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EISENHUT,D.G. Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards results of automatic depressurization sys logic studies & description of proposed mods.Studies included BWR small break LOCA accident outside primary containment,safe shutdown analysis & Mark I containment load mitigation.

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December 3, 1982

Mr. Darrell G. Eisenhut, Director
Division of Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Dear Mr. Eisenhut:

Our letter of September 30, 1982 indicated a description of proposed modifications to the automatic depressurization system logic would be provided by December 3, 1982. The proposed modifications to the logic system were to encompass the results of three independent studies involving the automatic depressurization system. These studies included:

- Boiling Water Reactor Owners Group study to address a small-break loss-of-coolant accident outside the primary containment.

- Appendix R safe shutdown analysis.

- Mark I Containment load mitigation.

The results of the studies performed to date and how they affect on the automatic depressurization system logic are discussed in the attachment to this letter.

Sincerely,

cvmangan

C. V. Mangan
Vice President Nuclear Engineering
and Licensing

CVM/RJP:bd

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NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT UNIT 1

AUTOMATIC DEPRESSURIZATION SYSTEM

The following discussion encompasses three studies performed or currently underway with respect to the automatic depressurization system logic at Nine Mile Point Unit 1. These studies are as follows:

A. Boiling Water Reactor Owners Group Study

This study was transmitted to the NRC by Mr. T.J. Dente, Chairman Boiling Water Reactor Owners Group by letter dated October 28, 1982. Based on our review of this study and the options discussed therein, modifications are not required to the automatic depressurization system logic at Nine Mile Point Unit 1. Implementation of system oriented emergency procedure guidelines, along with the current logic satisfies the intent of NUREG 0737 item II.K.3.18. These procedures provide additional guidance for use of the automatic depressurization system beyond that previously available.

The current revision of the system oriented emergency procedure guidelines was written assuming no modifications to the current automatic depressurization system initiation logic. The guidelines enable the operator to maintain control during conditions of increasing levels of degradation (system failures) and provide specific guidance on when manual initiation of the automatic depressurization system is required. Events requiring manual depressurization were analyzed including reactor pressure vessel isolation with a break located outside of the drywell. For this event, the operator has in excess of 10 minutes to manually depressurize the reactor pressure vessel in order to permit operation of the core spray injection system and prevent excessive fuel cladding heat up.

B. Appendix R Safe Shutdown Analysis

Our letter of December 3, 1982 provides a detailed description of proposed modifications to the Automatic Depressurization System logic. These are summarized below.

To prevent spurious actuation from occurring, the following modifications are required.

1. Add interposing relay contacts in the DC circuit for each valve and locate these contacts in another fire area which is independent of the control complex.

2. Modify the existing sensor logic to neutralize the actuation on loss of power to both reactor protection system busses 11 and 12.

The additional logic will be located outside the control complex. This additional logic will be one out of two low-low-low level and one out of two high drywell pressure for either channel 11 or channel 12. It will also be energized to actuate. In addition, manual actuation from the control room will be permitted via a control switch relay assembly. The additional relay (located outside the control room) will be controlled by a switch (located inside the control room) which normally shorts out this relay in addition to interrupting power to this relay. These features prevent spurious actuation.

C. Mark I Load Mitigation Study

A two phase study is currently in progress. The purpose of this two phase study is to evaluate options related to mitigation of loads associated with subsequent relief valve operation.

Phase 1 evaluated the capability of the Emergency Condenser System for small and intermediate sized breaks to reduce the number of relief valve actuations. Preliminary results of this phase indicates actuation of relief valves would occur with an elevated water leg condition present, resulting in potential damaging thrust loads in the relief valve discharge lines. As a result, we are proceeding with the Phase 2 study. Phase 2 will evaluate automatic depressurization system logic modifications to prevent these loads. Two options will be evaluated.

1. Low-Low Set and Automatic Depressurization System Initiation Logic Modification

Low-low set is a logic scheme which changes the setpoints of two relief valves under the following conditions. Given a signal representing relief valve actuation and either a reactor scram or a main steam isolation valve closure, the circuit lowers the opening and closing setpoint pressures of two relief valves which increases their blowdown window. This provides sufficient reactor blowdown to prevent reactor repressurization and subsequent relief valve lift during the predicted elevated water leg period. Automatic depressurization system initiation logic will keep any low-low set relief valve open once the automatic depressurization system timer is started. Any low-low set valve which opens due to a pressure signal while the timer is running will also remain open.

2. Setpoint Changes and Automatic Depressurization System Inhibit Modification

Relief valve opening and closing setpoints will be repositioned to increase the reactor blowdown with relief valve actuation and to ensure that the relief valve opening and closing sequence is predictable. The setpoints will be repositioned so that two valves, one from each division, open first and close last. The amount of blowdown will be enough to ensure that the repressurization time is greater than the time that the elevated water leg is predicted to exist. This will prevent a subsequent actuation of a relief valve during that period. To assure that

the automatic depressurization system will not open a valve in this sequence, an automatic depressurization system inhibit will be provided. This system will involve placing a time delay relay in the relief valve logic circuit which will prevent the relief valve from opening due to automatic depressurization system demand during the elevated water leg period. The relay will sense relief valve position (open or closed) and block the automatic depressurization system signal to the affected valve(s) for a set time (i.e. a few seconds) following relief valve closure.