LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket Number (2)	Page (3)
Dresden Nuclear Power Station, Unit 3	0 5 0 0 0 2 4 9	1 of 0 7

Title (4) Plant Shutdown Due to Inoperable High Pressure Coolant Injection and Isolation Condenser Systems

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)
									N/A	0 5 0 0 0
0 9	0 5	8 7	8 7	0 1 4	0 0	1 0	0 2	8 7	N/A	0 5 0 0 0

OPERATING MODE (9)	N
POWER LEVEL (10)	0 0 6

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

___ 20.402(b)	___ 20.405(c)	X 50.73(a)(2)(iv)	___ 73.71(b)		
___ 20.405(a)(1)(i)	___ 50.36(c)(1)	___ 50.73(a)(2)(v)	___ 73.71(c)		
___ 20.405(a)(1)(ii)	___ 50.36(c)(2)	___ 50.73(a)(2)(vii)	___ Other (Specify		
___ 20.405(a)(1)(iii)	X 50.73(a)(2)(i)	___ 50.73(a)(2)(viii)(A)	in Abstract		
___ 20.405(a)(1)(iv)	___ 50.73(a)(2)(ii)	___ 50.73(a)(2)(viii)(B)	below and in		
___ 20.405(a)(1)(v)	___ 50.73(a)(2)(iii)	___ 50.73(a)(2)(x)	Text)		

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER
Jerry F. Lizalek Technical Staff Engineer (X-421)	AREA CODE 8 1 5 9 4 2 - 2 9 2 0

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
B	B L	F S	D 1 6 3	N					
X	B J	2 0	C 6 8 4	N					

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 5, 1987, with Unit 3 at 6% rated thermal power, a special test of the isolation condenser was being performed in order to pinpoint the cause of a previous spurious isolation condenser isolation as reported by LER #87-13 on Docket #050249. While performing this testing at 0320 hours, the isolation condenser spuriously isolated due to differential pressure signals generated by an annubar flow sensing instrument located on the isolation condenser condensate return line. The isolation condenser was declared inoperable and the High Pressure Coolant Injection (HPCI) system was immediately tested satisfactorily as required by Technical Specification (T.S.) 4.5.E.2. However, when HPCI was subsequently tested on September 6, 1987 at 17% rated thermal power it was declared inoperable due to inability to obtain the required discharge pressure in the surveillance mode and tripping of the gland seal leakoff blower. An orderly unit shutdown was then completed, and modifications to the isolation condenser isolation circuitry and repairs to a HPCI test return line valve and gland seal leakoff blower were performed. Safety significance was mitigated by the low power levels during this testing program and the availability of the automatic depressurization and low pressure emergency core cooling systems.

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PLANT AND SYSTEM IDENTIFICATION:

General electric boiling water reactor - 2527 MWt rated core thermal power. Energy industry identification systems (EIIS) codes are identified in the text as [XX].

EVENT IDENTIFICATION:

An orderly unit shutdown was performed on September 6, 1987 after the High Pressure Coolant Injection (HPCI) [BJ] system was declared inoperable due to inability to fully close the M03-2301-10 test return line valve. The isolation condenser had previously been declared inoperable on September 5, 1987 due to spurious isolation of the isolation condenser during testing.

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 3 Event Date: September 5, 1987 Event Time: 0320 hours
Reactor Mode: N Mode Name: Startup Power Level: 6%
Reactor Coolant System (RCS) Pressure: 340 psig

B. DESCRIPTION OF EVENT:

On August 7, 1987, Dresden Unit 3 was shut down due to reactor feedwater system [SJ] oscillations. An extensive inspection, repair, and modification program was implemented to prepare for reactor startup. (Refer to LER #87-13 on Docket #050249 for further information regarding this event.) The complexity of the feedwater system transient event led to development of an augmented feedwater system test program designed to collect feedwater system data. Additionally, the startup testing program included a functional test of the isolation condenser [BL] in order to attempt to duplicate conditions which led to an automatic isolation of the isolation condenser while it was being used for cooldown following the securing of the reactor feedwater system. This special test was planned in order to pinpoint the root cause of the previous spurious isolation.

While performing this test of the isolation condenser at 0320 hours on September 5, 1987, in accordance with Special Procedure (SP) 87-8-132, "Isolation Condenser/Group V Isolation Flow Test", at 6% rated thermal power and 340 psig reactor pressure, an automatic primary containment Group V isolation [JM] occurred, closing all the isolation condenser system valves. The isolation condenser was then declared inoperable.

This was similar to the automatic Group V isolation which had tripped the isolation condenser during the shutdown on August 7, 1987. It had been postulated that an annubar flow sensing instrument installed on the isolation condenser condensate return line during the previous refueling outage was perhaps more sensitive to pressure oscillations or signal noise than the elbow tap type flow instrument utilized installed. Review of chart recorder test instrument traces installed for the test indicated that the annubar flow instrument was generating differential pressure spikes which may have resulted in automatic initiation of the Group V isolation. Review of the occurrence with the BWR Engineering Department resulted in implementation of a modification to install a time delay circuit in order to prevent future spurious isolations. Further testing was also planned using additional test instrumentation following installation of the modification.

Technical Specification 4.5.E.2 requires that the HPCI system be demonstrated operable immediately and daily thereafter when it is determined that the isolation condenser system is inoperable. The HPCI system was immediately tested satisfactorily as required. However, when the HPCI system was next tested on September 6, 1987 at 17% rated thermal power it was found that test return to condensate storage tank (CST) [KA] valve M03-2301-10 would not properly throttle in the closed direction. This valve is used during surveillance testing of the HPCI system to simulate injection conditions by pumping water back to the CSTs. With the valve not properly throttled, it was not possible to attain the required HPCI discharge pressure of 1200 psig. The maximum discharge pressure attained was 1100 psig.

Investigation by Maintenance personnel revealed that a packing nut on the M03-2301-10 valve had fallen off and the packing follower was cocked at an angle. Also, while the HPCI surveillance was being performed, the HPCI gland seal condenser hotwell hi/lo level alarm was received. It was verified by Operating personnel that the gland seal condenser hotwell level was high; it subsequently increased to the point where water from the gland seal condenser hotwell overflowed into the gland seal leakoff (GSLO) blower. This resulted in tripping of the GSLO blower. It was observed that that GSLO drain pump was not properly pumping down the gland seal condenser hotwell. In addition, the HPCI hi/lo oil level alarm was received. An Operator was immediately dispatched to the oil reservoir, and it was verified that the oil level was fluctuating near the low level alarm point. The HPCI system was then secured and declared inoperable. Appropriate notifications were made for an Unusual Event at 1135 hours as required per Emergency Action Level 3A, Loss of Plant Systems, and an orderly plant shutdown was commenced as required by Technical Specification 3.5.C.3. The Unusual Event was terminated at 1650 hours on September 6, 1987, when reactor pressure had been reduced to less than 90 psig (below which HPCI and isolation condenser operability is not required).

C. APPARENT CAUSE OF EVENT:

This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv) which requires the reporting of any event or condition that resulted in manual or automatic actuation of any engineered safety feature, and 10 CFR 50.73(a)(2)(i)(B), which requires the reporting of any operation or condition prohibited by the plant's Technical Specifications.

The root cause of the spurious primary containment Group V isolation which tripped the isolation condenser was determined to be differential pressure spikes and/or signal noise generated by the annubar flow instrument on the isolation condenser condensate return line. The annubar flow instrument is designed to sense high flow (300%/2508 gpm) in the condensate return line and initiate an isolation of the isolation condenser in the event of a postulated condensate return line break. The root cause was determined following a review of test recorder traces which were installed as a result of the August 7, 1987 Group V isolation reported by Licensee Event Report (LER) #87-013-0.

The root cause of the M03-2301-10 valve not properly throttling has been attributed to a misaligned packing follower. An investigation by the Maintenance Department revealed that a packing follower nut had fallen off and the packing material was not in alignment with the valve stem. This caused an increased friction drag on the valve stem. This prohibited the valve from fully closing.

The root cause of the HPCI hi/lo oil level alarm was due to the oil level approaching the low oil level alarm point. A review of the lubrication history revealed that the HPCI lubricating oil was pumped out, filtered, and replaced on 8/15/87 while Unit 3 was shut down. A subsequent interview with the Lubrication Foreman revealed that when the oil was replaced approximately 25 to 30 gallons remained in the filtering equipment as sedimentary waste. Approximately 1100 gallons of oil was returned to the oil reservoir and the tank gauge reading was within the normal range. It is believed that although the oil level was returned to the normal level with Unit 3 shutdown, when the unit was returned to service an amount of oil was displaced back into the system piping. This apparently resulted in the lower sump level during system operation.

In order to correct the problem with HPCI GSLO condenser overflow, the GSLO drain pump was replaced. A system inspection performed by the Maintenance department also discovered a vent path originating from the top of the GSLO condenser and terminating at the GSLO hotwell pump suction. It was postulated that this could cause the GSLO hotwell pump to loose its initial prime and become airbound.

D. SAFETY ANALYSIS OF EVENT:

The isolation condenser condensate return line annubar flow sensing instrument was installed as part of the reactor recirculation [AD] piping replacement performed during the last refueling outage. Following startup from the refueling outage, reactor pressure reached 90 psig at 0250 hours on August 24, 1986. However, the isolation condenser was operated satisfactorily on several occasions as shown below.

Date	Event
8/26/86	Dresden Operating Surveillance (DOS) 1300-1, "Isolation Condenser Five Year Heat Removal Capability Test" was performed.
10/1/86	Special Procedure SP 86-9-128, "Unit 3 Isolation Condenser Steam Line High Flow Isolation Setpoint Verification and Heat Removal Capability Verification" was performed.
10/14/86	Isolation condenser was manually initiated in response to a Group I isolation and subsequent reactor scram.
10/23/86	SP 86-9-128, "Unit 3 Isolation Condenser Steam Line High Flow Isolation Setpoint Verification and Heat Removal Capability Verification" was performed.

As documented in LER #86-018 on Docket #050249, a spurious isolation of the Unit 3 isolation condenser did occur on October 14, 1986. However, Unit 3 was shut down with the reactor vessel depressurized at this time. Engineering was contacted and Action Item Record #12-36-35 was initiated to request a review of this event. Instrument Technicians also checked all the primary containment Group V isolation switches and verified they were within Technical Specification limits. This was the first occurrence of a spurious Unit 3 isolation condenser isolation. A second spurious isolation was observed on the Unit 3 isolation condenser during its operation on August 2, 1987, as discussed previously. No similar occurrences have been observed on Dresden Unit 2, and the unit 2 isolation condenser condensate return and steam supply lines do not utilize annubar type flow sensing instruments.

Safety significance of the spurious isolation condenser isolation is mitigated by the fact that it was demonstrated operable on several occasions. Events precipitating use of the isolation condenser (closure of the main steam isolation valves [SB] at power) would be responded to by the electromatic relief valves and target rock safety relief valves [SB], which would automatically open as required and relieve reactor pressure to the torus. If the electromatic relief valves failed to open, the safety valves would automatically lift as required. Reactor makeup could be provided by the reactor feedwater system or the Low Pressure Coolant Injection (LPCI) [BO] or core spray [BM] systems.

Failure of the HPCI test return to CST valve M03-2301-10 valve prevented the Reactor Operator from obtaining the required HPCI discharge pressure during the HPCI surveillance. However, it would not have prevented use of HPCI for injection if necessary during a design-basis accident. Tripping of the GSLO blower due to overflow of the GSLO condenser hotwell also would not have prevented use of the HPCI system for injection. The GSLO blower removes non-condensible gases from the GSLO condenser hotwell during HPCI operation and routes them to the Standby Gas Treatment (SBGT) [BH] system. Loss of the GSLO blower could therefore be postulated to result in increasing HPCI room radiation and temperature levels during extended periods of HPCI operation, which could result in automatic isolation of the HPCI system on high HPCI room temperature (Technical Specification setpoint 200°F). As verified by the Operator locally, the oil level in the HPCI oil reservoir did not fall to a level significant enough to cause any damage to the HPCI turbine.

When both the isolation condenser and HPCI had been declared inoperable, an orderly shutdown was immediately commenced. Within four hours and fifteen minutes, reactor pressure was reduced to less than 90 psig. It should also be noted that this shutdown was initiated from a relatively low power level of 17%. Had a design basis accident occurred during this period, the relief and/or safety valves would have provided automatic depressurization to less than 350 psig reactor pressure, at which time the LPCI and core spray systems would have automatically injected if the normal feedwater system was unavailable.

E. CORRECTIVE ACTIONS:

In order to prevent future recurrence of spurious primary containment Group V isolations, Modification M12-3-87-37 was implemented to install a time delay in the isolation circuitry. The isolation condenser was subsequently functionally tested satisfactorily.

To correct the operating anomaly found on HPCI test return valve M03-2301-10, Work Request #68682 was initiated. The Electrical Maintenance Department performed a motor current signature and inspected the limit and torque switches. No abnormal indications were discovered. While performing a more detailed inspection of the valve body, the Maintenance Department noted that a packing follower nut had fallen off and the packing material was out of alignment. The Mechanical Maintenance Department was immediately dispatched to repair the packing. The packing assembly was repaired and locking nuts installed to prevent future recurrence of this problem.

To correct the low HPCI lubricating oil level condition an additional 55 gallons was added on September 8, 1987. This will adequately replace the 30 gallons removed as sedimentary waste. To prevent this event from recurring the Lubrication Foreman has been informed, by use of a memo, that if oil is removed as sedimentary waste it must be replenished.

To correct the GSLO condenser overflow condition the Mechanical Maintenance Department replaced the GSLO drain pump. Also, the vent line originating at the top of the GSLO condenser and terminating at the GSLO hotwell pump suctions was removed.

F. PREVIOUS OCCURRENCES:

LER Number/Docket	Title
87-013/050249	Low Reactor Water Level Scram Due to a Spurious Isolation Condenser Group V Isolation
87-012/050237	HPCI System Turbine Trips Due to Hydraulic Control System Problems
87-002/050249	HPCI System Inoperable Due to Oil Pressure Regulation Valve Failure
86-020/050249	Spurious Group V Isolation
86-018/050249	Spurious Group V Containment Isolation
86-014/050249	HPCI System Inoperable Due to Plugged Gland Seal Leakoff Pump Suction Screen

G. COMPONENT FAILURE DATA:

Manufacturer	Nomenclature	Model #	MFG Part #
Dietrich Standard	Annubar	DFF-25	N/A
Crane Valve Products	Valve	12" Globe	N/A

The packing was misaligned due to a packing nut falling off.

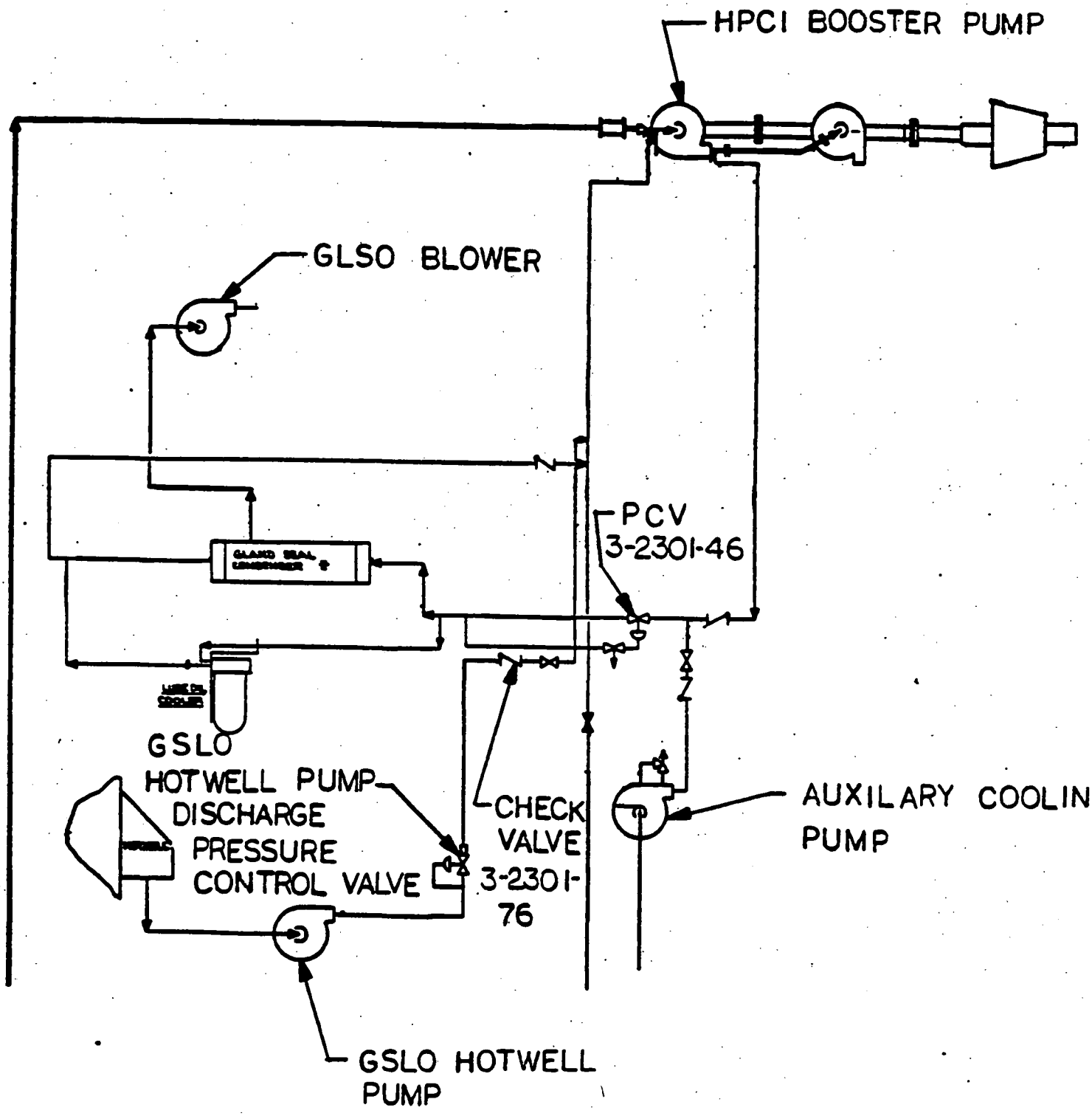
HPCI BOOSTER PUMP
GLSO BLOWER
PCV
3-2301-46
GSLO
HOTWELL PUMP
DISCHARGE
PRESSURE
CONTROL VALVE
CHECK
VALVE
3-2301-
76
AUXILARY COOLIN
PUMP
GSLO HOTWELL
PUMP

FIGURE 1

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Telephone 815/942-2920

October 2, 1987

EDE LTR #87-660

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Washington, D.C. 20555

Licensee Event Report #87-014-0, Docket #050249 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR 50.73(a)(2)(iv) and 50.73(a)(2)(i)(B).

E.D. Eenigenburg
Station Manager
Dresden Nuclear Power Station

EDE/kjl

Enclosure

cc: A. Bert Davis, Regional Administrator, Region III
File/NRC
File/Numerical

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