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May 29, 1991

U.S. Nuclear Regulatory Commission
ATTENTION: 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-91-004-00 for Waterford Steam Electric Station Unit 3. This Special Report is submitted per 10CFR50.36(c)(2) and Technical Specifications 4.8.1.1.3 and 6.9.2.

Very truly yours,

D.F. Packer
General Manager Plant Operations

DFP/DDW/rk
Attachment

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Special Report 91-004-00

Invalid failure of Emergency Diesel Generator 'A' due to a spurious turbocharger lube oil low pressure trip.

INTRODUCTION

At 1308 on April 29, 1991, Emergency Diesel Generator (EDG) 'A' tripped on turbocharger lube oil low pressure during the performance of Operating Procedure (OP) 903-068, "EDG Operability Test Verification." At the time of the test, the cause of the trip could not be readily determined. EDG 'A' was restarted at 1341 and OP-903-068 was satisfactorily completed. This event has been classified as an invalid failure and is being reported in accordance with Technical Specification (TS) 4.8.1.1.3. The root cause of this event was an overly restrictive pressure tolerance between the turbocharger lube oil low pressure trip set point and the turbocharger lube oil pressure regulator band.

NARRATIVE

At 1307, EDG 'A' was started to perform OP-903-068. EDG 'A' tripped at 1308. Normal turbocharger lube oil pressure was observed just prior to the trip. The Plant Monitoring Computer indicated that the EDG tripped on turbocharger lube oil low pressure. The turbocharger lube oil low pressure trip set point is a variable set point, dependent on EDG load. The trip set point is derived from a turbocharger low pressure shutdown valve setting of 4.0 psig, with a tolerance of +0.5 to -0.0 psi, plus an air manifold pressure input. With no load on the EDG, air manifold pressure is approximately 0.5 psi, making the no load trip set point 4.5 psi. An increase in EDG load increases air manifold

pressure and, consequently, the turbocharger lube oil low pressure trip set point.

Regulation of the turbocharger lube oil pressure is accomplished by a similar method. The turbocharger oil pressure regulator is set at 6.0 psi. An air manifold pressure signal is doubled and added to this 6.0 psi regulator setting. At no load conditions, oil pressure is controlled at 7.0 psi. As air manifold pressure increases with load, turbocharger lube oil pressure also increases. Since the air manifold signal to the turbocharger oil pressure regulator is doubled and the air manifold signal to the low pressure shutdown valve is not doubled, the difference between the normal turbocharger lube oil pressure and the low pressure shutdown set point increases as load increases. A relatively small pressure band exists between actual turbocharger lube oil pressure and the turbocharger low lube oil set point during EDG start up.

To prevent spurious trips, a time delay of 15 seconds is incorporated in the starting circuitry to allow turbocharger lube oil pressure to increase above the turbocharger low lube oil trip set point. EDG 'A' tripped shortly after this time delay had elapsed. The EDG was inspected for oil leaks. Since the cause of the trip could not readily be determined and since normal turbocharger lube oil pressure had been observed prior to the trip occurring, the EDG was restarted at 1341. Oil pressures remained within normal operating limits and OP 903-068 was satisfactorily completed.

During refuel outage 4, both the turbocharger low pressure shutdown valve and the turbocharger lube oil regulator settings were checked and calibrated. The turbocharger low pressure shutdown valve setting was found to be 3.8 psi and

was increased to 4.0 psi. The turbocharger lube oil regulator setting was found to be 6.5 psi and was reduced to 6.0 psi. These changes reduced the no load pressure band between turbocharger lube oil pressure and the turbocharger lube oil low pressure trip set point from 3.2 psi to 2.5 psi. The root cause of this spurious trip appears to be the reduced margin between the trip set point and the oil supply pressure.

The vendor has been consulted to determine the feasibility of increasing the margin between the trip set point and turbocharger lube oil pressure to prevent or minimize the number of spurious turbocharger lube oil low pressure shutdowns. The vendor has verbally agreed to provide written guidance allowing the turbocharger low pressure shutdown valve setting to be reduced to 3.0 psi. The turbocharger low pressure shutdown valve setting will be reduced when this guidance is received.

This failure is classified as an invalid failure since, in the emergency mode, the turbocharger low lube oil trip is bypassed. There have been two valid failures of EDG 'A' and one valid failure of EDG 'B' at Waterford 3 since the operating license was issued. The current surveillance test interval is at least once per 31 days, which is in conformance with the schedule of Regulatory Position C.2.d. The EDG would have performed as designed in the emergency mode; therefore, this event was not a threat to the health and safety of the general public.

PLANT CONTACT

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