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SEP 04 1984

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

Subject: Significant Deficiency Report #120
Final Report on Paul Munroe Electric-Hydraulic
Valve Actuator Deficiency
Limerick Generating Station, Units 1 and 2
NRC Construction Permit Nos. CPPR 106 and 107

Reference: 1) Telecon Record J. P. Evans and
R. B. Atkinson (PECC) to
W. Baunack, (USNRC), dated
11/22/83
2) Interim Report, dated 12/22/83

File: QUAL 2-10-2 (SDR #120 and 147)

Dear Dr. Murley:

In compliance with 10CFR50.55(e) we are submitting our Final
Significant Deficiency Report concerning the Paul Munroe
Electric-Hydraulic Valve Actuator Deficiency.

Interim Report (Reference 2) was previously submitted to your
office.

We trust that this satisfactorily resolves this item. If further
information is required, please do not hesitate to contact us.

Sincerely,

John S. Kemper

MJM/mlb/08298401

Copy to: Director of Inspection and Enforcement
United States Nuclear Regulatory Commission
Washington DC 20555

J. Wiggins, Resident NRC Inspector (Limerick)

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Significant Deficiency Report-SDR #120
Paul-Munroe Electric-Hydraulic Valve Actuator Deficiency
Limerick Generating Station-Unit 1&2
NRC Construction Permit Nos. CPPR 106 & 107

Description of Deficiency

The Limerick Generating Station has twenty-eight (28) HVAC valve actuators manufactured by PMH; Unit 1 and Common have eighteen (18) and Unit 2 has ten (10). As reported by reference 2, eighteen (18) Unit 1 and Common valve actuators were sent back to PMH for a complete overhaul as a result of contaminated hydraulic fluid and concern about depletion of seal life during the extended storage period. This overhaul which has been completed, included seal replacement and repair and/or replacement of damaged components. Reference 2 also stated that proper operation of the Unit 1 and Common systems with these overhauled valve actuators will be verified during the pre-operational testing activities.

During the pre-operational testing however, an additional problem was discovered with the valve actuators. The hydraulic-oil pump on many of the valve actuators was cycling more frequently to recharge the accumulator than specified by the PMH Service Manual. Analysis by PMH, through inspection of several disassembled valve actuators in their shop and at the Limerick jobsite, determined that the pump cycling was a result of the hydraulic pressure being reduced as a result of leakage occurring in various components; the solenoid valve, accumulator, and Flo-Tork. 14 of 18 valve actuators were found to have at least one of the leaking components. Hydraulic fluid contamination was not believed to be the cause of these leaking components.

Corrective Action

The corrective action established to correct the leaking components causing the pump cycling problems is as follows:

- A. Accumulators - Four accumulators (HV-76-012A, 012B, 010A and 010B) were found to be leaking as a result of porosity on the inside of the accumulator barrels. These accumulators will be replaced with new ones. Other accumulators are being monitored and will be replaced if leaks develop.
- B. Flo-Torks - Hydraulic fluid was found to be leaking past the piston seal on ten Flo-Torks (HV-76-012A, 012B, 013A and 013B and HV-78-010A, 010B, 020C, 020D, 184A and 184B). The cause of this leakage appeared to be a result of PMH switching from a unqualified seal to a qualified seal. With existing piston to cylinder wall clearances, this new seal could not prevent hydraulic fluid leakage under operating conditions. These leaking Flo-Torks are being repaired by PMH by re-bronzing the pistons and re-honing the cylinder barrel walls. Other Flo-Torks are being monitored and will be repaired if leaks develop.

- C. Keane Solenoid Valves - Ten solenoid valves were found to be leaking and are being replaced with new or repaired valves. To date, solenoid valves on six valve actuators (HV-76-110, 109, 013A and 184B and HV-78-010A and 020C) have been replaced, with replacement still scheduled for four valve actuators (HV-76-012A and 012B and HV-78-020A and 020B). Each actuator system had the ten micron filter replaced with a two micron filter to insure more positive filtration of stray contaminants. This leakage occurred as a result of the solenoid valve seating surfaces being scored during fabrication or from previous fluid contamination. Other solenoid valves are being monitored and will be repaired and/or replaced if leaks develop.

All valve actuators that have the hydraulic-oil pump cycling problem will have the leaking components replaced or repaired and all Unit 1 and Common systems with the valve actuators will have been tested to assure proper operation by September 14, 1984. None of the Unit 2 valve actuators will be overhauled at this time pending resolution of the Unit 2 status.

Safety Implication

Leakage of hydraulic fluid could have resulted in improper operation of the actuator since the actuator is driven by hydraulic fluid from the pump. Sufficient hydraulic pressure may not have been available to the actuator for its normal and safety modes of operation. If it had gone uncorrected, leakage of hydraulic fluid could have had an adverse effect on the safe operation of the plant.