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Dresden Nuclear Power Station
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September 1, 1994

RLBLTR 94-0008

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

Licensee Event Report 94-018, Docket 50-249 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10CFR50.73(a)(2)(iv).

Sincerely,

Richard L. Bax
Unit 3 Station Manager
Dresden Station

RLB/TT:cfq

Enclosure

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

rlb94/0008.94

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 3	05000249	1 OF 7

TITLE (4)
Unit 3 Reactor Scram on Low Level Due to Programmatic Deficiency and Human Error

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
08	06	94	94	-- 018 --	0	09	05	94	None	
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	003

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)
T. Theesfeld, Operations Staff Ext. 3572	(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 August 6, 1994, at 07:40 hours, during plant startup, Unit 3 scrammed from 3% reactor power on Low Reactor Water Level. While attempting to place a third Condensate Demineralizer into service, the operating shift crew became distracted monitoring Condensate/Condensate Booster (C\CB) pump amps and demineralizer differential pressure, and failed to monitor reactor water level. In the course of manipulating the C/CB pump minimum flow bypass valve to control amps and demineralizer differential pressure, the valve was fully opened, diverting nearly all condensate flow to the Main Condenser. Reactor water level decreased to the scram setpoint.

The C/CB pump minimum flow valve was closed down to establish normal flow. Recovery from the Scram was completed per procedures and the reactor was cooled down to cold shutdown condition. The licensed operators involved in the event were temporarily relieved of shift duties to assess their performance and assist in the investigation of the event.

EVENT IDENTIFICATION:

Unit 3 Reactor Scram on Low Level Due to Programmatic Deficiency and Human Error

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 3 Event Date: 08/06/94 Event Time: 07:40

Reactor Mode: N Mode Name: Start-up Power Level: 03%

Reactor Coolant System Pressure: 300 psig

B. DESCRIPTION OF EVENT:

The conditions prior to the event were as follows: the crew had just finished a shift brief covering the process of placing a third Condensate Demineralizer in service along with a second Condensate/Condensate Booster (C/CB) [SD] Pump and the first Feedwater Pump. A review of the post scram data indicated that prior to opening the C/CB minimum flow bypass valve, reactor pressure was 300 psig with a Main Steam bypass valve 3/4 open. The feedwater low flow regulating valve was in service and was approximately 25% open. The 3C C/CB pump was operating at approximately 6,500 GPM with about 600 GPM going to the reactor and the remainder going to the condenser via the C/CB pump minimum flow bypass line. The feedwater pump suction header pressure was approximately 338 psig and was adequate to provide sufficient flow to the vessel under the conditions at the time.

To support the start of the second C/CB pump, flow needed to be increased to maintain sufficient operating amperage on the pumps to minimize flow induced vibration at the pumps. The C/CB pump minimum flow bypass valve was fully opened, which caused the feedwater suction pressure to drop to approximately 300 psig. As reactor level dropped, the low flow feedwater regulating valve went full open. However, with insufficient pressure head to deliver water to the vessel, reactor water level dropped below the scram setpoint and reached a low of +6.9 inches. The water level remained below +8" (Dresden Emergency Operating Procedure action point) for approximately 17 seconds.

The C/CB pump minimum flow valve was closed down to establish normal flow. Recovery from the Scram was completed per procedures and the reactor was cooled down to cold shutdown condition.

At 0740 an ENS notification was made pursuant to 10CFR50.72(b)(2)(ii) - any event or condition that results in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

C. CAUSE OF EVENT:

This report is submitted in accordance with Title 10 of the Code of Federal Regulation Part 50 Section 73 (a) (2) (iv), which states that any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS) must be reported.

Operator Inappropriate Actions

At the 0715 all crew brief, the overview of upcoming activities on Unit 3 was discussed, and the Unit 1 non-licensed operator (NLO) was assigned the task of placing 3E condensate demineralizer into service. Shortly following the all crew brief, a Unit 3 detailed brief was given at the Unit 3 console. During this brief the Nuclear Station Operators (NSOs) (licensed reactor operators) were told that the unit 1 NLO would place the 3E demineralizer into service. The Unit 3 NSO, thinking that the Unit 1 NLO was already in the plant placing the 3E condensate demineralizer in service, quickly dispatched the Unit 3 NLO to open the condensate/booster minimum flow bypass valve. The Unit 3 NLO arrived at the condensate/booster pump minimum flow bypass valve and slowly opened the valve while in radio contact with the Unit 3 NSOs. When condensate demineralizer differential pressure reached 37 psig, the Unit 3 NSO instructed the NLO to stop opening the valve. Due to the perceived time pressure to establish more flow through the booster minimum flow valve prior to placing the 3E demineralizer into service, the control room operators were intent on watching demineralizer differential pressure. Coupled with their apprehension over condensate pump amps, they focused in on the condensate system only. The operations crew failed to communicate with one another the actual condition of the Unit 1 NLO and his job assignment and did not verify the actual status prior to assigning the next job. (See corrective action #2)

The Unit 3 NSO saw that reactor water level had started to trend downward when the condensate minimum flow valve was being opened. He recognized that the low flow feedwater regulator valve was opening to compensate for that downward trend. It is not unusual to see slight level swings when performing tasks affecting pressure, flow or power. The NSO assumed reactor water level was stable because he saw the initial slight dip in level and he saw the low flow feedwater regulating valve opening in response to the initial lowering reactor water level. He verified feedwater flow on the recorder on the 903-5 panel indicated steady flow rates. The feedwater flow recorder on the 903-5 panel indicated a constant feedwater flow of 400,000 pounds mass per hour. The Unit 3 NSO had witnessed a similar response several times previously, which led him to believe parameters were steady. For this reason, he did not feel a strong anxiety when level "fluctuated" when they started opening the condensate minimum flow valve. Unfortunately, the signal observed on the feedwater flow recorder was "noise", and not actual flow. (See corrective actions #3 and #4)

From 0735 until 0739 reactor water level was decreasing without being observed. No individual was specifically assigned the task of monitoring reactor water level during the briefings, but it is generally accepted, and consistently reinforced in the training process, that the unit NSO has primary responsibility for reactor water level monitoring. The failure to monitor level was not due to a training deficiency or procedural inadequacy. This failure occurred because the operators were concerned with a single parameter (C/CB pump amperage) and had not focused on overall plant conditions.

The NSO did not verify that reactor water level was steady following the observation that the level had decreased slightly and the low flow feedwater regulator valve was opening. Had the information that the NSO assumed previously been verified or validated, the NSO would have realized that reactor water level was continuing to decrease which would have led him to respond to the reactor water level transient. Therefore, better panel attentiveness would have prevented this event (See corrective action #1 and #5)

Organizational and Programmatic Concerns

An apprehension over the potential adverse consequences of failing to control the condensate system within prescribed limitations led the operators to focus their attention on the C/CB pump amperage limits during this evolution. The importance of error free operation has been stressed, but not clearly defined standards of performance. Each of the NSO's operating the plant during this evolution were monitoring the amps on the condensate pumps and watching the differential pressure across the demineralizers. The station has placed significant importance upon these values to limit C/CB pump low flow induced vibration. The SRO's involved with the start-up were ensuring that the NSO's were monitoring those parameters. Each person involved was ensuring the team would not make a mistake with this system.

DGP 1-1, Reactor Startup, states that a Reactor Feed Pump should be started when reactor pressure reaches 300 psig. To accomplish this, the Condensate Pumps must be able to supply sufficient water to the suction of the RFP. There is a conflict, however, in that the minimum amperage requirements for the operating condensate pumps are so restrictive that the operators must set system flows much higher to maintain this amperage. During this scenario, the reactor water level decreased because additional flow (needed for condensate pump requirements) was diverted via the condensate minimum flow line to the condenser. Actual operation requires a second condensate pump be started to support the start of the first reactor feed pump when performed at 300 psig placing the operator in a position where there is conflict between actual needs, start-up procedure needs, and system start-up procedure needs. (See corrective action #6)

During interviews with the licensed individuals involved, it was discovered that several individuals had been involved in a reactor startup where difficulty was encountered in maintaining reactor level while attempting to coordinate the start of a second condensate/booster pump and the first feedwater pump. None of these past events was adequately documented under the past reporting program, and could then not be reviewed for proper lessons learned. (See corrective action #7 and #8)

D. SAFETY ANALYSIS:

The safety significance of this Low Water Level scram is considered minimal. The reactor protection system is an engineered safety feature that monitors reactor operation and initiates a reactor trip upon detection of a condition outside normal parameters to prevent exceeding any safety limits. The reactor scram occurred at the required setpoint and design parameters were not exceeded.

E. CORRECTIVE ACTIONS:

1. Return to service of Unit 3 is on hold until high standards of performance in operations is defined and successfully demonstrated. These standards will include supervisory involvement and panel attentiveness.

2. The operations crews will participate in a lesson regarding skill-based errors and proven corrective actions to eliminate time based pressures. This will include discussion on good vertical and horizontal communication, supervisory expectations, and how a good questioning attitude can prevent this type of error from occurring again.

3. The training regarding self-check with an emphasis in the control room was continued for the remainder of the training cycle for each operating crew. A letter regarding the self-check policy in Operations (which is known as STAR: Stop, Think, Act, Review) as well as other departmental expectations has been sent to each of the Shift Engineers. This letter recognizes that the majority of our attention has been applied towards non-licensed operators. This letter was reviewed with the Shift Engineers emphasizing the need to stress this concept in the Control Room with Reactor Operators, Shift Control Room Engineer's, Shift Outage Managers, and Shift Engineers and to provide additional coaching as necessary to reach these expectations. (This item is completed.)

4. A review of the recorder by the Instrument Maintenance Department after the scram showed that the recorder was only tracing a noise signal and that the recorder does not trace feedwater flow until a feedwater pump is running. The information regarding the feedwater flow recorder was shared with the operators with the description of this event and submitted to training for inclusion into the licensed operator training programs. (This item is completed.)

5. The department consistently encourages a questioning attitude by the operators. This involves using multiple indication to assess information and validating and verifying the data to be correct. The individual involved with this event was counseled on the methods of correct Qualification, Validation and Verification of information to ensure that multiple input is used whenever possible when making a decision. (This item is completed.)

6. System Engineering has performed testing on this system since the scram occurred, and they have determined that the restrictions on the pumps were too limiting. New criteria has been established which lowers the amperage limits for the running pumps. The procedures regarding the start-up of the condensate pumps and the reactor feed pumps are being changed to reflect these new limits.

E. 7. A list of potential problem areas encountered during this and other similar evolutions for reactor startups, shutdowns, or other major evolutions deemed appropriate by the Operations Manager is being developed. Each crew is participating in a workshop designed specifically for potential problem analysis of conditions that exist during reactor start-up.

8. A step is being placed in DGP 1S-3, Unit 2/3 Master Outage Checklist, to formalize the requirement to contact the Operations Department, root cause analysis/self-assessment team for current trend data or significant event reports relative to unit startup.

F. PREVIOUS OCCURRENCES:

LER/Docket Number	Title
12-3-90-47	Air Dryer Failure Due to Management Deficiency

This item was relative to assigning prioritization to nuclear work requests.

G. COMPONENT FAILURE DATA:

None.

EVENT SUMMARY AND CAUSE CODES

LER NUMBER

12-3-94-018

	Lost generation	X	Reactor trip		NRC violation, level
	Cost > $25,000	X	ESF actuation		GSEP event, class
	Hazard or Spill	X	NRC reportable		Tech Spec LCO
	Personnel injury	X	LER		Potential or future loss
			PSE		SALP functional area

	Component Type					Failure mode								
X														
X														
X														

	Licensed? L or blank	Level	Department					Type	Detail Code		
A	L	W	O					I	3		
A	L	S	O					M	1		
A											

	Type	Detail Code	Department								
B											
B											
B											

	Type	Detail Code				
C						

	Type of Deficiency	Detail Code	Procedure Type				
D							
D							
D							

	Type	Detail Code	Department					
E	S	2	O					
E								
E								