Nuclear Operating Company

South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

April 14, 2010
U7-C-STP-NRC-100081

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Supplemental Response to Request for Additional Information

Reference: Letter, Scott Head to Document Control Desk, "Response to Requests for Additional Information," dated March 30, 2010 (U7-C-STP-NRC-100064)

Attached is a supplemental response to an NRC staff question included in Request for Additional Information (RAI) letter number 395 related to Combined License Application (COLA) Part 2, Tier 2, Appendix 6C. The original response to this RAI was provided in Reference 1. This supplemental response replaces the original response in its entirety and completes the response to NRC letter number 395.

The Attachment provides a supplemental response to the RAI question listed below:

RAI 06.02.02-26

The COLA changes in this response will be implemented at the first routine COLA Update following NRC acceptance of this response.

There are no commitments in this letter.

If you have any questions regarding this response, please contact me at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

D091
NRO

STI 32655168

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 4/14/10

Scott Head
Manager, Regulatory Affairs
South Texas Project Units 3 & 4

jet

Attachment:
RAI 06.02.02-26 Supplement 1

cc: w/o attachment except*
(paper copy)

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RAI 06.02.02-26 Supplement 1

QUESTION:

In RAI 6.2.2-6, the staff requested the applicant to explain how it accounted for miscellaneous debris (equipment tags, tape, and stickers or placards affixed by adhesives). In response, in a letter, dated September 28, 2009, the applicant stated that based on operating experience at STP 1&2 (operating PWR), each strainer will be assumed to have the openings of 2 cassettes blocked by miscellaneous latent debris, e.g., small pieces of plastic, tape, sheets of paper, and health physics low dose sign. Considering that following a LOCA 2 RHR pumps and 1 HPCF pump will be in operation and that each pump has two strainers, the total area of strainers blocked would be equal to 0.74 m^2 (8 ft^2). The staff noted that STP 1&2 have assumed a significantly higher area for miscellaneous latent debris (7.0 m^2 (75 ft^2) being transported to the sump) (GSI-191 Program: GL-04-02 Second Response, dated August 31, 2005).

Justify your basis for assuming 2 cassettes per strainer are blocked by miscellaneous latent debris.

SUPPLEMENTAL RESPONSE:

This supplemental response addresses an NRC comment from a phone call with STPNOC on April 1, 2010. It was requested that STPNOC include a discussion of LOCA-generated miscellaneous debris such as equipment tags, in addition to the latent miscellaneous debris described in this RAI. This supplemental response replaces the original response in its entirety. Changed portions from the original response are identified with revision bars in the margin.

As noted in the question, two filter pockets per strainer, which is approximately a total of 8 ft^2 of strainer area for all strainers, is assumed to be unavailable for the STP 3&4 ECCS pump suction strainers as a result of blockage due to miscellaneous latent debris such as equipment tags, tape, and stickers. This assumption is supported by the results of a suppression pool inspection that was conducted on a Japanese operating ABWR following a two-year operating interval. (There is no record of debris found following the first operating period.) The results of that inspection, which are documented in STPNOC report Number STPTEP-2-023 titled "Report on Task Order for the South Texas Project Units 3&4 ABWR Construction Project", show that a total of approximately 3.2 ft^2 of miscellaneous tape fragments and plastic sheet was found in the suppression pool. Of that total, 2.7 ft^2 was one item. No miscellaneous items were reported in the drywell. Note that the suppression pool cleanup system (SPCU) was operated prior to the refueling outage in which this inspection was made. However, as noted in STP 3&4 COLA FSAR Subsection 6.2.1.7.1.5 in the markup attached to the response to RAI 06.02.02-5 (transmitted via STPNOC Letter No. U7-C-STP-NRC-090141 on September 28, 2009):

> "... a remote visual inspection will be performed of the Residual Heat Removal (RHR), Reactor Core Isolation Cooling (RCIC), and High Pressure Core Flooder (HPCF)

suction strainers and the S/P floor to ensure there is no debris present. This inspection will be focused on the presence of debris in the suction strainers ..... Debris that is identified will be removed and any strainer structure gaps will be assessed and repaired if necessary."

This inspection will be performed prior to startup from each refueling outage.

With regard to LOCA-generated miscellaneous debris, the design of STP 3&4 minimizes the potential for such debris by specifying secure restraints, such as high tensile strength aircraft cable or specially designed bands, to secure equipment ID tags onto components located inside containment.

As a result of this response, the COLA will be revised as shown in the attached markups to FSAR Subsections 6C.3.1.2 and 6C.5.1. These markups replace, in their entirety, the Subsection 6C.3.1.2 markup that was provided in the supplemental response to RAI 04.04-3 (U7-C-STP-NRC-100044 dated February 22, 2010) and the Subsection 6C.5.1 markup that was provided in the supplemental response to RAI 06.02.02-20 (U7-C-STP-NRC-100060 dated March 15, 2010). Changes from COLA Rev. 3 are shown with gray shading. Only the last sentence in Section 6C.3.1.2 is added as compared to the previous submittal markup.

6C.3.1.2 LOCA-Generated Debris

Relative to the generation of debris from a postulated pipe break, the ABWR design contains a number of improvements from earlier BWR designs. The elimination of the recirculation piping removes a significant source of insulation debris from the containment and also reduces the likelihood of a large high energy pipe break, which could lead to debris generation. For the STP 3&4 design, there is no fibrous insulation or calcium silicate on piping systems, including small bore piping, inside the containment. All thermal insulation material is a reflective metallic insulation (RMI) design. RMI breaks up into shards too large to pass through the ECCS suction strainers, which have a maximum 2.1 mm (1/12 inch) hole size. Furthermore, the use of fibrous and calcium silicate materials in the STP 3&4 Primary Containment is prohibited. With regard to LOCA-generated miscellaneous debris, the design of STP 3&4 minimizes the potential for such debris by specifying secure restraints, such as high tensile strength aircraft cable or specially designed bands, to secure equipment ID tags onto components located inside containment.

6C.5.1 ECCS Pump Suction Strainer Sizing Design Basis

The ECCS suction strainer design to be used on STP 3&4, which is described in Subsection 6C.2 and its associated references, is the same as the design for the Reference Japanese ABWR (see References 6C-11, 6C-12 and 6C-13), and the STP

3&4 strainers will have at least the same area as the Reference Japanese ABWR strainers. Application of the Reference Japanese ABWR ECCS suction strainer design to STP 3&4 is conservative for the following reasons:

- The sizing of the Reference Japanese ABWR strainers is based on the methodology defined in the BWROG's Utility Resolution Guideline (URG) (Reference 6C-3).

- The Reference Japanese ABWR primary containment includes fibrous and calcium silicate thermal insulation, both of which are significant contributors to strainer head loss. For STP 3&4, the only type of thermal insulation allowed inside the primary containment is all stainless steel reflective metal insulation (RMI), which results in a much lower head loss across the ECCS suction strainers.

The application of the reference Japanese ABWR strainer head loss analysis to STP 3&4 is less conservative in one area. Subsection 6C.3 and Regulatory Guide 1.82, Rev. 3 state that the head loss calculations are to be performed at pump runout flow rate conditions. For the reference Japanese ABWR, these calculations were performed at design flow rate conditions. Because pump runout flow rate is greater than design flow rate and strainer head loss is proportional to flow rate, a higher suction strainer head loss is calculated at runout flow rate. However, this higher head loss is more than compensated by other changes made by STP 3&4 compared with the reference Japanese ABWR, including the removal of fibrous and calcium silicate insulation materials from the containment. Consequently, the use of the reference Japanese ABWR for the licensing basis for STP 3&4 is conservative. This evaluation is documented in Reference 6C-13.

The expected cleanliness of the ABWR primary containment is supported by operating experience from one of the oldest Japanese ABWRs. Specifically, an inspection at this plant recovered items from the suppression pool, including tape fragments, plastic sheet fragments, and short segments of rope. None of these types of items were reported in the drywell as a result of that inspection, and no such items were reported in either the drywell or suppression pool during the previous inspection, which was performed 2 years earlier. To account for the potential that there might be a few similar items inadvertently left in the primary containment during the life of the plant, it is assumed that 2 filter pockets on each ECCS strainer are completely blocked by miscellaneous latent debris.