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U.S. Nuclear Regulatory Commission
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Enclosed is the third supplement to Licensee Event Report 94-005, Docket 50-237, which is being submitted pursuant to 10 CFR 50.73(a)(2)(iv) which requires the reporting of any event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

This correspondence contains no new commitments.

If you have any questions, please contact Terry Riley, Dresden Regulatory Assurance Supervisor at (815) 942-2920 extension, 2714.

Sincerely,

for
J. Stephen Perry
Site Vice President
Dresden Station

Enclosure

cc: A. Bill Beach, Regional Administrator, Region III
NRC Resident Inspector's Office

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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 6

TITLE (4) Manual Reactor Scram Due to Loss of Instrument Air Resulting from Air Receiver Pipe Failure Caused by Improper Installation of Threaded Pipe During Initial Construction

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
									None	
04	30	94	94	-- 005 --	03	04	23	97	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	099

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
B	LD	PSF	X999						

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) header. All systems operated as expected. The loss of Instrument Air was due to a mechanical failure of the threaded portion of the inlet air supply piping to the 2A IA Receiver Tank. Pipe failure is attributed to pipe wall thinning from moisture induced corrosion compounded by the original construction threaded pipe installation which was contrary to the original plant (butt weld) design specification. The 2A receiver tank and inlet pipe were replaced and the compressor returned to service. The safety significance of this event was minimal. The ADS system was available for reactor pressure relief and the LPCI and Core Spray systems were available for core cooling. A previous reactor scram on loss-of-instrument-air, reported on January 16, 1993, was caused by dryer and backup air supply system failures. Corrective actions from that event would not have prevented this event.

This event is reportable per 10 CFR 50.73(a)(2)(iv), any event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Dresden Nuclear Power Station, Unit 2	05000237	94	-- 005 --	03	2 OF 6

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

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2527 Mwt rated core power.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX] and are obtained from IEEE Standard 805-1984, IEEE Recommendation Practice for System Identification in Nuclear Power Plants and Related Facilities

EVENT IDENTIFICATION:

Manual Reactor Scram Due to Loss of Instrument Air [LD] Resulting from Air Receiver Pipe Failure caused by improper installation of threaded pipe during initial construction contrary to the design specification.

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:

This LER is being submitted pursuant to 10 CFR 50.73(a)(2)(iv) which requires the reporting of any event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

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 [LD] 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 23:34:44, 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 inlet. 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"). IA header pressure decreased to approximately 40 psig before the manual isolation valve from the 2A receiver/IA header was closed and pressure recovery began.

Following the manual scram and MSIV closure, reactor water level decreased as expected due to shrink. The Nuclear Station Operator (NSO) manually closed the 2A Feedwater Regulating Valve (FWRV) per procedure 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. Review of post SCRAM reactor vessel level data indicates that as level passed 15" increasing, the feedwater flow rate began to decrease due to the 2B FWRV closing in automatic control. A drop in reactor vessel rate of level increase, however, was not apparent to the NSO. The NSO realized that high level would trip the RFPs. 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 reasoned the FWLCS could control level and transferred back to automatic control. Vessel level subsequently 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.

The operator's actions were within the procedures and current training. It was noted during the review of the data that no decrease in flow occurred corresponding to the manual flow control actions. Operators stated that training does not stress the elevation of the steam lines for HPCI or the Isolation Condenser in sufficient detail to realize their close proximity to the high level trip. Review of the transient indicated the feedwater level control system appeared to be operating properly prior to operator actions. The trip setpoints for the high level trips were verified and found to be within tolerances however the setpoint was reevaluated and reset to prevent future flooding of the 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 [BJ] was considered operable during the entire event. Isolation Condenser [BL] 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. APPARENT CAUSE OF EVENT:

The initiating event was mechanical failure of the threaded portion of the inlet air supply piping to the Unit 2A Instrument Air Receiver Tank. Sections of the inlet pipe were provided to Systems Materials Analysis Department (SMAD) for analysis to determine the cause of failure. The SMAD analysis indicated uniform corrosion thinning with failure at the pipe threads, the thinnest portion of the pipe wall. Threaded connections are susceptible to failure due to pipe wall thinning which occurs during the threading process in addition to the higher stress levels placed on threaded connections versus welded connections. The primary cause of the pipe failure was the improper installation (NRC Cause Code A) of a threaded pipe connection to the 2A Instrument Air Receiver Tank during initial plant construction. A review of original plant piping design specification (K-2202) revealed that a butt weld piping connection was required as opposed to the installed threaded pipe connection for 3" carbon steel. The receiver tank bid specification did not specify nozzle requirements. It is believed that the vendor supplied receiver, which contained a threaded nozzle, was field installed with a threaded pipe to a welded flange to simplify installation. Persons involved with the initial installation could not be identified to verify and validate the cause for threaded pipe installation.

D. SAFETY ANALYSIS:

The safety significance of this event was minimal. Concurrent with the loss of Instrument Air system header pressure, the operators scrammed the reactor and shut all MSIVs in accordance with plant Operating Abnormal Procedures. Isolation Condenser operation was initiated following the reactor scram for decay heat removal and reactor vessel pressure control, and performed as expected. 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 capable of operating with some water ingested (UFSAR section 6.3.3.1.3). In the event that a HPCI isolation were to occur, the Automatic Depressurization System (ADS), Low Pressure Coolant Injection (LPCI), and Core Spray (CS) [BM] Systems were available for core depressurization, inventory makeup, and core cooling.

E. CORRECTIVE ACTIONS:

The 2A IA compressor receiver tank, moisture separator, drain traps and portions of the inlet and discharge pipe were replaced. Throughout the IA System, corrective actions to address the primary cause of pipe failure (pipe failure at the threaded receiver/instrument air compressor connection) consisted of replacing the threaded connections at the air receiver tanks with welded connections.

Tank Inspections

Thickness measurements and an engineering evaluations were performed on the 2B, 3A, 3B, and 3C IA systems to determine receiver and inlet pipe thinning and the potential for a similar failure. Tank inspections for the 2B, 3A, and 3C receiver tanks were found to have similar but not as severe thinning.

Modifications were initiated to replace these tanks with a welded nozzle design. The 3B tank internals were found acceptable, weld overlays were placed over the threaded inlet air supply piping to prevent a postulated pipe failure. State of Illinois Department of Nuclear Safety (IDNS) Certificate Inspections will continued to be performed on the 3B IA tank and replaced as required.

The 2B IA receiver tank, inlet and discharge piping were replaced and the compressor returned to service during March, 1995; the 3A instrument Air receiver tank was replaced and returned to service in July, 1995; and the 3C Instrument Air Compressor Air Receiver Tank was replaced and returned to service in October 1995. All receiver tanks/piping interfaces included butt weld connections.

Feedwater Level Excursion

The Feedwater level excursion was reviewed in continuing training with licensed operators. Additional training has been performed to emphasize the level of the steam lines versus the RFP trip point. The operators did not act outside their procedures or training. Alternate methods have been discussed to prevent overfilling the reactor. The setpoint for the RFP and Turbine trip instruments was verified to be 54.5". The setpoint error analysis 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.

HPCI and Isolation Condenser Steam Line Inspection

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	Manual Eeactor Scram Due to Loss of Instrument Air Through Unit 3A IA Dryer Inlet Valve and Failure of SA/IA Cross-tie Valve to Open.

During this event, loss of instrument air resulted in a manual reactor scram on decreasing air header pressure. Loss of IA was due to an air dryer valve cycle failure, concurrent with the failure of the Service Air to Instrument Air backup air supply (cross-tie) valve to open in sufficient time to restore air header pressure. Corrective actions from this event which included dryer and back-up air supply valve improvements would not have prevented the April 30, 1994 loss of Instrument Air event.

G. COMPONENT FAILURE DATA:

The Instrument Air System is not NPRDS reportable.