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SUBJECT: Requests emergency change to unit 2 TS re inoperable ex-core neutron flux monitor.

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SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENT NO. 136 TO LICENSE NO. NPF-22 :
EMERGENCY REQUEST RELATED TO INOPERABLE
EX-CORE NEUTRON FLUX MONITOR
PLA-4263 FILES A17-2/R41-2 Docket No. 50-388

Reference: *Letter, PLA-4262, R.G. Byram to U.S. Nuclear Regulatory Commission, 'Request for Enforcement Discretion: Inoperable Ex-core Neutron Flux Monitor," dated February 6, 1995.*

Dear Sir:

The purpose of this letter is to request an emergency change to the Susquehanna SES Unit 2 Technical Specifications as a follow-up to the February 6, 1995, request for enforcement discretion (Ref). The NRC granted this enforcement discretion on February 6, 1995 contingent upon the submittal of this Technical Specification change.

BACKGROUND

At 2130 hours on January 30, 1995 the Ex-core Neutron Flux Channel 'B,' log power range indicator was found to be reading upscale by the Unit 2 Plant Control Operator (PCO). The 'B' channel was declared inoperable and the appropriate limiting condition of operation (LCO) action statement was entered. The 'A' channel remains operable.

PROPOSED TECHNICAL SPECIFICATION CHANGE

As shown on the attached markup, an emergency change is being proposed to amend the Technical Specification 3.3.7.5 to allow continued operation with one (1) neutron flux monitor channel inoperable and should the remaining channel become inoperable to allow continued operation for 7 days to restore the inoperable channel(s). The duration of the temporary change is by the proposed

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footnote which allows the 'B' Ex-core Neutron Flux Monitor to be inoperable until the first unit shutdown which allows for containment entry of sufficient duration to properly evaluate and correct the impaired condition, not to exceed the seventh refueling and inspection outage. These proposed changes are consistent with the enforcement discretion requested on February 6, 1995.

Attachment 1 shows the proposed Technical Specification changes.

SAFETY ANALYSIS

Technical Specifications 3.3.7.5 Action 80a states, "With the number of OPERABLE accident monitoring instrumentation channels less than the Required Number of Channels shown in Table 3.3.7.5.-1, restore the inoperable channel(s) to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours. The OPERABILITY of the accident monitoring instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess important variables following an accident. To provide this accident neutron flux monitoring capability, Susquehanna Steam Electric Station (SSES) Units 1 and 2 have an ex-core neutron monitoring system. The ex-core neutron monitoring system is comprised of two separate and redundant channels, each with four detectors mounted in the containment on the outside of the biological shield.

The ex-core system provides indication and alarm functions only. It provides log and low power countrate information to the Safety Parameter Display System (SPDS) and the plant computer. Indication of log and low power countrate and period is provided in the Control Room. The system also provides countrate information at the Shutdown Margin monitor. The ex-core system receives its power supply from instrument AC, which is backed by the diesel generators. The Ex-core system however, is not relied upon in the SSES Emergency Operating Procedures

Although the ex-core system was installed at SSES to meet the neutron flux monitoring requirements of Regulatory Guide 1.97, the post-accident neutron flux monitoring functions can be accomplished by the SRMs, IRMs, LPRMs, and APRMs, which are referred to as the NMS. The SRMs and APRMs provide the necessary information to the SPDS, while SRMs, APRMs, and the IRMs provide information to the plant computer. The SRMs and IRMs are supplied power from the 24VDC batteries, the APRMs are supplied from the RPS bus and are diesel generator backed. The Boiling Water Reactor Owners' Group (BWROG) Report, NEDO-31558 provides a review of the available neutron monitoring instrumentation and provides alternate requirements to those stated in Regulatory Guide 1.97.

To support the BWROG NEDO report, the NRC has issued a Safety Evaluation Report (SER) which analyzed event scenarios to determine the consequences of neutron flux monitoring unavailability and concludes that the failure of this instrumentation will not prevent the operator from determining appropriate reactor power levels. Alternate parameter status will be available

from which reactor power may be inferred. Some alternate indications may require more than one input to determine reactor power. However, based on the multiple inputs available to the operator, sufficient information will be available upon which to base operational decisions and to conclude that reactivity control has been accomplished. Further, NEDO-31558 contains criteria regarding the range, power supplies, and qualifications for NMS instrumentation that provide sufficient confidence that the NMS instrumentation will be available to confirm reactor shutdown for a wide range of events including an Anticipated Transient Without Scram (ATWS). Consistent with PP&L's understanding, the BWROG also stated that for BWR design bases events, recriticality is not a significant contributor to core melt risk for BWR accident scenarios that go beyond the design basis.

Based on a preliminary review of the NEDO report and NRC issued SER, PP&L has concluded that the results apply to SSES. Further work will be needed to confirm that all technical issues can be addressed which would conclude that the Ex-core Monitors are not needed for Susquehanna and can be removed from the Technical Specifications.

Review of the Improved Technical Specifications (ITS), NUREG 1433, for these Post Accident Monitoring (PAM) Instrumentation reveals that " the allowed outage time (AOT) for one channel of inoperable PAM instrumentation is extended to 30 days and the AOT for two channels of inoperable PAM instrumentation is extended to 7 days. Furthermore, for all instances of one channel of a Function inoperable, at the expiration of the 30 day allowance only a Special Report is required versus a plant shutdown. Due to the passive function of these instrumentation and the operator's ability to respond to an accident utilizing alternate instruments and methods for monitoring, it is not appropriate to impose stringent out of service times."

CONCLUSION

As stated in the NRC SER, the staff concludes that the post-accident neutron flux monitoring instrumentation at existing BWRs should meet the criteria in NEDO-31558 and the SSES exceeds such criteria. As approved by the enforcement discretion, Unit 2 will retain one channel of the ex-core monitor operable, will have available sufficient alternate accident monitoring functions and emergency operating procedures in place to assure protection of public health and safety. We conclude that neither an unreviewed safety question nor a significant hazards consideration is in the non-compliance. Based on the BWROG submittals, the Director of NRR has determined that Category 1 neutron flux monitoring instrumentation is not needed for existing BWRs to cope with a Loss-of-Coolant Accident (LOCA), ATWS, or other accidents that do not result in severe core damage conditions. Instrumentation to monitor the progression of core melt accidents is best addressed by the severe accident management program. Therefore, for existing BWRs, neutron flux monitoring instrumentation does not need to meet the Category 1 criteria of Reg. Guide 1.97. PP&L supports this position.

COMPENSATORY ACTIONS

The primary compensations for loss of Ex-core Monitors are the primary and alternate means of available reactivity indication. However, three additional compensatory actions will be implemented:

1. Inventory and ensure on-site availability of parts that could potentially be required for corrective maintenance on the A channel.
2. Change as necessary alarm response and surveillance procedures for the ex-core monitoring system.
3. Conduct Operator Training ('Hot Box') on the current situation (inoperable B channel), and re-emphasis the availability of the alternate means of reactivity indication.

NO SIGNIFICANT HAZARDS CONSIDERATIONS

The proposed change does not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated.

The ex-core system at SSES was installed for the purposes of providing accident neutron flux monitoring capabilities in accordance with Regulatory Guide 1.97. The ex-core system provides indication and alarm functions only. It provides log and low power countrate information to SPDS and the plant computer. Indication of log and low power countrate and period is provided at Control Room panel 2C652-42B. The system also provides countrate information at the Shutdown Margin monitor on panels 2C690 A and B.

Although the ex-core system was installed at SSES to meet the requirements of Regulatory Guide 1.97, the accident monitoring functions can be accomplished by the NMS instrumentation (SRMs, IRMs, LPRMs, and APRMs). NEDO-31558 provides an review of the available neutron monitoring instrumentation from an Emergency Procedure Guidance (EPG) standpoint and provide alternate requirements to those stated in Regulatory Guide 1.97.

The NEDO report examined the consequences of post-accident failures of the existing NMS. The report evaluated a range of events where the operator might be required to use the NMS for post-accident monitoring, and determined the effect of a NMS failure. This review was based on the generic BWROG EPGs. The events selected provided a spectrum of impacts, but the study concluded that they bound the importance of NMS for all events within the scope of the regulatory Guide 1.97 criteria.

The conclusion reached by the NEDO-31558 was that for these analyzed events, the long term post-accident function to monitor neutron flux is not needed after reactor shutdown has been confirmed. Although the environment of the NMS equipment will undergo severe environmental conditions, the automatic plant responses make the NMS indication of low importance to plant operators.

The analysis showed that for these events operator actions are not affected by the loss of the NMS if the RPIS remains operable. In addition to this, the initial environment in which the equipment is located is not expected to be harsh. Therefore, failure of the NMS or the RPIS is not expected to occur prior to shutdown confirmation.

The NMS at SSES meets the intent of the design requirements given in NEDO-31558 (both generic and plant specific). Therefore, the results of the analysis apply to SSES. Based on this the neutron flux monitoring capabilities are maintained by the use of the NMS. Furthermore, these capabilities are maintained even with a failure of the NMS as discussed in NEDO-31558.

At SSES Emergency Operating Procedures (EOP) were reviewed to assure that there is no plant specific role for neutron flux monitoring that differs from the evaluation in NEDO-31558. Our conclusion from this review is that the ex-core system is not in the SSES EOPs and that adequate procedural guidance exist to determine core power or the future response of core power.

2. ***Create the possibility of a new or different type of accident from any accident previously evaluated.***

The ex-core system at SSES was installed for the purposes of providing accident neutron flux monitoring capabilities in accordance with Regulatory Guide 1.97. The system provides indication and alarm functions only. As stated above, the NMS instrumentation will provide indications to ensure that post accident monitoring of neutron flux is available to the operators. This alternate indications will also allow the operators to confirm that reactivity control functions have been accomplished.

The analysis documented in NEDO-31558 also concluded that even with a total failure of all NMS plant safety would not be compromised, since core power could be determined from other plant variables. Therefore, a failure of this system will not cause the operators to take unanalyzed actions, nor will it cause the operator to commit errors of commission or omission, and as such will not create the possibility of a new or different type of accident.

3. *Involve a significant reduction in the margin of safety.*

Operating without the ex-core system does not reduce the margin of safety. The operators can determine neutron flux from the NMS instrumentation (SRMs, IRMs, and APRMs). In the unlikely event that all of the NMS instrumentation were to fail, core power could be determined from other plant parameters, such as steam flow, reactor pressure and pressure trend, and number of open SRVs. Thus, this change of Applicability has been demonstrated to have no safety significance and will not result in a decrease to the margin of safety.

BASIS FOR EMERGENCY REQUEST

10CFR50.91 provides guidance on what information the NRC requires in support of an application for an emergency change.

First, it requires the applicant to justify that an emergency exists, i.e., "...failure to act in a timely manner would result in ... prevention of either resumption of operation or of increase in power output...". As evidenced by the reference, Susquehanna SES Unit 2 would avoid an undesirable plant shutdown as a result of forcing compliance with a license condition and thus minimize potential safety consequences and operational risks that are inappropriate for the plant condition.

Secondly, 10CFR50.91 require the licensee to "... explain why this emergency situation occurred and why it could not avoid this situation...". The Ex-core Neutron Flux Channel 'B,' log power range indicator was found to be reading upscale at 2130 hours on January 30, 1995. An extensive effort was immediately initiated to address this event. These efforts, including Original Equipment Manufacturer (OEM) troubleshooting guidance, have resulted in the testing and replacement of many related electronic components and assemblies outside the Unit 2 primary containment.

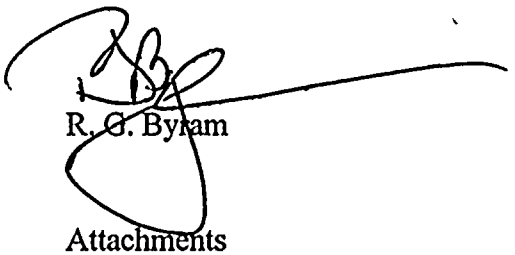
However, this testing and component replacement has not resulted in the correction of this inoperable condition, but has provided credible evidence that the root cause of this inoperable condition may be a faulty detector or a cable/connection problem inside primary containment. Based on the time necessary to evaluate this problem, interact on enforcement discretion, and to prepare and review this proposal internally, we believe that this application has been submitted in a timely fashion.

EVALUATION OF ENVIRONMENTAL CONSEQUENCES

This request is consistent with the Susquehanna design basis, in that adequate controls exist to ensure accurate core power level indication during all Operational Conditions. Therefore, no environmental consequences that have not been previously considered are anticipated.

Questions regarding this information should be directed to Mr. J. M. Kenny at (610) 774-7904

Very truly yours,



R. G. Byram

Attachments

cc: NRC Region I
Ms. M. Banerjee, NRC Sr. Resident Inspector - SSES
Mr. C. Poslusny, Jr., Sr. Project Manager - OWFN