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SEP 05 1984

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50-352/353

Mr. Thomas E. Murley, Director
Office of Inspection and Enforcement Region I
United States Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Subject: Limerick Generating Station, Units 1 & 2
Significant Deficiency Report No. 146
Diesel Oil Storage Tank Water Intrusion
NRC Construction Permit Nos. CPPR-106 & 107

Reference J. P. Evans (PECo) Telecon to J. Beall (USNRC), dated August 9, 1984

File: QUAL 2-10-2 (SDR No. 146)

Dear Mr. Murley:

During startup testing of the Limerick diesel generator fuel oil storage and transfer system, water was observed to have entered each of the diesel fuel oil storage tanks. We have evaluated the safety impact of this occurrence and believe that it may represent a significant deficiency per 10CFR50.55(e), and are hereby notifying you as required.

The details of our evaluation are contained in the attached report. As you requested in the referenced telecon, we have also addressed the potential for an analogous problem to develop at our Peach Bottom Atomic Power Station. Please do not hesitate to contact us should you desire further discussion or clarification of any aspect of this item.

Very truly yours,

John S. Kemper

WJM/cmv/08278405
Attachment
Copy to: Director of Inspection and Enforcement
United States Nuclear Regulatory Commission
Washington, DC 20555

S. K. Chaudhary, Resident NRC Inspection (Limerick)

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Limerick Generating Station, Units 1 & 2

Significant Deficiency Report - SDR No. 146

Diesel Fuel Oil Storage Tank Water Infiltration

NRC Construction Permit Nos CPPR-106 and 107

Introduction

This is the final report concerning a significant deficiency on the fuel oil storage tanks for the Limerick diesel generators. The affected tanks were fabricated by Buffalo Tank Division of Bethlehem Steel Corporation at their Baltimore, MD facility. A total of eight tanks were supplied to Limerick, four for each unit. Each tank is 12' in diameter, 49' long, and will hold a maximum of 41,500 gallons of fuel oil.

All eight of the tanks have been installed at the site and are located approximately 12' underground in front of the radwaste building, with a valve pit interposed from the ground surface to the top of each tank. The valve pit contains the fuel oil transfer pump motor, a tank access manway, an oil level gauge, a combination tank vacuum/overpressure relief valve, electrical conduits, and system process piping. In the event of water inleakage, drainage from the valve pits is accomplished through four inch pipes from the bottom of each valve pit, which connect to a common header that discharges into an oily waste interceptor.

Description of Deficiency

In March, 1984, during plant startup testing of the diesel fuel oil storage and transfer system, water was discovered to have entered all eight of the diesel generator fuel oil storage tanks. The water filled the empty Unit 2 fuel oil tanks, and raised the fuel oil level in the Unit 1 tanks to a level higher than the fuel oil transfer pump suction. This condition was discovered during routine inspection of the Unit 1 tanks to determine tank oil level. If not corrected, this water could have been transferred to the diesel generator day tanks, and ultimately into the diesel engines themselves. Although no actual transfer occurred, this represents a potential common mode diesel generator failure.

Investigation revealed that plant construction workers had routed the discharge hoses of temporary dewatering pumps from various sources (such as the fuel pool and the suppression pool) into a manhole located between the valve pit drain header and the oily waste interceptor. This manhole was mistaken for a nearby storm drain. The resulting volumetric flow rate of water exceeded the capacity of the manhole drainage line, so that the water in the manhole rose and began to backflow into the common header discharge. As the water filled the manhole, the level rose to a point where it exceeded the elevation of

the valve pit drainage ports, and water began to backflow into the valve pits.

The vacuum relief inlet of the combination tank vacuum/pressure relief valves is located approximately 15" above the floor of the valve pits. When the water level rose above these valves, the vacuum relief discs unseated (set to relieve at 0.5 oz differential force) and water flowed into each of the tanks.

Although this problem was attributed to a specific human error that would not occur under normal plant operation, subsequent investigation by PECo. revealed an aspect of the non-safety related oily waste system which could potentially result in an analogous situation. The oily waste interceptor discussed above also receives drainage from the diesel generator enclosures and the fuel oil truck unloading area. It is capable of handling approximately 150 gpm through a four inch inlet pipe. If the total input into this interceptor exceeds this amount, or the interceptor becomes clogged, flow is directed around the interceptor through a full-flow bypass line and is alarmed in the control room. The elevation of the bypass line is greater than the elevation of the drainage port of the valve pit and the vacuum relief valve inlet. Thus, any use of this bypass line would cause water to backup toward the diesel fuel oil storage tanks. If a volume of 5700 gallons were backed up in such a manner, water would begin to enter the storage tanks. An additional volume of 1500 gallons would then have to enter each tank before it would reach the fuel oil pump suctions. This would require the accumulation of a total of over 12,000 gallons of water before a potential problem was encountered. Therefore, flooding of the area, and/or clogging of the interceptor from service has a limited potential to result in a common mode diesel generator failure. A similar situation could occur if the drainage system was valved out of service. Although such occurrences are assessed to be quite unlikely, a corrective action program has been developed.

Corrective Action

Corrective actions have been segregated into long-term and short-term actions. These are discussed in detail below:

1. Short-Term Actions - Immediate actions included the following:

   a. The water was removed from the Unit 2 fuel oil storage tanks. The water in the Unit 1 tanks was allowed to settle to the bottom and to completely separate from the oil before it was removed. The water was removed and the fuel oil was analyzed to verify that it remained acceptable for use. The diesel generators were not operated in the interim.

b. The temporary drain hoses were removed from the oily waste manhole and routed to the nearby storm drain. Warning signs indicating the purpose of the oily waste manhole were posted until the normal manhole access cover could be installed. All permanent manhole covers have subsequently been installed.

c. The valve pits were cleaned of any silt and debris, and plugs were installed in the drainage ports of each of the eight valve pits. The plugs were verified to be capable of withstanding the static head which may develop if the downstream manholes should be flooded to surface elevation.

d. The design of the diesel fuel oil valve pits was reviewed to ensure that all other potential sources of water inleakage were eliminated. The plant operators were instructed to periodically monitor the valve pits for water accumulation.

2. Long-Term Actions - Prior to the first refueling outage, the following actions will be implemented:

a. Backwater check valves will be installed in the drainage inlet ports of each valve pit, in lieu of the plugs. This will allow normal functioning of the valve pit drains, while minimizing the amount of backflow inleakage.

b. The combination vacuum/pressure relief valves will be raised to a higher elevation off the floor of the valve pits, such that the allowable water level in the valve pits is maximized before leakage into the tanks occurs is maximized.

c. An operating procedure will be implemented which requires that each of the diesel generator fuel oil storage tank valve pits be inspected for water accumulation upon receipt of the control room high flow alarm in the oily waste interceptor bypass line.

Philadelphia Electric Company believes that the short-term program delineated above is sufficient to eliminate the potential for a common-mode diesel generator failure, and will permit safe operation of the plant. The long-term action items will accomplish the same purpose, but will minimize the inconvenience placed upon plant operations personnel.

In addition, we have evaluated the design of the diesel generator fuel oil storage and transfer system at the Peach Bottom Atomic Power Station, and have determined that no potential for an analogous failure exists. The Peach Bottom fuel oil storage tanks (although also located underground) are not equipped with individual valve pits or pressure/vacuum relief valves. Tank venting is accomplished only

through above-grade vent lines equipped with flame arrestors. Therefore, no backflow from the oily waste drainage system into the tanks can occur.

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