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

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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) Feedwater Transient results in Manual Reactor Scram due to Operating Team Knowledge Weakness and Operator Weakness while performing Manual Level Control.

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
07	28	97	97	-- 010 --	00	08	22	97	None	
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1
POWER LEVEL (10)	087

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:	Phone:
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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 July 27, 1997, with Unit 2 at full power, the 2B RFP recirc valve failed open and a recovery plan was created by the Operating Team to secure and isolate the failed valve. On July 28, 1997, the oncoming Operating Team reviewed Operating procedures and amended the recovery plan, without Management authorization, by allowing performance of the RFP changeover at a higher power than stated within the plan. This decision caused a higher than expected level increase on the start of the standby RFP and resulted in the Operator taking manual control of feedwater. The NSO failed to properly manipulate the feedwater controls and caused the trip of a RFP. A manual scram was initiated in accordance with conservative operating philosophy. The cause of the event was a performance error by the Operating Team. Corrective actions include counseling of involved operators in accordance with station policy and training to all operators on the event. This event is reportable per 10CFR50.73(a)(2)(iv), any event or condition that results in automatic or manual actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

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PLANT AND SYSTEM IDENTIFICATION:

General Electric - boiling water reactor - 2527 MWt rated core thermal 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:

Feedwater Transient results in Manual Reactor Scram due to Operating Team Knowledge weakness and Operator Weakness while performing Manual Level Control.

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: July 28, 1997 Event Time: 0139

Reactor Mode: 1 Mode Name: Run Power Level: 089%

Reactor Coolant System Pressure: 983 psig

B.1 INITIAL PLANT CONFIGURATION

Unit 2 was operating at 690 MWe prior to the sequence of events, with Feedwater Level Control (FWLC) selected for single element control and operating in Master Auto, controlling both Unit 2 A and B Feedwater Regulating Valves (FWRVs). The execution of DOP 3200-03, Startup of a Second Reactor Feed Pump or Shifting to an alternate Reactor Feed Pump (RFP), was being performed due to a concern which had developed on the previous shift involving the 2B RFP recirc to main condenser valve (AOV 2-3201B) failing open. Plans were made to transfer feedwater flow to the standby RFP in order to secure and isolate the 2B RFP to facilitate repairs of the 2B RFP recirc to main condenser valve.

B.2 DESCRIPTION OF EVENT:

At 1518 hours on July 27, 1997, with Unit 2 operating at full power, the 2B RFP recirc to main condenser valve spuriously opened to an intermediate position without a change in position indication or receipt of an audible alarm. The Operations Team recognized that both FWRVs had fully opened, with reactor level trending downward. The Operators reduced Unit power (from 804 to 700 MWe) to reduce steam flow and stabilize reactor water level. During the load decrease, the 2B RFP recirc to main condenser valve re-closed causing reactor water level to increase to a high level condition. A controlled level recovery was performed by throttling closed the A and B FWRVs in individual manual to balance reactor steam and feedwater flow. Reactor water level was declared stable at its normal level of +30 inches at 1527 hours.

In accordance with DAP 02-34, Dresden Prompt Investigation Program, an investigation was completed by Operations regarding the RFP Recirc valve failure event. As stated in the prompt investigation report, the Operations Unit Supervisor (afternoon shift July 27th) had developed a plan which would position the unit for the safe shutdown of the 2B RFP while the RFP recirc valve was failed open. Within this plan was a down power evolution to reduce Unit 2 load to 570 MWe prior to initiating a swap of the RFPs, as recommended by the Plant Engineer.

At 2300 hours July 27, 1997 (Shift Turnover from afternoon shift to midnight shift), Unit 2 was at 690 MWe. The oncoming Unit Supervisor discussed with the offgoing Unit Supervisor the provisions of the operating plan for transfer to the alternate reactor feed pump. The offgoing Unit Supervisor, who researched and created the plan, did agree that there was flexibility within the plan and that it could be altered.

Early on the midnight shift, the midnight shift Operating Team concluded that the RFP transfer could be performed at the existing 690 MWe power level. Their decision was based upon the following factors - current FWRV positions, RFP suction pressures, procedure review, prior experience, and discussion with their Team's Shift Manager.

At 0130 hours July 28, 1997, an HLA was performed in preparation for transfer of the RFP's (starting of 2C and securing 2B). During the HLA, the Unit Supervisor placed Action Limits on reactor water level by requiring a manual scram be initiated upon reaching +40 inches increasing or +20 inches decreasing. After the HLA, the Unit Supervisor commented to the Unit NSO that he should take manual control of feedwater if at any time he felt uncomfortable with the FWLC system performance. Prior to starting the 2C RFP, the Unit NSO stated to the Aux NSO that he would take manual control of reactor water level if level reached +35 inches increasing.

Upon starting the 2C RFP, feedwater flow increased from 8.3 Mlb/hr to 9.0 Mlb/hr and reactor water level promptly began to increase. The feedwater control system responded to the level increase by automatically reducing feedwater flow. Reactor water level reached +35 inches fifteen seconds after the start of the 2C RFP. Feedwater flow at this point had been decreased automatically to 8.5 Mlb/hr, and steam flow remaining at 8.3 Mlb/hr.

With reactor level achieving the established +35 inch reactor water level action point, the Unit NSO announced he was placing feedwater control in manual, which was acknowledged by the Unit Supervisor. The Unit NSO placed feedwater level control in master manual and began rapidly closing both FWRVs, resulting in feedwater flow decreasing to 1.0 Mlb/hr. His action resulted in a rapid decrease of reactor water level to approximately +31 inches over the next few seconds. The Aux NSO announced his observation that feedwater flow had decreased to less than 2.0 Mlb/hr, resulting in the Unit NSO responding by rapidly opening both FWRVs in manual, causing feedwater flow to increase to 11.0 Mlb/hr.

The quick increase in feed flow resulted in a corresponding RFP suction pressure decrease. Upon reaching a RFP suction pressure of 120 psig, the 2C RFP tripped as designed and the "RFP Sequential pump trip" annunciator was received. The RFP trip restored the suction pressure to the remaining RFP's as feedwater flow decreased from 11.0 Mlb/hr to 10.0 Mlb/hr. Reactor water level decrease stopped at +25 inches and the "Low Reactor Water Level" annunciator was received. The Unit Supervisor ordered a Manual Scram at 0139 hours.

The elapsed time from the Unit NSO placing FWLC in master manual control to the initiation of the manual scram was 24 seconds. The Unit Supervisor ordered the manual scram based on the difficulties he observed with control of reactor water level, and conservative operating philosophy. Reactor water level remained within the predetermined bounds established at the HLA through out the event.

B.3 DISCUSSION OF INTERVIEWS AND EVENT DATA:

The plan to perform a down power maneuver prior to swapping of the RFPs was amended by the midnight shift Operating Team and approved by the Shift Manager prior to performing the evolution. Though alteration to the plan was discussed between the offgoing and oncoming Unit Supervisors and determined to be acceptable, the initial plan to perform the RFP swap at 570 MWe was selected through involvement by Operations Senior Management and Plant Engineering input. The change in plan by the midnight shift was performed in a manner which did not conflict with the Operations Standards, however, it was not a conservative decision. More input could had been utilized in the decision process. The Operating Team concluded that performance of the RFP swap at 690 MWe was acceptable, based on procedural guidance and plant experience, but failed to take into account how the open RFP recirc valve would affect plant response. The Team's conclusion did not include the lowered RFP discharge pressure which existed due to the RFP recirc valve being failed open, as this was diverting 0.5 Mlb/hr process flow from the feedwater system. Under this condition, the diverted flow simulated the expected feedwater system pressures which would be seen at higher reactor power. With the RFP discharge pressure lower than normal for this power level, the FWRVs were open further than normal at the start of the event, a greater differential pressure increase would be observed upon start of the third RFP, ultimately resulting in a greater initial level increase than originally anticipated for the evolution.

Interviews and event data substantiate that the Unit NSO focused on reactor water level during manual feedwater control and his performance was not in accordance with Operator Training, which stresses the need to balance reactor steam and feedwater flow to stabilize reactor water level during an event. The operator's action to rapidly close down on the FWRVs greatly reduced feedwater flow and complicated the transient in progress, from which the Unit Supervisor ordered the manual scram.

The Operations crew performed an HLA briefing prior to beginning the evolution. Clearly defined criteria were discussed and agreed upon regarding execution of a manual scram, in accordance with proper standards of briefings. As a result of the Operating Team's knowledge weakness on expected system response with the RFP recirc valve open, the effect of the valve position was not specifically considered at the time of setting the briefing parameters. Interviews identified that the crew was prepared to observe a 2-3 inch level upswing during the evolution, contrary to the 5-inch upswing which actually occurred. The contingency actions established in the HLA were acceptable with respect to setting manual scram limits, however, it did not adequately address all possible unexpected conditions or plant responses with respect to manual feedwater level control.

C. CAUSE OF EVENT:

The primary cause for this event were personnel performance errors (NRC Cause Code A, Cognitive Personnel Error) by the members of the midnight shift operating team, during the process of amending the operating plan for swapping of the RFP. The Team exhibited a knowledge weakness on how the open RFP recirc valve would affect the expected level increase on the start of the third RFP. This, in conjunction with the Team not including available input to the decision process, resulted in amendment of the recovery plan and caused the higher than expected level increase.

A contributing cause for the event was the Nuclear Station Operator's failure to methodically perform manual feedwater control operations in accordance with Station Operator Training. His actions increased the magnitude of the event which was in progress, resulting in the initiation of a manual reactor scram. An additional contributing factor was the weak HLA which did not adequately address all possible unexpected conditions.

This event is reportable per 10CFR50.73(a)(2)(iv), any event of condition that results in automatic or manual actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

D. SAFETY ANALYSIS:

This event involved a manual reactor scram that was executed due to difficulties in performing manual feedwater control. The manual scram was performed well within pre-identified conservative bounds set by the Unit Supervisor and at no time was reactor water level less than +20 inches. A review of alarm typer data, event typer data, log books and interviews indicated no safety significant abnormalities. Therefore, the scram in and of itself had minimal safety consequence.

E. CORRECTIVE ACTIONS:

E.1 Prior to restart of Unit 2, the following actions were performed and presented to the Station On-site Review (OSR) Committee, as documented in OSR 97-246, dated 7/30/97):

Testing of the FWLC manual/auto station detent buttons was performed to verify proper operation in its ability to control fast and slow valve movement. No

abnormalities were identified in system/component performance, eliminating the feedwater control system as a potential cause for this event.

DOA 0600-01, Transient Level Control, was revised regarding parameters to be monitored and controlled during this type of event, and further detail on the use of the Manual Feedwater modes of operation was added. DOP 3200-03, Start-up of a Second Reactor Feed Pump or Shifting to an Alternate Reactor Feed Pump, was revised to limit the initial power level to an appropriate conservative value.

A training session covering this event was performed with all licensed personnel, prior to taking over Control Room duties. This session included:
- A briefing regarding the circumstances and preliminary causes of the manual scram.
- Discussion regarding procedure changes to DOP 3200-03 and DOA 0600-01.
- Observation of this type of event on the simulator, which included practice on the use of FWLC in manual modes.

E.2 The Assistant Shift Operations Supervisor will counsel the involved individuals in accordance with Station Policy and perform the appropriate actions to correct the performance of the individuals. (2371809701001)

E.3 A review regarding the need and frequency for training on manual reactor level control, and the expectations concerning contingency planning for evolutions which have impact on transient reactor level control, will be presented to the Operations Curriculum Review Committee for resolution. (2371809701002)

E.4 The Operations Manager will review the HLA process to determine if revisions are needed to the criteria for the content of HLA briefs. (2371809701003)

F. PREVIOUS OCCURRENCES:

LER/Docket Number	Title
96-011/05000249	Unexpected Cycling of the Low Pressure Coolant Injection Minimum Flow Valve During LPCI System Fill Due to Personnel Error
96-001/05000249	Inadvertent Start of the Unit 3 Diesel Generator Due to Personnel Error
96-006/05000237	Inadvertent Manual Scram While in Refuel Mode During Planned Periodic Surveillance Testing Due to Human Error
96-012/05000237	Inadvertent Start Of The 2/3 Diesel Generator Due To Personnel Error.

G. COMPONENT FAILURE DATA:

None.