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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

References: 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

2) DECo Letter to NRC, EF2-68328, "Final Report of 10CFR50.55(e) Item 114, Possible Overpressurization of North RHR Heat Exchanger," dated September 5, 1984.

3) DECo Letter to NRC, EF2-70025, "Amended Report of 10CFR50.55(e) Item 114, Possible Overpressurization of North RHR Heat Exchanger," dated October 8, 1984.

4) DECo Letter to, NRC EF2-70223, "Amended Report of 10CFR50.55(e) Item 114, Possible Overpressurization of North RHR Heat Exchanger, " dated December 13, 1984.

Subject: Justification for RHR Heat Exchanger Tube Leakage Test Commitment Clarification

As described in References 2, 3, and 4, on January 22, 1984, the shell side of the north RHR heat exchanger was subject to a fluid pressure which exceeded its 450 psi design 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. During a subsequent hydrostatic test on adjoining piping with a higher pressure rating, the isolation valve between this piping and the north RHR heat exchanger leaked. This leakage exposed the north RHR heat exchanger to a pressure greater than its maximum working design pressure.

A commitment was made in our initial report (Reference 2) on this incident which specified that once every 18 months (refueling outage) a leak test shall be performed on the RHR heat exchanger tubes. Also,

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the current UFSAR Section 5.5.7.5 "Inspection and Testing" indicates "at each refueling outage, a leak test is performed on the RHR heat exchanger tubes." This statement was added to the UFSAR based on the subject commitment. The purpose of this letter is to provide you with information which clarifies how DECo is actually monitoring for leakage on the RHR heat exchangers. The UFSAR will be updated to reflect the monitoring of RHR Service Water via chemistry samples, as described below.

Periodic leakage testing was determined to be unnecessary as a result of our investigation into this event. Periodic leak testing is unnecessary considering (1) the north RHR heat exchanger has been demonstrated to meet its relevant design requirements following the over-pressurization incident, (2) existing chemistry monitoring of RHR Service Water samples is adequate to detect RHR tube leakage, and (3) the loss of equipment availability/operability during the committed testing, if performed.

Reference 3 concluded that the subject heat exchanger meets its relevant design requirements and is therefore acceptable for its intended function based on the following analyses and investigations:

- 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 Department 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.

- Detroit Edison determined that there was no tube damage or leakage and no reduction in flow. Tube leakage was checked by performing a hydrostatic test of the shell side of the north RHR heat exchanger 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. To check for a reduction in flow, differential pressure measurements were taken across the tube side of both RHR heat exchangers under actual flow conditions. These tests revealed that the differential pressure drop across the tube side of both RHR heat exchangers were comparable and within design limits indicating that there was no reduction in flow through the north RHR heat exchanger as a result of this incident.

NRC Inspection Report 84-63 closed this item after reviewing the applicable Nonconformance Report and testing results.

Currently, Fermi 2 has been sampling the RHR Service Water return for divisions I and II routinely on a monthly basis per Chemistry Specification CHS-AUX-12. In addition to other parameters, these samples are analyzed for gamma emitting isotopes with an acceptance level of less than the minimum detectable activity (MDA). The required action if the gamma emitting isotopes are identified is to isolate the source of radioactivity ingress. This would include an evaluation of heat exchanger tube leakage as a potential source as appropriate to the circumstances involved. Thus, DECo has been and will continue to monitor for such leakage on a basis which is more frequent than the 18 month tube test.

Currently, the RHR heat exchangers are not designed with physical test connections to facilitate performance of a periodic leak test of the tubes. In order to perform the subject testing, the shell side of the heat exchanger would have to be pressurized and, with the tube side drained, tube leakage monitored. This would require removing a heat exchanger from service, draining the tube side, allowing the tubes to dry out, and pressurizing the shell side with water to operating pressure. The only advantage to this method would be that it may be possible to quantify the actual amount of tube leakage. However, the time required to perform the test, the inoperability of the system in preparation for and during the test do not justify the potential increase in the accuracy of the results. Please note that the actions specified by CHS-AUX-12 may result in performance of an actual tube leak test if the evaluation so warrants.

Conclusion

DECo has determined that the commitment to perform a periodic leakage test on the RHR Heat Exchanger tubes is necessary. Following the overpressurization incident DECo demonstrated that the north RHR heat exchanger met its design requirements and is therefore acceptable to perform its intended function. This fact was uncertain when the commitment to perform a routine tube leakage test was made (Reference 2). Subsequent correspondence (Reference 3) on this issue did not include the subject commitment since, based on our later investigations and evaluations, we concluded that periodic leakage testing was not deemed necessary. This letter is being submitted because it is not totally clear that the Reference 3 and 4 submittals eliminated the commitment made in Reference 2. The time required to perform periodic leakage tests on the RHR heat exchanger tubes and the inoperability/unavailability of the system during the test does not justify the potential increase in accuracy of the test results. More importantly, the current chemistry sampling and analysis monitors for such leakage on a more frequent basis and thus is a more appropriate means of determining system integrity.

If you have any questions, please contact Terry L. Riley, Supervisor of Compliance and Special Projects, Nuclear Licensing at (313) 586-4041 (or x-1684).

Sincerely,

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