

123 Main Street
White Plains, New York 10601
914 681.6950
914 287.3309 (Fax)



James Knubel
Senior Vice President and
Chief Nuclear Officer

February 6, 1998
IPN-98-015

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Subject: **Indian Point 3 Nuclear Power Plant**
Docket No. 50-286
Response to Request for Additional Information on
Proposed Technical Specification Changes Regarding
Pressure-Temperature Limits

- References:
1. NRC letter, G. Wunder to J. Knubel, "Request for Additional Information Regarding Proposed Changes to Pressure and Temperature (P/T) Curves (TAC No. M99928), dated January 15, 1998.
 2. NYPA letter, J. Knubel to NRC (IPN-97-149), "Proposed Exemption From Requirements of 10 CFR 50.60 and Proposed Technical Specification Changes Associated With Pressure-Temperature and Overpressure Protection System Limits for Up to 13 Effective Full Power Years," dated November 3, 1997.

Dear Sir:

This letter provides a partial response to the NRC's request for additional information (Reference 1). The request concerns the Authority's proposed Technical Specification changes to the pressure-temperature and overpressure protection system limits (Reference 2). The NRC's questions on the pressure and temperature limits (Questions 8, 9, and 10) followed by the Authority's responses are contained in Attachment I. Answers to the NRC's questions pertaining to the overpressure protection system limits (Questions 1 through 7) will be submitted under separate cover. Attachments II through IV contain supporting documentation for the information provided in Attachment I.

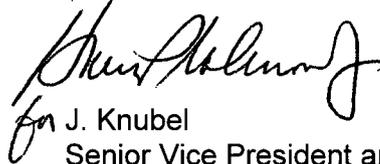
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This submittal contains no new commitments. If you have any questions, please contact Ms. C. D. Faison.

Very truly yours,



for J. Knubel
Senior Vice President and
Chief Nuclear Officer

- Attachments: I - Response to Request for Additional Information
II - IP3-CALC-RCS-02670, "Applicability of Reactor Vessel Neutron Fluence to 11 EFPY Service Life," dated February 2, 1998.
III - ABB-CE letter, PENG-98-003, "ART Determination for Indian Point Unit 3," dated January 16, 1998.
IV - ABB-CE letter, PENG-98-014, Revision 0, "Revised ART Determination for Indian Point Unit 3," dated January 23, 1998.

cc: Regional Administrator
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Resident Inspector's Office
Indian Point Unit 3
U.S. Nuclear Regulatory Commission
P.O. Box 337
Buchanan, NY 10511

Mr. George F. Wunder, Project Manager
Project Directorate I-1
Division of Reactor Projects I/II
U.S. Nuclear Regulatory Commission
Mail Stop 14B2
Washington, DC 20555

Mr. F. William Valentino, President
New York State Energy, Research,
and Development Authority
Corporate Plaza West
286 Washington Avenue Extension
Albany, NY 12203-6399

ATTACHMENT I TO IPN-98-015

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION ON THE PROPOSED
TECHNICAL SPECIFICATION CHANGES TO THE PRESSURE-TEMPERATURE AND
OVERPRESSURE PROTECTION SYSTEM LIMITS**

NEW YORK POWER AUTHORITY
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286
DPR-64

Response to Request for Additional Information

Pressure-Temperature Limit Questions

NRC Question 8:

A regulatory issue - The submittal employed an alternative method for calculating K_{IT} . According to Paragraph (b) of G-2214.3 of Appendix G of the ASME Code, the alternative methodology can be used when (a.1) the approximate shape of the temperature gradient is not as shown in Figure G-2214.3; or (a.2) the temperature change rate is more than 100°F/hr. Certainly, (a.2) does not apply to your case. Plot your plant-specific temperature difference across the vessel thickness on Figure G-2214.3 with the ASME curve. If they are not similar, explain why your plant-specific curve is different from the generic pressurized-water reactor curve. If they are similar and you decide to use the CE methodology, then your approach is no longer in accordance with the ASME Code, and an exemption request and a detailed methodology to a degree that the staff can perform hand calculations are needed.

NYPA Response:

Section G-2214 of ASME Code, Appendix G discusses a methodology for the calculation of stress intensity factors. The Authority proposes to use an alternate methodology, provided by ABB Combustion Engineering, to calculate K_{IT} . Reference 1 contained an exemption request to utilize this alternate methodology and a report which provided a description of the methodology and calculational details.

NRC Question 9:

Chemistry factor calculation - The use of three of the five surveillance data to calculate the chemistry factor for the limiting material is not acceptable. Use all five surveillance data as was concluded in the staff pressurized thermal shock evaluation of the IP-3 reactor pressure vessel dated August 12, 1993 to revise the P-T limits.

NYPA Response:

The Authority has recalculated the chemistry factor using the five surveillance data from the longitudinal and transverse specimens. In addition, an updated fluence value, contained in Reference 3, was also incorporated into the chemistry factor calculation. As a result of these new inputs, the chemistry factor has been revised from 158.7 to 168.12.

The Authority contracted ABB-CE to review the pressure-temperature curves, submitted with Reference 2, based upon the revised chemistry factor and the effects of the low leakage cores used at Indian Point 3 since Cycle 6. (The neutron fluences associated with the usage of low leakage cores are documented in Attachment II.) ABB-CE calculated a revised adjusted reference temperature (ART) for the limiting plate, B2803-3, at the 1/4T and 3/4T locations using the new inputs. The following table summarizes the results.

	<u>New ART values</u>	<u>Original ART values</u>
1/4T (B2803-3)	207°F	208°F
3/4T (B2803-3)	165.9°F	168°F

Since the new peak ART values are less than the peak ART values used to generate the heatup and cooldown curves submitted with Reference 2, these curves are still conservative. However, due to additional constraints described in the response to Question 10, new pressure-temperature curves will be submitted under separate cover. A summary of the ABB-CE calculations is provided in Attachment III.

NRC Question 10:

It was noted that in Table 3.3 and Table 3.5 of the submittal that the fluence values were based on projections from capsule Z results. WCAP-11815 which documents the capsule Z measurements and calculations, states that the 47-group SAILOR library, used in the calculations, is based on the ENDF/B-IV data base. In addition, Figure 6-1 indicates that the Indian Point Unit 3 utilizes a thermal shield. Since the capsule Z report was issued, the staff has determined that ENDF/B-IV based iron cross sections result into 15-20 percent fluence under estimation. In an NRC staff Indian Point 3 personnel telephone conference on November 15, 1997, you stated that the plant has been loaded in a low leakage mode, since capsule Z was removed and that the low leakage more than compensated for the fluence under estimation caused by the ENDF/B-IV cross sections. The staff needs documentation quantifying both effects to be able to decide the acceptability of the values used in the P/T curves and the overpressure protection settings.

NYP A Response:

As stated in Question 10, the Capsule Z report (Reference 4) fluence values were based upon the ENDF/B-IV cross section database. The NRC states that the ENDF/B-IV data set produces fluence values which are underestimated by approximately 15%. In order to compensate for this underestimation, the Authority has added a 15% penalty to the starting fluence values listed in WCAP-14044 (Reference 3). These increased fluence values were then used to determine a revised ART at the limiting plate location (1/4T for plate B-2803-3) of 208.1°F. This revised ART is slightly higher than the ART used to generate the pressure-temperature curves submitted with Reference 2, rendering these curves nonconservative. Therefore, the Authority intends to utilize the pressure-temperature curves originally generated by ABB-CE for 15 EFPYs, which are based upon a limiting ART value of 214°F (Reference 5 submitted the original ABB-CE pressure-temperature report to the NRC.). As shown in Attachment IV, the 15 EFPY time limit of these curves will be adjusted to 13.31 EFPYs to account for the 15% increased starting fluence. The new Pressure-Temperature curves generated from this effort will be submitted under separate cover.

It is important to note that the 15% penalty has been applied to reactor vessel fluence alone and not to surveillance capsule fluence as well. Applying this penalty to capsule fluence would

significantly reduce the chemistry factor. However, in order to provide an additional conservative margin, no credit has been taken for the reduced chemistry factor that would result from a 15% increase in surveillance capsule fluence.

References

1. NYPA letter (IPN-98-013), J. Knubel to NRC, "Proposed Exemption From Requirements of 10 CFR 50.60 to Utilize Alternate Methodology to determine K_{IT} ," dated January 28, 1998.
2. NYPA letter, J. Knubel to NRC (IPN-97-149), "Proposed Exemption From Requirements of 10 CFR 50.60 and Proposed Technical Specification Changes Associated With Pressure-Temperature and Overpressure Protection System Limits for Up to 13 Effective Full Power Years," dated November 3, 1997.
3. WCAP-14044, "Westinghouse Surveillance Capsule Neutron Fluence Reevaluation," E. P. Lippincott, April 1994.
4. WCAP-11815, "Analysis of Capsule Z from the New York Power Authority Indian Point Unit 3 Reactor Vessel Radiation Surveillance Program," S. E. Yanichko, S. L. Anderson, L. Albertin, March 1988.
5. NYPA letter to the NRC (IPN-90-046), "Proposed Changes to Technical Specifications Regarding Pressure-Temperature Limits," dated August 31, 1990.

ATTACHMENT II TO IPN-98-015

Applicability of Reactor Vessel Neutron Fluence to 11 EFPY Service Life

NEW YORK POWER AUTHORITY
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286
DPR-64