NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)

Isolated Instrument Results In Pressure Transient And Reactor Scram

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	DOCKET NUMBER(S)
											0 5 0 0 0
0 9	0 2	8 6	8 6	—	0 5 5	— 0 0	1 0	0 1	8 6		0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
2	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
0 0 3	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Paul Russ, Compliance Engineer, ext. 6472	2 1 6 2 5 9 - 3 7 3 7

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

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 fifteen single-space typewritten lines) (16)

On September 2, 1986 at 1102, a reactor scram occurred due to an upscale trip on the Intermediate Range Neutron Monitors (IRM). The plant was in Operational Condition 2 (Startup), performing initial nuclear heatup testing. A sudden increase in sensed steam pressure caused the Steam Bypass Valves to fully open resulting in a reactor pressure decrease. Subsequent operator action to reshut the valves combined with an isolated pressure transmitter caused the Steam Bypass Valves to shut more rapidly than expected, resulting in a void collapse and neutron flux spike.

The cause of the event was a sudden increase in sensed pressure for the Steam Bypass Valves Controller. The main steam pressure instrument isolation valves were subsequently found shut. Operator action to reclose the Steam Bypass Valves was hindered by the isolation of the instrument since the feedback signal to the pressure controller was not changing as reactor pressure decreased.

Corrective actions have included recalibration of the pressure regulators, instrumentation valve lineups, changes to operating instructions and procedures, and the issuance of a management directive for the operation of instrument isolation valves.

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

On September 2, 1986 at 1102, a reactor scram occurred due to an upscale trip on the Intermediate Range Neutron Monitors (IRM)[IG]. At the time of the event the plant was in Operational Condition 2 (Startup), the reactor power was approximately 3%, reactor pressure was 92 psig, feedwater flow was being controlled manually using the Low Flow Controller [TC], Steam Bypass Valves [PCV] 1 and 2 were full open and Steam Bypass Valve 3 was 20% open. The "B" Steam Bypass and Pressure Regulator [JI] was selected for pressure control.

The transient started at 1100 when Steam Bypass and Pressure Control pressure transmitter [PT] 1C85-N001B suddenly sensed an increase in pressure of approximately 35 psi.(This sensed pressure increase remained constant for the duration of the event.) All seven Steam Bypass Valves went full open causing reactor pressure to decrease at approximately 10 psi per minute. Reactor pressure reached a minimum of 66 psig. The reduction in pressure caused a void formation increase and a subsequent increase in indicated reactor vessel water level. The Supervising Operator reacted to the increase in reactor level by attempting to control the level increase by shutting the Feedwater Low Flow Control Valve [FCV]. Reactor level reached a maximum of +215 inches (above top of active fuel) as indicated on the upset range level instrument [LI]. Concurrently a second operator attempted to shut the Steam Bypass Valves using the Bypass Jack [HC] decrease. (The Steam Bypass Valves had been controlled manually using the Steam Bypass Valve opening Jack.) The operator actions failed to shut the Bypass Valves because the increased sensed pressure created an overriding automatic pressure control signal. The Maximum Combined Flow Limiter [JC] (which controls total steam flow to the Main Turbine and Steam Bypass Valves) was decreased and was also incapable of overcoming the pressure control signal. He then increased the pressure setpoint for the automatic pressure control. As a result of this action Steam Bypass Valves 6 and 7 went shut and Steam Bypass Valve 5 partially shut. Reactor pressure was still decreasing so the operator increased the pressure setpoint further attempting to shut the Steam Bypass Valves. This resulted in all Steam Bypass Valves rapidly closing. Reactor pressure subsequently increased from 66 psig to 69 psig causing a void collapse and a subsequent neutron flux spike. Seven of eight IRM's reached the trip setpoint of 120/125 scale (Range 9) and properly actuated the Reactor Protection System (RPS)[JC] causing a reactor scram. Because of the increase in steam flow caused by the Steam Bypass Valves opening and the operator actions shutting the Feedwater Low Flow Control Valve, reactor water level had decreased rapidly. Reactor level reached level 3 (+177.7 inches) as indicated on narrow range level instruments [LI]. This low level caused a second RPS actuation less than one second after the neutron flux scram. Reactor vessel level reached a minimum of +191 inches as indicated on wide range level instruments (<+165 inches narrow range). Operators restored level by further opening the Feedwater Low Flow Control Valve. Control Room operators took additional actions in accordance with Off Normal Instruction (ONI)-C71 "Reactor Scram", and Plant Emergency Instruction (PEI)-B13 "Reactor Pressure Vessel Control". The plant was stabilized in

Operational Condition 3 (Hot Shutdown) at 1118. During the transient, flow oscillations caused the Reactor Water Cleanup (RWCU)[CE] pumps to trip on low suction flow. The RWCU pumps were restarted at 1126.

The cause of the event was a sudden increase in sensed pressure on pressure transmitters (1C85-N001A, B) for Steam Bypass Valve control. The transmitter isolation valves [ISV] were subsequently found shut. The reasons for the increase in sensed pressure and the mispositioned instrument isolation valves are indeterminate. Earlier in the morning the Control Room operators questioned the steam pressure indication. A technician was sent to check the position of the transmitter isolation valves. He reported that he could not move the valves, however, the valves appeared to be open. A Work Order was initiated to repair the valves but not issued to the field. All work which has taken place during the past year on or in the area of the transmitter isolation valves has been reviewed and did not reveal any reason the isolation valves would have been shut. These valves were verified open on three separate occasions, the last being August 19, 1986. A final independent verification was scheduled to be performed by September 15, 1986. Operator action to reclose the Steam Bypass Valves was hindered by the isolation of the pressure transmitter. Since the feedback signal of sensed pressure did not change as reactor pressure decreased, the Steam Bypass and Pressure Regulator system did not respond as expected. Thus, a slight adjustment of the pressure setpoint caused the Steam Bypass Valves to rapidly shut.

Reactor power level was low during this event and the resulting thermal transient was small. Plant systems responded as expected to maintain the plant in a safe condition. For high power operation FSAR section 15.2.1 analyzed Pressure Regulator Downscale Failure which leads to a loss of pressure control such that the zero steam demand causes a pressurization. The high neutron flux scram is the mitigating system and is designed to be single failure proof. Therefore, this event had no safety significance. There were no previous similar events identified.

The corrective actions which have been or will be completed are as follows:

1) The pressure transmitter isolation valves were opened and verified open September 2, 1986. Additionally, valve lineups for 150 instruments were conducted September 4, 1986. The valve lineups included a first and second check. One test connection valve was found out of its normal position. However, in this case there is a second test connection valve in the line which was shut and a cap on the end of the line. No other discrepancies were identified.

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

2) Subsequent to the reactor scram a Work Order was issued to troubleshoot the pressure regulators. A failed oscillator card in the "A" pressure regulator was found and replaced. This card did not contribute to the event because the "B" regulator was selected for control. With the exception of the above oscillator card, the pressure regulators were tested and calibrated satisfactory, September 3, 1986.

3) The operating instructions which use or make reference to the Steam Bypass and Pressure Regulator System, were reviewed and compared with the vendor manual to ensure the system would be operated properly. Integrated Operating Instruction (IOI)-1 "Cold Startup", IOI-2 "Hot Startup", IOI-4 "Shutdown", IOI-6 "Cooldown-Main Condenser Not Available", IOI-7 "Cooldown Following a Reactor Scram Main Condenser Available", and System Operating Instruction (SOI)-C85 "Steam Bypass and Pressure Regulator System" have been enhanced to add a caution to identify possible system anomalies and to ensure that the Bypass Jack is used for pressure control during surveillances to test the Steam Bypass and Pressure Regulator System. The Control Room operators have been trained to the above changes with an emphasis placed on system operation and expected indications.

4) A memorandum was issued from Perry Plant Operations Department (PPOD) Manager to all project personnel re-emphasizing that only PPOD Instrument and Controls Section personnel are to operate instrument-related valves. Additionally, Plant Administrative Procedure (PAP)-0205 "Operability of Plant Systems" and PAP-0905 "Work Order Process" will be revised to include a caution to reenforce the operation of instrument-related valves by proper individuals only.

Energy Industry Identification System Codes are identified in the text as [XX].