

LICENSEE EVENT REPORT (LER)

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.

FACILITY NAME (1) Dresden Nuclear Power Station, Unit 2		DOCKET NUMBER (2) 05000237	PAGE (3) 1 OF 6
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TITLE (4)
Autostart of the 2/3 Diesel Generator due to Operating Team Knowledge Deficiency.

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	27	97	97	-- 016 --	00	09	23	97	Dresden, Unit 3	05000249
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1 (1)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
POWER LEVEL (10)	100 (99)	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: Ralph M. Fenili, Root Cause Analyst ext.2917 Phone: (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 27, 1997 at 1606, an unqualified toggle switch was found installed on the Unit 2/3 Emergency Diesel Generator (EDG)[EK] feeder breaker which supplies Unit 3 ESF Bus 33-1. Although the switch was designated as non-safety related, subsequent evaluation qualified the subject switch. Therefore, the non-qualified switch did not adversely affect the ability of the breaker to perform its intended function. In the interim, the EDG was declared inoperable until the breaker could be replaced and successful completion of operability testing was performed. The appropriate Technical Specification actions were taken upon discovery of this condition. Following installation of a replacement breaker, the 2/3 EDG was started for an operability run. A low idle start was to be performed per Dresden Operating Surveillance (DOS) 6600-01, Diesel Generator Surveillance Tests. The Nuclear Station Operator (NSO) started the EDG and allowed it to run at the low idle speed. After waiting 3 to 5 minutes, the High Voltage Operator (HVO) raised EDG speed locally. The 2/3 EDG tripped. The HVO reset the local annunciators, and depressed the 2/3 Diesel Engine Local Control Panel ALARM RESET pushbutton. The HVO believed the pushbutton would only reset the low cooling water pressure trip indicator. However, the pushbutton resets the sealed-in trip logic for the diesel, causing the EDG to restart because the EDG control switch was still in the "Start" position. This is an inadvertent ESF actuation. The cause of the event was determined to be a knowledge deficiency in the operation of the Diesel Engine Local Control Panel ALARM RESET pushbutton. Corrective actions include correction of the knowledge deficiencies and presentation of the event Lessons Learned to the other Operating Teams by the involved Operating Team.

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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:

Autostart of the 2/3 Diesel Generator due to Operating Team Knowledge Deficiency.

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2(3) Event Date: August 28, 1997 Event Time: 2023
 Reactor Mode: 1(1) Mode Name: Run (Run) Power Level: 100 (99)
 Reactor Coolant System Pressure: 1000(999) psig

B.1 DESCRIPTION OF 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).

On August 27, 1997 at 1606, an unqualified toggle switch was found installed on the Unit 2/3 Emergency Diesel Generator (EDG)[EK] feeder breaker which supplies Unit 3 ESF Bus 33-1. Although the switch was designated as non-safety related, subsequent evaluation qualified the subject switch. Therefore, the non-qualified switch did not adversely affect the ability of the breaker to perform its intended function.

In the interim, the EDG was declared inoperable until the breaker could be replaced and successful completion of operability testing was performed. The appropriate Technical Specification actions were taken upon discovery of this condition.

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At 2016, following installation of a replacement breaker at Bus 33-1, the 2/3 EDG was started for an operability run. Dresden Operating Surveillance (DOS) 6600-01, Diesel Generator Surveillance Tests, required that a low idle start be performed. The procedure directs that a tachometer or alternate method of speed determination be used to determine engine speed. Due to a malfunction of the tachometer which was being used, the EDG Testing Team decided to utilize the Control Room frequency meter for EDG speed indication, which is permitted per procedural step I.9.s. The High Voltage Operator (HVO) [Non-Licensed Operator] locally adjusted the governor to the low speed stop, in accordance with the surveillance. In the Control Room, the Nuclear Station Operator (NSO) [Licensed Reactor Operator] started the EDG by taking the 2/3 EDG "START/STOP/AUTO" switch to START. The EDG was properly started and allowed to run at the low idle speed. After waiting the required length of time (3-5 minutes), the HVO used the governor to locally raise EDG speed.

While raising speed the HVO heard the room vent fan start and observed field flashing, which indicated to him the EDG was approximately 800 rpm. Operator Training, as well as a note in DOS 6600-01 prior to step I.9.h, states this rpm interlock is for the vent fan to auto start. The HVO contacted the Control Room for speed indication. The NSO running the EDG observed the frequency meter on the 902-8 panel indicating approximately 60 Hz.

At 2025, while the NSO was reviewing the procedure for the next steps, the 2/3 EDG tripped and the Control Room received alarms: 902-8 C-4, 2/3 DIESEL GEN FAIL TO START, and 902-7 H-8, 2/3 DIESEL GEN CLG WTR PP TRIP/LKOUT. The NSO referred to the 2/3 DIESEL GEN FAIL TO START annunciator procedure. Steps 2 and 3 of the annunciator procedure has the local operator check the local alarm panel and refer to the appropriate procedure, which was performed. The 2/3 DIESEL GEN CLG WTR PP TRIP/LKOUT alarm was expected for the EDG trip. Local alarm "DIESEL ENGINE LOW WATER PRESSURE" indicated the reason for the EDG trip.

A common operator practice is to reset all alarms when conditions permit. At 2025, the HVO reset the local annunciators, and then proceeded to depress the 2/3 Diesel Engine Local Control Panel ALARM RESET pushbutton, located on the EDG control cabinet. The HVO believed that depressing this pushbutton would only reset the low cooling water pressure trip indicator. However, this action resets the sealed-in trip logic for the diesel. With the 2/3 EDG "START/STOP/AUTO" switch in the control room still in START, the diesel generator restarted as designed.

No changes had been made to the diesel governor position following the original trip of the EDG. At 2027, the 2/3 EDG again tripped due to low cooling water pressure after operating for approximately 2 minutes. The NSO in the Control Room placed the 2/3 EDG "START/STOP/AUTO" switch in the STOP position to prevent subsequent restarts which may result from recovery activities of the 2/3 EDG. At 2323, the appropriate 4-hour notification was made and station assistance obtained to determine the cause of the trip.

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B.2 CAUSE OF THE EDG TRIPS

The two trips of the EDG which occurred during the sequence of events were due to low EDG cooling water flow. Subsequent review of the event determined that the EDG cooling water pump operated as designed, but the EDG was not operating at 900 rpm (60 Hz). When the EDG trips occurred, the EDG was operating at approximately 670 rpm.

The EDG cooling water pump obtains its motive force from the EDG main shaft. The cooling water flow increases as the speed of the EDG increases. With the EDG operating at only 670 rpm, EDG coolant flow failed to reach its minimum required flow within two minutes, resulting in a trip of the EDG. The HVO at the EDG recognized that the EDG room vent fan had auto started. This action occurs prior to the EDG achieving 800 rpm, not at 800 rpm. When the vent fan started, the HVO requested that the NSO check EDG speed using the frequency meter. The NSO in the Control Room observed the 2/3 EDG frequency meter on the 902-8 panel indicating approximately 60 Hz and reported this value to the Team in the field.

The Operating Team, as a result of a knowledge deficiency, believed that the EDG frequency meter would read downscale until speed of the EDG achieved the lowest possible frequency available on the frequency meter. However, the frequency meter fails to an indicated nominal value of about 60 Hz until a minimum of 58 Hz is achieved (the minimum indicated value on the meter). At the time of the EDG trips, actual EDG speed and voltage were approximately 670 rpm and 3000 VAC (instead of 4160 VAC) respectively. The trip of the EDG was attributed to a failure to reach nominal operating speed on the EDG. This resulted in a reduced cooling water flow and caused a trip of the EDG upon completion of the 2 minute trip bypass timer cycle. The EDG and its associated trip function performed as designed.

C. CAUSE OF EVENT:

The cause of the event was determined to be Personnel Error (NRC Cause Code: A) due to a knowledge deficiency among members of the Operations Department. Interviews performed with various Licensed and Non-Licensed operators identified that a knowledge deficiency exists in the operation of the Diesel Engine Local Control Panel ALARM RESET pushbutton, located on the EDG control cabinet. Operators believed that this pushbutton would only reset only the low cooling water pressure trip indicator light. Had the members of the Operating Team been aware that their action would reset the sealed-in trip logic for the diesel, this event would have been averted. Discussions with licensed operators which were uninvolved with this event identified a similar knowledge deficiency. A review of the EDG training lesson plan found that this issue is discussed within the plan text. A second knowledge deficiency existed in that the Operators believed that the EDG frequency meter would read downscale until speed of the EDG achieved the lowest possible frequency available on the frequency meter. Operation of the frequency meter was found not to be sufficiently covered within the Training lesson plan to prevent this event.

NRC FORM 366A (5-92)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95	
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A subsequent review of EDG computer data revealed that the EDG output voltage at the time of the trip was 3000 VAC, not the normal 4160 VAC that the EDG is designed to deliver. The failure to utilize this indication prevented identification that the indicated 60 Hz on the frequency meter was incorrect.

D. SAFETY ANALYSIS:

The signal that starts the vent fan and flashes the field also starts a two minute timer. Upon completion of the timer cycle, if adequate EDG cooling flow is not achieved, the EDG will trip. Should the auto start be initiated from an ECCS signal, these trips are bypassed. Subsequent troubleshooting of the EDG found no problem with cooling water flow. The EDG would have been capable of functioning as designed had an ECCS signal been received. In addition, the Unit 2 and 3 EDGs remained operable during this event, capable of providing emergency power to station components, making the safety significance of this event minimal. Therefore, the health and safety of the public were not compromised as a result of this event.

E.1 CORRECTIVE ACTIONS:

Operations will present this event to the Training Curriculum Review Committee for determination of the best method for correction of the knowledge deficiencies identified during this event. (2371809701601)

E.2 ADDITIONAL ACTIONS TO BE TAKEN:

Operations Staff has revised DOS 6600-01, Diesel Generator Surveillance Tests, to include information on the EDG frequency meter operation. (Complete)

The involved Operating Team will critique their event performance, determine how to correct their performance deficiencies, and present the event Lessons Learned to the other Operating Teams. (2371809701602)

"Caution" placards will be created and affixed to the Diesel Engine Local Control Panel ALARM RESET pushbutton, stating their ability to reset the trip logic of the EDGs. (2371809701603)

Operations will review EDG procedures (DOS 6600-01 and annunciator procedures) utilized during this event to determine where guidance on EDG frequency meter operation and the need to take the EDG control switch to STOP on a trip should be placed. (2371809701604)

F. PREVIOUS OCCURRENCES:

<u>LER/Docket Number</u>	<u>Title</u>
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A review of Licensee Event Reports for the previous two years failed to identify any events resulting from the knowledge deficiency of a nuclear worker.

NRC FORM 366A
(5-92)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
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G. COMPONENT FAILURE DATA:

None.