Nuclear

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December 27, 1988
4410-88-L-0192/0381P

US Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Dear Sirs:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Criticality Safety Assessment for Use of the Plasma Arc Torch
To Cut the Upper Core Support Assembly Baffle Plates
and the Core Support Shield, Revision 1

GPU Nuclear letter 4410-88-L-0110, dated August 11, 1988, submitted, for NRC review and approval, the Criticality Safety Assessment for Use of the Plasma Arc Torch to Cut the Upper Core Support Assembly (UCSA) Baffle Plates and the Core Support Shield. The sixth item on Page 6 of this document currently states: "Operating Procedure 4210-OPS-3255.29, 'Automated Cutting Equipment System Operation,' includes a signed verification by the on-duty Fuel Handling Senior Reactor Operator that the 15 gallon tank has been disconnected from the HE-200 unit prior to system operation and prior to filling the 15 gallon tank."

Currently, GPU Nuclear's plans are to utilize a separate procedure(s), different from that referenced above, for plasma arc cutting of the UCSA Baffle Plates and the Core Support Shield. Thus, attached is a revised Page 6 which replaces the reference to 4210-OPS-3255.29 with the phrase, "The applicable operating procedure(s) shall include..."

Sincerely,

M. B. Roche
Director, TMI-2

ROW/emf

Attachment

cc: Senior Resident Inspector, TMI - R. J. Conte
Regional Administrator, Region 1 - W. T. Russell
Director, Plant Directorate IV - J. F. Stolz
Systems Engineer, TMI Site - L. H. Thonus

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SAFETY ANALYSIS

SA No. 4710-3221-88-02

Rev. No. 1

TITLE

CRITICALITY SAFETY ASSESSMENT FOR USE OF THE PLASMA ARC TORCH TO CUT THE UPPER CORE SUPPORT ASSEMBLY BAFFLE PLATES AND THE CORE SUPPORT SHIELD

Originator M Wells Date 12/22/88

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Design Cognizant Engineer R. Blumberg Date 12/22/88 Rad Con N/A RAW Date 12/21/88

APPROVAL

Mgr Eng. Section Paul J Kochis Date 12/22/88 Site Ops Director C.A. KUEHN per telecon R Dwelle Date 12/23/88

FORM 4000-ENG-7310.09-1 (12/87)

Rev.	SUMMARY OF CHANGE	Approval	Date
0	Initial submittal via GPU Nuclear letter 4410-88-L-0110.		8/88
1	Revised sixth bullet on Page 6.		12/88

RESULTS/CONCLUSIONS

The results of the criticality safety analysis completed by Oak Ridge National Laboratory (Reference 4) are provided in Table 1. As can be seen from this table, the maximum calculated neutron multiplication, including an uncertainty bias of 2.5% Δk was 0.928. This value of K_{eff} occurs with an inner fuel cylinder height of 23.0 inches. A cylinder of this size cannot fit (i.e., somewhat large) in the region in which the unborated water is assumed to leak (see Figure 3). Consequently, it is concluded that 0.928 is a conservative value for the neutron multiplication as a result of the unborated water inleakage that can be postulated to occur during the cutting of the baffle plates with the plasma arc torch. As this K_{eff} is significantly less than the licensing basis of $K_{eff} \leq 0.99$, it is concluded that the plasma arc torch can be used to cut the baffle plates without presenting a criticality safety concern.

Operational Limitations

The above conclusion is based on the following operational limitation and the applicable limitations in References 1, 2, and 3:

- A system configuration such that a maximum of 3.5 gallons can drain following a line rupture or torch tip blowout with the torch operating in the Reactor Vessel.

- Following the loss of coolant inventory, the torch must be removed and repaired before refilling the torch cooling system.

- If in-vessel flushing of the torch is being performed, no load handling operations (heavy or light) are permitted in or above the Reactor Vessel.

- Flushing of the plasma arc torch coolant system with the torch within the vessel can only occur if there are no known leaks in the coolant system and the torch is at least 1 foot from the baffle plates or core formers. Otherwise, the torch must be removed from the vessel prior to connection of the flushing tie-in.

- The maximum inventory of unborated water permitted in the flush system storage tank is 15 gallons.

- The applicable operating procedure(s) shall include a signed verification by the on-duty Fuel Handling Senior Reactor Operator that the 15 gallon tank has been disconnected from the HE-200 unit prior to system operation and prior to filling the 15 gallon tank.

- The plasma arc torch shall be positioned greater than one (1) foot from fuel bearing areas, external to the region between the baffle plates and core barrel, which contain greater than or equal to 10 kg of fuel. This restriction does not apply to fuel bearing areas in the Lower Core Support Assembly/Lower Head region (e.g., fuel assembly R-6) which is bounded by the criticality safety assessment in Reference 1.