Public Service
Electric and Gas
Company

Louis F. Storz

Senior Vice President - Nuclear Operations

Public Service Electric and Gas Company P.O. Box 236, Hancocks Bridge, NJ 08038 609-339-5700

MAY 17 1999
LR-N990137
LCR H99-01

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

REQUEST FOR CHANGE TO TECHNICAL SPECIFICATIONS
OSCILLATION POWER RANGE MONITOR (OPRM)
HOPE CREEK GENERATING STATION
FACILITY OPERATING LICENSE NPF-57
DOCKET NO. 50-354

In accordance with 10CFR50.90, Public Service Electric & Gas (PSE&G) Company hereby requests a revision to the Technical Specifications (TS) for the Hope Creek Generating Station (HC). In accordance with 10CFR50.91(b)(1), a copy of this submittal has been sent to the State of New Jersey.

The proposed changes revise the Technical Specifications to include the Oscillation Power Range Monitor (OPRM) system. Similar submittals have been made by Pennsylvania Power and Light for Susquahanna (November 3, 1998) and the Tennessee Valley Authority for Browns Ferry Unit 2 (September 8, 1998). The OPRM which was installed at Hope Creek during the seventh refueling outage is being operated in the "indicate only" mode to evaluate the system's performance. PSE&G plans to fully enable the OPRM trip function during Hope Creek's ninth refueling outage (RF09) which is currently scheduled to begin on April 22, 2000. Hence in preparation for this action, we are providing proposed TS for the operation of the OPRM system. Hope Creek will continue to operate with the interim corrective actions (ICAs) described in our response to Generic Letter 94-02 until the OPRM trip function is enabled and revised Technical Specifications are implemented. With the activation of the OPRM, PSE&G considers that commitments in response to Generic Letter 94-02 are fulfilled for Hope Creek.

The proposed changes have been evaluated in accordance with 10CFR50.91(a)(1), using the criteria in 10CFR50.92(c), and a determination has been made that this request involves no significant hazards considerations. The basis for the requested

A001

MAY 17 1999

change is provided in Attachment 1 to this letter. A 10CFR50.92 evaluation, with a determination of no significant hazards consideration, and a statement of environmental considerations is provided in Attachment 2. The marked up and new Technical Specification pages affected by the proposed changes are provided in Attachment 3. Attachment 4 describes the degree to which the Hope Creek design and implementation conforms to the applicable NRC accepted generic topical reports and associated NRC safety evaluation reports.

Upon NRC approval of this proposed change, PSE&G requests that the amendment be made effective immediately and be implemented prior to exceeding 25% rated thermal power during return to power from the ninth refueling outage (RF09). Based on the current date for RF09 and in order to provide sufficient time for associated administrative activities we would like to receive the amendment by March 31, 2000.

Should you have any questions regarding this request, please contact Mr. Phil Duca at 609-339-2381.

Sincerely,

Louis F. Storz

MAY 17 1999

Affidavit
Attachments (4)

C Mr. H. Miller, Administrator - Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. R. Ennis
Licensing Project Manager - Hope Creek
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 8B1
11555 Rockville Pike
Rockville, MD 20852

Mr. S. Pindale (X24)
USNRC Senior Resident Inspector - HC

Mr. K. Tosch, Manager IV
Bureau of Nuclear Engineering
P. O. Box 415
Trenton, NJ 08625

REF: LR-N990137
LCR H99-01

STATE OF NEW JERSEY)
) SS.
COUNTY OF SALEM)

L. F. Storz, being duly sworn according to law deposes and says:

I am Senior Vice President - Nuclear Operations of Public Service Electric and Gas Company, and as such, I find the matters set forth in the above referenced letter, concerning Hope Creek Generating Station are true to the best of my knowledge, information and belief.

Louis F. Storz

Subscribed and Sworn to before me
this 17th day of May, 1999

Kimberly J. Brown
Notary Public of New Jersey

My Commission expires on June 16th, 2003

HOPE CREEK GENERATING STATION
FACILITY OPERATING LICENSE NPF-57
DOCKET NO. 50-354
REVISIONS TO THE TECHNICAL SPECIFICATIONS (TS)

BASIS FOR REQUESTED CHANGE

Public Service Electric and Gas Company (PSE&G), under Facility Operating License No. NPF-57 for the Hope Creek Generating Station, requests that the Technical Specifications (TS) contained in Appendix A to the Operating License be amended as proposed herein: to add TS 3.3.10, Oscillation Power Range Monitor Instrumentation; to revise TS 3.4.1, Recirculation System to remove requirements restricting operation consistent with the application of the OPRM Option III as the long term solution to the thermal-hydraulic (T-H) instability issue; and to revise TS 6.9.1.9, Core Operating Limits Report (COLR) to include the analytical methods used to determine OPRM operating limits. TS 3.3.10 delineates the Oscillation Power Range Monitor (OPRM) system Limiting Conditions for Operation, Applicability, Actions and Surveillance Requirements.

REQUESTED CHANGE, PURPOSE AND BACKGROUND:

Hope Creek is operating under the interim corrective actions (ICAs) described in PSE&G's response to NRC Generic Letter 94-02. The ICAs include restrictions on plant operation and procedural requirements for operator action in response to instability events. The ICAs supplement existing Technical Specifications requirements applicable when operating with one or more recirculation loops, for monitoring and mitigating the magnitude of APRM and LPRM noise levels within one defined region of the power to flow map and to quickly exit a second defined region.

The requirements of the ICAs and existing Technical Specifications limit the probability of an instability event by restricting the duration of any entry into the regions of the power to flow map most susceptible to instability under anticipated entry conditions. Actions are also required by the ICAs when conditions consistent with the onset of T-H oscillations are observed. These actions result in the suppression of conditions required for an instability event and thereby prevent any potential challenge to the minimum critical power ratio (MCPR) safety limit.

The proposed change alleviates the reliance upon the operator by implementing the Oscillating Power Range Monitor (OPRM) system. The OPRM does not require operator action or involvement to suppress conditions which have the potential to develop into anticipated T-H instability events. The OPRM ensures automatic protection of the MCPR safety limit.

Consistent with the implementation of the OPRM, TS 3.4.1 (which sets limiting conditions for operation for recirculation loops) and TS 6.9.1.9 (which identifies the analytical methods for determination of limits reported in the COLR) are revised by the proposed change. The revisions to TS 3.4.1 delete Figure 3.4.1.1-1 and eliminate requirements for monitoring local neutron flux noise and limiting the duration of entry into regions of the power to flow map associated with the detection, suppression or prevention of thermal hydraulic instability. The revisions to TS 6.9.1.9 require the documentation of operating limits for 3/4.3.10 in the COLR. The revision also identifies the applicable NRC reviewed and approved analytical methods. These revisions of TS 3.4.1 and 6.9.1.9 are consistent with the application of the OPRM as an Option III long term solution to the T-H instability issue.

JUSTIFICATION OF REQUESTED CHANGES:

The OPRM is designed to initiate a reactor scram via existing reactor protection system (RPS) trip logic upon detection of conditions consistent with the onset of local oscillations in core power and the approach to conditions required for sustained oscillations and a thermal-hydraulic instability event. This capability will assure protection of the MCPR safety limit under all anticipated core-wide and regional T-H instability events.

The design and effectiveness of the OPRM system in meeting the regulatory requirement to detect and suppress conditions necessary to initiate T-H instability is documented in the following NRC accepted topical reports:

NEDO-32645-A, August 1996	BWROG Reactor Core Stability Detect and Suppress Solutions Licensing Basis Methodology and Reload Applications
NEDO-31960-A, November 1995	BWROG Long-Term Stability Solutions Licensing Methodology
NEDO-31960-A, Supplement 1, November 1995	BWROG Long-Term Stability Solutions Licensing Methodology
CENPD-400-P-A, Rev. 1, May 1995	Generic Topical Report for the ABB Option III Oscillation Power Range Monitor (OPRM)

The OPRM system is comprised of four OPRM channels that provide inputs to an associated RPS channel via eight OPRM modules. The OPRM modules are installed in available locations in the associated LPRM pages in the power range neutron monitoring system (PRNMS) panels. Each OPRM channel takes amplified LPRM

signals from one APRM group and either another APRM group or one unassigned LPRM group. The LPRM signals are grouped together such that the resulting OPRM response provides adequate coverage of anticipated oscillation modes. Each OPRM channel consists of two OPRM modules and contains more than 30 OPRM cells, where a cell represents a combination of four LPRMs in adjacent areas of the core. The use of instantaneous flux and smaller grouping of LPRMs in cells provides better resolution for the detection of local oscillations than the APRM system alone. With many cells, each consisting of multiple LPRMs in close proximity, the sensitivity of the OPRM is not adversely impacted by single LPRM failures.

The design and implementation of the OPRM does not cause any degradation in the existing APRM, LPRM and RPS systems. The OPRM system conforms to the existing 1 out of 2 taken twice trip input to the Reactor Protection System. The OPRM System does not adversely impact the design basis and operation of the interfacing equipment (i.e., the APRM, RPS, Recirculation Flow Unit and LPRM Systems). Isolator accuracy, response time and performance requirements are included in the design. The OPRM module locations have been assigned consistent with RPS and Neutron Monitoring system separation requirements. Additional considerations to maintain redundancy diversity, separation, and electrical isolation requirements are as follows:

The APRM power signal in 6 out of 8 cases is derived from within the page; thus, no separation/isolation requirements apply. For the two signals required for the LPRM A and B pages, the signal is derived from APRM E and F consistent with existing APRM subsystem logic. In these cases, analog isolators are provided at the signal originating page to maintain the integrity of the RPS / OPRM interface. Cable separation is provided as required by the use of Siltemp fire wrap. The flow signal is derived with the respective APRM and LPRM page. As in APRM power, the flow signal to LPRM A and B pages is derived from APRM E and F providing the same logic and separation.

Each OPRM module applies the three separate algorithms for detecting local oscillations described in NEDO-31960-A and NEDO-31960-A, Supplement 1: the period based algorithm (PBA), the amplitude based algorithm (ABA) and the growth rate algorithm (GRA). Each OPRM module executes the algorithms on the LPRM signals and cell configurations for that channel and generates alarms and trips based on the results. Either module in a channel can trip the OPRM channel. The OPRM trips actuate the RPS when the appropriate RPS trip logic is satisfied. The OPRM trip function is enabled when APRM power is greater than or equal to 30% of rated thermal power (RTP) and the recirculation drive flow is less than or equal to the value corresponding to approximately 60% of rated core flow.

The OPRM provides annunciation to alert the operator when the system is enabled and also provides a pre-trip alarm upon detection of the imminent onset of local core power

oscillations. The alarm is available to alert the operator to the plant condition in time for compensatory actions to be taken for those conditions for which instability may be anticipated.

The RPS trip provided by the PBA is actuated when oscillation as detected by one or more OPRM cells in each OPRM channel meet certain criteria for period and amplitude. The PBA is the only algorithm that is credited in the analysis of the capability of the OPRM to protect the MCPR safety limit. The remaining algorithms (ABA and GRA) provide defense-in-depth and additional protection for T-H instability events initiated from unanticipated conditions.

Upon implementation of the OPRM and its associated RPS trip function, operation in regions of the power/flow map potentially susceptible to T-H instability is acceptable since the OPRM system provides reliable detection and suppression of conditions necessary for the initiation of T-H instability events. Therefore, Technical Specifications requirements which currently limit operation in specified regions of the power to flow map are deleted.

The OPRM assures maintenance of the margin of safety associated with the MCPR safety limit for instability events initiated from anticipated conditions without relying on operator action. This capability was demonstrated by Hope Creek specific analyses based on the methodology described in NEDO-32465-A and for future operating cycles will be verified as part of the cycle-specific core reload analysis.

The OPRM provides improved protection by automating the detection and suppression function.

Conclusion

The OPRM assures maintenance of the margin of safety associated with the MCPR safety limit for instability events initiated from anticipated conditions without relying on operator action. The system is designed and installed in a manner that does not degrade existing APRM, LPRM and RPS systems. With the elimination of the ICA's, operator burden is reduced.

HOPE CREEK GENERATING STATION
FACILITY OPERATING LICENSE NPF-57
DOCKET NO. 50-354
REVISIONS TO THE TECHNICAL SPECIFICATIONS (TS)

10CFR50.92 EVALUATION AND ENVIRONMENTAL ANALYSIS

Public Service Electric & Gas (PSE&G) has concluded that the proposed changes to the Hope Creek Generating Station (HC) Technical Specifications do not involve a significant hazards consideration. In support of this determination, an evaluation of each of the three standards set forth in 10CFR50.92 is provided below.

REQUESTED CHANGE

The proposed change: adds TS 3.3.10, Oscillation Power Range Monitor Instrumentation; revises TS 3.4.1, Recirculation System to eliminate restrictions upon operating in those regions of the power to flow map most susceptible to thermal hydraulic (T-H) instability; and revises TS 6.9.1.9, Core Operating Limits Report (COLR) to include the analytical methods used to determine the OPRM amplitude setpoint operating limits specified in the COLR.

BASIS

1. *The proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.*

The proposed change specifies limiting conditions for operations, required actions and surveillance requirements of the OPRM system and allows operation in regions of the power to flow map currently restricted by the requirements of Interim Corrective Actions (ICAs) and certain limiting conditions of operation of Technical Specifications (TS) 3.4.1. The OPRM system can automatically detect and suppress conditions necessary for thermal-hydraulic (T-H) instability. A T-H instability event has the potential to challenge the Minimum Critical Power (MCPR) safety limit. The restrictions of the ICAs and TS 3.4.1 were imposed to ensure adequate capability to detect and suppress conditions consistent with the onset of T-H oscillations that may develop into a T-H instability event. With the installation of the OPRM System, these restrictions are no longer required.

The probability of a T-H instability event is most significantly impacted by power to flow conditions such that only during operation inside specific regions of the power to flow map, in combination with power shape and inlet enthalpy conditions, can the occurrence of an instability event be postulated to occur.

Operation in these regions may increase the probability that operation with conditions necessary for a T-H instability can occur.

However, when the OPRM is operable with operating limits as specified in the COLR, the OPRM can automatically detect the imminent onset of local power oscillations and generate a trip signal. Actuation of an RPS trip will suppress conditions necessary for T-H instability and decrease the probability of a T-H instability event. In the event the trip capability of the OPRM is not maintained, the proposed change includes actions which limit the period of time before the effected OPRM channel (or RPS system) must be placed in the trip condition. If these actions would result in a trip function, an alternate method to detect and suppress thermal hydraulic oscillations is required. In either case the duration of this period of time is limited such that the increase in the probability of a T-H instability event is not significant. Therefore the proposed change does not result in a significant increase in the probability of an accident previously evaluated.

An unmitigated T-H instability event is postulated to cause a violation of the MCPR safety limit. The proposed change ensures mitigation of T-H instability events prior to challenging the MCPR safety limit if initiated from anticipated conditions by detection of the onset of oscillations and actuation of an RPS trip signal. The OPRM also provides the capability of an RPS trip being generated for T-H instability events initiated from unanticipated but postulated conditions. These mitigating capabilities of the OPRM system would become available as a result of the proposed change and have the potential to reduce the consequences of anticipated and postulated T-H instability events. Therefore, the proposed change does not significantly increase the consequences of an accident previously evaluated.

2. *The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.*

The proposed change specifies limiting conditions for operations, required actions and surveillance requirements of the OPRM system and allows operation in regions of the power to flow map currently restricted by the requirements of ICAs and TS 3.4.1. The OPRM system uses input signals shared with APRM and rod block functions to monitor core conditions and generate an RPS trip when required. Quality requirements for software design, testing, implementation and module self-testing of the OPRM system provide assurance that no new equipment malfunctions due to software errors are created. The design of the OPRM system also ensures that neither operation nor malfunction of the OPRM system will adversely impact the operation of other systems and no accident or equipment malfunction of these other

systems could cause the OPRM system to malfunction or cause a different kind of accident. Therefore, operation with the OPRM system does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Operation in regions currently restricted by the requirements of ICAs and TS 3.4.1 is within the nominal operating domain and ranges of plant systems and components for which postulated equipment and accidents have been evaluated. Therefore operation within these regions does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed change which specifies limiting conditions for operations, required actions and surveillance requirements of the OPRM system and allows operation in certain regions of the power to flow does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. *The proposed change does not involve a significant reduction in a margin of safety.*

The proposed change specifies limiting conditions for operations, required actions and surveillance requirements of the OPRM system and allows operation in regions of the power to flow map currently restricted by the requirements of ICAs and TS 3.4.1.

The OPRM system monitors small groups of LPRM signals for indication of local variations of core power consistent with T-H oscillations and generates an RPS trip when conditions consistent with the onset of oscillations are detected. An unmitigated T-H instability event has the potential to result in a challenge to the MCPR safety limit. The OPRM system provides the capability to automatically detect and suppress conditions which might result in a T-H instability event and thereby maintains the margin of safety by providing automatic protection for the MCPR safety limit while significantly reducing the burden on the control room operators. In the event the trip capability of the OPRM is not maintained, the proposed change includes actions which limit the period of time before the effected OPRM channel (or RPS system) must be placed in the trip condition. If these actions would result in a trip function, an alternate method to detect and suppress thermal hydraulic oscillations is required. Since, in either case, the duration of this period of time is limited so that the increase in the probability of a T-H instability event is not significant. Operation with the OPRM system does not involve a significant reduction in a margin of safety.

Operation in regions currently restricted by the requirements of ICAs and TS 3.4.1 is within the nominal operating domain assumed for identifying the range

of initial conditions considered in the analysis of anticipated operational occurrences and postulated accidents. Therefore, operation in these regions does not involve a significant reduction in the margin of safety.

The proposed change, which specifies limiting conditions for operations, required actions and surveillance requirements of the OPRM system and allows operation in certain regions of the power to flow map, does not involve a significant reduction in a margin of safety.

CONCLUSION

Based on the above, PSE&G has determined that the proposed changes do not involve a significant hazards consideration.

ENVIRONMENTAL CONSIDERATION

This proposed revision to the Technical Specifications changes a requirement with respect to a facility component located within the restricted area as defined in 10 CFR Part 20. It has been determined that the proposed changes involve no significant hazards consideration. The proposed changes do not involve a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite; and there is no significant increase in individual or cumulative occupational radiation exposure. Since the proposed changes conform to the criteria for licensing actions eligible for categorical exclusion specified in 10 CFR 51.22(c)(9), no environmental assessment or environmental impact statement is required.