PMSTPCOL PEmails

From: Norato, Michael
Sent: Thursday, April 01, 2010 3:36 PM
To: STPCOL
Subject: FW: Phone call summary

From: Makar, Gregory
Sent: Tuesday, March 30, 2010 11:28 PM
To: Norato, Michael
Subject: Phone call summary

Mike,

Here's a summary of the call today. I'm grateful you could be there for part of it. I copied the RAI below and added - in blue - what the applicant plans to to. The applicant did not request any changes to the RAI for clarification, so the draft we sent to them will be issued. I should be at work by about 6:20, so if you have any questions let me know. Later in the morning (9:00) I have a call with Areva and then a document review at their Twinbrook office.

Greg

STP 6.2 Chemical Effects RAI (Question No. 17354)

The staff reviewed Supplemental response #2 to RAI 06.02.02-11 and determined the response is not complete. The aluminum corrosion calculations and solubility data used to analyze chemical effects were based on boron-containing solutions. These analysis tools do not apply directly to boron-free BWR coolant. In addition, the analysis did not include all relevant chemical debris sources. Therefore, the staff requests the following information:

- Analysis of aluminum chemical effects using corrosion and solubility data applicable to the post-LOCA ECCS fluid at STP 3&4.
  The applicant recognizes there are two cases to address – without boron and with boron (if the sodium pentaborate is added from the Standby Liquid Control System). They have begun gathering data for aluminum corrosion and solubility in B-free water and still intend to show that they can calculate an aluminum surface area that can be allowed in containment (as latent debris) without generating chemical debris. They have already done this for borated water.

- If the pH is expected to vary with time during the postulated 30-day post-LOCA period, provide an analysis of the chemical effects based on the predicted transient or explain how your approach is bounding. (For example, addition of sodium pentaborate from the standby liquid control system would increase pH over some time period.)
  The applicant will run the boron case with a prototypical pH transient representing a starting pH of 7 that increases to 9 as the SLC system is added. They will also quantify the pH decrease (nitric and hydrochloric acid) from radiolysis of air and cable insulation and include it in the analysis.

- Discuss your plans to address chemical effects not considered in the initial analysis, such as:

- Constituents dissolved from concrete in the coatings zone of influence (ZOI), since the NRC coatings guidance assumes removal of the coating within the ZOI. Concrete dissolution generates elements that can form chemical precipitates, including precipitates containing aluminum (e.g., sodium aluminum silicate).
  The applicant determined a bounding value for coated concrete in the ZOI and will include that surface area of exposed concrete in the chemical evaluations.

- Zinc, which corroded at a low rate in testing related to PWRs but would be expected to corrode at higher rates in neutral and acidic solutions. This may result in levels of zinc particulate, zinc corrosion products, and zinc in solution that could contribute to other chemical precipitates.
  The only zinc in containment is inorganic zinc coating primer. They have determined the quantity and will analyze corrosion and solubility as they are doing for aluminum, but recognizing that the form of the debris may be different (e.g., particulate vs. amorphous gel-like material.)

- Corrosion products (iron oxide) resulting from iron or steel corrosion prior to or following a LOCA
  In their judgement, the amount of iron corrosion products used in the screen testing, which was based on the URG, is bounding for ABWR.

- Any other material present in containment that would be exposed to the post-LOCA fluid and has not been addressed by an integrated chemical effects analysis for the ABWR environment.
  They will make a statement that they have identified all materials and addressed the potential for chemical debris. In addition, they are considering quantifying the bed thickness for their 1 cubic foot of fiber and arguing that it would be too thin to create trap chemical debris and cause head loss.

- If your analysis predicts the formation of chemical debris, discuss your plans for addressing the impact of this debris on the ECCS strainers and fuel assemblies (e.g., integrated strainer testing or a simplified approach that relies on significant clean screen area).

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