



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

April 5, 2005  
NOC-AE-05001865  
10CFR50.73

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

South Texas Project  
Unit 2  
Docket No. STN 50-499  
Licensee Event Report 2005-01

Unit 2 Shutdown Due to Reactor Coolant System Pressure Boundary Leak

Pursuant to 10CFR50.73(a)(2)(i)(A) and 10CFR50.73(a)(2)(ii)(A), the South Texas Project submits the attached Licensee Event Report 2005-01 regarding a shutdown of STP Unit 2 due to a Reactor Coolant System Pressure Boundary Leak.

This event did not have an adverse effect on the health and safety of the public.

There are no commitments contained in this event report. Corrective actions will be handled in accordance with the STP Corrective Action Program.

If there are any questions on this submittal, please contact S. M. Head at (361) 972-7136 or me at (361) 972-7800.

A handwritten signature in black ink, appearing to read "Gary Parkey".

Gary Parkey  
Vice President, Generation  
and Plant General Manager

awh/

Attachment: LER 2005-01

Handwritten initials "IE22" in black ink.

cc:

(paper copy)

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Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [infocollects@nrc.gov](mailto:infocollects@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

# LICENSEE EVENT REPORT (LER)

| 1. FACILITY NAME           | 2. DOCKET | 6. LER NUMBER |                      |                    | 3. PAGE |
|----------------------------|-----------|---------------|----------------------|--------------------|---------|
| South Texas Project Unit 2 | 05000 499 | YEAR          | SEQUENTIAL<br>NUMBER | REVISION<br>NUMBER | 2 OF 4  |
|                            |           | 2005          | 01                   | 00                 |         |

## I. DESCRIPTION OF REPORTABLE EVENT

### A. REPORTABLE EVENT CLASSIFICATION

This event is reportable in accordance with 10CFR50.73(a)(2)(i)(A) as completion of a shutdown required by the Technical Specifications and in accordance with 10CFR50.73(a)(2)(ii)(A) as serious degradation of a principal safety barrier .

### B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

South Texas Project Unit 2 was in Mode 1 operating at 100% power.

### C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

N/A

### D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES

On 1/28/05 Unit 2 Radiation Transmitter (RT) 8011 particulate channel indicated an increase in activity from 1.1 E-9 to a final value of approximately 1.6 E-9 microcuries per milliliter. On 2/2/05 a second step increase was noted on the RT-8011 particulate channel to a final value of approximately 2.2 E-9. A Condition Report was written and an inspection plan was developed to find the source of the increasing trend on the RT-8011 particulate channel. A robotic camera inspection inside the bioshield revealed a small steam plume near Steam Generator (SG) 2A on 2/8/05. This area contained a 3/4" vent line attached to a 12" Safety Injection (SI) line that connects to the Reactor Coolant System (RCS) Loop 2A cold leg. On 2/9/05 it was determined that the steam plume was coming from the inlet side of RC-0127 which is the first vent valve off of the SI line. Due to the fact that this was an unisolable RCS pressure boundary leak, Unit 2 was shutdown to Mode 5 on 2/9/05 to comply with Technical Specification 3.4.6.2.

A root cause team was assembled to determine the preliminary cause of the RCS pressure boundary leak and to determine the extent of condition. It was determined that the crack initiated on the inside of the RC-0127 fillet weld at a weld flaw (lack of fusion) and propagated to the surface of the weld due to High Cycle Fatigue (HCF).

### E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE, OR PROCEDURAL OR PERSONNEL ERROR

Following investigation into an increasing containment atmosphere particulate radiation monitor trend, primary leakage (steam plume) was discovered coming from a 3/4 inch vent line off of the "A" Cold Leg Safety Injection line. The leak was determined to be unisolable Reactor Coolant System Pressure Boundary leakage.

Destructive testing performed on the weld showed the through-wall leak was from a crack that originated from the interior of the weld at the weld root.

## II. COMPONENT OR SYSTEM FAILURES

### A. FAILURE MODE, MECHANISM, AND EFFECTS OF EACH FAILED COMPONENT

The failure mode was a through-wall leak at the socket weld to 3/4 " vent valve RC-0127.

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**B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE**

The crack initiated at the root of the RC-0127 inlet weld due to lack of fusion which was found on about 120 degrees of the weld root. High Cycle Fatigue (HCF) propagated the crack through the weld.

**C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS**

N/A

**D. FAILED COMPONENT INFORMATION**

The fillet weld with the crack at the inlet of RC-0127 is a stainless steel (ER308L weld material) ASME Class 2 socket weld joint.

**III. ANALYSIS OF THE EVENT**

**A. SAFETY SYSTEM RESPONSES THAT OCCURRED**

N/A

**B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY**

The RC-0127 leak did not result in any safety system not being capable of performing its design basis function.

**C. SAFETY CONSEQUENCES AND IMPLICATIONS**

This event did not adversely affect the safety of the public or station personnel. There was no release of radiation as a result of this incident.

The RC-0127 leak did not initiate a plant transient condition and would not have prevented the mitigation of an initiating event. Therefore, the RC-0127 socket weld leak did not change the core damage frequency or large early release frequency.

**IV. CAUSE OF THE EVENT**

The cause of the pressure boundary leak was a crack that initiated on the inside of the RC-0127 fillet weld at a weld flaw and propagated to the surface of the weld due to High Cycle Fatigue (HCF).

**V. CORRECTIVE ACTIONS**

1. The Unit 2 vent line containing RC-0127 and RC-0145 was removed and replaced with a welded plug.
2. Vibration measurements were taken on the Loop 'B' vent line (line most similar to the leaking line that was removed) prior to the Unit 2 restart to ensure that they meet acceptance criteria.
3. Vibration measurements of susceptible lines will be taken at the start of the Unit 2 Fall 2005 refueling outage to identify any further extent of condition.
4. Vibration measurements of susceptible lines were taken at the start of the Unit 1 Spring 2005 refueling outage. Two vent lines are scheduled to be removed during the outage, including the Unit 1 RC-0127/0145 vent.

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|                            |           | 2005          | 01                   | 00                 |         |    |   |

**VI. PREVIOUS SIMILAR EVENTS**

There have been no similar events at STP within the last 3 years.

**VII. ADDITIONAL INFORMATION**

STPNOC also plans to establish a fatigue monitoring program for small bore piping that is capable of identifying the specific components and locations that are susceptible to fatigue cracking and implementing measures for monitoring and correcting fatigue cracks.