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BUTLER,W.R. Project Directorate I-2

SUBJECT: Forwards proposed Amends 142 & 96 to Licenses NPF-14 & NPF-22,respectively,changing TS Surveillance Requirement 4.1.4.1 to demonstrate rod worth minimizer operability.

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Director of Nuclear Reactor Regulation
Attention: Dr. W.R. Butler, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

**SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENT NO. 142 TO LICENSE NO. NPF-14 AND PROPOSED AMENDMENT NO. 96 TO LICENSE NO. NPF-22:
CHANGES TO THE SSES UNITS 1 & 2 TECHNICAL SPECIFICATIONS TO DEMONSTRATE ROD WORTH MINIMIZER (RWM) OPERABILITY**

Docket Nos. 50-387 and 50-388

PLA-3507 FILES A17-2, R41-2

Dear Dr. Butler:

The purpose of this letter is to propose changes to the Susquehanna SES Units 1 and 2 Technical Specifications.

BACKGROUND

Technical Specification Surveillance Requirement 4.1.4.1 states in part, the following: *"The RWM shall be demonstrated OPERABLE: a. ... in OPERATIONAL CONDITION 1 prior to RWM automatic initiation when reducing THERMAL POWER by verifying proper indication of the selection error of at least one out-of-sequence control rod."*

Based upon the RWM design, surveillance testing cannot be performed prior to RWM automatic initiation. Therefore, ACTION 3.1.4.1a is entered each time this test must be performed.

DESCRIPTION OF CHANGE

PP&L is proposing to revise Specification 4.1.4.1 such that while in OPERATIONAL CONDITION 1 when reducing THERMAL POWER the selection error for an out-of-sequence control rod is demonstrated within one hour after reaching the low power setpoint (LPSP).

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Other changes are editorial in nature to provide a clear format and to clarify that "RWM automatic initiation" is defined to be that point in time when the LPSP is reached. The Technical Specification Bases are accordingly revised. See attached marked-up pages.

SAFETY ANALYSIS

Control rod sequences are established and implemented to limit the consequences of a Control Rod Drop Accident (CRDA). This is accomplished by insuring control rod worths are limited, under all operating conditions, to values such that in the event of a CRDA the calculated peak fuel enthalpy is not greater than the design limit of 280 cal/gm.

SSES characteristics are such that above 20% of rated power the worst case CRDA will not result in a peak fuel enthalpy greater than 280 cal/gm. The cycle transient analyses contained in the Unit 1 Cycle 6 and Unit 2 Cycle 5 Reload Summary Reports have shown that the energy deposited by ANF 9x9 fuel during a postulated CRDA is well below the 280 cal/gm limit. Therefore, above 20% of Rated Thermal Power, no operating restrictions are required to meet the requirements of a CRDA. Below 20% of rated power, restrictions must be placed on reactor configuration to limit rod worths and, therefore, the consequences of a CRDA. This is accomplished by defining control rod sequences for which the CRDA criteria are met. Control rod sequences are enforced, during reactor startup and shutdown, through specific plant operating procedures and are backed up through hardware and software utilizing some combination of RWM, Rod Sequence Control System (RSCS), and Reactor Manual Control System (RMCS).

The RSCS is a hardwired system which limits the worth of any control rod which could be dropped by regulating rod patterns and sequences. The RSCS is operable (i.e., its logic automatically energizes) when thermal power is reduced to the LPSP (20% Rated Thermal Power). The system annunciates an alarm on reduction of power at a point approximately 5% above the LPSP (25% Rated Thermal Power). This allows time for operator action to check for correct rod alignment to avoid a rod block when power is reduced to the LPSP.

The RWM is a software monitoring system, programmed in the plant process computer, which permits only the same rod patterns and sequences as prescribed for the RSCS. The system is bypassed and its block function disabled only by specific administrative procedural controls initiated by the operator.

With the reactor below the LPSP, a "select error" occurs whenever the operator selects a control rod other than one contained in the currently latched group or a rod currently positioned so as to cause a withdrawal or insert error. The process computer develops a "select error" signal when the RWM program determines any of the aforementioned conditions exist. This signal is sent to an operating panel and illuminates a "SELECT ERROR" light.

The RWM and RSCS are designed to function as compatible independent redundant systems to backup operator procedural controls to limit rod worths during reactor startup and low power operation, thereby preventing significant fuel damage in the event of a CRDA. These systems will not in themselves establish high rod worth patterns in the event of failure of either system. Both systems logic automatically energizes when the LPSP is reached.

The sequence of events given in the CRDA analyses as described in the FSAR includes the assumption that the RWM is not functioning. This event is terminated, without operator actions, by the Average Power Range Monitor (APRM) 120% power signal which scrams the reactor. If the RWM were inoperable, prior to reaching and below the LPSP, the Reactor Protection System (RPS) APRM scrams in addition to the RSCS are available to mitigate the consequences of a CRDA thus ensuring peak fuel enthalpy will remain under 280 cal/gm.

CONCLUSION

Other utilities were contacted during the course of research for this proposed change. Information was requested as applied to their individual plant system specifics and technical specification requirements. In the majority of cases, the proposed changes are in agreement with the current technical specification requirements of these plants. None of the surveillance procedures for these plants required use of temporary modifications to system circuitry, ie. jumpers, which could increase the risk of a plant transient.

Surveillance testing prior to entry into the condition where the LPSP is reached would require temporary modifications to system circuits which could increase the risk of a plant transient. PP&L has not, and does not intend to pursue this action for this reason.

Current plant operating procedures requires demonstration of RWM operability once THERMAL POWER is reduced below the LPSP per GO-100/200-004, "Plant Shutdown to Minimum Power". There is no reason to believe the RWM system will not be confirmed operable once conditions are reached where the surveillance testing can be performed. In any case, the required LIMITING CONDITION FOR OPERATION ACTION is to have a second licensed operator or other

technically qualified member of the unit technical staff present at the reactor control console. This, in effect, is a requirement to have a "human" RWM.

The proposed change does not physically modify the RWM system design nor its function as described in the FSAR. It precludes the need to jumper circuits which could pose challenges to plant systems and the possibility of inadvertent scrams.

The proposed change does not impact any accident analyses as described in the FSAR. If the RWM failed or were inoperable, the RPS and RSCS are available to mitigate the consequences of a CRDA.

Rod insert/withdrawal sequences are determined by Reactor Engineering to minimize rod worths and reactivity insertion rates. They are accomplished through performance of administrative procedures. The RWM enforces those procedural requirements. The proposed change does not modify the method or requirements of those procedures.

The RWM system function is not required for safe shutdown of the plant as described in the FSAR. It need not function during a Loss of Offsite Power event. The RSCS is redundant to the RWM and is fully operable once the LPSP is reached. Demonstrating RWM operability within one hour after, versus prior to, system initiation will not adversely affect the safe operation of SSES nor contribute to an event not analyzed in the FSAR.

NO SIGNIFICANT HAZARDS CONSIDERATIONS

I. This proposal does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   Surveillance testing prior to reaching the LPSP is not desirable because it would require temporary modifications to system circuitry which could increase the risk of a plant transient. The sequence of events given in the CRDA analyses as described in the FSAR includes the assumption that the RWM is not functioning. This event is terminated, without operator actions, by the Average Power Range Monitor (APRM) 120% power signal which scrams the reactor. If the RWM were inoperable, prior to reaching or below the LPSP, the Reactor Protection System (RPS) APRM scrams in addition to the RSCS are available to mitigate the consequences of a CRDA thus ensuring peak fuel enthalpy will remain under 280 cal/gm.

II. This proposal does not create the possibility of a new or different type of accident from any accident previously evaluated.

Neither the design, function, nor operation of the RWM system is proposed to be modified. Demonstrating the selection error of an out-of-sequence control rod within one hour after reaching the LPSP cannot create the possibility of a new or different event.

III. This change does not involve a significant reduction in a margin of safety.

There is no reason to believe the RWM system will not be confirmed operable once conditions are reached where the surveillance testing can be performed. Sufficient backup exists such that demonstrating operability within one hour after the LPSP is reached will not cause a margin of safety to be reduced.

ENVIRONMENTAL CONSEQUENCES

No change to the design basis of Susquehanna is being proposed by this change. Therefore, no environmental consequences that have not been considered previously are anticipated.

IMPLEMENTATION

PP&L requests that the proposed changes be approved in time to support shutdown for the Unit 2 4th refueling and inspection outage, which is currently scheduled to begin on March 9, 1991. This will be the next planned occurrence of this surveillance test.

Any questions on this request should be directed to Mr. R.R. Sgarro at (215) 774-7916.

Very truly yours,

H. W. Keiser

Attachment

cc: NRC Document Control Desk (original)
NRC Region I
Mr. M. C. Thadani, NRC Project Manager
Mr. G. S. Barber, NRC Sr. Resident Inspector
Mr. T. M. Gerusky, PA DER