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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO THE MSIV ACTUATION LOGIC DESIGN AT NINE MILE POINT, UNIT 2 DOCKET NO. 50-410

1.0 INTRODUCTION

The main steam isolation valve (MSIV) actuator control system for Nine Mile Point, Unit 2 (NMP-2) was modified recently to compensate for deficiencies found within the mechanical portion of the original MSIV actuator design. The original actuator design consisted of a mechanical latching mechanism to hold the valve open and two normally energized solenoid operated spring plungers to release the mechanism and permit spring closure of the valve. Each solenoid was powered from a separate, independent Uninterruptable Power Supply (UPS) system, and it took the deenergization of both solenoid spring plungers to initiate closure of the associated MSIV (i.e., disengage the mechanical latch). Testing of the original design revealed that in some cases the force produced by the solenoid operated spring plungers was inadequate to trip the mechanical latch.

Subsequently, the licensee decided to eliminate the use of the mechanical latch trip system described above and to utilize the hydraulic system, originally intended only to open the MSIVs, to maintain the MSIVs in the open position. This re-design proposes using the solenoid operated valves (SOVs) which are part of the original hydraulic system. These SOVs will be normally energized to keep the solenoid valves closed, thereby maintaining the hydraulic pressure to keep the MSIVs open. Deenergization of any one of the SOVs will cause rapid closure (release of hydraulic pressure) of the associated MSIV. In an attempt to enhance MSIV availability and to be consistent with the original MSIV design, the

licensee proposed to provide power to each SOV from either of two independent UPS systems through automatic transfer circuitry in order to assure that the loss of one power supply system would not deenergize (open) either SOV. After review of the modifications performed on the MSIVs, the staff informed the licensee by letter dated January 14, 1987 that the automatic transfer logic was not in full compliance with the requirements of 10 CFR 50, Appendix A, General Design Criterion (GDC) 21 and IEEE Standard 279 [10 CFR 50.55 a(h)].

By letter dated January 15, 1987, the licensee committed to remove the automatic transfer system and informed the staff of a revised method of supplying power to the electrical SOVs associated with the MSIV actuation system. The staff's evaluation of the latest MSIV design modifications proposed for the MSIV actuator control system is provided below.

2.0 EVALUATION

The modified NMP-2 MSIV actuator logic control circuitry will utilize relay logic (coil-to-contact) operation to assure that actuation of a single emergency trip sensor (i.e., one-out-of-two in trip system A or B) will not cause inadvertent closure of the MSIVs. This is consistent with the original design basis of NMP-2 whereby the logic is set up as a one-out-of-two taken twice logic (i.e., one-out-of-two in trip system A and B are required to close the MSIVs). To reiterate, the automatic transfer between the redundant Class 1E reactor protection system (RPS) UPS systems has been removed. Thus, a loss of a single RPS UPS system will deenergize its associated SOV and result in the closure of the associated MSIVs which is consistent with the fail-safe design feature.

Also, the relay logic design allows the licensee to perform their required Technical Specification monthly channel functional test surveillance requirements and provides coil-to-contact isolation between

the redundant logic channels. The staff questioned the use of these relays as qualified isolation devices. In response (letters dated January 15 and February 4, 1987), the licensee described the relays and committed to perform maximum credible fault tests to qualify the relays as acceptable isolation devices. The device has been identified as a ITE/Telemechanique (Gould-Type J10) relay. The relay contains a metal barrier that separates the coil section and its associated wiring from the contact section of the relay and its wiring. The licensee has confirmed that the subject relays are seismically and environmentally qualified for their safety-related application in accordance with IEEE 344-1975 and 10 CFR 50.49 respectively.

In the February 4, 1987 letter, the licensee provided an outline of the test procedure used to qualify the Gould J10 relays and provided a summary of the test results. The staff audited the test procedure used to demonstrate the qualification of the subject relays as acceptable isolation devices. The test procedure identified the maximum credible fault voltage and current to be 119 Vac and 15 amps respectively. After review of the analysis (supplied by letter dated January 15, 1987) used to determine these fault values, the staff considers 119 Vac/15 amps to be acceptable fault test values for qualification of the relays. The acceptance criteria provided in the test procedure was found to be acceptable (i.e., upon application of the maximum credible fault, the isolation between the coil and contact will be maintained and no spurious signals will be transmitted across the barrier). The test summary (provided in the February 4, 1987 letter) shows that the relay performed in accordance with the established acceptance criteria stated above (i.e., no spurious signals were observed when the maximum credible faults were applied in the transverse modes). Based on the results of the tests and the actual relay configuration (metal barrier between the coil and contact portions of the device), the staff concludes that the Gould J10 relays as installed in the MSIV actuator control system are acceptable isolation devices.

Upon further review of the MSIV logic design modifications, the staff questioned the use of redundant fault interrupting devices for isolation between the Class 1E and non-Class 1E circuits. The latest modifications show that the non-Class 1E MSIV partial stroke test solenoid valve will be powered from the RPS Class 1E bus through redundant 3 amp fuses. The licensee has stated that the fuses are procured and installed as Class 1E devices and that both are properly coordinated with the upstream protective devices. In their February 4, 1987 letter, the licensee confirmed that a continuous 3 ampere load will not degrade the ability of the Class 1E system to perform its required protective function (i.e., the Class 1E system is designed for and rated to support the 3 ampere current draw). Further, the licensee has verified that the replacement of fuses is covered by the NMP-2 Standing Order No. 14, "Operations Department Fuse Control Program," which will ensure, through quality assurance review, verification that a correct size fuse will be installed. The staff finds this acceptable.

The staff pursued the issue related to periodic verification of operation of the redundant emergency trip SOVs associated with each MSIV. The licensee provided information in their January 15 and February 4, 1987 letters to address this issue. The correct performance of the MSIV emergency trip actuation solenoid valves can be verified during MSIV full closure testing. The MSIVs will be full stroke tested at each cold shutdown in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (Part IWV 3412). This commitment is described in the NMP-2 preservice inspection plan pump and valve program and is based upon Technical Specification Section 4.0.5 which requires compliance with ASME Section XI. The licensee has further committed to revise Operating Surveillance Procedure (OSP) N2-MSS-CS-001 to require positive confirmation of the functioning of each MSIV actuator solenoid during each cold shutdown full stroke test. Reed switch position indication is provided in the control room for the SOVs whereby the operator can verify proper solenoid valve operation. The OSP identified above should be revised

prior to the next full stroke test required by ASME Section XI. The licensee has also verified that the Electrical Protection Assembly (EPA) setpoints are coordinated with the load requirements of the SOVs and that calculations were performed to ensure that both the high and low voltage EPA trip setpoints maintain the operating voltage within allowable values.

3.0 CONCLUSION

Based on the above evaluation, the staff concludes that the latest design modifications made to the MSIV actuation control system comply with the applicable regulatory acceptance criteria including the requirements of IEEE 279 and GDC 21 and are, therefore, acceptable.

ENCLOSURE 2

EICSB/DBL SALP INPUT

PLANT: Nine Mile Point, Unit 2

LICENSEE: Niagara Mohawk Power Corporation

DOCKET NO: 50-410

LICENSEE STATUS: OR

SER SUBJECT: Safety Evaluation Report INPUT

PERFORMANCE PARAMETERS:

(1) Management Involvement in Assuring Quality
(2) Approach to Resolution of Technical Issues From a Safety Standpoint
(3) Response to NRC Initiatives
(4) Staffing (Including Management)
(5) Reporting and Analysis of Reportable Events
(6) Training and Qualification Effectiveness
(7) Any Other SALP Functional Area

PERFORMANCE PARAMETER	NARRATIVE DESCRIPTION OF APPLICANT/LICENSEE'S PERFORMANCE	CATEGORY/ RATING
1	The licensee did not appear to adequately understand staff policies and did not make decisions based on adequate management involvement. An appropriate level of management was not present and significantly involved at the various review meetings held with the licensee.	3
2	The licensee's submittals showed that there was not an adequate understanding as to the information necessary to resolve various issues. The approach to resolve the issues appeared to be viable but the information	3

PERFORMANCE PARAMETER	NARRATIVE DESCRIPTION OF APPLICANT/LICENSEE'S PERFORMANCE	CATEGORY/ RATING
	provided to resolve the issues was lacking significantly in thoroughness and depth and met minimum requirements. Much effort was expended by the staff to provide guidance to the applicant necessary to resolve many of the issues. Repeated requests and clarifications of requirements had to be made to obtain necessary information. The lack of sufficient information has caused much delay in the resolution of the issues.	
3	The licensee responded poorly (lack of thoroughness) to concerns raised by the staff. In particular, where design changes were made that required staff re-review, the applicant was reluctant to provide sufficient details to allow the staff to complete its review. The staff has spent considerable effort to obtain an acceptable resolution of the issue (i.e., the NRC staff had to generate specific guidance on information needed to resolve the issues).	3

OVERALL APPLICANT/LICENSEE PERFORMANCE RATING 3