UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 22, 1993

Docket No. 50-220

Mr. B. Ralph Sylvia
Executive Vice President, Nuclear
Niagara Mohawk Power Corporation
301 Plainfield Road
Syracuse, New York 13212

Dear Mr. Sylvia:

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION REGARDING THE NINE MILE POINT NUCLEAR STATION UNIT NO. 1 REACTOR VESSEL ELASTIC-PLASTIC FRACTURE MECHANICS ASSESSMENT (TAC NO. M86107)

By letter dated December 17, 1992, Niagara Mohawk Power Corporation (NMPC) submitted for NRC staff review and approval, a plant-specific report entitled "Elastic-Plastic Fracture Mechanics Assessment of Nine Mile Point Unit 1 Beltline Plates for Service Level A and B Loadings." This submittal replaced an earlier submittal dated October 16, 1992. A similar report for level C and D loadings was also prepared and submitted on February 26, 1993. These reports are intended to demonstrate through fracture mechanics analysis that a margin of safety exists against fracture equivalent to that required by Appendix G of ASME Code Section III, for beltline plates having upper-shelf energy (USE) values below the screening criterion of 50 ft-lb.

The NRC staff, with assistance from its contractor, Oak Ridge National Laboratory, has completed a preliminary review of these reports. However, we have determined that additional information, as identified in the two enclosures, is required for us to complete our review. Therefore, in order for us to complete our review in a timely manner, NMPC is requested to respond to these requests for additional information within 30 days of receipt of this letter.

This requirement affects one respondent and, therefore, is not subject to Office of Management and Budget review under P.L. 96-511.

Sincerely,

Donald S. Brinkman

Donald S. Brinkman, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
Requests for Additional
Information

cc w/enclosures:
See next page

Mr. B. Ralph Sylvia
Niagara Mohawk Power Corporation

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ENCLOSURE 1

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

REQUEST FOR ADDITIONAL INFORMATION

REGARDING ELASTIC-PLASTIC FRACTURE MECHANICS ASSESSMENT FOR SERVICE LEVEL A AND B LOADINGS

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION UNIT NO. 1

DOCKET NO. 50-220

The following information is requested to continue our review of your December 17, 1992, submittal:

1. The report indicates that the J-R curve for a 6T specimen tested at 180 °F is drawn to meet the J axis at J_{Ic} = 525 in-lb/in^2, then this curve is shifted down to make the J_{Ic} point coincide with the estimated J_{Ic} point, leaving the difference between the plateau level of J and J_{Ic} constant at 175 in-lb/in^2, independent of both temperature and USE. Provide justification for the asserted independence of the J difference (175 in-lb/in^2) with respect to temperature and USE values. Also justify that the proposed J-R model should breakdown when USE values reach zero. (Although this issue was addressed in a telephone conference held in January 1993, a written response is required.)

2. The report contains no description of the fracture mechanics analysis procedure, i.e. the equations used for calculating J_{appl}, T_{appl}, and P_{inst}. Only the name of a computer program is mentioned. Either confirm that the equations used are identical to those in Appendix X or list all the equations which differ.

3. Provide information regarding the effect of cladding to the calculated applied J value.

ENCLOSURE 2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

REQUEST FOR ADDITIONAL INFORMATION

REGARDING ELASTIC-PLASTIC FRACTURE MECHANICS ASSESSMENT FOR SERVICE LEVEL C AND D LOADINGS

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION UNIT NO. 1

DOCKET NO. 50-220

The following information is requested to continue our review of your February 26, 1992, submittal:

1. The report indicates in Section 4.1 that temperature dependent properties were used in the thermal and stress analyses. Provide the details of these temperature dependencies.

2. Figure 4-12 in the report dated December 17, 1992, and in a previous report dated October 16, 1992, indicates that the Mean-2σ properties and the 95% confidence properties (Mean - 1.645σ) give the same lower bound line. Clarify this and confirm that Mean-2σ properties have been used for Levels A, B, and C analyses.

3. The J-material values at 0.1 inch listed in Table 5-3 are lower than the corresponding values in Figures 5-1 to 5-4 and 5-7 to 5-10 in the Levels A & B report by approximately 6 lbs. Explain this difference.

4. Levels C and D transients must be analyzed from the beginning of the transient to the time at which the metal at the tip of the flaw being analyzed reaches a temperature equivalent to the adjusted RT_{NDT} plus 50 °F. Confirm that this practice has been adopted or provide revised analyses.

5. Supply a complete list of input parameters and conditions for the transient thermal analysis, including specific heat, thermal conductivity, density, the resulting value of thermal diffusivity, coefficient of thermal expansion, elastic modulus and Poisson's ratio (for both cladding and base metal); also the relationships needed to determine the inside surface heat transfer coefficient.

6. Supply the detailed calculation procedure for determining the clad equivalent stress values listed in Table 5-1.

7. Provide the derivation or the reference (indicating the page number) of Equation (5-3).

8. Provide loads and values of Δa for the results labelled under "Flaw Stability Criterion" in Tables 5-3 and 5-4. Supply details for one calculation.

This requirement affects one respondent and, therefore, is not subject to Office of Management and Budget review under P.L. 96-511.

Sincerely,

Original signed by:

Donald S. Brinkman, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
Requests for Additional
Information

cc w/enclosures:
See next page

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