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NRC-95-0127

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

- References:
- 1) Fermi 2  
NRC Docket No. 50-341  
NRC License No. NPF-43
  - 2) NRC Bulletin 95-02, "Unexpected Clogging of a Residual Heat Removal (RHR) Pump Strainer While Operating in Suppression Pool Cooling Mode," dated October 17, 1995
  - 3) Detroit Edison Letter NRC-95-0014, "Response to NRC Inspection Report 94016," dated February 10, 1995

Subject: Fermi 2 30-Day Response to NRC Bulletin 95-02

This letter provides the written report required within 30 days (Required Action 1), which addresses how Fermi 2 intends to comply with the requested actions in the bulletin. To facilitate review, the response generally follows the order and format of the Requested Actions.

#### **Relevant Technical Background**

The Fermi 2 plant has eight suction strainers taking water from the suppression pool to which Bulletin 95-02 applies (Emergency Core Cooling System and Reactor Core Isolation Cooling). These eight strainers provide water for ten pumps as shown on the list that follows. (Note - strainer T2302X224A is shared by core spray pumps E2101C001B and E2101C001D, and strainer T2302X224B is shared by core spray pumps E2101C001A and E2101C001C.)

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<u>Pump PIS No.</u>		<u>Strainer PIS No.</u>
E1102C002A	RHR pump	T2302X223D
E1102C002B	RHR pump	T2302X223B
E1102C002C	RHR pump	T2302X223C
E1102C002D	RHR pump	T2302X223A
E2101C001A	Core spray pump	T2302X224B
E2101C001B	Core spray pump	T2302X224A
E2101C001C	Core spray pump	T2302X224B
E2101C001D	Core spray pump	T2302X224A
E4101C001A	HPCI pump	T2302X225
E5101C001	RCIC pump	T2302X226

The Fermi 2 General Electric BWR 4 / Mark I plant, having a steel torus suppression pool design, does not allow access to the suppression pool while the plant is operating. Whenever access is allowed during outages, housekeeping and Foreign Material Exclusion (FME) controls are established in accordance with administrative procedures.

Torus water sampling is done at Fermi 2 without personnel access to the torus, using the Torus Water Management System (TWMS). The TWMS is used to maintain torus water quality by transferring torus water to the condensate system and returning clean condensate water to the torus. This system is manually operated to maintain proper torus water level and desired water quality. Furthermore, use of the TWMS to clean the torus water eliminates access during operation, and the only means for introducing materials to the torus during operation is by blowdown from the drywell.

The suppression pool was cleaned and all of the strainers were inspected and determined to be operable during Refueling Outage Four (RFO4) in 1994 as follows. Desludging and inspection was performed on all underwater surfaces of the Suppression Pool (Torus) and coating repair performed on the torus shell. This desludging was performed by divers using vacuum heads that brush the surface as they draw in debris. The strainers were "as found" inspected, and the inspections documented. A video was made during a typical strainer inspection. In the as-found condition, prior to the sludge vacuum operation described above, less than 5% of the surface holes were visually blocked with debris. The strainers were judged to be in good condition and free of debris after desludging and cleaning. All eight of the strainers listed above were "as-found" inspected, desludged, and temporarily removed for dimensional verification.

NRC Inspection Report 94016 issued a Notice of Violation describing a situation where the torus and drywell were not sufficiently cleaned in preparation for plant operation following the completion of RFO4. The conditions that led to this NOV

have been corrected as described in Reference 3, the Detroit Edison response to the violation. Immediate corrective actions were taken as described in that response that included the following:

1. The clean-up and walkdown of the torus and drywell was reperformed following the initial NRC walkdown to ensure all debris was removed prior to plant startup, and
2. Annual site orientation training for plant personnel was conducted in January 1995, which included a discussion of the plant housekeeping problems encountered during the outage and the potential consequence.

As part of corrective actions to be taken to prevent recurrence, the Reference 3 response also committed the following:

1. Management feedback will be provided to appropriate first line supervisors regarding their role in maintaining and restoring acceptable plant conditions during maintenance activities, and
2. Prior to the next refueling outage, Detroit Edison will evaluate housekeeping practices for Primary Containment.

Subsequent to the completion of the RFO4 outage, a mini-outage was required in January 1995 (FO 95-01) during which corrective maintenance on torus-to-drywell vacuum breaker valves was performed. This work required access to and work activities in the suppression pool. Detroit Edison was successful in ensuring that housekeeping was maintained at a high standard during work and at containment closure. Access was controlled by Housekeeping Procedure NPP-HK1-01, Plant Housekeeping, (currently identified as MMA10, Revision 0), which required the sign-in and sign-out of all material and personnel. A subsequent forced outage in June 1995 (FO 95-02) required access to and work activities in the drywell and torus. A Nuclear Quality Assurance surveillance conducted to assess housekeeping and tool control with an emphasis on the drywell and torus noted that there was strong management commitment to address housekeeping and tool control during this outage. The surveillance report further noted that torus cleanliness was satisfactory during work and at close-out, and that the drywell coordinators felt that no items capable of clogging the ECCS strainers were left behind in the drywell. In summary, the torus entries since the exhaustive inspection and cleanup activities performed at the close of RFO4 have been conducted with an elevated sensitivity to Foreign Materials Exclusion (FME) issues in the primary containment and with satisfactory results.

In summary, at the completion of RFO4 activities in the drywell and torus, the strainers were left in a clean and operable condition, and the drywell and torus were

confirmed to be free of debris. Subsequent torus entries and work activities were executed with sensitivity to FME issues, partly as a result of the related violation.

**Requested Action No. 1 - Operability Evaluation**

Detroit Edison has verified operability of the RHR, Core Spray, HPCI, and RCIC pumps listed above as to their ability to perform their safety functions. The verification considers suppression pool and strainer cleanliness conditions in conjunction with test data and other information as follows.

The eight RHR and Core Spray pumps are tested quarterly by drawing water from the suppression pool through the suction strainer, circulating the water through a test line, and discharging it back to the suppression pool. A review of quarterly test results from August 1988 through October 1995 has shown that the four RHR pumps and the four Core Spray pumps have exceeded the minimum flow requirement on every surveillance test. The pump performance test data (pump flows and pump suction pressures) indicates steady performance of the RHR and Core Spray pumps with no sign of strainer degradation.

The surveillance tests performed on HPCI and RCIC do not take water from the suppression pool. The test line for these two systems takes water from and returns water to the condensate storage tank (CST). However, the HPCI suction strainer is located at the same elevation, has the same diameter, and has the same size strainer perforations as the RHR suction strainers. Based on the similarity between the HPCI strainer and the RHR strainers, on the flow performance of the RHR flow tests through the suppression pool strainers, and on the visual inspection performed on all strainers in during the summer of 1994, Detroit Edison has determined the HPCI suppression pool strainer and associated suction piping to be operable.

The suction strainer for the RCIC system is located at the same elevation as the RHR and core spray suction strainers. The RCIC suction strainer is approximately one half the diameter and height of the Core Spray suction strainers, and has the same size strainer perforations as the RHR, Core Spray, and HPCI strainers. Based on the similarity between the RCIC strainer and the Core Spray strainers, on the flow performance of the RHR and Core Spray flow tests through the suppression pool strainers, and on the visual inspection of all strainers in during the summer of 1994, Detroit Edison has determined the RCIC suppression pool strainer and associated suction piping to be operable. For the purpose of assessing the relative susceptibility of a strainer to become clogged due to the gradual accumulation of debris, the strainer perforation size and elevation in the suppression pool are more important factors than the screen diameter or height. This supports the determination that the observed Core Spray strainer performance is indicative of the expected RCIC strainer performance.

In summary, there is no reason to suspect that strainer-related degradation of flow performance for the systems and associated flow paths listed above is occurring at the Fermi Plant because of recent torus cleaning and inspection activities, strict FME controls for primary containment activities, and increased awareness of FME issues since the most recent containment cleaning and inspections. The observed RHR and Core Spray flow performance is consistent with the expectation that there is no performance degradation due to accumulation of debris on the strainers, and similar performance is expected of the HPCI and RCIC strainers based on the actual test data obtained for the RHR and Core Spray systems.

**Requested Action No. 2 - Confirmatory Testing and Inspection**

The Bulletin requests that licensees confirm the conclusions of the operability evaluation above through appropriate test(s) and strainer inspection(s) within 120 days of the date of the Bulletin.

Detroit Edison proposes to meet the intent of this requested action by:

1. re-inspecting the suction strainers during refueling outages, beginning with the next refueling outage (RFO5), scheduled to begin September 1996, and;
2. continuing to conduct and trend the quarterly operability surveillances for the RHR and Core Spray flow paths as is presently done (described in Requested Actions 1 and 5) and;
3. performing an initial analysis of the torus water for suspended solids (including fibrous materials) within the 120-day window specified by the Bulletin. The discussion of Requested Action No. 5 describes additional periodic analysis of torus water for suspended solids.

Detroit Edison will evaluate the need to perform additional strainer inspections or to take other actions (e.g., torus cleaning) based on any information obtained from past or future quarterly flow tests or torus water analyses that suggests strainer-related flow degradation. Detroit Edison recognizes that the strainer opening size will limit the size of debris that will be observed on the strainer to materials that cannot easily pass through the strainers.

Although the proposed schedule for the strainer inspections exceeds the 120-day schedule in the Bulletin Requested Action No. 2, Detroit Edison believes that the proposed actions are responsive to the Bulletin. This conclusion is also supported by the recent and thorough torus cleaning and inspection activities performed at

Fermi 2, in conjunction with the FME provisions described above that have been in place since the primary containment was verified to be free of debris. Quarterly testing of the RHR and Core Spray Systems will continue to confirm the operability of the suction strainers in these systems (as well as imply the operability of the HPCI and RCIC strainers), and the suspended solid analysis for torus water will alert the plant to conditions that could result in the strainer degradation described in the Bulletin. Detroit Edison does not believe that scheduling an outage prior to RFO5 for underwater inspections, or scheduling such inspections for a short forced outage that could occur prior to that time, will provide information that cannot be inferred from the information collected by the proposed actions.

**Requested Action No. 3 - Suppression Pool Cleaning**

The suppression pool was cleaned during the following refueling outages:

RFO1	September 1989
RFO2	April 1991
RFO4	August 1994

As stated in Requested Action No. 2 above, Detroit Edison plans to re-inspect the suction strainers during refueling outages, beginning with the next refueling outage, RFO5. Detroit Edison plans to have a process in place at the start of RFO5 to determine whether suppression pool cleaning is needed, so that it can be added to the outage scope if necessary.

As suggested by Requested Action No. 3, the cleaning schedule will be consistent with the operability evaluation and its confirmation as defined by Requested Actions No. 1 and 2. The process will address the program for the periodic inspection of the pool and cleaning of the pool if determined to be necessary, including procedures for the cleaning of the pool, criteria for determining the appropriate cleaning frequency, and criteria for evaluating the adequacy of the pool cleanliness.

**Requested Action No. 4 - Review of FME Procedures**

As described in the Reference 3 inspection report response, Detroit Edison committed to review the housekeeping procedure and related administrative controls prior to the next refueling. The Fermi 2 Plant Housekeeping procedure identifies cleanliness, material control, and tool control requirements for work on plant systems. Detroit Edison reaffirms this previous commitment in response to Bulletin 95-02, Requested Action No. 4. Although all of the actions associated with this commitment have not been completely defined or completed at this time, interim actions were successfully applied to the mini-outages as described above, and

awareness training on the subject of Foreign Materials Exclusion has been given to selected personnel.

**Requested Action No. 5 - Additional Measures**

The quarterly surveillance tests of the RHR pumps and the core spray pumps measure the pump suction inlet pressure before starting the pumps and after the pumps have been started and reached a steady state. Pump suction pressure is being reviewed and trended.

Samples of the suppression pool water are taken and analyzed by the plant Chemistry Organization monthly. The sampling and related analysis is facilitated at the Fermi 2 plant by the Torus Water Management System (TWMS), which is described in the Fermi 2 UFSAR, Section 9.2.8 and the background above. The TWMS allows sampling without personnel access to the torus. The analysis presently measures conductivity and the amount of selected elements. Following the performance of the initial analysis for suspended solids as described in Requested Action No. 2, Detroit Edison will determine the proper frequency for and continue to perform this type of analysis on a periodic basis. Although there are limitations on the ability to obtain a sample representative of all torus water conditions, analyzing suspended solids provides valuable information on the conditions in the torus and provides added assurance that potentially serious conditions will not go undetected.

The determination considering the need for and the identification of specific proposed additional measures, if any, related to water analysis, will be completed prior to the startup from RFO5 in conjunction with the process described in Requested Action No. 3 that defines the need, extent, and frequency of suppression pool cleaning.

**Summary of Commitments**

The following is a listing of the commitments made in this 30-day response to NRC Bulletin 95-02:

1. Re-inspect the torus strainers during refueling outages, beginning with the next refueling outage (RFO5).
2. Continue to conduct and trend the quarterly operability surveillances, including the trending of pump suction pressure data, for the RHR and Core Spray flow paths as is presently done.

USNRC

November 16, 1995

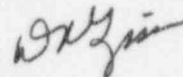
NRC-95-0127

Page 8

3. Perform an analysis of the torus water for suspended solids (including fibrous materials) within the 120-day window specified by the Bulletin.
4. Have a process in place at the start of RFO5 to determine whether suppression pool cleaning is needed, so that it can be added to the outage scope if necessary. The process will address the program for the periodic inspection of the pool and cleaning of the pool if determined to be necessary, including procedures for the cleaning of the pool, criteria for determining the appropriate cleaning frequency, and criteria for evaluating the adequacy of the pool cleanliness.
5. As described in Reference 3, Detroit Edison committed to review the housekeeping procedure and related administrative controls prior to the next refueling. Detroit Edison reaffirms this commitment.
6. Determine the proper frequency for future torus water analysis for suspended solids prior to RFO5, and continue to perform them on a periodic basis.
7. Determine the need for and identify specific proposed additional measures, if any, related to water analysis prior to the startup from RFO5.

If you have any questions, please contact Mr. Robert A. Newkirk at (313) 586-4211.

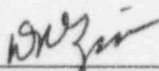
Sincerely,



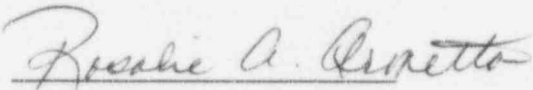
cc: T. G. Colburn  
M. J. Jordan  
H. J. Miller  
A. Vogel



I, DOUGLAS R. GIPSON, do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

  
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DOUGLAS R. GIPSON  
Senior Vice President

On this 16th day of November 1995 before me personally appeared Douglas R. Gipson, being first duly sworn and says that he executed the foregoing as his free act and deed.

  
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Rosalie A. Armetta  
Notary Public

ROSAIE A. ARMETTA  
NOTARY PUBLIC - MONROE COUNTY, MI  
MY COMMISSION EXPIRES 10/11/99