STP Nuclear Operating Company
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November 9, 2016
NOC-AE-16002916
10 CFR 50.90

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498 and STN 50-499
Additional Information Regarding Sensitivity Studies for
STPNOC Risk-Informed Pilot GSI-191 Application
(TAC NOS. MF2400 – MF2409)

Reference: Letter; J. Connolly to NRC Document Control Desk, "Supplement 3 to Revised STP Pilot Submittal and Requests for Exemptions and License Amendment for a Risk-Informed Approach to Address Generic Safety Issue (GSI)-191 and Response to Generic Letter (GL) 2004-02 (TAC NOS. MF2400 - MF2409)"; October 20, 2016; (NOC-AE-16003401) (ML16302A015).

In the referenced correspondence, STP Nuclear Operating Company (STPNOC) provided a supplement to the STP Risk-Informed GSI-191 application. Following review of the supplement, the NRC staff requested information regarding sensitivity studies on break orientation and reactor core bypass. The requested information is provided in the Enclosure to this letter.

There are no commitments in this letter.

If there are any questions or if additional information is needed, please contact Drew Richards at (361) 972-7666 or me at (361) 972-7344.

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

Executed on November 9, 2016

James Connolly
James Connolly
Site Vice President

amr/JWC

Enclosure: Additional Information Regarding Sensitivity Studies for STPNOC Risk-Informed Pilot GSI-191 Application

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ENCLOSURE

Additional Information Regarding Sensitivity Studies for STPNOC Risk-Informed Pilot GSI-191 Application

SNPB-3-20 Supplemental Information

Follow-up question 1:

The staff understood that STP would provide the conclusions of the break orientation sensitivity study. The staff needs this to complete its SE.

STP Response:
The RELAP5-3D includes a Stratification Entrainment/Pullthrough model to account for changes in void fractions of the mixture flowing through a break from large horizontal pipes or vessels. This model can be enabled at junctions simulating the break on large pipes (such as cold or hot legs) to account for the break orientation (upward, lateral, and downward orientations).
A sensitivity analysis was performed to investigate the effect of the break orientation on the PCT during the post-core blockage LTCC. From the results of the analysis it was concluded that no significant difference in the PCT was observed between the cases analyzed.
Additional considerations on the break size in comparison with the diameter of the hot leg were made to identify the best configuration for each break size analyzed. In particular, the stratification entrainment/pullthrough model was disabled for 16" break scenario, due to the large size of the break, while a downward oriented break was assumed for smaller breaks (6" and 2") to minimize the enthalpy flowing through the break.

Follow-up question 2:

The staff understood that the bypass sensitivity study would assume a true single worst failure. The staff does not believe the single failure of the ECCS train is the worst failure. Also, the staff believes a top-peaked power shape is necessary and appropriate for this analysis. STP's use of Appendix K decay heat, steam generator tube plugging, and RWST size and temperatures, and sump temperature assumptions appear appropriate.

STP Response:
An additional sensitivity analysis is conducted to investigate the effect of the power shape on the PCT under the condition of core barrel/baffle bypass open during the post-core blockage LTCC. The sensitivity is executed under the same assumptions and conditions applied to the sensitivity B1 described in the answer to SNPB-3-20. The input file is generated from the one used to perform the simulation B1, only changing the core BB bypass (junction 84501) to be open during the post-core blockage LTCC. As describes in the answer to RAI-SNPB-3-3, this configuration is likely to be the most realistic condition.
The simulation conditions of the reference case (B1) and the sensitivity case (B1F) are listed below.

<u>Boundary Conditions and other Assumptions</u>

Reference Case (Sensitivity B1) – Top Skewed, Core BB Blocked

The axial power profile is chosen to represent the STP relative axial power distribution at high full power (HFP), beginning of life (BOL) and equilibrium Xenon.

The core BB bypass is assumed to be blocked at the core blockage time and maintained blocked during the post-core blockage LTCC.

Sensitivity Case (B1F) – Top Skewed, Core BB Bypass Open

The axial power profile is the same of the one adopted in the reference case. The core BB bypass is assumed to remain open during the post-core blockage LTCC.

<u>Simulation Results</u>

No appreciable differences in PCT during the post-core blockage LTCC are found, as shown in Figure 1. Saturation temperature is also included in the figure.

The PCT of the sensitivity case appears smoother than the one simulated under the reference conditions (core bypass blocked).

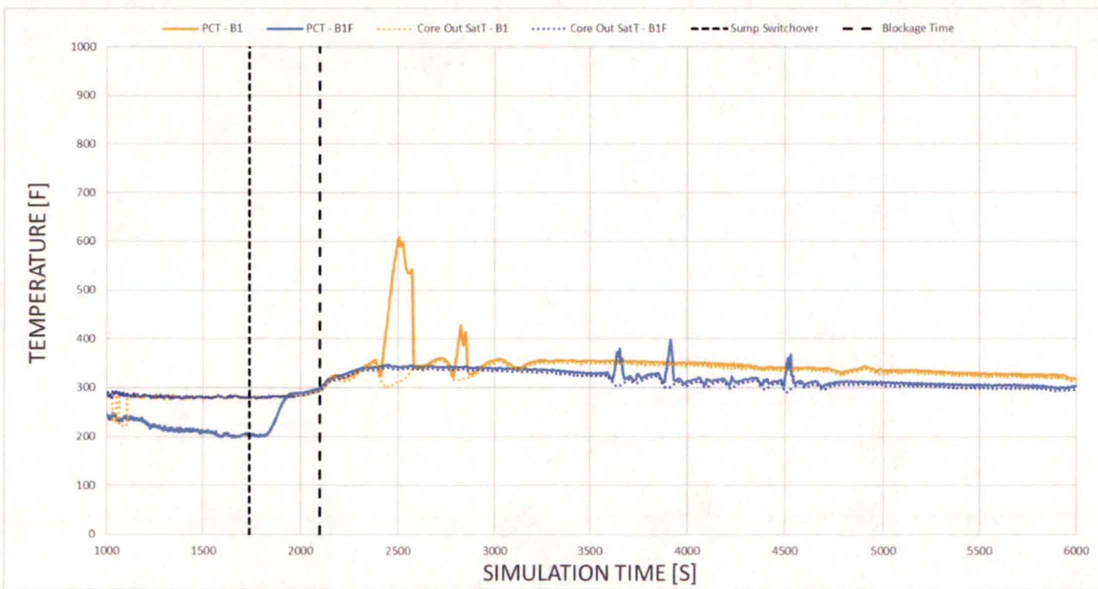

Figure 1. PCT (Reference Case B1; Sensitivity Case B1F)