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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 87 TO FACILITY OPERATING LICENSE NO. DPR-63

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-220

1.0 INTRODUCTION

By application dated May 27, 1986, Niagara Mohawk Power Corporation (the licensee) requested an amendment to Appendix A of Facility Operating License No. DPR-63 for the Nine Mile Point Nuclear Station, Unit No. 1. The amendment would modify the Technical Specifications (TS) Section 6.12, High Radiation Area, Table 3.6.2a, Instrumentation That Initiates Scram, Table 3.6.2b, Instrumentation That Initiates Primary Coolant System or Containment Isolation, Table 3.6.2h, Vacuum Pump Isolation, and the notes to these three tables to allow Niagara Mohawk to demonstrate the feasibility of a Hydrogen Water Chemistry System as a mitigator of intergranular stress corrosion cracking of stainless steel piping at Nine Mile Point Unit 1.

2.0 EVALUATION

Niagara Mohawk is investigating the implementation of Hydrogen Water Chemistry as a possible mitigator of intergranular stress corrosion cracking in reactor recirculation system piping. To demonstrate the feasibility of a permanent Hydrogen Water Chemistry System for Nine Mile Point Unit 1, a pre-implementation test will be conducted. The test is to be performed by Niagara Mohawk and General Electric and is similar in scope to hydrogen injection tests previously performed at other nuclear power plants. Experience gained from these programs will be incorporated into the Nine Mile Point Unit 1 test plan.

The pre-implementation test involves injecting hydrogen into the feedwater system from zero to approximately 45 standard cubic feet per minute in predefined increments of 2-4 standard cubic feet per minute. A stoichiometric amount of oxygen will be added upstream of the recombiner to aid in proper off-gas recombination. During this stage, various chemical and operating parameters (e.g., H_2,O_2, electrochemical potential) will be monitored to define the intergranular stress corrosion cracking immune regime for Nine Mile Point Unit 1.

During normal operation of a BWR, N-16 is formed from an O-16 (N,P) reaction. Normally most of the N-16 combines rapidly with oxygen to form water-soluble, non-volatile nitrates and nitrites. However, because of the lower oxidizing potential present in a hydrogen water chemistry environment, N-16 reacts with excess hydrogen forming ammonia, making the N-16 more volatile. As a consequence, the steam N-16 activity can increase up to a factor of five. The resultant increase in the background radiation level necessitates a temporary change to the main steam line high radiation scram and isolation setpoints.

The changes made to the Technical Specifications are the inclusion of a note to the main steam line high radiation scram and isolation setpoints (Tables 3.6.2a, 3.6.2b) and vacuum pump isolation (Table 3.6.2h). This change will allow the setpoints initially to be changed based on a calculated value of the radiation level expected during the test. Once the test has begun, these setpoints may be changed based on either revised calculations or measurements of actual radiation levels resulting from hydrogen injection.

The test will be performed with the reactor power at greater than 20% rated power. The initial setpoint changes may be made within 24 hours prior to the planned start of the hydrogen injection test. The setpoints shall be re-established to five times normal rated power background within 24 hours following completion of the test or within 12 hours of establishing reactor power levels below 20% rated power, while these

functions are required to be operable. Additionally, hydrogen injection shall be terminated and the injection system secured if reactor power is less than 20% rated power.

The only accident which takes credit for this setpoint is the control rod drop accident. This accident is most severe at hot standby with the main steam lines wide open as opposed to power operation because:

(1) reactivity worths of the control rods are greater at hot standby than at power, and
(2) fission products released as a result of the excursion are transported to the main condenser, then to the high flow mechanical vacuum pump system and eventually offsite, instead of the offgas system.

A bounding analysis (FSAR Revision 3, Chapter XV, Section C.4, Control Rod Drop Accident) has been performed to establish limits for incremental control rod worths to ensure that the peak fuel enthalpy does not exceed 280 cal gm (a limiting value) if the maximum worth control rod were to drop out. The analysis has shown that limits on control rod worths are necessary for power levels less than 20 percent of design rated. Above 20 percent of rated design power inherent feedback mechanisms, primarily in the form of steam voids, limit the control rod worth to such an extent that the control rod drop accident need not be considered. Because the main steam line radiation monitor setpoint will be increased only for hydrogen injection at power levels of 20% or higher, the FSAR analysis and the design function of the MSLRM trip will remain valid. Therefore, this proposed Technical Specification change will not reduce plant safety margins.

The bases for 3.6.2 and 4.6.2, Protective Instrumentation, indicates that in addition to the control rod drop accident, the radioactivity at the main steam line radiation monitor, due to the gross failure of one rod with complete fission product release from the rod, would exceed the normal background at the monitor. This function of the main steam line radiation

monitor can also be provided by the condenser air ejector radioactivity monitor and the stack monitor, which must meet the operability requirements of Specification 3.6.14. These monitors can detect lower levels of radioactivity than the main steam line radiation monitor.

In addition to the above, a note is being added to Specification 6.12 to indicate that certain areas may temporarily exceed 1000 mrem/hr during the hydrogen water chemistry test without having access controlled by locked doors under the administrative control of the Station Shift Supervisor. These areas do not have to be continually manned to safely shut the plant down. However, these areas will be identified by the licensee, roped off and conspicuously posted. Pursuant to 10 CFR 20.203(c)(5), the licensee has requested approval for a method not included in paragraph 20.203(c)(2) and (4) to control access to a high radiation area. This method discussed above is by identifying, roping off, and posting the area and performing the tests during the back shifts with fewer workers in the plant. We conclude that this alternate method of control is acceptable to prevent unauthorized entry and that the requirement of 20.203(c)(3), in that no person is prevented from leaving a high radiation area, is met.

Finally, an ALARA review will be performed prior to beginning the injection test. The hydrogen water chemistry tests will be conducted at night to minimize potential exposure to plant personnel. Extensive in-plant and site radiation surveys will be conducted at regular intervals during the test to monitor the actual doses as-low-as reasonably achievable. In addition, the capability to monitor for fuel failures, which is the purpose of the Main Steam Line Radiation trip setpoint, will be maintained by: 1) the continued operability of the main steam radiation monitors which provide signals to the reactor protection and primary containment isolation systems; 2) routine radiation surveys; 3) the performance of primary coolant water analysis; and 4) the continued operability of the condenser air ejector radioactivity monitor and stack monitor. Due to these continued monitoring capabilities, and based on the discussion above, the staff finds the proposed amendment request to be acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

The staff 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, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security nor to the health and safety of the public.

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Dated: July 10, 1986