Nuclear Operating Company

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

October 25, 2010
U7-C-STP-NRC-100242

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 No. PROJ0772
Responses to Request for Additional Information

Reference: Letter from Tekia Govan to Mark McBurnett, "Request for Additional Information Re: South Texas Project Nuclear Operating Company Topical Report (TR) WCAP-17116-P Revision 0, Supplement 5 – Application to the Advanced Boiling Water Reactor (TAC NO. RG0007)," August 24, 2010 (ML102360520)

Attached are responses NRC staff questions included the reference. The responses to the following RAI questions are provided in Attachments 1, 2, and 3:

RAI-7S01 RAI-15S01 RAI-28S01

There are no commitments in this letter.

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

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

Executed on 10/25/10

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

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Attachments:

1. RAI-7S01
2. RAI-15S01
3. RAI-28S01

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

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RAI-7S01

QUESTION

RAI-7 had requested clarification on whether adequate consideration had been given to a variety of double-ended guillotine and longitudinal split break configurations, as required by Appendix K Section I.C.1.a. In their response as part of U7-C-STP-NRC-100155 STP replied that additional undocumented sensitivity studies of longitudinal split breaks in the main steam line have shown that the predicted behavior is very similar to that of an otherwise equivalent guillotine break. However, one might expect longitudinal split and double-ended guillotine breaks to behave similarly in cases of single-phase steam flow (as assumed by the STP undocumented sensitivity case). If the break location were to contain liquid and gas phases in close proximity, then entrainment of one phase into the other could result in significantly different break flow characteristics (also dependent upon whether the break is in the top, bottom, or side of the pipe). Demonstrate the adequacy of ECCS performance for ABWR in the presence of longitudinal splits in the feedwater line.

SUPPLEMENT RESPONSE

The GOBLIN code is based on a drift flux model and does not explicitly model entrainment. The current model for the feedwater (FW) line break, for example, considers the elevation of the two-phase mixture in the downcomer relative to the FW sparger nozzle elevation. When the mixture level drops below the nozzles, the break flow through the nozzles would transition to steam.

The FW line break analysis does not explicitly model the FW system. Rather, the analysis conservatively examines the reactor pressure vessel (RPV) side of the break, because this side of the break results in a loss of inventory. The break flow from the RPV is limited by the nozzles on the FW sparger until the break size is comparable to the total nozzle flow area. The diameter of each nozzle is approximately 1.75 inches and there are 54 nozzles per sparger, resulting in a total nozzle flow area of 0.9 ft^2 for the 100% break size. With regard to inventory loss from the RPV, the worst case 200% longitudinal split in the FW line would have the same inventory loss as a 100% double-ended guillotine (DEG) break in the FW line. For smaller longitudinal splits in the FW line, the flows from each side of the split would be competing for the flow area of the split. This would result in a reduced flow contribution from the RPV side of the split. Therefore, the longitudinal split is bounded by the DEG break with regard to minimum RPV inventory.

RAI-15S01

QUESTION

The response to item (b) of the RAI-15 states that the flow through the ADS valves is determined by a critical flow model. In order to better understand the modeling of the flow through the ADS, provide the specific critical flow model (e.g., Moody's) used in the LTR analyses. Further, clarify the effect on the stagnation pressure in sub-volumes 9,2 and 13,2 relative to form and friction losses which would reduce the stagnation pressure below the "dome" or "system" pressures shown in WCAP-17116-P. In addition, provide the throat (critical flow) area and any discharge coefficient assumptions that are used in the analyses.

SUPPLEMENT RESPONSE

To determine the flow through the ADS valves in support of the WCAP-17116-P analyses, it was not necessary to perform a hydraulic calculation, which would have required the model description and input parameters being requested in this RAI. Instead, the ADS capacity used in the LOCA analyses in WCAP-17116-P is the total minimum flow capacity for the ADS as defined in ABWR DCD Table 6.3-1.

RAI-28S01

QUESTION

The STP response to RAI-28 clarifies that the 'DRAGON' option was not used for the ABWR LOCA analysis presented in WCAP-17116-P. However, it does not clarify the relevance of this option to future ABWR LOCA analyses. Confirm that the 'DRAGON' option will not be used for any future ABWR LOCA analysis calculations. If it is planned to use DRAGON for any future applications to ABWR, provide a list of example applications, including results of typical calculations.

SUPPLEMENT RESPONSE

The 'DRAGON' option is not planned to be used for any future ABWR LOCA analysis calculation.