



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

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U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
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South Texas Project  
Units 1 and 2  
Docket No. STN 50-498, STN 50-499  
Inspection and Mitigation of Alloy 82/182 Pressurizer Butt Welds - Revised

Reference: Letter, David W. Rencurrel to Document Control Desk, "Inspection and Mitigation of Alloy 82/182 Pressurizer Butt Welds," dated January 30, 2007 (NOC-AE-06002099)

In October 2006, while performing inspections of pressurizer Alloy 82/182 butt welds in accordance with MRP-139, a PWR licensee discovered several circumferential indications in the pressurizer surge, safety, and relief nozzles. Because of the potential importance of this issue, STP Nuclear Operating Company (STPNOC) commits to the following actions taken or planned at the South Texas Project (STP) for inspecting or mitigating Alloy 82/182 butt welds on pressurizer spray, surge, safety, and relief lines.

Pursuant to a request by the NRC staff, STPNOC submits this letter superseding the referenced correspondence and associated actions. Text changes from the preceding correspondence in the following discussion are identified by change bars in the margin.

**Inspection/Mitigation Schedule**

Unit 1

The affected Alloy 82/182 butt weld in the STP Unit 1 pressurizer surge line has been mitigated and inspected. Details concerning the mitigated location are provided in the attached Table 1. Results of completed inspections are attached as Table 3. Remaining STP Unit 1 pressurizer nozzle butt weld mitigation activities will be completed after December 31, 2007, during the Spring 2008 refueling outage. This scheduled date is acceptable as justified below. Inspection of the remaining pressurizer butt welds at STP Unit 1 will be performed in accordance with industry guidance (MRP-139).

Unit 2

Inspection of pressurizer Alloy 82/182 butt welds at STP Unit 2 in accordance with industry guidance (MRP-139) has not yet been completed. STPNOC intends to complete all of the mitigation and inspection activities on these locations in refueling outage 2RE12 (Spring 2007). Details concerning STP Unit 2 inspection and mitigation activities are provided in the attached Table 2. Results of completed inspections are attached as Table 4. The inspection of pressurizer butt welds at STP Unit 2 will be performed in accordance with industry guidance (MRP-139).

### **Reporting**

Within 60 days of unit restart, STPNOC will report the details of the inspection results of any unmitigated pressurizer nozzle Alloy 82/182 weld examination and any corrective or mitigative actions taken.

Results of bare metal visual (BMV) examinations of pressurizer Alloy 82/182 butt weld locations performed at power will be reported to the NRC within 60 days of the inspection.

### **Previous Inspection Results**

The results of previous inspections of pressurizer butt welds at STP Units 1 and 2 are provided in Tables 3 and 4, respectively. There have been no relevant indications.

### **Monitoring Program**

Until mitigation is complete, STPNOC will monitor Unit 1 and Unit 2 for leakage on a daily basis when the unit is in mode 1, 2, or 3.

### **Action Levels and Responses to Action Levels Exceeded**

Action levels and responses as described below will be implemented for Unit 1 and for Unit 2 beginning March 1, 2007, until mitigation for that unit is complete.

#### **Action level for day-to-day changes:**

0.1 gpm increase from one day to the next, sustained for 72 hours with at least 0.1 gpm not confirmed from sources other than the pressurizer nozzle welds.

Identification of the 0.1 gpm leak increase starts the 72-hour action clock. The clock continues until either: 1) the leak rate increase is reduced below 0.1 gpm; or 2) the increase in leakage is found to originate from other than the pressurizer nozzle welds.

#### **Action level for changes relative to a baseline:**

0.25 gpm above a baseline sustained for 72 hours with 0.25 gpm not confirmed from sources other than the pressurizer nozzle welds

The baseline is to be established using historical data collected within seven days after achieving 100% power after plant startup from the most recent bare metal visual inspection of the welds.

#### **Response to action level exceeded:**

Once the 72-hour evaluation period is complete and the leak rate is still elevated, place the unit in Mode 3 within 6 hours and Mode 5 within the next 36 hours, and perform a bare metal visual inspection of unmitigated pressurizer surge line, spray, safety, and relief nozzle butt welds and safe-end butt welds containing Alloy 82/182 material.

A bare metal visual examination is to be performed if evidence of leakage from a source other than the pressurizer is identified but the leak rate from that source can not be quantified. If the leakage from the other source can be quantified, and leakage is below the action levels, the unit can be returned to Mode 1 and a BMV examination is not required.

### **Advanced Non-Linear Finite Element Analysis**

Additional refined crack growth calculations of the limiting pressurizer nozzle Alloy 82/182 weld configuration are being developed using three-dimensional finite element analysis as described in correspondence from Marvin D. Fertel, Nuclear Energy Institute, to Luis A. Reyes, Executive Director of Operations, NRC, dated January 26, 2007. Modeling a changing crack shape, rather than a semi-elliptical flaw shape, is expected to result in a significant increase in the estimated

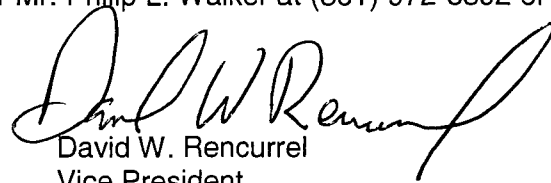
time between through-wall penetration and rupture for the limiting case nozzle. The status of this effort will be provided by May 31, 2007.

**Contingency Planning**

STPNOC will adopt contingency plans to shut down by December 31, 2007, if technical information being developed by MRP through advanced finite element analyses does not provide reasonable assurance to the NRC that PWSCC crack conditions will remain stable and not lead to rupture without significant time from the onset of detectable leakage.

Commitments made in this letter are listed in attachment 5. Changes to any of the information contained in this letter will be provided to the NRC for review prior to making a formal revision.

STPNOC staff is available to meet with the NRC to discuss any of the information in this letter. If there are any questions, please contact either Mr. Philip L. Walker at (361) 972-8392 or me at (361) 972-7867.



David W. Rencurrel  
Vice President,  
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PLW

- Attachment:
1. Table 1, South Texas Project Unit 1 Inspection and Mitigation Summary for Alloy 600/82/182 Pressurizer Butt Welds
  2. Table 2, South Texas Project Unit 2 Inspection and Mitigation Summary for Alloy 600/82/182 Pressurizer Butt Welds
  3. Table 3, South Texas Project Unit 1 Previous Inspection Results
  4. Table 4, South Texas Project Unit 2 Previous Inspection Results
  5. List of Commitments

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**Table 1: South Texas Project Unit 1  
 Inspection and Mitigation Summary for Alloy 600/82/182 Pressurizer Butt Welds**

Nozzle		MRP-139 Volumetric Inspection Requirement Met or to be Met		Mitigation Completed or to be Completed	Comments
Function / Designation	Susceptible Material Description	Outage Designation	Start Date (MM/YYYY)	Outage Designation	
Spray / RC1003BB	<i>Nozzle-to-safe end weld</i>	1RE14	04/2008	To be completed 1RE14	Mitigate by Full Structural Weld Overlay and inspect. This outage will occur after 12/31/2007.
Surge / RC1412NSS		1RE13	10/2006	Completed 1RE13	Mitigated by Full Structural Weld Overlay and inspected. Mitigation is complete.*
Safety / RC1004NSS		1RE14	04/2008	To be completed 1RE14	Mitigate by Full Structural Weld Overlay and inspect. This outage will occur after 12/31/2007.
Safety / RC1009NSS		1RE14	04/2008	To be completed 1RE14	Mitigate by Full Structural Weld Overlay and inspect. This outage will occur after 12/31/2007.
Safety / RC1012NSS		1RE14	04/2008	To be completed 1RE14	Mitigate by Full Structural Weld Overlay and inspect. This outage will occur after 12/31/2007.
Relief / RC1015NSS		1RE14	04/2008	To be completed 1RE14	Mitigate by Full Structural Weld Overlay and inspect. This outage will occur after 12/31/2007.

\* STPNOC completed the ultrasonic examination for the STP Unit 1 pressurizer surge nozzle weld overlay on October 24, 2006. No relevant indications were found. Two non-relevant indications were detected that were found to be acceptable per the standards of ASME Section XI, IWB-3514-2 and/or IWB-3514-3 criteria for their respective size and position. These indications are laminar-type flaws located in the first weld layer at the base metal interface. No repairs to the overlay material and/or base metal were required or performed. The results were submitted to the NRC November 1, 2006 (ML063170071).

**Table 2: South Texas Project Unit 2  
 Inspection and Mitigation Summary for Alloy 600/82/182 Pressurizer Butt Welds**

Nozzle		MRP-139 Volumetric Inspection Requirement Met or to be Met		Mitigation Completed or to be Completed	Comments
Function / Designation	Susceptible Material Description	Outage Designation	Start Date (MM/YYYY)	Outage Designation	
Spray / RC2003BB	<i>Nozzle-to-safe end weld</i>	2RE12	04/2007	To be completed 2RE12	Mitigate by Full Structural Weld Overlay and inspect
Surge / RC2412NSS		2RE12	04/2007	To be completed 2RE12	Mitigate by Full Structural Weld Overlay and inspect
Safety / RC2004NSS		2RE12	04/2007	To be completed 2RE12	Mitigate by Full Structural Weld Overlay and inspect
Safety / RC2009NSS		2RE12	04/2007	To be completed 2RE12	Mitigate by Full Structural Weld Overlay and inspect
Safety / RC2012NSS		2RE12	04/2007	To be completed 2RE12	Mitigate by Full Structural Weld Overlay and inspect
Relief / RC2015NSS		2RE12	04/2007	To be completed 2RE12	Mitigate by Full Structural Weld Overlay and inspect

**Table 3: South Texas Project Unit 1 Previous Inspection Results**

Nozzle	Refueling Outage	Inspection Type(s)	Inspection Results
Spray / RC1003BB	Spring 1995 Spring 2005 Fall 2006	UT & PT VT-1 & BMV VT-1 & BMV	No relevant Indications
Surge / RC1412NSS	Spring 1991 Spring 2005 Fall 2006	UT & PT VT-1 & BMV VT-1 & BMV	No relevant Indications
Safety / RC1004NSS	Fall 1989 Spring 2005 Fall 2006	UT & PT VT-1 & BMV VT-1, BMV & PT	No relevant Indications
Safety / RC1009NSS	Fall 1992 Spring 2005 Fall 2006	UT & PT VT-1 & BMV VT-1 & BMV	No relevant Indications
Safety / 6RC1012NSS	Fall 1992 Spring 2005 Fall 2006	UT & PT VT-1 & BMV VT-1 & BMV	No relevant Indications
Relief / 6RC1015NSS	Fall 1989 Spring 2005 Fall 2006	UT & PT VT-1 & BMV VT-1 & BMV	No relevant Indications

**Table 4: South Texas Project Unit 2 Previous Inspection Results**

Nozzle	Refueling Outage	Inspection Type(s)	Inspection Results
Spray / RC2003BB	Spring 1997 Spring 2004 Fall 2005	UT & PT VT-1 & BMV VT-1 & BMV	No relevant Indications
Surge / RC2412NSS	Spring 1997 Fall 2005	UT & PT VT-1 & BMV	No relevant Indications
Safety / RC2004NSS	Fall 1990 Spring 2004 Fall 2005	UT & PT VT-1 & BMV VT-1, BMV	No relevant Indications
Safety / RC2009NSS	Fall 1995 Spring 2004 Fall 2005	UT & PT VT-1 & BMV VT-1 & BMV	No relevant Indications
Safety / 6RC2012NSS	Fall 1995 Spring 2004 Fall 2005	UT & PT VT-1 & BMV VT-1 & BMV	No relevant Indications
Relief / 6RC2015NSS	Fall 2002 Spring 2004 Fall 2005	UT & PT VT-1 & BMV VT-1 & BMV	No relevant Indications



### 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.

Commitment	CR Action	Expected Completion
The inspection of the remaining pressurizer butt welds at STP Unit 1 will be performed in accordance with industry guidance (MRP-139).	07-2473-7	04/21/2008
The inspection of pressurizer butt welds at STP Unit 2 will be performed in accordance with industry guidance (MRP-139).	07-2473-8	04/27/2007
Within 60 days of unit restart, STPNOC will report the details of the inspection results of any unmitigated pressurizer nozzle Alloy 82/182 weld examination and any corrective or mitigative actions taken. (Unit 1)	07-2473-9	06/20/2008
Within 60 days of unit restart, STPNOC will report the details of the inspection results of any unmitigated pressurizer nozzle Alloy 82/182 weld examination and any corrective or mitigative actions taken. (Unit 2)	07-2473-17	06/26/2007
Results of bare metal visual (BMV) examinations of pressurizer Alloy 82/182 butt weld locations performed at power will be reported to the NRC within 60 days of the inspection. (Unit 1)	07-2473-18	06/20/2008
Results of bare metal visual (BMV) examinations of pressurizer Alloy 82/182 butt weld locations performed at power will be reported to the NRC within 60 days of the inspection. (Unit 2)	07-2473-19	06/26/2007
The results of inspections or mitigation of pressurizer Alloy 82/182 butt weld locations will be reported to the NRC within 60 days of startup from the outage in which they were performed. (Unit 1)	07-2473-10	06/20/2008
The results of inspections or mitigation of pressurizer Alloy 82/182 butt weld locations will be reported to the NRC within 60 days of startup from the outage in which they were performed. (Unit 2)	07-2473-20	06/26/2007
Remaining STP Unit 1 pressurizer nozzle butt weld mitigation activities will be completed after December 31, 2007, during the Spring 2008 refueling outage.	07-2473-11	04/21/2008
Until mitigation is complete, STPNOC will monitor Unit 1 and Unit 2 for leakage on a daily basis when the unit is in mode 1, 2, or 3. Action levels and responses as described in the letter to which these commitments are attached will be implemented for Unit 1 and Unit 2 beginning March 1, 2007, until mitigation for that unit is complete.	07-2473-12	03/01/2007

Additional refined crack growth calculations of the limiting pressurizer nozzle Alloy 82/182 weld configuration are being developed using three-dimensional finite element analysis. The status of this effort will be provided by May 31, 2007.	07-2473-14	05/31/2007
STPNOC will adopt contingency plans to shut down by December 31, 2007, if technical information being developed by MRP through advanced finite element analyses does not provide reasonable assurance to the NRC that PWSCC crack conditions will remain stable and not lead to rupture without significant time from the onset of detectable leakage.	07-2473-15	12/31/2007
Changes to any of the information contained in this letter will be provided to the NRC for review prior to making a formal revision.	07-2473-16	04/21/2008