Davis-Besse Root Cause Review – Status Call 1-19-2012

Please describe the work completed and still ongoing/planned for each of your subcontractors:

PII-Core Bore Sample Testing (C), Finite Element Model Development (Jan 30),
FMEA Report - TBD
MPR- Initial Evaluation of failure mechanisms and third party review of PII report.
Vatic Associates- Initial Evaluation of failure mechanisms and third party review of PII report.

Status of Your Team Work Products

Event & Causal Factor Chart with Barrier Analysis- NA
PII Fault Trees- NA

FMEA- (Worksheet for each failure mode or group of modes? – Yes separate failure modes and effects analysis worksheet expected for each item in RC FMA matrix. Preliminary version mid-week (Jan 25th)

Finite Element Model of the Containment Shield Building (Abaqus Code)- (Jan 30th)

- ABAQUS software controlled by licensee's contractor?
- Model "benchmarked" for what the evaluation is attempting to determine?
  - Model results compared against test data?, or
  - Model results compared against a known solution?
- ABAQUS software errors that could affect analysis results, how are they evaluated and controlled?

No information on these questions other than model developed and applied to Crystal River containment cracking issue. Updated to reflect DB Shield building including specific mechanical properties of DB SB materials (concrete/rebar). Also, believe that PII will run ABAQUS against another software model to validate results. Licensee expects this information to be included in final PII report.

Root Cause Report-TBD, draft report will not be ready before end of month.

Explain Purpose of Purdue Univ Testing and Why not Used by RCT- To evaluate the excess capacity or the bond strength of Lap splice configuration for DB SB rebar configurations. Dr. Susan of Purdue (concrete expert) and Dr. Darwin Kansas St Univ (Bond strength expert) will collaborate under Bechtel direction to perform test. Licensee will fabricate a beam section with concrete and rebar that matches 28 day strength requirements for DB SB. Beam will be placed in bending until failure by laminar cracking. Then additional tensile capacity of rebar w cracked concrete will be measured. Suspect 30-50% capacity with this configuration. Result will be used to support a use-as-is disposition for the existing concrete cracking configuration and will not be needed for root cause efforts. NRC will be informed of test schedule.

Questions Related to the NRC request for information.

Item #11- Core Bore Sample Plans

Core Bore Data at 4 Locations Needed to Support/Refute Groups of Critical Failure Modes:

- Explain Each of the 4 Groups of Failure Mechanisms- **early work not related to PII failure modes.**

- Were Core samples taken as planned including location and size for core samples? **Yes.**

- How many were harvested at each location to support these tests? **One or more.**

Davis-Besse Shield Building Concrete Bore Samples Test Schedule:

- Were the three core samples -4" diameter at Photometrics and the three 4" diameter at Univ of Colorado (+two 3" dia samples) sample selected per document above? **Yes.**

- How was the location for harvesting the Three 2" dia core bores samples sent to Photometrics facility determined? **No specific logic, used 2" samples from cracked and uncracked locations for carbonation examinations.**

- Were any of the 2" bore samples needed to confirm Group 1 and 2 failure modes? If so, why is this acceptable? **No, just to confirm extent of cracking**

- Typo after discussion of samples at Un of Colorado? **Yes.**

Item #15 – Schedule for completion of RCR

- You indicated freeze thaw test not complete by need date to end RCR due to equipment failure. What failed? **Lost power to test rig**. Is freeze/thaw still a viable potential cause? **Yes**, Why is this test information not needed by RCT? **We have data from original construction freeze/thaw tests.**

-Stated that freeze/thaw testing had been done on the first pour of the shield building. What testing was done and did this testing include both the type 1 and type 2 cement used in construction of the SB? **Freeze thaw done early on for only the type 2 cement because of time of year below grade portion of SB was poured (winter).**

How sensitive is your analytical model to obtaining accurate material properties in this area**? Don't know yet if model can predict freeze thaw.**

Other

Current Leading Potential Causes For Cracking? **At least 8 and could be combination of several.**

Do you still believe that a Root Cause for SB cracking can be identified? **Yes, but verdict is still out since this is not straightforward.**