



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

April 25, 2002
NOC-AE-02001310
File No.: G25
10CFR50.73
STI: 31437910

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

South Texas Project
Unit 1
Docket No. STN 50-498
Licensee Event Report 02-001

Control Room Envelope Ventilation System Failed to Maintain
a Positive Pressure in the Control Room

Pursuant to 10CFR50.73, South Texas Project submits the attached Unit 1 Licensee Event Report 02-001 regarding the discovery that the control room envelope ventilation system was unable to maintain a positive pressure in the control room relative to adjacent areas. Failure of a fire damper in the control room ventilation system resulted in all trains of control room envelope ventilation being unable to maintain the required positive pressure of Technical Specification surveillance requirement 4.7.7.e.3 for a period of about thirty-four hours.

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

The only commitments in this report are contained in the Corrective Action section of the attachment.

If there are any questions on this submittal, please contact W. R. Bealefield, Jr. at (361) 972-7696 or me at (361) 972-7849.

A handwritten signature in black ink, appearing to read "E. D. Halpin".

E. D. Halpin
Plant General Manager

Attachment: LER 02-001 (South Texas, Unit 1)

IE 22

cc:

(paper copy)

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LICENSEE EVENT REPORT (LER)(See reverse for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory information 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 Management Branch (T-6 EB), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to bjs1@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 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.

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4. TITLE Control Room Envelope Ventilation System Failed to Maintain a Positive Pressure in the Control Room
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5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	26	2002	2002	01	00	04	25	2002	FACILITY NAME	DOCKET NUMBER
										05000
										05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR : (Check all that apply)
10. POWER LEVEL 100	20.2201(b) 20.2203(a)(3)(ii) 50.73(a)(2)(ii)(B) 50.73(a)(2)(ix)(A)
	20.2201(d) 20.2203(a)(4) 50.73(a)(2)(iii) 50.73(a)(2)(x)
	20.2203(a)(1) 50.36(c)(1)(i)(A) 50.73(a)(2)(iv)(A) 73.71(a)(4)
	20.2203(a)(2)(i) 50.36(c)(1)(ii)(A) 50.73(a)(2)(v)(A) 73.71(a)(5)
	20.2203(a)(2)(ii) 50.36(c)(2) 50.73(a)(2)(v)(B) OTHER
	20.2203(a)(2)(iii) 50.46(a)(3)(ii) 50.73(a)(2)(v)(C) Specify in Abstract below or in
	20.2203(a)(2)(iv) 50.73(a)(2)(i)(A) X 50.73(a)(2)(v)(D) NRC Form 368A
	20.2203(a)(2)(v) X 50.73(a)(2)(i)(B) X 50.73(a)(2)(vii)
	20.2203(a)(2)(vi) 50.73(a)(2)(i)(C) 50.73(a)(2)(viii)(A)
	20.2203(a)(3)(i) 50.73(a)(2)(ii)(A) 50.73(a)(2)(viii)(B)

12. LICENSEE CONTACT FOR THIS LER	
NAME William R. Bealefield, Jr.	TELEPHONE NUMBER (Include Area Code) 361-972-7696

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
	IC	RLY		YES					

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO		MONTH	DAY	YEAR

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

On February 26, 2002 Unit 1 was operating in Mode 1 at 100% power. Unit 1 was in a "B" train extended allowed outage (EAOT) maintenance state. Instrument & Control maintenance personnel were performing a preventive maintenance task to replace backup power supply batteries in two plant fire detection panels for the Electrical Auxiliary Building (EAB). During the maintenance, at approximately 1030, a return air fire damper failed closed. This condition changed the air balance relationship between the EAB and the Control Room Envelope (CRE) ventilation systems. The CRE ventilation subsystem was unable to maintain the required positive differential pressure of at least 0.125 inches water gauge. Plant Operations personnel became aware of the change in differential pressure and initiated troubleshooting efforts to determine the cause. At approximately 1405 on February 26, engineering personnel informed the control room that the fire damper was tripped closed. Operations personnel did not believe that CRE ventilation system operability was affected. On February 27 a differential pressure test was performed on the CRE which identified the inability to meet the positive differential pressure of Technical Specification (TS) Surveillance requirements 4.7.7.e.3. The Shift Supervisor declared all three trains of CRE ventilation inoperable at 1035 and entered TS action 3.7.7.c. Following repairs to the fire damper, Control Room ventilation systems were declared operable at 2045 on February 27, 2002.

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

DESCRIPTION OF EVENT

On February 26, 2002 Unit 1 was in Mode 1 operating at 100% power. The unit was in a "B" train extended allowed outage time (EAOT) maintenance state. Instrument and Control maintenance personnel were performing a preventive maintenance activity to replace the backup power supply batteries in fire detection panels (IC) for the Electrical Auxiliary Building (EAB). During the maintenance, at approximately 1030, a return air fire damper failed closed. The maintenance personnel were not aware of this condition. During this time an off-duty Shift Supervisor entered the Unit 1 Control Room and informed the Unit Supervisor that there was an abnormal pressure differential between the Unit 1 EAB and the outside areas. Shortly thereafter, the Unit 1 Shift Supervisor entered the EAB and also noticed the high differential pressure. The Shift Supervisor directed operations personnel to walk down the system and started troubleshooting activities to locate any abnormalities. Additionally he requested the assistance of the system engineer for the EAB ventilation system.

Engineering personnel performed troubleshooting activities and identified that there was a slightly positive pressure, relative to the Control Room on the 10 foot and 35 foot elevations. At approximately 1405, engineering informed the Shift Supervisor that the fire damper was closed. The Shift Supervisor did not recognize that control room envelope (CRE) heating, ventilation and air conditioning (HVAC) operability was affected due to one failed damper. Maintenance work documents were initiated to block open the damper. Discussions at this time, between engineering and operations, did not result in communicating the engineering viewpoint that the CRE was adversely impacted by the failed damper. The operations staff understood that the fire damper impact was limited to the "B" train EAB HVAC, which was already out of service.

Day shift operations personnel turned over the failed damper condition to the night shift personnel with emphasis on repairing the damper to correct the personal safety hazard created by the higher differential pressure across the EAB doors. Maintenance personnel did not make any repairs during the night shift because the correct repair parts were not available.

On February 27, 2002 following the Daily Communications & Teamwork Meeting, engineering, operations and maintenance personnel held a breakout meeting concerning repairs to the damper. These discussions resulted in uncertainty regarding the operability of the CRE HVAC system. At approximately 0900 the Shift Supervisor directed testing to be performed to determine CRE HVAC system status. The testing was completed at approximately 1030, and it indicated that the required positive differential pressure of ≥ 0.125 inches water gauge between the CRE and surrounding areas was not being maintained. The Shift Supervisor declared the CRE HVAC inoperable and entered Technical Specification 3.7.7.c at approximately 1035.

Maintenance and engineering personnel investigation determined that all eight sections of the damper were in the closed position and the electro-thermal links (ETL) for all eight sections were separated. Inspection of the ETLs from the damper found that they had separated due to an electrical current through the devices, which melted the links. The links have two methods of separation:

- The links can be separated thermally due to a fire (requires air temperature of approximately 165 degrees or greater).
- The links can receive a 24 volt DC current from the fire detection panel which energizes a thermal device causing an internal heat source, which will melt the link.

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Maintenance and engineering personnel performed additional troubleshooting in the fire detection panel and discovered that mechanical agitation of a relay, similar to what would have occurred during the battery replacement, resulted in energizing the 24 volt circuit for the damper. This relay is the actuation relay for the ETLs for three fire dampers. The alarm circuit associated with this relay actuating did not energize. This type of response is abnormal for this relay. The normal response for this relay is to energize all actuation circuits, energize a relay energized light on the circuit board and an alarm is initiated at the local control panel which is transmitted to the control room. Partial failure of this relay energized the ETL circuits for the damper causing them to melt and allow the damper to trip to the closed position.

Maintenance personnel replaced six of the eight failed ETLs and wired the two remaining damper blades open.

At approximately 1500 an air balance was performed on the EAB HVAC equipment.

At approximately 2015 the CRE air cleanup system functional test was completed satisfactorily.

The CRE HVAC system was declared operable and Technical Specification 3.7.7.c was exited at 2045 on February 27.

Maintenance personnel subsequently replaced the relay board, replaced the two remaining failed ETLs and the system tested satisfactorily.

All other safety related equipment operated as required during this event.

EVENT SIGNIFICANCE

This event did not affect nuclear or personal safety however, this event rendered all three trains of Unit 1 CRE HVAC system inoperable for approximately thirty-four hours.

The CRE design basis was not violated with respect to a single failure of the fire damper since it failed to its closed safety position and because this component is not considered an active component.

When the EAB return air fire damper closed, the return air pathway for the 35' elevation was shut off while the supply side fans continued to run. Continued supply air with degraded return airflow caused the air pressure in the EAB to increase and develop a higher than normal equilibrium. This condition changed the air balance relationship between the EAB and the CRE. The CRE HVAC system was no longer capable of maintaining the CRE at the required positive pressure with both available trains operating. This condition rendered CRE HVAC inoperable. The control room staff did not readily identify this inoperable condition.

This condition is reportable pursuant to 10CFR50.73(a)(2)(i)(B)-Operation or condition prohibited by Technical Specifications, 10CFR50.73(a)(2)(v)(D) – any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident, and 10CFR50.73(a)(2)(vii) – common cause inoperability of independent trains or channels.

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

CAUSE OF EVENT

Root Causes:

1. Verbal communications between Control Room personnel and Systems Engineering personnel lacked sufficient process rigor to ensure that a common understanding of the problem was achieved.
2. Knowledge issues related to CRE failure modes and suitable compensatory actions to maintain system operability concerns contributed to the communications failure.

CORRECTIVE ACTIONS

1. Operations department to implement a problem resolution checklist (or similar tool) for Control Room Supervisors. This corrective action will be completed by April 30, 2002.
2. Revised the Electrical Auxiliary Building HVAC System procedure to include a description of the CRE HVAC boundary, a list of fire dampers that can affect CRE HVAC operability and general precautions reminding personnel that surrounding HVAC systems can affect CRE HVAC operability. This corrective action was completed on March 25, 2002.
3. Review and revise, as appropriate, licensed operator training material on CRE HVAC to ensure the following are included:
 - CRE HVAC boundaries and interfacing systems.
 - The impact surrounding HVAC systems can have on CRE HVAC operability.
 - Basic CRE HVAC system operability requirements and conditions and their bases.
 - Changes to Electrical Auxiliary Building HVAC System procedure.
 - Basic CRE HVAC system operability and surveillance requirements from Technical Specifications and the basis for each operability condition or surveillance.
 This corrective action will be completed by April 30, 2002.
4. Submit the event to the Licensed Operator (LOR) Requalification Curriculum Review Committee (CRC) for inclusion in LOR training. This corrective action will be completed by April 30, 2002.
5. Issue a training bulletin to Engineering department personnel explaining alternate methods of maintaining system operability in accordance with Generic Letter 91-18 guidance. This corrective action will be completed by April 30, 2002.
6. Engineering Support Personnel (ESP) CRC will develop training material regarding suitable compensatory actions to maintain system operability as authorized by station/regulatory guidance and incorporate this training into appropriate ESP 100 training module(s)
This corrective action will be completed by June 30, 2002.
7. Include a description of this event in site publication- Operating Experience News Briefs.
This corrective action will be completed by April 30, 2002.

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ADDITIONAL INFORMATION

The failed relay was a model MR201/T manufactured by AIR Products and Controls.

A review of the South Texas Project Corrective Action Program database did not identify any other fire damper failures caused by energizing the ETLs or any other inadvertent actuation of fire dampers during the past 3 years.