Nuclear Operating Company

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

July 19, 2010
NOC-AE-10002574
File No.: G25
10 CFR 50.73

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

South Texas Project
Unit 2
Docket No. STN 50-499
Licensee Event Report 2-2010-003: Containment Purge in Operation
When Not Permitted By Technical Specifications

Pursuant to 10 CFR 50.73, the STP Nuclear Operating Company (STPNOC) submits the attached Unit 2 Licensee Event Report (LER) 2-2010-003 to address an incident in which supplemental containment purge was initiated contrary to Technical Specification requirements. This condition is considered reportable under 10 CFR 50.73(a)(2)(i)(B) as a condition not allowed by Technical Specifications.

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

There are no commitments contained in this LER. The STP Corrective Action Program controls processing of corrective actions.

If there are any questions on this submittal, please contact either P. L. Walker at (361) 972-8392 or me at (361) 972-7158.

L. W. Peter
Plant General Manager

PLW
Attachment: LER 2-2010-003: Containment Purge in Operation When Not Permitted By Technical Specifications

STI: 32703369

IE22
NRR

cc:
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NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 80 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, 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)

(See reverse for required number of digits/characters for each block)

| 1. FACILITY NAME | 2. DOCKET NUMBER | 3. PAGE |
|---|---|---|
| South Texas Unit 2 | 05000499 | 1 OF 5 |

**4. TITLE**

Containment Purge in Operation When Not Permitted by Technical Specifications

| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO. | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | N/A | N/A |
| 05 | 22 | 10 | 2010 | - 003 - | 0 | 07 | 19 | 2010 | FACILITY NAME N/A | DOCKET NUMBER N/A |

**9. OPERATING MODE**

1

**10. POWER LEVEL**

100%

**11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§:** *(Check all that apply)*

| | | | |
|---|---|---|---|
| ☐ 20.2201(b) | ☐ 20.2203(a)(3)(i) | ☐ 50.73(a)(2)(i)(C) | ☐ 50.73(a)(2)(vii) |
| ☐ 20.2201(d) | ☐ 20.2203(a)(3)(ii) | ☐ 50.73(a)(2)(ii)(A) | ☐ 50.73(a)(2)(viii)(A) |
| ☐ 20.2203(a)(1) | ☐ 20.2203(a)(4) | ☐ 50.73(a)(2)(ii)(B) | ☐ 50.73(a)(2)(viii)(B) |
| ☐ 20.2203(a)(2)(i) | ☐ 50.36(c)(1)(i)(A) | ☐ 50.73(a)(2)(iii) | ☐ 50.73(a)(2)(ix)(A) |
| ☐ 20.2203(a)(2)(ii) | ☐ 50.36(c)(1)(ii)(A) | ☐ 50.73(a)(2)(iv)(A) | ☐ 50.73(a)(2)(x) |
| ☐ 20.2203(a)(2)(iii) | ☐ 50.36(c)(2) | ☐ 50.73(a)(2)(v)(A) | ☐ 73.71(a)(4) |
| ☐ 20.2203(a)(2)(iv) | ☐ 50.46(a)(3)(ii) | ☐ 50.73(a)(2)(v)(B) | ☐ 73.71(a)(5) |
| ☐ 20.2203(a)(2)(v) | ☐ 50.73(a)(2)(i)(A) | ☐ 50.73(a)(2)(v)(C) | ☐ OTHER |
| ☐ 20.2203(a)(2)(vi) | x 50.73(a)(2)(i)(B) | ☐ 50.73(a)(2)(v)(D) | Specify in Abstract below or in NRC Form 366A |

**12. LICENSEE CONTACT FOR THIS LER**

| NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| Philip L. Walker, Staff Licensing Engineer | 361-972-8392 |

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

| CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX |
|---|---|---|---|---|---|---|---|---|---|
| NA | | | | | | | | | |

**14. SUPPLEMENTAL REPORT EXPECTED**

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* x NO

**15. EXPECTED SUBMISSION DATE**

| MONTH | DAY | YEAR |
|---|---|---|
| | | |


ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On May 22, 2010, the Unit 2 Supplemental Containment Purge Subsystem was used to reduce containment pressure. This is a routine operation used to maintain containment pressure consistent with Technical Specification requirements. A surveillance test was in progress that required one of the two Solid State Protection System (SSPS) containment isolation automatic actuation logic channels be taken out of service. With one logic channel out of service, containment purge valves are required to be kept closed.

Required actions for an inoperable ESFAS instrumentation channel or interlock are shown in Technical Specification Table 3.3-3. With fewer than the minimum of two automatic actuation logic channels operable, operation may continue only if the containment purge supply and exhaust valves are maintained closed. Opening the containment purge valves when only one SSPS train is operable is not permitted under Technical Specifications. This condition is considered reportable under 10 CFR 50.73(a)(2)(i)(B) as a condition not allowed by the Technical Specifications.

Initiation of supplementary containment purge with an inoperable SSPS train/channel resulted from inadequate personnel communications and a deficient procedure. Conduct of Operations requirements will be revised to ensure adequate communications and assignment of responsibilities, and procedures will be revised to enhance control over containment purge initiation.

There were no personnel injuries, no offsite radiological releases, and no damage to other safety-related equipment. Because containment purge valves could still be closed on a signal from the operable logic channel, this is not a safety system functional failure.

| 1. FACILITY NAME | 2. DOCKET | 6. LER NUMBER | | | 3. PAGE |
|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| South Texas Unit 2 | 05000499 | 2010 | 003 | 00 | 2 OF 5 |

**NARRATIVE** *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

## I. DESCRIPTION OF EVENT

### A. REPORTABLE EVENT CLASSIFICATION

This event is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B). As required by Action 18-a of Technical Specification Table 3.3-3, when a Solid State Protection System channel is inoperable, plant operation can continue only if the containment purge supply and exhaust valves are maintained closed. However, STP Unit 2 initiated containment purge while a channel was inoperable. Consequently, STP Unit 2 was in a condition prohibited by Technical Specifications.

### B. PLANT OPERATING CONDITIONS PRIOR TO EVENT

STP Unit 2 was in Mode 1 at 100% power.

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

No other structures, systems, or components were inoperable at the start of the event and contributed to the event.

### D. NARRATIVE SUMMARY OF THE EVENT

On May 22, 2010, preparations were made to perform a surveillance test of the Unit 2 Solid State Protection System (SSPS) Logic Train R. This procedure verifies the Logic Train R SSPS Automatic Trip and Automatic Actuation Logic output functions by simulating input combinations in conjunction with each possible interlock. Placing Logic Train R in test mode prevents it from automatically actuating various features.

At 1517 hours, the SSPS Input Error Inhibit Switch was placed in the "inhibit" position in accordance with the surveillance test procedure. An inoperable logic train requires entry in several actions as described in Technical Specification Table 3.3-3, including a requirement that containment purge valves be closed.

At approximately 1540 hours, a reactor operator observed an indicator showing reactor containment pressure was near its alarm setpoint. At 1542 hours, the reactor operator initiated supplemental purge of reactor containment for pressure control. The primary reactor operator was informed of the purge activity and noted it in the Unit 2 Control Room logbook.

At 1554 hours, containment pressure had been satisfactorily regulated and supplementary purge was secured. The primary reactor operator was informed of the conclusion of purge activity and noted it in the Unit 2 Control Room logbook. Logic Train R was restored at 1601 hours.

During the shift change at approximately 1800 hours, the oncoming Shift Manager reviewed the Control Room logbook and recognized the period of concurrent supplementary purge operation and logic train test mode condition as being a violation of Technical Specification requirements.

Note that the Train S actuation of purge valve closure was still available during the surveillance. There were no failures that would have prevented Train S from closing the purge valves. Therefore, this is not a safety system functional failure.

E. METHOD OF DISCOVERY

The violation of Technical Specification requirements was discovered when the control room logbook was reviewed during shift turnover.

## II. EVENT-DRIVEN INFORMATION

A. SAFETY SYSTEMS THAT RESPONDED

No safety systems were required to respond during this event.

B. DURATION OF SAFETY SYSTEM INOPERABILITY

The SSPS Input Error Inhibit Switch was placed to the "Inhibit" position per Surveillance Test 0PSP03-SP-0005R at 1517 hours. Containment purge using the supplementary purge system was begun at 1542 hours. Supplementary purge was stopped at 1554 hours. The period of noncompliance with Technical Specification requirements was 12 minutes.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

**Technical Specification Requirements:**

As noted in TS 3.3.2 Action c, with an ESFAS instrumentation channel or interlock inoperable, required actions are shown in Table 3.3-3. As required by Action 18-a of Technical Specification Table 3.3-3, when a containment isolation automatic actuation logic channel is inoperable, plant operation may continue only if the containment purge supply and exhaust valves are maintained closed. Two operable channels is the minimum required to allow containment purge valves to be open; one channel was made inoperable during the surveillance test. Therefore, opening the valves while only SSPS Train S is operable is not permitted under Technical Specifications.

If only one train of Containment Purge Radioactivity-High is operable, the inoperable train is to be restored within 30 days. During the 30 days, if in Mode 1, 2, 3, or 4, supplementary purge valves may be open during the allowed outage time for up to two hours at a time for purge operation. However, with the entire logic train inoperable, this allowed outage time is not available.

**Design Description:**

Supplementary Containment Purge Subsystem

The Supplementary Containment Purge Subsystem provides the capability to reduce gaseous and particulate contamination of the containment atmosphere to enable safe, continuous personnel access under operating conditions. Containment penetrations for this subsystem are 18 inches in diameter. The Supplementary Containment Purge isolation valves are primarily opened as needed in response to changes in containment air pressure.

There are two isolation valves included in the Supplementary Containment Purge supply subsystem, and two on the Supplementary Purge exhaust subsystem. For each subsystem, one motor-operated isolation valve is inside containment and one air-operated isolation valve is outside containment. The motor-operated valves fail as-is on loss of power, and the air-operated valves fail closed on loss of air pressure. Each is a butterfly valve with resilient seals.

Interlocks are provided to automatically close the valves upon Containment ventilation isolation signal. In the event of a LOCA or other Design Basis Accident (DBA) while the Supplementary Containment Purge Subsystem is in operation, containment isolation occurs such that resultant offsite doses are kept within the limits prescribed by 10CFR100.

Containment pressure is monitored and conditions approaching the limits allowed by the Technical Specifications are annunciated. Containment pressure is controlled by periodic operation of the supplementary purge system.

Solid State Protection System

The Reactor Trip System includes two redundant logic trains, R and S, each of which can initiate a reactor trip. The purpose of ESFAS actuation logic and relays is to initiate the integrated system response that accomplishes the design safety function of the applicable engineered safety feature (ESF). Technical Specification Table 3.3-3 Action 18-a applies when the actuation logic for RCB Purge Radioactivity - High is inoperable because it affects both channels. The required action is to maintain the isolation valves closed. Loss of power supply to the output ESF relays of either channel of these monitors will be considered inoperable actuation logic and the isolation valves are to be maintained closed in accordance with Action 18-a. This is because this failure mode will result in the inability of the other actuation signals to close the purge valves if the initial signal is reset.

**Extent of Condition:**

Other surveillance procedures have been identified that require entry into Action 18. These procedures include requirements that containment purge not be allowed during performance of the surveillance.

**Risk Assessment:**

This condition did not contribute to core damage risk and contributed very little to large early release risk. The insignificant large early release probability is principally due to the exposure time of 12 minutes, or approximately $6 \times 10^{-4}$ year. A formal assessment was not performed but the STP annual core damage frequency is less than $1 \times 10^{-5}$ per year. Even with the very conservative assumption that all core damage progresses to a large early release, the incremental Large Early Release Probability is less than $6 \times 10^{-9}$. Therefore, this event had very low safety significance.

## III. CAUSE OF THE EVENT

A. The root cause of this event was inadequate communications between Control Room staff members:

- The crew supervisor noted in the log book early in the shift that SSPS surveillance tests would be performed later in the shift. The log entry stated the applicability of Technical Specification Table 3.3-3 Action 18, and the requirement to maintain the containment purge valves closed. The operations crew was not informed by their supervisor that a surveillance procedure would be in progress that prohibited containment purge by Technical Specification requirements.
- Containment pressure may vary during the course of normal plant operations. The primary

reactor operator observed that pressure indication showed the need to relieve pressure through actuation of the Supplementary Containment Purge Subsystem. Purge was initiated without informing crew supervision. The log was updated to note initiation of containment purge, but the entry for beginning the surveillance procedure was not read.

B. In addition, the surveillance procedure does not include a prohibition against performing a supplemental containment purge with the logic train out of service for testing.

## IV. CORRECTIVE ACTIONS

A. Remedial Actions:

No remedial actions are required.

B. Compensatory Actions:

Control room staff is briefed when the unit enters a Technical Specification Limiting Condition of Operation.

C. Recurrence Control:

Control room staff communications will be enhanced by the following changes:

- Revise Conduct of Operations to define control room crew standards for communications regarding Technical Specification requirements.
- Revise Conduct of Operations to establish expectations and standards for making and updating logbook entries.
- Revise supplementary containment purge procedure to specify notification of control room staff supervision before initiating containment purge.

In addition, the supplemental containment purge procedure will be revised to prohibit purging containment atmosphere when a logic train is out of service.

These actions are expected to be completed by September 21, 2010.

## V. PREVIOUS SIMILAR EVENTS

Control room logs were reviewed for instances of containment building purges while surveillance procedures that place restrictions on containment purge activities were in progress. No similar violations of Technical Specification Table 3.3-3 Action 18 were found.

## VI. ADDITIONAL INFORMATION

Investigation did not identify an organizational weakness or adverse condition beyond the circumstances of this event.