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W3F1-95-0186

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November 27, 1995

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

Subject: Waterford 3 SES  
Docket No. 50-382  
License No. NPF-38  
Reporting of Special Report

Gentlemen:

Attached is Special Report Number SR-95-004-00 for Waterford Steam Electric Station Unit 3. This report outlines the results of the investigation into the Emergency Diesel Generator "B" Turbocharger Low Lube Oil Pressure trips that occurred on October 30, 1995. The most probable cause of these trips has been determined to be a failed diaphragm in Combustion Air Inlet Temperature Control Valve EGC108 B. This Special Report is submitted in accordance with Technical Specifications 4.8.1.1.3 and 6.9.2 and USNRC Regulatory Guide 1.108.

Very truly yours,

D.R. Keuter  
General Manager  
Plant Operations

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Attachment

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cc: L.J. Callan, NRC Region IV, C.P. Patel, NRC-NRR,  
G.L. Florreich, J.T. Wheelock - INPO Records Center,  
R.B. McGehee, N.S. Reynolds, NRC Resident Inspectors  
Office (WMSB4300), Administrator - LRPD

**SPECIAL REPORT**  
**SR-95-004-00**

**REPORTABLE OCCURRENCE**

On October 30, 1995, Waterford Steam Electric Station 3 was shutdown for the Refuel 7 outage when Emergency Diesel Generator (EDG) "B" experienced two trips due to Turbocharger Low Lube Oil Pressure. The EDG had been started for the performance of Surveillance Procedure OP-903-116 "Train B Integrated Emergency Diesel Generator/Engineering Safety Features Test" when the trips occurred. These events are classified as nonvalid failures during valid tests in accordance with Regulatory Guide 1.108 and are being reported in accordance with Technical Specifications (TS) 4.8.1.1.3 and 6.9.2. EDG "B" has experienced no valid failures in the last 20 valid tests and one valid failure in the last 100 valid tests. In accordance with the Waterford 3 Technical Specifications, the currently required surveillance test interval for EDG "B" is at least once per 31 days.

**EVENT DESCRIPTION**

The Refuel 7 outage at Waterford 3 began on September 22, 1995. On October 22, 1995, EDG "B" was removed from service for a routine maintenance outage that included the 18 month inspection required by Inspection Procedure MM-003-015. The lower oil control rings and piston pin end caps were removed from all pistons during this inspection. This was in accordance with the corrective actions initiated following the crankcase overpressurization event that EDG "A" experienced on October 10, 1995 (reference Special Report SR-95-003-00). Following completion of the planned maintenance activities, the tagout was cleared in preparation for post maintenance testing. Several post maintenance starts of EDG "B" were performed for adjustments prior to releasing the EDG to Operations for retesting.

At 0003 hours on October 30, 1995, Emergency Diesel Generator (EDG) "B" was started in preparation for recommencing testing in accordance with the requirements of Surveillance Procedure OP-903-116. The EDG output breaker was closed at 0010 hours. At 0023 hours on October 30, 1995, the EDG tripped on Turbocharger Low Lube Oil Pressure. The load on the EDG was approximately 3.4 MW at the time of the trip. The trip resulted in the EDG output breaker opening and bypassing of the cooldown cycle.

Plant Maintenance personnel were contacted to perform troubleshooting to determine the cause for the trip. The troubleshooting effort did not identify a cause for the trip. It was believed at this time that the Turbocharger Low Lube Oil Pressure trip had been a spurious trip. At 0721

hours on October 30, 1995, EDG "B" was once again started for the performance of Surveillance Procedure OP-903-116. The EDG was paralleled with offsite power at 0727 hours. At 0741 hours on October 30, 1995, the EDG tripped for a second time on Turbocharger Low Lube Oil Pressure. The load on the EDG was being raised from 3.5 MW to 4.0 MW at the time of the trip.

### CAUSAL FACTORS

Entergy Operations, Inc. believes that the most probable cause for the two trips was a failed diaphragm on Combustion Air Right Inlet Temperature Control Valve EGC108 B. When the EDG is shutdown, heated jacket water circulates throughout the system to keep components warm so that the EDG is ready for a rapid start at all times. EGC108 B controls jacket water flow through the right bank combustion air heater when the EDG is shutdown and when the EDG is operating. The function of this valve is to open to allow the combustion air to be preheated when the inlet combustion air temperature is less than 105 degrees Fahrenheit.

The Control Air System provides the operating air for EGC108 B. Upon a complete loss of air, this valve will fail in the open position. This system also provides operating air for control of the Turbocharger lube oil. During troubleshooting following the second trip of EDG "B", it was determined that the diaphragm on EGC108 B was leaking air. The air leak caused components that normally control Turbocharger lube oil pressure to malfunction. This resulted in a decrease in Turbocharger lube oil pressure. When the Turbocharger lube oil pressure decreased to the trip setpoint, the EDG tripped as per design. However, there is a backup system that controls Turbocharger lube oil pressure upon a complete loss of control air. This backup system is capable of supplying adequate, but reduced, lube oil to the Turbocharger. Waterford 3 believes that the EDG trips occurred during the sluggish transition from the normal to the backup lube oil control system caused by the partial loss of control air. Throughout these events, the Turbocharger was receiving sufficient lube oil to preclude the possibility of damage.

### CORRECTIVE MEASURES

Condition Report (CR) 95-1102 was generated in accordance with Waterford 3 Administrative Procedure UNT-006-011, "Condition Report", to provide a means to implement the Waterford 3 Corrective Action Program. As an immediate corrective measure, the control air was removed from valve EGC108 B. This resulted in EGC108 B assuming the fail safe fully open position.

Valve EGC108 B will be reworked at the next available opportunity. In addition, Systems Engineering will perform an evaluation to determine if

the Combustion Air Inlet Temperature Control Valves on both EDGs can be permanently removed. Based on the results of this evaluation, the need for a maintenance task to require the replacement of the softgoods on these valves every 5 years will be investigated.

#### SAFETY SIGNIFICANCE

Waterford 3 was shutdown for the Refuel 7 outage at the time of these events. The "A" train EDG remained operable throughout the time period that EDG "B" was out of service. Safety analysis assumes that a single failure disables one protection train. However, a single EDG, safety bus, and associated Engineered Safety Features equipment are adequate to protect the reactor during the worst case postulated accident.

Also, Waterford 3 Technical Specifications (TS) only require one EDG to be operable when the plant is shutdown. As previously mentioned, EDG "A" was operable throughout the time period that EDG "B" was out of service. Therefore, the TS requirements were satisfied. In addition, the Turbocharger Low Lube Oil Pressure trip is bypassed when an EDG operates in the emergency mode. The conditions which led to the Turbocharger Low Lube Oil Pressure trip would not have prevented EDG "B" from performing its safety function. Therefore, EDG "B" would have functioned as designed during an actual emergency situation.

Based on the above information, this event did not compromise the health and safety of the public or plant personnel.

#### SIMILAR EVENTS

A review of the Licensing Research System database identified four Special Reports (SR-88-003, SR-90-002, SR-91-004, and SR-91-005) that document EDG trips that occurred at Waterford 3 due to Turbocharger Low Lube Oil Pressure. None of these trips were attributed to a failed valve diaphragm.