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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 148 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 November 18, 1993, 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 (TS). The requested changes would revise the setpoints for the degraded voltage relays for the 4.16kV Power Boards 102 and 103 as specified in TS Table 3.6.2i. The setpoints would be revised from their current values of 3580 volts 18.5 $\pm$ 3 seconds to a proposed value of $\geq$ 3705 volts > 3.4 seconds and < 60 seconds. The proposed change was submitted in response to findings of the NRC's Electrical Distribution System Functional Inspection conducted at NMP-1 from September 23, 1991, to October 25, 1991.

2.0 EVALUATION

The undervoltage protection for NMP-1 4.16kV Power Boards 102 and 103 is designed to ensure that sufficient voltage is available to the loads connected to Power Boards 102 and 103. Two levels of undervoltage protection are provided, loss of voltage and degraded voltage. NMP-1 TS Table 3.6.2i, "Diesel Generator Initiation," characterizes the setpoints for the two levels of protection. The existing setpoints for the 4.16kV Power Boards 102 and 103 degraded voltage relays are $\geq$ 3600V for relay dropout and 3580V 18.5 $\pm$ 3 seconds for corresponding operating time. This equates to an approximate 30 second delay with a relay dropout point just below the undervoltage setpoint of 3600 volts.

An Electrical Distribution System Functional Inspection (EDSFI) was conducted at NMP-1 from September 23, 1991, to October 25, 1991. As part of the EDSFI, the NRC staff reviewed NMP-1's degraded voltage report. In Inspection Report No. 50-220/91-80, the NRC staff indicated that with a dropout setpoint of 3600V, the voltage available at Power Boards 102 and 103 could fall below the level required to support acceptable operation of connected loads. Motor design criteria require that a minimum of 3600V be available at the terminals of 4000V motors (90% of 4000V). With 3600V at Power Boards 102 and 103 and considering line losses, the voltage at the connected motor terminals would not be adequate. Motor design criteria require that a minimum of 495V be

available at the motor terminals of 550V safety related motors. With the current degraded voltage setpoints, the voltage on certain safety related 600V busses would be about 492V. Therefore, the connected motor terminal voltage would not be adequate. In response to the NRC staff's concerns, NMPC implemented administrative controls to assure adequate voltage at the 4.16kV and 600V busses. Specifically, NMPC raised the NMP-1 offsite power grid voltage limits at Niagara Mohawk Power Control, installed the 115kV voltage reading on the Control Room Large Value Display, and implemented a temporary administrative procedure, which would alert the operator and provide specific actions to take if the offsite power supply dropped below 117kV. This assured that the required voltage is available at the connected motor terminals and other loads. The NRC's inspection team determined that the administrative controls were adequate in Inspection Report 50-220/91-80, dated January 10, 1992.

As a result of the EDSFI conducted by the NRC on September 9, 1991, NMPC proposed to revise the degraded voltage relay setpoints provided in the NMP-1 TS Table 3.6.2i, Item b., "Degraded Voltage." Specifically, in the amendment request dated November 18, 1993, the setpoints for the 4.16kV Power Boards 102 and 103 degraded voltage relay dropout would be revised from 3600V to 3705V. Further increases to the setpoint were determined unacceptable based on the reduced margin between the voltage setpoint and the grid voltage (and the subsequent increased potential for separation from the offsite power). Additionally, the corresponding operating time setpoint would be revised from "3580V 18.5 $\pm$ 3 seconds" to "> 3.4 seconds and < 60 seconds." A minimum 3.4-second time delay would preclude spurious separation from offsite power during loads sequencing and the operating time format is consistent with the guidance provided in the NRC's Improved Standard Technical Specifications (NUREG-1433). Additionally, there would be an editorial change to TS Table 3.6.2i, Item a., "Loss of Voltage." Specifically, the word undervolt would be changed to undervoltage.

3.0 EVALUATION

NMPC stated in the November 18, 1993, submittal that the licensee had performed an analysis to determine the degraded voltage setpoint that would ensure sufficient voltage at Power Boards 102 and 103 to support acceptable operation of critical loads. The distribution system voltages were determined using the Electrical Load Monitoring System for Alternating Current Loads (ELMSAC) software. ELMSAC is a static model voltage drop and short circuit current iterative calculation. The loads required for motor starts throughout the loss-of-coolant accident (LOCA) sequence were used in calculating the resultant bus and load voltages. These loads comprise the maximum expected loading conditions and lowest voltages which the safety related busses will experience. The required setting of the undervoltage relays were calculated using the analytical limit of the minimum allowable 4.16kV safety related bus voltages.

The NRC staff identified several concerns related to the degraded voltage relay setpoint change. The NRC staff concerns were addressed in a conference call with the licensee staff on February 1, 1994. The first concern was regarding whether or not NMPC had considered degraded voltage down to the 480V and 120V levels when preparing the new calculation for the degraded voltage relay setpoint. NMPC staff stated that the low voltage distribution system at NMP-1 is nominally 600V. The effects of the degraded voltages were analyzed down to 600V and 120V levels. Terminal voltages were calculated to ensure adequate voltage would be available for safety-related 600V and 120V loads. The second concern that the NRC staff had was how the new calculation differed from the old calculation and what were some of the assumptions made in the new calculation. NMPC staff stated that the original calculation verifies that voltage remains above the relay reset value (presently 111.8kV, based on existing dropout setpoint). The new calculation establishes a relay nominal dropout value above the analytical minimum and accounts for potential setpoint error/tolerance, resulting in an increased reset value to 115.2kV. Additionally, the original calculation did not calculate 600V and 120V load terminal voltages at the degraded voltage relay dropout setpoint. The new calculation does not assume adequate voltage levels exist at the load terminals but rather, analyzes for voltages sufficiency under more conservative distribution loading conditions. Some of the new assumptions made in the new calculation were as follows:

1. Unit scram (with fast bus transfer of station nonsafety distribution to offsite power) and coincident LOCA sequencing.

2. LOCA sequencing including a manual start of a containment spray raw water pump on each train to achieve maximum bus loading.

3. The relay tolerance is a worst case value.

Another concern that the NRC staff had was whether or not any field verification was done to validate the data used in the new degraded voltage relay setpoint calculation. The NMPC staff confirmed that the new distribution load flow model was validated against field measurements recorded during a 1981 field test. The calculated voltages were found to be conservative when compared to the measured values and within 3% accuracy. Additionally, the NMPC staff assured the NRC staff that there had not been any significant load change that would invalidate the field measurements taken in 1981 and stated that the accuracy was still 3% at the present time. The NRC staff's final concern was related to the type of controls that would be used to update the calculation with future load changes. NMPC stated that the distribution system loading changes are incorporated into the load flow analysis program in accordance with the Configuration Management Program (procedure NEP-CON-110). Additionally, an individual within the electrical design organization has been designated as being responsible for the maintenance of the software program. Load additions with significant impact to safety related distribution buses will trigger reanalysis of impact to the relay setpoint.

The proposed changes to increase the degraded voltage relay setpoint provide additional conservatism for the 4160V vital buses to provide safety-related equipment with adequate voltage at the 4160V, 600V and 120V levels and, therefore, reduce the risk of tripping or damaging the vital equipment associated with accident mitigation. Additionally, NMPC has adequately addressed the concerns raised by the NRC staff and demonstrated that the above changes will not involve a significant increase in the probability or consequences of an accident previously evaluated. Therefore, based on this, we find the proposed revision to change the degraded voltage relay setpoint from 3600 V to 3705 V and the corresponding operating time from 3580 V 18.5 $\pm$ 3 seconds to > 3.4 seconds and < 60 seconds to be acceptable. Additionally, the editorial change to TS Table 3.6.2i, Item a., to change the word undervolt to undervoltage is also acceptable.

4.0 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.

5.0 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. 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 (58 FR 67851). 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.

6.0 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.

Principal Contributor: M. D. Pratt

Date: April 7, 1994

Docket No. 50-220 April 7, 1994

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

Dear Mr. Sylvia:

SUBJECT: ISSUANCE OF AMENDMENT FOR NINE MILE POINT NUCLEAR STATION UNIT NO. 1 (TAC NO. M88256)

The Commission has issued the enclosed Amendment No. 148 to Facility Operating License No. DPR-63 for the Nine Mile Point Nuclear Station Unit No. 1 (NMP-1). The amendment consists of changes to the Technical Specifications (TSs) in response to your application transmitted by letter dated November 18, 1993.

The amendment revises the setpoints for the degraded voltage relays for the 4.16kV Power Boards 102 and 103 as specified in TS Table 3.6.2i. The setpoints have been revised from 3580 volts 18 $\pm$ 3 seconds to 3705 volts > 3.4 seconds and < 60 seconds. This change has been made in response to findings of the NRC's Electrical Distribution System Functional Inspection conducted at NMP-1 from September 23, 1991, to October 25, 1991.

A copy of the related Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's next regular biweekly Federal Register notice.

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

Enclosures:
1. Amendment No. 148 to DPR-63
2. Safety Evaluation

cc w/enclosures:
See next page
*See previous concurrence

OFFICE	LA:PDI	PM:PDI-1	*OGC	D:PDI-1	
NAME	CVogan	DBrinkman:cn		RCapra	
DATE	4/7/94	4/7/94	03/28/94	04/07/94	/ /

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Document Name: NM188256.AMD