on cantilevered or terminated ducts in the PAB were examined and found to be positively secured to the end hanger.” Provide a justification for omitting this observation in the CREFS ductwork walkdown.

#### EMCB HVAC RAI 4

Reference 2, Section 6.1.2, also states that “VNPAB ductwork is often not positively secured to the horizontal angle cross-member of the trapeze hangers.” And that “The SRT judged that this is unimportant since most hangers consist of trapeze supports that “capture” the ductwork between the vertical support rods thereby ensuring that the ducts cannot fall off the hanger during a seismic event.”

- a) The above states that **most** hangers consist of trapeze supports, etc. Are there any ducts that are not tied down securely on supports of the non-trapeze or non-boxed type supports where the non-secured ducts could possibly displace and hit adjacent SSCs, slide and/or fall off during a seismic event and how have these issues been resolved?
- b) For ducts on trapeze supports and/or on supports that provide a mechanism to capture the duct from falling off but not stop it from possibly displace due to a seismic event, has the SRT considered seismic interactions with adjacent SSCs and how has this issue been resolved?

#### EMCB HVAC RAI 5

Reference 2, Section 5.0 (page 8) states that “Specification 6118-M-41 gages will conservatively be used for the dead load and seismic evaluations.” The staff notes that four (4) out of the six (6) listed ducts in the table of Section 5.0 are shown to have heavier actual gages than the 6118-M-41 specified gage. Therefore, by using Specification 6118-M-41 gages for these ducts, it produces non-conservative lower deadweight and seismic loads. Provide a technical resolution for this issue.

#### EMCB HVAC RAI 6

Reference 2, in table of Section 5.0, contains the width and the diameter of the rectangular and circular ducts that were tested for thickness using ultrasonic testing. Majority (4 out of 5) of the duct profiles tested produced an actual lighter gage than the PBNP Ventilation System Design Specification 6118-M-41.

- a) Please update the table to show both dimensions for the field tested rectangular ducts.
- b) Provide a table which shows all the duct sizes, material and type involved in the AST credited HVAC.
- c) Please provide a sound justification for the duct sizes that were not field tested for thickness.

#### EMCB HVAC RAI 7

Reference 2, Section 6.1.1, “Duct Stresses”, states that “The allowable bending stress is 8 ksi for carbon steel.” It is noted, that while this is true (per Reference 4) for carbon steel, galvanized sheet and stainless steel rectangular ducts, it is not the case for circular ducts. Please verify

that all duct stresses, either by calculation or by sound engineering judgment, after including required modifications, meet the Reference 4 allowable values.

#### EMCB HVAC RAI 8

Reference 2 indicates that for duct support evaluations were performed in accordance with the criteria of the AISC Manual of Steel Construction, 9th Edition.

- a) Please state the design basis AISC steel construction manual edition for original construction.
- b) Please provide reference to the specific controlled documentation that supports the AISC steel construction manual reconciliation from your original construction design basis AISC manual to the 9th Edition.

#### EMCB HVAC RAI 9

Are there any walls, floors or ceilings other than reinforced concrete that were used to provide ductwork support and how has their seismic integrity been evaluated?

#### EMCB HVAC RAI 10

Please verify that in cases where beam clamps are used, clamping frictional forces have not been credited to resist deadweight or seismic (horizontal or vertical) loads.

#### EMCB HVAC RAI 11

None of the SEWS shows duct sizes. Please provide the duct sizes (including thicknesses or gages) for submitted SEWS.

#### EMCB HVAC RAI 12

The SEWS show only galvanized sheet metal for duct material. Please confirm that all AST credited HVAC ductwork utilizes galvanized sheet metal for duct material.

#### EMCB HVAC RAI 13

The staff notes, that the NRC approved GIP is GIP-2. Reference 2, Section 11.8, makes reference to GIP-2. The SRT utilized GIP-3A to evaluate Control Room HVAC control panel C-67, fans W-1 3 B1 & B2 (Control Room Recirculation Fans), W-14 A & B (F-16 Control Room Charcoal Filter Fans), W21 A & B (PAB Exhaust Fans) and W30 A & B (F-23/F-29 PAB Exhaust Fans). Please verify that GIP-3A has been incorporated in the stations' licensing basis FSAR. If this is not the case, the staff requests that the SEWS be revised to show compliance with GIP-2.

#### EMCB HVAC RAI 14

The SRT's walkdown included the charcoal filter banks located in the same rooms with fans W30A and W30B. The SRT comments shown in the SEWS are as stated below:

“In the same room (about 20 ft away) there are charcoal filter banks in the rooms with a footprint of 107" x 180". The visible 107" side has 10 - 1/2" concrete expansion anchors with two anchors having nuts that are raised. The 180" side cannot be fully viewed as it is adjacent to a wall but at least 10 anchors were counted, some of which again were missing nuts or for which the nuts were raised. The two other sides are inaccessible. The filter banks are about 10' high and are adjudged to have a natural frequency in excess of about 20 Hz. Since they cannot uplift the anchors only need to resist base shear and there are sufficient visible anchors to accomplish this so they are declared seismically adequate. They pose no interaction potential risk to the fans.”

The SRT comments describe degraded conditions which need to be repaired. There are missing anchor nuts and raised anchor nuts on the sides that were accessible for walkdowns, while two sides on each unit were inaccessible. The provided justification for acceptance lacks rigor. No basis is provided for the judgment that they have a natural frequency in excess of 20 HZ. The SRT did not provide a technical justification which either involved actual dimensions and weights or estimated ones nor a calculation or technical discussion to justify that the lifting force at the bolt pattern, which can be developed due to the CG coupled overturning moment, is overcome by the unit's deadweight or anchorage resistance.

Please provide assurance that these SRT commented non-conformances will be corrected for these important to safety components prior to the proposed AST implementation and provide an acceptable justification for the seismic adequacy of these units.

#### EMCB HVAC RAI 15

Resolutions for the floor response spectrum outliers where demand exceeds capacity for fans W13B1, W13B2, W14A and W14B have not been provided. Provide resolution for these outliers and reference of controlled documentation containing information needed to implement resolution.

#### EMCB HVAC RAI 16

The SRT observed corroded anchorage of fans W13B1 and W13B2. Shown in the SEWS, the SRT's resolution for these outliers was to replace the corroded anchorage. Please include these outliers in the list of OLs of Section 9.0 and provide reference of controlled documentation which provides information needed to implement these repairs.

#### EMCB HVAC RAI 17

- a) Provide a list of all required HVAC modifications identified in Reference 2. The list of outliers (OLs) and recommended resolutions in Section 9.0 Reference 2 does not contain all SRT identified OLs.
- b) Please provide reference of controlled documentation containing information needed to implement resolution of the identified outliers and documentation which tracks the schedule of repairs and assures that all HVAC required modification will be completed prior to implementing the proposed AST. Also provide resolution where resolution has not been provided.

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