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SUBJECT:

FORWARDING REFT ENTITLED: "ANALYSIS OF SMALL BREAKS IN THE REACTOR COOLANT PUMP DISCHARGE PIPING FOR THE B&W LOWERED LOOP 177 FA PLANTS, MAY 1, 1979", DESCRIBING METHODS USED & RESULTS FROM RECENT STUDIES OF SMALL BREAKS IN REACTOR COOLANT PUMP DISCHARGE

PLANT NAME: THREE MILE ISLAND - UNIT 1

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METROPOLITAN EDISON COMPANY

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May 3, 1978

TELEPHONE 215-929-3601

GQL 0809

Director of Nuclear Reactor Regulations
Attn: R. W. Reid, Chief
Operating Reactors Branch No. 4
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Small Break LOCA

Attached is the report (ANALYSIS OF SMALL BREAKS IN THE REACTOR COOLANT PUMP DISCHARGE PIPING FOR THE B&W LOWERED LOOP 177 FA PLANTS, May 1, 1978) describing the methods used and the results obtained from B&W's recent studies of small breaks in the reactor coolant pump discharge piping for the B&W lowered loop 177 - fuel assembly plants. This report shows that at power levels up to 2568 mwt, full compliance with 10 CFR 50.46 is achieved.

This report differs from the report we submitted to you with our letter of April 27, 1978, GQL 0778, in that only a power level up to 2568 mwt is considered herein, and two additional break sizes (0.15 ft² and 0.17 ft²) have been evaluated. This report supercedes the like report dated April 24, 1978.

In addition to requesting the information contained in the aforementioned report, you also requested additional information via telecopy to Met-Ed on May 1, 1978. Responses to your additional concerns are as follows:

1. Verify that the procedure changes described in your letter of April 27, 1978 have been fully implemented.

Response: Temporary Change Notice (TCN) No. 78-161 to Operating Procedure 1104.2 (Makeup and Purification Demineralization) was issued on April 22, 1978, to permit operations with one of the two makeup pump discharge cross connect valves (MU-V76A/B) open. MU-V76B is presently locked open.

TCN No. 78-173 to Emergency Procedure 1202-6 (Loss of Reactor Coolant/ Reactor Coolant Pressure) which supercedes TCN No. 78-160, April 21, 1978, was issued on April 27, 1978, to detail the required operator action in accordance with the analysis assumptions.

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GQL 0809

2. Describe the tests that have been conducted to verify your ability to perform the procedures described in your letter of April 27, 1978 within the time limits specified. Provide the measured times obtained in a dry run measured from the time of assumed safety features actuation.

Response: On April 24, 1978, a response time test was conducted to evaluate our ability to open the HPI valves following the hypothetical small break LOCA and diesel failure. The test began by informing the CRO that an RCS low pressure alarm had sounded followed immediately by ES actuation. The CRO took time to verify that one diesel seemingly failed to start and one make-up pump was not running. The CRO took time to page his primary AO to inform him to open MU-V 76A. At that point the CRO left the Control Room (simulating the CRO's next action) to open MU-V 16 A/B. (These valves were chosen in part because they are the most remote and most inaccessible.) The time test was considered complete when communications were established between the control room and the CRO from MU-V 16 A/B.

The first test took 5 minutes and 4 seconds with the following breakdown of events:

2 minutes - CRO to recognize and interpret accident: page primary AO to open MU-V 76A.

3 min. 4 sec. - response time (walking) to MU-V 16 A/B, simulate opening $\frac{1}{2}$ turn, and establish communications with control room.

A second test was conducted in an attempt to improve the response time. The result was that the response time (including time to open the valve $\frac{1}{2}$ turn) was reduced to 2 minutes without breaking into a run.

Drills will be performed by all operating shifts in an above manner in an attempt to minimize operator response times. Results of drills thus far are as follows:

<u>Drill</u>	<u>Date</u>	<u>CRO Evaluation Time</u>	<u>A/O Response Time*</u>	<u>CRO Response Time*</u>
1	5/2/78	2 min.	1 min. 6 sec.	1 min. 57 sec.
2	5/2/78	2 min.	1 min.	2 min.

* Response Time is for valve start to open and establish communications.

3. Provide an analysis demonstrating that the valve operating procedures, when utilized under any accident condition requiring operation of the HPI pumps, will not lead to a condition (such as runout, inadequate NPSH, etc.) which could result in degradation of pump performance during any part of the transient.

May 3, 1978
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Response: The procedure revisions have been reviewed, and it has been determined that utilization of these procedures under any accident condition requiring operation of the HPI pumps will not lead to degradation of pump performance during any part of the transient. Performance of these procedures provides assurance that the total HPI flow, whether through two legs or four legs, will not exceed 550 gpm. Further assurance that pump runout will not occur results from B&W's indicating that pump runout will not occur as long as the back pressure is greater than the pressure equivalent to 1500 ft² of water (approximately 650 psi). For the largest break analyzed (0.17 ft²), RCS pressure reaches about 650 psia in about 400 seconds, at which time the HPI valves would already be into the balancing evolution. Conservative calculations based on FSAR and Technical Specification data have been performed and indicate that adequate NPSH exists for at least 7.5 hours while taking suction from the BWST.

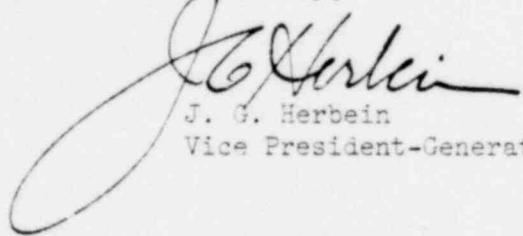
4. Describe the training provided for the designated operators on each shift, including exercising procedures, which will assure adequate preparation and readiness on all shifts.

Response: Upon receipt of the Cycle 4 reload License, each shift was briefed on the constraints of the license and the small break LOCA procedure requirements. An Operations Order was written to require each Operations Department person to signify understanding of the procedure changes and manning requirements. Also, each Operations Department person is to physically locate all equipment required to be operated in accordance with the procedure changes. The Operations Order further requires one person on each shift who is free to respond to the postulated accident to be stationed in the Control Room at all times, and one person on each shift to be stationed on the primary side of the plant at all times to carry out the required action specified in the procedure changes. A sheet is attached to the Control Room Log Sheet showing who are the two individuals assigned the responsibilities for carrying out the actions indicated in the procedure changes.

Each shift will be rebriefed at least once per month of the actions required in the procedures.

Based on current scheduling, TMI-1 will be in the position to obtain 100% full power (2535 Mwt) on May 7, 1978. Therefore, it is requested that your review be completed prior to May 7, 1978.

Sincerely,



J. G. Herbein
Vice President-Generation

JCH:RJS:dkf

Enclosure

1485 311

ANALYSIS OF SMALL BREAKS
IN THE
REACTOR COOLANT PUMP DISCHARGE PIPING
FOR THE
B&W LOWERED LOOP 177 FA PLANTS

DUPLICATE DOCUMENT

Entire document previously
entered into system under:

ANO 7904230043

No. of pages: 16

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R. W. Reid

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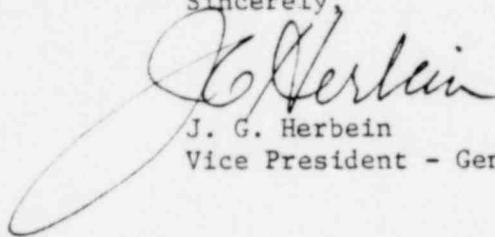
April 20, 1978
GQL 0743

As pointed out in our letter of November 18, 1977, the difference in peak RCS pressure, between the analysis done for 172 lbm/sec at 2500 psig and a 500 ms delay time and the analysis done for 156 lbm/sec and a 450 ms delay time, is only 0.3 psi higher.

The Cycle 4 peak RCS pressure resulting from the bounding analysis submitted April 17, 1978, is about 2749 psig. Assuming an additional 0.3 psi based on the above discussion results in a peak RCS pressure of 2749.3 psig, which is below the 2750 psig limit. Since the 2749 psig valve has the additional conservatism of having used a 45 psi instrument error (30 psi had previously been assumed), sufficient justification for the increased settings is presented for Cycle 4.

Met-Ed will have the bounding analysis performed again using the 156 lbm/sec relief rate and a 450 ms trip string pressure delay time. Results of this reanalysis will be submitted in mid - May along with our refined Cycle 4 Tech Spec.

Sincerely,



J. G. Herbein

Vice President - Generation

JGH:RJS:jmr

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