Nuclear Operating Company

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

August 23, 2011
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File: G25

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2746

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Response to Request for Additional Information for the
South Texas Project License Renewal Application (TAC No. ME4938)

References:
1. STPNOC Letter dated October 25, 2010, from G. T. Powell to NRC Document Control Desk, "License Renewal Application" (NOC-AE-10002607) (ML103010257)
2. NRC letter dated May 31, 2011, "Requests for Additional Information for the Review of the South Texas Project, License Renewal Application" (ML11140A015)
3. STPNOC letter dated July 5, 2011, from G. T. Powell to NRC Document Control desk, "Response to Request for Additional Information for the South Texas Project License Renewal Application" (NOC-AE-11002687) (ML11193A016)
4. Teleconference between the South Texas Project and the NRC, "STP SAMA RAI Response Clarifications," on July 28, 2011.

By Reference 1, STP Nuclear Operating Company (STPNOC) submitted a License Renewal Application (LRA) for South Texas Project (STP) Units 1 and 2. By Reference 2, the NRC staff requested additional information for review of the STP LRA. STP provided a response to the requested additional information in Reference 3. During a teleconference with the Nuclear Regulatory Commission staff on July 28, 2011 (Reference 4), STP agreed to clarify some of the responses provided in Reference 3. The clarification is provided in the Enclosure to this letter.

There are no regulatory commitments in this letter.

Should you have any questions regarding this letter, please contact either Arden Aldridge, STP License Renewal Project Lead, at (361) 972-8243 or Ken Taplett, STP License Renewal Project regulatory point-of-contact, at (361) 972-8416.

A147
NRR

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

Executed on August 23, 2011.
Date

G. T. Powell
Vice President,
Technical Support & Oversight

KJT

Enclosure: Clarification of STPNOC Response to Request for Additional Information

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Clarification of STPNOC Response to Request for Additional Information

SOUTH TEXAS PROJECT
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION
REGARDING THE ANALYSIS OF SEVERE
ACCIDENT MITIGATION ALTERNATIVES

References:
1. STPNOC letter dated July 5, 2011, from G. T. Powell to NRC Document Control desk, "Response to Request for Additional Information for the South Texas Project License Renewal Application", (NOC-AE-11002687) (ML11193A016)
2. Teleconference between the South Texas Project and the NRC, "STP SAMA RAI Response Clarifications," on July 28, 2011.

The STPNOC response to a request for additional information (RAI) for the South Texas Project License Renewal Application is provided in Reference 1. By Reference 2, the Nuclear Regulatory Commission (NRC) staff requested clarification of the STP response to RAI questions designated in Reference 1 as 1.d, 1.f and 6.b. The RAI questions from Reference 1 are repeated below followed by the additional clarification requested in Reference 2.

NRC Requested Information:

1. Provide the following information regarding the Probabilistic Risk Assessment (PRA) used for the Severe Accident Mitigation Alternative (SAMA) analysis:

   d. ER Section F.7.1 states that the CDF of 6.39E-06 per year is a mean value from the RISKMAN Monte Carlo quantification. Confirm that all the CDF and release category frequency values given are also mean values. If so, describe why it appears that the sum of the initiating event contributor's mean values reported in Table F.2-1 equal the mean of the total distribution.

   Additional Clarification Requested:

   The response to this RAI states that a reduced set of sequences was used for the uncertainty analysis and the results scaled so that the mean of the distribution was scaled to match the mean of the CDF point estimate or 6.39E-06 per year. It is unclear how this scaling of the CDF distribution impacts the 95th percentile multiplier of 1.6 used in the uncertainty analysis.

   Provide the mean and 95th percentile CDF from the Monte Carlo distribution and the ratio of this 95th percentile CDF to the point estimate CDF for the reduced set of sequences. If the resulting ratio is greater than 1.6, consider the impact on the SAMA cost benefit analysis provided in the ER and in response to RAIs. Also, confirm that all CDF and release frequency values provided in the ER and in RAI responses are point estimates based on mean basic event values.

STPNOC Response:

The distribution for core damage frequency (CDF) for the reduced set of sequences has a mean of 8.52E-06 per year and a 95th percentile of 1.59E-05 per year. The point estimate CDF for the reduced set of sequences is 5.89E-06 per year. The ratio of the 95th of Monte Carlo CDF distribution to the point estimate is 1.59E-05 divided by 5.89E-06, or 2.70. There are no new cost beneficial SAMAs identified as a result of the revised multiplier. The CDF and release frequency estimates are point estimates based on mean basic event values.

NRC Requested Information:

1. Provide the following information regarding the Probabilistic Risk Assessment (PRA) used for the Severe Accident Mitigation Alternative (SAMA) analysis:

   f. Provide a brief summary of the history of the STP Level 1 PRA that includes for each revision: the date released, the CDF contribution for internal events and each of the external event hazards [i.e., seismic, fire, tornado, and main cooling reservoir (MCR) breach], and the major changes in the revision that led to the change in the CDF, including identification of major changes or updates to the modeling for various initiator groups such as internal flooding, fire, and seismic. Also, identify the STP PRA revision reviewed in the 2002 Westinghouse Owners Group (WOG) peer review.

   Additional Clarification Requested:

   The total CDF for STP_REV4 is given in Table 1-3 of the RAI response as 1.17E-05 per year. Section F.2 of the ER and page 9 of Attachment 1 to STPNOC's 2/28/07 RMTS submittal give the total as 9.08E-06 per year.

   Explain this difference and/or indicate the necessary corrections in the submittals.

STPNOC Response:

The total CDF given in Table 1-3 of the original RAI response is incorrect. The corrected table is provided below.

Table 1-3
STP_REV4 CDF Groupings (events/year)

Total CDF	Internal Events Contribution	External Events Contribution	
9.08E-06	6.60E-06	Fires	1.0E-06
		Floods	1.40E-08
		Flood MCR	2.88E-07
		High Winds (i.e. tornados)	1.1E-06
		Seismic	7.26E-08
		Total External	2.48E-06

NRC Requested Information:

6. Provide the following information with regard to the Phase II cost-benefit evaluations:

   b. ER Section F.6.3, 5th paragraph, explains that the evaluation of SAMA 12 did not consider the condition in which non-condensable gases such as hydrogen are present since this condition is not modeled in the PRA, but that this condition is conservatively treated in the PRA. If this SAMA impacts this condition then the estimated risk reduction is potentially underestimated. Also, this same section of the ER states that SBO sequences were excluded in the modeling of this SAMA because AC power is needed to start a reactor coolant pump (RCP). This also potentially underestimates the risk reduction benefit for this SAMA since it does not appear to include SBO scenarios in which AC power is recovered. Discuss these issues and their impact on the SAMA analysis.

      Additional Clarification Requested:

      The ER discussion of the modeling of SAMA 12 appears to indicate that the only sequences impacted and credited in the cost benefit analysis are those involving leakage from the primary system. The conservative modeling discussed involves hydrogen generation for non-leakage sequences. The response to the RAI states sequences involving this conservative modeling are included in the assessment of the impact of this SAMA. Describe how these conservatively modeled sequences are included in the SAMA evaluation.

STPNOC Response:

The "non-leakage" scenarios that involve hydrogen generation are similar to that which occurred at TMI-2 when both steam generator cooling and high pressure injection were temporarily lost. For the STP Probabilistic Risk Assessment (PRA) models, temporary losses are conservatively treated as complete losses for later times (i.e., the frequency of such sequences is not divided up into sequences with recovery and others without recovery). Unrecovered losses of steam generator cooling lead to reactor coolant system (RCS) pressure increases and eventual RCS leakage. Subsequent failure of feed-and-bleed would lead to a high pressure core damage sequence with the steam generators boiled dry. This unrecovered sequence is used to assess induced steam generator tube rupture. The frequency of sequences that have either temporary or complete interruptions of both steam generator cooling and high pressure injection (regardless whether they involve recovery or not) are subsumed into one conservative representation of the sequence. The sequence is conservative with respect to calculations of induced steam generator tube ruptures because the RCS is at high pressure and the steam generators are not cooled at later times. Hydrogen generation, whether it occurs or not, would not make the assessment of induced tube ruptures, as analyzed in the PRA, more severe.

The stated concern appears to be that scenarios in which HPI/AFW are recovered after the generation of non-condensable gases could result in conditions where the reactor coolant pumps may be started and cause an induced steam generator tube rupture (ISGTR); however, if HPI and/or AFW are recovered, the conditions of concern are eliminated. Recovery of AFW would allow re-fill of the steam generators, which would

preclude ISGTR. Recovery of HPI would cool the core and also preclude an ISGTR. No additional scenarios have been identified for STP that would increase the averted cost-risk calculated for SAMA 12 in the ER. .