

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Susquehanna Steam Electric Station - Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 8 7	PAGE (3) 1 OF 0 4
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TITLE (4)
Diesel Generator Failures.

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 NAMES	DOCKET NUMBER(S)
0 9	1 0	3 4	8 4	0 4 0	0 0	1 0	1 2	8 4	SSES - Unit 2	9 5 0 0 0 3 8 8
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OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)				
POWER LEVEL (10) 1 0 1 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(e)	<input type="checkbox"/> 80.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 80.36(a)(1)	<input checked="" type="checkbox"/> 80.73(a)(2)(v)	<input type="checkbox"/> 73.71(e)	
	<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 80.36(a)(2)	<input type="checkbox"/> 80.73(a)(2)(vii)		
	<input type="checkbox"/> 20.406(a)(1)(iii)	<input type="checkbox"/> 80.73(a)(2)(i)	<input type="checkbox"/> 80.73(a)(2)(viii)(A)		
	<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 80.73(a)(2)(ii)	<input type="checkbox"/> 80.73(a)(2)(viii)(B)		
<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 80.73(a)(2)(iii)	<input type="checkbox"/> 80.73(a)(2)(ix)			

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER
NAME R.W. Stanley - Compliance Engineer		AREA CODE 7 1 7
		7 5 4 2 - 3 9 3 1 0

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS		
X	E K	*	C 6 3 4	Y							

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)			<input checked="" type="checkbox"/> NO			

ABSTRACT (Limit to 1400 spaces i.e. approximately fifteen single-space typewritten lines) (16)

During the performance of SO-024-001 "Monthly Diesel Generator Operability Test", the "D" Diesel Generator tripped on high turbo charger vibration. The radial turbo charger bearing was found to be failed. A replacement turbo charger was installed, the diesel was tested and returned to service.

During the repair work on the "D" Diesel, the RHR suppression pool cooling full flow test valve 1F024A failed to stroke was declared inoperable. This placed the plant into action statement 3.8.1.1c which requires with 1 diesel inoperable verify within 2 hours all systems that depend on the remaining diesels are operable or be in Hot Shutdown within the next 12 hours. The valve was placed into operation after 6 hours and 15 minutes. This was prior to the Hot Shutdown requirement.

While the "D" Diesel Generator was out for repairs, and after the 1F024A was repaired and declared operable, the "B" Diesel Generator developed a starting problem. With 2 diesels out of service, Technical Specification 3.8.1.1 requires restoration to 3 operable diesels or be in Hot Shutdown within the next 12 hours. At 2045 on September 12, 1984, the "D" Diesel was returned to service, and the "B" Diesel was returned to service at 0730 on September 13, 1984.

Over the next several days other failures of the "B" Diesel occurred during investigation of the slow start problems. Corrective actions included maintenance of the starting air system, reworked fuel oil system, and cleaning of the air operated control valves.

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*Turbo Charger Radial Bearings.

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TEXT (If more space is required, use additional NRC Form 366A's) (17):

From September 10, 1984 through September 25, 1984, the Station experienced several related and unrelated problems with the Emergency Diesel Generators. 1 diesel experienced a turbo charger failure and subsequent surveillance testing, per Technical Specification requirements, revealed an intermittent starting problem on another diesel generator. Turbo charger repairs were made expeditiously. Due to the intermittent nature of the slow starts on another diesel, several attempts were necessary to repair the problem. An organized systematic approach was taken which included instrumenting the diesel (visocorder for relay operation, pressure gauges for starting air, etc.) to observe several parameters during diesel testing. As corrective actions were identified and implemented the diesel was successfully tested and returned to service. Subsequent slow starts led to increased troubleshooting which resulted in correction of the problem such that testing to date has been successful.

The events of the period are detailed below:

During the performance of SO-024-001 "Monthly Diesel Generator Operability Test", at 1455 on September 10, 1984, the "D" Diesel Generator tripped on high turbo charger vibration. The radial bearing was found failed; a replacement turbo charger was installed.

Technical Specification 3.8.1.1 requires the remaining diesels to be started within 4 hours and at least once per 8 hours thereafter. During this increased testing time interval, the "B" Diesel Generator did not start at 0215 on September 11, 1984. The diesel was successfully started 23 minutes later.

At 0750 on September 11, 1984, the RHR suppression pool cooling full flow test valve 1F024A was declared inoperable when its circuit breaker tripped. The valve was inspected by the Maintenance Department under WA S44663 and found to be inoperable because the key which holds the motor pinion to the motor shaft fell out. The missing key was located in the actuator grease box and reinstalled. To prevent a recurrence of the key from sliding out the end of the motor shaft, the motor shaft was peened over. The key is normally retained by friction imposed on the motor pinion gear/shaft interface by a set-screw which is located in the motor pinion gear, at 90° relative to the key. Because this has not been a recurring problem, this condition is considered to be an isolated occurrence. The proper orientation of the key and set-screw is addressed in Limatorque type SMB000-4 operator maintenance procedure MT-GM-021, thus there is adequate assurance that PP&L actuator maintenance will be proper, and no further action is required.

Action Statement 3.8.1.1c requires, with on diesel generator inoperable, the verification within 2 hours that all systems and components that depend on the remaining diesel generators as a source of emergency power are operable; otherwise be in Hot Shutdown within the next 12 hours. Since the "D" Diesel was inoperable due to turbo charger problems and the RHR suppression pool cooling full flow test valve 1F024A was declared inoperable for repairs, the above Action Statement applied. Power for the RHR full flow test valve 1F024A is powered from the "C" Diesel Generator. The RHR suppression pool full flow test valve 1F024A was out of service for only 6 hours and 15 minutes. Therefore, a Hot Shutdown was not required.

At 1721 on September 11, 1984, the "B" Diesel Generator failed to start. Another start attempt 34 minutes later resulted in a slow start of 11.2 seconds versus a start time of less than 10 seconds as required by Technical Specification 4.8.1.1.2. This attempt was declared a failure, which was the third failure of the last 100 starts which increased the testing frequency to 1 start every 7 days. At 1812 on September 11, 1984, a successful start was achieved; the diesel was declared operable.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

At 0054 on September 12, 1984, the "B" Diesel required 12.5 seconds to start, and the diesel was declared inoperable. Regulatory Guide 1.108 defines this as a valid failure which was the fourth failure of the last 100 starts which increased the testing frequency to 1 start every 3 days. 17 minutes later another start attempt resulted in a successful start and the diesel was declared operable.

At 0850 on September 12, 1984, the "B" Diesel was declared inoperable for troubleshooting. At 0905 on the same day, a start attempt was made on the diesel which failed to start in the required 10 seconds. This was documented as a 'non-valid' test. 20 minutes later another start attempt resulted in a successful start. At 0930 on September 12, 1984, the diesel was declared operable.

At 1040 on September 12, 1984, the "B" Diesel was removed from service for further testing and investigation of intermittent starting problems. 2 diesels were declared inoperable which placed the plant into Technical Specification 3.8.1.1 action statement which requires at least 3 diesels operable within 2 hours or be in a Hot Shutdown condition within the next 12 hours. At 2045 on September 12, 1984, the "D" Diesel was declared operable after completion of testing, following turbo charger replacement. This restored the plant to 3 operable diesel generators.

At 1620 on September 12, 1984, the "B" Diesel Generator was started for troubleshooting. The start time was in excess of the required 10 seconds. This start was documented as a 'not valid' test. At 0427 on September 13, 1984, Maintenance completed its investigation of the starting problem on the "B" Diesel Generator, which consisted of cleaning the starting air distributor and its lines, changing the fuel oil strainers and filters, and air start pilot valves were cleaned and inspected per WA-S44669. At 0427 on September 13, 1984, the "B" Diesel was started acceptably for a post maintenance run. This run is documented as a 'valid' start. The "B" Diesel was declared operable 0730 on September 13, 1984.

The "B" Diesel was started at 2148 on September 13, 1984. The diesel required 11.9 seconds to attain rated speed. This start is documented as a failure, increasing the number of failures to 5 in the last 100 valid tests, which requires a testing frequency of one start every 3 days. The problem of the slow start time was investigated by WA S44703 which replaced the fuel oil booster pump and check valves in the system. Also, the investigation found suction flanges from the day tank to the booster pump loose. These loose suction flanges allowed air to enter the fuel oil system upon the initial start, causing a slow starting time. Seven troubleshooting runs were performed between 2205 on September 13, 1984, and 0422 on September 16, 1984. An operability run was made at 1736 on September 16, 1984. There has been no history of this type of failure before. A slow start time caused by loose suction line fittings is an isolated case, and the subsequent proper tightening has cured the problem. 3 WA's were written to check the tightness of the fittings on the fuel oil suction lines for the "A", "C", and "D" Diesels.

At 0620 on September 24, 1984, while the "D" Diesel was out of service to correct the deficiencies which were noted on the "B" Diesel, the "B" Diesel was declared out of service due to a trip during a starting attempt. With 2 diesels out of service, Technical Specification 3.8.1.1 Action Statement requires at least 3 diesels to be operable within 2 hours or be in a Hot Shutdown condition within the next 12 hours. The "D" Diesel was placed into service at 1545 on September 24, 1984, therefore, no Hot Shutdown was required.

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

A troubleshooting start on the "B" Diesel was attempted at 1945 on September 24, 1984, and the diesel tripped after 12.5 seconds. The fuel oil system pressure response time was 1.5 to 2.5 seconds, which indicated this was not a recurrence of the previous problem. The fuel racks on the "B" Diesel did not open for 6 to 7 seconds. This is in excess of a normal diesel start in which the fuel racks open to admit fuel to the cylinder within 2 seconds. This 4 to 5 second lag in the response of the fuel racks resulted in a 4 to 5 second delay in starting time. The problem was determined as the Safety Trip Fuel Oil Control Cylinder (USC-7) not venting. This cylinder is expanded when the diesel is shutdown, resulting in closed fuel racks. The venting problem was traced back to the sluggish response of the Safety Trip Control Valve (USCV-9). This control valve is an air operated valve and will vent the Safety Trip Control Cylinder (USC-7) immediately upon a start signal. Upon disassembly of USCV-9 light metal shaving and some corrosion was noted. The valve was cleaned and reassembled, and the pneumatic circuit was tested with satisfactory results. The diesel was declared operable on September 25, 1984. This is a 'non valid' failure since the Fuel Oil Control Cylinder (USC-7) is vented in the emergency mode by 2 electrically operated solenoid valves, therefore, the Safety Trip Control Valve (USV-9) is bypassed in the emergency mode.

The correction of the fuel oil pressure response problem and the fuel rack response time problem has restored the reliability of the "B" Diesel. Diesel testing has been satisfactory since these repairs have been made. The degradation of the USCV-9 Control Valve was most likely caused by poor control air quality supplied from the starting air compressors. Air dryers are to be installed under PMR 82-761 during the first refueling outage to reduce the moisture problem.



Pennsylvania Power & Light Company

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October 12, 1984

U.S. Nuclear Regulatory Commission
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SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 84-040-00
ER 100450 FILE 841-23
PLA- 2335

Docket No. 50-387 / 50-388
License No. NPF-14 / NPF-22

Attached is Licensee Event Report 84-040. This event was determined reportable per 50-73(a)(2)(v), due to Diesel Generators and one RHR Suppression Pool Cooling Full Flow Test Valve inoperability.

H. W. Keiser
Superintendent of Plant-Susquehanna

RWS/jls

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