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September 5, 1984
EF2-68328

Mr. James G. Keppler
Regional Administrator
Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

Reference: (1) Fermi 2
NRC Docket No. 50-341
(2) Letter, D. A. Wells to J. G. Keppler
March 7, 1984, QA-84-0087

Subject: Final Report of 10CFR50.55(e) Item 114
"Possible Overpressurization of North
RHR Heat Exchanger"

This is Detroit Edison's final report of Item 114, "Possible Overpressurization of North RHR Heat Exchanger." Item 114 was originally reported as a potential deficiency on January 24, 1984, and was subsequently documented on Reference (2).

Description of Deficiency

On January 22, 1984, the North RHR heat exchanger may have been subjected to fluid pressure on the shell side which exceeded the 450 psi maximum working pressure. The incident occurred because a thermal relief valve on the North RHR heat exchanger was left blanked after a low pressure hydrostatic test on piping attached to the heat exchanger was completed. When the higher pressure rated adjoining piping was tested, the isolation valve between the piping being hydrostatic tested and the RHR heat exchanger leaked. This leakage may have exposed the isolated RHR heat exchanger to a pressure greater than its maximum working design pressure.

Analysis of Safety Implications

If the heat exchanger had been damaged and the damage had gone undetected, it could have degraded the ability of the heat exchanger to perform its safety-related function.

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Mr. James G. Keppler
September 5, 1984
EF2-68328
Page 2

Corrective Action

In response to the potential overpressure condition, Detroit Edison has taken the following corrective actions:

- (1) Test procedures have been revised to assure that on future hydrostatic tests, systems outside the test boundary cannot be inadvertently over-pressurized.
- (2) An investigation of the incident was conducted by Detroit Edison Engineering in order to ascertain the potential pressures to which the heat exchanger may have been exposed. Records were reviewed from both the day of the incident (January 22, 1984) and from January 28, 1984 when a subsequent test was run to reenact the incident.

On January 27, 1984, Detroit Edison requested General Electric, the vendor of the heat exchanger, to have Fromson Heat Transfer Ltd., the designer and the fabricator of the heat exchanger, review the capability of the heat exchanger to withstand the maximum postulated pressure of 1330 psig. The N-4 nozzle area was singled out in the Fromson review as the weakest portion of the shell. Therefore, insulation was removed from the area and a visual examination of the painted area was conducted. There was no evidence of yielding (paint cracking). The paint was then removed from designated areas and hardness readings were taken. These readings indicated nothing which would indicate overstressing of the area. Subsequently an ultrasonic preservice inspection of the N-4 nozzle was performed by Southwest Research Institute personnel. In addition an ultrasonic surface wave examination was conducted by Detroit Edison's Engineering Research laboratory. These tests indicated no surface connected defects. The Fromson report also indicated that if the heat exchanger had been overpressurized to the maximum postulated value, damage may have occurred in the channel on the cooling water side. Specifically, the pass partition plate might be deformed by the flexing of the tube sheet. Therefore, this area was examined by means of a boroscope which was inserted through a relief valve connection and through a drain connection. There was no indication that the pass partition plate was deformed.

Mr. James G. Keppler
September 5, 1984
EF2-68328
Page 3

These observations demonstrated that the North RHR Heat Exchanger was not overpressurized, because had the heat exchanger pressure reached 1300 psi, evidence of damage would have been detected by the inspections performed.

To further demonstrate the pressure integrity of the heat exchanger, the shell side was hydrotested at the maximum working pressure of 450 psi. There was no indication of any leakage either at the flange area or from the shell side through the tubes.

Differential pressure measurements were taken across the tube side of both RHR heat exchangers. The results show that the tube side pressure drops in the heat exchangers are comparable and within the design limit.

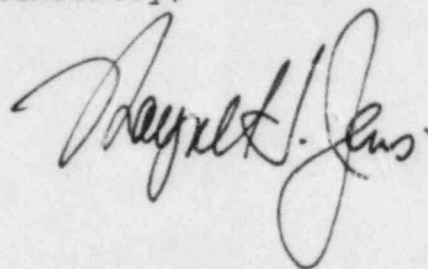
Based on the foregoing, Detroit Edison has concluded that the North RHR heat exchanger was subjected to a shell side pressure on the order of 400 to 500 psi. This is well within the range of the hydrostatic test pressure of the vessel (675 psi).

- (3) Other low pressure piping and valves which may have been subjected to the overpressure condition were evaluated and determined not to have been adversely affected.
- (4) The heat transfer performance of both RHR heat exchangers will be measured during startup testing to demonstrate their adequacy against the design basis. Performance of the heat exchanger is further monitored throughout plant operation. Corrective actions would be taken if monitoring indicates inadequate performance.
- (5) To assure continued tube integrity, Edison has a surveillance program in place. Once every 18 months (refueling outage) a leak test is performed on the RHR heat exchanger tubes. The purpose of this test is to monitor the tube integrity so that corrective action can be taken if needed.

Mr. James G. Keppler
September 5, 1984
EF2-68328
Page 4

This is Detroit Edison's final report on this item. If you have questions concerning this matter, please contact Lewis P. Bregni, (313) 586-5083.

Sincerely,

A handwritten signature in dark ink, appearing to read "Raymond L. Lewis". The signature is fluid and cursive, with the first name "Raymond" and last name "Lewis" clearly distinguishable.

cc: Mr. P. M. Byron
Mr. R. DeYoung
Mr. M. Jordan
Mr. R. C. Knop