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JAFP-00-0309

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

Subject: **Docket No. 50-333**
LICENSEE EVENT REPORT: LER-00-016 (DER-00-05874)

**High Pressure Coolant Injection System Declared Inoperable Due to Water in
Turbine Exhaust Piping**

Dear Sir:

This report is submitted in accordance with 10 CFR 50.73 (a) (2) (v).

There are no commitments contained in this report.

Questions concerning this report may be addressed to Mr. Gordon Brownell at (315) 349-6360.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Michael J. Colomb", followed by a horizontal line.

MICHAEL J. COLOMB

MJC:GB:las
Enclosure

cc: USNRC, Region 1
USNRC, Project Directorate
USNRC Resident Inspector
INPO Records Center

IE22

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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TITLE (4)

High Pressure Coolant Injection System Declared Inoperable Due to Water in Turbine Exhaust Piping

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 NAME	DOCKET NUMBER
11	20	00	00	016	00	12	20	00	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000
OPERATING MODE (9)		N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		72	20.2201(b)			20.2203(a)(2)(v)			50.73(a)(2)(i)	50.73(a)(2)(viii)
			20.2203(a)(1)			20.2203(a)(3)(i)			50.73(a)(2)(ii)	50.73(a)(2)(x)
			20.2203(a)(2)(i)			20.2203(a)(3)(ii)			50.73(a)(2)(iii)	73.71
			20.2203(a)(2)(iii)			20.2203(a)(4)			50.73(a)(2)(iv)	OTHER
			20.2203(a)(2)(iii)			50.36(c)(1)		X	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

Mr. Gordon Brownell, Licensing Engineer

TELEPHONE NUMBER (Include Area Code)

315-349-6360

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	BJ	LS	M235	N					

SUPPLEMENTAL REPORT EXPECTED (14)

X YES (If yes, complete EXPECTED SUBMISSION DATE).		NO	EXPECTED	MONTH	DAY	YEAR
				03	20	2001

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

On November 20, 2000, at 2310 hours, with reactor power at approximately 72 percent, it was discovered that the High Pressure Coolant Injection (HPCI) System turbine exhaust drain pot level switch 23LS-98 was inoperable. Prior to the level switch failure, HPCI turbine steam supply isolation valve 23MOV-14 was experiencing valve seat leakage. These concurrent conditions resulted in water accumulation in the HPCI turbine exhaust line and rendered the HPCI System inoperable.

A root cause evaluation is being conducted to determine the cause of this sequence of events.

Immediate corrective actions included repairing level switch 23LS-98 and returning it to an operable condition, successfully completing Surveillance Testing of the HPCI System, returning HPCI System to an operable status, and initiating a root cause analysis of the event.

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DESCRIPTION

On November 20, 2000, at 2310 hours, with reactor power at approximately 72 percent, operators discovered that the High Pressure Coolant Injection (HPCI) System [BJ] turbine exhaust drain pot level switch 23LS-98 was inoperable. Prior to the level switch failure, HPCI turbine steam supply isolation valve 23MOV-14 was experiencing valve seat leakage. These concurrent conditions resulted in water accumulating in the HPCI turbine exhaust line and rendered the HPCI System inoperable.

There has been known seat leakage through isolation valve 23MOV-14. The function of 23LS-98 is to provide Control Room annunciation and automatic opening of HPCI turbine exhaust drain valve 23AOV-54 upon high water level in the HPCI turbine exhaust drain pot. On November 20, 2000, it was determined that 23LS-98 was not functioning as designed. During the ensuing investigation, Instrument and Controls (I&C) technicians determined that the reset over-travel adjustment of level switch 23LS-98 had moved from its original setting and resulted in the failure of the level switch contacts to makeup. This resulted in the failure of the switch to actuate on the high water level trip setting. The technicians completed repairs to the switch and returned 23LS-98 to an operable condition.

CAUSE OF THE EVENT

Seat leakage past 23MOV-14 resulted in the accumulation of water in the HPCI turbine exhaust line. The design function of 23LS-98 is to provide Control Room annunciation and opening of HPCI turbine exhaust drain valve 23AOV-54 upon high water level in the HPCI turbine exhaust drain pot. On November 20, 2000, level switch 23LS-98 was found inoperable. This condition resulted in the failure of the switch to actuate both the Control Room annunciator and the HPCI turbine exhaust drain valve 23AOV-54 on the high water trip set point. The apparent cause for the level switch failure was the lack of a locking mechanism on the switch's over-travel adjustment machine screw. This screw had rotated down from its original setting, preventing full switch arm movement and prohibiting switch contact makeup.

A root cause evaluation is being conducted to determine the cause of this sequence of events.

Select HPCI System parameters are being monitored on an increased frequency to ensure HPCI System operability. This monitoring will continue until completion of the root cause evaluation.

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EVENT ANALYSIS

This report is being submitted in accordance with 10 CFR 50.73(a)(2)(v), "Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to: Remove residual heat; or Mitigate the consequences of an accident."

The effects of water in the HPCI turbine exhaust piping had been identified as an industry concern as documented in General Electric's Service Information Letter (SIL) Number 580 dated May 6, 1994. The SIL described incidents involving the bursting of turbine exhaust line rupture diaphragms (discs) during HPCI turbine startups rendering HPCI inoperable. The cause of the incidents was identified as a malfunction of the turbine exhaust line drain system. During system startup, steam at reactor pressure is admitted to the turbine. If water is blocking the turbine exhaust line, the steam pressure in the turbine exhaust casing rapidly increases to accelerate the water slug through the line. This can result in the compression of the non-condensibles downstream or upstream of the water slug. If the rupture diaphragms are exposed to this momentary high pressure before the water slug is expelled, it can result in the rupture of both exhaust line rupture diaphragms, rendering HPCI System inoperable.

This potential scenario was the basis for declaring the HPCI System inoperable on November 20, 2000.

The HPCI System was last tested as required by Technical Specifications (TS) and declared operable on November 15, 2000 at 0035 hours. An evaluation estimated that the approximate date/time the HPCI exhaust line filled with water and became inoperable was November 17, 2000 at 1330 hours. The failure of 23LS-98 was discovered and HPCI System declared inoperable on November 20, 2000 at 2310 hours. Repairs and surveillance testing were successfully completed and the HPCI System was returned to an operable condition at 1755 hours on November 21, 2000. It is therefore estimated that the HPCI System was inoperable for 4 days, 4 hours and 25 minutes.

The safety significance of the condition was minimal based on the Automatic Depressurization System (ADS) [SB], the Residual Heat Removal (RHR) System [BO], and the Core Spray (CS) System [BM] being available as emergency core cooling systems during the period HPCI was inoperable. The Reactor Core Isolation Cooling (RCIC) System [BN] was also available as a source of high pressure injection during this period.

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EXTENT OF CONDITION

An extent of condition review was completed for similar potential affects of water intrusion on the RCIC System. The review results identified that the RCIC System steam admission isolation valve was not leaking as evidenced by ambient temperatures on the turbine casing.

23LS-98 is a Mercoid level switch and is unique to the HPCI System.

Following completion of the root cause analysis, the lessons learned from this event will be extended to the RCIC system.

CORRECTIVE ACTIONS

1. Immediately following the discovery of inoperable level switch 23LS-98, I & C technicians successfully completed repairs and returned 23LS-98 to an operable condition. **(Complete)**
2. Surveillance Test Procedure ST-4N, "HPCI Quick-Start, Inservice, & Transient Monitoring Test" was successfully completed following level switch repairs, and the HPCI System was returned to an operable status. **(Complete)**
3. A root cause evaluation is being conducted to review the sequence of events leading to this event, and to determine the reason(s) for the HPCI System becoming inoperable. The results of this root cause evaluation and resulting corrective actions will be provided in a supplement to this LER.
(Root Cause Evaluation Scheduled Completion Date - February 28, 2001)
4. Following completion of the root cause analysis, the lessons learned from this event will be extended to the Reactor Core Isolation Cooling System. **(Scheduled Completion Date - April 1, 2001)**

ADDITIONAL INFORMATION

A. Previous Similar Events:

LER-89-014 reported declaring the HPCI System inoperable due to seat leakage through 23MOV-14 and resulting in water contamination of the turbine bearing lubricating oil system.

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ADDITIONAL INFORMATION (cont.)

B. Failed Components:

Component Identification: HPCI Turbine Exhaust Drain Pot Level Switch
Component Mark Number: 23LS-98
Component Description: Displacement Level Switch
Manufacturer: Mercoïd Corp.
Model Number: 215-1

C. Applicability to NEI 99-02, Rev. 0:

This event does constitute a safety system functional failure in the context of NEI 99-02, Revision 0.