TOSHIBA

Leading Innovation

12 Issues from GSI-191

STP 3&4 ECCS Strainer Audit

RAI Response

- In April, STPNOC provided a two-part response to RAI 06.02.02-1 including:
  - Discussion of baseline/bounding evaluation for Japanese ABWR, consistent with U.S. BWR guidance in Utility Resolution Guidance (URG) prepared in 1998
  - STP 3&4 approach to 12 recent issues identified for PWRs during resolution of GSI-191

Items 1&2: Downstream Effects

- See separate presentation

Item 3: Debris Bed Head Loss Prediction

- RAI Response (shortened):
  - Toshiba confirmed head loss characteristic parameter for H5 insulation design, which includes some Cal-Sil. CCI strainer testing confirmed acceptance criteria met. H5 evaluation will be available for NRC audit.
- Subsequent to RAI Response, Toshiba decided to eliminate all fiber insulation from STP 3&4 primary containment, so RAI Response will be revised.

Item 4: Chemical Effects

- RAI Response (shortened):
  - Only RMI on large bore piping and nuclear grade fiberglass on small bore piping allowed; aluminum and zinc are prohibited. [Needs revision because fiber is not allowed, but zinc in coatings is allowed.]
  - No chemical reactions with normal suppression pool water chemistry—confirmed with bench-top testing
  - Post-LOCA SLC-actuation water has higher pH, but since no aluminum or phosphates in containment, unlikely to have reactions—bench-top testing to confirm is scheduled for third quarter

Item 5: Assessment of Coatings

- RAI Response (shortened):
  - Coatings [URG-mandated 85 lbs. paint chips] are included in existing CCI head loss tests for H5, which bound STP 3&4. H5 evaluation will be available for NRC audit.
  - Additionally, when detailed design is completed for STP 3&4, Toshiba will conduct confirmatory small-scale tests with predicted mix of debris, including coatings.

Item 6: Latent Debris (and Suppression Pool Cleanliness)

- RAI Response:
  - The SPCU (Suppression Pool Clean Up System) will minimize the amount of corrosion products which could accumulate on the bottom of the suppression pool.
  - Other debris will be minimized by the adoption of INPO and EPRI guidance for cleanliness and Foreign Materials Exclusion (FME).
  - Therefore, the latent debris defined in the URG (which was used for the Hamaoka 5 testing) is considered bounding for STP 3&4.

Item 7: Zone of Influence (ZOI) adjustment for air jet testing

- RAI Response:
  - The current debris generation evaluation uses the URG methodology, and there is no indication in GSI-191 guidance documents (e.g., NEI 04-07) that this methodology is unconservative, other than for Cal-Sil, which will not be used at STP 3&4 (see Item 3 above).

Item 8: ZOI for Protective Coatings

- RAI Response:
  - See discussion on Items 5 and 7 above. There is no indication that the quantity of coatings assumed for the Hamaoka 5 strainer testing (which is based on URG guidance) is unconservative.

Item 9—Debris Transport - Erosion

- RAI Response:
  - The Hamaoka 5 debris transport evaluation uses the URG transport factors for Mark III and Mark I containments. The URG transport factors were based on testing.

Item 10—Debris Characteristics – Calcium Silicate Insulation

- RAI Response:
  - See Item 3 above, “Debris Bed Head Loss” (Cal-Sil will not be used in the primary containment at STP 3&4.)

Item 11—Near Field Effect/Scaling

- RAI Response:
  - The summary report of the CCI strainer testing performed for Hamaoka 5 will be available for NRC audit by May 31, 2009.
  - Additionally, Toshiba will confirm that the CCI strainer testing ensured adequate mixing of all debris such that test results are valid by conducting confirmatory small-scale testing of detailed design debris loading (see Item 5, above).

Item 12—Spherical ZOI Approach

- RAI Response:
  - The current debris generation calculation for Hamaoka 5 considers breaks representing adverse combinations of insulation and other materials of concern.