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October 5, 1995
C311-95-2406

U. S. Nuclear Regulatory Commission
Att: Document Control Desk
Washington, DC 20555

Gentlemen:

Subject: Three Mile Island Nuclear Generating Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Response to Request for Additional Information - Core Reload Methodology

NRC letter dated August 23, 1995 requested additional information regarding GPU Nuclear Topical Report TR-091, Revision 0, "Steady State Reactor Physics Methodology for TMI-1." This Topical Report was submitted by GPU Nuclear on March 6, 1995 for NRC review and approval for in-house GPU Nuclear core reload design.

The attachment provides an itemized response to each of the NRC questions. If any additional information is required, please contact Mr. David J. Distel, GPU Nuclear Licensing at (201) 316-7955.

Sincerely,

J. Knubel
Vice President and Director, TMI

DJD/plp
Attachment

c: Administrator, Region I
TMI Senior Resident Inspector
NRC Senior Project Manager, TMI-1

A001

ATTACHMENT

1.0 QUESTIONS

1. **In section 6.0, Reliability Factors, page 103 of the reference document you state: "These values are typical of the values used in reload analysis, but they will be evaluated and revised if needed, as more operation data is available."**

   A. What type of analyses will be performed on subsequent cycle data and what criteria will you use to decide if reliability factors need revision?

   B. If reliability factors need to be revised what mechanism do you plan to use to affect this change?

RESPONSE

Section 6.0 of TR-091 describes the methodology used to determine various "95/95" reliability factors based on comparisons between measured and calculated values. Because the current safety analyses (TMI-1 FSAR Chapter 14) use bounding values for most key physics parameters, not all reliability factors calculated in Section 6.0 are utilized. The reliability factors for regulating control rod group worth, radial peak pin, and total peak pin are directly used in the determination of Reactor Protection System (RPS) trip setpoints and alarm limits. Their application is described in TR-092, "TMI-1 Reload Design and Setpoint Methodology," which will be submitted to NRC in October 1995.

When subsequent cycle data are available, they will be added to the database. The impact of these data on the reliability factors will then be evaluated. It is likely to have some effect on the reliability factors for the Hot Zero Power (HZP) Beginning of Cycle (BOC) parameters due to the small size of the database. These reliability factors will be redetermined using the method described in Section 6.0. However, changes in these reliability factors would not have any impact on the safety limits and core operating limits since these reliability factors are not applied in current safety analyses (bounding values used).

The added data is unlikely to affect the power peak reliability factors because of the large number of data in the database. These power peak reliability factors are generally considered cycle independent. However, if the root-mean-square (RMS) errors of the new cycle's power comparison differ significantly from those of previous cycles (typically less than 2% for the radial power and less than 5% for total power), the cause of the deviation will be investigated and the impact on the power peak reliability factors will be evaluated.

If the comparisons worsen, the power peak reliability factors will be revised. However, it is not necessary to revise the power peak reliability factors if the comparisons improve, unless more operational margin is desired. Should there be a need to change the power peak reliability factors, they will be redetermined by applying the methodology given in Section 6.0 and will be documented in the cycle's reload analysis calculation package.

2. How do the reliability factors listed in Section 6 compare with those being used for your current safety analyses?

RESPONSE

Not all the reliability factors listed in Section 6.0 are used in current safety analyses. The reliability factors for radial pin peak, total pin peak and regulating control rod (CR) group worth are directly used in determining the reactor protection system power/imbalance/flow trip setpoints, power imbalance alarm limits and control rod insertion limits. The reliability factor for control rod worth is the same as the current value. The reliability factors for radial and total pin peak are quite close to the current values. The current values are determined by Babcock and Wilcox (B&W) Fuel Company based on CASMO-3/NEMO. The reliability factors are compared below:

Reliability Factor	TR-091	CURRENT
Regulating CR Group Worth	-10%	-10%
Radial Pin Peak	1.035	1.038
Total Pin Peak	1.055	1.048

The differences in the peak power reliability factors are due to the differences in the computer codes (SIMULATE-3 versus NEMO). Improvement in the total pin peak reliability factor is expected if SIMULATE-3, instead of NEMO, is used to generate the input for the plant process computer.

3. What values of the reliability factors do you propose using to set plant safety limits?

RESPONSE

To be consistent with the methodology developed at GPU Nuclear, the reliability factors for the regulating control rod group worth, radial pin peak and total pin peak determined in TR-091 should be used to set plant safety limits. Since the current reliability factor for radial pin peak (1.038) bounds the 1.035 value determined in TR-091, the 1.038 value will be used for conservatism. Therefore, we propose to use the following reliability factors to set plant safety limits:

Reliability Factor	Value
Regulating CR Group Worth	-10%
Radial Pin Peak	1.038
Total Pin Peak	1.055

As shown in the Table provided in response to Question 2, these reliability factors to be used by GPU Nuclear in establishing plant safety limits are the same or bound those used by Babcock and Wilcox in current reload analysis methods.

4. What effect will the use of these new reliability factors have on existing plant operating limits?

RESPONSE

Since the reliability factors determined in TR-091 are either the same or close to the current values (see answers to Questions 2 and 3), the impact of using the new reliability factors on existing plant operating limits is insignificant. As shown in the attached Figures 1 and 2, the power imbalance alarm limits and control rod insertion limits generated with GPU Nuclear methodology are essentially the same as the

vendor results. The Cycle 10 limits are determined using the following reliability factors:

Reliability Factor	GPUN	Vendor
Regulating CR Group Worth	-10%	-10%
Radial Pin Peak	1.038	1.038
Total Pin Peak	1.055	1.048

TR-092, "TMI-1 Reload Design and Setpoint Methodology," will document the application of the new reliability factors as compared to our current plant operating limits for Cycle 10.

Figure 1 Power Imbalance Alarm Limits
(0-to-75 EFPD and 4 Pump Operation)

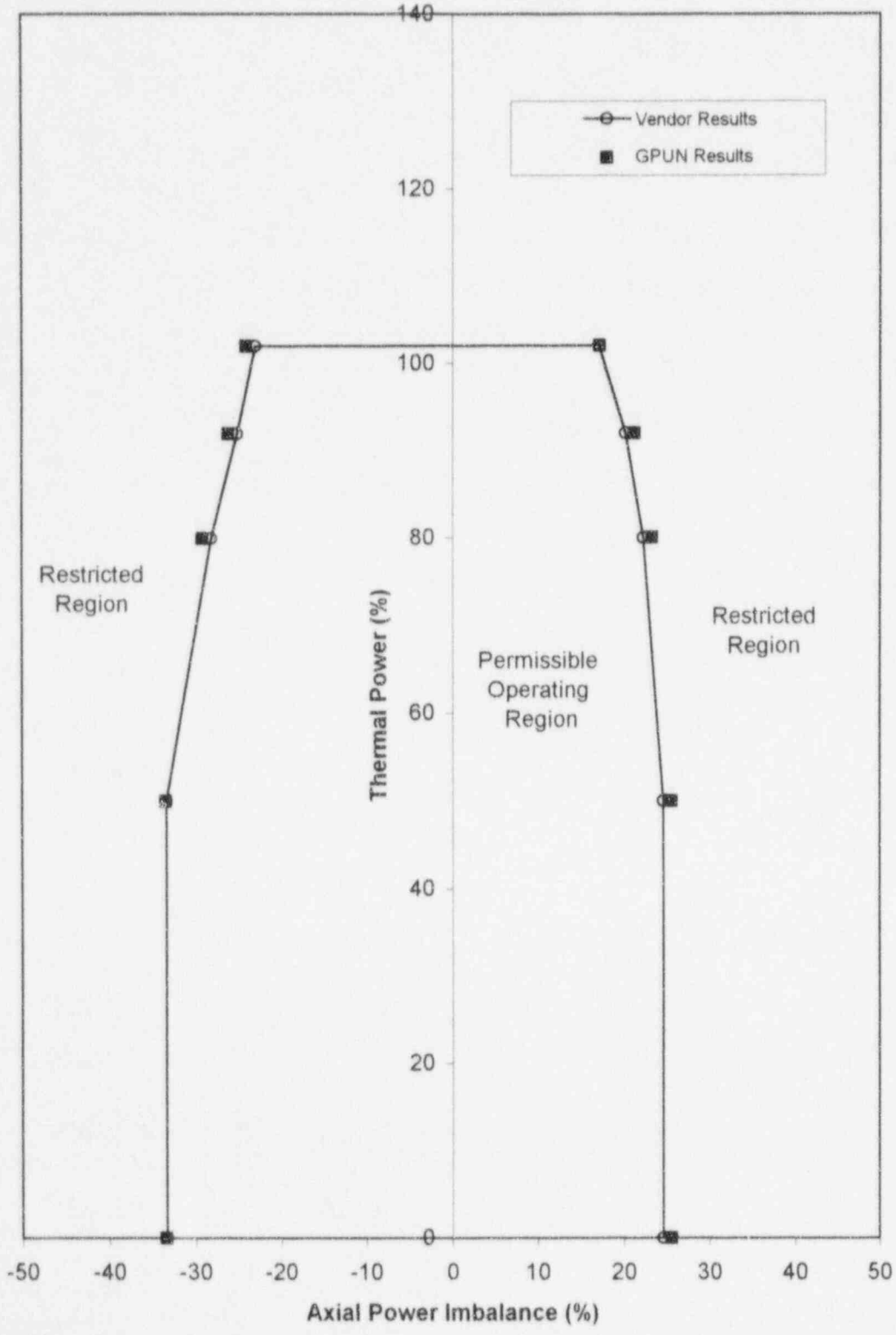

Figure 2 Control Rod Insertion Limits
(0-to-75 EFPD and 4 Pump Operation)