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New York Power Authority

Ralph E. Beedle
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March 17, 1993
JPN-93-016

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

SUBJECT: James A. Fitzpatrick Nuclear Power Plant
Docket No. 50-333
Response to NRC Second Request for Additional Information - Power Uprate Submittal (TAC No. M83182)

REFERENCE: 1. NYPA letter, R. E. Beedle to the NRC, dated June 12, 1992 (JPN-92-028), regarding Proposed Changes to the Technical Specifications for Power Uprate (JPTS-91-025)

Dear Sir:

The Authority's response to the second set of NRC questions on the FitzPatrick power uprate program (Reference 1) are attached. These two questions concern the effects of increased process and ambient temperatures and pressures on instrument accuracy.

If you have any questions, please contact Mr. J. A. Gray, Jr.

Very truly yours,

Ralph E. Beedle

Attachment list and cc: next page

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Attachments: 1. Response to Second Request for Additional Information - FitzPatrick Power Uprate Review

2. NYPA Calculation JAF-CALC-NBS-00223, Revision 1, "02DPT-116A,B; -117A,B; -118A,B; -119A,B Main Steam Hi Flow PCIS", November 17, 1992

3. NYPA Calculation JAF-CALC-NBS-00224, Revision 1, "02DPT-116C,D; -117C,D; -118C,D; -119C,D Main Steam Hi Flow PCIS", November 17, 1992

cc: Regional Administrator
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ATTACHMENT 1 TO JPN-93-016

RESPONSE TO SECOND REQUEST FOR ADDITIONAL INFORMATION
FITZPATRICK POWER UPRATE REVIEW

QUESTION

1 With regard to the calculations for Main Steam High Flow and Turbine First Stage Pressure, justify your position that Process Measurement Accuracy effects are not applicable. As part of your response, please address the change in steam density as a function of the change in pressure across the flow element and the expected change in differential pressure over the operating range from 35 to 120% of power.

ANSWER

Main Steam Hi Flow:

GE NEDC-31336 page 3-86 (Reference 1) states: "A process measurement accuracy allowance of 2% (1% for BWR/6) of rated flow is a conservative allowance for the flow error due to pressure higher than the design pressure of the flow element."

In NYPA calculation JAF-CALC-NBS-00224, Revision 1 (attached), the primary element uncertainty (PE) is conservatively assumed to be 5% of full span to encompass all uncertainties associated with the main steam flow element, including process measurement accuracy as stated on page 3-86 of GE NEDC-31336.

Turbine First Stage Pressure:

Process measurement accuracy effects were not considered for the turbine first stage pressure transmitter because the instrument line routings are not affected by the environment. GE NEDC-31336, pages 3-170 and 3-171 also makes the same assumption for process measurement accuracy.

General:

Although the density of steam does change with respect to the differential pressure across the venturi, the flowing fluid is measured at the average density of the fluid at the section of measurement (Reference 2). The venturi flow elements used in this application (02-FE-114A, -114B, -114C, -114D) were designed for constant pressure and temperature (1015 psia and 575 °F, respectively) per the GE Instrument Data Sheet 234A9301RK Sheet 24 and the GE Steam Flow Curve 528-51393.

ANSWER
(continued)

The proposed power uprate will increase the steam flow by 4.8%. Dome pressure will increase by 35 psi to 1055 psia. Increased pressure will increase the steam density (refer to the Main Steam Flow Element Pressure Correction Curve Drawing 7.71-42A). NYPA calculations were revised to include this pressure correction drawing.

In the attached NYPA calculations (JAF-CALC-NBS-00223, Revision 1 and JAF-CALC-NBS-00224, Revision 1), the GE Steam Flow Curve 528-51393 was corrected for a pressure of 1077 psia, which is the power uprate Hi Pressure Reactor Trip. The dotted line on this drawing represents steam flow at pressure of 1077 psia. This dotted line was developed by multiplying the existing curve by an s-conversion factor of 1.034 which was obtained from the Main Steam Flow Element Pressure Correction Curve Drawing 7.71-42A. The FitzPatrick Hi Steam Flow Trip ($\leq$ 106 psid), which corresponds to a steam flow of 3.5×10^6 lb/hr under existing conditions, corresponds to a steam flow of approximately 3.62×10^6 lb/hr for the power uprate conditions.

The GE Instrument Data Sheet 234A9301RK Sheet 24, the GE Steam Flow Curve 528-51393 and the Main Steam Flow Element Pressure Correction Curve Drawing 7.71-42A are included in attached NYPA Calculations JAF-CALC-NBS-00223, Revision 1 and JAF-CALC-NBS-00224, Revision 1.

REFERENCES

1. GE NEDC-31336 (Proprietary), "General Electric Instrument Setpoint Methodology," by W. H. Cooley, Jr., et. al., October 1986

2. ASME, "Fluid Meters, Their Theory and Application," edited by H. S. Bean, Sixth Edition 1971, Report of ASME Research Committee on Fluid Meters

ATTACHMENT 1 TO JPN-93-016

RESPONSE TO SECOND REQUEST FOR ADDITIONAL INFORMATION
FITZPATRICK POWER UPRATE REVIEW

QUESTION

2 There appears to be a considerable difference of opinion between the New York Power Authority and General Electric as to the magnitude of temperature changes within instrumentation racks and at transmitter sites. (Evidence of these differences in opinion are evidenced by a comparison of the position taken on pages 5 and 6 of JAF-CALC-NBS-00224 and pages 2-5, 2-7, 2-8 and 2-9 of NEDC-31336). Justify your position that temperature effects need not be considered for the main steam differential pressure transmitters and the trip units for both main steam flow and turbine first stage pressure. (Question 2 contained a typographical error. The GE document referred to in the question should be NEDC-31336 not NEDC-31556.)

ANSWER

The equations in GE NEDC-31336, pages 2-5, 2-7, 2-8 and 2-9 (Reference 1) are general Rosemount equations that take into account the temperature effects for equipment that must operate in a harsh environment during and after an accident. However, GE NEDC-31336, page 3-86 states that the Main Steam Line Hi Flow channel is not required to operate during and after an accident, consequently, a post accident harsh environment need not be considered. Therefore, no difference exists between GE and NYPA assumptions.

For the analog transmitter trip units in both Main Steam and Turbine first stage pressure calculations, there is no temperature effect considered other than one included in the equipment specifications. The trip units are located in the Relay Room. The environment in this area is considered normal mild.

GE NEDC-31336, page 2-7 shows that temperature effect is not considered for the Control Room, since it is included in the equipment specifications. NYPA calculations also took into account the information included in the equipment specifications.

REFERENCE

1. GE NEDC-31336 (Proprietary), "General Electric Instrument Setpoint Methodology," by W. H. Cooley, Jr., et. al., October 1986

ATTACHMENT 2 TO JPN-93-016

NYPA Calculation JAF-CALC-NBS-00223, Revision 1,
"02DPT-116A,B; -117A,B; -118A,B; -119A,B Main Steam Hi Flow PCIS",
November 17, 1992

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