



GPU Nuclear Corporation  
Post Office Box 480  
Route 441 South  
Middletown, Pennsylvania 17057-0191  
717 944-7621  
TELEX 84-2386  
Writer's Direct Dial Number:

January 19, 1990  
C311-90-2001

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

Dear Sir:

Three Mile Island Nuclear Station, Unit (TMI-1)  
Operating License No. DPR-50  
Docket No. 50-289  
GPUN Response to NRC Bulletin 89-03

This is in response to NRC Bulletin 89-03, "Potential Loss of Required Shutdown Margin During Refueling Operations" which requires that, pursuant to 10CFR 50.54(f) within 60 days of receipt, licensees notify the NRC whether they have taken or will take the actions requested by the bulletin. Attachment 1 provides GPUN's response to each of the actions requested by the bulletin.

It should be noted that these changes were initiated as a result of GPUN's evaluation related to use of higher enrichment fuel prior to the NRC's issuance of Information Notice 89-51 and Bulletin 89-03. Starting with TMI-1 Cycle 6 in March 1987, GPUN implemented an "18-month" fuel cycle. The nominal enrichments of 2.85% wt. used in the Cycle 6 design did not pose a significant departure from previous fuel loadings. The major difference was the use of Lumped Burnable Poison Rods (LBP) in the new assemblies loaded toward the core center. Starting with Cycle 7, TMI-1 changed to a higher 3.6% wt. loading for the new fuel. When evaluating potential core alterations during the refueling for Cycle 7, the subject question was addressed. The NRC IE Notice and Bulletin were issued later based on a similar concern identified at Calvert Cliffs.

The changes described in the Attachment 1 will be implemented prior to adding new fuel assemblies to the core. The next core loading, for TMI-1 Cycle 8, is currently scheduled for early February 1990.

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These changes provide assurance that an adequate shutdown margin as required by TMI-1 Technical Specifications for refueling operations is maintained during movement and placement of fuel.

Sincerely,

H. D. Hukill  
Vice President and Director, TMI-1

HDH/MRK

Attachment

cc: J. Stolz  
R. Hernan  
F. Young  
W. Russell

Sworn and subscribed to  
before me this 19th  
day of January, 1990.

Notarial Seal  
Sharon P. Brown, Notary Public  
Londonderry Twp., Dauphin County  
My Commission Expires July 12, 1993

Member, Pennsylvania Association of Notaries

## GPUN Response to NRC Bulletin 89-03

GPUN's response to actions requested by the bulletin are as follows:

Action Item 1:

Assure that any intermediate fuel assembly configuration (including control rods) intended to be used during refueling is identified and evaluated to maintain sufficient refueling boron concentration to result in a minimum shutdown margin of approximately 5%.

GPUN Response:

Fuel assemblies will normally only be loaded into their final core locations. This has been the standard procedure followed in the past. However, if a fuel assembly is to be placed in any other core location due to fuel handling constraints, it shall only be placed into core locations that would contain an assembly with equal or higher reactivity as determined by the approved core reload design. Sufficient boron concentration will be maintained to meet the minimum shutdown margin required by TMI-1 Technical Specifications (TS). TS 3.8.4 requires that during head removal and while loading and unloading fuel, boron concentration shall be maintained at not less than that required for Refueling Shutdown. Per TS 1.2.6, "the reactor is in the refueling shutdown condition when, even with all rods removed, the reactor would be subcritical by at least  $1\% \rho_k/k$  and coolant temperature at the decay heat removal pump suction is no more than 140°F." During refueling operations, the reactor is substantially more subcritical due to control rod insertion as the control rods are worth approximately  $5\% \rho_k/k$  at refueling temperatures and boron concentrations. Also under the actual conditions experienced during refueling operations, there will be open core locations which will increase the shutdown margin even more.

Action Item 2:

Assure that fuel loading procedures only allow those intermediate fuel assembly configurations that do not violate the allowable shutdown margin and that these procedures are strictly adhered to.

GPUN Response:

The refueling procedure governing fuel loading in the core will be revised to implement the above requirement. Since the current procedures already require that a Core Load Engineer and Refueling Supervisor (SRO) concur with all changes to the approved sequence, no additional administrative controls are considered necessary.

Action Item 3:

Assure that the staff responsible for refueling operations is trained in the procedures recommended in Item 2 above and understand the potential consequences of violating these procedures. This training should include the fundamental aspects of criticality control with higher enriched fuel assemblies.

GPUN Response:

Core Load Engineers and Refueling Supervisors will receive training on the new procedures prior to implementation. Training for the Core Load Engineers will include the basis for the additional restrictions on intermediate fuel assembly configurations.