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

NIAGARA MOHAWK POWER CORPORATION

DOCKET NO. 50-410

NINE MILE POINT NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 12
License No. NPF-69

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Niagara Mohawk Power Corporation (the licensee) dated January 13, 1989, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-69 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, as revised through Amendment No. 12 are hereby incorporated into this license. Niagara Mohawk Power Corporation shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert A. Capra

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Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 30, 1989

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 12 TO FACILITY OPERATING LICENSE NO. NPF-69

DOCKET NO. 50-410

Revise Appendix A as follows:

Remove Pages	Insert Pages
3/4 4-1	3/4 4-1
3/4 4-2	3/4 4-2
3/4 4-3	3/4 4-3
3/4 4-6	3/4 4-6
3/4 4-7	3/4 4-7
3/4 4-8	3/4 4-8
3/4 4-9	3/4 4-9
B3/4 4-1	B3/4 4-1
B3/4 4-2	B3/4 4-2

3/4.4 REACTOR COOLANT SYSTEM

3/4.4.1 RECIRCULATION SYSTEM

RECIRCULATION LOOPS

LIMITING CONDITIONS FOR OPERATION

3.4.1.1 Two reactor coolant system recirculation loops shall be in operation with:

a. Total core flow greater than or equal to 45% of rated core flow, or
b. THERMAL POWER within the unrestricted zone of Figure 3.4.1.1-1.

APPLICABILITY: OPERATIONAL CONDITIONS 1* and 2*.

ACTION:

a. With one reactor coolant system recirculation loop not in operation:

   1. Within four hours:

      a) Place the recirculation flow control system in the Loop Manual (Position Control) mode, and

      b) Reduce THERMAL POWER to $\leq$ 70% of RATED THERMAL POWER, and,

      c) Increase the MINIMUM CRITICAL POWER RATIO (MCPR) Safety Limit by 0.01 to 1.07 per Specification 2.1.2, and,

      d) Reduce the Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limit to a value of 0.81 times the two recirculation loop operation limit per Specification 3.2.1, and,

      e) Reduce the Average Power Range Monitor (APRM) Scram and Rod Block and Rod Block Monitor Trip Setpoints and Allowable Values to those applicable for single recirculation loop operation per Specifications 2.2.1, 3.2.2 and 3.3.6.

      f) Reduce the volumetric drive flow rate of the operating recirculation loop to $\leq$ 41,800** gpm.

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* See Special Test Exception 3.10.4.

** This value represents the volumetric recirculation loop drive flow which produces 100% core flow at 100% THERMAL POWER.

LIMITING CONDITIONS FOR OPERATION (Continued)

g) Perform Surveillance Requirement 4.4.1.1.2 if THERMAL POWER is ≤ 30%* of RATED THERMAL POWER or the jet pump loop flow in the operating loop is ≤ 50%* of rated jet pump loop flow.

2. The provisions of Specification 3.0.4 are not applicable.

3. Otherwise be in at least HOT SHUTDOWN within the next 12 hours.

b. With no reactor coolant system recirculation loops in operation, immediately initiate action to reduce THERMAL POWER such that it is not within the restricted zone of Figure 3.4.1.1-1 within two hours, and initiate measures to place the unit in at least STARTUP within six hours and in HOT SHUTDOWN within the next six hours.

c. With one or two reactor coolant system recirculation loops in operation and total core flow less than 45% but greater than 39%** of rated core flow and THERMAL POWER within the restricted zone of Figure 3.4.1.1-1:

1. Determine the APRM and LPRM*** noise levels per Specification 4.4.1.1.1:

a) At least once per eight hours, and

b) Within 30 minutes after the completion of a THERMAL POWER increase of at least 5% of RATED THERMAL POWER.

2. With the APRM or LPRM*** neutron flux noise levels greater than three times their established baseline noise levels, within 15 minutes initiate corrective action to restore the noise levels within the required limits within two hours by increasing core flow or by reducing THERMAL POWER.

d. With one or two reactor coolant system recirculation loops in operation and total core flow ≤ 39%** and THERMAL POWER within the restricted zone of Figure 3.4.1.1-1, within 15 minutes initiate corrective action to reduce THERMAL POWER to within the unrestricted zone of Figure 3.4.1.1-1 or increase core flow to > 39%** within 4 hours.

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* Final values were determined during Startup Testing based upon the actual THERMAL POWER and jet pump loop flow which will sweep the cold water from the vessel bottom head preventing stratification.

** Core flow which is equivalent to minimum core flow for 2 recirculation pumps at high speed with minimum flow control valve position.

*** Detector levels A and C of one LPRM string per core octant plus detectors A and C of one LPRM string in the center of the core should be monitored.

SURVEILLANCE REQUIREMENTS

4.4.1.1.1 With one reactor coolant system recirculation loop not in operation, at least once per 12 hours verify that:

a. Reactor THERMAL POWER is $\leq$ 70% of RATED THERMAL POWER,

b. The recirculation flow control system is in the Loop Manual (Position Control) mode,

c. The volumetric drive flow rate of the operating loop is $\leq$ 41,800 gpm,* and

d. Core flow is > 39%** when THERMAL POWER is within the restricted zone of Figure 3.4.1.1-1.

4.4.1.1.2 With one reactor coolant system recirculation loop not in operation, within no more than 15 minutes prior to either THERMAL POWER increase or jet pump loop flow increase, verify that the following differential temperature requirements are met if THERMAL POWER is $\leq$ 30%*** of RATED THERMAL POWER or the recirculation jet pump loop flow in the operating recirculation loop is $\leq$ 50%*** of rated jet pump loop flow:

a. $\leq$ 145°F between reactor vessel steam space coolant and bottom head drain line coolant,

b. $\leq$ 50°F between the reactor coolant within the loop not in operation and the coolant in the reactor pressure vessel, and

c. $\leq$ 50°F between the reactor coolant within the loop not in operation and the operating loop.

The differential temperature requirements of Specification 4.4.1.1.2 b. and c. do not apply when the loop not in operation is isolated from the reactor pressure vessel.

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* This value represents the volumetric recirculation loop drive flow which produces 100% core flow at 100% THERMAL POWER.

** Core flow which is equivalent to minimum core flow for 2 recirculation pumps at high speed with minimum flow control valve position.

*** Final values were determined during Startup Testing based upon the actual THERMAL POWER and jet pump loop flow which will sweep the cold water from the vessel bottom head preventing stratification.

REACTOR COOLANT SYSTEM

RECIRCULATION SYSTEM

JET PUMPS

LIMITING CONDITIONS FOR OPERATION

3.4.1.2 All jet pumps shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

ACTION:

With one or more jet pumps inoperable, be in at least HOT SHUTDOWN within 12 hours.

SURVEILLANCE REQUIREMENTS

4.4.1.2 All jet pumps shall be demonstrated operable as follows:

a. Each of the above required jet pumps shall be demonstrated OPERABLE within 24 hours after THERMAL POWER exceeds 25% of RATED THERMAL POWER and at least once per 24 hours while greater than 25% of RATED THERMAL POWER, by determining jet pump loop flow, recirculation loop drive flow, flow control valve position, and diffuser-to-lower plenum differential pressure for each jet pump and verifying that no two of the following conditions occur when both recirculation jet pump loop indicated flows are in compliance with Specification 3.4.1.3.

   1. The indicated jet pump loop flow differs by more than 10% from the established* flow control valve position-jet pump loop flow characteristics.

   2. The indicated jet pump loop flow differs by more than 10% from the established* jet pump loop flow-recirculation loop drive flow characteristic for the loop.

   3. The indicated diffuser-to-lower plenum differential pressure of any individual jet pump differs from established* patterns by more than 20%.

b. During single recirculation loop operation, each of the jet pumps in the operating loop shall be demonstrated OPERABLE within 24 hours after THERMAL POWER exceeds 25% of RATED THERMAL POWER and at least once per 24 hours while greater than 25% of RATED THERMAL POWER, by determining jet pump loop flow, recirculation loop drive flow, flow control valve position, and diffuser-to-lower plenum differential pressure for each jet pump and verifying that no two of the following conditions occur:

   1. The indicated jet pump loop flow in the operating loop differs by more than 10% from the established* single recirculation loop control valve position-loop flow characteristics.

   2. The indicated jet pump loop flow differs by more than 10% from the established* jet pump loop flow-recirculation loop drive flow characteristic for the operating loop.

* Determined during the startup test program.

SURVEILLANCE REQUIREMENTS (Continued)

3. The indicated diffuser-to-lower plenum differential pressure of any individual jet pump differs from established* single recirculation loop patterns by more than 20%.

c. The provisions of Specification 4.0.4 are not applicable provided that this surveillance is performed within 24 hours after exceeding 25% of RATED THERMAL POWER.

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* Determined during the startup test program.

REACTOR COOLANT SYSTEM

RECIRCULATION SYSTEM

RECIRCULATION LOOP FLOW

LIMITING CONDITIONS FOR OPERATION

3.4.1.3 Jet pump loop flow mismatch shall be maintained within:

a. 5% of rated core flow with effective core flow* greater than or equal to 70% of rated core flow.

b. 10% of rated core flow with effective core flow* less than 70% of rated core flow.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2 during two recirculation loop operation.**

ACTION:

With the jet pump loop flows different by more than the specified limits, either:

a. Restore the jet pump loop flows to within the specified limit within 2 hours, or

b. Shut down one of the recirculation loops and take the ACTION required by Specification 3.4.1.1.

SURVEILLANCE REQUIREMENTS

4.4.1.3 Jet pump loop flow mismatch shall be verified to be within the limits at least once per 24 hours.

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* Effective core flow shall be the core flow that would result if both jet pump loop flows were assumed to be at the smaller value of the two jet pump loop flows.

** See Special Test Exception 3.10.4.

REACTOR COOLANT SYSTEM

RECIRCULATION SYSTEM

IDLE RECIRCULATION LOOP STARTUP

LIMITING CONDITIONS FOR OPERATION

3.4.1.4 An idle recirculation loop shall not be started unless the temperature differential between the reactor pressure vessel steam space coolant and the bottom head drain line coolant is less than or equal to 145°F, and:

a. When both loops have been idle, unless the temperature differential between the reactor coolant within the idle loop to be started up and the coolant in the reactor pressure vessel is less than or equal to 50°F, or

b. When only one loop has been idle, unless the temperature differential between the reactor coolant within the idle and operating recirculation loops is less than or equal to 50°F and the operating jet pump loop flow is less than or equal to 50% of rated jet pump loop flow.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3 and 4.

ACTION:

With temperature differences and/or jet pump loop flow rates exceeding the above limits, suspend startup of any idle recirculation loop.

SURVEILLANCE REQUIREMENTS

4.4.1.4 The temperature differentials and jet pump loop flow rate shall be determined to be within the limits within 15 minutes before startup of an idle recirculation loop.

3/4.4.1 RECIRCULATION SYSTEM

The impact of single recirculation loop operation upon plant safety is assessed and shows that single-loop operation is permitted if the MCPR fuel cladding safety limit is increased as noted by Specification 2.1.2, APRM scram and control rod block setpoints are adjusted as noted in Tables 2.2.1-1 and 3.3.6-2, respectively, MAPLHGR limits are decreased by the factor given in Specification 3.2.1, and MCPR operating limits are adjusted per Section 3/4.2.3.

Additionally, surveillance on the volumetric drive flow rate of the operating recirculation loop is imposed to exclude the possibility of excessive core internals vibration. Drive flow is the flow rate for the recirculation pump in the operating loop. The surveillance on differential temperatures below 30% THERMAL POWER or 50% rated jet pump loop flow is to mitigate the undue thermal stress on vessel nozzles, recirculation pump and vessel bottom head during the extended operation of the single recirculation loop mode. Jet pump loop flow is the sum of the flows through the 10 jet pumps in one loop. Core flow is the sum of the two jet pump loop flows.

The objective of GE BWR plant and fuel design is to provide stable operation with margin over the normal operating domain. However, at the high-power/low-flow corner of the operating domain, a small probability of limit cycle neutron flux oscillations exists, depending on combinations of operating conditions (e.g., rod pattern, power shape). To provide assurance that neutron flux limit cycle oscillations are detected and suppressed, APRM and LPRM neutron flux noise levels should be monitored while operating in this region.

Stability tests at operating BWRs were reviewed to determine a generic region of the power/flow map in which surveillance of neutron flux noise levels should be performed. A conservative decay ratio of 0.6 was chosen as the basis for determining the generic region for surveillance to account for the plant-to-plant variability of decay ratio with core and fuel designs. This generic region has been determined to correspond to a core flow of less than or equal to 45% of rated core flow and a THERMAL POWER greater than that specified in Figure 3.4.1.1-1.

Plant-specific calculations can be performed to determine an applicable region for monitoring neutron flux noise levels. In this case, the degree of conservatism can be reduced since plant-to-plant variability would be eliminated. In this case, adequate margin will be assured by monitoring the region which has a decay ratio greater than or equal to 0.8.

Neutron flux noise limits are also established to ensure early detection of limit cycle neutron flux oscillations. BWR cores typically operate with neutron flux noise caused by random boiling and flow noise. Typical neutron

RECIRCULATION SYSTEM

3/4.4.1 (continued)

flux noise levels between 1% and 12% of rated power (peak-to-peak) have been reported for the range of low to high recirculation loop flow during both single and dual recirculation loop operation. Neutron flux noise levels which significantly bound these values are considered in the thermal/mechanical design of GE BWR fuel and are found to be of negligible consequence. In addition, stability tests at operating BWRs have demonstrated that when stability-related neutron flux limit cycle oscillations occur, they result in peak-to-peak neutron flux limit cycles of 5 to 10 times the typical values. Therefore, actions taken to reduce neutron flux noise levels exceeding three times the typical value are sufficient to ensure early detection of limit cycle neutron flux oscillations.

Typically, neutron flux noise levels show a gradual increase in absolute magnitude as core flow is increased (constant control rod pattern) with two reactor recirculation loops in operation. Therefore, the baseline neutron flux noise level obtained at a specified core flow can be applied over a range of core flows. To maintain a reasonable variation between the low-flow and high-flow end of the flow range, the range over which a specific baseline is applied should not exceed 20% of rated core flow with two recirculation loops in operation. Data from tests and operating plants indicate that a range of 20% of rated core flow will result in approximately a 50% increase in neutron flux noise level during operation with two recirculation loops. Baseline data should be taken near the maximum rod line at which the majority of operation will occur. However, baseline data taken at lower rod lines (i.e., lower power) will result in a conservative value since the neutron flux noise level is proportional to the power level at a given core flow.

An inoperable jet pump is not, in itself, a sufficient reason to declare a recirculation loop inoperable, but it does, in case of a design-basis accident, increase the blowdown area and reduce the capability of reflooding the core; thus, the requirement for shutting down the facility when a jet pump is inoperable. Jet pump failure can be detected by monitoring jet pump performance on a prescribed schedule for significant degradation.

Jet pump loop flow mismatch limits are in compliance with the ECCS LOCA analysis design criteria for two recirculation loop operation. The limits will ensure an adequate core flow coastdown from either recirculation loop after a LOCA. In the case where the mismatch limits cannot be maintained during two loop operation, continued operation is permitted in a single recirculation loop mode.

In order to prevent undue stress on the vessel nozzles and bottom head region, the recirculation loop temperatures shall be within 50°F of each other before startup of an idle loop. The loop temperature must also be within 50°F of the reactor pressure vessel coolant teamperature to prevent thermal shock to the