UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 51 TO FACILITY OPERATING LICENSE NO. NPF-69

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION, UNIT 2

DOCKET NO. 50-410

1.0 INTRODUCTION

By letter dated May 21, 1993 (Reference 1), Niagara Mohawk Power Corporation (the licensee) submitted a request for changes to the Nine Mile Point Nuclear Station, Unit 2 (NMP2), Technical Specifications (TS). The requested changes would (1) revise the slope of the line on the power-to-flow map representing the average power range monitor (APRM) flow-biased simulated thermal power scram setpoint, and (2) relocate references to the APRM rod block instrumentation and setpoints from the TS to the updated safety analysis report (USAR).

The APRM scram setpoint modifications are requested to remove power to flow restrictions imposed at low flows where the APRM flow-biased scram limit encroaches on the extended load line limit (ELLLA) region. Analyses supporting operation in the ELLLA region appear in Appendix 15G of the NMP2 USAR, as well as in Appendix A of the USAR, "Reload Analysis," which presents cycle specific analyses.

2.0 EVALUATION

2.1 APRM Flow-Biased Simulated Thermal Power Upscale Scram Setpoint

The APRM simulated thermal power (STP) scram function furnishes protection against exceeding thermal limits during slow transients. In those transients considered 'fast,' neutron flux leads thermal flux due to the fuel time constant, so setting a relatively high fixed neutron flux trip is acceptable since the fuel will not heat up sufficiently to challenge thermal margins. This APRM fixed neutron flux trip would need to be lowered to respond adequately to slow transients. In these slow cases, the neutron and thermal fluxes are matched, so allowing the neutron flux to rise to the fixed flux level could lead to thermal limit violations.

To provide protection for the slow transients, the APRM signal is modified using a time delay which simulates the fuel time constant. The STP signal is compared with a flow-biased reference that decreases approximately parallel to the flow control lines of the power-to-flow map.

The current APRM STP trip setpoint uses an equation [0.66(W-ΔW) + 51%], with a maximum value of 113.5%. The high value, or clamp, is set below the APRM fixed neutron flux trip. The proposed change uses a new equation to establish the STP setpoint, [0.58(W-ΔW) + 59%], but maintains the maximum clamped value of 113.5%.

The Bases for NMP2 TS 3/4.2.2 state that the APRM flow biased STP upscale scram setpoint is adjusted to ensure that the minimum critical power ratio (MCPR) does not decrease to less than the fuel cladding integrity safety limit or that greater than or equal to 1% plastic strain does not occur during degraded plant conditions. Transient analyses discussed in NMP2 USAR Appendix A, "Reload Analysis" use a fixed value of 117% as the APRM STP trip setpoint, demonstrating that the fuel safety requirements are maintained even with the new setpoint. An example is the loss of feedwater heating event (manual flow control case) which depends on the APRM STP scram for protection. The change of critical power ratio listed in Table A.15.0-1 of the USAR remains at 0.11. This and the other analyses remain conservative with the new setpoint, since the actual APRM STP trip would occur at a lower power setpoint than used in the analyses.

The Bases for NMP2 TS 2.2.1 explains that the APRM setpoints were selected to provide adequate margin for the safety limits while allowing operating margin from unnecessary shutdowns. Further, the difference between the setpoint and allowable value accounts for instrument accuracy and calibration capability. The proposed change serves part of the stated objective, avoiding unnecessary shutdowns, by furnishing greater margin between the operating envelope and the setpoint at lower flows. The margin between the allowable value and trip point is maintained with this change. Thus, the only real alteration is to the margin provided between the setpoint and the analysis point of 117%. Examination of the difference in the available margin shows that safety margins are not unduly reduced. At 40% flow, the setpoint change (from 77.4% power to 82.2%) results in a reduction of approximately 5% to the available margin. This maintains a nearly 35% power margin between the analysis and actual setpoints. At higher flows the margin is smaller, but the change is smaller as well. At no value of flow is the difference between the actual setpoint and the analysis value ever less than the original difference of 3.5% at the clamped value.

The ELLLA analyses contained in NMP2 USAR, Appendix 15G considered the impact of limiting oscillations based upon published General Electric guidance as well as institution of requirements set forth in NRC Bulletin 88-07 (Reference 2). The setpoint change does not alter these measures.

Thus, the proposed setpoint modification adequately accounts for the required margin of safety as shown by analyses and satisfies the considerations set forth in the TS Bases. The change to the APRM STP flow biased scram setpoint is acceptable.

2.2 APRM Flow-Biased Neutron Flux Upscale Rod Block Instrumentation System

The basis for the APRM flow-biased neutron flux upscale rod block setpoints are discussed along with the scram setpoint in the Bases for NMP2 TS 2.2.1 in terms of protecting against violation of the safety limit. However, safety analyses for NMP2 take no credit for the operation of the APRM rod block instrumentation. Although in certain situations the rod block would prevent the need for a protective action, it is not necessary to ensure that safety limits are not violated. For instance, the rod block monitor (RBM), not the APRM rod block, provides a safety function for a control rod withdrawal error. The APRM rod block acts only as a backup function.

Removal of references to the APRM rod block instrumentation is consistent with the criteria detailed in the Commission's Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors (Reference 3), which states that design or operation constraints should satisfy four criteria in order to be located in the TS: (1) Installed instrumentation that is used to detect, and indicate in the control room a significant abnormal degradation of the reactor coolant pressure boundary. (2) A process variable, design feature or operating restriction that is the initial condition of a design basis accident or transient analysis that either assumes failure of or presents a challenge to the integrity of a fission product barrier. (3) A structure, system or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. (4) A structure, system or component which operating experience or probabalistic safety assessment has shown to be significant to public health and safety.

The application provided justification for the conclusion that the APRM rod block instrumentation for NMP2 did not meet the first three criteria. The analyses of the USAR show that the last criterion is not met since the safety analyses do not rely on the system, therefore, it is not needed to meet safety margins and furnish protection.

Thus, the relocation of the APRM rod block instrumentation to the USAR will permit design changes in accordance with 10 CFR 50.59 and the safety functions will be adequately controlled by the regulatory requirements that apply to the design control process. Further, the change is consistent with the Commission's Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors.

3.0 TECHNICAL SPECIFICATIONS

The following changes to the NMP2 TS are proposed in the application:

a. TS Table 2.2.1-1, "Reactor Protection System Instrumentation Setpoints," is revised to include the new flow biased simulated thermal power upscale setpoint equation.

b. TS 3/4.2.2, "Average Power Range Monitor Setpoints," and associated Bases are revised to remove references to the APRM flow-biased neutron flux upscale control rod block trip setpoint.

c. TS Tables 3.3.6-1, 3.3.6-2 and 4.3.6-1 of TS 3/4.3.6, "Control Rod Block Instrumentation" are modified, removing parameters associated with the APRM flow-biased neutron flux upscale control rod block setpoints. An editorial change is included for TS Table 3.3.6-2.

d. TS 6.9.1.9, "Core Operating Limits Report" references to the APRM flow-biased neutron flux upscale control rod block trip are deleted.

As discussed in the previous section, these changes are considered acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New York State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The amendment also relates to changes in recordkeeping, reporting, or administrative procedures or requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (58 FR 34080). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and (10). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

1. Letter (NMP2L 1388) from B. Ralph Sylvia (NMPC) to USNRC dated May 21, 1993 transmitting an Application for Amendment to Nine Mile Point Unit 2 Operating License.

2. NRC Bulletin 88-07, Supplement 1, "Power Oscillations in Boiling Water Reactors (BWRs)," December 30, 1988.

3. USNRC, Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors, 58 FR 39132, July 22, 1993.

Principal Contributor:
J. Donoghue

Date: November 9, 1993

A copy of the related Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

Original signed by:

John E. Menning, Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 51 to NPF-69
2. Safety Evaluation

cc w/enclosures:
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