



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

December 12, 2006  
NOC-AE-06002094  
File No.: G25  
10 CFR 50.55a

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
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South Texas Project  
Unit 1  
Docket No. STN 50-498  
Results of Reactor Head Penetration Inspection  
Pursuant to Revision 1 of Order EA-03-009

Pursuant to Revision 1 of NRC Order EA-03-009, STP Nuclear Operating Company (STPNOC) provides the results of volumetric examinations of the South Texas Project Unit 1 reactor pressure vessel head penetrations. The revised Order requires that, within 60 days after returning a unit to operation, licensees provide a description of the inspection performed in accordance with the Order. The inspection was performed during South Texas Project Unit 1 refueling outage 1RE13; the unit was returned to operation on November 4, 2006.

The Order requires the following inspections:

- A bare metal visual examination every third refueling outage or five years, whichever is shorter;
- A non-visual, non-destructive examination (NDE) prior to February 11, 2008; and
- A visual inspection to identify boric acid leak paths during every refueling outage.

A bare metal visual examination of the Unit 1 reactor vessel head was most recently performed during the Spring 2003 refueling outage (1RE11). The results were reported to the NRC by correspondence dated August 18, 2003 (accession number ML032330260). The inspections in 1RE13 addressed the NDE requirement and the visual examination for boric acid leaks; the results are reported here.

Non-visual nondestructive volumetric examination was performed on all 76 reactor head penetration tubes with J-groove welds, including the head vent penetration and the degas penetration. The examination detected no discontinuities or indications of boric acid leak paths, and no flaws needing disposition or corrective action were identified. In addition, a visual inspection to identify potential boric acid leaks from the pressure-retaining components above the reactor pressure vessel head found no indications. Details are provided in the attachment.

A list of commitments is provided as an attachment to this letter.

If there are any questions, please contact either Philip L. Walker at (361) 972-8392 or me at (361) 972-7867.



David W. Rencurrel  
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PLW

- Attachment: 1. Response to NRC Order EA-03-009 for South Texas Project Unit 1 – 1RE13 Examination Results
2. List of Commitments

cc:  
(paper copy)

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**South Texas Project  
Unit 1  
Response to NRC Order EA-03-009 for South Texas Project Unit 1 –  
1RE13 Examination Results**

Pursuant to Revision 1 of NRC Order EA-03-009, STP Nuclear Operating Company (STPNOC) calculated the susceptibility of the South Texas Project (STP) Unit 1 reactor pressure vessel head to pressurized water stress corrosion cracking (PWSCC), as represented by effective degradation years (EDY) at the end of each operating cycle. Unit 1 was determined to have an EDY of 6.9 EDY when the 1RE13 refueling outage began in October 2006. The Order Inspection Category, determined in accordance with Section IV.A, is "low." Therefore, STPNOC was required to perform an inspection in accordance with NRC Order EA-03-009, Sections IV.C(5)(b)(i) and IV.D.

**Requirements**

Section IV.C(5)(b)(i) requires ultrasonic testing of the reactor head penetration nozzle volume from two inches above the highest point of the root of the J-groove weld to one inch below the lowest point of the toe of the J-groove weld, including all penetration nozzle surfaces below the J-groove weld having an operating stress level of 20 ksi or greater. The Order also requires an assessment to determine if there has been leakage into the annulus between the head penetration nozzle and the head low-alloy steel.

**Examination Parameters**

During 1RE13, STPNOC performed a non-visual nondestructive volumetric examination of the reactor head penetration tubes in compliance with Section IV.C.(5)(b)(i) of Revision 1 of the Order. Of the 79 penetrations present, 75 were examined from the underside of the reactor vessel head using ultrasonic test equipment maneuvered into place using a remote positioning manipulator. One penetration was examined using both automated ultrasonic testing and manual eddy current testing. Three penetrations were not included because they were not attached to the head with "J-groove" welds.

**Examination Results**

The affected penetrations were scanned starting from the taper-to-cylinder transition at the bottom of each nozzle up to at least two inches above the highest point of the J-groove weld. STPNOC performed an analysis which supports limiting the examination zone to 1-inch below the lowest point of each J-groove weld. UT coverage of most of the penetrations with J-groove welds addressed at least the specified one inch. However, one Control Rod Drive Mechanism penetration had examination coverage less than one inch because the penetration length only allowed examination to 0.73-inch below the weld toe. With the exception of the degas penetration nozzle, an inside diameter chamfer on the end of each nozzle precludes coverage to the very end of the nozzle below the J-groove weld. The de-gas penetration was found to have an unchamfered extension leading 0.67-inch below the lowest point of the J-groove weld. Because it was unchamfered, scanning coverage extended to the end of the degas penetration nozzle. No recordable indications were found. Please note that the one penetration that received less coverage than required by the NRC Order will be addressed in a relaxation request to the NRC in a separate submittal consistent with the schedule requirements of the Order.

The head vent line was examined with both ultrasonic testing (UT) and eddy current testing (ET) to satisfy the requirements of the Order. The vent line penetration was scanned starting from

the taper-to-cylinder transition at the bottom of the weld to at least two inches above the highest point of the J-groove weld. The vent line is flush with the inside contour of the head and the chamfer on the corner of the vent prevents full coverage to the very end of the nozzle. Consequently, the configuration of the weld at the base of the vent line is not suitable for examination by UT. The J-groove weld surface was examined using ET. No recordable indications were found using either method.

The examinations detected no discontinuities or indications of boric acid leak paths.

### List of Commitments

The following table identifies the actions in this document to which the STP Nuclear Operating Company has committed. Statements in this submittal with the exception of those in the table below are provided for information purposes and are not considered commitments. Please direct questions regarding these commitments to Philip Walker at (361) 972-8392.

<b>Commitment</b>	<b>Expected Completion Date</b>	<b>CR Action No.</b>
The one penetration that received less coverage than required by the NRC Order will be addressed in a relaxation request to the NRC in a separate submittal consistent with the schedule requirements of the Order.	12/31/2007	05-15733-20