U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-387/89-18
50-388/89-16

Docket Nos. 50-387
50-388

License Nos. NPF-14
NPF-22

Licensee: Pennsylvania Power and Light Company
2 North Ninth Street
Allentown, Pennsylvania 18101

Facility Name: Susquehanna Steam Electric Station Units 1 and 2

Inspection At: Berwick, Pennsylvania

Inspection Conducted: July 10-14, 1989

Inspector: E. H. Gray — 8/7/89
E. H. Gray, Senior Reactor Engineer — date

Approved by: Jack Strosnider — 8/8/89
J. Strosnider, Chief, Materials and Processes Section — date

Inspection Summary: Inspection on July 10-14, 1989 (Report Nos. 50-387/89-18 and 50-388/89-16)

Areas Inspected: A routine, announced inspection was performed of the emergency diesel generators (EDG) fuel supply, related equipment and procedures.

Results: One violation, a failure to lock a normally open valve and one FSAR deviation of maintaining less than two hours of fuel in the EDG day tanks were identified. Areas were identified where improvements in EDG reliability could be achieved.

DETAILS

1.0 Persons Contacted

Pennysylvania Power and Light Company

*R. Breslin, Maintenance
*R. Byram, Superintendent of Plant
B. Darrach, EDG System Engineer
A. Dominguez, Sr. Results Engineer - Ops
*J. Graham, Asst. Mgr. - NQA Operations
*A. Iorfida, I&C Supervisor
*R. Matthews, Sr. Analyst - NQA
*T. Nork, Plant Engineering Group Supervisor (Systems)
R. Paley, Systems Engineer - Electrical
*D. Roth, Sr. Compliance Engineer
*R. Wehry, Compliance Engineer

U.S. Nuclear Regulatory Commission

*S. Barber, Senior Resident Inspector
*W. Oliveira, Reactor Engineer

*Denotes those present at the exit meeting.

2.0 Licensee Action on Previously Identified Items

(Closed) Unresolved Item (387/85-26-02)

Diesel generator air start compressor and air dryer compatibility causing relief valve chatter. Following the EDG air dryer installation, the air tank pressure relief valves would open and close during air compressor operation. The licensee established that the compressor required a size increase. Larger capacity air compressors were installed and operational in January 1986. Additional related modifications 869010 and 869001 were operational on October 20, 1986 and July 3, 1986. During inspection 387/89-18, the air compressors and air dryers were observed to be operational without pressure relief valve opening and closing cycles.

3.0 Review of the Emergency Diesel Generators

3.1 Introduction

The Susquehanna two unit site has four 4000 KW Cooper Bessemer emergency diesel generators (EDG) to provide adequate safety related electrical power for safe plant shutdown in the event that offsite power is lost. A fifth diesel, designated as "E" of greater capacity can be substituted for any of the four other diesels. The objective of this inspection was to determine to what extent the licensee has established that the EDGs will start and continue to run if required. The inspection reviewed portions of the logic, hardware, and procedures for air

start, fuel and lubrication oil systems. Contingencies for potential problems that could act as impediments to EDG starting and running were assessed.

The inspection did identify a number of conditions or potential problems that could either prevent EDG startup or impede continuing operation. The inspection scope and findings are discussed below. The licensee is required to evaluate and respond to the notices of violation and deviation (Appendices A&B) and is requested to evaluate the other findings and decide if any actions are appropriate to further improve EDG reliability.

3.2 Findings

Day Tank Fuel Supply

The plant technical specification in paragraph 3.8.1.1 requires each day fuel tank to contain a minimum of 325 gallons of fuel. The updated FSAR, Revision 40 of page 9.5-39 indicates that each day tank contains fuel oil sufficient for over two hours of full load continuous diesel generator operation. The inspector noted the following fuel tank capacity problems.

- The plant operator daily rounds log specifies a minimum day tank fuel requirement of 60% for tanks A, B, C, D and 48% for tank E. This is less than required for two hours of operation at full load.

- Drawings J653 sheets 48 and 152 indicate the maximum useable fuel in day tanks A through D and E to be 376 and 497 gallons, respectively, considering the unuseable volume at the bottom of the tank and the fill stop points.

The presence of less than two hours of fuel in the diesel generator day tanks is a deviation from the FSAR commitment (50-387/89-18-01 and 50-388/89-16-01). Also, it is suggested that the FSAR be changed to indicate the actual amount of useable fuel in the EDG day tanks. As currently written, the FSAR indicates that the day tanks contain sufficient fuel for two hours of EDG operation. This is misleading and could cause problems in an emergency response situation. The inspector also noted that the fuel level gage (LI02020E) on the E main fuel tank has been broken since at least January 18, 1988.

Air Start System

The diesel generator air start systems provide compressed air directly to the engine cylinders to initiate engine rotation and engine start.

- The air start tanks are both normally lined up to their respective diesel. If one were to be drained, air from the second tank is prevented from draining into it by a check valve. These check

valves are examined by maintenance on an 18 month cycle but are not normally tested, such that the ability of the check valves to prevent back flow of starting air is not clearly demonstrated.

- The B and C diesel air start tank drain lines continuously leak air, such that the air compressors run more often than expected. This presents the possibility of exhausting the air start tanks (receivers) should the air compressors become inoperative.

- There is at least a 25 second timer to shut off air flow to the engine should diesel engine start fail to occur. Testing of the air receivers per the FSAR, page 9.5-49, consisted of 5 start cycles which for one tank used 17.2 seconds of air. The analysis does not answer the following question: Should the engine fail to start and use 25 seconds or more of air, would sufficient air be available to start the engine after the cause of the nonstart was corrected?

- A new system of air start dryers was recently installed. The inspectors observed these air dryers to periodically exhaust a mixture of oil and water into the diesel building basement rather than directly to a suitable drain. The licensee acknowledged the problem and is in the process of considering an air dryer modification.

- The starting air tank to engine line valves are normally locked open per procedure CL-024-018. The inspector observed that valve 034038D on this line while in the open position with a lock and chain draped over the valve handle was not secured by the lock. This is a violation of 10 CFR 50 Appendix B, Criterion V (50-387/89-18-02, 50-388/89-16-02).

Lube Oil

The sampling of diesel engine lubrication oil taken monthly for analysis to identify unfavorable oil conditions or the initiation of engine problems is not coordinated with monthly engine runs. The result is that lubrication oil samples are not typical of the oil condition present during or shortly after engine operation. Sampling shortly after engine runs would provide a more accurate analysis of fuel oil quality and engine performance.

125 Volt Direct Current

Flow of starting air to the engine cylinders and the fuel control cylinder is initiated by 125 volt DC power to the air start solenoids.

- No manually operated bypass valve and line is provided around the air start solenoids to provide an alternative method for starting the EDG in the event of loss of control power.

- At low engine speed (rpm) fuel is supplied by the 125 volt electric fuel pump. At higher rpm, fuel is supplied by the engine driven fuel pump. The licensee has not verified under what conditions adequate fuel can be delivered by the engine driven fuel pump should the electric fuel pump be unable to deliver fuel at low rpm and what the consequences would be.

Long Term Diesel Generator Operation

The diesel generator operating log is used for recording and tracking engine variables during diesel runs that exceed 45 minutes. Diesel testing and operating procedures are primarily directed toward meeting the monthly diesel test requirements. A procedure outlining specific actions that would be required by maintenance, operations and others at the site if the diesel generators are needed for the extended time period such as seven days has not been prepared.

Other Areas

The inspector reviewed the process of fuel procurement, maintenance, instrument and controls, engineering and the alarm response procedures and observed plant operator rounds on the diesels. No specific problems relative to the emergency diesel generators were observed in these areas.

3.3 Conclusion

In the areas examined, with the exception of the identified violation and deviation, the EDG program is in agreement with the technical specification and FSAR. The inspection identified areas where reliability could be improved.

4.0 Exit Interview

The inspector met with licensee management representatives (see Section 1.0 for attendees) at the conclusion of the inspection on July 14, 1989.

The inspector summarized the scope and findings of the inspection at that time. At no time during this inspection was written material provided to the licensee by the inspector.