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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 85 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 January 28, 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 (NMP-1). The amendment would modify the Technical Specifications (TS) to: (1) reflect a change in the limits for minimum reactor vessel temperature for pressurization, and (2) delete the operating limits for hydrostatic testing with the reactor critical.

Three surveillance capsules were installed in the NMP-1 reactor vessel prior to startup in 1969. Two surveillance capsules have been removed from the NMP-1 reactor vessel to date. The A capsule was removed in 1979 after a vessel exposure of 5.8 effective full power years (efpy) and the C capsule was removed in 1982 after a vessel exposure of 7.98 efpy. The requested revision to the pressure-temperature curves reflects changes in reactor vessel materials property due to irradiation embrittlement. This revision is required to meet safety margins of Appendix G, 10 CFR Part 50, which requires the licensee to perform periodic testing of reactor vessel material samples placed inside of the reactor vessel in order to monitor neutron irradiation embrittlement. The three capsules installed at NMP-1 contain Charpy and tensile mechanical property test specimens, along with iron, copper and nickel dosimeter wires.

2.0 EVALUATION

The C capsule is of primary interest and is located at 300-degree azimuth; and the A capsule is located at 30-degree azimuth. The samples in both capsules represent base metal, weld metal and heat affected zone (HAZ) metals. The licensee performed the following tests for the specimens that were removed from the capsules:

(1) Charpy impact tests: the data generated from these tests was used to construct the Charpy transition curves and to determine the upper shelf energy level of reactor vessel materials. The data included test temperature, energy absorbed by the specimen in breaking, lateral expansion, percent ductile fracture, 30 ft-lb level nil-ductility temperature (NDT) and 50 ft-lb level NDT temperature. The Charpy impact data were prepared and reported according to ASTM E 185-82 and the results are within the minimum allowable specified in 10 CFR Part 50 Appendix G.

(2) Tensile tests: The tensile tests were conducted to determine the tensile properties of metals; e.g., yield strength, ultimate tensile strength, uniform elongation, total elongation, fracture strength, fracture stress, and reduction in area.

(3) Chemical analysis: The weld metal and base metal specimen were analyzed to determine percentage weight of copper, phosphorus, and nickel, using the method of x-ray fluorescence. The following is the average chemical composition of the specimens.

	copper	nickel	phosphorus
Base metal	0.25%	0.52%	0.041%
Weld metal	0.17%	0.07%	0.022%

The chemical contents of these elements are needed to calculate nil-ductility reference temperature (RT_{NDT}).

(4) Neutron dosimetry measurements: This task used a germanium detector to measure specific activities of flux monitor wires in the surveillance capsule. The gamma radiation from the dosimeter was measured and used to calculate the neutron fluence. The capsule specimens received a fast neutron fluence of $4\sim5 \times 10^{17}$ n/cm^2 at $E > 1$ MeV. This neutron fluence is comparable to those of other BWR vessels for the period of 5-8 efpy.

Using Regulatory Guide 1.99, Revision 2 the licensee calculated the shifted RT_{NDT} based on the amount of neutron fluence, and the percentage weight of copper and nickel in the material and compared the results to the shifts which resulted from the surveillance test data. Based on the test results, the pressure-temperature limits were obtained using the reference stress intensity factor vs. temperature relation as discussed in Appendix G of the ASME Code. In evaluating the licensee's calculation, the staff used procedures in SRP 5.3.2 and Regulatory Guide 1.99, Revision 2 to determine the acceptability of the RT_{NDT} shift and pressure-temperture limits. The staff found the licensee's pressure-temperature limits acceptable for 11 efpy of core operation.

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.

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Dated: June 10, 1986