BWR OWNERS' GROUP

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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Joe Golla (NRC)

Subject: BWROG ECCS Suction Strainers Action Item No. 8 Status

Reference: Summary of 08/10/10 Public Meeting with Boiling Water Reactor Owners' Group (BWROG), September 8, 2010 (ML102360056)

The purpose of this letter is to provide status on Action Item No. 8 from the reference summary of the August 10th and 11th, 2010 BWROG ECCS Suction Strainers Status Meeting. The action was for the BWROG to provide the staff with the results of an evaluation associated with temperature of potential holdup volumes of coolant and their impact on chemical effects. Specifically, the staff stated that holdup volumes could result in hotter temperatures where chemical effects could occur. The BWROG stated during the August meeting that this is not likely to be a significant issue due to small inactive volumes and these volumes not communicating with the suppression pool. The staff stated the BWROG should evaluate this. This letter summarizes the results of our internal evaluation.

First of all, we would like to acknowledge that the study of chemical effects on strainer head loss is currently under development in accordance with the project schedule. The purpose of the August 2010 status meeting was to provide high-level information regarding the plan for resolving chemical effects for the BWRs. We provided a fair amount of detailed information and the exchange with the staff was very productive. One of the questions asked by the staff was associated with the elevated temperatures associated with coolant pooling in the drywell and how this might affect corrosion rates developed based on bulk suppression pool temperatures. The question was noted and will be addressed in detail during the development of the test plan for the dissolution studies. However, we took an action to investigate and evaluate the significance of coolant holdup volumes within the drywell with regard to chemical effects.

A sample BWR drywell of each of the three containment designs - Mark I, II and III - was evaluated for the existence of potential holdup volumes. The results of our investigation indicate that there are two general types of holdup volumes within BWR drywells, active and inactive volumes.

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Active volumes are within the recirculating coolant flow path so they are rapidly replenished by recirculating coolant, are well mixed and are expected to be approximately the same temperature as the recirculating coolant. For example, after a LOCA the sample Mark II containment evaluated contains an active volume that covers the floor of the drywell and is as deep as the height of the protruding downcomers, and this pool will be rapidly replenished by recirculating coolant flow. The estimated temperature rise experienced by this active volume is on the order of 1°F, and the turnover time is approximately 6 minutes.

Active volumes are found within all three types of sample drywell designs evaluated, and can contain up to ~20% of the total coolant volume. The active volumes are typically found on the floor of the drywell, and are formed by water pooling below the highest point of the downcomers or weir wall, depending on the containment design. Since the active volumes are directly within the recirculating coolant flow path, they are well-mixed and have an average coolant residence time on the order of 1 to 20 minutes, and as a result the coolant within the active volumes experiences only a small temperature rise over the base recirculating coolant temperature, on the order of 0.25° to 1.5°F.

Inactive volumes are cavities that may fill with coolant, but are not within the recirculating coolant flow path so they are not well mixed, and coolant within them may experience a temperature increase greater than that of the active volumes. Among the sample drywells of each of the three BWR containment designs evaluated, a significant potential inactive volume was found within the sample Mark I drywell. This potential inactive volume consists of the cylindrical cavity beneath the RPV, and could contain on the order of ~10% of the total coolant volume.

The details and potential impacts of the active and inactive volumes on chemical effects for the three BWR containment designs will be evaluated and documented in the BWR Material Dissolution Test Plan to be issued in 4Q 2011. The Staff will be provided the opportunity to review and comment on the evaluation methodology and results.

Please contact me or Rob Whelan, BWROG PM, at (910) 200-1006, with any questions.

Regards,

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Chairman
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cc: M.H. Crowthers, BWROG Vice Chairman
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