UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
METROPOLITAN EDISON COMPANY	)	Docket No. 50-289
	)	(Restart)
(Three Mile Island Nuclear	)	
Station, Unit No. 1)	)	

LICENSEE'S COMMENTS ON HPI QUESTION AND ANSWERS IN NRC OCTOBER EXAMINATIONS

In accordance with Licensee's proposal dated December 16, 1981, and the Board's Memorandum and Order approving same dated December 18, 1981, Licensee submits its comments on the significance of HPI answers provided by operator license candidates who took the NRC written and oral examinations in October, 1981.

A. Written Examinations

Each of the two sets of RO written examinations (designated A and B) contained the question: "List all the conditions to be satisfied prior to terminating or throttling HPI." In order fully to understand the answers and NRC grading, it is necessary to make some preliminary observations about the question itself.

As evidenced by the NRC's answer keys for the two sets of examinations, the NRC examiners expected answers based on Section 6.B.3.1'.a of Emergency Procedure 1202-6B, which is a basic procedure establishing criteria for throttling HPI after it has been automatically initiated. In its entirety Section 6.B.3.11.a reads as follows:

> "11.a. Throttle HPI after bypassing ESAS only when one of the following conditions exists:
>
> (1) The LPI system is in operation and flowing at a rate in excess of 1000 gpm in in each line and the situation has been stable for 20 minutes.
>
> (2) The degree of subcooling is at least 50°F (as determined by saturation meter or 5 highest and operable incore thermocouples) and the action is necessary to prevent pressurizer level from going off scale high."

The answer keys also acknowledge that there are three Notes in E1202-6B following Section 6.B.3.11.A which elaborate upon the instructions contained in that section, including specific recognition that one of the Notes (limiting the degree of subcooling beyond 50°F by the applicable pressure-temperature restrictions of Figures 1 and 2 attached to the emergency procedure) involves pressure vessel integrity considerations. The answer keys also

indicate that coverage of these Notes was not required in answers to the HPI question.

Some of the examinees confined their answers to the material referenced in the NRC answer key. Others, however, expanded their answers to include instructions on throttling HPI contained in other emergency procedures addressed to special situations. These additional procedures include the following:

EP 1202-6C. This procedure is designed for loss of reactor coolant or reactor coolant pressure events causing high pressure injection, core flood and low pressure injection. Thus by definition the procedure is concerned with a large break LOCA. In case of a large break the HPI pumps might runout and cavitate due to inadequate discharge pressure. Throttling of HPI to keep the HPI pumps within an operating range of 500 to 550 gpm is called for without regard to the throttling criteria for small breaks contained in EP 1202-6B.

EP 1202-6B, Attachment 2. Section 2.B.2.7 and Attachment 2 of EP 1202-6B cover the special circumstance of an event where automatic HPI injection has occurred but where the event has been determined to be a non-LOCA overcooling incident. In such an event throttling of HPI is called for without the requirement that throttling is necessary to prevent the pressurizer level from going off-scale high.

EP 1202-5. This is a special procedure covering an OTSG rupture. In such an event HPI may be automatically initiated. If so, the HPI throttling criteria are similar to one of the

criteria listed in Section 6.B.3.11.a of EP 1202-6B, i.e. that both pressure control and a 50° subcooling margin must first be established in the RCS.

EP 1202-2. This procedure is applicable in the event of a station black-out (i.e. loss of off-site power). If the event also is accompanied by automatic HPI initiation, operators are referred (Section 2.B.5) to EP 1202-6B for guidance. EP-1202-2 also covers, however, the situation where conditions for automatic HPI actuation have not occurred but where manual initiation may be necessary to keep the pressurizer level from going too low. In this situation throttling of the HPI pumps is permitted when adequate pressurizer level (100") has been restored and a 50° subcooling margin exists.

EP-1202-4. This procedure also covers an event, i.e. reactor trip, where automatic HPI initiation has not been called for but where manual initiation may be necessary to keep the pressurizer level from going too low. Here again HPI may be throttled when pressurizer level has been restored, RCS pressure is greater than 1600 psig and a 50° subcooling margin exists. (Note: EP 1202-4 has not been previously distributed to the Board, Special Master or parties and is enclosed with this memorandum.)

Turning to the answers provided by the examinees to the HPI question, we note at the outset that Section 6.B.3.11.a of EP-1202-6B involves a follow-up action rather than an immediate operator response. Operators would have available to them the written emergency procedure. Clark et al, ff. Tr. 6225, at

5, 6 (Clark); PID (Plant Design and Procedures and Separation Issues) Par. 744. NUREG-0094 (Section IV.F.) describes the content of operator examinations and, with respect to emergency procedures, emphasizes that while operator applicants should demonstrate complete understanding of automatic actions and immediate action steps specified in emergency procedures, they should "be able to describe generally the objectives and methods used in ... emergency operating procedures." We believe the distinction between immediate and follow-up actions is a major element in determining the level of detail which operators are required to commit to memory and thus can be expected to recite in a closed-book examination.

With respect to the evaluation and grading of examination answers, Licensee has the following comments:

1. All but one[1/] of the 32 examinees referenced both of the basic throttling criteria listed in Section 6.B.3.11.a of EP 1202-6B, i.e. the 50° subcooling and LPI flow criteria. Grading penalties were for the most part concerned with the completeness with which the criteria were described.

2. The majority of penalties assessed were for failure to include correctly all of the elements of the 50° subcooling and LPI flow criteria. Thus points were deducted for failures (a) to indicate that the 50° subcooling is to be determined by reference to the saturation meter or five highest incore thermocouple readings, (b) to specify that the 1000 gpm LPI flow was

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1/ Examinee AA listed only the 50° subcooling criterion.

required in each LPI leg, and (c) for specifying that the 1000 gpm flow must have been present for at least 20 minutes without adding that the flow must also have been stable during this period. Licensee notes that incomplete answers to correctly identified basic criteria reflect primarily on the examinees' inability to recall from memory all of the elements of written criteria which would be available for guidance in follow-up actions. They do not necessarily indicate inadequate training or that incorrect actions, in violation of the written procedures, would be taken by any of the examinees.

3. Some of the examinees received a grading penalty, not warranted in Licensee's view, for failure to indicate that the two throttling criteria in Section 6.B.3.11.a were in the alternative, i.e. that it was only necessary to meet either the 50° subcooling or LPI flow criterion.[2/] Considering the wording of the question (which called for all conditions necessary for HPI throttling) the failure to list conditions in the disjunctive was understandable. In fact, only one[3/] of the 32 examinees read the question as calling for a statement of the criteria in the alternative.

4. Some of the examinees were penalized, again in Licensee's view incorrectly, for characterizing one of the elements

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2/ NRC grading on this point was irregular. Thirteen of the examinees (A, B, D, E, G, H, T, EE, BB, CC, FF, GG and KK) were assessed a penalty. Seventeen of the examinees (C, F, I, L, P, Q, R, S, U, V, Y, DD, OO, QQ, RR, UU and WW) were assessed no penalties for the same treatment of their answers. In the case of examinees S and RR, the graders' notations appear to indicate that a penalty was initially assessed but later restored.

3/ Examinee Z.

of the 50° subcooling criterion as a requirement that HPI throttling be necessary "to keep from going solid" or "to prevent filling the pressurizer." They were docked for not using the wording of the emergency procedure "to prevent pressurized level from going off scale high."[4/] Since the function of the criterion is indeed to allow the operator to keep from going solid once the 50° subcooling criterion has been met, the answers should have been accepted as correct.

B. Oral Examinations

Examination results distributed by the NRC Staff indicate that oral questions dealing with HPI were addressed to a total of 23 candidates. Sixteen of the candidates were marked "S" (Satisfactory) on all HPI questions. Since in these circumstances neither the oral question or answer is noted by the NRC examiners, it is not possible to tell how many of the HPI questions dealt with thottling criteria.

Of the seven remaining candidates, three (P, Z and BB) received collectively a grading of "M" (Marginal) on a total of five HPI questions, a grading of "U" (Unsatisfactory) on two questions and an "S" on a total of 21 HPI questions. From the examiner's notes it would not appear that any of these candidates'

4/ Again the NRC grading was irregular. Ten of the examinees (E, G, I, P, Q, U, Y, BB, CC and GG) were assessed penalties. Four of the examinees (T, V, CC and OO) with similar answers received no penalty.

answers graded "M" or "U" had anything to do with throttling HPI.

Four candidates (I, S, AA and RR) received "U" or "M" gradings on oral questions which do appear to bear on HPI throttling. Without the full question and answer it is difficult to judge the examiner's grading and notations, but several answers were in all probability incorrect. They represent, however, a very small fraction of all the HPI questions which were addressed to candidates in the oral examinations.

In sum, Licensee does not believe that the results of the NRC written and oral examinations, as they relate to throttling criteria for HPI, reflect adversely on Licensee's training program or indicate that the operator candidates would fail correctly to observe Licensee's emergency procedures.

Respectfully submitted,

SHAW, PITTMAN, POTTS & TROWBRIDGE

By George F. Trowbridge

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