PSNH

Public Service of New Hampshire

New Hampshire Yankee Division

George S. Thomas
Vice President-Nuclear Production

NYN- 88075

May 27, 1988

United States Nuclear Regulatory Commission
Washington, DC 20555

Attention: Document Control Desk

References: (a) Facility Operating License NPF-56, Construction Permit CPPR-136, Docket Nos. 50-443 and 50-444

(b) PSNH letter SBN-1191 dated September 12, 1986, "Interim 10CFR50.55(e) Report: Veritrak/Tobar Transmitters (CDR-86-00-09)," J. DeVincentis to R. W. Starostecki

(c) PSNH letter SBN-1212 dated October 9, 1986, "Veritrak/Tobar Transmitters," G. S. Thomas to V. S. Noonan

(d) NRC meeting summary, dated May 10, 1988, "Technical Specifications Meeting for Seabrook Station Operating License"

(e) NUREG-0896, Supplement No. 6, "Safety Evaluation Report Related to the Operation of Seabrook Station, Units 1 and 2"

Subject: Veritrak/Tobar Transmitter Replacement

Gentlemen:

In Reference (c), New Hampshire Yankee (NHY) indicated that the subject transmitters exhibited anomalies (i.e., ambient temperature shifts) which might, in certain applications, create conditions where allowable value limits would be exceeded. As a result of these concerns, NHY conservatively revised certain affected transmitter setpoints to preclude the anomalies from affecting the satisfactory operation of the transmitters. Furthermore, NHY indicated that the affected Veritrak/Tobar transmitters would be replaced with Rosemount transmitters.

The enclosed document provides the NHY analysis for the setpoint values for steam generator level, pressurizer level, and pressurizer pressure for the Rosemount transmitters. This analysis utilized the Westinghouse Setpoint Methodology which has previously been approved by the NRC Staff. Therefore, NHY requests that the Staff approve the attached analysis or provide comments no later than June 20, 1988. Subsequent to the Staff approval of the analysis and associated setpoint values, NHY will submit to modify the Technical Specifications as discussed in Reference (d). Any FSAR changes identified as a result of this transmitter replacement will be included in a future update.

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w/check #150
#25512

Pursuant to 10CFR170.12 (c), a check for $150.00 is also enclosed.

Should you have any further questions regarding this matter, please contact Mr. Warren J. Hall at (603) 474-9574 extension 4046.

Very truly yours,

George S. Thomas

Enclosure

Mr. William T. Russell
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Mr. Victor Nerses, Project Manager
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Mr. Antone C. Cerne
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Background

In March of 1986, New Hampshire Yankee (NHY) reported excessive ambient temperature compensation calibration shifts in Veritrak Group A transmitters when subjected to changes in ambient temperature from 80 to 130 degrees F. The transmitters in question, which provide inputs into the Reactor Protection System (RPS), were removed and returned to Westinghouse for analysis and repair. Westinghouse established a test program to evaluate and correct the cause of calibration shifts. During the course of the Westinghouse test program, calibration shifts in excess of specified limits were discovered when the ambient temperature was varied from 80 to 280 degrees F. The trip setpoints for these instrument channels were based on the maximum calculated error plus margin. Excessive ambient temperature compensation shifts could create a condition where the setpoint could exceed the allowable value limit of the Seabrook Technical Specifications.

Based on test results from Westinghouse and available data on Veritrak/Tobar transmitters, NHY had increased the surveillance and calibration requirements for all Class 1E Veritrak/Tobar transmitters located inside Containment which provide inputs to the RPS. Additionally, Westinghouse recommended that NHY revise the trip setpoints for pressurizer pressure low safety injection actuation and steam generator level low-low reactor trips. The Seabrook Technical Specifications reflect these revised setpoints.

These additional calibrations 1) have increased the length of time the unit will need to remain in Mode 3 during startup; 2) have increased the workload of the station staff; and 3) are inconsistent with ALARA principles. The revised setpoints are closer to the normal operating range and thus increase the chance of unnecessary trips. As a result of these concerns. NHY decided to investigate potential transmitter replacements. In a letter dated October 9, 1986 (SBN-1212, "Veritrak/Tobar Transmitters," G. S. Thomas to V. S. Noonan), NHY stated that the affected transmitters would be replaced with Rosemount transmitters.

Discussion

The Rosemount transmitters replace the Veritrak/Tobar Class 1E transmitters that presently provide (a) steam generator level, (b) pressurizer level, and (c) pressurizer pressure inputs to the Solid State Protection System. The Rosemount transmitters are environmentally and seismically qualified for their locations inside the containment. The replacement Rosemount transmitters are identical in type to the Veritrak transmitters except for the pressurizer pressure transmitter. In this application, the Rosemount transmitter is a gauge type pressure transmitter while the Veritrak transmitter is an absolute type. Therefore, an increase in containment pressure will cause the pressurizer pressure channel to indicate low, and a decrease in containment pressure will cause it to read high. The normal variations in atmospheric pressure have been considered in the instrument setpoint calculation. The replacement Rosemount transmitters have been used

in operating plants and have an excellent history of performing within stated accuracy limits; therefore, an increase in operating reliability and performance is expected.

Rosemount Transmitter Analysis

A. Steam Generator Level

The steam generator narrow range level instrument channel statistical allowances were calculated to be ±2.9 percent of span for normal and ±13.2 percent of span for accident environmental conditions. Based on these statistical allowances, a low-low level trip setpoint of 14.0 percent and a hi-hi level trip setpoint of 86 percent were determined by:

1. Adding normal environmental channel statistical allowances of 2.9 percent to the FSAR Chapter 15 accident analysis limit of 10 percent, which yields a minimum trip setpoint of 12.9 percent. This 10 percent accident analysis limit results from the normal loss of feedwater transient which does not result in a harsh environment.

2. Adding the accident instrument channel statistical allowance of 13.2 percent to the FSAR Chapter 15 accident analysis limit of 0 percent which yields a minimum trip setpoint of 13.2 percent. The channel statistical allowance includes a larger reference leg heatup error that was calculated using the same methodology used to determine the current setpoint. The containment purge valves were assumed to be open instead of closed (purging the air from the containment, thereby maximizing containment temperature when the containment high pressure safety injection (Hi-1) setpoint is reached), and the maximum expected atmospheric pressure was used. The 0 percent accident analysis limit results from a feedwater line break which could result in a harsh environment.

3. Subtracting the normal channel statistical allowance of 2.9 percent from the FSAR Chapter 15 accident analysis limit of 90 percent which yields a maximum trip setpoint of 87.1 percent. This value was decreased to 86 percent, resulting in an increase in margin of 0.4 percent of span.

When compared to the calculated values, the steam generator low-low level setpoint of 14 percent is conservative. The margin between the total allowance and the channel statistical allowance is increased for the Rosemount transmitter. Based on these revised setpoints, allowable values of 12.6% for the steam generator low low trip and 87.7% trip were calculated.

B. Pressurizer Level

The pressurizer level instrument channel statistical allowance of 4.62 percent was calculated for normal environmental conditions. No accident channel statistical allowance was calculated since no FSAR Chapter 15 accident analysis takes credit for this instrument channel. Utilizing the channel statistical allowance of 4.62 percent yields a trip setpoint of 92 percent, which is the same as the existing setpoint. The allowable value was calculated to be 93.75%, compared to the current value of 93.8%.

C. Pressurizer Pressure

The pressurizer pressure transmitter provides two reactor trip signals (high and low pressurizer pressure), input to the overtemperature delta T reactor trip, and low pressurizer pressure safety injection actuation. The pressurizer pressure reactor trips are not relied upon for the mitigation of any FSAR Chapter 15 transient that would result in a harsh containment environment; therefore, the only effect on a gauge pressure transmitter in this application is the normal containment pressure variation discussed above.

For the low pressurizer pressure safety injection actuation, the high containment pressure caused by a harsh environment will cause the transmitter to indicate a lower than actual pressure. This difference is in the conservative direction as it will cause the safety injection signal to be generated sooner than it otherwise would be.

The protection system setpoints were developed by calculating the instrument channel statistical allowance using the Westinghouse methodology, and applying this to the FSAR Chapter 15 accident analysis limit. The pressurizer pressure instrument channel statistical allowances were calculated to be ±2.39 percent of span for normal and ±14.44 percent of span for accident environmental conditions. Based on these statistical allowances, a low pressurizer pressure reactor trip setpoint of 1945 psig, a high pressurizer pressure reactor trip setpoint of 2385 psig, and a low pressurizer pressure safety injection setpoint of 1865 psig were determined by:

1. Adding the normal instrument channel statistical allowance of 19.12 psig to the FSAR Chapter 15 Accident analysis limit of 1920 psig which yields a minimum low pressurizer pressure reactor trip setpoint of 1939.12 psig.

2. Subtracting the normal instrument channel statistical allowance of 19.12 psig from the FSAR Chapter 15 accident analysis trip setpoint of 2410 psig which yields a maximum high pressurizer pressure reactor trip setpoint of 2390.88 psig.

3. Adding the accident instrument statistical allowance of 115.5 psig to the accident analysis limit of 1745 psig for the low pressurizer pressure safety injection setpoint which yields a minimum setpoint of 1860.5 psig.

The effect of the Rosemount transmitters on the overtemperature delta T trip was evaluated and determined to be acceptable since it resulted in an increase of 0.6 percent of span in the margin between the total allowance and the channel statistical allowance.

When compared to the calculated values, the low pressurizer pressure reactor trip setpoint of 1945 psig, low pressurizer safety injection setpoint of 1865 psig, and the high pressurizer pressure reactor setpoint of 2385 psig are conservative. The margin between the total allowance and the channel statistical allowance is approximately (within 0.04 percent of span) the same for the Rosemount and Veritrak transmitters. These setpoints yield allowable values of 1931 psig, 1852 psig, and 2398 psig, respectively.