THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

P.O. BOX 97 ■ PERRY, OHIO 44081 ■ TELEPHONE (216) 259-3737 ■ ADDRESS-10 CENTER ROAD
FROM CLEVELAND: 479-1260 ■ TELEX: 241599
ANSWERBACK: CEI PRYO

Al Kaplan

VICE PRESIDENT
NUCLEAR GROUP

Serving The Best Location in the Nation
PERRY NUCLEAR POWER PLANT

November 28, 1989
PY-CEI/NRR-1099 L

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

Perry Nuclear Power Plant
Docket No. 50-440
Supplementary Information on IRM
Rod Block Technical Specification
Change Request

Gentlemen:

The Cleveland Electric Illuminating Company (CEI), on November 19, 1987 submitted to the NRC an amendment request for the Perry Nuclear Power Plant (PNPP) Technical Specifications (T.S.) consisting of a modification to Table 4.3.6-1 Items 4b and 4d. This Technical Specification Change Request proposed the addition of a requirement to verify trip setpoints of the Intermediate Range Monitor (IRM) Control Rod Block Instrumentation during performance of the weekly Channel Functional Testing. In addition, this Technical Specification Change Request proposed an extension of the surveillance interval for Channel Calibration of this instrumentation from semi-annually (SA) to at least once per 18 months (R). This letter reiterates CEI's desire to pursue this change request. Included in this letter is supplemental information on the purpose of the change, and the relationship of both instrument drift and the design basis safety analyses to the change. In summary, IRM Neutron Flux Rod Block Function is not relied upon in PNPP's design basis safety analyses and instrument drift is not a concern applicable to this change request.

Nonsafety Related Operational Burden

Modification of the IRM Channel Calibration surveillance interval for Control Rod Block Instrumentation was proposed by our Reactor Operators and I&C Technicians as part of a scram reduction effort following review of LER 87-052 dated 7/31/87. This review identified an unnecessary and avoidable burden placed upon the plant, the reactor operators, and the technicians due to an inconsistency among various Technical Specification surveillance intervals required for the channel calibration of IRMs. Technical Specification 3.3.6, "Control Rod Block Instrumentation" requires an IRM channel calibration on a 6-month surveillance interval versus the 18-month interval prescribed for the same IRM's for other, more safety-significant functions.

A001

This IRM Rod Block function is only required to be operable in Operational Conditions 2 and 5. The design of the IRM circuitry precludes IRM channel calibration with the reactor in Operational Condition 1 due to high neutron flux and Mode Switch position; during normal Mode 1 operation the neutron detectors are withdrawn from the core and the Mode Switch is in the Run Position with the IRM trip functions bypassed. Therefore, the present Technical Specifications would require all the IRM Channels to be declared inoperable if sustained power operations have occurred which extended beyond the surveillance interval due date. Due to this "inoperability," Action Statements for T.S. 3.3.6 require that one of the IRM Channels be placed in the tripped condition within one (1) hour after entering Mode 2. This results in the generation of a control rod block and, since the same IRM logic serves both the rod block and the scram functions, it also results in the Reactor Protection System (RPS) being placed in a half-scram condition. Requiring the performance of IRM channel calibrations under the above plant conditions results in an increased possibility for an unnecessary scram and safety system challenges. The extension of the surveillance interval for the performance of the IRM Rod Block Channel Calibration from 6-months to 18-months is an improvement in safety. It would help avoid unnecessary scrams during Mode 2 operations by significantly reducing the time that the half-scram signal is inserted in the Reactor Protection System after entry into Mode 2,* and also would eliminate unnecessary manipulations of plant equipment in order to perform the calibration at the same time that a portion of the RPS system is in the tripped condition.

Other Related Considerations

The relationship of setpoint drift to the proposed change in calibration interval has also been considered. Drift over the proposed 18-month surveillance interval is not a concern with regard to this change for the following reasons:

(1) The circuitry from the IRMs to the trip units for the RC&IS Neutron Flux Rod Block and for the RPS Neutron Flux Scram consists of the same subcomponents with the only difference being their respective setpoints. It is unnecessary to require a channel calibration of the IRM Rod Block circuitry every six months where an 18 month IRM RPS calibration interval is appropriate. The IRM Neutron Flux Rod Block exists to block the movement of control rods as the neutron flux signal from the reactor approaches either end of the currently selected IRM range, and the Neutron Flux Scram exists to

---

* Even though this change to the Calibration interval would reduce the time that the half-scram is inserted after entry into Mode 2, the half-scram signal would still be required by TS 3.3.6 until the IRM Channel Functional Test is completed. A future Tech Spec change submittal is being evaluated by CEI which would provide a reasonable time period for performance of the IRM Functional Test, prior to declaring the IRM's inoperable upon entry into Mode 2 from Mode 1. This would provide further scram reduction benefits by eliminating the need to operate with a half-scram while performing the IRM Channel Functional Test.

insert the rods if the neutron flux signal gets even closer to the high end of the current IRM range before the operator can switch to the next higher IRM range. The nominal trip setpoint values provided in the Technical Specifications for these functions are selected to utilize the maximum range of the instrument (108 of 125 divisions of scale for Rod Block and 120 of 125 divisions of scale for Scram). Allowances for instrument drift are made by providing a two division margin (2/125th of scale) between the nominal trip setpoints and the technical specification allowable values (110 divisions of scale for Rod Block and 122 divisions of scale for Scram). Please note that the same drift allowance (2/125ths) is provided for both the rod block and RPS scram functions. These setpoints are unitless since the actual value of the neutron flux signal during the startup period is not important to the operation of the rod block or scram functions. The rod block and scram functions are based instead on a "percentage of scale" of the currently selected IRM range.

(2) A review of trending data from the IRM Rod Block channel functional test results at the Perry Nuclear Power Plant supports the conclusion that drift is not a valid concern. A total of 341 IRM Channel Functional Tests have been performed on the 8 IRM channels since July 1987, with only a single incident of Rod Block setpoints found outside the "leave-as-is-zone," (the leave-as-is zone is only 1 division of scale away from the nominal setpoint value). In this instance, drift on an upscale alarm setpoint was in the conservative direction. This condition was discovered by a setpoint check during performance of the required channel functional test during shutdown for the first refueling outage. No downscale alarm setpoints have been found outside of their leave-as-is zone.

An additional question was raised as to which portions of the IRM circuitry are checked during the Functional Test. As noted above, the actuation of the rod block and scram functions is based on the neutron flux signal from the reactor reaching a preset point on the currently selected IRM range, rather than being based on an actual calibrated value of neutron flux. Therefore, the important parameter to check to verify operability of these functions is that the setpoints on the trip units are correct. The Functional Test performs this by applying a test voltage (internally generated from the IRM drawer) to the input of the operational amplifier (op amp), which provides the input to the trip units. This signal is adjusted to verify that the value of the established upscale and downscale trip setpoints is appropriate. If the setpoint is found outside of its leave-as-is-zone, the reference value into the trip unit will be adjusted until the function occurs at its proper value. This adjustment will be made as a part of the Functional Test. In addition, the Functional Test also checks the performance of the amplifier attenuators, gain inverters and the mean square analog units by insertion of known values (e.g., zero, 40, 125) and verifies proper output from the op amp. The Functional Test also verifies full insertion capabilities of the IRM detectors.

The proposed requirement to perform the trip setpoint verification on the upscale and downscale IRM Rod Block setpoints during the weekly Functional Tests is actually a more conservative method of ensuring continued operability of the IRM rod block function in the sense that if the plant enters Mode 2 or 5 more frequently than every 18 months, the setpoints will be checked to ensure the rod block function will occur within its established allowable value, and if the results of the setpoint check show that adjustment is necessary, an appropriate adjustment will be made. Thus, the proposed check ensures that any setpoint drift would be corrected whether the time period between entries into Operational Condition 2 or 5 is shorter or longer than 6 months.

USAR Safety Analysis Review

In the No Significant Hazards Analysis for the T.S. Change Request, we stated that extending the surveillance interval for Channel Calibration of the IRM Rod Block Function does not involve a significant increase in the probability or consequences of an accident previously evaluated because the IRM Neutron Flux Rod Blocks are not relied upon in any of the accident or transient analyses of PNPP's USAR Chapter 15. CEI has again reviewed the accident/transient analyses considered in PNPP's USAR and has confirmed that the IRM Neutron Flux Rod Block Function of T.S. 3.3.6 is not relied upon to ensure safety in any of the Accident/Transient Analyses considered therein. The rod block functions directly referenced in PNPP's USAR Chapter 15 Accident/Transient Analyses are the refueling interlocks which are relied upon to preclude the removal of more than one control rod while in the refuel mode (USAR 15.4.1.1.2.f) and the Rod Pattern Control System (RPCS), a subsystem of the Rod Control and Information System (RC&IS), which prevents out-of-sequence continuous control rod withdrawal accidents during reactor startup (USAR 15.4.1.2.2.3).

We also stated in the No Significant Hazards Analysis that extending the calibration interval for the non-safety IRM Rod Block function from 6-months to 18-months would not involve a significant reduction in the margin of safety due to the fact that the safety-related IRM input for the Reactor Protection System is itself on an 18 month calibration frequency. The safety analyses do take credit for an IRM or APRM Neutron Flux scram via the Reactor Protection System, but do not rely upon IRM Neutron Flux rod blocks in any analysis. Due to the negligible safety significance of the IRM rod block function as compared to the IRM RPS input, granting the proposed amendment would not significantly decrease the margins of safety.

The addition of the surveillance requirement to verify IRM Upscale and Downscale Rod Block Trip Setpoints during the Weekly Channel Functional Test matches example (ii) of previously published Commission guidance on actions not likely to involve a significant hazards consideration (51 FR 7751), i.e. "a change that constitutes an additional limitation, restriction or control not presently included in the technical specifications, e.g., a more stringent surveillance requirement."

The supplemental information provided in this letter does not revise the previously submitted Technical Specification change request, and the Significant Hazards Analysis and Environmental Impact Statement of the original request remain valid.

If you have any questions, please feel free to call.

Very truly yours,

Al Kaplan
Vice President
Nuclear Group

AK:njc

cc: T. Colburn
P. Hiland
U.S. NRC Region III
J. Harris (State of Ohio)