Docket No. 50-220

July 10, 1986

Niagara Mohawk Power Corporation
Attn: Mr. C. V. Mangan
Senior Vice President
c/o Miss Catherine R. Seibert
300 Erie Boulevard West
Syracuse, New York 13202

Dear Mr. Mangan:

SUBJECT: HYDROGEN WATER CHEMISTRY TEST (TAC 61588)

Re: Nine Mile Point Nuclear Station, Unit No. 1

The Commission has issued the enclosed Amendment No. 87 to Facility Operating License No. DPR-63 for the Nine Mile Point Nuclear Station, Unit No. 1. This amendment is in response to your application dated May 27, 1986. The amendment modifies Technical Specification (TS) Section 6.12, High Radiation Area, Table 3.6.2a, Instrumentation That Initiates Scram, Table 3.6.2b, Instrumentation That Initiates Primary Coolant System or Containment Isolation, Table 3.6.2h, Vacuum Pump Isolation, and the notes to these three tables to allow Niagara Mohawk to demonstrate the feasibility of a Hydrogen Water Chemistry System as a mitigator of intergranular stress corrosion cracking of stainless steel piping at Nine Mile Point Unit 1.

A copy of our related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notices.

Sincerely,
ORIGINAL SIGNED BY

John A. Zwolinski, Director
BWR Project Directorate #1
Division of BWR Licensing

Enclosures:
1. Amendment No. 87 to License No. DPR-63
2. Safety Evaluation

cc w/enclosures:
See next page

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

NIAGARA MOHAWK POWER CORPORATION

DOCKET NO. 50-220

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 87
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 May 27, 1986, 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 Appendix A, as revised through Amendment No. 87 , 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.

FOR THE NUCLEAR REGULATORY COMMISSION

John A. Zwolinski, Director
BWR Project Directorate #1
Division of BWR Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 10, 1986

ATTACHMENT TO LICENSE AMENDMENT NO. 87

FACILITY OPERATING LICENSE NO. DPR-63

DOCKET NO. 50-220

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

REMOVE	INSERT
186	186
192	192
- -	196a
198	198
204	204
224	224
- -	225a
270	270

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.6.1 STATION PROCESS EFFLUENTS	4.6.1 STATION PROCESS EFFLUENTS
a. Effluent release limits are described in Specification 3.6.15.	a. Monitoring the radioactive discharges from Nine Mile Point Unit 1 is described in Specification 4.6.15.
b. The mechanical vacuum pump line shall be capable of automatic isolation by closure of the air-operated valve upstream of the pumps. The signal to initiate isolation shall be from high radioactivity (five times normal) in the mainsteam line.*	b. At least once during each operating cycle (prior to startup), verify automatic securing and isolation of the mechanical vacuum pump.

* Within 24 hours prior to the planned start of the hydrogen injection test with the reactor power at greater than 20% rated power, the normal full-power radiation background level and associated trip and alarm setpoints may be changed based on a calculated value of the radiation level expected during the test. The background radiation level and associated trip and alarm setpoints may be adjusted during the test program based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip and alarm setpoints shall be reset within 24 hours of re-establishing normal radiation levels after completion of the hydrogen injection or within 12 hours of establishing reactor power levels below 20% rated power, while these functions are required to be operable. At reactor power levels below 20% rated power, hydrogen injection shall be terminated and the injection system secured.

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)	≤ 10 percent valve closure from full open		(c)	(c)	x
(7) High Radiation Main-Steam-Line	2	2	≤5 times normal background at rated power(n)		x	x	x
(8) Shutdown Position of Reactor Mode Switch	2	1	- -		(k)	x	x
(9) Neutron Flux (a) IRM (i)	2	3(d)	≤96 percent of full scale		(g)	(g)	(g)

(n) Within 24 hours prior to the planned start of the hydrogen injection test with the reactor power at greater than 20% rated power, the normal full-power radiation background level and associated trip and alarm setpoints may be changed based on a calculated value of the radiation level expected during the test. The background radiation level and associated trip and alarm setpoints may be adjusted during the test program based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip and alarm setpoints shall be reset within 24 hours of re-establishing normal radiation levels after completion of the hydrogen injection or within 12 hours of establishing reactor power levels below 20% rated power, while these functions are required to be operable. At reactor power levels below 20% rated power, hydrogen injection shall be terminated and the injection system secured.

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) High Radiation Main Steam Line	2	2	$\leq$ 5 times normal background at rated power (e)			x	x
(5) Low Reactor Pressure	2	2	$\geq$ 850 psig				x
(6) Low-Low-Low Condenser Vacuum	2	2	$\geq$ 7 in. mercury vacuum			(a)	x
(7) High Temperature Main Steam Line Tunnel	2	2	$\leq$ 200F			x	x

NOTES FOR TABLES 3.6.2b and 4.6.2b

(a) May be bypassed in the refuel and startup positions of the reactor mode switch when reactor pressure is less than 600 psi.

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

(c) May be bypassed in the shutdown mode whenever the reactor coolant system temperature is less than 215°F.

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

(e) Within 24 hours prior to the planned start of the hydrogen injection test with the reactor power at greater than 20% rated power, the normal full-power radiation background level and associated trip and alarm setpoints may be changed based on a calculated value of the radiation level expected during the test. The background radiation level and associated trip and alarm setpoints may be adjusted during the test program based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip and alarm setpoints shall be reset within 24 hours of re-establishing normal radiation levels after completion of the hydrogen injection or within 12 hours of establishing reactor power levels below 20% rated power, while these functions are required to be operable. At reactor power levels below 20% rated power hydrogen injection shall be terminated and the injection system secured.

Table 3.6.2h

VACUUM PUMP 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
VACUUM PUMP							
High Radiation Main Steam Line	2	2	$\leq$ 5 times normal background (a)		X	X	X

NOTES FOR TABLES 3.6.2h and 4.6.2h

(a) Within 24 hours prior to the planned start of the hydrogen injection test with the reactor power at greater than 20% rated power, the normal full-power radiation background level and associated trip and alarm setpoints may be changed based on a calculated value of the radiation level expected during the test. The background radiation level and associated trip and alarm setpoints may be adjusted during the test program based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip and alarm setpoints shall be reset within 24 hours of re-establishing normal radiation levels after completion of the hydrogen injection or within 12 hours of establishing reactor power levels below 20% rated power, while these functions are required to be operable. At reactor power levels below 20% rated power hydrogen injection shall be terminated and the injection system secured.

6.12 High Radiation Area (Continued)

a. A radiation monitoring device which continuously indicates the radiation dose rate in the area.

b. A radiation monitoring device which continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received. Entry into such areas with this monitoring device may be made after the dose rates in the area have been established and personnel have been made knowledgeable of them.

c. An individual qualified in radiation protection, with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area and shall perform periodic radiation surveillance at the frequency specified by the Radiation Protection Supervisor or designate in the Radiation Work Permit.

6.12.2 In addition to the requirements of 6.12.1 areas accessible to personnel with radiation levels such that a major portion of the body could receive in one hour a dose greater than 1000 mrem** shall be provided with locked doors*** to prevent unauthorized entry, and the hard keys or access provided by magnetic keycard shall be maintained under the administrative control of the Station Shift Supervisor or designate on duty and/or the Radiation Protection Supervisor or designate. Doors shall remain locked except during periods of access by personnel under an approved RWP which shall specify in accordance with site approved procedures accordingly, the dose rate levels in the immediate work area and the maximum allowable stay time for individuals in that area. In lieu of the stay time specification of the RWP, continuous surveillance, direct or remote, such as use of closed circuit TV cameras, may be made by personnel qualified in radiation protection procedures to provide positive exposure control over the activities within the area. For individual areas accessible to personnel with radiation levels such that a major portion of the body could receive in one hour a dose in excess of 1000 mrem** that are located within large areas, such as the drywell, where no enclosure exists for purposes of locking, and no enclosure can be reasonably constructed around the individual areas, then that area shall be roped off, conspicuously posted and a flashing light shall be activated as a warning device.

* by accessible passage and permanently fixed ladders
** measurement made at 18" from source of radioactivity
*** The requirement for locked doors to prevent unauthorized entry does not apply to areas which may temporarily exceed 1000 mrem/hr during the hydrogen water chemistry tests to be conducted during approximately a six-week period following startup from the spring 1986 refueling outage.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

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

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-220

1.0 INTRODUCTION

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

2.0 EVALUATION

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

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

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

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

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

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

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

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

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

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

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

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

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

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security nor to the health and safety of the public.

Principal Contributor: J. Kelly, J. Donohew

Dated: July 10, 1986