

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) St. Lucie, Unit 2										DOCKET NUMBER (2) 0 5 0 0 0 3 8 9										PAGE (3) 1 OF 0 3									
TITLE (4) Manual Reactor Trip due to Spurious Control Intercept Valve Signal																													
EVENT DATE (5)						LER NUMBER (6)						REPORT DATE (7)						OTHER FACILITIES INVOLVED (8)											
MONTH		DAY		YEAR		YEAR		SEQUENTIAL NUMBER		REVISION NUMBER		MONTH		DAY		YEAR		FACILITY NAMES N/A											
0 4		1 7		8 5		8 5		0 0 3		0 0		0 5		1 7		8 5		DOCKET NUMBER(S) 0 5 0 0 0											
OPERATING MODE (9) 1						THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §. (Check one or more of the following) (11)																							
POWER LEVEL (10) 0 9 9						20.402(b)						20.408(a)						50.73(a)(2)(iv)						73.71(b)					
						20.408(a)(1)(i)						50.36(a)(1)						50.73(a)(2)(v)						73.71(c)					
						20.408(a)(1)(ii)						50.36(a)(2)						50.73(a)(2)(vi)						OTHER (Specify in Abstract below and in Text, NRC Form 366A)					
						20.408(a)(1)(iii)						50.73(a)(2)(i)						50.73(a)(2)(viii)(A)											
						20.408(a)(1)(iv)						50.73(a)(2)(ii)						50.73(a)(2)(viii)(B)											
						20.408(a)(1)(v)						50.73(a)(2)(iii)						50.73(a)(2)(ix)											
LICENSEE CONTACT FOR THIS LER (12)																													
NAME Roger Kulavich, Shift Technical Advisor																TELEPHONE NUMBER 3 1 0 5 4 1 6 5 1 - 3 1 5 1 0													
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																													
CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NRC		CAUSE		SYSTEM		COMPONENT		MANUFACTURER		REPORTABLE TO NRC											
X		J J C		P U		W 1 2 0		N																					
SUPPLEMENTAL REPORT EXPECTED (14)																													
YES (If yes, complete EXPECTED SUBMISSION DATE)																X		NO		EXPECTED SUBMISSION DATE (15)		MONTH		DAY		YEAR			

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

EVENT

On April 17, 1985, at 0755, the St. Lucie, Unit 2 reactor was at 99.26 percent power with the turbine control system (DEH) in MANUAL for maintenance. At approximately 0755 all four turbine intercept valves closed, apparently due to a spurious close-intercept-valve (CIV) signal generated when a maintenance technician reenergized the digital portion of the DEH. The CIV caused the moisture separator reheater (MSR) relief valves to open. The control room operators determined that the entire turbine steam flow was relieving to atmosphere (after passing through the High Press turbine) and prudently initiated a manual reactor trip to prevent the loss of secondary water inventory through the open MSR relief valves. There were no significant releases of radioactivity. The health and safety of the public was not affected.

CAUSE OF EVENT

Subsequent investigation revealed no physical cause for the spurious CIV signal.

CORRECTIVE ACTIONS

The immediate corrective actions were to stabilize the plant in hot shutdown and troubleshoot the DEH system.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO 3150-0104
EXPIRES 8/31/85

FACILITY NAME (1) St. Lucie, Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 8 9	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 5	— 0 0 3	— 0 0	0 2	OF	0 3

TEXT (If more space is required, use additional NRC Form 366A's) (17)

EVENT

The event occurred on April 17, 1985, at 0755. The reactor was at 99.26 percent power with all systems operating normally except the Turbine Control System DEH (Westinghouse P-2000 Model #1). Prior to the event on April 17, 1985, the DEH had been drifting while operating in the Automatic or "digital control" mode. The DEH was placed in MANUAL operation while the Instrumentation and Control (I&C) group analyzed the faulty digital circuitry. Circuit schematics show sufficient electrical independence such that any maintenance action taken on the digital portion should not affect the DEH manual circuitry. With that in mind, an I&C technician deenergized and started work on the digital computer (CPU) portion of the DEH. When the I&C technician completed his repairs and reenergized the CPU, a simultaneous close-intercept-valves (CIV) signal closed all four (4) intercept valves (IV). The closed intercept valves shut off steam flow from the high pressure turbine to the low pressure turbine and caused all four (4) moisture separator reheater (MSR) steam relief valves to lift.

The purpose of the CIV signal is to prevent the generator frequency from increasing during an 8 to 10 cycle fault in the 240 Kv lines. By design the CIV should close the intercept valves just long enough to keep the generator frequency in step with the 240 Kv frequency and allow any excess steam inventory in the MSR to relieve to atmosphere via the MSR reliefs. For reasons not yet determined, the intercept valves did not return to the full open position following the spurious CIV on April 17. Control room operators stated they observed the intercept valves attempting to reopen but then closing again, oscillating in this manner until the manual turbine trip was initiated.

The manual turbine trip and reactor trip was a precautionary measure on the operators' part to prevent the loss of secondary water inventory and automatic trip due to low steam generator water level. The plant response to the trip was normal with all automatic equipment actuation as required for existing plant conditions.

This event generated a great deal of public concern due to the extremely loud noise generated by the open MSR relief valves. Consequently a company news release was made on the event.

All possible causes for the event were discussed and investigated from 0900 to 1400 hours. When the investigation determined the cause of the event to be a spurious electrical transient caused by reclosing the circuit breaker feeding the CPU at the conclusion of maintenance, the decision was made to commence normal start up and return the unit to service. This is the first LER involving a reactor trip due to DEH maintenance at power.

CAUSE OF THE EVENT

Subsequent investigation of the event found no component failures, personnel errors, or procedural violations which could have caused the CIV signal. Evaluation of the DEH electrical schematics by competent personnel found no physical connection between the CPU circuitry being worked and the CIV circuit. The conclusion drawn was that the electrical "spike" caused by reenergizing the DEH CPU module caused the spurious CIV signal. DEH vendor assessment of both the spurious CIV signal and the subsequent cycling of the intercept valves is still continuing.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES 8/31/85

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

SAFETY ASSESSMENT

The purpose of the CIV signal is not to protect the turbine from overspeed conditions. Two independent overspeed protection systems (OPC, mechanical trip) exist for that purpose. The purpose of the CIV signal is to prevent or delay the loss of the St. Lucie Plant generation by turbine overspeed trip during FPL system grid disturbances. This was desirable in past to enhance FPL system grid performance. Consequently, the CIV circuitry is not required either for plant equipment protection or plant safety.

Loss of secondary plant water inventory is the parameter of concern which led to this manual reactor trip. The event initiated from 99.26 per cent reactor power which would be the most severe power level for loss of secondary water inventory out of the open MSR relief valves.

The plant operators took prudent action to manually trip the reactor well before the situation challenged the Reactor Protective System (RPS). The RPS is designed to automatically trip the reactor on low steam generator water level to ensure the secondary heat sink is maintained.

The anticipated steam generator water level shrink from a trip at this power level resulted in an auxiliary feedwater system automatic actuation as expected.

The plant response to the trip was normal with all required automatic actions performing as designed.

CORRECTIVE ACTIONS

The immediate corrective actions were to stabilize the plant at hot shutdown conditions while an evaluation was made of possible causes for the spurious CIV signal. As stated above no specific problem could be identified. The spurious CIV signal is believed to have originated in a voltage spike caused by shutting the circuit breaker to repower the digital computer after maintenance. Based on the above, the plant was returned to power with the stipulation that nonroutine DEH maintenance would not be permitted at power and the continued desirability of the CIV feature would be evaluated.

The CIV feature was subsequently removed from the DEH circuitry at both St. Lucie units with a Facility Review Group approved jumper based on preliminary evaluation by engineering. Further engineering and DEH vendor studies are continuing.

L-85-202

5/17/85

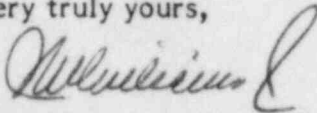
U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Gentlemen:

Re: Reportable Event 85-03
St. Lucie Unit 2
Date of Event: April 17, 1985
Manual Reactor Trip due to Spurious
Control Intercept Valve Signal

The attached Licensee Event Report is being submitted pursuant to the requirements of 10 CFR to provide notification of the subject event.

Very truly yours,



J. W. Williams, Jr.
Group Vice President
Nuclear Energy

JWW/SAV/js

Attachment

cc: Dr. J. Nelson Grace, Region II, USNRC
Harold F. Reis, Esquire
File 933.1
PNS-LI-85-206v

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