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SUBJECT: Forwards util response & addl info re structural upgrade program, per 881214 meeting & 870324 SER.

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January 25, 1989

U.S. Nuclear Regulatory Commission
Document Control Desk
Attn: Mr. Carl Stahle
PWR Project Directorate No. 1
Washington, D.C. 20555

Subject: Structural Upgrade SER
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

Dear Mr. Stahle:

On March 24, 1987, the NRC issued to RG&E a Safety Evaluation Report on the Structural Upgrade Program (SUP). In that report, the Staff concluded that, subject to the plant modifications which RG&E had committed to install, the implementation of the Structural Upgrade Program would provide reasonable assurance that Ginna Station could safely shut down following specified environmental events. The Staff also stated that these conclusions of this SER were subject to nine conditions.

On May 24, 1987, RG&E responded with the necessary information requested by the NRC, as well as our acceptance of and comments on the NRC findings. Since this exchange of information, there has been no official documented agreement that all of the subject nine conclusions and recommendations may be considered "closed".

RG&E and the NRC therefore conducted a meeting on December 14, 1988 to discuss outstanding items.

Listed in Enclosure A is a tabulation of each of the nine items, RG&E's response, and the additional information requested by the Staff at that meeting. We trust this information is sufficient to complete the NRC's review of Ginna's Structural Upgrade Program.

Robert C. Mecredy
General Manager
Nuclear Production

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xc: U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Ginna Senior Resident Inspector

ENCLOSURE A

NRC Comment 1:

The licensee should assess actual thermal loads for use in load combinations for any areas of the plant known to have high operating temperatures (e.g., concrete surrounding the reactor vessel).

RG&E Response:

This specific subject was reviewed in TER-C5506-423 for SEP Topic III-7.B, provided as an attachment to the NRC's SER of August 22, 1983. The worst-case condition was analyzed, and found to be acceptable. Furthermore, during normal operation, there are no concrete regions subject to temperatures in excess of 200°F. Therefore, it is considered that RG&E has already adequately assessed the proper thermal loads for use in load combinations.

Additional Discussion: None

NRC Comment 2:

Straight wind loads should be applied to windward, leeward and side walls as prescribed by ANSI A58.1-1982.

RG&E Response:

The application of the wind and tornado loads was applied as a constant uniform load over the height of each structure, instead of stepping the wind pressure as stated in ANSI A58.1-1982. It was determined that the variations in the total load transferred into the structure by this assumption was small, and would not affect the results of the overall analysis.

Additional Discussion: None

NRC Comment 3:

Although portions of siding and decking are permitted to fail, any loads imparted by the siding or decking to the steel frame should be considered in the analysis. It is not acceptable to assume all of the siding blows off and reduces the load applied to the steel frame.

RG&E Response:

As noted by the NRC, RG&E has assumed, in its calculations of wind and tornado loadings on Ginna structures, that the siding and decking will remain intact and, therefore, transfer the full magnitude of these loads to the structures.

This conservative assumption was made even though RG&E conducted tests on the siding in order to establish the load capacity of the siding.

These tests showed that the siding will tear but not separate from the structure under the wind loads associated with the design basis tornado, and would therefore reduce the loads imposed on the structures.

Additional Discussion: None

NRC Comment 4:

If portions of the roof decking are permitted to fail from snow loading, the licensee should assure that the failure is local and consequences are acceptable.

RG&E Response:

Table 3-12 of Appendix A of the Structural Reanalysis Program lists the capacities of the roofs at Ginna Station. The table shows that the capacities of the roofs are greater than the applied loads in all areas except the D/G Building. Modifications to the diesel generator building, including the roof, are part of Ginna's Structural Upgrade Program and will upgrade the building to assure no failures, or to assure that the consequences are acceptable. The NRC comment will thus be resolved, since no roof decking failures due to snow loadings will be calculated to occur with unacceptable consequences.

Additional Discussion: None

RG&E agreed to revise the third sentence above to read, "Modifications to the diesel generator building, including the roof, are part of Ginna's Structural Upgrade Program and will upgrade the building to assure no failures". All other statements remain unchanged.

NRC Comment 5:

In demonstrating the adequacy of roof decks, the licensee should account for buckling, taking into account such factors as unsupported lengths, deck shape, and noting that elastic buckling can occur for long, unsupported lengths.

RG&E Response:

The evaluation of the roof decking done in the Structural Upgrade Program considered that the allowable stresses associated with the steel roof decking, found at Ginna Station, would be increased by 1.6 in accordance with the Standard Review Plan for extreme load cases. Based on information found in the American Iron and Steel Institute (AISI), Specifications for the Design of Cold-Formed Steel

Structural Members", (Reference 21), a theoretical buckling stress for the roof decking has been estimated to be greater than the actual yield stress of the material. Stress levels found in the roof decking as a result of the extreme snow load are, in nearly all cases, less than the allowable stress of the steel decking multiplied by the 1.6 allowable overstress. For the remaining areas where the stress levels were found to be greater than the Standard Review Plan allowable stresses, the actual stress was still found to be less than the yield stress of the material. It is RG&E's conclusion that since all three stresses associated with the extreme snow load were found to be less than the yield stress of the material (and concurrently less than the theoretical yield stress of the material), local buckling of compression areas of the decking will not occur.

Additional Discussion: None

NRC Comment 6:

The licensee has committed to examine the east wall of the control building and portions of the diesel generator building for tornado winds and missiles.

RG&E Response:

The east wall of the relay room (part of the Control Building) has been modified to withstand wind and tornado loadings, including missiles. The east wall of the control room was previously found capable of resisting these loads in the SER's for SEP Topics III-2 and III-4.A. The diesel generator building is also being modified as part of the Structural Upgrade Program in order to withstand wind and tornado loads, including missiles.

Additional Discussion:

The design criteria for these modifications is consistent with SEP approved criteria.

NRC Comment 7:

The licensee should assure that previous conclusions reached regarding seismic capability developed in SEP Topic III-6 remain valid considering seismic loads in combination with other loads.

RG&E Response:

The overall structural seismic integrity of the Ginna structures was previously evaluated by NRC contractors (Lawrence Livermore Laboratories) and found acceptable as a result of the review of SEP Topic III-6, "Seismic Considerations", in NUREG/CR-1821. Some local modifications were agreed to by RG&E. In the NUREG/CR-1821 assessment, load combinations were addressed as follows:

A. Section 4.3.3

"Because stresses resulting from load cases and combinations of loads from these more recent criteria are not available, the reevaluation of the containment building concentrates on the effects of variations of seismic criteria on the stresses developed for the original design load combinations. In the other cases, for which no original seismic analysis results are available, conservative estimates of stresses from other loads are made". (emphasis added)

B. Section B.3.3

"B.3.3 Normal, Seismic, and Accident Loadings. Those loading combinations of particular importance in the reevaluation process involve the usual combinations incorporating normal loadings, (dead load, live load, pressure, temperature, etc., as appropriate) with seismic loadings. Design basis accident load effects were not considered..." (emphases added)

Based on the Lawrence Livermore Review, and the resultant NRC SER of 08/22/83, which did not list any structural issues as unresolved, it is considered that the NRC's conclusion regarding seismic acceptability of Ginna structures properly reflected conformance with current criteria.

Load Combinations, including seismic, were also specifically evaluated in SEP Topic III-7.B. In the NRC's SER on this topic, dated August 22, 1983 (with attached FRC TER C5506-423), several open issues were identified, including the seismic loads on the diesel generator shear walls. RG&E has committed, as part of the Structural Upgrade Program, to make the appropriate modifications, considering loads due to winds, tornadoes, snow, floods, and seismic events, as noted in our letters of May 19, May 27, and August 19, 1983 (SEP Topic III-7.B) as well as our July 13, 1984 letter concerning the overall Structural Upgrade Program.

Based on these NRC Safety Evaluation Reports, and the RG&E commitments which previously delineated the scope and extent of RG&E's Structural Upgrade Program, RG&E does not consider that any additional assurance regarding seismic load combination issues is necessary to validate the conclusions.

Additional Discussion:

Since the RG&E response above did not resolve all NRC concerns, RG&E had an additional analysis performed. The results of this analysis was presented to the NRC at the December 14, 1988 meeting. It consisted of a complete seismic analysis of an area of the plant that was judged to be most critical for overall structural stability of the plant. The "slice methodology" consisted of analyzing the common wall between the turbine and intermediate buildings. The approach used the seismic input that was developed for the "Piping Seismic Upgrade Program for Ginna Station" and combined these seismic loads with other loads (dead load, live load, piping reactions, etc.). The results of the analysis confirmed RG&E's position that the Ginna Structures are capable of withstanding a seismic event in combination with other appropriate loads.

After considerable discussion on the subject of seismic loads and analyses, the staff requested that RG&E provide some additional information. The following attachments are submitted as part of this document:

Attachment 1 - "Ginna Station - Seismic Upgrade Program - Auxiliary Structures Seismic Analysis" dated May 15, 1980.

Attachment 2 - "Design of the Modifications to the Auxiliary Building and Turbine Building Bracing", dated January 11, 1983.

Attachment 3 - "Calculations from the Slice Methodology Analysis for the Mode Significance Factor".

Attachment 4 - Evaluation of the Impact on the Seismic Analysis at Ginna Station due to the Structural Upgrade Program.

NRC Comment 8:

The licensee has committed to evaluate the effects of masonry blockwall failure on main steam and feedwater lines and associated valves, and to prevent the walls from entering the spent fuel pool.

RG&E Response:

As noted in RG&E's July 13, 1984 submittal, RG&E has agreed to evaluate the effects of masonry wall failure on the main steam and feedwater lines, and associated valves, and the spent fuel. The means to prevent damage to the required steam and feedwater piping, and associated valves, will be completed as part of the Structural Upgrade Program by December, 1988. The modification to prevent damage to the spent fuel due to failure of the block wall on the north side of the spent fuel pool has already been completed. The block wall on the west side of the spent fuel pool is not expected to adversely

effect the integrity of the fuel in the spent fuel pool, such that the guideline exposures of 10CFR Part 100 would be exceeded. Preliminary calculations indicate that the effect of failure of this relatively small wall is bounded by the previously accepted effects of a design basis tornado missile. Thus, no modifications are expected to be required for this wall. The detailed calculation will be completed prior to the scheduled completion of the Structural Upgrade Program (12/88).

Additional Discussion:

The anticipated completion date for the Structural Upgrade Program has been modified, due at least partially to the delay in attaining an SER for this subject. Completion is now anticipated by December, 1989.

NRC Comment 9:

The licensee has committed to assure operability of the power supply and piping associated with one auxiliary feedwater pump, assure sufficient instrumentation to monitor safe shutdown conditions, and to perform an evaluation of the effect of depressurization on diesel generator operability.

RG&E Response:

These commitments will be implemented prior to RG&E's completion date for Structural Upgrade Program of 12/88. The necessary instrumentation rerouting has already been completed.

Additional Discussion:

Modifications and analyses concerning the Diesel Generator Building upgrade are anticipated to be completed by December, 1989. Power supply and piping modifications for the Standby Auxiliary Feedwater System are now scheduled to be completed during the 1989 refueling outage.