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

March 3, 1995

Mr. B. Ralph Sylvia
Executive Vice President, Nuclear
Niagara Mohawk Power Corporation
Nine Mile Point Nuclear Station
P. O. Box 63
Lycoming, NY 13093

SUBJECT: ISSUANCE OF AMENDMENT FOR NINE MILE POINT NUCLEAR STATION UNIT NO. 1 (TAC NO. M89981)

Dear Mr. Sylvia:

The Commission has issued the enclosed Amendment No. 153 to Facility Operating License No. DPR-63 for the Nine Mile Point Nuclear Station Unit No. 1. The amendment consists of changes to the Technical Specifications (TSs) in response to your application transmitted by letter dated July 21, 1994, as supplemented December 5, 1994, December 14, 1994, January 11, 1995, and February 1, 1995. The December 5, 1994, December 14, 1994, and January 11, 1995, submittals provided responses to our requests for additional information dated November 3, 1994, and November 9, 1994. The February 1, 1995, submittal requested withdrawal of that portion of the proposed amendment associated with the extension of the calibration frequency of the source range neutron flux monitors (SRMs) and intermediate range neutron flux monitors (IRMs). We have granted your February 1, 1995, request for withdrawal.

The amendment revises TSs 2.1.2 (Fuel Cladding Integrity), 3.1.7 (Fuel Rods), 3.6.2/4.6.2 (Protective Instrumentation), and the associated Bases to allow the use of Range 10 on the IRMs with the Reactor Protection System low pressure trip for main steam line isolation valve closure not in bypass. The amendment also makes associated changes to TSs Setpoints, Bases, References, and Notes for TSs 2.1.2, 3.1.7, and 3.6.2/4.6.2.

Copies of the related Safety Evaluation and Notice of Partial Withdrawal are enclosed. The Notice of Issuance will be included in the Commission's next regular biweekly Federal Register notice; the Notice of Partial Withdrawal will be published separately in the Federal Register.

Sincerely,

Donald S. Brinkman

Donald S. Brinkman, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation



Docket No. 50-220

Enclosures: 1. Amendment No. 153 to DPR-63
2. Safety Evaluation
3. Notice of Partial Withdrawal

cc w/encls: See next page



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March 3, 1995

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Sincerely,

Original signed by:

Donald S. Brinkman, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-220

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1. Amendment No. 153 to DPR-63
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Niagara Mohawk Power Corporation

Nine Mile Point Nuclear Station
Unit No. 1

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DATED: March 3, 1995

AMENDMENT NO. 153 TO FACILITY OPERATING LICENSE NO. DPR-63-NINE MILE POINT UNIT 1

Docket File
PUBLIC
PDI-1 Reading
S. Varga, 14/E/4
J. Zwolinski, 14/H/3
L. Marsh
C. Vogan
D. Brinkman
OGC
D. Hagan, T-4 A43
G. Hill (2), T-5 C3
C. Grimes, 11/E/22
G. Golub
M. Rubin
F. Gee
E. Marinos
ACRS (4)
OPA
OC/LFDCB
PD plant-specific file
C. Cowgill, Region I

cc: Plant Service list

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

NIAGARA MOHAWK POWER CORPORATION

DOCKET NO. 50-220

NINE MILE POINT NUCLEAR STATION UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 153
License No. DPR-63

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

   A. The application for amendment by Niagara Mohawk Power Corporation (the licensee) dated July 21, 1994, as supplemented December 5, 1994, December 14, 1994, January 11, 1995, and February 1, 1995, 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. DPR-63 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 153, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance to be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

LB Marsh

Ledyard B. Marsh, Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 3, 1995

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 153 TO FACILITY OPERATING LICENSE NO. DPR-63

DOCKET NO. 50-220

Revise Appendix A as follows:

| Remove Pages | Insert Pages |
|---|---|
| 10 | 10 |
| 11 | 11 |
| 18 | 18 |
| 19 | 19 |
| 20 | 20 |
| 21 | 21 |
| 22 | 22 |
| -- | 70a |
| 74 | 74 |
| 199 | 199 |
| 200 | 200 |
| 202 | 202 |
| 203 | 203 |
| 206 | 206 |
| 213 | 213 |
| 227 | 227 |
| 251 | 251 |

## SAFETY LIMIT

c. The neutron flux shall not exceed its scram setting for longer than 1.5 seconds as indicated by the process computer. When the process computer is out of service, a safety limit violation shall be assumed if the neutron flux exceeds the scram setting and control rod scram does not occur.

To ensure that the Safety Limit established in Specifications 2.1.1a and 2.1.1b is not exceeded, each required scram shall be initiated by its expected scram signal. The Safety Limit shall be assumed to be exceeded when scram is accomplished by a means other than the expected scram signal.

d. Whenever the reactor is in the shutdown condition with irradiated fuel in the reactor vessel, the water level shall not be more than 6 feet, 3 inches (-10 inches indicator scale) below minimum normal water level (Elevation 302'9") except as specified in "e" below.

e. For the purpose of performing major maintenance (not to exceed 12 weeks in duration) on the reactor vessel; the reactor water level may be lowered 9' below the minimum normal water level (Elevation 302'9"). Whenever the reactor water level is to be lowered below the low-low-low level setpoint redundant instrumentation will be provided to monitor the reactor water level.

## LIMITING SAFETY SYSTEM SETTING

T = FRTP/CMFLPD (T is applied only if less than or equal to 1.0)

FRTP = Fraction of Rated Thermal Power where Rated Thermal Power equals 1850 MW

CMFLPD = Core Maximum Fraction of Limiting Power Density

With CMFLPD greater than the FRTP for a short period of time, rather than adjusting the APRM setpoints, the APRM gain may be adjusted so that APRM readings are greater than or equal to 100% times CMFLPD provided that the adjusted APRM reading does not exceed 100% of rated thermal power and a notice of adjustment is posted on the reactor control panel.

b. The IRM scram trip setting shall not exceed 12% of rated neutron flux for IRM range 9 or lower.

The IRM scram trip setting shall not exceed 38.4% of rated neutron flux for IRM range 10.

c. The reactor high pressure scram trip setting shall be ≤ 1080 psig.

d. The reactor water low level scram trip setting shall be no lower than -12 inches (53 inches indicator scale) relative to the minimum normal water level (302'9").

| SAFETY LIMIT | LIMITING SAFETY SYSTEM SETTING |
|---|---|

Written procedures will be developed and followed whenever the reactor water level is lowered below the low-low level set point (5 feet below minimum normal water level). The procedures will define the valves that will be used to lower the vessel water level. All other valves that have the potential of lowering the vessel water level will be identified by valve number in the procedures and these valves will be red tagged to preclude their operation during the major maintenance with the water level below the low-low level set point.

In addition to the Facility Staff requirements given in Specification 6.2.2.b, there shall be another control room operator present in the control room with no other duties than to monitor the reactor vessel water level.

e. The reactor water low-low level setting for core spray initiation shall be no less than -5 feet (5 inches indicator scale) relative to the minimum normal water level (Elevation 302'9").

f. The reactor low pressure setting for main-steam-line isolation valve closure shall be ≥850 psig when the reactor mode switch is in the run position or the IRMs are on range 10.

g. The main-steam-line isolation valve closure scram setting shall be ≤10 percent of valve closure (stem position) from full open.

h. The generator load rejection scram shall be initiated by the signal for turbine control valve fast closure due to a loss of oil pressure to the acceleration relay any time the turbine first stage steam pressure is above a value corresponding to 833 Mwt, i.e., 45 percent of 1850 Mwt.

i. The turbine stop valve closure scram shall be initiated at ≤10 percent of valve closure setting (Stem position) from full open whenever the turbine first stage steam pressure is above a value corresponding to 833 Mwt, i.e., 45 percent of 1850 Mwt.

However, in response to expressed beliefs[7] that variation of APRM flux scram with recirculation flow is a prudent measure to assure safe plant operation during the design confirmation phase of plant operation, the scram setting will be varied with recirculation flow.

An increase in the APRM scram trip setting would decrease the margin present before the fuel cladding integrity safety limit is reached. The APRM scram trip setting was determined by an analysis of margins required to provide a reasonable range for maneuvering during operation. Reducing this operating margin would increase the frequency of spurious scrams which have an adverse effect on reactor safety because of the resulting thermal stresses. Thus, the APRM scram trip setting was selected because it provides adequate margin for the fuel cladding integrity safety limit yet allows operating margin that reduces the possibility of unnecessary scrams.

The scram trip setting must be adjusted to ensure that the LHGR transient peak is not increased for any combination of FRTP and CMFLPD. The scram setting is adjusted in accordance with Specification 2.1.1a when the core maximum fraction of limiting power density exceeds the fraction of rated thermal power.

Reactor power level may be varied by moving control rods or by varying the recirculation flow rate. The APRM system provides a control rod block to prevent rod withdrawal beyond a given point at a constant recirculation flow rate, and thus to protect against the condition of a MCPR less than the SLCPR. This rod block trip setting, which is automatically varied with recirculation flow rate, prevents an increase in the reactor power level to excessive values due to control rod withdrawal. The flow variable trip setting provides substantial margin from fuel damage, assuming a steady-state operation at the trip setting, over the entire recirculation flow range. The margin to the safety limit increases as the flow decreases for the specified trip setting versus flow relationship; therefore, the worst case MCPR which could occur during steady-state operation is at 110% of rated thermal power because of the APRM rod block trip setting. The actual power distribution in the core is established by specified control rod sequences and is monitored continuously by the in-core LPRM system. As with the APRM scram trip setting, the APRM rod block trip setting is adjusted downward if the core maximum fraction of limiting power density exceeds the fraction of rated thermal power, thus, preserving the APRM rod block safety margin.

b. Normal operation of the automatic recirculation pump control will be in excess of 30% of rated flow; therefore, little operation below 30% flow is anticipated. For operation in the startup mode while the reactor is at low pressure (<800 psia), the IRM range 9 high flux[16, 17] scram setting is calibrated to correspond to 12% of rated neutron flux. The IRM range 9, 12% of rated neutron flux calibration is on a nominal basis, which provides adequate margin between the setpoint and the safety limit at 25% of rated power. The margin is also adequate to accommodate anticipated maneuvers associated with plant startup. There are a few possible sources of rapid reactivity input to the system in the low power flow condition. Effects of increasing pressure at zero or low void content are minor, cold water from sources available during startup is not much colder than that already in the system, temperature coefficients are small, and control rod patterns are constrained to be uniform by operating procedures backed up by the rod worth minimizer. Worth of individual rods is very low in a uniform rod pattern. Thus, of all possible sources of reactivity input, uniform control rod withdrawal is the most probable cause of significant power rise. Because the flux distribution associated with uniform rod withdrawals does not involve high local peaks, and because several rods must be removed to change power by a significant percentage of rated, the rate of power rise is very slow. Generally, the heat flux is in near equilibrium with the fission rate. In an assumed uniform rod withdrawal approach to the scram level, the rate of power rise is no more than 5% of rated per minute, and the IRM system would be more than adequate to assure a scram before the power could exceed the safety limit.

Procedural controls will assure that the IRM scram is maintained for low flow condition. This is accomplished by keeping the IRMs on range 9 until 20% flow is exceeded and reactor pressure is >850 psig and that control rods shall not be withdrawn if recirculation flow is less than 30%. If the APRMs are onscale, then the reactor mode switch may be placed in run, thereby switching scram protection from the IRM to the APRM system. If the APRMs are not onscale, then operation with the mode switch in startup (including normal startup mode steam chest warming and bypass valve operation) may continue using IRM range 10, provided that the main turbine generator is not placed in operation.

To continue operation with the mode switch in startup beyond 12% of rated neutron flux, the IRMs must be transferred into range 10. The Reactor Protection System is designed such that reactor pressure must be above 850 psig to successfully transfer the IRMs into range 10, thus assuring added protection for the fuel cladding safety limit. The RPS design will cause the low reactor pressure main-steam-line isolation to be unbypassed when one IRM in trip system 11 and one IRM in trip system 12 are placed in range 10. Procedural controls assure that IRM range 9 is maintained on all IRM channels up to 850 psig reactor pressure. The IRM scram remains active until the mode switch is placed in the RUN position at which time the scram function is transferred to APRMs.

The adequacy of the IRM scram in range 10 was determined by comparing the scram level on the IRM range 10 to the minimum APRM scram level. The IRM scram is at approximately 38.4% of rated neutron flux while the minimum flow biased APRM scram which occurs at zero recirculation flow is at 65% of rated power. Therefore, startup mode transients (i.e., those not including turbine operation) requiring a scram based on a flux excursion will be terminated sooner with an IRM Range 10 scram than with an APRM scram.

Above the RWM low power setpoint of rated power, the ability of the IRMs to terminate a rod withdrawal transient is limited due to the number and location of IRM detectors. An evaluation was performed that showed by maintaining a minimum core flow of $20.25\times10^6$ lb/hr (30% rated flow) in range 10, a complete rod withdrawal initiated below 40% of rated power would not result in violating the fuel cladding safety limit. Normal operation of the automatic recirculation pump control will be in excess of 30% rated flow; therefore, little operation below 30% flow is anticipated. Therefore, IRM upscale rod block and scram in range 10 provide adequate protection against a rod withdrawal error transient.

The IRM Limiting Safety System Setting 2.1.2.b for IRM range 9 of <12% rated neutron flux and IRM range 10 of <38.4% of rated neutron flux are nominal trip setpoints as defined by GE Setpoint Methodology as outlined in NEDC-31336. The calibration of these Limiting Safety System Setting values is completed by adjusting IRM amplifier gain such that IRM indication is correlated to rated neutron flux. With the IRM indication correlated to neutron flux, the IRM upscale on range 9 corresponds to 12% and range 10 to 38.4% of rated neutron flux, respectively.

For IRM operation in range 9 or less, in order to ensure that the IRM provided adequate protection against the single rod withdrawal error, a range of rod withdrawal accidents was analyzed. This analysis included starting the accident at various power levels. The most severe case involves an initial condition in which the reactor is just subcritical and the IRM system is not yet on scale. This condition exists at quarter rod density. Additional conservatism was taken in this analysis by assuming that the IRM channel closest to the withdrawn rod is bypassed. The results of this analysis show that the reactor is scrammed and peak power limited to 1% of rated power, thus maintaining a limit above the SLCPR. Based on the above analysis, the IRM provides protection against local control rod withdrawal errors and continuous withdrawal of control rods in sequence and provides backup protection for the APRM.

c. As demonstrated in UFSAR Section XV-A and B, the reactor high pressure scram is a backup to the neutron flux scram, turbine stop valve closure scram, generator load rejection scram, and main steam isolation valve closure scram, for various reactor isolation incidents. However, rapid isolation at lower power levels generally results in high pressure scram preceding other scrams because the transients are slower and those trips associated with the turbine generator are bypassed.

The operator will set the trip setting at 1080 psig or lower. However, the actual set point can be as much as 15.8 psi above the 1080 psig indicated set point due to the deviations discussed above.

d. A reactor water low level scram trip setting -12 inches (53 inches indicator scale) relative to the minimum normal water level (Elevation 302'9") will assure that power production will be terminated with adequate coolant remaining in the core. The analysis of the feedwater pump loss in UFSAR Section XV-B.3.13 has demonstrated that approximately 4 feet of water remains above the core following the low level scram.

The operator will set the low level trip setting no lower than -12 inches relative to the lowest normal operating level. However, the actual set point can be as much as 2.6 inches lower due to the deviations discussed above.

e. A reactor water low-low level signal -5 feet (5 inches indicator scale) relative to the minimum normal water level (Elevation 302'9") will assure that core cooling will continue even if level is dropping. Core spray cooling will adequately cool the core, as discussed in LCO 3.1.4.

The operator will set the low-low level core spray initiation point at no less than -5 feet (5 inches indicator scale) relative to the minimum normal water level (Elevation 302'9"). However, the actual set point can be as much as 2.6 inches lower due to the deviations discussed above.

f-g. The low pressure isolation of the main steam lines at 850 psig was provided to give protection against fast reactor depressurization and the resulting rapid cooldown of the vessel. Advantage was taken of the scram feature which occurs when the main steam line isolation valves are closed, to provide for reactor shutdown so that high power operation at low reactor pressure does not occur, thus providing protection for the fuel cladding integrity safety limit. Operation of the reactor at pressures lower than 850 psig requires that the reactor mode switch be in the startup position and the IRMs on range 9 or lower, where protection of the fuel cladding integrity safety limit is provided by the IRM high neutron flux scram. Thus, the combination of main steam line isolation on reactor low pressure and isolation valve closure scram assures the availability of neutron flux scram protection over the entire range of applicability of the fuel cladding integrity safety limit. In addition, the isolation valve closure scram anticipates the pressure and flux transients which occur during normal or inadvertent isolation valve closure. With the scrams set at $\leq$10% valve closure, there is no increase in neutron flux and peak pressure if the vessel dome is limited to 1141 psig. [8, 9, 10].

The operator will set the pressure trip at greater than or equal to 850 psig and the isolation valve stem position scram setting at less than or equal to 10% of valve stem position from full open. However, the actual pressure set point can be as much as 15.8 psi lower than the indicated 850 psig and the valve position set point can be as much as 2.5% of stem position greater. These allowable deviations are due to instrument error, operator setting error and drift with time.

In addition to the above mentioned Limiting Safety System Setting, the scram dump volume high level scram trip (LCO 3.6.2) serves as a secondary backup to the Limiting Safety System Setting chosen. This high level scram trip assures that scram capability will not be impaired because of insufficient scram dump volume to accommodate the water discharged from the control rod drive hydraulic system as a result of a reactor scram (Section X-C.2.10)*.

h. The generator load rejection scram is provided to anticipate the rapid increase in pressure and neutron flux resulting from fast closure of the turbine control valves due to the worst case transient of a load rejection and subsequent failure of the bypass. In fact, analysis [9,10] shows that heat flux does not increase from its initial value at all because of the fast action of the load rejection scram; thus, no significant change in MCPR occurs.

i. The turbine stop valve closure scram is provided for the same reasons as discussed in h above. With a scram setting of $\leq$10% valve closure, the resultant transients are nearly the same as for those described in i above; and, thus, adequate margin exists.

*UFSAR

(1) General Electric BWR Thermal Analysis Basis (GETAB) Data, Correlation and Design Application, NEDO-10958 and NEDE-10958.

(2) Linford, R. B., "Analytical Methods of Plant Transient Evaluations for the General Electric Boiling Water Reactor," NEDO-10801, February 1973.

(3) UFSAR Section XV-A and B.

(4) UFSAR Section XV-A and B.

(5) UFSAR Section XV-A and B.

(6) UFSAR Section XV-A and B.

(7) Letters, Peter A. Morris, Director of Reactor Licensing, USAEC, to John E. Logan, Vice-President, Jersey Central Power and Light Company, dated November 22, 1967 and January 9, 1968.

(8) UFSAR Section XV-A and B.

(9) Letter, T. J. Brosnan, Niagara Mohawk Power Corporation, to Peter A. Morris, Division of Reactor Licensing, USAEC, dated February 28, 1972.

(10) Letter, Philip D. Raymond, Niagara Mohawk Power Corporation, to A. Giambusso, USAEC, dated October 15, 1973.

(11) Nine Mile Point Nuclear Power Station Unit 1 Load Line Limit Analysis, NEDO 24012, May, 1977.

(12) Licensing Topical Report "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A, latest approved revision.

(13) Nine Mile Point Nuclear Power Station Unit 1, Extended Load Line Limit Analysis, License Amendment Submittal (Cycle 6), NEDO-24185, April 1979.

(14) General Electric SIL 299 "High Drywell Temperature Effect on Reactor Vessel Water Level Instrumentation."

(15) Letter (and attachments) from C. Thomas (NRC) to J. Charnley (GE) dated May 28, 1985, "Acceptance for Referencing of Licensing Topical Report NEDE-24011-P-B, Amendment 10."

(16) GENE-909-16-0393, "IRM/APRM Overlap Analysis for Nine Mile Point Nuclear Station Unit One," Revision 1, dated April 14, 1993.

(17) GENE-909-39-1093, "IRM/APRM Overlap Improvement for Nine Mile Point Nuclear Station Unit One," dated March 8, 1994.

| LIMITING CONDITION FOR OPERATION | SURVEILLANCE REQUIREMENT |
|---|---|
| i. Required Minimum Recirculation Flow Rate for Operation in IRM Range 10<br><br>During startup mode of operation in IRM range 10, a minimum recirculation flow rate of 30% of rated core flow is required. Control rods shall not be withdrawn if recirculation flow is less than 30% of rated. | |

Reporting Requirements

The LCOs associated with monitoring the fuel rod operating conditions are required to be met at all times, i.e., there is no allowable time in which the plant can knowingly exceed the limiting values of MAPLHGR, LHGR, MCPR, or Power/Flow Ratio. It is a requirement, as stated in Specifications 3.1.7a, b, c, and d that if at any time during power operation it is determined that the limiting values for MAPLHGR, LHGR, MCPR, or Power/Flow Ratio are exceeded, action is then initiated to restore operation to within the prescribed limits. This action is initiated as soon as normal surveillance indicates that an operating limit has been reached. Each event involving operation beyond a specified limit shall be reported as a Reportable Occurrence. If the specified corrective action described in the LCOs was taken, a thirty-day written report is acceptable.

Operations Beyond the End-of-Cycle (Coastdown)

The General Electric generic BWR analysis of coastdown operation (Reference 17) concludes that operation beyond the end-of-cycle (coastdown) is acceptable. Amendment No. 7 to GESTAR (Reference 18) concludes that the analysis conservatively bounds coastdown operation to forty (40) percent power. The margin to all safety limits analyzed increased linearly as the power decreased.

Required Minimum Recirculation Flow Rate for Operation in IRM Range 10

During power operation above the low power setpoint of 20% power and less than 40% power when in IRM range 10 with the mode switch in startup, the control rod withdrawal error analysis requires the minimum flow to be greater than 30% to ensure protection against the SLMCPR for control rod withdrawal error to the full out position. To ensure compliance with this analysis, the LCO prohibits control rod withdrawal in IRM range 10 if recirculation flow is less than 30%. This is procedurally controlled. This minimum flow restriction does not apply in the run mode.

TABLE 3.6.2a (cont'd)

INSTRUMENTATION THAT INITIATES SCRAM

Limiting Condition for Operation

| Parameter | Minimum No. of Tripped or Operable Trip Systems | Minimum No. of Operable Instrument Channels per Operable Trip System | Set Point | Reactor Mode Switch Position in Which Function Must Be Operable | | | |
|---|---|---|---|---|---|---|---|
| | | | | Shutdown | Refuel | Startup | Run |
| (6) Main-Steam-Line Isolation Valve Position | 2 | 4(h)(o) | ≤ 10 percent valve closure from full open | | (c) | (c) | x |
| (7) Deleted | | | | | | | |
| (8) Shutdown Position of Reactor Mode Switch | 2 | 1 | --- | | (k) | x | x |
| (9) Neutron Flux | | | | | | | |
| (a) IRM | | | | | | | |
| (i) Upscale | 2 | 3(d)(o) | ≤96 percent of full scale | | x | x | |

TABLE 3.6.2a (cont'd)

**INSTRUMENTATION THAT INITIATES SCRAM**

**Limiting Condition for Operation**

| Parameter | Minimum No. of Tripped or Operable Trip Systems | Minimum No. of Operable Instrument Channels per Operable Trip System | Set Point | Reactor Mode Switch Position in Which Function Must Be Operable: Shutdown | Refuel | Startup | Run |
|---|---|---|---|---|---|---|---|
| (ii) Inoperative | 2 | 3(d)(o) | --- | | x | x | |
| (b) APRM | | | | | | | |
| (i) Upscale | 2 | 3(e)(o) | Specification 2.1.2a | | x | x | x |
| (ii) Inoperative | 2 | 3(e)(o) | --- | | x | x | x |
| (10) Turbine Stop Valve Closure | 2 | 4(o) | ≤ 10% valve closure | | | | (i) |
| (11) Generator Load Rejection | 2 | 2(o) | (j) | | | | (i) |

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TABLE 4.6.2a (cont'd)

INSTRUMENTATION THAT INITIATES SCRAM

Surveillance Requirement

| Parameter | Sensor Check | Instrument Channel Test | Instrument Channel Calibration |
|---|---|---|---|
| (8) Shutdown Position of Reactor Mode Switch | None | Once during each major refueling outage | None |
| (9) Neutron Flux | | | |
| (a) IRM | | | |
| (i) Upscale | (f)(g) | (f) | (f) |
| (ii) Inoperative | (f)(g) | (f) | (f) |
| (b) APRM | | | |
| (i) Upscale | None | Once per 3 months | Once per week[(m)]<br>Once per 3 months |
| (ii) Inoperative | None | Once per 3 months | None |
| (10) Turbine Stop Valve Closure | None | Once per 3 months | Once per operating cycle |
| (11) Generator Load Rejection | None | Once per 3 months | Once per 3 months |

## NOTES FOR TABLES 3.6.2a and 4.6.2a

(a) May be bypassed when necessary for containment inerting.

(b) May be bypassed in the refuel and shutdown positions of the reactor mode switch with a keylock switch.

(c) May be bypassed in the refuel and startup positions of the reactor mode switch when reactor pressure is less than 600 psi, or for the purpose of performing reactor coolant system pressure testing and/or control rod scram time testing with the reactor mode switch in the refuel position.

(d) No more than one of the four IRM inputs to each trip system shall be bypassed.

(e) No more than two C or D level LPRM inputs to an APRM shall be bypassed and only four LPRM inputs to an APRM shall be bypassed in order for the APRM to be considered operable. No more than one of the four APRM inputs to each trip system shall be bypassed provided that the APRM in the other instrument channel in the same core quadrant is not bypassed. A Traversing In-Core Probe (TIP) chamber may be used as a substitute APRM input if the TIP is positioned in close proximity to the failed LPRM it is replacing.

(f) Calibrate prior to startup and normal shutdown and thereafter check once per shift and test once per week until no longer required.

(g) Verify SRM/IRM channels overlap during startup after the mode switch has been placed in startup. Verify IRM/APRM channels overlap at least 1/2 decade during entry into startup from run (normal shutdown) if not performed within the previous 7 days.

(h) Each of the four isolation valves has two limit switches. Each limit switch provides input to one of two instrument channels in a single trip system.

(i) May be bypassed when reactor power level is below 45%.

(j) Trip upon loss of oil pressure to the acceleration relay.

(k) May be bypassed when placing the reactor mode switch in the SHUTDOWN position and all control rods are fully inserted.

(l) Only the trip circuit will be calibrated and tested at the frequencies specified in Table 4.6.2a, the primary sensor will be calibrated and tested once per operating cycle.

(m) This calibration shall consist of the adjustment of the APRM channel to conform to the power values calculated by a heat balance during reactor operation when THERMAL POWER ≥ 25% of RATED THERMAL POWER. Adjust the APRM channel if the absolute difference is greater than 2% of RATED THERMAL POWER. Any APRM channel gain adjustment made in compliance with Specification 2.1.2a shall not be included in determining the absolute difference.

**TABLE 3.6.2b (cont'd)**

**INSTRUMENTATION THAT INITIATES PRIMARY COOLANT SYSTEM OR CONTAINMENT ISOLATION**

**Limiting Condition for Operation**

| | Parameter | Minimum No. of Tripped or Operable Trip Systems | Minimum No. of Operable Instrument Channels per Operable Trip System | Set Point | Reactor Mode Switch Position in Which Function Must Be Operable: Shutdown | Refuel | Startup | Run |
|---|---|---|---|---|---|---|---|---|
| (4) | Deleted | | | | | | | |
| (5) | Low Reactor Pressure | 2 | 2(f) | ≥ 850 psig | | | (h) | x |
| (6) | Low-Low-Low Condenser Vacuum | 2 | 2(f) | ≥ 7 in. mercury vacuum | | | (a) | x |
| (7) | High Temperature Main Steam Line Tunnel | 2 | 2(f) | ≤ 200°F | | | x | x |

(g) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that Parameter.

With the number of Operable channels one less than required by the Minimum Number of Operable Instrument Channels for the Operable Trip System, either

1. Place the inoperable channel(s) in the tripped condition within 24 hours.

or

2. Take the ACTION required by Specification 3.6.2a for that Parameter.

(h) Only applicable during startup mode while operating in IRM range 10.

## TABLE 3.6.2g (cont'd)

## INSTRUMENTATION THAT INITIATES CONTROL ROD WITHDRAWAL BLOCK

### Limiting Condition for Operation

| Parameter | Minimum No. of Tripped or Operable Trip Systems | Minimum No. of Operable Instrument Channels per Operable Trip System (i) | Set Point | Reactor Mode Switch Position in Which Function Must Be Operable | | | |
|---|---|---|---|---|---|---|---|
| | | | | Shutdown | Refuel | Startup | Run |
| c. Downscale | 2 | 3(b) | ≥5 percent of full scale for each scale | | x | x | |
| d. Upscale | 2 | 3(b) | ≤88 percent of full scale for each scale | | x | x | |
| (3) APRM | | | | | | | |
| a. Inoperative | 2(h) | 3(c) | --- | | x | x | x |
| b. Upscale (Biased by Recirculation Flow) | 2(h) | 3(c) | Specification 2.1.2a(h) | | x | x | x |
| c. Downscale | 2(h) | 3(c) | ≥[5.28/125] divisions of full scale | | (d) | (d) | x |

The set points on the generator load rejection and turbine stop valve closure scram trips are set to anticipate and minimize the consequences of turbine trip with failure of the turbine bypass system as described in the bases for Specification 2.1.2. Since the severity of the transients is dependent on the reactor operating power level, bypassing of the scrams below the specified power level is permissible.

Although the operator will set the setpoints at the values indicated in Tables 3.6.2.a-1, the actual values of the various set points can differ appreciably from the value the operator is attempting to set. The deviations include inherent instrument error, operator setting error and drift of the set point. These errors are compensated for in the transient analyses by conservatism in the controlling parameter assumptions as discussed in the bases for Specification 2.1.2. The deviations associated with the set points for the safety systems used to mitigate accidents have negligible effect on the initiation of these systems. These safety systems have initiation times which are orders of magnitude greater than the difference in time between reaching the nominal set point and the worst set point due to error. The maximum allowable set point deviations are listed below:

Neutron Flux

APRM Scram, ±2.3% of rated neutron flux (analytical limit is 120% of rated flux)
APRM Rod Block, ±2.3% of rated neutron flux (analytical limit is 110% of rated flux)
IRM, ±2.5% of rated neutron flux

The APRM downscale rod block setpoint has been derived based on GE setpoint methodology as outlined in NEDC-31336, "GE Instrumentation Setpoint Methodology." In this methodology, the setpoint is defined as three values, Nominal Trip Setpoint, Allowable Value, and Analytical Limit. Table 3.6.2g shows the nominal trip setpoints. The corresponding allowable value is as follows:

APRM Downscale Rod Block, allowable value is ≥[4.24/125] divisions of full scale

Recirculation Flow Upscale, ±1.6% of rated recirculation flow (analytical limit is 107.1% of rated flow)
Recirculation Flow Comparator, ±2.09% of rated recirculation flow (analytical limit is 10% flow differential)

Reactor Pressure, ±15.8 psig

Containment Pressure ±0.053 psig

Reactor Water Level, ±2.6 inches of water

Main Steam Line Isolation Valve Position, ±2.5% of stem position

Scram Discharge Volume, +0 and -1 gallon

Condenser Low Vacuum, ±0.5 inches of mercury

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 153 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 letter dated July 21, 1994, as supplemented December 5, 1994, December 14, 1994, January 11, 1995, and February 1, 1995, Niagara Mohawk Power Corporation (the licensee or NMPC) submitted a request for changes to the Nine Mile Point Nuclear Station Unit No. 1 (NMP-1), Technical Specifications (TSs). The requested changes would add a tenth range on the Intermediate Range Neutron Flux Monitoring (IRM) system for plant shutdown and startup operations and would extend the calibration interval for the Source Range Neutron Flux Monitoring (SRM) system and IRM system from prior to startup and shutdown to 30 months. TSs 2.1.2, "Fuel Cladding Integrity;" 3.1.7, "Fuel Rods;" 3.6.2/4.6.2, "Protective Instrumentation;" and the associated Bases would be modified. The December 5, 1994, December 14, 1994, January 11, 1995, and February 1, 1995, letters provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

In requests for additional information dated November 3, 1994 and November 9, 1994, the NRC staff asked the licensee questions related to overlap between the Average Power Range Neutron Flux Monitoring (APRM) and the IRM systems and analysis of design basis events. The NRC staff also asked the licensee to submit observed instrument drift data to support the extension of calibration interval of the SRMs and IRMs to 30 months.

From these requests and further exchanges on the telephone, the NRC staff determined that the licensee did not provide adequate drift data to enable the NRC staff to make a determination with confidence of the acceptability of the extension request and on February 1, 1995, the licensee withdrew the portion of the amendment associated with the extension of calibration interval for SRMS and IRMs.[1]

Incorporation of IRM Range 10, as proposed in the amendment, would alleviate operational difficulty experienced while changing the mode switch between Startup and Run. Present plant procedures require the mode switch change while using IRM Range 9. The Range 9 upscale scram is at approximately 12% power. Range 10 permits monitoring of neutron flux up to approximately 40% power. However, normal Range 10 operation will generally involve increasing reactor power only within a few percent above 12% before switching to the APRM system in the Run mode. Range 10 should increase the IRM/APRM overlap to at least 1/2 decade and facilitate a smoother transition between Startup and Run.

With the addition of Range 10, the coincident IRM/APRM scram has been deleted. The impact on plant safety of the deletion of the coincident scram is contained in GENE 909-39-1093, "IRM/APRM Overlap Improvement for Nine Mile Point Nuclear Station, Unit One."

As operation in IRM Range 10 permits up to approximately 40% of rated power while in the Startup mode, a low pressure reactor isolation setpoint at 850 psig has been added for operation in Range 10 to avoid exceeding plant safety limits. In addition, procedural limits on minimum core flow during Range 10 operation have been added to provide continued protection against the rod withdrawal event.

The NRC staff reviewed the use of IRM Range 10, the two new setpoints to be added and the deletion of the IRM/APRM coincident scram to ensure that the proposed changes do not reduce the present plant safety margin and also do not adversely affect the ability to mitigate design basis events (accidents and transients) and satisfy plant safety limits.

## 2.0 EVALUATION

### 2.1 Deletion of Coincident IRM/APRM Scram

The amendment deletes the coincident APRM downscale/IRM upscale scram by deleting the APRM downscale scram setpoint. The impact of deletion of the APRM downscale trip has been evaluated in the licensee submittal and GENE 909-39-1093, "IRM/APRM Overlap Improvement for Nine Mile Point Nuclear Station, Unit One." The coincident scram provides protection against noncontinuous neutron flux monitoring during transition between the APRM and the IRM systems. If the switch to Startup to Run is premature, and the APRM downscale setpoints have not cleared, the IRM scram remains active to provide backup scram protection.

Upon deletion of the APRM downscale scram, the remaining APRM downscale rod block should continue to offer protection against rod withdrawal errors and prevent power ascension while APRM monitors are downscale. The setpoint for APRM downscale rod block in TS Table 3.6.2g is revised to reflect the existing plant equipment setting, and the proposed allowable value is documented in the Bases for TS 3.6.2. The deletion of the downscale scram does not affect the 120% upscale reactor scram, which should continue to offer protection against design basis events previously analyzed. The TS Limiting Condition for Operation for an inoperable/downscale APRM requires corrective action within one hour.[2,3]

During startup, if the APRM monitors are not onscale for transfer from IRM Range 9, the IRM monitors can be transferred into Range 10. In order to prevent violation of safety limits, entry into Range 10 is not permitted unless total core flow is greater than 20% and system pressure is greater than

850 psig. These limits are further discussed in the next section. Range 10 is designed to satisfy the continuous monitoring requirement previously provided by the coincident APRM/IRM trip by increasing the IRM/APRM overlap. Addition of IRM Range 10 should provide at least a 1/2 decade IRM/APRM overlap, allowing continuous monitoring of both systems during transition.

In consideration of the scram protection available during transition between Startup and Run mode and the overlap offered by Range 10, coupled with minimum pressure/flow requirements, the deletion of the coincident scram will not impact plant safety or compromise safety limit margins.

2.2 Minimum Flow and Vessel Pressure Requirements

Current TSs require recirculation flow to be greater than 20% before entering Run mode. The amendment also requires 20% flow in order to enter Range 10, and also requires 30% flow before control rods can be withdrawn in Range 10. Supporting information[4] stipulates that above 20% power and less than 40% power, 30% flow is required so that the Safety Limit Minimum Critical Power Ratio (SLMCPR) is not exceeded for rod withdrawal error transients. The control rod withdrawal error event is further discussed in the next section.

The amendment also adds a reactor low pressure isolation setpoint of 850 psig for entry into and operation in Range 10. Presently, the 850 psig setpoint for minimum reactor pressure exists only in the Run mode. The setpoint has been added to satisfy the fuel cladding integrity safety limit in TS 2.1.1.b, which requires core power not to exceed 25% of rated thermal power when reactor pressure is less than or equal to 800 psia or core flow is less than 10%. Above 800 psia and 10% core flow, TS 2.1.1.a specifies a SLMCPR limit to offer protection against loss of cladding integrity.

2.3 Analysis of Design Basis Events

The control rod drop event has been evaluated for operation with IRM Range 10. NMP-1 uses a Rod Worth Minimizer (RWM) system which is designed to sequence rod withdrawals and should prevent fuel enthalpy from exceeding the 280 cal/g design limit for the rod drop event. TS 3.1.1.b.(3)(b) requires the RWM to be operable from 0 to 20% power. The control rod drop event is limiting for power levels below 10%; above 10%, Doppler and voiding reactivity feedbacks act to minimize the impact of the rod drop event. Analysis of this event conservatively assumes availability of only the 120% power APRM scram. Therefore, the ability to successfully terminate the rod drop event will not be adversely impacted by the addition of Range 10.

The control rod withdrawal error event involves complete withdrawal of a control rod to the fully withdrawn position. Analysis of the event conservatively assumes credit only for the APRM scram at 120% of rated power. Occurrence of this event is bounding at low power levels, and results of licensee analysis at low power levels satisfy the fuel cladding failure threshold limit of 170 cal/g. Above the RWM low power setpoint of 20%, the SLMCPR must be satisfied. Licensee analysis states that for power levels less than 40%, operation with core flows greater than 30% should provide margin to the SLMCPR. The licensee has provided requirements in the plant TS for 30% flow while withdrawing rods while in Range 10. If future reloads include changes in the assumptions made for the control rod withdrawal event or changes in the core/fuel design, then the 30% flow requirement would also need further review and possible revision. The licensee considers the possibility of operation above 20% power while in IRM Range 10 to be small.[5] Below 20% power, the rod worth minimizer should be available to offer protection against rod withdrawal events. Evaluation of the rod withdrawal event, with consideration of IRM and APRM scram and rod withdrawal block setpoints and other existing operating/surveillance requirements, provides reasonable assurance that, for operation in Range 10 with core flow greater than 30% of rated, the SLMCPR will not be violated for the control rod withdrawal event.

Another possible source of positive reactivity insertion is a rapid cold water injection. Cold water injection transients include inadvertent high pressure coolant injection, loss of feedwater heater events and improper startup of an idle recirculation loop. These events were evaluated assuming inoperability of IRM scram setpoints so that reactor scram occurs at 120% power. Results of the evaluation demonstrate margin to the licensing basis failure criterion of 170 cal/g. During low power operation, the cal/g is a more appropriate failure criterion that Minimum Critical Power Ratio (MCPR) due to the increased margin to MCPR limits which exists at low power levels.

NMPC has requested a change to the NMP-1 TSs. The amendment incorporates a tenth range on the IRM system, adds setpoints on vessel pressure and core flow, and deletes the APRM downscale scram.

The NRC staff determined that IRM Range 10 would increase the IRM/APRM overlap and facilitate a smoother transition between Startup and Run. Incorporation of Range 10 does not negatively impact the outcome of design basis events and transients. Protective system setpoints for reactor vessel isolation and minimum core flow rates while operating with IRM Range 10 will offer added protection against exceeding plant TS safety limits. Deletion of the IRM/APRM coincident scram will not reduce plant safety margin. Therefore, the NRC staff has determined that the changes do not adversely affect continued safe operation of the plant, and are acceptable.

## 3.0 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.

## 4.0 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 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 (59 FR 45028). Accordingly, the 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 or environmental assessment need be prepared in connection with the issuance of the amendment.

## 5.0 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.

## 6.0 REFERENCES


1. Letter from B. Sylvia (NMPC) to USNRC, Withdrawal of Portion of Previously Submitted Amendment, dated February 1, 1995.

2. GENE-909-39-1093, "IRM/APRM Overlap Improvement for Nine Mile Point Nuclear Station Unit One," p. 8, March 8, 1994.

3. Nine Mile Point Unit 1 Technical Specifications, Table 4.6.2a.

4. Letter from B. Sylvia (NMPC) to USNRC, Application for amendment to operating license, p. 10, July 21, 1994.

5. Letter from B. Sylvia (NMPC) to USNRC, Response to Request for Additional Information for Facility Operating License DPR-63, p. 3, December 5, 1994.


Principal Contributors: G. Golub
F. Gee

Date: March 3, 1995

UNITED STATES NUCLEAR REGULATORY COMMISSION

NIAGARA MOHAWK POWER CORPORATION

DOCKET NO. 50-220

NINE MILE POINT NUCLEAR STATION UNIT NO. 1

# NOTICE OF PARTIAL WITHDRAWAL OF APPLICATION FOR AMENDMENT TO FACILITY OPERATING LICENSE

The United States Nuclear Regulatory Commission (the Commission) has granted the request by the Niagara Mohawk Power Corporation (NMPC) to withdraw a portion of their July 21, 1994, application, for a proposed amendment to Facility Operating License DPR-63 for the Nine Mile Point Nuclear Station Unit No. 1, located in Oswego County, New York.

The proposed amendment would have revised Technical Specifications (TSs) 2.1.2 (Fuel Cladding Integrity), 3.1.7 (Fuel Rods), 3.6.2/4.6.2 (Protective Instrumentation), and the associated Bases to allow the use of Range 10 on the Intermediate Range Neutron Flux Monitors (IRMs) with the Reactor Protection System low pressure trip for main steam line isolation valve closure not in bypass. Changes were also proposed to TS Tables 3.6.2.a/4.6.2a (Instrumentation that Initiates Scram) and TS Tables 3.6.2g/4.6.2g (Instrumentation that Initiates Control Rod Withdrawal Block) to extend the calibration frequency of the Source Range Neutron Flux Monitors (SRMs) and the IRMs from prior to startup and shutdown to once per operating cycle. The proposed change would have also changed the Instrument Channel Test interval for the SRMs and IRMs from prior to startup and shutdown to once per week. Associated changes to TSs Setpoints, Bases, References, and Notes for TSs 2.1.2, 3.1.7, and 3.6.2/4.6.2 were also proposed.

By letter dated February 1, 1995, NMPC requested to withdraw that portion of the proposed amendment associated with the extension of the calibration frequency for the SRMs and IRMs.

The Commission has previously issued a Notice of Consideration of Issuance of Amendment to Facility Operating License, Proposed No Significant Hazards Consideration Determination, and Opportunity for a Hearing which was published in the FEDERAL REGISTER on August 31, 1994 (59 FR 45028).

For further details with respect to this action, see the application for amendment dated July 21, 1994, as supplemented on December 5, 1994, December 14, 1994, and January 11, 1995, and the licensee's letter dated February 1, 1995, which withdrew the portion of the application for license amendment associated with the extension of the calibration frequency for the SRMs and IRMs. The above documents are available for public inspection at the Commission's Public Document Room, 2120 L Street, NW., Washington, DC, and at the local public document room located at Reference and Documents Department, Penfield Library, State University of New York, Oswego, New York.

Dated at Rockville, Maryland, this 3rd day of March 1995.

FOR THE NUCLEAR REGULATORY COMMISSION

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