
AP1000 Post LOCA Recirculation Screens and Downstream Effects

Objectives:

- Present Westinghouse's position with regard to AP1000 response to GSI-191 – Sump Blockage and Down Stream Effects
- Clarify NRC concerns with the Westinghouse position
- Establish a path forward to close any unresolved issues

Westinghouse's understanding of NRC concerns

- Sources of Debris
 - Amount of Fiber
 - Quantity of Latent Debris transported
 - Interface requirements for COLA
 - Aluminum
 - Chemical effects of coatings even though they are not transported
- Downstream Testing
 - Fuel test
 - Applicability of LOCADM

Sources of Debris

- Amount of Fiber
 - Westinghouse assumes 10% by volume of the latent debris is fibrous.
 - The NRC staff indicated NEI 04-07 assumed the amount of fiber should be 15% by weight (Method 2).
 - Westinghouse used Method 1 (analysis of samples).
 - Debris estimate is based on a walk down of representative sample of existing plants that use reflective insulation.
 - Basis for debris estimate is available for review.

Sources of Debris

- Quantity of Latent Debris transported
 - The NRC staff considers the quantity of latent debris Westinghouse assumes to be transported to be too small.
 - Westinghouse has not provided information with respect to latent debris from vertical surfaces or any statistical sampling analysis.
 - Westinghouse's basis for the latent debris is representative plant walkdown data. This data can be made available for review.

Sources of Debris

- Interface requirements for COLA
 - The NRC staff indicated that there needed to be specific acceptance criteria for COLAs with respect to validating the assumptions regarding debris inside containment.
 - The DCD COL item should list the specific quantities (pounds) of latent fiber and particles that would be acceptable.
 - The NRC does not want the utilities digging through calc notes to get this information.
 - The NRC staff stated that Westinghouse should refer to Regulatory Guide 1.206 – “Combined License Applications for Nuclear Power Plants” for the types of information that needs to be included in the interface requirement.
 - Westinghouse agrees to provide interface requirements.

Sources of Debris

- Aluminum
 - The only potential aluminum included in the AP1000 design is the source range detectors and they are encased so as not to come in contact with the coolant during recirculation following a LOCA.
 - Westinghouse has not identified any additional sources of Aluminum and conservatively assumed 53 lbm.
 - The NRC asked what is the basis for the 53 lbm. As discussed, the 53 lbm is based on engineering judgment to accommodate small parts / pieces as we go through the procurement process.
 - Westinghouse is prepared to discuss the basis for the assumed amount of aluminum.

Sources of Debris

- Chemical effects of coatings even though they are not transported as coating debris.
 - What chemicals are leached out of the non-safety coatings as they come into contact with the recirculating coolant?
 - What is the impact of these leached chemicals?
 - Westinghouse's position is that the coatings are consistent with those in operating plants and the NRC has accepted those coatings.

Downstream Testing

- Fuel test
 - The NRC staff stated that they were not willing to accept the test (3" screen simulating a Fuel Assembly) we transmitted to the NRC as being representative of the AP1000 fuel assembly.
 - An additional test has been completed and results provided to the NRC.

Downstream Testing

- Applicability of LOCADM
 - LOCADM is the analysis tool used to assess the impact of debris and chemical effects on fuel heat transfer. The tool accounts for fiber by using “bump-up” factors to the impact of chemical effects on fuel heat transfer to account for the decrease in heat transfer as a result of fiber.
 - With the fiber levels in AP1000 being much less than in current operating plants, justify that these “bump-up” factors are still valid.

Next Steps

- Westinghouse has submitted an additional test report which more accurately reflects a typical fuel assembly (issued to NRC 2/11/09)
- Additional information is available for NRC review.
- A “Focus” meeting should be scheduled with the NRC staff in the upcoming weeks so that the NRC staff’s concerns can be addressed.

