



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.

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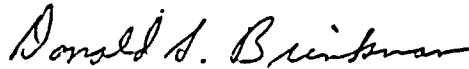
Mr. B. Ralph Sylvia

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July 22, 1993

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, 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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Mr. B. Ralph Sylvia  
Niagara Mohawk Power Corporation

Nine Mile Point Nuclear Station  
Unit No. 1

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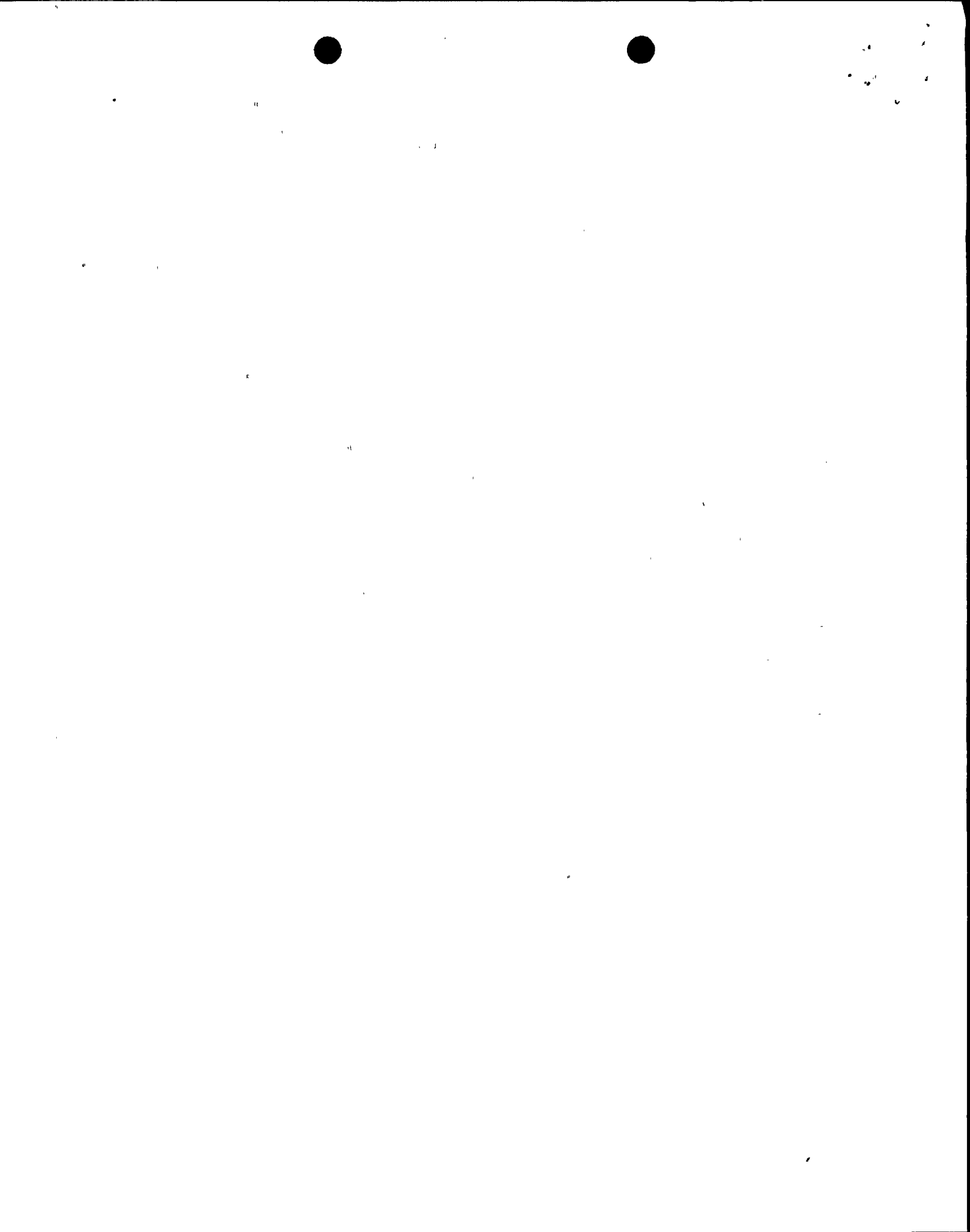
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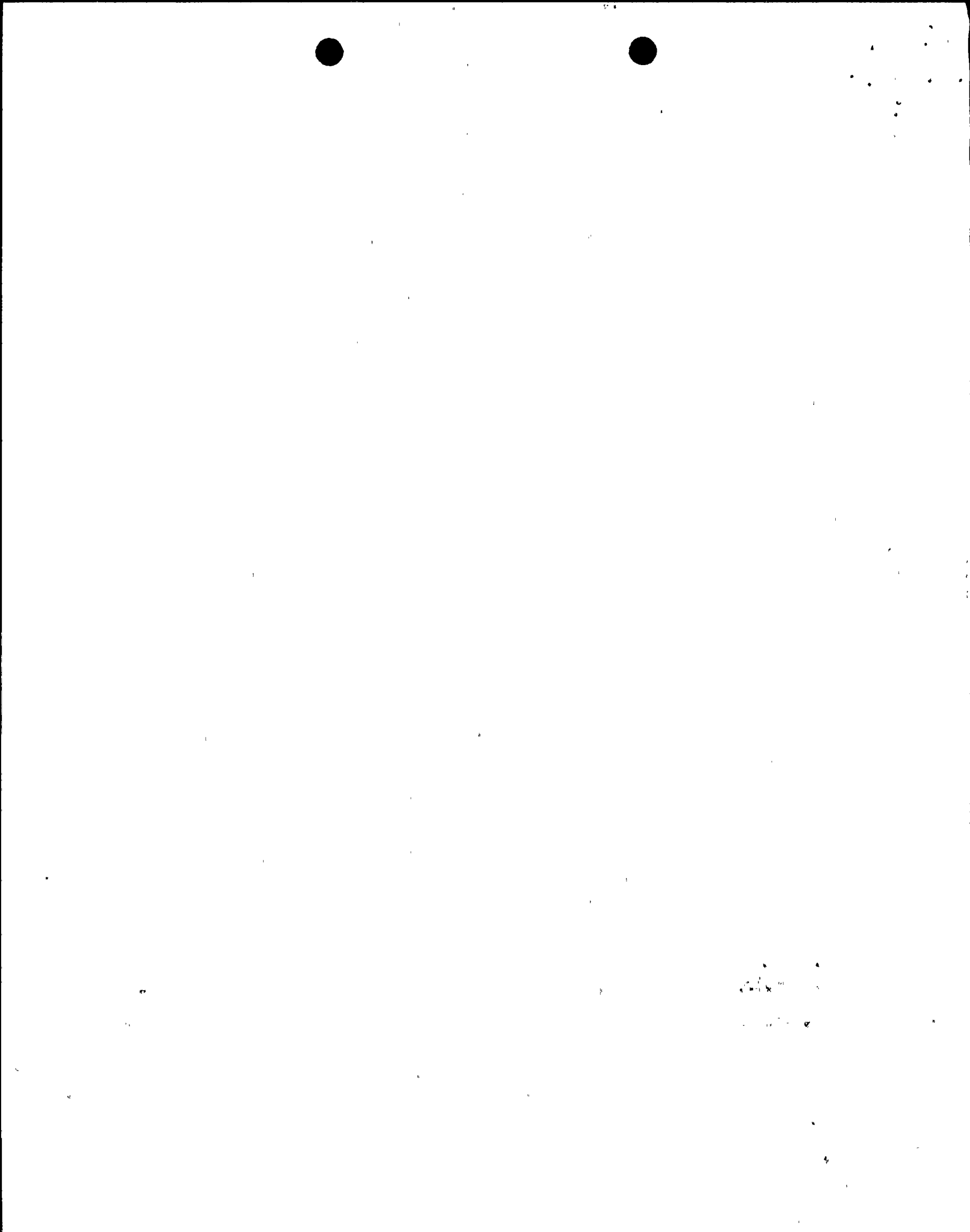


UNITED STATES  
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WASHINGTON, D.C. 20555-0001

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  $J_{1c} = 525 \text{ in-lb/in}^2$ , then this curve is shifted down to make the  $J_{1c}$  point coincide with the estimated  $J_{1c}$  point, leaving the difference between the plateau level of J and  $J_{1c}$  constant at  $175 \text{ in-lb/in}^2$ , independent of both temperature and USE. Provide justification for the asserted independence of the J difference ( $175 \text{ in-lb/in}^2$ ) 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  $J_{\text{appl}}$ ,  $T_{\text{appl}}$ , and  $P_{\text{inst}}$ . 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.







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REQUEST FOR ADDITIONAL INFORMATION

REGARDING ELASTIC-PLASTIC FRACTURE MECHANICS ASSESSMENT FOR SERVICE

LEVEL C AND D LOADINGS

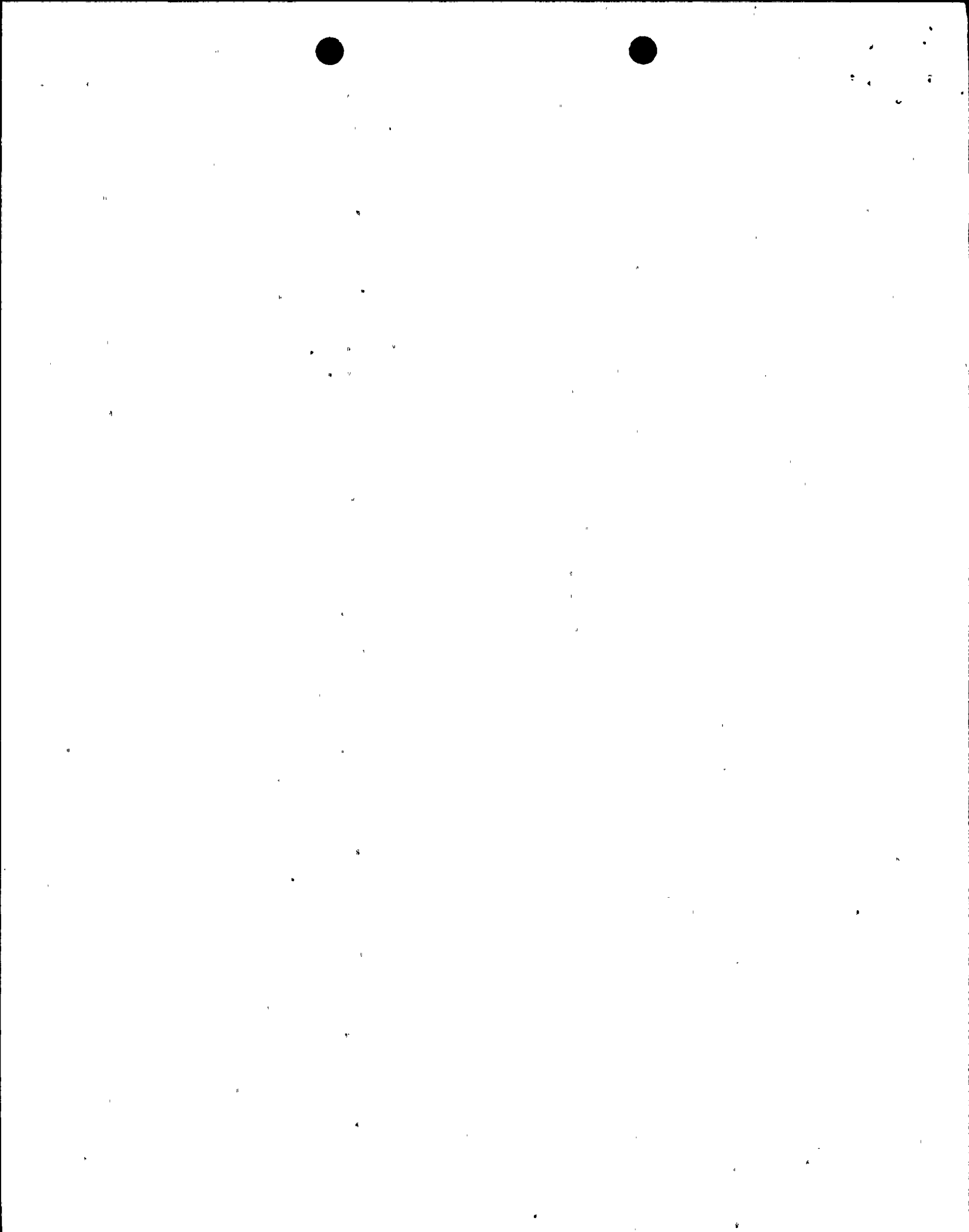
NIAGARA MOHAWK POWER CORPORATION

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- $2\sigma$  properties and the 95% confidence properties (Mean -  $1.645\sigma$ ) give the same lower bound line. Clarify this and confirm that Mean- $2\sigma$  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  $RT_{NOT}$  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  $\Delta a$  for the results labelled under "Flaw Stability Criterion" in Tables 5-3 and 5-4. Supply details for one calculation.



Mr. B. Ralph Sylvia

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July 22, 1993

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

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