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PERRY NUCLEAR POWER PLANT

Al Kaplan
VICE PRESIDENT
NUCLEAR GROUP

May 20, 1988
PY-CEI/NRR-0849 L

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

Perry Nuclear Power Plant
Docket No. 50-440
Technical Specification
Change Request on Control Rod Scram
Accumulator Low Pressure Setpoint

Dear Gentlemen.

The Cleveland Electric Illuminating Company (CEI) hereby requests amendment of Facility Operating License NPF-58 for the Perry Nuclear Power Plant, Unit 1. In accordance with the requirements of 10 CFR 170.12 a check in the amount of $150.00 is enclosed. In accordance with the requirements of 10 CFR 50.91(b)(1), a copy of this request for amendment has been sent to the State of Ohio as indicated below.

This amendment requests revision of Section 4.1.3.3 of the Perry Technical Specifications pertaining to surveillance requirements for the control rod scram accumulators. The revision would change the control rod scram accumulator alarm setpoint based on recommendations from General Electric.

Attachment 1 provides the Summary, Safety Analysis, Significant Hazards and Environmental Impact Considerations. Attachment 2 is a copy of the marked up Technical Specification pages.

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

Very truly yours,

A. Kaplan

Al Kaplan
Vice President
Nuclear Group

AK:cab

Attachments

cc: K. Connaughton
T. Colburn
J. Harris (State of Ohio)

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1/1
w/check #150
#043272

Summary

The proposed amendment revises the control rod scram accumulator alarm setpoint from 1535 ± 15 psig to ≥ 1520 psig. This is based on advice from General Electric that several operating nuclear stations have reported that hydraulic control unit (HCU) accumulator pressure switches have actuated below the limits stated in their plant technical specifications during regularly scheduled surveillance testing. These pressure switches provide an alarm in the control room when they trip on low HCU accumulator nitrogen pressure. The purpose of the proposed change is to allow a higher setpoint to be established in order to provide adequate allowance for the downward instrument drift that has been observed.

Safety Analysis

The control rod scram accumulators are used to provide the driving force for inserting control rods following a scram signal. The scram accumulators are hydraulic cylinders with an internal free floating piston. The piston separates the water on top from the nitrogen gas underneath. The scram accumulator is precharged with Nitrogen gas, and charging water pressure compresses the gas to a nominal pressure of approximately 1720 psig. When a scram signal is generated water in the scram accumulator and charging line is admitted under the Control Rod Drive Mechanism (CRDM) drive piston, and the water above the piston is vented to the scram discharge volume (SDV). The large differential pressure between the accumulator and the SDV produces a large upward force on the index tube of the CRDM. This force gives the rod a high initial acceleration and provides a large margin of force to overcome friction and the weight of the rod. After the initial acceleration is achieved, the CRDM insertion continues at a nearly constant velocity. This characteristic provides a high initial rod insertion rate. As the drive piston nears the top of its stroke, the piston seals close off the large passage (buffer shaft orifices) in the buffer shaft, and the drive slows.

In addition to the accumulator, reactor pressure can also be used to scram the control rods. Upon a scram, the accumulator provides the initial pressure to insert the control rod. As the accumulator discharges, its pressure drops rapidly. When the accumulator pressure drops below the reactor pressure, reactor pressure forces a ball check valve in the CRDM to unseat, blocking accumulator pressure and allowing reactor pressure to complete the drive stroke. At reactor pressure greater than about 600 psig, reactor pressure alone is capable of scramming the drive. At low pressures (< 600 psig), the accumulator is necessary to scram the drive.

The accumulator pressure is verified weekly in accordance with the surveillance requirements of Technical Specification No. 3.1.3.3. In addition, pressure switch alarms are provided to monitor the accumulator pressure between weekly surveillances. The pressure switch detectors are presently set to alarm at 1535 ± 15 psig on decreasing pressure in accordance with Technical Specification surveillance requirement 4.1.3.3.b.2. However, the upper setpoint limit of 1550 psig has not provided sufficient flexibility to assure that the pressure switch alarms at an accumulator pressure of ≥ 1520 psig. This is because the present Technical Specification setpoint may not always provide sufficient instrument drift margin.

This downward instrument drift trend has been observed since initial plant startup. To allow for this instrument drift the change proposes to amend the surveillance requirements (4.1.3.3.b 2) of Technical Specification No. 3.1.3.3 to state that the low pressure alarm be set at "equal to or greater than 1520 psig" on decreasing pressure with no upper setpoint limit. This would allow for a sufficiently high setpoint value to be established.

This proposed change gives flexibility to account for instrument drift allowance so that sufficient nitrogen pressure is maintained for the required scram performance. Increasing the accumulator alarm setpoint will not affect or change the original design basis for the Control Rod Drive Hydraulic System (CRDHS). Furthermore, all equipment associated with the CRDHS will continue to perform its design function. The HCU accumulator pressure switches are bourdon tube devices manufactured by Barksdale, Inc. with a proof pressure of 4800 psig and an adjustable setpoint range of 160-3200 psig (Model No. BIT-GH32SS).

There is no safety significance to the upper setpoint which is being eliminated. As stated in the General Electric (GE) Service Information Letter (SIL)-429 Revision 1 dated January 18, 1988, "HCU Accumulator Pressure Switches", the only concern with the upper setpoint is that the selected alarm setpoint should not be set so high that the alarm fails to reset following accumulator repressurization after a scram. If this were to happen the accumulator(s) would be declared inoperable and the appropriate Actions of LCO 3.1.3.3 would be taken. However this would not affect the Accumulators ability to function during a scram. The SIL also states that higher settings may require more frequent nitrogen addition during normal operations (due to alarms actuating at a higher pressure than at present time). This again does not represent a safety concern since the accumulators are located in containment which is normally accessible during plant operations. GE's recommendation as stated in SIL 429 is to amend the Technical Specification to allow low pressure alarms be set at 1520 psig or greater on decreasing pressure.

At initial startup, the calibrated setpoint range for the pressure switches was between 1520-1550 psig. The first major Technical Specification surveillance of the pressure switch setpoints was performed on December 27, 1985. During this surveillance, 48 percent of the pressure switches alarmed outside of the calibrated setpoint range specified by the present Technical Specification. (11.4 percent alarmed at 1520 psig or below.) Technical Specification HCU Accumulator Alarm Pressure Switch surveillances were again performed for 86 HCU pressure switches on January 15, 1986. 22 percent of the alarm setpoints actuated outside of the calibrated setpoint range (12.8 percent alarmed at 1520 psig or below). On August 8, 1987 all 177 HCU Accumulator Alarm Pressure Switch surveillance were performed. This time 42.9 percent actuated outside of the calibrated setpoint range with 14.7 percent alarming at or below 1520 psig. Based on this operating experience, it is evident that the 30 psig band (1520-1550 psig) has not provided adequate instrument drift margin for certain of the installed accumulator pressure switches.

The alarm setpoint is established to assure that operator actions are taken to maintain the scram accumulator pressure at a value high enough to carry out the scram function discussed above. Since the proposed change does not lower this setpoint, there is no adverse safety significance to the proposed change.

Significant Hazards Analysis

The standards used to arrive at a determination that a request for amendment requires no significant hazards consideration are included in the Commission's Regulations, 10 CFR 50.92, which state that the operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety. CEI has reviewed the proposed change with respect to these three factors.

The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated because the low pressure setpoint will not be allowed to be set below the present technical specification value, and in fact may be set at a more conservative position.

The proposed change does not create the possibility of a new or different kind of accident than previously evaluated because the requested action is limited to the revision of the allowable alarm setpoint range and because the alarm setpoint may be set in a more conservative direction. This setpoint provides only an alarm and does not result in any system or component automatic actuations.

The proposed change does not involve a significant reduction in a margin of safety because allowing a more conservative alarm setpoint actually increases the margin of safety.

Therefore, CEI has concluded that this proposed amendment involves no significant hazards considerations.

Environmental Impact

The Cleveland Electric Illuminating Company has reviewed the proposed Technical Specification change against the criteria of 10 CFR 51.22 for environmental considerations. As shown above, the proposed change does not involve a significant hazards consideration, nor increase the types and amounts of effluents that may be released offsite, nor significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, CEI concludes that the proposed Technical Specification change meets the criteria given in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement.