February 5, 2001

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 - CORRECTION TO THE STAFF SAFETY EVALUATION ASSOCIATED WITH THE SECOND 10-YEAR INTERVAL INSERVICE INSPECTION (ISI) PROGRAM BASED ON RISK-INFORMED ALTERNATIVE APPROACH (RELIEF REQUEST RR-ENG-2-16) (TAC NOS. MA7789 AND MA7790)

Dear Mr. Cottle:

We are writing to correct errors in the staff's safety evaluation (SE), dated September 11, 2000. The SE supported the staff's approval of the STP Nuclear Operating Company's (STPNOC) request (RR-ENG-2-16) for relief from the American Society of Mechanical Engineers (ASME) Code, Section XI ISI requirements for certain Class 1 piping welds. The staff identified errors on pages 3 and 5 of the SE after its September 11, 2000, issuance. The identified errors have been corrected as shown in the enclosure. The revisions to pages 3 and 5 are identified by the bars in the margins. Pages 1 and 9 are also included for completeness. The corrections of the identified errors do not alter the conclusions reached in the staff's original SE.

We regret any inconvenience caused by the errors in the SE. Should you have any questions, please contact me at 301-415-1476.

Sincerely,

/RA by R. A. Gramm Acting for/
Mohan C. Thadani, Senior Project Manager, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Enclosure: Corrections to SE

cc w/encl: See next page

South Texas, Units 1 & 2

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF FROM ASME CODE REQUIREMENTS FOR

SECOND 10-YEAR INSERVICE INSPECTION PROGRAM

BASED ON RISK-INFORMED ALTERNATIVE APPROACH

SOUTH TEXAS PROJECT, UNITS 1 AND 2

SOUTH TEXAS PROJECT NUCLEAR OPERATING COMPANY

DOCKET NOS. 50-498 AND 50-499

1.0 INTRODUCTION

By letter dated December 30, 1999, as supplemented April 17, 2000, the STP Nuclear Operating Company (the licensee) submitted Relief Request RR-ENG-2-16 (Ref. 1). The submittal proposed a risk-informed inservice inspection (RI-ISI) program as an alternative to the current ISI program for a subset of Class 1 piping welds including Categories B-F welds (pressure retaining dissimilar metal welds in vessel nozzle) and non-socket B-J welds (pressure retaining welds in piping). The licensee stated that its RI-ISI program was developed in accordance with the methodology contained in the Electric Power Research Institute (EPRI) report EPRI TR-112657 (Ref. 2), which was previously reviewed and approved by the staff. This relief request by the licensee was made pursuant to 10 CFR 50.55a(a)(3)(i) for the second 10-year ISI interval for South Texas Project (STP), Units 1 and 2.

2.0 BACKGROUND

2.1 Applicable Requirements

Section 50.55a(g) of Title 10 of the *Code of Federal Regulations* (10 CFR), requires that ISI of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (hereafter called ASME Code) and the applicable addenda, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The regulation at 10 CFR 50.55a(a)(3) states in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the proposed alternatives would provide an acceptable level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the

mechanisms and failure modes, and consequence evaluations are to be performed using probabilistic risk assessments (PRAs) to establish piping segment safety ranking for determining new inspection locations.

It should be noted that the licensee, in its submittal, described the inclusion of Category B-F dissimilar metal nozzle welds in its RI-ISI program as a deviation to the EPRI guideline. However, the staff's review and approval of EPRI TR-112657 included application of RI-ISI methodology not only to Category B-J welds, but also to Category B-F welds. The staff also notes that application of the EPRI TR-112657 methodology to B-F welds has been implemented in the RI-ISI programs at ~~Surry Power Station Unit 1 and~~ Arkansas Nuclear One Unit 2. | Therefore, contrary to the licensee's statement in its submittal, the inclusion of B-F welds in the RI-ISI program is not a deviation from the EPRI-TR methodology.

In Table 5-1 of Reference 1, a comparison between the current ISI program and the proposed RI-ISI program is provided for inspection location selection criteria. The staff finds that the information submitted adequately defines the proposed changes to the ISI program.

3.2 Engineering Analysis

In accordance with the guidance provided in RGs 1.174 and 1.178 (Ref. 3 and Ref. 4), the licensee provided the results of an engineering analysis of the proposed changes using a combination of traditional engineering analysis and a PRA. The licensee stated that results of the engineering analysis demonstrate that the proposed changes are consistent with the principles of defense-in-depth and that adequate safety margins will be maintained. The licensee performed an evaluation to determine susceptibility of components (i.e., a weld on a pipe) to a particular degradation mechanism that may be a precursor to leak or rupture, and then performed an independent assessment of the consequence of a failure. The proposed RI-ISI program will result in a reduction of required examination locations from 151 in Unit 1 and 132 in Unit 2 to 59 in each unit.

The licensee stated that for the Class 1 piping at STP, the augmented inspection program implemented during the first inspection interval in response to NRC Bulletin 88-08 regarding thermal fatigue will be subsumed in the RI-ISI program for those components within the scope of the RI-ISI program, since the potential for thermal fatigue is explicitly considered in the application of the EPRI RI-ISI process. The licensee also stated that the existing augmented inspection program for the rest of the Class 1 piping at STP is unaffected by the proposed RI-ISI program. The staff concludes that this approach to the augmented inspection program is consistent with the EPRI TR-112657 guidelines, and therefore, acceptable.

Piping systems within the scope of the RI-ISI program were divided into piping segments. Pipe segments are defined as lengths of pipe whose failure (anywhere within the pipe segment) would lead to the same consequence and which are exposed to the same degradation mechanisms. That is, some lengths of pipe whose failure would lead to the same consequences may be split into two or more segments when two or more regions are exposed to different degradation mechanism. The staff finds this appropriate, and necessary, because the methodology combines separate consequence categories with degradation mechanism categories and therefore the two characteristics should not be mixed within a segment. The

configuration of operating and standby trains in 1996. The licensee also stated that new system analyses and split fractions data for new top events were included in 1994 and are maintained in accordance with the licensee's PRA control program. The licensee addressed the issue of accident management strategies by adopting the Severe Accident Management Guidelines (SAMGs) published in June 1997 and by including SAMGS in the current Level 2 analyses for the current PRA model, STP-1997.

The staff did not review the IPE analysis to assess the accuracy of the quantitative estimates. The staff recognizes that the quantitative results of the IPE are used as order of magnitude estimates for several risk and reliability parameters used to support the assignment of segments into three broad consequence categories. ~~Any~~ Inaccuracies in the models or in assumptions large enough to invalidate the broad categorizations developed to support RI-ISI ~~would~~ should have been identified ~~by the licensee, and also~~ during the staff's review of the IPE and by the licensee's ~~proposed RI-ISI~~ model update control program. Minor errors or inappropriate assumptions will affect only the consequence categorization of a few segments and will not invalidate the general results or conclusions. The staff finds the quality of the licensee's PRA sufficient to support the proposed RI-ISI program.

The degradation category and the consequence category were combined according to the approved methodology described in the EPRI TR-112657 to categorize the risk significance of each segment. The risk significance of each segment is used to determine the number of weld inspections required in each segment.

The licensee proposes to reduce the number of welds to be examined for ASME Code, Section XI, category B-F and B-J welds from 151 welds to 59 welds (from 26 percent to 10 percent) for Unit 1, and from 132 welds to 59 welds (from 24 percent to 10.6 percent) for Unit 2, and to change the location of some of the ASME Code, Section XI weld inspections. The licensee conducted a bounding analysis to estimate the change in risk expected from replacing the current ISI program with the RI-ISI program. The calculations estimated the change in risk due to removing locations and adding locations to the inspection program. For high consequence category segments, the licensee used the conditional core damage probability (CCDP) based on the highest evaluated CCDP. For medium and low consequence category segments, bounding estimates of CCDP were used. The licensee estimated the change in risk using bounding failure rates from the EPRI methodology. The licensee performed its bounding analysis with and without taking credit for an increased probability of detection (POD). The results of the analysis for Units 1 and 2, shown below, indicate that even without credit for improved POD, the estimates are less than the EPRI methodology guideline values.

	ΔCDF using EPRI TR-112657 piping failure frequency	
	No Improved POD	**Improved POD**
Unit 1	8.76E-08	-1.06E-07
Unit 2	7.62E-08	-1.11E-07

quality and safety. This safety evaluation authorizes implementation of the proposed RI-ISI program for the second 10-year ISI interval, which begins at STP Units 1 and 2 on September 25, 2000, and October 19, 2000, respectively.

5.0 REFERENCES

1. Letter, dated December 30, 1999, as supplemented April 17, 2000, T. J. Jordan (South Texas Project, Units 1 and 2, Manager, Systems Engineering), to U.S. Nuclear Regulatory Commission, containing *Risk-Informed Inservice Inspection Program Plan - South Texas Project Units 1 and 2*.

2. EPRI TR-112657, Revision B, *Revised Risk-Informed Inservice Inspection Evaluation Procedure*, July 29, 1999 (ACN 9908120170). NRC staff safety evaluation on EPRI TR-112657, Revision B, is dated October 28, 1999 (ADAMS ML993190477).

3. NRC Regulatory Guide 1.174, *An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis*, July 1998.

4. NRC Regulatory Guide 1.178, *An Approach for Plant-Specific Risk-Informed Decisionmaking: Inservice Inspection of Piping*, September 1998.

5. NRC NUREG-0800, Chapter 3.9.8, *Standard Review Plan for Trial Use for the Review of Risk-Informed Inservice Inspection of Piping*, September 1998.

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Date: September 11, 2000

February 5, 2001

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Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Enclosure: Correction to safety evaluation

cc w/encl: See next page

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* See previous concurrence
** No legal objection

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