

LICENSEE EVENT REPORT (LER)

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TITLE (4)
Inadvertent Deenergization of Safety Buses 65E, 72E, 13EC and 72EC During Performance of Surveillance Test Resulting in ESF Actuations

EVENT DATE (5)			LER NUMBER (6)					REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)							
MON	DAY	YR	YR	SEQUENTIAL NUMBER				REVISION NUMBER	MON	DAY	YR	FACILITY NAMES						
9	8	98	98	-	0	0	7	-	0	0	10	5	98					
												DOCKET NUMBER (8)						
												0	5	0	0	0		
												0	5	0	0	0		

OPERATING MODE (9) 5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (11)	
POWER LEVEL (10) 0	10 CFR - <u>50.73(a)(2)(iv)</u> OTHER - _____ (Specify in Abstract below and in text, NRC Form 366A)	

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER
Norman K. Peterson		AREA CODE: 734 586-4258

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		
X	E	K	8 1	G 0 8 0	Y						

[] YES (If yes, complete EXPECTED SUBMISSION DATE)	[X] NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (16)
 On September 8, 1998 at 1833 hours, while performing Surveillance Procedure 24.307.12, "Emergency Diesel Generator 13 - ECCS Start and Load Reject Test and Logic Functional Test of Bus 65E Breakers," an unexpected deenergization of the Division 2 safety buses [EK] 65E, 72E, 13EC, and 72EC occurred when the EDG 13 output breaker opened unexpectedly. Power was lost to the RPS "B" MG set and subsequently to the RPS "B" bus. All control rods were already inserted, as the plant was in Operational Condition 5 (Refueling) at the time of this event. The expected plant isolations and actuations occurred.

The cause of this event is believed to have been a faulty static underfrequency relay in combination with the frequency transient experienced when the governor shifted from the droop to the isochronous mode, as designed, following the opening of breaker 65E-E6 (offsite power to bus 65E). This relay was removed and bench tested. It satisfactorily passed the voltage cutoff and frequency dropout testing; however, it was destroyed during bench testing prior to performing the time delay portion of the test. Thus, it was not possible to verify the proper functioning of the time delay feature for the static underfrequency relay. A replacement relay was installed and the logic functional portion of the test was re-performed satisfactorily. Based upon these factors, it is believed that the static underfrequency relay was faulty; and this in combination with the frequency transient, resulted in the tripping of breaker 13EC-EC3 following the opening of breaker 65E-E6.

The ESF actuations/isolations associated with this event were as expected for a loss of the 65E, 72E, 13EC, and 72EC buses and were within the design bases for those systems affected. The loss of an entire division of onsite and/or offsite power, including loss of the associated emergency diesel generator, the 4160V and 480V ESF buses and the associated RPS MG set, is an analyzed condition which bounds this scenario. Therefore, this event did not adversely affect the health or safety of the public.

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Initial Plant Conditions

Operational Condition: 5 (Refueling)
 Reactor Power: 0 percent
 Reactor Pressure: Atmospheric
 Reactor Temperature: 97 degrees Fahrenheit

Description of the Event:

On September 8, 1998 at 1833 hours, while performing Surveillance Procedure 24.307.12, "Emergency Diesel Generator 13 - ECCS Start and Load Reject Test and Logic Functional Test of Bus 65E Breakers," an unexpected deenergization of the Division 2 safety buses [EK] 65E, 72E, 13EC, and 72EC occurred when the EDG 13 output breaker opened unexpectedly. Power was lost to the RPS "B" MG set and subsequently to the RPS "B" bus. All control rods were already inserted, as the plant was in Operational Condition 5 (Refueling) at the time of this event. The following isolations/isolation signals occurred:

- *Group 2 - Reactor Water Sample System
- *Group 3 - Residual Heat Removal (RHR) System (Division 2)
- *Group 4 - Residual Heat Removal Shutdown Cooling and Head Spray System
- *Group 5 - Core Spray System (Division 2)
- *Group 6 - High Pressure Coolant Injection System
- *Group 7 - High Pressure Coolant Injection Vacuum Breakers
- *Group 8 - Reactor Core Isolation Cooling System
- *Group 9 - Reactor Core Isolation Cooling System Vacuum Breakers
- *Group 11 - Reactor Water Cleanup System (Outboard)
- *Group 12 - Torus Water Management System
- Group 13 - Drywell Sumps
- Group 14 - Drywell and Suppression Pool Ventilation System
- *Group 15 - Traversing Incore Probe System
- *Group 16 - Nitrogen Inerting System

* These systems had already been properly removed from service; therefore, no valve movement occurred.

The Reactor Building Heating Ventilation and Air Conditioning (HVAC) System isolated and the Standby Gas Treatment System automatically started to maintain Secondary Containment Integrity. The Control Center HVAC System shifted to the Recirculation Mode. The RHR Shutdown Cooling System did not isolate because the suction isolation valve, a direct current motor driven valve, had already been tagged in the open position to allow work on the Division 2 batteries. These isolations and actuations comprise the expected result of the loss of the Division 2 safety buses, and were reported to the NRC in accordance with 10CFR50.72(b)(2)(ii).

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During performance of Surveillance Procedure 24.307.12, with Emergency Diesel Generator (EDG) 13 running paralled to the grid at 750 - 1000 kw, the offsite power to Bus 65E breaker (65E-E6) was opened in accordance with the logic functional portion of the surveillance procedure to allow EDG 13 to switch from the droop to the isochronous mode of operation and continue to supply the connected Division 2 loads. However, immediately following the 65E-E6 breaker opening, the EDG 13 output breaker (13EC-EC3) also opened unexpectedly, resulting in the loss of power to safety buses 65E, 72E, 13EC, and 72EC.

Walkdowns following this event revealed a tripped flag on the static underfrequency relay in the 13EC-EC3 breaker trip logic. The underfrequency trip function is not required from a plant safety standpoint. It is enabled as protection for the diesel generator when the diesel generator is, or has been, paralled with offsite power (both 13EC-EC3 and 65E-E6 closed initially).

Division 2 RPS power was restored, using the alternate source, at 1857 hours. Power to the other affected loads was restored by 1957 hours. The Standby Gas Treatment System was secured at 2126 hours and control room ventilation was restored to its normal mode at 2129 hours on September 8, 1998.

Cause of the Event

The most probable cause of this event was a faulty static underfrequency relay in combination with the frequency transient experienced when the governor shifted from the droop to the isochronous mode, as designed, following the opening of breaker 65E-E6 (offsite power to bus 65E). Two suspect control logic devices were removed and sent to the relay testing group for evaluation following this event; the ES relay, which controls the operating mode of the governor, and the static underfrequency relay (81 device). Improper operation of either device could have resulted in the EDG output breaker opening during the surveillance testing.

The ES relay was tested satisfactorily with no anomalies observed. The static underfrequency relay satisfactorily passed voltage cutoff and frequency dropout testing; however, it was destroyed during bench testing prior to performing the time delay portion of the test. Thus, it was not possible to verify the proper functioning of the time delay feature for the static underfrequency relay. A replacement relay was installed and the logic functional portion of the test was reperformed satisfactorily. Based upon these factors, it is believed that the static underfrequency relay was faulty; and this in combination with the frequency transient, resulted in the tripping of breaker 13EC-EC3 following the opening of breaker 65E-E6.

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Analysis of the Event

The ESF actuations/isolations associated with this event were as expected for a loss of the 65E, 72E, 13EC, and 72EC buses and were within the design bases for those systems affected. The loss of an entire division of onsite and/or offsite power, including loss of the associated emergency diesel generator, the 4160V and 480V ESF buses and the associated RPS MG set, is an analyzed condition which bounds this scenario. The response of the emergency diesel generator and the onsite and offsite distribution system control logic circuitries were also in accordance with the expected design response for these systems and components as described in UFSAR Section 8.3.1.1.8.1. Therefore, this event did not adversely affect the health or safety of the public.

Corrective Actions

The static underfrequency relay (81 device) was replaced and EDG 13 was tested satisfactorily. Additionally, since this event, EDGs 11 and 14 have been tested satisfactorily with no underfrequency relay problems noted.

Additional Information

A. Failed Components

General Electric Type SFF 21A static underfrequency relay (81 device)

B. Previous Similar Events

There have been no previous LERs involving a faulty static underfrequency relay (81 device) which have led to the tripping of an EDG output breaker and subsequent ESF actuations.