

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)
OYSTER CREEK, UNIT 1DOCKET NUMBER (2)
0 5 0 0 0 2 1 9PAGE(S)
1 OF 0 6

TITLE (4)

REACTOR ISOLATION 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	6	1	2	8	5	8	5	0	1	2	0	5	0	0	0	0
0	6	1	2	8	5	8	5	0	1	2	0	5	0	0	0	0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 8: (Check one or more of the following) (11)

OPERATING MODE (9)	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
N	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
POWER LEVEL (10)	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
1	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(vii)(A)	
0	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(vii)(B)	
0	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)
NAME: Michael H. Allen, Operations Engineer
TELEPHONE NUMBER: 6 10 19 9 1 7 1 1 - 14 1 3 8 1 1

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	
B	J	J P C V	M 4 2 3	N	B	A	A I S V V 0 3 7		Y	
B	A	A I S V	V 0 8 0	Y	B	C	E I S V L 2 3 5		Y	

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

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

On June 12, 1985, a mechanical failure of the plant's Electric Pressure Regulator (EPR) resulted in a decrease in reactor pressure. This pressure drop caused automatic closure of the Main Steam Isolation Valves, resulting in an automatic reactor scram. Although all rods inserted to shutdown the reactor, one of the two Scram Discharge Volumes (SDVs) did not fully isolate. The resulting flow of hot water through the volume caused steam and paint fumes to be emitted in the Reactor Building. This in turn caused activation of the deluge fire system on the 51' elevation of the Reactor Building. The Isolation Condensers were not initially used for plant cooldown due to high reactor water level. While attempting to place the Reactor Water Cleanup System in service to lower reactor water level, a cleanup system isolation valve failed to open due to its breaker tripping. The Electromatic Relief Valves (EMRVs) were used to control pressure until reactor water level was reduced (by letdown via the Cleanup System) to the point where the Isolation Condensers could be used. Reactor pressure was then controlled through manual actuation of the Isolation Condensers and pressure was reduced to less than 600 psig. The scram signal was reset, and the plant was placed in the cold shutdown condition. Repairs to the EPR, the two SDV valves, and the cleanup system valve were completed prior to plant startup following this event.

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

Date of Occurrence

The event occurred on June 12, 1985 at approximately 0938 hours.

Identification of Occurrence

The Reactor Protection System automatically scrambled the reactor due to Main Steam Isolation Valve (MSIV) closure. During the event, the south Scram Discharge Volume (SDV) did not fully isolate.

This event is considered to be a reportable event as defined in 10CFR50.73(a)(2)(ii) and (a)(2)(iv).

Conditions Prior to Occurrence

The plant was operating at normal plant pressure of 1020 psig and reactor power level was approximately 1922 MWt. The turbine generator was on line producing approximately 642 MWe. The Reactor Water Cleanup System was out of service for demineralizer resin replacement and was ready to be returned to service. Reactor coolant activity was 1.17×10^{-1} uCi/cc.

Description of Occurrence

On June 12, 1985, a mechanical failure of the Electric Pressure Regulator caused a bypass valve to fully open. The resulting decrease in reactor pressure caused the MSIVs to isolate which then caused a reactor scram. Although all rods inserted to at least position 02, the south SDV did not fully isolate; one drain valve, V-15-121 failed to shut fully and the redundant drain valve, V-15-134 reopened slightly as V-15-121 leakage allowed pressure under the seat of V-15-134 to increase. As reactor coolant leaked past the Control Rod Drive (CRD) seals and into the SDV and Reactor Building Equipment Drain Tank (RBEDT), the SDV and associated piping began to heat up. Also, hot water being drained into the RBEDT flashed to steam. The paint on the SDV began to blister and fume. Steam in the RBEDT emanated from the hub drains in the reactor building, particularly around the south SDV (directly above the RBEDT). The combination of the two eventually caused activation of the deluge fire system on the south end of the 51' elevation of the reactor building. An Unusual Event was declared because of the potential loss of equipment from the deluge system activation.

The scram could not be reset until reactor pressure was reduced to less than 600 psig (MSIV closure scram low pressure bypass). Since reactor water level had increased to greater than 181" TAF, the isolation condensers could

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not be used due to possible water hammer damage. They were then manually overridden, according to procedure, to prevent an impending automatic initiation on high pressure. When reactor pressure increased, two (2) EMRVs opened as their setpoint was reached. The operators then took manual control of the EMRVs, per procedure, and controlled pressure between 950 and 1000 psig. The Containment Spray System was started in the torus cooling mode. While attempting to place the Reactor Water Cleanup (RWCU) system in service (out for a resin change), the auxiliary pump bypass valve V-16-14 failed to open due to its breaker tripping. This delayed lowering reactor water level by letdown to enable use of the Isolation Condensers. Eventually, letdown was established via the RWCU system, level was reduced below 181" TAF and reactor pressure control was switched to the isolation condensers. Pressure was reduced to less than 600 psig and the scram was reset. This removed the source of hot water to the SDV and RBEDT and thus the steam and paint fumes that were entering the reactor building.

During this evolution of lowering pressure, reactor level shrunk to below the reactor low water level setpoint and a second scram signal was received. Level was promptly restored via the feedwater system and the scram was reset. Also, before the initial scram was reset and while the EMRVs were opening on high pressure, several scram signals (3) were received due to high reactor pressure. Since the reactor was already shutdown, these later scrams (low water level and high pressure) were of no significance.

The reactor recirculation pumps were manually tripped before an automatic trip on high reactor pressure was received, in order to activate the Fuel Zone Level System. Since there is a requirement to be less than 212°F prior to restarting these pumps, the operators were directed to place the plant in cold shutdown. Pressure was reduced until the Shutdown Cooling System could be placed in operation and the plant was then placed in cold shutdown.

Once plant conditions were stable and all vital equipment potentially affected by the deluge system was verified operable, the Unusual Event was terminated. A post-trip review was conducted by plant management after the event.

Apparent Cause of Occurrence

The apparent cause of the occurrence was a mechanical failure of the EPR which resulted in a decrease in reactor pressure and a subsequent MSIV closure scram. Small particles in the turbine hydraulic oil to the EPR was the major factor causing EPR failure. A control valve in the EPR, which allows pressure to be controlled, had a particle or impurity lodged in it.

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This caused the valve to stick in a position which called for the main steam control/bypass valves to open (limited to 105% of rated flow) even when power to the EPR was turned off. Therefore, pressure continued to decrease rather than increasing to the setpoint of the Mechanical Pressure Regulator (MPR), which would have taken over control. Thus, the EPR failed such that an attempt to switch to the MPR was not effective in controlling the pressure decrease. Other factors contributing to the event were as follows:

- a. The control room operator controlling level raised reactor water level in the reactor to high in the indicated range. Subsequent leakage through feedwater regulating valves and feed from the CRD pumps raised reactor water level above the level instrument span. The high water level and the inability to determine how high the level was, precluded use of the isolation condensers for pressure control early in the event.
- b. Reactor Water Cleanup (RWC) System isolation valve V-16-14 did not initially open due to a trip of its supply breaker. This hampered the lowering of reactor water level to allow initiation of the Isolation Condenser System. The breaker tripped because the limitorque operator for the valve did not develop sufficient torque to move the valve off its seat. This insufficient torque was a result of improper gear ratios in the operator. This deficiency had been previously identified, and changing of the gear ratios had been scheduled for next outage.
- c. The south SDV drain valves, V-15-134 and V-15-121, did not fully isolate, which resulted in passage of hot reactor water through the SDV into the RBEDT. Valve V-15-121 leaked by because its actuator bottomed out before the valve was fully seated. Improper stroke adjustment was the root cause of this problem. The resulting through leakage caused pressurization of the piping between V-15-121 and downstream valve V-15-134. Because the actuator closing spring for V-15-134 was improperly sized, this valve opened slightly when pressure due to V-15-121 leakage was applied under its seat. With both valves now slightly open, a flow path from the SDV to the RBEDT was established.

Analysis of Occurrence and Safety Assessment

The reactor properly isolated on low reactor pressure and scrambled on MSIV closure. The plant was able to be stabilized in a safe cold shutdown condition. Even though reactor water level was too high to allow initial use of the isolation condensers, reactor pressure was adequately controlled per procedure using the EMRVs.

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The SDVs (north and south) are used to limit the loss of and contain reactor vessel water from all the control rod drives during a scram. The failure of the south SDV to properly isolate after the reactor scram represented a degradation of containment in that it allowed reactor vessel water to pass through the SDV into the reactor building environment. This failure coupled with activation of the deluge system resulted in elevated airborne radiation levels in the reactor building as well as potential operability problems for safety related systems due to high humidity conditions. During this event, prompt operator action allowed reduction of pressure to below 600 psig so that the scram signal could be reset. Once reset, the flow of drive water to the SDV (and into the RBEDT) was terminated. All vital equipment potentially affected by the activation of the deluge system (a result of steam and paint fumes) was verified operable. The safety significance of this event was minimal since the plant was safely brought to cold shutdown and no vital equipment was adversely affected by the deluge system. No radioactivity was released outside the reactor building as a result of this event.

The failure of the south SDV to fully isolate would be most severe during a loss of offsite power. The loss of offsite power causes an immediate reactor scram. Under these conditions, the normal high pressure source of makeup water to the reactor vessel (feed pumps) would not be available. If the SDV did not fully isolate, the resulting leakage through the SDV would cause reactor vessel level to lower to the setpoint which initiates the Core Spray System. Operator action to reduce reactor pressure via manual actuation of ADS would be necessary. This pressure reduction would allow the Core Spray System to makeup for any losses due to SDV leakage. Plant procedures direct the operator to manually reduce pressure to allow use of the Core Spray system as a makeup source during situations (such as the above) in which a small leak causes a decrease in reactor water level but not a decrease in reactor pressure. Thus, operator action, coupled with Core Spray system initiation would act to mitigate the consequences of this worst case scenario.

Corrective Action

The immediate corrective action was to reduce reactor pressure to allow reset of the scram signal. The plant was then placed in cold shutdown. A post-trip review was conducted by plant management following the event. Corrective actions completed prior to the subsequent startup included:

- a. The sticking EPR control valve was rebuilt, filters for the valve were replaced, and the oil tubing supplying the valve was flushed. Results of subsequent testing of the EPR were satisfactory.

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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

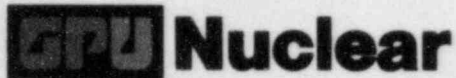
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- b. The gear ratio was changed in the RWCU isolation valve (V-16-14) limitorque operator. The valve performed satisfactorily during subsequent testing.
- c. The stroke was adjusted on SDV valve V-15-121. In addition, all other SDV vent and drain valves were checked for proper stroke adjustment. No deficiencies were noted.
- d. The actuator spring for SDV valve V-15-134 was replaced with a properly sized spring for the valve's particular application. The valve performed satisfactorily during subsequent pressure testing.

Future corrective actions to be implemented include:

- a. This event will be discussed during operator training.
- b. An investigation will be conducted to determine why the incorrect spring was installed in the actuator for valve V-15-134.
- c. The present EPR filtration system will be reviewed for possible improvement (to prevent impurities in the hydraulic control oil). Alternative control valve designs, which would eliminate this type of control valve failure, will also be evaluated.



GPU Nuclear Corporation

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July 12, 1985

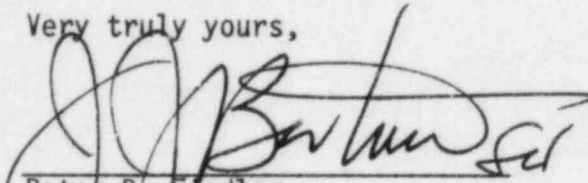
U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Dear Sir:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Licensee Event Report

This letter forwards one (1) copy of Licensee Event Report (LER) No. 85-012. This LER also fulfills the requirement of Section 6.9.3.f. of the Oyster Creek Technical Specifications for reporting challenges and failures of Electromatic Relief Valves (EMRVs).

Very truly yours,



Peter B. Fiedler
Vice President and Director
Oyster Creek

PBF:KB:dam(0981A)
Enclosures

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