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April 29, 1980
BECO Ltr #80-79

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Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

License No. DPR-35
Docket No. 50-293

Additional Information on
Supplement 1 to Reload 4 Submittal

Dear Sir:

During your review of NEDO-24224-1 as submitted on April 3, 1980, by Boston Edison Company, two areas were identified where additional information would be desirable. These areas involve the assumptions used in the LOCA analysis with no core spray heat transfer credit. The desired information in the form of questions and answers is contained in an attachment to this letter.

Should there be further questions regarding this submittal, please contact us.

Very truly yours,

A. Paul Andognini

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ATTACHMENT

Question 1:

Why is there assumed to be no change in the reflood between this supplemental analysis (no core spray) and the original analysis? Is this assumption conservative?

Response 1:

There are two ways that can be postulated which might change the reflooding time in the Pilgrim's LOCA analysis with no core spray heat transfer (CSHT).

The first way is a change in the way the water flows from the spray sparger, down through the core and bypass regions, into the lower plenum, and up into the core. In the supplemental analysis, the assumption was made that the spargers were cracked and that they leaked enough to prevent the spray distribution from delivering sufficient spray flow to the hot bundle to permit credit for spray cooling. The spray water is still delivered to the upper plenum, where it is sprayed or pooled over the top of the core and bypass regions. Very little water flows through the upper tie plates down into the core because of the action of CCFL (counter current flow limiting). Practically all of the spray water therefore flows through the top guide into the bypass region, filling the bypass rapidly. Flow from the bottom of the bypass into the lower plenum is limited by the drilled holes in the lower tie plates. The area of the flow restriction at the bottom of the bypass is what determines the refilling rate of the lower plenum and the reflooding time of the core.

Therefore, a change in the spray distribution in the upper plenum does not affect the filling of the bypass, the leakage from the bypass to the lower plenum, and the reflooding time of the core. In both the original and the supplemental analyses, the flow path of the spray water from the upper plenum, through the bypass, down into the lower plenum, and up into the core, is the same.

The second way is a change in the depressurization rate, caused by the assumption of no CSHT, which could affect the flow rates of the core spray systems, and consequently change the reflooding time. A sensitivity study was performed (described in NEDO-24224-1, page I-2) which showed that the change in the depressurization rate for the limiting break was negligible. Therefore no effect on reflood time would be expected from this mechanism.

Question 2:

Why was 25 BTU/HR/FT² chosen as the heat transfer coefficient on the channel exterior wall after the water level in the bypass reaches the hot mode? Address the conservatism in this number.

Response 2:

A value of 25 BTU/HR/FT² was determined from the FLECHT Test Program to be used as the heat transfer coefficient for the bundle internals during the times in question. The value of 25 is consistent with a film boiling boundary condition as opposed to complete wetting at the channel exterior surface. A more realistic

heat transfer coefficient on the channel exterior surface would thus be 1000 BTU/HR/FT² (assuming channel wetting). The value of 25 is thus conservative. The net effect on the analysis (of using 25 instead of 1000) is not very large but is in the conservative direction.