Nuclear Operating Company

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

July 5, 2001
NOC-AE-01001126
File No.: G26
10CFR50.73
STI: 31307580

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

South Texas Project
Unit 2
Docket No. STN 50-499
Licensee Event Report 01-004
Automatic Reactor Trip

Pursuant to 10CFR50.73, South Texas Project submits the attached Unit 2 Licensee Event Report 01-004 regarding an automatic reactor trip. This event did not have an adverse effect on the health and safety of the public.

Licensee commitments are listed in the Corrective Action section of the attachment. If there are any questions on this submittal, please contact either W. R. Bealefield, Jr. at (361) 972-7696 or me at (361) 972-7800.

G. L. Parkey
Plant General Manager

Attachment: LER 01-004 (South Texas, Unit 2)

IE22

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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(1-2001)

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2001

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
South Texas, Unit 2	05000 499	1 OF 3

TITLE (4)
Automatic Reactor Trip due to Low Water Level in Steam Generator 2A

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER 05000
05	08	2001	01	– 004 –	00	07	05	2001	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)					
		20.2201(b)	20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
POWER LEVEL (10)	100%	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)	X	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 Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iii)	50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		
		20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)		
		20.2203(a)(2)(v)	50.73(a)(2)(i)(B)		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)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
W. R. Bealefield, Jr.	361-972-7696

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

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

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

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

On May 8, 2001, at 1528, Unit 2 was operating at 100% power. Activities were in progress to monitor the valve positioner on steam generator '2A' Feedwater Regulating Valve (FRV) using a laptop computer and Hart communication adapter connected to the positioner signal leads. After several minutes of monitoring, the troubleshooting team connected the laptop computer to a utility outlet to keep its battery charged. Unknown to the team, the Hart adapter was designed with one of its leads connected to the laptop computer ground. The grounded Hart adapter lead was connected to the positive signal lead of the FRV positioner. The FRV control circuit is designed with the negative signal lead connected to plant ground in the 7300 Process Cabinets. When the laptop AC power cord with ground plug was plugged into the utility outlet, both signal leads for the FRV were connected to ground. This resulted in a loss of positioner control signal, closure of the FRV and rapid decrease in steam generator '2A' water level. The operators observed the loss of feedwater flow and attempted to reopen the FRV in manual control. Operations directed the team to remove test equipment. Operations staff ordered a manual reactor trip; however, steam generator '2A' reached the LO-LO Level setpoint and the reactor tripped automatically. All control rods fully inserted. All actuated safety equipment operated as required. The root causes identified were that personnel did not recognize the ground potential of the laptop and adapter, and the work control process did not provide adequate controls for this activity. Corrective actions include improving the work control process and establishing programmatic controls for the use of test equipment.

LICENSEE EVENT REPORT (LER)

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South Texas Unit 2	05000-499	2001	-- 004 --	00	2 OF 3

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

DESCRIPTION OF EVENT:

On May 8, 2001 Unit 2 was operating at 100% power.

During refueling outage 2RE08 in the spring of 2001 new digital positioners were installed on the Unit 2 Feedwater Regulating Valves (FRVs). The digital positioners have the ability to communicate their parameters in digital format through a protocol standard known as Hart. Communication is established by connecting a Hart adapter between a computer and the positioner demand signal leads. The computer (laptop) contained software (Cornerstone) to translate the Hart signal to support trending and troubleshooting. After 2RE08, some of the FRVs exhibited occasional instability. Condition Reports were written to address the instability of FRVs '2A' and '2D'. On May 8, 2001 monitoring of the digital positioners was initiated to obtain data for the resolution of the condition reports. Monitoring of the '2D' valve digital positioner was completed using a laptop computer and a Hart adapter.

A pre-job brief for the troubleshooting work on '2A' FRV was conducted in accordance with work control procedures. During the pre-job brief, it was discussed that a short could close the valve. If this occurred, Operations would notify the troubleshooting team to immediately remove the laptop computer. Shorting of the valve signal was considered highly unlikely based on previous successful monitoring activities including the monitoring of the '2D' FRV performed earlier that day. Monitoring of the '2A' FRV positioner was established using the same laptop and Hart adapter used for the '2D' FRV. After about twelve minutes of monitoring, the team connected the laptop computer to a utility outlet to keep its batteries charged. Shortly after the laptop was plugged in, the team noticed that all signals from the positioner had fallen to zero but believed it was an indication issue. Unknown to the troubleshooting team, the Hart adapter was designed with one of its leads connected to the laptop computer ground. This grounded Hart adapter lead was connected to the positive signal lead to the '2A' FRV positioner. The FRV control circuit is designed with the negative signal lead connected to plant ground in the 7300 Process Cabinets. When the laptop computer was plugged into the utility outlet, the AC adapter's ground plug connected the two FRV signal leads. This resulted in a loss of signal to the positioner, which caused the FRV to close and the water level in steam generator '2A' to rapidly decrease. The shorted signal leads also caused the loss of communication from the positioner to the laptop computer, resulting in the signal observed by the troubleshooting team.

The control room operators observed the loss of feedwater flow with a 100% indicated demand signal. Operations then transferred the '2A' FRV to manual control in an attempt to reopen '2A' FRV and instructed the troubleshooting team to remove the monitoring equipment. After the monitoring equipment was removed the signal was again available to the positioner and the digital positioner started to reboot. The positioner completed its' reboot and responded to the 100% demand signal. Feedwater flow increased, but the increased flow was insufficient to keep steam generator '2A' from reaching the LO-LO Level trip setpoint. Operations staff ordered a manual reactor trip in anticipation of a LO-LO Level automatic trip but the reactor tripped automatically just as the operator was about to manually trip the reactor. All control rods fully inserted. The Auxiliary Feedwater System actuated on low-low steam generator water level as expected. All safety related equipment operated as required.

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

CAUSE OF EVENT

Root Causes

1. Personnel did not recognize the laptop computer and Hart adapter as test equipment with the potential to introduce a ground path. The Hart adapter documentation was not obtained to verify vendor input that the adapter was not polarity sensitive. Prior testing was insufficient to detect the ground path.

2. The work control process did not provide adequate controls for working on reliability-significant equipment.

CORRECTIVE ACTIONS

1. Programmatic controls will be established for the use of test or data acquisition equipment when used to monitor in service reliability-significant equipment. This action will be completed by August 30, 2001.

2. The work control process will be revised to provide enhanced controls for working on reliability-significant plant equipment. This action will be completed by September 13, 2001.

ANALYSIS OF EVENT:

A notification was made to the Nuclear Regulatory Commission on May 8, 2001 at 1924 pursuant to 10CFR50.72(b)(2)(iv)(B) for an actuation of the Reactor Protection System and 10CFR50.72(b)(3)(iv)(A) for the actuation of specified systems.

The conditional core damage probability (CCDP) for a reactor trip is approximately 2.0E-7.

There were no structures, systems or components that were inoperable at the start of the event which contributed to the event.

ADDITIONAL INFORMATION:

Operating experience reviews did not find any cases where use of a laptop computer contributed to plant events. There have been numerous occasions where grounded test equipment has caused plant events. The use of a laptop was not considered as test equipment in regards to previous operating experience.

The Hart adapter was purchased based on engineering discussions with the valve positioner vendor. In these discussions, engineering requested information concerning whether the Hart adapter was polarity sensitive. The vendor indicated that polarity did not matter. After implementation of the FRV positioner modification during refueling outage 2RE08 and prior to startup, the Hart adapter was tested to verify that interchanging the Hart adapter leads had no effect on valve and communication performance. However, this testing was performed using a laptop computer that had a 2-prong AC connector. The laptop computer utilized in this prior testing was from a different manufacturer than the laptop used in this event which had a 3-prong AC connector. The third prong connects to ground. The prior test results were satisfactory and falsely proved/reinforced the vendor input that the Hart adapter was not polarity sensitive.