



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 39 TO FACILITY OPERATING LICENSE NO. DPR-63
NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT NUCLEAR STATION, UNIT NO. 1
DOCKET NO. 50-220

I. INTRODUCTION

By letter dated September 25, 1979 and as supplemented by letter dated October 22, 1980, Niagara Mohawk Power Corporation, the licensee, proposed changes to the Nine Mile Point Unit 1 Technical Specifications. These changes specify allowable operating conditions with three or more operable recirculation loops and the inoperable loops either isolated, unisolated or a combination thereof. The impact of inoperable recirculation loops on reactor flow distribution and coolant inventory as related to reactor safety analyses is considered in this evaluation.

II. EVALUATION

Partial loop operation and its effect on core flow distribution has been experimentally quantified in Reference 1. The measurements show that for a jet pump reactor core flow remains uniform under partial loop operation. The lower plenum hydraulic design in a non-jet pump reactor (Nine Mile Point) is essentially identical to the jet pump reactor design. Additionally, Nine Mile Point 1 has baffle plates in the lower plenum to uniformly distribute the impinging water flow from recirculation pump discharge to the core. Therefore flow would be uniform under partial loop operations. The assumption of uniform flow for reactor safety analyses remains valid.

For four loop operation with the idle loop isolated, the previous accident analyses for five loop operation are bounding except for the Loss of Coolant Accident (LOCA). The unavailable mass of water in the isolated loop during blowdown results in a slightly earlier uncover time for the hot node. This results in an increase in the peak clad temperature of approximately 30°F, which is approximately equivalent to a 1.5 percent reduction in Maximum Average Planar Linear Heat Generation Rate (MAPLHGR). To assure that the peak clad temperature remains below the 10 CFR 50 Appendix K limits the Average Planar Linear Heat Generation Rate (APLHGR) for each fuel type as a function of average planar exposure shall not exceed 98 percent of the MAPLHGR applicable to five pump operation during steady state power operation with one recirculation line isolated.

For three loop operation with two idle loops isolated, further increases in peak clad temperature would result during a postulated LOCA since an additional mass of water is unavailable during blowdown due to the second isolated loop. During a postulated LOCA, a second isolated loop would result in a further increase in the peak clad temperature and requires an additional 2 percent reduction in MAPLHGR. To assure that the peak clad temperature remains below the Appendix K limits, the APLHGR for each fuel type as a function of average planar exposure shall not exceed 96 percent of the MAPLHGR applied to five pump operation during steady state power operation with two recirculation lines isolated.

For three loop operation with one loop isolated and one loop unisolated, previous analyses for four loop operation with one loop isolated is bounding since loops out of service but unisolated have no effect on ECCS calculation or transient analyses.

Previous core-wide transient analyses for five loop operation are bounding for four loop and three loop operation with the idle loops isolated, except for the idle loop startup transient analysis. To preclude idle loop startup the licensee will be required by Technical Specifications to use procedural controls identical to those currently utilized for four loop operation with the idle loop isolated. These requirements for idle loop operation preclude the inadvertent startup of recirculation pumps and therefore remove the need for a power level restriction under partial loop operation. If these administrative procedures are removed, power level shall be restricted to 90.5 percent of rated. This is the power level for which an inadvertent startup of an idle loop has been analyzed and the consequences found acceptable. The results of this analysis are for idle loop startup with four pumps operating and it is applicable to three loop operation.

For one or two loops out of service but not isolated, the core flow and fluid inventory distribution in the core are the same as would be present with all loops in service. Therefore, there would be no affect on the Emergency Core Cooling System (ECCS) calculation due to the out-of-service loop(s). This is due to the fact that no credit is taken for extended nucleate boiling caused by flow coastdown in the unbroken loops. Therefore, operation at the full MAPLHGR limits is acceptable with one or two loops out of service but not isolated.

For transient analyses the effect of backflow through unisolated, inoperable loops has been taken into account. The Technical Specifications power/flow line will be administratively reduced to assure that allowable power corresponds to actual core flow. For example, core flow is generally measured from venturi fluid dynamic characteristics in each pump discharge line. However, given backflow through unisolated, inoperable loops, actual core flow would be less than measured. The reduced power/flow line accounts for the backflow and the assumed power/flow condition for transient analyses remain valid. The adjustment is less than 0.3% of APRM power and will not

significantly affect reactor operations, so that the use of administrative procedures for this operation is considered appropriate. (The idle loop startup transient is not as severe as for the isolated loop case since the backflow keeps the unisolated, inoperable loops close to reactor temperature thereby minimizing the reactivity insertion.)

In the evaluation of MCPR safety limit the licensee has concluded that increase TIP noise uncertainty under partial loop operating conditions may require an increase in safety limit MCPR. The licensee has committed to conservatively increase the MCPR safety limit by 0.01 during three loop operation to account for the potential increased uncertainty. This requirement shall be incorporated into the Technical Specifications to assure compliance.

On the above bases, the proposed modifications to plant Technical Specifications and operating procedures acceptably account and restrict operation with three or more operable loops.

III. ENVIRONMENTAL CONSIDERATIONS

We have determined that this amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that this amendment involves an action which is insignificant from the standpoint of environmental impact, and pursuant to 10 CFR §51.5(d)(4) that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

IV. CONCLUSION

We have concluded based on the considerations discussed above that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) 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 or to the health and safety of the public.

Dated: December 12, 1980