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July 5, 1984  
EF2-69272

Mr. James G. Keppler  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region III  
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  
February 6, 1984, QA-84-0079

Subject: Final Report of 10CFR50.55(e) Item 111 "Design Deficiency on the RHR Reservoir Freeze Over"

This is Detroit Edison's final report concerning the design deficiency on the Residual Heat Removal (RHR) reservoir freeze over. Item 111 was originally reported as a potential deficiency on January 4, 1984, and subsequently documented in Reference (2).

Description of Deficiency

On December 28, 1983, water in the RHR reservoir, which serves as the ultimate heat sink, froze to a depth of two to three inches. Safety-related Diesel Generator Service Water, Emergency Equipment Service Water and Residual Heat Removal Service Water deep draft pumps take suction from these reservoirs. Ice formed around the column of these pumps and could have potentially made the pumps inoperable if a plug of ice formed inside the column, or if the pumps' column alignment was affected.

The RHR complex design did not provide an adequate method to prevent freezing of the reservoirs for the period between the end of construction and initial plant operation. For this period, the reservoirs were full of water and no heat was added to the reservoirs during cold weather.

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Mr. James G. Keppler  
July 5, 1984  
EF2-69272  
Page 2

### Analysis of Safety Implications

The RHR complex, as designed, minimizes excessive heat loss from the reservoirs even though the reservoirs' surface is partially exposed to outside ambient temperatures. Based on the design of the RHR complex and the heat which will be supplied to the reservoirs, it is estimated that the reservoirs will not freeze during a normal winter. In the event of a severe cold period, or a winter colder than normal, additional heat may be required to be added to the reservoirs.

Excessive freezing of the ultimate heat sink could prevent safety-related deep draft pumps from operating. These pumps are required for the operation of safety-related systems which are used for core cooling and cooling of safety-related equipment.

The walls of the reservoir were not damaged by the ice and a design calculation determined that ice could form in the reservoirs up to a thickness of 18 inches without exceeding the maximum allowable loading on the walls.

### Corrective Action

After ice was observed, action was taken to eliminate ice from around the pump columns to protect them from potential damage. This was accomplished by installing temporary air bubblers and submersible circulating pumps in the reservoirs around the pump columns. No damage to the pumps has been identified as a result of the reservoirs freezing.

Detroit Edison is developing a procedure to ensure that the safety related pumps in the RHR complex will be operable for all cold weather periods. This will be accomplished by adding heat to the reservoirs, and/or verifying that the pumps are operable. The temperature of both reservoirs will be monitored by thermocouples with an alarm in the control room if the temperature drops to 43°F. The amount of heat that was originally designed to be sent to the reservoirs is estimated to be sufficient to keep the reservoirs above 43°F

Mr. James G. Keppler  
July 5, 1984  
EF2-69272  
Page 3

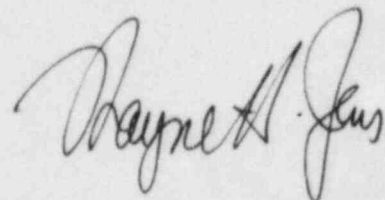
during a normal winter. During severe cold periods or during colder than normal winters, additional heat can be added to the reservoir to maintain the water temperature above 43°F. The source of this heat, while the unit is operating, will be from running the Emergency Equipment Cooling Water system and/or Emergency Diesel Generators. While the unit is not operating, the decay heat from the reactor core will supply an ample amount of heat.

In the unlikely event that heat cannot be added to the reservoir before the temperature drops to 41°F, a visual inspection of the reservoirs by an operator during normal rounds to the RHR complex would be required to verify that no ice has formed. If ice is observed and the reservoir temperature is below 41°F, the operability of each safety related pump in that reservoir will be verified every eight hours.

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

Sincerely,

cc: Mr. P. M. Byron  
Mr. R. C. DeYoung  
Mr. D. A. Ferg (Cygn Corp.)  
Mr. R. C. Knop  
Mr. M. D. Lynch



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