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May 31, 1994

GFSLTR 94-0173

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

License Event Report 94-005, Docket 50/237 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR 50.73(a)(2)(iv).

Sincerely,

Gary F. Spedl
Station Manager
Dresden Station

GFS/meh

Enclosure

cc: J. Martin, Regional Administrator, Region III
NRC Resident Inspector's Office
File/NRC
File/Numerical

(GFS94\0173.94)

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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Dresden Nuclear Power Station, Unit 2	05000237	1 OF 5

TITLE (4)
Manual Reactor Scram Due to Loss of Instrument Air

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
04	30	94	94	-- 005 --	0	05	31	94	None	
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(iii)		73.71(b)
	20.2203(a)(1)		20.2203(a)(3)(ii)	X	50.73(a)(2)(iv)		73.71(c)
	20.2203(a)(2)(i)		20.2203(a)(4)		50.73(a)(2)(v)		OTHER
	20.2203(a)(2)(ii)		50.36(c)(1)		50.73(a)(2)(vii)		(Specify in Abstract below and in Text, NRC Form 366A)
	20.2203(a)(2)(iii)		50.36(c)(2)		50.73(a)(2)(viii)(A)		
	20.2203(a)(2)(iv)		50.73(a)(2)(i)		50.73(a)(2)(viii)(B)		
	20.2203(a)(2)(v)		50.73(a)(2)(ii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Ken Yates, System Engineer Ext. 2715	(815) 942-2920

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 15 single-spaced typewritten lines) (16)

On April 30, 1994 at 2334, Unit 2 was manually scrammed from 99% power due to rapid depressurization of the Instrument Air (IA) [LD] header. All eight main steam isolation valves (MSIV) were manually closed. All systems operated as expected.

The loss of Instrument Air was due to a circumferential failure of the 2A IA compressor supply line to the 2A air receiver, which was attributed to excessive pipe wall thinning from moisture induced corrosion.

Following the scram and MSIV isolation, a reactor water level transient occurred that resulted in water overflow into the HPCI steam supply and Isolation Condenser lines. The lines were drained following the event, and no damage to components, piping, or supports was observed.

EVENT IDENTIFICATION:

Manual Reactor Scram Due to Loss of Instrument Air

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: April 30, 1994 Event Time: 23:33:26

Reactor Mode: N Mode Name: Run Power Level: 99%

Reactor Coolant System Pressure: 1005 psig

B. DESCRIPTION OF EVENT:

On April 30, 1994 at 2333, with Unit 2 operating at 99 % reactor power, a Control Room Annunciator, 2A Instrument Air Dryer trouble alarm/bypass open, was received. At 23:33:10 and 23:33:26, Unit 2 Instrument Air Pressure and Unit 2 Service Air Pressure Lo Alarms were recorded on the Control Room Sequence of Events Recorder (SER), respectively. The Unit 2 Shift Supervisor (SS) was dispatched to investigate the cause of the low pressure conditions. At 2344, a manual reactor scram was initiated by the Unit 2 NSO per Dresden Abnormal Operating Procedure (DOA 4700-01), at 55 psig instrument air (IA) header pressure.

The cause of the rapid loss of air was a circumferential failure of the 2A IA compressor supply line at the 2A IA receiver tank. IA header pressure decreased to approximately 40 psig before the manual isolation valve was closed and pressure recovery began. The Unit 2 SS verified the backup Service Air to Instrument Air cross-tie valve had opened as required. The backup air supply, however, was unable to maintain header pressure due to the size of the break (3").

Following the manual scram and MSIV closure, reactor water level decreased as expected due to shrink. The NSO manually closed the 2A Feedwater Regulating Valve (FWRV) as level reached -3" increasing. The 2B FWRV was in automatic control and opening to restore level to the 15" Feedwater Level Control System (FWLCS) level setpoint. The reactor feedwater pumps (RFP) were operating near runout flow conditions and level was increasing about 3" per second. As level passed 15" increasing, the feedwater flow rate began to decrease; the 2B FWRV began closing in automatic control. At 20" Reactor Vessel Level the NSO placed the 2B FWRV in manual control and closed the valve some amount to reduce vessel level rate of rise. During reactor vessel level recovery, the NSO transferred back to automatic control, subsequently vessel level reached 55" causing the RFPs and Main Turbine to trip. RFP inertia coast down resulted in vessel level increase to 62 inches with water intrusion into the HPCI and Isolation Condenser inlet steam lines.

Water was drained from the HPCI steam line to the Inlet Drain Pot causing a high level alarm. The Inlet Drain Pot was aligned to the Main Condenser and Suppression Pool to allow draining. Approximately forty minutes after the event the Inlet Drain Pot Hi Level Alarm cleared. Additional draining was performed following the event to insure the HPCI turbine was completely free of water. The HPCI System was considered operable during the entire event. Isolation Condenser operation was initiated following the reactor scram for reactor vessel pressure control, and performed as expected. A system walkdown of accessible steam supply and condensate return lines was performed on May 1, 1994 to inspect for possible water hammer. No evidence of water hammer was observed.

C. CAUSE OF EVENT:

This report is submitted in accordance with 10CFR50.73(a)(2)(iv), which requires reporting of any event that results in unplanned manual or automatic actuation of any engineered safety feature, including the Reactor Protection System.

The initiating event was mechanical failure of the threaded portion of the inlet air supply piping to the Unit 2A Instrument Air Receiver Tank. The piping had thinned due to oxidation of the carbon steel pipe in the presence of moisture. The layered appearance of the oxide indicates the corrosion had taken place over a period of years, and the pipe eventually failed when it could no longer withstand system operating pressure.

The current design of the IA system does not include check valves that would prevent depressurization of the IA header in the event of a break at the receiver.

The cause of the excessive moisture in the IA piping/receiver tank appears to be improper operation of the moisture separator (MS) and receiver tank moisture traps. Maintenance history review found seven instances of trap replacement and six instances of trap cleaning, with no apparent effort to find and correct the root cause.

Operating personnel manually blowdown the moisture traps each shift, and interviews indicated that the 2A IA after cooler moisture separator and receiver drain trap occasionally contain several gallons of water, particularly during high humidity conditions. This was not typical of the other compressor locations.

Additionally, comparison of moisture separator field installation to design drawings indicates that the drain line to the MS is improperly installed, allowing excess moisture to remain in the separator and possibly be carried into the piping and receiver.

The cause of the reactor vessel overfill appears to have been complicated by operator actions taken to mitigate the level transient. Review of the transient indicates the feedwater level control system appeared to be operating properly. It was determined that the manual manipulation of the feedwater regulating valve complicated the event and allowed the overfill to occur.

D. SAFETY ANALYSIS:

The safety significance of this event was minimal. On the loss of instrument air, the operators scrammed the reactor and shut all MSIVs in accordance with plant Operating Abnormal Procedures. All systems operated as expected, and all safety related air operated valves operated as expected.

Following the scram, reactor water level rose above the HPCI Steam Line Supply Nozzle, and an unknown amount of water entered the line. The water drained from the steam line to the Inlet Drain Pot, which was aligned to the Main Condenser and Suppression Pool. Approximately forty minutes after the event the Inlet Drain Pot Hi Level Alarm cleared. Additional draining was performed following the event to insure that the HPCI turbine was completely free of water.

The HPCI turbine is designed to ingest some water, and would have operated if required.

E. CORRECTIVE ACTIONS:

The 3C IA compressor, normally aligned to supply Unit 2, was out-of-service for scheduled maintenance. The 3C IA compressor was expeditiously returned-to-service to allow Unit 2 start up.

The 2A IA compressor continues to remain out-of-service until the receiver tank is replaced.

Thickness measurements and an engineering evaluation were performed on the 2B and 3C IA systems to determine receiver and inlet pipe thinning and the potential for a similar failure. The 2B and 3C receiver tanks were found to have similar but not as severe thinning. The tanks will be replaced within the next 6 months.

The 3A and 3B IA Receiver tanks will be inspected as soon as practical.

The Feedwater level excursion will be reviewed in continuing training with licensed operators. The setpoint for the RFP and Turbine trip instruments was verified to be 54.5". The setpoint methodology was re-evaluated to conservatively apply all instrument and calibration uncertainties under normal operating conditions and a new setpoint was derived at 48". A setpoint change was made prior to unit startup along with appropriate procedure changes.

A walkdown of all accessible steam inlet piping was performed on the HPCI and Isolation Condenser systems to ensure support integrity. Dresden Operating Surveillance (DOS) 2300-3, HPCI Monthly Verification was performed during startup to verify the HPCI system drains were functional.

F. PREVIOUS OCCURRENCES:

LER/Docket Number	Title
93-05/05000249	Instrument Air Header Pressure Loss Via 3A Instrument Air Dryer Due to Management Deficiency
90-47/05000249	Manual Reactor Scram Due to Loss of Instrument Air Through Unit 3A IA Dryer Inlet Valve and Failure of SA/IA Cross-tie Valve to Open.

G. COMPONENT FAILURE DATA:

The Instrument Air System is not NPRDS reportable.