

# CATEGORY 1

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AUTH.NAME    AUTHOR AFFILIATION  
MECREDY, R.G.    Rochester Gas & Electric Corp.  
RECIP.NAME    RECIPIENT AFFILIATION  
VISSING, G.S.

SUBJECT: Forwards proprietary response to RAI re structural aspects of spent fuel pool storage rack mod at Ginna Nuclear Power Plant. Proprietary response withheld (ref 10CFR2.790).

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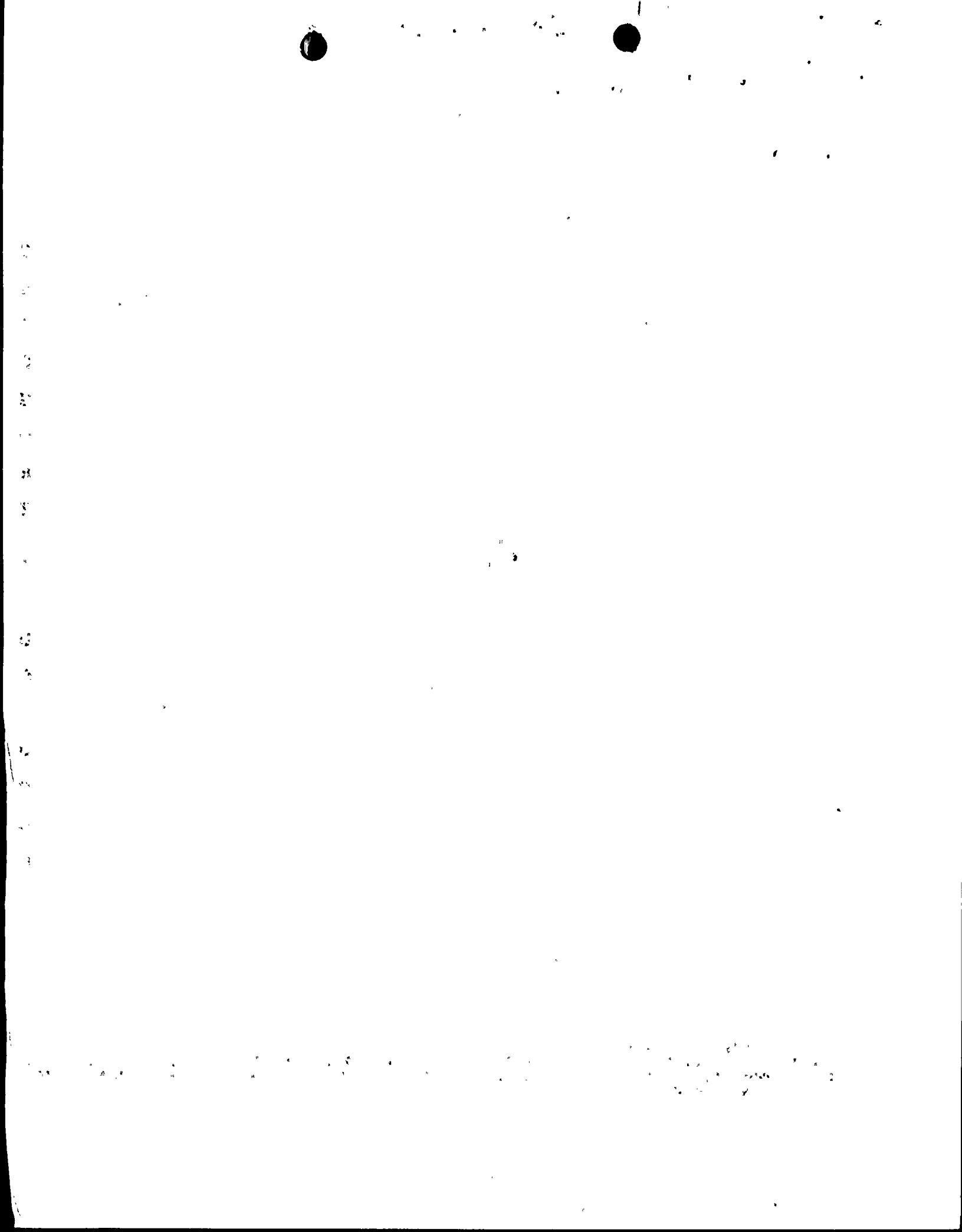
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ROBERT C. MECREDDY  
Vice President  
Nuclear Operations

January 15, 1998

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

Subject: Response to Request for Additional Information on the Structural Aspects of the Spent Fuel Pool Storage Rack Modification at Ginna Nuclear Power Plant (TAC No. M95759)

Ref. (1): Letter from G. S. Vissing (NRC) to R. C. Mecreddy (RG&E), Subject: Request for Additional Information on the Structural Aspects of the Spent Fuel Pool Storage Rack Modification at Ginna Nuclear Power Plant (TAC No. M95759), dated December 16, 1997.

Dear Mr. Vissing:

By Reference 1, the NRC staff requested additional information regarding the proposed license amendment request for modification of the Ginna Spent Fuel Storage Pool dated March 31, 1997. The questions were related to the Structural Evaluation of the proposed Modification.

Enclosed are responses to Questions 2 and 3. Response to Question 3 is provided in two separate documents: a Non-Proprietary and a FRAMATOME Proprietary. The Non-Proprietary document contains all the responses but omits information which is considered FRAMATOME Proprietary.

The document entitled FRAMATOME Proprietary is a duplicate of Question No. 3 in the Non-Proprietary version except that proprietary data has been added to that document. The FRAMATOME Proprietary data in that document is supported by an affidavit signed by FRAMATOME TECHNOLOGIES, Inc.. Accordingly, it is respectfully requested that the document entitled "FRAMATOME

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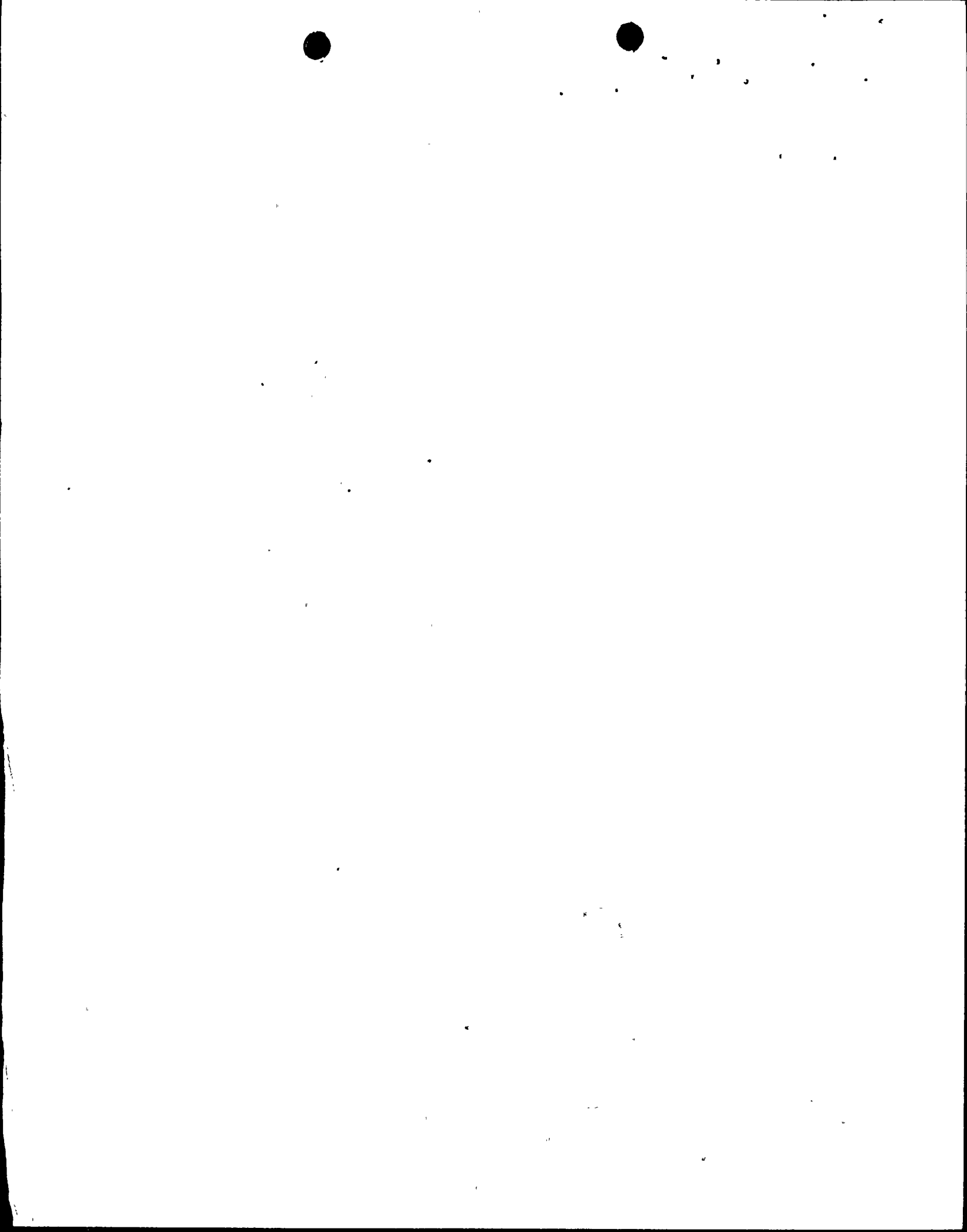
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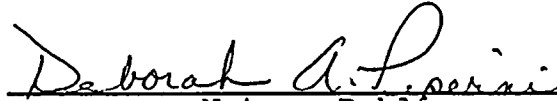
Proprietary" be withheld from public disclosure in accordance with 10CFR 2.790 of the Commission's regulations.

Very truly yours,

  
Robert C. Mecredy

JPO\491

Subscribed and sworn to before me  
on this 15th day of January, 1998

  
Notary Public

DEBORAH A. PIPERNI  
Notary Public in the State of New York  
ONTARIO COUNTY  
Commission Expires Nov. 23, 1999

xc: Mr. Guy S. Vissing (Mail Stop 14B2)  
Senior Project Manager  
Project Directorate I-1  
Washington, D.C. 20555

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

Ginna Senior Resident Inspector

Mr. Paul D. Eddy  
State of New York  
Department of Public Service  
3 Empire State Plaza, Tenth Floor  
Albany, NY 12223-1350

AFFIDAVIT OF THOMAS A. COLEMAN

- A. My name is Thomas A. Coleman. I am Vice President of Government Relations for Framatome Cogema Fuels (FCF). Therefore, I am authorized to execute this Affidavit.
- B. I am familiar with the criteria applied by FCF to determine whether certain information of FCF is proprietary and I am familiar with the procedures established within FCF to ensure the proper application of these criteria.
- C. In determining whether an FCF document is to be classified as proprietary information, an initial determination is made by the Unit Manager, who is responsible for originating the document, as to whether it falls within the criteria set forth in Paragraph D hereof. If the information falls within any one of these criteria, it is classified as proprietary by the originating Unit Manager. This initial determination is reviewed by the cognizant Section Manager. If the document is designated as proprietary, it is reviewed again by personnel and other management within FCF as designated by the Vice President of Government Relations to assure that the regulatory requirements of 10 CFR Section 2.790 are met.
- D. The following information is provided to demonstrate that the provisions of 10 CFR Section 2.790 of the Commission's regulations have been considered:
- (i) The information has been held in confidence by FCF. Copies of the document are clearly identified as proprietary. In addition, whenever FCF transmits the information to a customer, customer's agent, potential customer or regulatory agency, the transmittal requests the recipient to hold the information as proprietary. Also, in order to strictly limit any potential or actual customer's use of proprietary information, the substance of the following provision is included in all agreements entered into by FCF, and an equivalent version of the proprietary provision is included in all of FCF's proposals:

AFFIDAVIT OF THOMAS A. COLEMAN (Cont'd.)

"Any proprietary information concerning Company's or its Supplier's products or manufacturing processes which is so designated by Company or its Suppliers and disclosed to Purchaser incident to the performance of such contract shall remain the property of Company or its Suppliers and is disclosed in confidence, and Purchaser shall not publish or otherwise disclose it to others without the written approval of Company, and no rights, implied or otherwise, are granted to produce or have produced any products or to practice or cause to be practiced any manufacturing processes covered thereby.

Notwithstanding the above, Purchaser may provide the NRC or any other regulatory agency with any such proprietary information as the NRC or such other agency may require; provided, however, that Purchaser shall first give Company written notice of such proposed disclosure and Company shall have the right to amend such proprietary information so as to make it non-proprietary. In the event that Company cannot amend such proprietary information, Purchaser shall, prior to disclosing such information, use its best efforts to obtain a commitment from NRC or such other agency to have such information withheld from public inspection.

Company shall be given the right to participate in pursuit of such confidential treatment."

AFFIDAVIT OF THOMAS A. COLEMAN (Cont'd.)

- (ii) The following criteria are customarily applied by FCF in a rational decision process to determine whether the information should be classified as proprietary. Information may be classified as proprietary if one or more of the following criteria are met:
- a. Information reveals cost or price information, commercial strategies, production capabilities, or budget levels of FCF, its customers or suppliers.
  - b. The information reveals data or material concerning FCF research or development plans or programs of present or potential competitive advantage to FCF.
  - c. The use of the information by a competitor would decrease his expenditures, in time or resources, in designing, producing or marketing a similar product.
  - d. The information consists of test data or other similar data concerning a process, method or component, the application of which results in a competitive advantage to FCF.
  - e. The information reveals special aspects of a process, method, component or the like, the exclusive use of which results in a competitive advantage to FCF.
  - f. The information contains ideas for which patent protection may be sought.



AFFIDAVIT OF THOMAS A. COLEMAN (Cont'd.)

The document(s) listed on Exhibit "A", which is attached hereto and made a part hereof, has been evaluated in accordance with normal FCF procedures with respect to classification and has been found to contain information which falls within one or more of the criteria enumerated above. Exhibit "B", which is attached hereto and made a part hereof, specifically identifies the criteria applicable to the document(s) listed in Exhibit "A".

- (iii) The document(s) listed in Exhibit "A", which has been made available to the United States Nuclear Regulatory Commission was made available in confidence with a request that the document(s) and the information contained therein be withheld from public disclosure.
- (iv) The information is not available in the open literature and to the best of our knowledge is not known by Combustion Engineering, Siemens, General Electric, Westinghouse or other current or potential domestic or foreign competitors of Framatome Cogema Fuels.
- (v) Specific information with regard to whether public disclosure of the information is likely to cause harm to the competitive position of FCF, taking into account the value of the information to FCF; the amount of effort or money expended by FCF developing the information; and the ease or difficulty with which the information could be properly duplicated by others is given in Exhibit "B".

E. I have personally reviewed the document(s) listed on Exhibit "A" and have found that it is considered proprietary by FCF because it contains information which falls within one or more of the criteria enumerated in Paragraph D, and it is information which is customarily held in confidence and protected as proprietary information by FCF. This report comprises information utilized by FCF in its business which afford FCF an opportunity to obtain a

AFFIDAVIT OF THOMAS A. COLEMAN(Cont'd.)

competitive advantage over those who may wish to know or use the information contained in the document(s).

TH Coleman

THOMAS A. COLEMAN

State of Virginia)

) SS. Lynchburg

City of Lynchburg)

Thomas A. Coleman, being duly sworn, on his oath deposes and says that he is the person who subscribed his name to the foregoing statement, and that the matters and facts set forth in the statement are true.

TH Coleman

THOMAS A. COLEMAN

Subscribed and sworn before me  
this 9<sup>th</sup> day of January 1998.

Robin A. Noble

Notary Public in and for the City  
of Lynchburg, State of Virginia.

My Commission Expires 4-30-98

Dr. Johnson

Robert A. Vogel

4-30-88

Enclosure 1

1. Response to Question 2
2. Non-Proprietary Response to Question 3

Question No. 2:

*In the staff's RAI dated September 5, 1997, you were requested to provide a power spectral density (PSD) of the artificial time history to demonstrate the adequacy of the time history. You provided a PSD of the time history (SSE1-X) with a PSD function developed from Regulatory Guide (RG) 1.60 spectrum (NRC-0.2G shown on page A-8 of Reference 1). It is interesting to note that the SSE1-X PSD contains energy that is more than about 1.4 to 1.8 times the energy of the NRC-0.2G PSD. RG&E is requested to provide the following:*

- (a) Technical discussion of the details as to how the NRC-0.2G PSD was developed. Also, provide sample calculations.*
- (b) The time histories used for the development of the two (SSE1-X and NRC-0.2G) PSD on a 3.5-inch diskette.*
- (c) A comparison between the response spectra (RS) developed using the two time histories indicated in item (b) above.*

Response:

The US NRC Regulatory Guide (RG) 1.60 provides the Design Response Spectra (DRS) curve for a maximum (peak) 1.0 g acceleration and was the basis for the generation of the GINNA seismic time histories. The SRP Section 3.7.1 (Reference A), Appendix A specifies minimum PSD requirement for seismic time histories based on RG 1.60. The target PSD curve  $S_{\alpha(w)}(f)$  based on 1.0 G DRS peak acceleration, is defined by Equation 2 in Reference A, p.3.7.1-11:

For frequencies between 0.3 to 2.5 Hz:  $S_{\alpha(w)}(f) = 650 (f / 2.5)^{0.2} [\text{in}^2/\text{sec}^3]$   
For frequencies between 2.5 to 9.0 Hz:  $S_{\alpha(w)}(f) = 650 (2.5 / f)^{1.8} [\text{in}^2/\text{sec}^3]$   
For frequencies between 9.0 to 16.0 Hz:  $S_{\alpha(w)}(f) = 64.8 (9 / f)^3 [\text{in}^2/\text{sec}^3]$   
For frequencies between 16.0 to 24.0 Hz:  $S_{\alpha(w)}(f) = 11.5 (16 / f)^8 [\text{in}^2/\text{sec}^3]$

For DRS peak accelerations other than 1.0 G, the PSD target curve  $S_{\alpha(w)}(f)$  is scaled by the square of the actual DRS peak acceleration. The time history PSD curve is required to envelope 80% of the scaled target PSD curve  $S_{\alpha(w)}(f)$  given above.

- a) The NRC-0.2G PSD scaled target curve (for example SSE-1 Horizontal X, Fig.NRCQ1b.1 in Reference B) is obtained as follows:

The target PSD curve scaling factor is  $(0.2)^2 = 0.04$ , since the SSE-X1 DRS peak acceleration is 0.2 G. For example, at  $f = 2.5$  Hz, the target PSD (based on 1.0G peak acceleration) is  $650 [\text{in}^2/\text{sec}^3]$ . The resulting scaled target PSD value for GINNA (using

the scaling factor = 0.04) then becomes  $0.04(650) = 26$  [ $\text{in}^2/\text{sec}^3$ ] in Ref. B, Fig. NRCQ1b.1. A similar procedure is applied for all other frequencies that define the GINNA scaled target PSD curve.

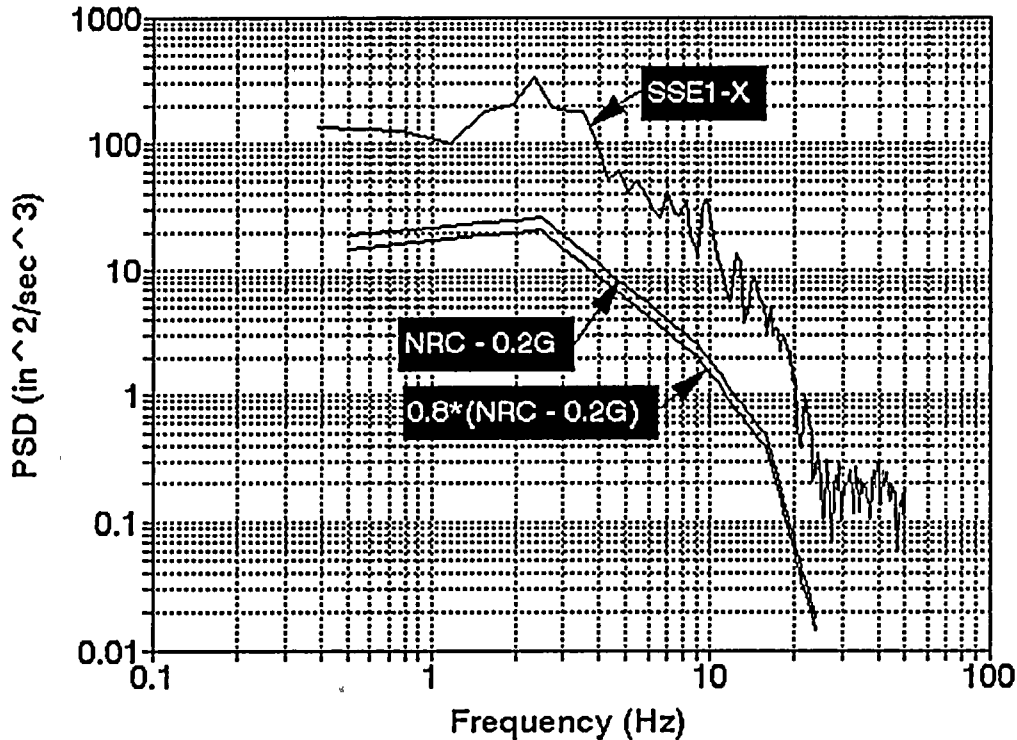
The 80% scaled target PSD curve is labeled as "0.8\*(NRC-0.2G)" in Ref. B, Fig. NRCQ1b.1, and represents 80% of the "NRC-0.2G" curve in the respective Figure.

- b) The SSE1 horizontal X and Y time histories are provided in ASCII format on the 3.5-inch diskette labeled "Time Histories". There is no time history associated with NRC-0.2G. The time histories are provided in the following format: Time (sec), Acceleration ( $\text{in}/\text{sec}^2$ ). There are 2001 entries which run from 0.00 sec. to 20.00 sec., in increments of 0.01 sec..
- c) The Response Spectra (RS) used for generation of the SSE1 horizontal X and Y time histories are shown in Ref. B, Figures NRCQ1a.1 and NRCQ1a.2.

Since the "NRC-0.2G" curve in Reference B is not derived from any time history, there is no corresponding response spectra developed from a time history.

Note that the Reference A, p.3.7.1-7 suggests that the DRS primarily defines the seismic ground motion (i.e. time histories) and the PSD requirement is a secondary requirement that ensures sufficient seismic power input into the structure of interest. For the SSE time histories that are used in GINNA multi-rack pool structural licencing, it is demonstrated that their PSD curves conservatively envelop target PSD requirements in SRP 3.7.1, Appendix A.

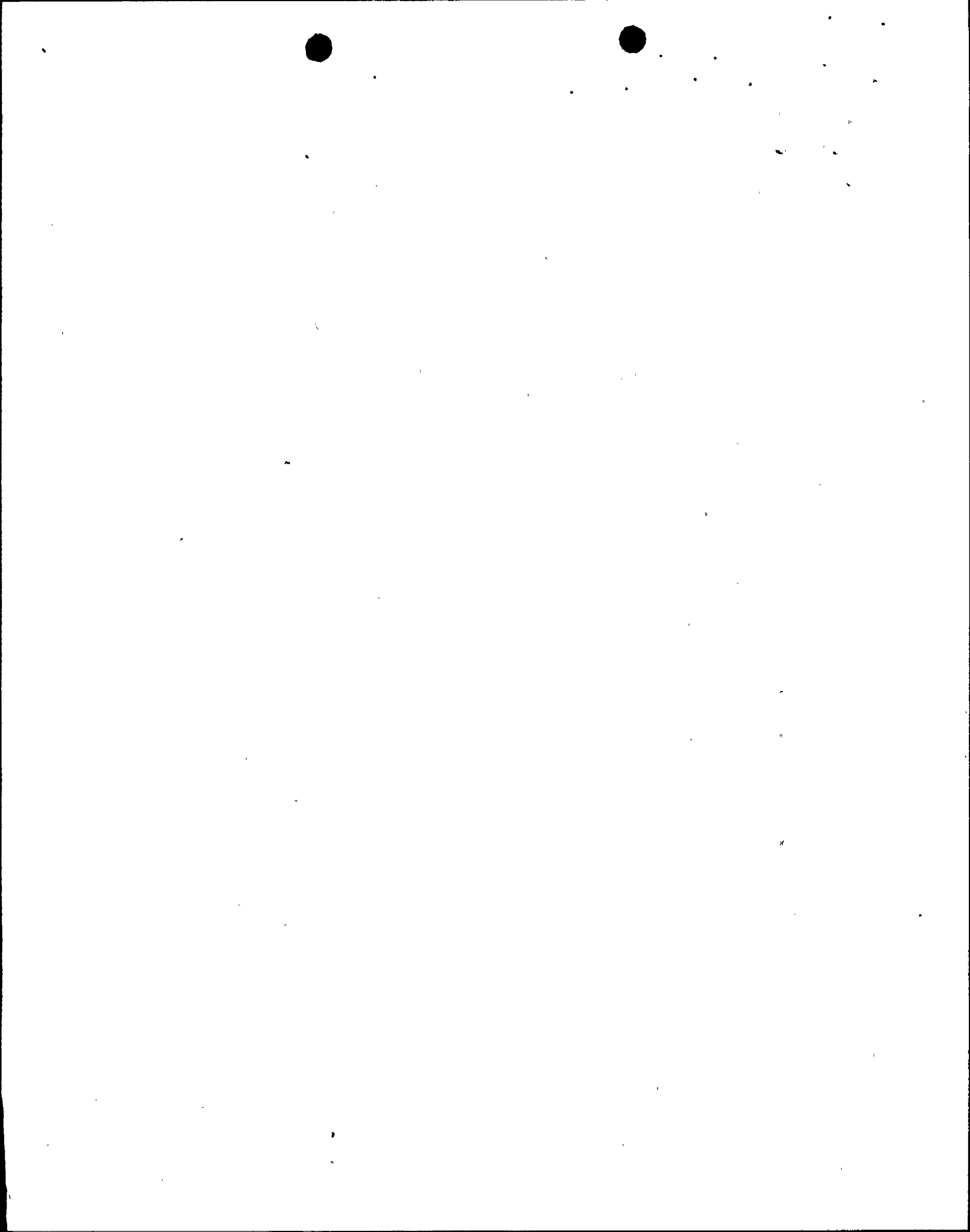
Figure NRCQ1b.1 PSD Comparison For GINNA SSE1 - Horizontal X



- Notes: 1) Upper curve (SSE1-X) is the PSD for the GINNA time history SSE1-X.
- 2) Middle curve (NRC-0.2G) is the scaled target PSD curve, based on SRP 3.7.1 requirements. The scale factor is  $(0.2)^2 = .04$ . Therefore, at 2.5 Hz, SRP 3.7.1 specifies  $650 \text{ inch}^2/\text{sec}^3$ . The scaled target value at 2.5 Hz is  $(.04)(650) = 26 \text{ in}^2/\text{sec}^3$ . Note that this curve is not based on any time history.
- 3) Bottom curve represents 80% of the middle curve in 2) above. This is the minimum value specified by SRP 3.7.1.

**References:**

- A) U.S. Nuclear Regulatory Commission, Standard Review Plan, Section 3.7.1, Rev. 2, August, 1989.
- B) "Response to Request for Additional Information - Spent Fuel Pool (SFP) Modification - Structural Design Considerations (TAC No. M95759), R. E. Ginna Nuclear Power Plant, Docket No. 50-244," Letter dated October 20, 1997, from RG&E to U.S. NRC.





Question No. 3:

*In the staff's RAI dated September 5, 1997, you were requested to provide the results of any existing experimental studies that verify the correct or adequate simulation of the fluid coupling utilized in the ANSYS analyses for the fuel assemblies, racks and walls. You provided a comparison study between the results of an ANSYS analysis and an experimental test. The staff reviewed the comparison study and concluded that the study is not sufficient to demonstrate the adequacy of the ANSYS code used to simulate the dynamic fluid coupling and the structure-fluid-structure interactions due to: (i) the conditions of the experimental setup (i.e., boundary conditions, dimensions and shapes of the structure, application of the load, etc.) are so different from the real conditions of the rack structures and (ii) very limited test data are obtained and presented.*

*It is staff's understanding that RG&E's contractor, Framatome, has been conducting two series of the rack tests in France since August of 1994. The first series of tests is to study the fluid-structure interaction in a storage pool and the second series of tests is to study the behavior of storage racks (one full-scale and one 1/2-scale model). RG&E is requested to submit: (i) the detailed testing description, (ii) the status of the test program, and (iii) comparison studies between the results of the experimental tests and the ANSYS predictions.*

Response:

The seismic analysis of the licensing report used for the 1985 re-racking of the GINNA pool contained Appendix D, titled "Experimental Verification of Fluid Coupling Theory", which provided an experimental study evaluating a rigid square box in a square pool with 2-dimensional fluid motion (References 3.24 and 3.25 of the Licensing Report). The results from that experimental test program are the same set of results that FCF used as the basis for the ANSYS study provided.

FCF judged that it was appropriate to verify the ANSYS model with the results from the same study used for the resident racks, since six of the existing resident racks will remain in the Ginna pool for the planned re-rack.

In response to the specific issues raised in Question 3., the following information is provided.

Regarding part (I), the French rack testing descriptions are provided below:

[ PROPRIETARY ]

Regarding part (ii), the status of test program is provided below:

[ PROPRIETARY ]

U.S. NRC  
G. S. Vissing

A-5

January 13, 1998

Regarding part (iii), a response to the request for comparison studies between ANSYS and experimental data is provided below:

There have not been any ANSYS calculations performed for these experiments and thus FCF does not have related comparison studies between the experimental data and the ANSYS predictions.

The scope and status of the testing, as described in sections (I) and (ii) above, indicate that  
[ PROPRIETARY ]

**References:**

References 3.24 and 3.25 in "Application for Amendment to Facility Operating License, Revised Spent Fuel Pool Storage Requirements, Rochester Gas and Electric Corporation, R. E. Ginna Nuclear Power Plant, Docket No. 50-244," Letter dated March 31, 1997, from RG&E to U.S. NRC.