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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 99 TO FACILITY OPERATING LICENSE NO. DPR-63

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-220

INTRODUCTION

By letter dated April 5, 1988, as supplemented by letter dated April 8, 1988, the licensee proposed changes to the Nine Mile Point Nuclear Station, Unit 1, (NMP-1) Technical Specifications. Specifically, these changes are (1) the addition of new Sections 3.7.1 and 4.7.1, "Special Test Exception-Shutdown Margin Demonstrations," and the associated Bases; (2) a revision to Technical Specification 1.1.a, "Shutdown Condition-Cold," to allow the reactor mode switch to be placed in the startup position to perform the shutdown margin demonstration; (3) a revision to Technical Specification 1.1.b, "Shutdown Condition-Hot," to allow the reactor mode switch to be placed in the refuel position to perform reactor coolant system pressure testing, control rod scram time testing, and scram recovery operations; and (4) the addition of Sections 3.7.1 and 4.7.1 to the Table of Contents.

These changes permit reactor coolant system pressure testing (system leakage and hydrostatic testing) and control rod scram time testing to be performed with the mode switch in the refuel position and the reactor coolant temperature greater than 212°F. These changes also allow the mode switch to be placed in the refuel position to facilitate scram recovery operations.

The Nine Mile Point Unit 1 Technical Specification Surveillance Requirement 4.1.1c requires all operable control rods to be scram time tested after each major refueling outage and prior to power operation. It also requires this testing to be performed with the reactor pressure above 800 psig. The control rod drive scram time testing is not permitted to be performed with the mode switch in the startup position as this would be considered entering the power operation condition. The reactor coolant system pressure testing is the only condition other than power operation during which the required pressure of over 800 psig can be attained. Therefore, the past practice has been to conduct scram time testing of control rods in conjunction with reactor coolant system pressure testing (system leakage and hydrostatic testing) in the shutdown condition-cold with the reactor mode switch in the refuel position. The current Technical Specifications permit the reactor mode switch to be placed in the refuel position when the plant is in the shutdown condition-cold. The refuel position is the only reactor mode switch position that allows a control rod to be withdrawn except for startup or run positions, which are power operating conditions.

In Amendment No. 95 to the License issued on March 15, 1988, Figure 3.2.2.c of the Technical Specifications was revised to reflect thirteen effective full power years of operation. Figure 3.2.2.c defines the minimum temperature for pressurization during hydrostatic testing. This revised curve raised the minimum allowable temperature for pressurization during system pressure testing to 222°F at a pressure of 1050 psig.

In the past, in order to perform control rod scram time testing in the shutdown condition-cold with reactor pressure above 800 psig, the reactor coolant system was pressurized to conduct the reactor coolant system pressure test. After completing the reactor coolant system test, pressure was reduced to 850 psig (margin of 50 psig to ensure sufficient pressure is maintained). The 850 psig pressure would presently correspond to a temperature of about 192°F for the revised Figure 3.2.2.c.

During the performance of the control rod scram time test the reactor coolant temperature may continue to gradually increase as heat is added to the system from pressurizing the reactor coolant system, decay heat in the fuel and the operation of the recirculation pumps. Since the reactor coolant system is pressurized and isolated, there are no systems available to cool the reactor coolant system while in the system pressure test condition. Only ambient heat losses will tend to cool the reactor coolant system. Therefore, the reactor coolant temperature may continue to gradually increase during the control rod scram time test. Therefore, the reactor coolant temperature may exceed 212°F before completion of the control rod scram time testing. The licensee has stated that past experience has shown that it takes approximately 4 hours to scram time test the 129 control rods.

Based on the above, if the control rod scram time test is performed in conjunction with the reactor coolant system pressure test at temperature as required by the revised Figure 3.2.2.c, the reactor coolant temperature may exceed the 212°F limit for the shutdown condition-cold because of the heat being added to the system and the inability to control the temperature through cooling systems during the pressure test. The licensee, consequently, has requested the Technical Specifications be revised to allow the control rod drive scram testing to be performed in the shutdown condition-hot with the mode switch in the refuel position.

The new Sections 3.7.1 and 4.7.1, and the associated Bases will define the shutdown margin testing to be performed before the control rod scram time testing to ensure the reactor cannot be made critical by the withdrawal of only one control rod.

The change to allow the mode switch to be placed in the refuel position during scram recovery is not related to the other changes. Following a scram the temperature of the reactor coolant is likely to exceed 212°F. The definition of the refueling condition in the Technical Specifications limits operation in this condition to less than 212°F. Placing the mode switch in the refuel position following a scram will permit individual rod motion. This capability will allow the operators to fully insert any control rods that have not settled to the full-in position ('00') after a scram.

The change to add Sections 3.7.1 and 4.7.1 to the Table of Contents is administrative.

EVALUATION

The proposed technical specification change adds an exception to Definition 1.1a to allow the reactor mode switch to be placed in the startup position when in the shutdown condition-cold to perform the shutdown margin demonstration test. In addition, an exception is being added to Definition 1.1b to allow the mode switch to be placed in the refuel position to conduct system pressure and control rod scram time testing and to enhance scram recovery operations. In conjunction with this change, a new Special Test Exception, 3.7.1 and 4.7.1, is being added to specify the requirements and surveillances for placing the reactor mode switch in the startup position when in the shutdown condition-cold to perform the shutdown margin demonstration test. The Table of Contents is also being revised to add the new section.

The change to allow the reactor mode switch to be placed in the startup position when in the shutdown condition-cold and the addition of Sections 3.7.1 and 4.7.1 will allow the shutdown margin demonstration tests to be performed before the system pressure and control rod scram time tests. The shutdown margin demonstration will be performed by the adjacent rod method. In addition, control rod drive exercising and timing of each control rod (normal control drive insertion and withdrawal adjustments) will be conducted before the system pressure and control rod scram time tests. The performance of these tests will ensure the reactor cannot be made critical by the withdrawal of a single rod.

When the reactor mode switch is in the refuel position, an electrical interlock prevents more than one control rod from being withdrawn. During the reactor coolant system pressure testing all rods are fully inserted. During the control rod scram time testing one rod at a time will be withdrawn. The performance of the shutdown margin testing, before the reactor coolant system pressure testing and the control rod scram time testing, in conjuction with the interlocks that prevent removal of more than one control rod, will ensure the reactor cannot be made critical.

All systems that would normally be required to be operable when the reactor is in the shutdown condition-hot will be operable during scram time testing and reactor pressure testing except for the automatic depressurization system (ADS), the high pressure coolant injection system (HPCI) and the emergency cooling (EC) systems. The core spray and containment spray systems will be available and are designed to mitigate the consequences of a loss-of-coolant-accident (LOCA) should it occur during the reactor coolant systems pressure testing or the control rod scram time testing. Technical Specifications 3.1.5.a and 3.1.8.a only require the ADS and the HPCI (respectively) to be operable when the reactor coolant pressure is greater than 110 psig and the reactor coolant temperature is greater than saturation temperature. During the reactor pressure testing and the scram time testing the temperature will be less than the saturation temperature (reactor coolant system will be subcooled), therefore the ADS and HPCI are not needed and are not required to be operable.

In Amendment No. 82 to the License for Nine Mile Point, Unit 1, dated May 12, 1986, Technical Specifications Section 3.1.3 was revised to eliminate the requirement for the EC system to be operable during hydrostatic testing (system coolant system pressure testing) with the reactor not critical. The change was requested because during reactor coolant system pressure testing

the EC system steam supply piping and the emergency condenser tube bundles are filled with water. This change was allowed on the basis that during the reactor coolant system pressure testing the rods are fully inserted and the reactor is maintained in a shutdown condition. Therefore, during this testing, the EC System function as a backup to the main condenser following reactor vessel isolation and scram, would not be needed.

The control rod scram time testing will be performed in conjunction with the reactor coolant system pressure testing. During the control rod scram time testing only one control rod is removed at a time. As discussed above, the reactor cannot be made critical during this testing with the reactor mode switch in the refuel position. The major heat load additions during this testing will be from pressurizing the reactor coolant system, decay heat in the fuel, and the operation of the recirculation pumps. As the core will have been freshly loaded, a portion of the core will contain fresh fuel thereby reducing some of the decay heat. The heat loads listed are small as compared with normal operating heat loads. As the additional heat load associated with the removal of one rod is insignificant and the total heat load is small, the conclusion that the EC system is not required to be operable during reactor coolant system pressure testing is still valid during the control rod scram time testing.

During the reactor coolant pressure testing the reactor vessel head will be in place and there will be no refueling activities. Therefore there is no possibility of a refueling accident.

The system pressure (hydrostatic) testing curve for minimum temperature for pressurization can be utilized during scram time testing as the testing does not cause additional thermal stresses on the vessel. Minor pressure changes, as a result of individual control rod scram time testing, have no effect on fracture toughness considerations. The licensee has stated that the actual experience at Nine Mile Point Unit 1 has been that pressure changes of 5-10 psi occur during an individual rod scram.

The change to allow the reactor mode switch to be placed in the refuel position when in the Shutdown Condition-Hot will also facilitate scram recovery procedure. During a scram at Nine Mile Point Unit 1, the control rods are automatically inserted to the full-in position where they should stay. However, some rods may rebound to position 02 or 04 after a scram and must be reinserted manually to the full-in position. At Nine Mile Point Unit 1, placing the mode switch in the shutdown position prevents all manual rod motion. Control rods can neither be inserted nor withdrawn. Consequently, placing the mode switch in the refuel position will enable the operator to insert those rods that did not settle to the full-in position. However, since the reactor coolant system temperature would normally be greater than 212°F immediately following a scram, this condition is not currently defined in the Technical Specifications. This change, therefore, will facilitate scram recovery.

The addition of Sections 3.7.1 and 4.7.1 to the Table of Contents of the Technical Specifications are administrative and do not affect plant operations.

On the basis of the evaluation discussed above, the staff finds the revisions to the Technical Specifications as proposed in the licensee's letters of April 5, 1988 and April 8, 1988 are acceptable for Nine Mile Point Unit 1.

ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of the facility components located within the restricted areas as defined in 10 CFR Part 20. The staff has determined that this 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 Sec 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

CONCLUSION

We have 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 these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Dated: June 9, 1988

PRINCIPAL CONTRIBUTOR:

M. Haughey