UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 77 TO FACILITY OPERATING LICENSE NO. NPF-58

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY, ET AL.

PERRY NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-440

1.0 INTRODUCTION

By application dated May 1, 1995, supplemented December 20, 1995, the Cleveland Electric Illuminating Company, et al. (the licensees) submitted proposed changes to the Perry Nuclear Power Plant Technical Specifications. The licensee proposed to incorporate the guidance associated with the Boiling Water Reactor Owners' Group (BWROG) Topical Report NEDO-32291, "Systems Analyses for the Elimination of Selected Response Time Testing Requirements." The topical report, which was reviewed and approved by the staff, eliminates selected response time testing requirements.

In addition, the licensee proposed incorporation of the guidance provided by Generic Letter 93-08, "Technical Specifications Line Item Improvement to Relocate Tables on Instrument Response Time Limits." The generic letter relocates tables identifying response time limits for selected instruments from the technical specifications to the updated final safety analyses report (USAR).

The supplemental letter of December 20, 1995, accounted for the Technical Specification changes made by previously issued amendments, and did not change the licensee's request or affect the staff's notice of no significant hazards considerations.

Elimination of Selected Response Time Testing (NEDO-32291)

2.0 BACKGROUND

Current technical specifications (TSs) require nuclear power plants to periodically perform response time testing for instrument channels on the reactor protection system, emergency core cooling systems, and the isolation actuation instrumentation. The intent of these tests is to ensure that changes in response time of instrumentation beyond the limits assumed in safety analyses are detected, and combined with instrument calibration, to ensure that the instrument is operating correctly. The response time tests do not demonstrate that the instrument response time design value is met, but rather that the specified performance requirements of the TSs are satisfied.

By letter dated January 14, 1994, the Boiling Water Reactor Owners' Group (BWROG) submitted Topical Report NEDO-32291, "System Analyses for Elimination of Selected Response Time Testing Requirements," for staff review. The BWROG stated in NEDO-32291 that operational history has shown that significant degradation of instrumentation response times is being detected during the performance of calibrations and other surveillance tests. The BWROG further stated that the performance of conventional response time tests has proven to be of little value in assuring that instrumentation will perform as required or for determining the health of the instrument because the majority of allowable instrumentation response times are system response times rather than instrument times.

The primary argument provided in the topical report in support for the elimination of response time testing is that appropriate alternatives are currently in place per the criteria of Regulatory Guide 1.118, "Periodic Testing of Electric Power and Protection Systems," and IEEE 338-1977, "Criteria for the Periodic Testing of Nuclear Power Generating Station Safety Systems," which states:

> Response time testing of all safety-related equipment, per se, is not required if, in lieu of response time testing, the response time of the safety equipment is verified by functional testing, calibration checks or other tests, or both. This is acceptable if it can be demonstrated that changes in response time beyond acceptable limits are accompanied by changes in performance characteristics which are detectable during routine periodic tests.

3.0 EVALUATION

By letter dated December 28, 1994, from B. Boger to R. Pinelli, the NRC staff approved use of NEDO-32291 for the elimination of selected response time testing requirements. In the accompanying safety evaluation, the staff concluded that significant degradation of instrument response times, i.e., delays greater than about 5 seconds, can be detected during the performance of other surveillance tests, principally calibration, if properly performed. Accordingly, the staff concluded that response time testing can be eliminated from technical specifications for the instrumentation identified in the topical report and accepted NEDO-32291 for reference in license amendment applications for all boiling water reactors provided that certain conditions are met.

The following includes the conditions for approval as established in the staff's safety evaluation along with the licensee's responses:

Staff Position:

When submitting plant-specific license amendment requests, licensees must confirm the applicability of the generic analysis of NEDO-32291 to their plant, and in addition to the request as shown in Appendix I of the topical report, the technical specification markup tables as shown in Appendix H, and a list of affected instrument loop components as shown in Appendix C.1, licensees must state that they are following the recommendations from EPRI

NP-7243,"Investigation of Response Time Testing Requirements," and, therefore, are requiring the following actions:

(a) Prior to installation of a new transmitter/switch or following refurbishment of a transmitter/switch (e.g., sensor cell or variable damping components), a hydraulic response time test shall be performed to determine an initial sensor-specific response time value, and

(b) For transmitters and switches that are capillary tubes, capillary tube testing shall be performed after initial installation and after any maintenance or modification activity that could damage the lines.

Licensee's Response:

By letter dated May 1, 1995, the licensee confirmed the applicability of NEDO-32291 to the Perry Nuclear Power Plant, Unit 1 (PNPP). As identified in Appendix A and H of the topical report, the licensee was a participating utility in the evaluation. Their submittal contained proposed technical specification changes consistent with Appendix I and included a listing of affected instrument loop components as shown in Appendix C of NEDO-32291. In addition, the licensee stated that they are following the recommendations of EPRI NP-7243 by the following:

(a) PNPP currently uses Rosemount transmitters exclusively for the "transmitter/switch" channels described in NEDO-32291. The licensee committed to revise procedures used for Rosemount transmitter replacement to require a transmitter bench test for response time to be performed on applicable transmitters prior to installation. This testing, which will be performed for both new and refurbished transmitters, will be implemented prior to the next refueling outage. Finally, the licensee noted that Appendix G of NEDO-32291 discusses Barksdale switches. While the PNPP design does not currently include these switches, the licensee committed to make the appropriate changes to the installation procedures if Barksdale switches are installed.

(b) The PNPP design does not include capillary tubes for transmitters requiring response time testing.

The staff's safety evaluation also included the following conditions for approval.

Staff Position:

(a) That calibration is being done with equipment designed to provide a step function or fast ramp in the process variable.

Licensee's Response:

(a) All PNPP transmitters requiring response time testing are Rosemount transmitters. Existing Rosemount calibration instructions pressurize the transmitter to 125%, then depressurize the transmitter (fast ramp). During this excursion the transmitter/instrument loop is observed for

sluggishness or erratic operation that would be indicative of degraded transmitter/instrument loop performance.

Staff Position:

(b) That provisions have been made to ensure that operators and technicians, through an appropriate training program, are aware of the consequences of instrument response time degradation, and that applicable procedures have been reviewed and revised as necessary to assure that technicians monitor for response time degradation during the performance of calibrations and functional tests.

Licensee's Response:

(b) As previously stated, PNPP procedures include ramp change testing requirements to check for sluggishness or erratic operation. The licensee stated that administrative procedures, which establishes the policy and administrative controls governing surveillance testing (calibrations and functional tests), will be revised to include statements describing the consequences of response time degradation and the need to monitor for this condition during testing. The licensee committed to incorporate these changes prior to implementing the proposed technical specification changes.

Staff Position:

(c) That surveillance testing procedures have been reviewed and revised if necessary to ensure calibrations and functional tests are being performed in a manner that allows simultaneous monitoring of both the input and output response of units under test.

Licensee's Response:

(c) The licensee stated that existing procedures meet the intent of this requirement to assure that the input and output responses are simultaneously monitored. Existing procedures require that technicians monitor for sluggish transmitter/instrument loop behavior while performing ramp functions.

Staff Position:

(d) That for any request involving the elimination of response time testing for Rosemount pressure transmitters, the licensee is in compliance with the guidelines of Supplement 1 to Bulletin 90-01, "Loss of Fill-Oil in Transmitters Manufactured by Rosemount."

Licensee's Response:

(d) By letter dated December 1, 1994, the staff accepted the PNPP response to Supplement 1 to Bulletin 90-01 and concluded that the licensee was in compliance with the guidelines of the Supplement.

Staff Position:

(e) That for those instruments where the manufacturer recommends periodic response time testing as well as calibration to ensure correct functioning, the licensee has ensured that elimination of response time testing is nevertheless acceptable for the particular application involved.

Licensee's Response:

(e) The licensee reviewed the vendor recommendations for the affected instruments and concluded that none of them require response time testing.

Finally, the licensee proposed two changes that are outside the scope of NEDO-32291. First, the licensee proposed moving existing SR 4.3.3.3 requirements that verify the ECCS response time limits from the instrumentation section to SR 4.5.1 under TS 3.5.1, "ECCS-Operating." This change would be accompanied by a note stating that the ECCS actuation instrumentation are excluded from the ECCS RESPONSE TIME test. ECCS response time operability requirements specify a time limit for the entire channel, from the time the monitored parameter exceeds its setpoint until the ECCS equipment is capable of performing its intended function. Moving the SR from the instrumentation section to the systems section of the TS represents a relaxation of requirements because existing SR 4.3.3.3 was applicable during all MODES of operation when the ECCS subsystems were required to be operable whereas SR 3.5.1 is only applicable during MODES 1, 2 and 3. The staff considers these changes acceptable because there are no design basis events during MODES 4 and 5 where the ECCS systems are relied upon and the response time tests, which are typically performed during shutdown conditions, would identify any operability problems that may exist. In addition, during MODES 4 and 5, the probability and consequences of accidents are reduced due to the pressure and temperature limitations of these MODES.

The second proposed change outside the scope of NEDO-32291 modifies Definition 1.13, "Emergency Core Cooling System (ECCS) Response Time," Definition 1.21, "Isolation System Response Time," and Definition 1.37, "Reactor Protection System Response Time." Each of these definitions, which define response time testing, are affected by the changes resulting from NEDO-32291. The licensee has proposed adding the following sentence to the end of each definition: "Exceptions are stated in the individual surveillance requirements." The licensee considers these changes necessary to clarify the definition with the changes that are being made consistent with NEDO-32291. The staff does not object to these proposed changes and finds them acceptable.

The NRC staff has previously concluded that licensees may reference NEDO-32291 in license amendment applications provided that certain conditions are met. In their application dated May 1, 1995, the licensee addressed each of these conditions and the staff finds the responses acceptable. Therefore, the staff finds the licensee's proposed changes to the PNPP TSs acceptable.

Relocation of Technical Specification Tables
of Instrument Response Time Limits
(GL 93-08)

4.0 BACKGROUND

Section 182a of the Atomic Energy Act (the Act) requires applicants for nuclear power plant operating licenses to include TSs as part of the license. In Section 50.36 of Title 10 of the Code of Federal Regulations (10 CFR 50.36), the Commission established the regulatory requirements related to the content of TSs. That regulation requires that the TSs include items in five specific categories, including (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; and (5) administrative controls. However, the regulation does not specify the particular requirements to be included in TSs.

The NRC developed criteria, as described in the "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors" (58 FR 39132), to determine which of the design conditions and associated surveillances should be located in the TSs as limiting conditions for operations. As stated in the Final Policy Statement, the TS must include these conditions or limitations on reactor operation which are "necessary to obviate the possibly of an abnormal situation or event giving rise to an immediate threat to the public health and safety." Four criteria were subsequently incorporated into the regulation by an amendment to 10 CFR 50.36 (60 FR 36953):

1. installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary;

2. a process variable, design feature, or operating restriction that is an initial condition of a Design Basis Accident or Transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier;

3. a structure, system, or components that is part of the primary success path and which functions or actuates to mitigate a Design Basis Accident or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier;

4. a structure, system, or component which operating experience or probablistic safety assessment has shown to be significant to public health and safety.

The Commission's final policy statement recognized, as had previous statements related to the staff's technical specification improvement program, that implementation of the policy would result in the relocation of existing technical specification requirements to licensee controlled documents such as the USAR. Those items relocated to the USAR would in turn be controlled in

accordance with the requirements of 10 CFR 50.59, "Changes, tests and experiments." Section 50.59 of Title 10 of the Code of Federal Regulations provides criteria to determine when facility or operating changes planned by a licensee require prior Commission approval in the form of a license amendment in order to address any unreviewed safety questions. NRC inspection and enforcement programs also enable the staff to monitor facility changes and licensee adherence to USAR commitments and to take any remedial action that may be appropriate.

5.0 EVALUATION

The licensee has proposed changes to TS 3.3.1, 3.3.2, 3.3.3 and 3.3.4.2 that remove the references to Tables 3.3.1-2, 3.3.2-3, 3.3.3-3 and 3.3.4.2-3 and deletes these tables from the TSs. The licensee committed to relocate the tables on response time limits to the USAR in the next periodic update.

Tables 3.3.1-2, 3.3.2-3, 3.3.3-3 and 3.3.4.2-3 contain the values of the response time limits for the Reactor Protection System, Isolation Actuation, Emergency Core Cooling System Actuation, and End-of-Cycle Recirculation Pump Trip System instruments. The limiting conditions for operation for this instrumentation specify these systems shall be operable with response times as specified in these tables. These limits are the acceptance criteria for the response time tests performed to satisfy the surveillance requirements of TS 4.3.1.3, 4.3.2.3 and 4.3.4.2.3 for each applicable function. These surveillances ensure that the response times of the instruments are consistent with the assumptions of the safety analyses performed for design basis accidents and transients. The changes associated with the implementation of Generic Letter 93-08 involve only the relocation of the response time tables but retain the surveillance requirement to perform response time testing. The USAR will now contain the acceptance criteria for the required response time surveillances. Because it does not alter the TS requirements to ensure that the response times of the instruments are within their limits, the staff has concluded that relocation of these response time limit tables from the TS to USAR is acceptable.

The staff's determination is based on the fact that the removal of the specific response time tables does not eliminate the requirements for the licensee to ensure that the protection instrumentation is capable of performing its safety function. Although the tables containing the specific response time requirements are relocated from the technical specifications to the USAR, the licensee must continue to evaluate any changes to response time requirements in accordance with 10 CFR 50.59. Should the licensee's determination conclude that an unreviewed safety question is involved, due to either (1) an increase in the probability or consequences of accidents or malfunctions of equipment important to safety, (2) the creation of a possibility for an accident or malfunction of a different type than any evaluated previously, or (3) a reduction in the margin of safety, NRC approval and a license amendment would be required prior to implementing the change.

The staff's review concluded that 10 CFR 50.36 does not require the response time tables to be retained in technical specifications. Requirements related to the operability, applicability, and surveillance requirements, including

performance of testing to ensure response times, are retained due to those systems' importance in mitigating the consequences of an accident. However, the staff determined that the inclusion of specific response time requirements for the various instrumentation channels and components addressed by Generic Letter 93-08 was not required. The response times are considered to be an operational detail related to the licensee's safety analyses which are adequately controlled by the requirements of 10 CFR 50.59. Therefore, the continued processing of license amendments related to revisions of the affected instrument or component response times, where the revisions to those requirements do not involve an unreviewed safety question under 10 CFR 50.59, would afford no significant benefit with regard to protecting the public health and safety. Further, the response time requirements do not constitute a condition or limitation on operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety, in that the ability of applicable systems to perform their safety functions are not adversely impacted by the relocation of the response time tables from the TS to the USAR.

In addition to removing the response times from the TS, the licensee is modifying the TS Bases Sections 3/4.3.1 and 3/4.3.2 to reflect these changes and has stated that the plant procedures for response time testing include acceptance criteria that reflect the response time limits in the tables being relocated to the USAR. These changes are acceptable in that they merely constitute administrative changes required to implement the TS change discussed above.

These TS changes are consistent with the guidance provided in Generic Letter 93-08 and the TS requirement of 10 CFR 50.36. The staff has determined that the proposed changes to the TS for the Perry Nuclear Power Plant, Unit No. 1, are acceptable.

6.0 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.

7.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or a change to 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 27345). 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.

8.0 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.

Principal Contributor: Douglas V. Pickett

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