Mr. John H. Mueller
Chief Nuclear Officer
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Nine Mile Point Nuclear Station
Operations Building, Second Floor
P. O. Box 63
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March 8, 2000

Template NRR-058

SUBJECT: NINE MILE POINT NUCLEAR STATION, UNIT NO. 1 - ISSUANCE OF AMENDMENT RE: NOBLE METAL CHEMICAL ADDITION (TAC NO. MA6325)

Dear Mr. Mueller:

The Commission has issued the enclosed Amendment No.169 to Facility Operating License No. DRP-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 August 26, 1999, as supplemented by letter dated December 17, 1999.

The amendment changes TS 3.2.3, "Coolant Chemistry," to support the implementation of the Noble Metal Chemical Addition.

A copy of the related safety evaluation is enclosed. A Notice of Issuance will be included in the Commission's biweekly Federal Register Notice.

Sincerely,

/RA/

Peter S. Tam, Senior Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-220

Enclosures: 1. Amendment No.169 to DRP-63
2. Safety Evaluation

cc w/encls: See next page

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

March 8, 2000

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cc w/encls: See next page

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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 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 169
License No. DRP-63

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

   A. The application for amendment by Niagara Mohawk Power Corporation (the licensee) dated August 26, 1999, as supplemented by letter dated December 17, 1999, 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 1;

   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

The Technical Specifications contained in Appendix A, which is attached hereto, as revised through Amendment No.169 is hereby incorporated into this license. Niagara Mohawk Power Corporation shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented before the licensee first performs the noble metal chemical addition.

FOR THE NUCLEAR REGULATORY COMMISSION

Marsha Gamberoni

Marsha Gamberoni, Acting Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 8, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 169

TO FACILITY OPERATING LICENSE NO. DRP-63

DOCKET NO. 50-220

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by Amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
96	96
97	97
98	98
--	98a

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT

3.2.3 COOLANT CHEMISTRY

Applicability:

Applies to the reactor coolant system chemical requirements.

Objective:

To assure the chemical purity of the reactor coolant water.

Specification:

a. The reactor coolant water shall not exceed the following limits for > 24 hours with the coolant temperature ≥200 degrees F and reactor thermal power ≤ 10%, or a shutdown shall be initiated within 1 hour and the reactor shall be shutdown and reactor coolant temperature be reduced to <200 degrees F within 10 hours.

Conductivity	1 μmho/cm*
Chloride ion	100 ppb
Sulfate ion	100 ppb

* During Noble Metal Chemical Addition (NMCA), the limit is 20 μmho/cm. Post NMCA, the conductivity limit is 2 μmho/cm for up to a 5 month period at power operation.

4.2.3 COOLANT CHEMISTRY

Applicability:

Applies to the periodic testing requirements of the reactor coolant chemistry.

Objective:

To determine the chemical purity of the reactor coolant water.

Specification:

Samples shall be taken and analyzed for conductivity, chloride and sulfate ion content daily. In addition, if the conductivity becomes abnormal (other than short term spikes) as indicated by the continuous conductivity monitor, samples shall be taken and analyzed within 8 hours.

When the continuous conductivity monitor is inoperable, a reactor coolant sample shall be taken and analyzed for conductivity, chloride and sulfate ion content at least once per 8 hours.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT

b. The reactor coolant water shall not exceed the following limits for > 24 hours with reactor thermal power > 10%, or a shutdown shall be initiated within 1 hour and the reactor shall be shutdown and reactor coolant temperature be reduced to < 200 degrees F within 10 hours.

Conductivity	1 μmho/cm*
Chloride ion	20 ppb
Sulfate ion	20 ppb

c. In no case shall the reactor coolant exceed the following limits at the specified conditions or, a shutdown shall be initiated within 1 hour and the reactor shall be shutdown and reactor coolant temperature be reduced to <200 degrees F within 10 hours.

1. With reactor coolant temperature ≥ 200 degrees F, the conductivity has a maximum limit of 5 μmho/cm**, or

2. With reactor coolant temperature ≥ 200 degrees F and reactor thermal power ≤ 10%, the maximum limit of chloride or sulfate ion concentration is 200 ppb, or

3. With reactor thermal power > 10%, the maximum limit of chloride or sulfate ion concentration is 100 ppb.

* Post NMCA, the conductivity limit is 2 μmho/cm for up to a 5 month period at power operation.
** During NMCA, the limit is 20 μmho/cm.

In its May 8, 1997 letter, the NRC required that NMPC submit an application for amendment to address the differences between the current TS conductivity limits for reactor coolant chemistry and the analysis assumptions for the core shroud crack growth evaluations. The purpose of this specification is to limit intergranular stress corrosion cracking (IGSCC) crack growth rates through the control of reactor coolant chemistry. The LCO values ensure that transient conditions are acted on to restore reactor coolant chemistry values to normal in a reasonable time frame. Under transient conditions, potential crack growth rates could exceed analytical assumptions, however, the duration will be limited so that any effect on potential crack growth is minimized and the design basis assumptions are maintained. The plant is normally operated such that the average coolant chemistry for the operating cycle is maintained at the conservative values of < 0.19 μmho/cm for conductivity and < 5 ppb for chloride ions and < 5 ppb for sulfate ions. This will ensure that the crack growth rate is bounded by the core shroud analysis assumptions. Since these are average values, there are no specific LCO actions to be taken if these values are exceeded at a specific point in time. The EPRI "BWR Water Chemistry Guidelines-1996 Revision" (EPRI TR-103515-R1, BWRVIP-29) action level 1 guidelines suggest that if conductivity is above 0.3 μS/cm, or chloride or sulfate ions exceed 5 ppb, that corrective action be initiated as soon as possible and to restore levels below level 1 within 96 hours. If the parameters are not reduced to below these levels within 96 hours, complete a review and implement a program and schedule for implementing corrective measures.

Specifications 3.2.3a, b, and c are consistent with NMPC's commitment to Table 4.4 of the BWR water chemistry guidelines. The 24 hour action time period for exceeding the coolant chemistry limits described in 3.2.3a and b ensures that prompt action is taken to restore coolant chemistry to normal operating levels. The requirement to commence a shutdown within 1 hour, and to be shutdown and reactor coolant temperature be reduced to < 200 degrees F within 10 hours minimizes the potential for IGSCC crack growth. Reactor water samples are analyzed daily to ensure that reactor water quality remains within the BWR water chemistry guidelines. These samples are analyzed and compared to action level 1 values.

The conductivity of the reactor coolant is continuously monitored. The continuous conductivity monitor is visually checked shiftly in accordance with procedures. The monitor alarms at the local panel. The recorder, which is located in the Control Room, alarms in the Control Room. The samples of the coolant which are analyzed for conductivity daily will serve as a comparison with the continuous conductivity monitor. The primary sample point for the reactor water conductivity samples is the non-regenerative heat exchanger in the reactor water cleanup system. An alternate sample point is the #11 recirculation loop. The reactor coolant samples will also be used to determine the chloride and sulfate concentrations. Therefore, the sampling frequency is considered adequate to detect long-term changes in the chloride and sulfate ion content. However, if the conductivity becomes abnormal (>0.19 μmho/cm), other than short term spikes, chloride and sulfate measurements will be made within 8 hours to assure that the normal limits (< 5 ppb of chloride or sulfate ions) are maintained. A short term spike is defined as a rise in conductivity (> 0.19 μmho/cm) such as that which could arise from injection of additional feedwater flow for a duration of approximately 30 minutes in time. These actions will minimize the potential for IGSCC crack growth.

NMP1 will use Noble Metal Chemical Addition (NMCA) as a method to enhance the effectiveness of Hydrogen Water Chemistry (HWC) in mitigating IGSCC. NMCA will result in temporary increases in reactor coolant conductivity values during and following application. During application, the conductivity limit specified in 3.2.3a and 3.2.3c.1 is increased to 20 μmho/cm. The application period includes post-NMCA injection cleanup activities conducted prior to returning the plant to power operation. An increase in conductivity is expected principally due to residual ionic species from the NMCA. However, these species have minor effects on IGSCC and are, therefore, acceptable. During NMCA, samples will be obtained from the temporary skid which is placed in service during the NMCA injection process.

Following NMCA application, industry experience indicates that there may be an elevated conductivity approaching the 1 μmho/cm conductivity limit delineated in TS 3.2.3a and 3.2.3b. To provide operating margin, a conductivity limit of 2 μmho/cm is allowed for up to 5 months of power operation. The increase in the conductivity is attributed to an increase in soluble iron and pH in the reactor water, which results from the application of the noble metals and its affect on deposits on the fuel. Soluble iron nor increased pH contribute to IGSCC crack growth. The existing 1 μmho/cm limit is based on EPRI guidelines action level 2 for power operation, which assumes normal conductivity below .3 μmho/cm. Increasing the limit to 2 μmho/cm during the period when soluble iron levels are high provides an equivalent operating margin consistent with the chloride and sulfate limits. Accordingly, a temporary (<5 month period at power operation) elevated conductivity is acceptable and not considered "abnormal" as discussed in TS 4.2.3 and Bases (i.e., > 0.19 μmho/cm). Therefore, following NMCA, increased sampling (i.e., every 8 hours versus daily) is not warranted.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 169 TO FACILITY OPERATING LICENSE NO. DRP-63

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-220

1.0 INTRODUCTION

By letter dated August 26, 1999, as supplemented by letter dated December 17, 1999, Niagara Mohawk Power Corporation (NMPC or the licensee) proposed a license amendment to change the Technical Specifications (TSs) for Nine Mile Point Nuclear Station, Unit No. 1, to support the implementation of the Noble Metal Chemical Addition (NMCA). Specifically, the licensee requested an increase of the reactor water conductivity limits in TS 3.2.3.a and 3.2.3.c.1 to 20.0 umho/cm during NMCA application and, after NMCA application, increase the conductivity limits in TS 3.2.3.a and 3.2.3.b to 2.0 umho/cm for up to a period of five months at power operation. Since the increase of conductivity is expected, the licensee proposed that increased reactor coolant chemistry sampling frequency (from once every 24 hours to every 8 hours) not be required when conductivity exceeds 0.19 umho/cm for up to 5 months. The TS Bases are also revised to support the proposed changes in the TSs. The licensee plans to perform NMCA when the plant is in a hot shutdown condition during a mid-cycle shutdown.

The NMCA process was developed by General Electric Nuclear Energy (GENE) as a measure to enhance the effectiveness of hydrogen water chemistry in mitigating the intergranular stress corrosion cracking (IGSCC) of reactor vessel internals in boiling water reactors (BWRs). The NMCA process will deposit a very thin discontinuous layer of the noble metals (platinum and rhodium) on the component surfaces during the application period. The treated surfaces will behave catalytically and promote oxidant-hydrogen recombination, which will allow the treated components to reach the low electrochemical corrosion potential at low hydrogen injection rates. The low hydrogen injection rate will reduce the plant radiation exposure over the life of the plant. The NMCA process has been successfully applied to a number of operating BWRs in this country.

NMPC's letter dated December 17, 1999, provided additional information in support of the initial application for amendment, and did not change the Commission's finding of no significant hazards consideration published in the Federal Register (64 FR 51347, September 22, 1999).

2.0 EVALUATION

The staff's evaluation of the licensee's proposed TS changes is provided below:

(i) During NMCA, the licensee proposed to increase the reactor coolant conductivity limits in TS 3.2.2.a and 3.2.3.c.1 to 20.0 umho/cm. The existing conductivity limits in TS 3.2.3.a and 3.2.3.c.1 are 1.0 umho/cm and 5.0 umho/cm, respectively. The application period includes an injection period and post-NMCA injection clean-up activities conducted prior to returning to power operation. During the NMCA injection period, the reactor coolant conductivity is expected to increase due to the presence of residual ionic species from the NMCA process. These ionic species do not have a significant effect on IGSCC in reactor vessel internals or reactor fuel. The results of laboratory testing under a similar environment have shown that there is a negligible effect on crack growth during the entire application period. Following NMCA, conductivity is expected to increase. The expected increase in conductivity is attributed to an increase in soluble iron and pH in the reactor water resulting from the application of the noble metals and its effect on deposits on the fuel. The increased soluble iron concentration and pH would not have significant effects on IGSCC.

The licensee's proposed changes of reactor coolant conductivity limits are based on the recommendations made by GENE who developed this process. The GENE recommendations incorporate industry experience with provisions for adequate operation margins to prevent unnecessary plant shutdown resulting from the increase in conductivity during and following NMCA.

Based on the consideration that the increase in the conductivity resulting from NMCA will not cause a detrimental effect to the components that are susceptible to IGSCC, the staff has determined that the licensee's proposed increase in reactor coolant conductivity limits is acceptable. Furthermore, the unlikely presence of an excessive amount of the aggressive ionic species such as chlorides and sulfates will be detected in a timely fashion by increased frequency of coolant sampling for chemical analysis. The coolant sampling will be taken every 8 hours instead of every 24 hours.

(ii) Following the NMCA application period, the licensee proposed to increase the reactor coolant conductivity limit in TS 3.2.3.a and 3.2.3.b from 1.0 umho/cm to 2.0 umho/cm for up to a period of 5 months at power operation. The licensee proposed to monitor certain conductivity levels administratively. Specifically, the sampling procedure will require additional monitoring of coolant (i.e., at an 8-hour frequency) each time conductivity exceeds 1 umho/cm during the post-application period of approximately 5 months. This increased sampling will be implemented and controlled administratively. The staff has determined that the licensee's proposed conductivity limit during the post-NMCA period is acceptable since the temporary elevated conductivity after application of NMCA is expected and the proposed sampling frequency for coolant chemistry is considered adequate to confirm that the elevated conductivity is not due to the high level of aggressive ionic species such as chlorides and sulfates in the coolant.

(iii) To support the implementation of NMCA, the TS Bases Sections 3.2.3 and 4.2.3 are revised to provide the bases for the proposed changes of the reactor coolant conductivity limits and coolant chemistry monitoring frequency in the TSs. The revised sections are consistent with the proposed TS changes.

The staff concludes that the licensee's proposed TS amendment, as proposed in the licensee's submittals dated August 26, 1999, and supplemented on December 17, 1999, is acceptable for the implementation of NMCA at NMP1. The NMCA process will enhance the resistance of the reactor vessel internals to IGSCC.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to use of a facility component located within the restricted area as defined in 10 CFR Part 20. 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 staff has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (64 FR 51347, dated September 22, 1999). 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 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, (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.

Principal Contributor: W. Koo

Date: March 8, 2000