April 9, 2002

Mr. William T. Cottle
President and Chief Executive Officer
STP Nuclear Operating Company
South Texas Project Electric
 Generating Station
P. O. Box 289
Wadsworth, TX 77483

SUBJECT: SOUTH TEXAS PROJECT, UNITS 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION REGARDING RISK-INFORMED INSERVICE TESTING PROGRAM (TAC NOS. MB2136 AND MB2137)

Dear Mr. Cottle:

By letter dated May 21, 2001, STP Nuclear Operating Company (STPNOC) submitted information and requested approval of the risk-informed inservice testing (RI-IST) program for pumps and valves for the South Texas Project, Units 1 and 2. The NRC staff is reviewing the request and requires additional information in order to complete its evaluation.

The NRC staff discussed the enclosed request for additional information (RAI) with your staff during a telephone call on February 20, 2001. It was agreed that STPNOC will respond to the RAI in time to permit timely completion of STPNOC's request. If the circumstances result in an unexpected delay in your response, please contact me promptly at (301) 415-1476.

Sincerely,

/RA/

Mohan C. Thadani, Senior Project Manager, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Enclosure: Request for Additional Information

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION

REGARDING RISK-INFORMED INSERVICE TESTING PROGRAM

STP NUCLEAR OPERATING COMPANY

SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION (STP)

DOCKET NOS. 50-498 AND 50-499

1. Section 1.0 of the Engineering Analysis mentions "enhanced common cause failure modeling" (page 1-3). What does this mean [other than as described on page 2-33]? Is it the proposed methodology of dividing the common cause importance value into the individual elements (page 2-11) as opposed to conservatively assuming that a common cause event in the cutsets should have its entire risk significance assigned to all components represented by the event (page 2-26)? How is the potential for inter-system common cause failure addressed by the licensee's categorization process and assessment of the overall change in risk associated with the proposed risk-informed inservice testing (RI-IST) program?

2. Section 2.3.2 of the Engineering Analysis states that "during the RI-IST Working Group meetings, members deterministically addressed the issue of common cause to ensure that the final component categorization adequately considers the effect of common cause failures." How was this done and what specific effect did it have on the categorization of components? How was this different than the Expert Panel's shift in the ranking of 25 check valves based on inclusion of common-cause failure basic events in the risk-assessment worth (RAW) risk metric (page 2-18)?

3. Section 2.0 states that component corrective maintenance evaluations were used to establish a baseline for future monitoring that is needed to compensate for some of the components whose testing requirements are reduced (page 2-1). Please elaborate on what this means (e.g., were they used to establish unavailability thresholds). What specifically will be monitored and how often?

4. Section 2.1.2 of the Engineering Analysis states that "[f]or the high risk significant components that are not within the scope of the current IST program, it is not practicable to perform Code testing." Section 2.3.2.2 states that while a handful of pumps and valves (e.g., main steam dump valves, start-up feedwater pumps) are considered important to the operation of South Texas Project, none of these components have been designated by the RI-IST Working Group as RI-IST high. Section 2.3.2.2 also states that certain fans (33), chillers (6), and dampers (22) are highly risk significant and that while Code testing is not practicable, the components are tested frequently and adequately (page 2-25).

   At San Onofre Generating Station (SONGS), Southern California Edison Company (SCE) stated that they would add additional monitoring and trending to ensure continued availability and operability of the high safety significance (HSS) chillers. In addition, SCE stated that the chillers would be diagnostically tested on a periodic basis. While the specific chiller parameters to be monitored were not identified by the licensee, the staff found that the licensee's plans were acceptable because they would provide reasonable assurance of the operational readiness of the chillers and would ensure timely identification of degradation in chiller performance (i.e., degradation associated with failure modes identified as important in the licensee's probabilistic risk assessment [PRA]). While STP's RI-IST Program Description Summary contains an identical section to that in the SONGS RI-IST Program Description with regard to high-risk PRA components not in the IST program, the description of the treatment STP will provide to these components doesn't meet the acceptance criteria used by the staff to evaluate similar components at SONGS. STP's RI-IST Program Description should include a description of the activities that will: (1) provide reasonable assurance of the operational readiness of the non-Code HSS components, and (2) ensure timely identification of degradation in their performance (i.e., degradation associated with failure modes identified as important in the licensee's PRA).

5. In discussing the qualitative method used to categorize unmodeled components (page 2-7), the Engineering Analysis states: "The qualitative method is consistent with the principle of defense-in-depth because it preserves the distinction between those components that have high relative redundancy and those that have only high relative reliability." What does this mean and how is it accomplished?

6. Section 2.3.1.2 of the Engineering Analysis states that the level of detail of the PRA supports a completely quantitative analysis of the impact of proposed test interval extensions on plant risk. For licensing support system and medium safety significance (MSS) components, did STP use the RI-IST frequency specified in the table attached to the Engineering Analysis to calculate the overall change in core damage frequency (CDF) and large early release frequency (LERF)? Section 2.3.2.4 of the Engineering Analysis (page 2-28) states that "Upon issuance of regulatory acceptance of this relief request, STP plans to implement the RI-IST program evaluated in this document and outlined in Attachments 2 and 3. When the NRC issues its final acceptance of the exemption request, STP will, at that time, implement the program as outlined in the exemption request. However, the remaining components will receive the programmatic treatment described in Attachment 2." This will presumably remove the RI-IST low components from the scope of the licensee's RI-IST program. What is the change in CDF and LERF associated with the revised test strategy for the RI-IST low components? If STP relies on the sensitivity study performed in support of the exemption request (that increased the unavailability of these components simultaneously by a factor of 10), how does STP know that this sensitivity study bounds the potential increase in CDF and LERF?

7. Section 2.3.2 of the Engineering Analysis contains a PRA ranking category of "Medium (Further Evaluation is Required)" (page 2-15). What is the purpose of this category and what components fall into this category? Why isn't one of the RI-IST medium ranking threshold FV<0.005 and RAW between 2 and 100 [as opposed to between 2 and 10]? STP's RAW thresholds are significantly higher than were used in Comanche Peak's and SONGS' RI-IST programs. Does having a RAW threshold greater than 10 or 100 invalidate the adequacy of their (factor of 10 increase in unavailability) sensitivity study? Which IST components had RAW risk metric scores greater than 10 and what was the final ranking for these components?

8. Section 2.3.2 of the Engineering Analysis states that "As a result of the Expert Panel review, the risk ranking for several components was revised to ensure consistency with risk-ranking developed to support the [graded quality assurance] GQA Program." Which components had their ranking adjusted by the expert panel, how were they adjusted, and on what specific basis. Please provide a copy of the RI-IST Working Group decision narrative bases for these components.

9. Section 2.3.2.3 of the Engineering Analysis states that "Components with operational concerns were considered more risk significant by the RI-IST Working Group." Other than the main steam power-operated relief valves (page 2-44), were any other valves elevated by the RI-IST Working Group? Why weren't the main steam dump valves (which have a plan of action to improve their reliability) elevated and included in the RI-IST program (page 2-25)? Please provide a copy of the RI-IST Working Group decision narrative bases for the main steam dump valves.

10. Section 2.3.2.3 of the Engineering Analysis states that "The sensitivity studies performed in support of STP's GQA Program considered <u>most</u> [emphasis added] of the issues addressed by both the ASME Code Case and the NRC-approved RI-IST projects (i.e., TXU's Comanche Peak and SCE's San Onofre Nuclear Generating Station)." Please list which issues or sensitivity studies were not addressed or performed and state why.

11. Section 2.2.1 (page 2-4) and Section 2.3.3.1 (page 2-33) of the Engineering Analysis states that the STP PRA takes into account the fact that the essential cooling water and component cooling water systems are rotated weekly for maintenance activities and therefore, no changes in test frequency or method modeled by the PRA are proposed for these systems. [The test frequency for the CCW pumps is extended from quarterly to once every 54 months as part of the RI-IST Program.] This seems inconsistent with STP's decision not to include compensatory measures that are not regulatory driven (e.g., by technical specifications) (pages 2-30 and 2-34) when assessing the potential change in risk associated with RI-IST program changes. Please clarify this apparent inconsistency.

12. Section 2.3.3.1 of the Engineering Analysis (page 2-35) discusses the direct safety benefits of the proposed RI-IST program at STP. Specifically, it states that "Possibly the most important effect of the proposed RI-IST program will likely be the <u>reliability improvements for RI-IST High components</u> in the IST program, as it is expected that <u>increased attention</u> and <u>reduced manipulation of these components</u> [emphasis added] will improve reliability and decrease unavailability due to human errors." How is it that there will be less manipulation of the RI-IST high components?

13. Section 2.4.1 of the licensee's RI-IST Engineering Analysis discusses STP's component corrective maintenance evaluation. This evaluation included RI-IST Working Group review of operating experience group (OEG) reports and an independent component maintenance history review. "Conclusions about component performance were based on the tested IST function(s) for a given component. That is, if an event involved a failure of a valve to open, but IST tests the reliability of the valve to close (i.e., not to open), then the event was not considered to be an IST failure." How would the results

of STP's performance review changed if all failures were evaluated (i.e., as opposed to just those that resulted in the loss of a safety function tested by the IST program)?

14. Section 2.4.1 of the Engineering Analysis states that "the RI-IST Working Group determined that components classified as Maintenance Rule category (a)(1) should not be eligible for test interval extension until they are no longer in (a)(1). ... In general, should a Maintenance Rule evaluation place a component with an extended IST in category (a)(1), the RI-IST program will test that component at the Code-prescribed frequency until such time that the component's performance history merits removal from (a)(1) status." This commitment should be included in the licensee's RI-IST Program Description Summary.

15. (a) Valve group CV29 should list both reactor coolant pump (RCP) seal water containment isolation motor-operated valves (MOVs) (page 15 of 32).

    (b) The main steam safeties (MS02) should be included on the list of IST valve groups (page 21 of 32).

    (c) Should there be an IST test description for valve group CV31, chemical and volume control system (CVCS) alternate immediate boration manual isolation valve (page 9 of 21)?

16. For valve group SI25, safety injection pump suction check valves, why was the disassembly and inspection test/function ranked high and yet the frequency has been extended from once each refueling outage to once every 54 months?

17. In a safety evaluation dated July 23, 1999, the NRC approved a risk-informed relief request for STP to extend the Code-required leakage rate test for selected condenser cooling water (CCW) and safety injection (SI) system containment isolation check valves (i.e., based on a bounding calculation using STP's ISLOCA analysis). How has the change in LERF associated with this earlier RI-IST program change been considered in assessing the acceptability of the proposed RI-IST program? For the purpose of calculating the overall potential change in risk associated with the RI-IST program changes, why was 30 months used as the current IST frequency for the leakage rate test (e.g., instead of once each refueling outage)? Do any other RI-IST program changes affect STP's interfacing systems loss-of-coolant accident analysis?

18. Why isn't a relief request for valve group CC28 included as part of Attachment 3? These valves were included in relief request RR-56 for Unit 1 and in relief request RR-52 for Unit 2 and approved by the NRC in a safety evaluation dated July 23, 1999 (as indicated above). The other 9 valves in those relief requests were addressed in Attachment 3. The staff acknowledges that failure of the valves in group CC28 would not contribute to a LERF (whereas failure of the other 9 valves could).

19. If a potentially generic problem is identified during a test, will all components in the group in that unit be inspected or tested (reference NRC Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," Position 2 for check valves and Supplement 6 to Generic Letter 89-10, "Safety-Related Motor-Operated

Valve Testing and Surveillance," for motor-operated valves [MOVs])? While Section 7, Corrective Action, of the licensee's RI-IST Program Description Summary will determine whether failures (including IST program failures) are generic and initiate corrective actions for all components in the affected group when the failure has generic implications, it does not specifically require the testing or evaluation of the other components in the group. Such testing or evaluation is particularly important for components in a group whose testing is staggered over an extended interval. Therefore, Section 5.0, Program Implementation of the licensee's RI-IST Program Description Summary should state:

> If a component in a group fails or reveals adverse performance during testing or operations, STPNOC will evaluate the applicability of that information to each component in the group.

20. In discussing the effects of shutdown configurations on component categorization (RI-IST Engineering Analysis, page 2-19) the licensee stated that main steam power-operated relief valves (PORVs, RI-IST group MS03) performed a dominant role in achieving safe shutdown. Therefore, the Working Group indicated this in its narrative basis, and in so doing, they elevated the importance of the PORVs. In the following paragraph, the licensee states that no component groups shifted categories from RI-IST Low or RI-IST medium to RI-IST high based solely on the impact of component failure on achieving or maintaining safe shutdown. Please clarify this apparent inconsistency.

21. Section 3.0, Testing Philosophy of the licensee's RI-IST Program Description Summary for HSS and MSS structures, systems and components (SSCs) should:

    (a) Commit to using either ASME Code Case OMN-1 for MOVs subject to the limitations listed in 10 CFR 50.55a(3)(iii) or to the MOV program that was reviewed and approved by the staff in response to Generic Letters 89-10 and 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Power-Operated Valves."

    (b) Commit to the using either condition monitoring for check valves (i.e., Appendix II of the OM Code, 1995 Edition with the 1996 Addenda subject to the limitations listed in 10 CFR 50.55a(3)(iv)) or to an alternative that will provide the staff with reasonable confidence that adequate component capability (margin) will exist, above that required during design-basis conditions, such that component operating characteristics over time do not result in reaching a point of insufficient margin before the next scheduled test activity [reference, Section 3.1 of Regulatory Guide 1.175, "An Approach for Plant-Specific Risk-Informed Decisionmaking Inservice Testing"].

    (c) Commit to testing at least one pump in each RI-IST medium pump group each refueling outage (as opposed to testing one pump every other refueling outage for a 3-pump group).

22. The testing philosophy for air-operated valves (AOVs) in the the licensee's RI-IST Program Description Summary states that STPNOC has committed to work with the

Joint Owners Group (JOG) for AOVs to develop an enhanced AOV testing program. The JOG AOV "Core Group" has since disbanded. Revision 1 of the JOG AOV Program Document was published December 13, 2000 (reference NEI Project Number 689). The staff notes that the "elements of STPNOC's enhanced AOV testing program" simply lists the major headings from the JOG AOV Program Document (with the exception of Documentation/Data Management). The licensee's RI-IST Program Description Summary should either commit to implement the JOG AOV program or describe its alternative AOV testing program.

23. The licensee's RI-IST AOV program appears to be limited to Category 1 AOVs. Are the licensee's RI-IST medium AOVs considered to be Category 1 AOVs? Provide a list of all Category 1 and 2 AOVs.

Valve

Risk Ranking	AOV Category	RHR Heat Exchanger-CCW Outlet Valves (CC04)
RI-IST High		Reactor Coolant Auxiliary Spray Valve (CV01)
RI-IST Medium		RCS Charging Flow Control Valve (CV13)
RI-IST Medium		RCB Supplementary Purge Supply & Return Outside CIVs (HC02)
RI-IST Medium		

All other AOVs at STP were categorized as RI-IST low and will therefore be excluded from the licensee's RI-IST program.

24. The testing philosophy for AOVs in the licensee's RI-IST Program Description Summary states that: "Design basis evaluations will be performed for AOV Program Category 1 valves." The JOG AOV Program Document classifies AOVs into two categories:

Category 1: AOVs that are safety-related, active, and have high safety significance,

OR

AOVs that are non-safety-related, active, and have high safety-significance.

Category 2: AOVs that are safety-related and active but do not have safety-significance.

AOVs not in Categories 1 or 2 are considered outside the scope of the JOG AOV program, as they were deemed not to be critical to plant safety.

Category 2 AOVs as described above are analogous to RISC-3 SSCs under Option 2 of risk-informing the NRC's regulations. As such, the licensee still needs to have reasonable confidence of functionality of Category 2 AOVs under design-basis conditions throughout their service life. The licensee's RI-IST Program Description Summary should be revised to describe the periodic testing that will be performed on Category 2 AOVs (e.g., reference proposed Final Safety Analysis Report Section 13.7.3.3.5 in support of STP's risk-informed exemption request). For example, STPNOC's test program for Category 2 AOVs should obtain data or information that will allow evaluation of operating characteristics to support STPNOC's determination that these SSCs will remain capable of performing their safety-related functions under design-basis conditions throughout the service life of the SSC.