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VISSING,G.

SUBJECT: Responds to GL 96-04, "Boraflex Degradation in Spent Fuel Pool Storage Racks."

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ROBERT C. MECREDY
Vice President
Nuclear Operations

October 24, 1996

U.S. Nuclear Regulatory Commission
Document Control Desk
Attn: Guy Vissing
Project Directorate I-1
Washington, D.C. 20555

Subject: Response to NRC Generic Letter 96-04, dated June 26, 1996; SUBJECT: BORAFLEX DEGRADATION IN SPENT FUEL POOL STORAGE RACKS.
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

Dear Mr. Vissing:

Generic Letter 96-04 requested from licensees that use Boraflex in their spent fuel racks to provide a response within 120 days to the information requested in the Generic Letter. The information requested in GL 96-04 is as follows:

Requested Information

"All licensees of power reactors with installed spent fuel storage racks containing the neutron absorber Boraflex are requested to provide an assessment of the physical condition of the Boraflex, including any deterioration, on the basis of current accumulated gamma exposure and possible water ingress to the Boraflex and state whether a subcritical margin of 5 percent can be maintained for the racks in unborated water. Monitoring programs or calculational models in effect or being developed, or an estimation of anticipated concerns based on the specific rack design, are considered an appropriated basis for this response. All licensees are further requested to submit to the NRC a description of any proposed actions to monitor or confirm that this 5-percent subcriticality margin can be maintained for the lifetime of the storage racks and describe what corrective actions could be taken in the event it cannot be maintained. Licensees should describe the results from any previous post operational blackness tests and state whether blackness testing, or other in-situ tests or measurements, will be periodically performed. Chronological trends of pool reactive silica levels, along with the timing of significant events such as refuelings, pool silica cleanups, etc., should be provided. Implications of

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Requested Information (Cont.)

how these pool silica levels relate to Boraflex performance should be described. All licensees are requested to submit the information to the NRC to ensure that the onsite storage of spent fuel is in compliance with GDC 62 for the prevention of criticality in fuel storage and handling and with the 5-percent subcriticality margin position of the NRC staff to assure compliance with GDC 62."

RG&E has monitored the surveillance program for potential Boraflex degradation at Wisconsin Electric's Point Beach Units 1 and 2, as required by commitment in Reference 1. Based on information from Wisconsin Electric, the results of blackness testing of the Boraflex panels confirm the assumptions with respect to the physical condition of Boraflex panels as documented in the RG&E Criticality Safety Analysis approved by the NRC staff in 1996 (Reference 2).

RG&E practices have positively addressed some factors that influence the release of silica from Boraflex into the spent fuel pool: gamma radiation and pool temperature. RG&E has decreased the impact of gamma radiation on Boraflex panels by allowing for decay of the spent fuel assemblies in the Region 1 racks (without Boraflex) prior to storing the assemblies in the Region 2 racks (with Boraflex). RG&E's practice over several years has been to store spent fuel assemblies recently discharged from the reactor as long as possible in the Region 1 racks, normally 1 to 2 years prior to transferring the assemblies to Region 2 racks. Therefore, gamma radiation levels to the Boraflex panels in Region 2 have been substantially reduced.

An additional RG&E practice has been to maintain the spent fuel pool temperature between 60 and 70°F when heat load and lake temperature allow. This practice reduces the rate of dissolution of the Boraflex into the spent fuel pool.

The information discussed in the above paragraphs indicate that the 5 percent subcriticality margin in unborated water at the R. E. Ginna Nuclear Power Plant is still maintained.

Proposed actions to monitor or confirm that the 5-percent subcriticality margin can be maintained for the lifetime of the storage racks

Monitoring programs and calculational models concerning proposed actions to monitor or confirm that the 5-percent subcriticality margin can be maintained for the lifetime of the storage racks are described below.

1. RG&E will continue monitoring blackness testing performed by Point Beach to provide a preliminary indication of any potential deterioration of Boraflex in the spent fuel racks at the R. E. Ginna Nuclear Power Plant.

2. RG&E will monitor silica levels in the spent fuel pool on a monthly basis to detect and evaluate unusual trends or abnormal increases. The silica data will be compared with industry data and any plants with similar rack design (if available) to determine whether it is an indication of Boraflex degradation.

3. RG&E will develop a calculational model to evaluate the potential for Boraflex degradation in the spent fuel racks. Currently, the RACKLIFE software developed by the Electric Power Research Institute provides such a means. In the future, RG&E may evaluate the use of similar software programs for modeling the behavior of Boraflex in the spent fuel racks.

4. RG&E will perform blackness testing on selected (most likely to degrade) Boraflex panels in calendar year 1997 to obtain data on the physical condition of the Boraflex panels.

5. Future testing of the Boraflex panels will be evaluated periodically based on the following information: (a) the results of blackness testing performed at Point Beach; (b) the results of the blackness testing that will be performed by RG&E in calendar year 1997; (c) the results of blackness testing at plants with racks of similar design (if available); and (d) the information obtained from the appropriate model that is used to provide an evaluation of Boraflex degradation (as discussed in above Section 3.).

Corrective actions that RG&E could take in the event that the 5-percent subcriticality margin cannot be maintained

1. RG&E is supporting the development by the Electric Power Research Institute of a system to measure boron-10 areal density in the Boraflex panels (BADGER). This type of measurement system, in conjunction with the use of an appropriate software that identifies cells with potential Boraflex degradation, could be used to assess quantitatively the level of boron-10 areal density. Corrective actions could include administrative controls to restrict storage in those cells, or the use of retired Rod Cluster Control Assemblies (RCCAs) in those locations.

2. RG&E is currently performing a criticality safety analysis to support a spent fuel reracking with a licensing submittal to the NRC scheduled for early 1997. The criticality safety analysis will establish minimum burnup requirements for storage in Region 2 racks with Boraflex such that it incorporates margin to the criterion of k_{eff} no greater than 0.95. Storage of high burnup fuel assemblies in selected positions (checkerboarding) in the Region 2 racks with Boraflex will be considered. This margin can potentially compensate for limited levels of Boraflex degradation.

3. RG&E would evaluate for implementation measures to offset Boraflex degradation, including neutron absorbing inserts for the spent fuel assemblies stored in the Region 2 racks with Boraflex, or the use of soluble boron credit.

Chronological trends of pool reactive silica levels

Chronological trends for reactive silica levels in the spent fuel pool are shown in Table 1 together with the schedules for refueling outages during that period. RG&E has not performed any specific cleanup of the pool silica other than the normal removal of silica with the spent fuel pool cooling purification loop. The data shows a gradual increase in the concentration of silica in the spent fuel pool during the period 1995 through 1996. There is not a conclusive relationship between an increase in the silica levels and the potential for Boraflex degradation because of the introduction of silica from other sources such as the boric acid in the makeup water added to the spent fuel pool. RG&E will monitor

and evaluate the silica levels to determine whether abnormal increases of silica are due to Boraflex degradation or other events.

Very truly yours,

Robert C. Mecredy

JPO\
Attachment

Subscribed and sworn to before me
on this 24th day of October, 1996

Deborah A. Piperni

DEBORAH A.PIPERNI
Notary Public in the State of New York
ONTARIO COUNTY
Commission Expires Nov. 23, 19 97

xc: Mr. Guy Vissing (Mail Stop 14C7)
Project Directorate I-1
Washington, D.C. 20555

U.S. Nuclear Regulatory Commission
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Ginna Senior Resident Inspector

REFERENCES

1. Letter from R. W. Kober (RG&E) to W. A. Paulson (NRC), dated August 10, 1984; SUBJECT: RESPONSES TO NRC STAFF QUESTIONS.

2. Letter from A. R. Johnson (NRC) to R. C. Mecredy (RG&E), dated August 30, 1995; SUBJECT: SAFETY EVALUATION OF ROCHESTER GAS AND ELECTRIC'S PROPOSED CRITICALITY ANALYSIS OF THE GINNA NEW AND SPENT FUEL RACKS/CONSOLIDATED ROD STORAGE CANISTERS (TAC NO. M92188).

TABLE 1. REACTIVE SILICA LEVELS AND REFUELING OUTAGE DATES		
REACTIVE SILICA		REFUELING OUTAGE DATES
DATE	VALUE (PPM)	
12/29/87	10.0	02/06/87 - 03/10/87
04/21/92	7	03/29/92 - 05/11/92
04/19/94	6.9	03/04/94 - 04/17/94
08/30/94	6.5	
10/04/94	10.6	
10/11/94	6.3	
12/13/94	9.9	
04/25/95	14.9	03/26/95 - 05/04/95
06/06/95	14.4	
07/11/95	15.1	
08/08/95	15.1	
09/12/95	7.7	
10/10/95	17.7	
11/15/95	18.4	
12/12/95	19.9	

TABLE 1. REACTIVE SILICA LEVELS AND REFUELING OUTAGE DATES		
REACTIVE SILICA		REFUELING OUTAGE DATES
DATE	VALUE (PPM)	
01/16/96	20.0	
02/13/96	9.9	
04/09/96	17.3	04/01/96 - 06/09/96
05/10/96	17.4	
06/09/96	17.6	
07/23/96	13.7	
08/13/96	17.6	
09/10/96	18.0	
10/08/96	19.4	