D 0710.1/48

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REC: REID R W
NRC

ORG: HERBEIN J G
METROPOL EDISON

DOCDATE: 07/24/78
DATE RCVD: 07/28/78

DOCTYPE: LETTER NOTARIZED: NO
SUBJECT:
FORWARDING APPLICANT"S PROPOSED PERMANENT SOLUTION TO SMALL BREAK LOCA FOR UNITS 1 & 2 INVOLVING MODIFICATION TO THE HIGH PRESSURE INJECTION SYSTEM.

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LTR 1 ENCL 1

PLANT NAME: THREE MILE ISLAND - UNIT 1
THREE MILE ISLAND -- UNIT 2

REVIEWER INITIAL: XJM
DISTRIBUTER INITIAL: mc

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METROPOLITAN EDISON COMPANY

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July 24, 1978
GQL 1254

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

Director of Nuclear Reactor Regulation
Attn: S. A. Varga, Chief
Light Water Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

Three Mile Island Nuclear Station
TMI-1 DPR-50, Docket No. 50-289
TMI-2 DPR-73, Docket No. 50-320

In our letters of April 27, 1978 (GQL 0778) and May 5, 1978 (GQL 0854), we indicated that we would propose a permanent solution to the Small Break LOCA problem for TMI-1 and TMI-2 respectively. Although the dates which we committed to for submitting this solution were not the same for both units (TMI-1 - July 24, 1978; TMI-2 - August 5, 1978), enclosed please find a description of our proposed permanent solution applicable to both units for the Small Break LOCA problem.

Your most expeditious review is requested as we wish to make this modification during our next refueling outage and we must begin procurement as soon as possible. Should you have any questions concerning our proposed solution to the Small Break LOCA problems, we are available to meet with you and discuss this issue.

Sincerely,

J. G. Herbein
Vice President-Generation

JGH:RAL:cjg

cc: Harley Silver, NRC
Gerry Zwetzig, NRC

Enclosure

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A001 S 1/1

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ROPOSED PERMANENT SOLUTION T
SMALL BREAK LOCA CONCERN
(Applicable to TMI-1 and TMI-2)

The proposed permanent solution to Small Break LOCA concerns for TMI Units 1 and 2 involves a modification to the High Pressure Injection (HPI) System. With this modification installed, reliance on operator action to mitigate the effects of a Small Break LOCA will be decreased.

The modifications to the HPI System mentioned above will allow an operator to perform the manual operations outlined in our letters of April 27, 1978 (TMI-1) and May 5, 1978 (TMI-2) remotely from the control room, with the exception of opening the makeup pump discharge cross connect valve. Plant operation will occur with this valve in the open position. Consequently, this valve will already be open should the postulated accident occur.

As outlined in the attached sketch, the proposed HPI System modifications will allow each HPI isolation valve to be connected to both the red and green (Channel 1 and 2) power. Each channel will contain redundant contactors between the breakers at the motor control center, and the valve itself. The contactors on Channel 1 will be interlocked by a Kirk Key Interlock in the Control Room, with the contactors on Channel 2. This interlock will preclude closing the contactors on both channels at the same time, and will provide at least two (2) points of separation between the two channels at all times.

Should the postulated Small Break LOCA occur, the operator will receive a safety injection alarm in the Control Room within sixty (60) seconds of the break occurring. Our procedures will (if this proposal is approved), require the operator to, upon receipt of the alarm, verify flow through all four (4) safety injection valves. If the operator identifies "no flow" in any of the injection legs, he will proceed to manually transfer power (using the Kirk Key Interlock) to the valve(s) with "no flow" indication. This will assure flow through all four (4) injection legs, thus meeting the acceptance criteria to alleviate the postulated Small Break LOCA.

As discussed in previous submittals, the postulated small break problem will not occur unless the small break is accompanied by a loss of off-site power. In our situation, the operator will perform the above action regardless of a loss of off-site power, with no degradation of the ability to mitigate the accident.

By letter (J. Taylor to S. Varga) dated July 18, 1978, Babcock & Wilcox (B&W) has submitted additional ECCS Small Break Analyses for B&W 177 Fuel Assembly Lowered Loop NSS (2772 Mw). These analyses incorporated a step input of water to the Reactor Coolant System at ten (10) minutes and result in a conservative maximum peak cladding temperature of 1092°F for the worst case break. Based on this and other analyses which B&W has performed (assuming a step input of water to the RCS in fifteen (15) minutes instead of ten (10) minutes), the maximum peak clad temperatures for the worst case break size (utilizing the 2772 Mw analysis) is about 2000°F (still below the 2200°F Criteria of 10 CFR 50.46).

We therefore, conclude that a step input of water (initiation of flow through all four injection legs) at fifteen (15) minutes is acceptably within the requirements of 10 CFR 50.46.

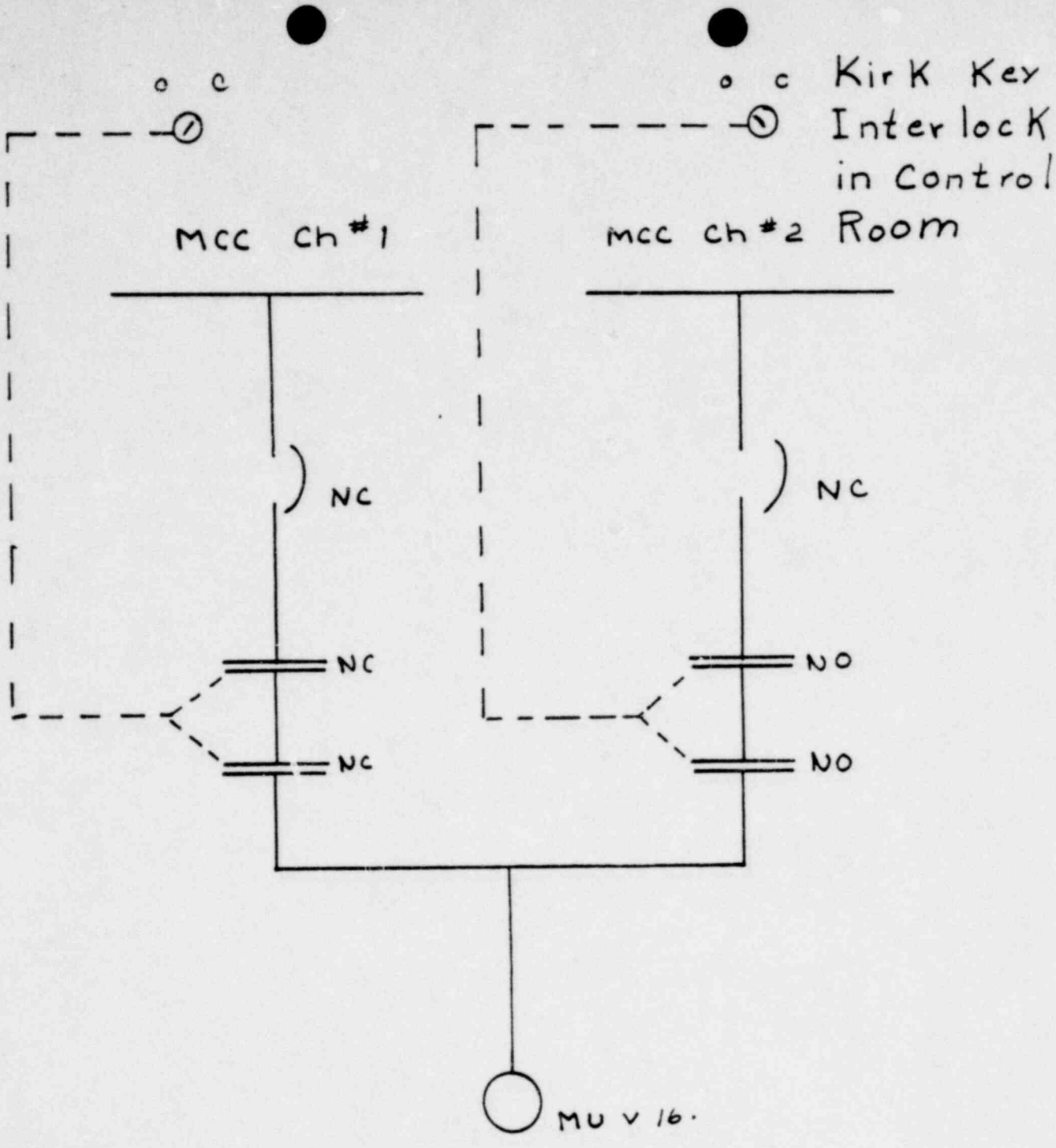
As stated in Nureg-0460, operator action may be assumed at the end of ten (10) minutes if 1)adequate information is displayed, and 2)the actions are very simple in nature. This is consistent with past licensing actions and is appropriate for those actions which are simple and based on the display of adequate information to the operator. As discussed earlier, the operator receives a safety injection signal alarm (audible and visual alarm) in the Control Room in less than sixty (60) seconds from the initiation of the postulated break. At that time, he has four (4) flow indicators available. Based on whether his indicators show adequate flow or "no flow", he must turn two (2) key controlled switches (located side by side) for each valve with a "no flow" indication. Under single failure criteria, the maximum number of valves he would have to transfer would be two (2) or a total of four (4) switches, all located on the same panel.

We, therefore, conclude that adequate information is available to the operator and the actions he must perform are few and very simple in nature. We further conclude that ten (10)minutes to perform these actions is a reasonable operator delay time and would successfully align the HPI system to mitigate any size postulated LOCA with substantial margin to 10 CFR 50.46 limits.

However, as stated earlier, we do have analysis that indicates that at least fifteen (15) minutes are available (for the worst case break) before operator action is required. A fifteen (15) minute operator delay time will also successfully align the HPI system to mitigate any size postulated LOCA with margin to 10 CFR 50.46 limits.

We request your approval of this proposed concept and approval of an operator response delay time in the range of ten (10)to fifteen (15) minutes inclusive.

Upon receiving your approval of the above proposed permanent solution, we will authorize B&W to perform analyses which will be totally in conformance with 10 CFR 50.46, documenting that our proposed modifications will produce maximum peak cladding temperatures below 10 CFR 50.46 limits (assuming an operator delay time consistent with the minimum delay time you find acceptable).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