



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20556-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 93 TO FACILITY OPERATING LICENSE NO. NPF-58

CLEVELAND ELECTRIC ILLUMINATING COMPANY, ET AL.

PERRY NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-440

1.0 INTRODUCTION

By a letter dated August 29, 1995, Centerior Energy, the licensee for Perry Nuclear Power Plant Unit 1 (PNPP), requested NRC's approval to implement amendments to its Operating License NPF-58, by incorporating modifications to the Technical Specifications (TS). This amendment revises Technical Specification Tables 3.3.5.1-1, "Emergency Core Cooling System Instrumentation," and 3.3.6.1-1, "Primary Containment and Drywell Isolation Instrumentation," by revising allowable values for selected plant process instrumentation in accordance with Instrument Setpoint Methodology Group and GE Topical Report NEDC-31336, "General Electric Instrument Setpoint Methodology," dated October 1986. The instrument channels selected were based on the functions assumed to operate in the accident and transient analyses contained in the Updated Safety Analysis Report (USAR), Chapter 15.

The supplemental letter of June 25, 1998, provided additional information and did not change the requested amendment or the proposed no significant hazards consideration. Therefore, the request was not renoticed in the Federal Register.

2.0 BACKGROUND

In 1983, during licensing reviews of various plants, the NRC staff identified concerns relating to the calculation methodology used by licensees to determine protection system Trip Setpoints (SPs) and Allowable Values (AVs) for controlled process variables of safety systems in TS. To evaluate and address the NRC's concerns, the PNPP licensee along with several other licensees and the General Electric (GE) Company, formed a review group called the Instrument Setpoint Methodology Group (ISMG). The ISMG reviewed the NRC's concerns, and in October 1986, issued GE Topical Report NEDC-31336, "General Electric Instrument Setpoint Methodology," for the staff's review and approval. The staff reviewed the NEDC-31336 and issued a Safety Evaluation Report (SER) on March 23, 1993, approving the GE topical report. In addition, the SER identified seven generic concerns that needed to be addressed by individual licensees before the GE methodology could be applied to their plant-specific instruments.

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By letter dated October 15, 1993, the licensee for PNPP presented the results of their evaluation for applying the NEDC-31336 methodology to their plant-specific instruments and also presented their response to the seven generic concerns relating to such an application. The staff reviewed the licensee's plant-specific submittal of October 15, 1993, and by an SER dated July 18, 1995, approved the incorporation of the GE setpoint methodology in NEDC-31336. The July 18, 1995, SER also concluded that the licensee's responses to the staff's generic concerns were acceptable.

3.0 PROPOSED CHANGES AND EVALUATION

Proposed changes to the current TS:

TS Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation"

1. For Function 1.e, "Reactor Vessel Pressure - Low (LPCI Injection Valve Permissive)," for LPCI Pump A, revise Allowable Value from ≥ 462.5 psig and ≤ 512.5 psig to ≥ 490.0 psig and ≤ 537.1 psig.
2. For Function 2.d, "Reactor Vessel Pressure - Low (LPCI Injection Valve Permissive)," revise Allowable Values from ≥ 468.0 psig and ≤ 518.0 psig to ≥ 490.0 psig and ≤ 537.1 psig for LPCI Pump B, and revise Allowable Values from ≥ 466.6 psig and ≤ 516.6 psig to ≥ 490.0 psig and ≤ 537.1 psig for LPCI Pump C.
3. For Function 4.b, "ADS Initiation Timer," revise Allowable Value from ≤ 117 seconds to ≥ 100.5 and ≤ 109.5 seconds.
4. For Function 5.b, "ADS Initiation Timer," revise Allowable Value from ≤ 117 seconds to ≥ 100.5 and ≤ 109.5 seconds.

TS Table 3.3.6.1-1, "Primary Containment and Drywell Isolation Instrumentation"

1. For Function 1.b, "Main Steam Line Pressure - Low," revise Allowable Value from ≥ 795.0 psig to ≥ 795.2 psig.
2. For Function 1.c, "Main Steam Line Flow - High," revise Allowable Value from ≤ 191 psid to ≤ 189.3 psid.

TS Table 3.3.6.2-1, "RHR Containment Spray System Instrumentation"

1. For Function 2, "Containment Pressure - High," revise Allowable Value from ≤ 8.85 psig to ≤ 8.71 psig.

Evaluation:

In their submittal of August 29, 1995, the licensee stated that the new values of SP and AV for the proposed TS changes were taken from their October 15, 1993 submittal which was

approved by the staff in the July 18, 1995 SER. In addition, the SP and AV values for Low Pressure Coolant Injection (LPCI) valve permissive A, B and C were adjusted to remove the applicable head-correction factors. The head correction adjustment was originally incorporated to maintain consistency with the method of specifying setpoints at PNPP. It is now addressed in the calibration procedures.

Some of the proposed TS instrument AVs have upper and lower limits. Therefore, it appears that these AVs have a range. The staff determined that the appearance of a "range" for any AV which has been calculated using the NEDC-31336 methodology warranted some clarification since the AV was intended to be a singly discreet value. During a conference call on May 2, 1996, the licensee informed the NRC staff that the upper and lower limits are unique AVs with each AV associated with one unique analytical limit (AL) per function. In these cases, mitigating action has to be initiated on an increasing value as well as on a decreasing value of the controlled-process-variable. Therefore, there are two (high and low) ALs, two AVs and two trip settings for the SP to initiate mitigating action before the controlled-process-variable encroaches on the analytical limit associated with an increasing or decreasing parameter value. The licensee stated that this explanation was provided in Note 10 on page 5 of Attachment 3 to their October 15, 1993 submittal regarding use of the NEDC-31336 methodology.

Note 10 states, "To calculate the trip/permissive setpoint, the methodology requires that two analytical limits be evaluated. Two separate single-sided distributions are utilized, one for the upper analytical limit, the other for the lower analytical limit. This results in the calculation of two trip setpoints, one associated with each analytical limit. These two nominal trip setpoints then provide the bounds for selecting the actual setpoint. The actual setpoint will be located between these two nominal trip setpoints."

The staff found the Note 10 explanation for two unique AVs each associated with an upper and lower AL to be acceptable but determined that the last sentence of the note, "The actual setpoint will be located between these two nominal trip setpoints", is not correct because one actual SP between the two (increasing and decreasing direction) ALs cannot initiate protective action effectively (note that the licensee in several places has used the term "field setpoint" in lieu of setpoint). The staff believes that the two unique nominal SPs could be implemented by using two separate bistables or by using two separate contacts (a or b) of the same bistable dedicating one contact each for one unique nominal SP.

Every nominal SP has a calculated margin between the SP and its AV, which is known as the SP-margin. This is the margin by which the SP is allowed to move between two consecutive surveillances without encroaching on its AV. In accordance with Note 10, if the actual SP is located between the two nominal setpoints, then the SP-margin could be wider than if the SP was located at its nominal value. Because a SP margin may, therefore, be larger than assumed in the setpoint calculation, an instrument whose characteristics are degraded beyond acceptable limits could be found to be within calibration in consecutive surveillances without encroaching on its AV. As a result, it may not be possible to accurately assess instrument operability or that the setpoint calculation assumptions are continuing to be met by the instrument during routine instrument surveillance. Therefore, the actual SP should be located at its nominal calculated value.

During a conference call with the licensee on May 24, 1996, the NRC staff suggested that for AVs with a range, the licensee should provide a statement conveying an explanation of Note 10 with a stipulation to locate, control, and reset the SP to its nominal value (allowing for calibration tolerances) during calibration. The staff suggested that such a statement could be included either as a footnote to the TS table, a statement in the TS bases or a part of the licensee's administrative procedures. During this conference call, the licensee agreed to incorporate the following new paragraph:

"Some functional units have both an upper and lower analytical limit that must be evaluated. The Allowable Values (AVs) and the Trip Setpoint (SP) are derived from both an upper and lower analytical limit using the standard setpoint methodology. These are cases where mitigating action has to be initiated on an increasing value as well as on a decreasing value of the controlled process variable. Due to the upper and lower limits, AVs of such functional units appear to incorporate a range. However, the upper and lower limits are unique AVs with each AV associated with one unique setpoint and analytical limit per functional unit. The trip setpoints associated with each upper AV and lower AV are carefully analyzed for potential interactions between setpoints and AV are located to accurately assess instrument operability during instrument surveillance and satisfy the setpoint calculation uncertainty assumptions."

The licensee, however, did not indicate that the above paragraph would be incorporated in any of their documents. The licensee did propose the following revised paragraph.

"Some functional units have both an upper and lower analytical limit that must be evaluated. The Allowable Values (AVs) and the singular Trip Setpoint (SP) are derived from an upper and lower analytical limit using the standard setpoint methodology. These are cases where mitigating action has to be initiated on an increasing value or a decreasing value of the controlled process variable. Due to the upper and lower analytical limits, the derived Allowable Values result in having an acceptable trip setpoint range which is contained within the upper and lower Allowable Values. A specific trip setpoint is chosen from within this acceptable range. The specific trip setpoint associated with the upper and lower AVs is carefully analyzed for potential interactions between the setpoint and AVs. The capability exists to accurately assess the trip setpoint relative to instrument operability during instrument surveillance to validate setpoint calculation uncertainty parameters."

This revised paragraph was not acceptable to the staff since it did not indicate: (1) both the upper and lower limits of AVs are unique AVs with each AV (upper limit or lower limit) associated with one unique SP and AL per functional unit, and (2) the trip SPs associated with each upper AV and lower AV are carefully located to permit accurate assessment of instrument operability during instrument surveillance and to satisfy the setpoint calculation uncertainty assumptions. Therefore, by a letter dated February 19, 1998, the staff forwarded a request for

additional information (RAI) on the above issues. In response to this RAI, the licensee, by letter dated June 25, 1998, provided information addressing the staff's concerns.

In their response the licensee did not indicate that each nominal SP has been located with respect to its AV such that instrument operability could be assessed accurately. The inability to assess instrument operability is the result of extending the AV-Nominal SP margin beyond its calculated value(s). Rather, to address the staff's original concern, the licensee proposed, in their response to the February 19, 1998 RAI, to use a specific calibration allowance known as leave-as-is-zone (LAIZ) instead of using the AV-SP margin for establishing instrument operability during each surveillance. The licensee stated that the AV-SP margin is not the only determining factor to assess instrument operability, although other licensees use only the AV-SP margin for this purpose. The licensee indicated that "LAIZ" at the PNPP will be smaller when compared to the AV-SP margin (AV-Nominal SP margin). Therefore, it is conservative to use the LAIZ instead of the AV-SP margin for operability assessment. The licensee further stated that their procedures stipulate that during surveillance, if the specified value of LAIZ is exceeded, it will be documented and the instrument performance will be evaluated by the responsible engineer for acceptability.

4.0 FINDINGS

Based on its review, the NRC staff finds the proposed TS modifications, which include the revised values of AV in the ITS format, to be consistent with the previously approved setpoint methodology of NEDC-31336 and, therefore, acceptable. The staff notes that while the licensee's submittal included TS values for SPs, the format of the ITS (which has been implemented by the licensee subsequent to the August 29, 1995 submittal) no longer includes SPs. Although, for a few functional units, the application of GE's methodology for the location of a SP with respect to its AV does not appear to be consistent with general industry practice, as stated by the licensee in their submittal, the licensee has administrative procedures for implementation of the LAIZ to ensure for instrument performance assessment and resetting the SP as necessary. The licensee stated that for all cases, the value of the LAIZ will be smaller when compared to its AV-SP margin and an evaluation of the results of instrument performance from each surveillance test will be performed by a qualified responsible engineer on a timely basis. The staff, therefore, concludes that the licensee's instrument operability determination is consistent with the TS requirements and is acceptable.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluent that may be released offsite and that there is no significant increase in individual or cumulative occupational

radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding (60 FR 62496). Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

7.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

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