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December 30, 1994

TPJLTR 94-0009

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

Licensee Event Report 94-030, Docket 50-237 is being voluntarily submitted in accordance with Technical Specification 6.6, NUREG 1022 and 10CFR50.73.

Sincerely,

A handwritten signature in black ink, appearing to read "T. P. Joyce", is written over the typed name.

Thomas P. Joyce
Site Vice President

TPJ/JO:cfq

Enclosure

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

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NRC FORM 366 (5-92)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95					
LICENSEE EVENT REPORT (LER)										
FACILITY NAME (1) Dresden Nuclear Power Station, Unit 2					DOCKET NUMBER (2) 05000237			PAGE (3) 1 OF 5		
TITLE (4) Spurious Tripping of Motor Operated Valve Feed Circuit Breaker Under Valve Reversal Conditions Due to Inadequate Breaker Magnetic Setting Procedure										
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
12	04	94	94	-- 030 --	00	12	23	94	None	
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
N		20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(iii)		73.71(b)		
POWER LEVEL (10)		20.2203(a)(1)		20.2203(a)(3)(ii)		50.73(a)(2)(iv)		73.71(c)		
002		20.2203(a)(2)(i)		20.2203(a)(4)		50.73(a)(2)(v)		X 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 John O'Neill, Motor Operated Valve Engineer Ext. 2783						TELEPHONE NUMBER (Include Area Code) (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)

At 1938 hours on November 26, 1994, with Unit 2 at 2% rated power while in the startup mode, a spurious Group V Isolation Signal was received when Motor Operated Valve (MOV) 2-1301-4 was being opened. All the Isolation Condenser [BL] Group V isolation valves went closed as expected except for MOV 2-1301-4. The breaker for MOV 2-1301-4 valve tripped. During special testing, on December 1, 1994, to verify the cause of the breaker trip it was determined that the breaker trip setting was not set high enough to account for higher starting currents that occur during MOV reversal conditions. A review of all safety related MOVs on Units 2 & 3 revealed that there were 2 valves on Unit 2 and 4 valves on Unit 3 that may not have breaker settings with sufficient margin to prevent breaker tripping during MOV reversal conditions. The Unit 2 breakers were reset prior to unit start-up and the Unit 3 breakers will be reset during the next short outage. The safety significance is minimal as this condition is only present during valve cycling operations (normally surveillance testing). This LER is being submitted voluntarily as the MOV reversal condition is not part of the Design Basis as identified in the UFSAR.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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 (MNB 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.

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

EVENT IDENTIFICATION:

Spurious Tripping of Motor Operated Valve Feed Circuit Breaker Under Valve Reversal Conditions Due to Inadequate Breaker Magnetic Setting Procedure

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: 12-04-94 Event Time: 1215
 Reactor Mode: N Mode Name: Start-up Power Level: 007%
 Reactor Coolant System Pressure: 200 psig

B. DESCRIPTION OF EVENT:

At 1938 hours on November 26, 1994, with Unit 2 in the start-up mode, a spurious Group V Isolation Signal was received when Isolation Condenser Motor Operated Valve (MOV) 2-1301-4 was being opened per Dresden General Procedure (DGP) 1-1 Unit 2(3) Normal Unit Start-up (LER 94-29). All the Isolation Condenser Group V isolation valves went closed as expected except for MOV 2-1301-4. The breaker for MOV 2-1301-4 valve tripped as indicated by no light indication in the control room. When the breaker was reset the valve indicated full closed. The isolation signal was reset and the valve was stroked successfully. MOV 2-1301-4 was re-opened and the Isolation Condenser was placed in standby operation.

On December 1, 1994 with Unit 2 in the shutdown mode, troubleshooting was performed in an effort to recreate the breaker tripping event. Special Procedure (SP) 94-11-137 was performed to simulate the MOV reversal which occurred on November 26, 1994. During SP 94-11-137, the 2-1301-4 valve was given an open signal and then when the valve was in the intermediate position an isolation signal was initiated which immediately caused the MOV to reverse directions and attempt to close; however, the MOV feed circuit breaker tripped immediately. Diagnostic equipment, monitoring MOV three phase voltage and current, revealed that the starting current for the MOV reversal was greater than the normal starting current and sufficient to trip the circuit breaker.

A review of all safety related MOVs on Units 2 and 3 was initiated to determine if other MOVs had feed circuit breakers set without enough margin to ensure operation in an MOV reversal condition. This review determined that MOVs in the Isolation Condenser system 2-1301-1 (Isolation Condenser Steam Supply Inboard Isolation Valve) and 2-1301-4 (Isolation Condenser Condensate Return Inboard Isolation Valve) on Unit 2 and MOVs in the Reactor Water Cleanup [CE] 3-1201-1 (Reactor Water Cleanup Supply Inboard Isolation Valve), Isolation Condenser 3-1301-1 (Isolation Condenser Steam Supply Inboard Isolation Valve) and 3-1301-4 (Isolation Condenser Condensate Return Inboard Isolation Valve) and High Pressure Coolant Injection [BJ] 3-2301-4 (High Pressure Coolant Injection Steam Supply Inboard Isolation Valve) systems on Unit 3 were susceptible to spurious trips during MOV reversal conditions. The circuit breaker settings for 2-1301-1 and 2-1301-4 were increased prior to unit start-up on December 4, 1994. An Operability Assessment (Chron# 0305047) was performed for MOVs 3-1201-1, 3-1301-1, 3-1301-4 and 3-2301-4 on December 3, 1994.

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On December 4, 1994, following Operations Department review of the Operability Assessment, an ENS notification was made based on MOV 2-1301-4 being outside the design basis during unit start-up on November 26, 1994. In addition, MOVs 2-1301-1, 3-1201-1, 3-1301-1, 3-1301-4 and 3-2301-4 all were determined to have circuit breaker magnetic settings lower than the desired nominal trip setting (twice locked rotor current).

C. CAUSE OF EVENT:

This LER is submitted voluntarily as the MOV reversal condition is not part of the Design Basis as identified in the UFSAR. Although the MOV reversal condition is not part of the Design Basis, the MOVs and all supporting components (ie. circuit breakers) should have sufficient operating margin to support MOV reversal conditions which can occur during normal operations.

The cause of this event is attributed to incorrect instantaneous circuit breaker settings for MOVs. MOV feed circuit breakers are set in accordance with CECO Technical Information Document (TID) E/I&C-06, Molded Case Circuit Breaker Selection and Settings. TID-E/I&C-06, section 3.2, specifies a magnetic setting of the circuit breaker of greater than twelve times the full load current. This methodology is based on the locked rotor (starting current) being approximately six times the full load current, and applying a factor of two to account for back EMF (voltage) that can increase instantaneous starting current.

The motor nameplate for MOV 2-1301-4 indicates the full load current to be approximately 10 amps and a locked rotor current of 84 amps. This motor was installed in the Spring of 1993 as part of an actuator upgrade to satisfy requirements of NRC GL 89-10. The modification included a feed circuit breaker replacement. The modification design documents specified a circuit breaker magnetic setting which had a nominal trip current of 120 amps.

The breaker setting for the condition of MOV actuation from a total rest condition was sufficient. However, when an MOV is in motion and a signal is applied that halts continued movement in the original direction, followed immediately by a demand to energize the MOV for movement in the opposite direction, the MOV does not come to a complete stop prior to the reenergization. As the motor is coasting down, following deenergization, a back EMF is generated due to the electrical characteristics of the motor. This back EMF is still present upon reenergization and results in a higher voltage being applied to the motor windings, which results in a higher starting current. In this case the higher starting current experienced during MOV reversal was sufficient to trip the circuit breaker.

D. SAFETY ANALYSIS:

The MOV reversal condition can only occur if the MOV is in motion and is subjected to a signal which causes it to immediately reverse and go the opposite direction. The Isolation Condenser valves (2-1301-1, 2-1301-4, 3-1301-1, 3-1301-2 and 3-1301-4) and the Reactor Water Cleanup valve (3-1201-1) which did not have breaker settings with adequate margin are all normally open valves. The valves have automatic isolation logic that will close the valves in the event of a line break. During normal power operations the valves are routinely cycled for surveillance testing (approximately monthly). During these cycling

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operations the valves would be susceptible to a reversal condition. As the containment isolation valves are normally cycled individually, the second containment isolation valve in the line would be not be affected by the reversal condition and would perform its safety function and isolate the line.

The High Pressure Coolant Injection valve (3-2301-4) which did not have a breaker setting with adequate margin is a normally open valve. The valve has automatic logic that would close the valve in the event of a line break. If the valve was closed the automatic logic would open the valve in the event of a High Pressure Coolant Injection (HPCI) signal. This valve is cycled routinely for surveillance testing (approximately bi-weekly). During these cycling activities the containment isolation valves are cycled individually, the second containment isolation valve in the line would not be affected by the reversal condition and would close to the isolate the line. If the valve was going closed and an injection signal was received the valve might not return to the full open position rendering the HPCI system unavailable to perform its injection function. The Automatic Depressurization System and Isolation Condenser System would still be able to perform their safety function.

An evaluation using Probabilistic Risk Assessment (PRA) techniques was performed on December 3, 1994. This evaluation determined that the change in the Core Damage Frequency (CDF) due to the circuit breaker tripping in an MOV reversal condition would be "non-risk significant" (less than 1E-6). For these reasons the safety significance of this event is considered minimal.

E. CORRECTIVE ACTIONS:

Immediate actions were to simulate the MOV reversal conditions through SP 94-11-137. This test determined that the MOV and circuit breaker were performing properly based on the way they were set. The reason the breaker tripped was due to the breaker setting not being high enough to incorporate the higher starting current. A review of all Unit 2 and 3 safety related MOVs circuit breaker settings was performed on December 2, 1994. This review determined what MOVs had circuit breaker settings that were not set at greater than two times the locked rotor current. There were two valves on Unit 2, 2-1301-1 (Isolation Condenser Steam Supply Inboard Isolation Valve) and 2-1301-4 (Isolation Condenser Condensate Return Inboard Isolation Valve) that did not meet this criteria. There were five valves on Unit 3, 3-1201-1 (Reactor Water Cleanup Supply Inboard Isolation Valve), 3-1301-1 (Isolation Condenser Steam Supply Inboard Isolation Valve), 3-1301-2 (Isolation Condenser Steam Supply Outboard Isolation Valve), 3-1301-4 (Isolation Condenser Condensate Return Inboard Isolation Valve) and 3-2301-4 (High Pressure Coolant Injection Steam Supply Inboard Isolation Valve) that did not meet this criteria.

The breakers for the Unit 2 MOVs were reset prior to unit start-up under work requests D28772 (2-1301-1 Normal Feed Breaker), D28730 (2-1301-4 Normal Feed Breaker) and D28773 (2-1301-1/4 Alternate Feed Breaker). SP 94-11-137 was reperformed on December 3, 1994 for MOV 2-1301-4 and the valve successfully reversed direction without a breaker trip. An Operability Assessment (Chron# 0305047) was performed on December 3, 1994 for the Unit 3 valves. The breaker settings for the Unit 3 low margin AC valves will be adjusted during the next short outage under work requests D28799 (3-1201-1), D28793 (3-1301-1 Normal Feed Breaker), D28731 (3-1301-4 Normal Feed Breaker) and D28794 (3-1301-1/4 Alternate

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Feed Breaker) and D28797 (3-2301-4). This outage is presently scheduled for mid-January, 1995. (237-180-94-03001)

On December 2, 1994, the Chief Electrical Engineer in the CECO's Nuclear Engineering and Technical Services (NETS) Department was notified of this event. A review of TID-E/I&C-06 was performed. It was determined that the TID did not address MOV reversal and did not provide a high enough instantaneous breaker trip setting to account for valve reversal of MOVs with locked rotor current greater than six times full load current. The other CECO stations were notified of this event through Tech Alert (TA) 94-05, issued on December 7, 1994. Further review of the TID and revision of the TID are planned to be completed by March 15, 1995. (237-180-94-03002)

F. PREVIOUS OCCURRENCES:

None.

G. COMPONENT FAILURE DATA:

N/A