

DUKE POWER COMPANY

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May 13, 1988

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: Catawba Nuclear Station
RII:PTB
Violation 50-413,414/87-30-01

Dear Sir:

Please find attached a revised response to the subject Violation concerning the calculation of Reactor Thermal Power. This revised response is the result of conversations with the Inspector, P. T. Burnette, and should replace in entirety our original response of December 28, 1987.

Very truly yours,

H. B. Tucker
Hal B. Tucker

LTB/13/sbn

Attachment

xc: Dr. J. Nelson Grace, Regional Administration
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Mr. P. K. Van Doorn
NRC Resident Inspector
Catawba Nuclear Station

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DUKE POWER COMPANY
RESPONSE TO VIOLATION
413, 414/87-30-01

Technical Specification T.S. 2.2.1 requires that the Reactor Trip System Instrumentation and Interlocks Setpoints shall be set consistent with the Trip Setpoint values shown in Table 2.2-1. With a Reactor Trip System Instrumentation or Interlock Setpoint less conservative than the value shown in the Allowable Values column of Table 2.2-1, adjust the Setpoint consistent with the Trip Setpoint Value and determine within 12 hours that Equation 2.2-1 was satisfied for the affected channel.

Contrary to the above, on April 28, 1987, with all four channels of Power Range Neutron Flux Trip Setpoints less conservative than the Allowable Value of Table 2.2-1, the licensee used incorrect values for Z and S in Equation 2.2-1 to determine that Equation 2.2-1 was satisfied and to conclude that the event was within the safety analysis. Consequently, determination that Equation 2.2-1 was satisfied was not performed within the 12 hours specified by the Technical Specification Action Statement.

RESPONSE:

1. Admission or Denial of Violation

Duke Power Company admits the violation.

2. Reasons for Violation if Admitted

Technical Specification 2.2.1 requires that the Power Range NIS High Flux Reactor Trip setpoints be more conservative than 111.1% of Rated Thermal Power as evaluated by equation 2.2-1:

$$Z + R + S \leq TA$$

Where: Z = 4.56 (from Table 2.2-1)
R = Determined (Rack Drift Error)
S = 0.0 (from Table 2.2-2)
TA = 7.5 (from Table 2.2-1)

Per this Technical Specification, the Power Range NIS is recalibrated whenever its indication is in error $\geq 2\%$ from indicated Reactor Thermal Power. During the subject incident an error in the calculation of Reactor Thermal power on the Plant Operator Aid Computer created indications of thermal power $\approx 3\%$ lower than actual power level. Since this error was not realized at the time, Operations personnel directed I and E personnel to recalibrate the Power Range NIS channels to match the erroneous thermal power level. This resulted in the Power range NIS being $\approx 3\%$ nonconservative with respect to the High Flux Reactor Trip Setpoint, (the worst channel was 3.1% nonconservative).

The error in the Reactor Thermal Power Heat Balance was discovered and corrected within two hours of the erroneous NIS recalibration and the NIS was promptly recalibrated to restore the required conservatism.

An invalid evaluation of Equation 2.2-1 was performed within the Specified 12 hours as follows:

The value of "R" was assumed to be 0.5 and the value of "S" used was zero as indicated on Table 2.2-1. The value of "Z" used was 5.96, which assumes an inherent NIS/Thermal Power mismatch of 5%. The "Z" value of 4.56 provided by Table 2.2-1 assumes a mismatch of 2%. The new value of Z had been derived due to considerable interest in the past in adopting a broader interpretation of the Technical Specification requiring recalibration of the Power Range NIS whenever mismatches in excess of 2% with indicated reactor thermal power exist, (the intent being to eliminate multiple recalibrations during power ascension following shutdowns or load decreases). This erroneous Equation 2.2-1 analysis showed no violation of safety limits (i.e. the Trip Setpoints' Allowable Value on Table 2.2-1 was not exceeded). However, since unapproved (from a Technical Specification standpoint) values were used in this analysis it was not, in effect, performed to the satisfaction of the Technical Specification's 12 hour Action Statement and hence the violation was incurred.

3. Corrective Actions Taken and Results Achieved

An exhaustive evaluation of the intended application of Equation 2.2-1 with respect to the Power Range NIS by Performance, Station I and E, Westinghouse, and Design Engineering's Nuclear Safety personnel has resulted in the following interpretation:

$$\text{Equation 2.2-1: } Z + R + S \leq TA$$

$$Z = 4.56 \text{ (from Table 2.2-1)}$$

$$R = \frac{X}{1.2} + 0.1$$

where : X = the mismatch between NIS and Thermal Power indications, in percent.

$\frac{X}{1.2}$: adjusts this mismatch for the proper percent of span (120%)

0.1 = the worst expected NIS channel rack drift between calibrations (per I and E personnel as substantiated by review of Monthly Channel Calibration Procedures)

S = 0.0 (from Table 2.2-1, an assumed value of zero for an Ion Chamber field device)

TA = 7.5 (As assigned by Table 2.2-1)

Adopting this interpretation of Equation 2.2-1, the evaluation of this event yields the following result:

$$\begin{array}{rccccccc} Z & + & R & + & S & & \leq & TA \\ 4.56 & + & \frac{(3.1)}{1.2} & + & 0.1 & + & 0.0 & \leq & 7.5 \\ & & & & & & & & 7.243 \leq 7.5 \end{array}$$

Which verifies that no Safety Limits were violated during the subject event.

4. Corrective Actions to be Taken to avoid further Violations

A Technical Specification Interpretation shall be issued to clarify the application of Equation 2.2-1 to ensure that it is properly applied to perform required evaluations within the specified 12 hours.

5. Date of Full Compliance

All corrective actions will be complete by June 15, 1988.