

August 8, 1990

Docket No. 50-219

DISTRIBUTION

Docket File

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Dear Mr. Fitzpatrick:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING GPU NUCLEAR CORPORATION'S RESPONSE TO NRC BULLETIN 90-02 "LOSS OF THERMAL MARGIN CAUSED BY CHANNEL BOX BOW" (TAC NO. 76342)

In letters dated May 21, 1990 and July 20, 1990, GPU Nuclear Corporation (GPUN) responded to NRC Bulletin 90-02, "Loss of Thermal Margin Caused By Channel Box Bow." We have reviewed the information and have determined that additional information is required in order for the staff to complete its review. The specific information requested is presented in the enclosure.

We request that the information be provided within 10 days of receipt of this letter. If you have any questions regarding this request, please contact me.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than 10 respondents; therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

signed by J. F. Stolz for

Alexander W. Dromerick, Senior Project Manager
Project Directorate I-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc w/enclosure:
See next page

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REQUEST FOR ADDITIONAL INFORMATION

Based on our current understanding of your methods for compensating for the impact of channel box bow on thermal margin, the staff believes that your methods are non-conservative and do not assure that the thermal margin to the CPR safety limit is maintained. This assessment is based on the following:

- (a) Your projected end of cycle (EOC) channel bow is based on Oyster Creek data only. Our examination of your data base indicates that it fails to identify a sharp increase in the rate of channel bow which occurs in the 38 to 40 GWD/MTU exposure range for other data. It appears that this difference may be due to insufficient data in the advanced exposure range rather than the cited superior performance characteristics of the Oyster Creek channels. Additional bow measurement data in the advanced exposure range are needed to substantiate your claim of superior channel bow performance due to your procurement control and core management programs.
- (b) Your methods rely partially on GE methodology which has not yet been approved by the staff. If approved, it is likely that its application will be limited to the first bundle lifetime and exposures not exceeding the 38 to 40 GWD/MTU cited above. While your methods partially account for non-conservatism which limit the application of the GE model to lower exposures, other concerns are not addressed. For example, core thermal-hydraulic calculations based on assumed bow configurations could over-predict the thermal margin on some channels but underpredict others due to the channel delta-p/inlet flow distribution relationship.

Unless the staff concerns are alleviated by additional data and information, it is our position that fuel channel boxes in the second bundle lifetime should not be reused in future operating cycles. Our evaluation of your current

operating cycle is continuing. Please provide additional information in response to the following:

1. Your response to the expressed staff position and its impact on your next operating cycle.
2. A detailed explanation is needed regarding how the coefficients and parameters (BFC, BFP) in your channel bow correlation were derived and exactly how this correlation is applied to channels at different core locations having different exposure histories.
3. A detailed discussion is needed regarding exactly how the bow data presented in Figure 2 of your May 21, 1990 submittal have been utilized in developing your bow correlation. This discussion should specify whether upper bound values, means values, mean plus one σ , etc., are used in the correlation.
4. In your July 20, 1990 submittal you state that GPUN limits the reuse of channels "to those that have been located only in the central region of the core." Does this mean that the reused channels all remained in the central core region during the entire first bundle lifetime? To clarify this, a description of your fuel shuffling scheme for reloading is needed.
5. Your May 21, 1990 submittal indicates that 150 second lifetime channels reside in the current (Cycle 12) core. We cannot determine from the information provided in your submittals, the total number of bundles (containing these channels) which were analyzed by your methodology. With reference to Figure 1 of your May 21 submittal, indicate specifically which bundles were analyzed, which bundles exhibit the maximum bow, which bundles are limiting bundles, and which of the remaining bundles residing in cells containing the second lifetime channels are fresh fuel bundles. In addition, correlate the channels listed in Table 1 of the May 21 submittal with Figure 1.

6. Provide limiting plots of predicted bow versus channel exposure, from the beginning of Cycle 10 (when second lifetime channels were first installed) to the end of the current cycle, to encompass all second lifetime channels currently in the core.