Mr. H. B. Roche  
Vice President/Director, THI-2  
GPU Nuclear Corporation  
P. O. Box 480  
Middletown, Pennsylvania 17057  

Dear Mr. Roche:  

Subject: Three Mile Island Nuclear Station, Unit 2 - Criticality Safety for Use of the Plasma Arc Torch to Cut the Upper Core Support Assembly Baffle Plates and the Core Support Shield (TAC 69114)  

The Nuclear Regulatory Commission staff has reviewed your August 11, 1988, and December 27, 1988, submittals regarding criticality safety during plasma arc cutting of core support assembly components. These include the core baffle plates, core former plates, and core support shield.  

As stated in the enclosed Safety Evaluation issued by the staff, we conclude that the proposed activities can be accomplished without significant risk to the health and safety of the public provided that they are in accordance with the limitations stated in your submittals and in the staff's Safety Evaluation. Plasma arc cutting of the core support assembly components falls within the scope of activities previously considered in the "Programmatic Environmental Impact Statement." We, therefore, approve the plasma arc cutting of core support assembly components as described in your Safety Evaluation Report.

Sincerely,

[Signatures]

John F. Stolz, Director  
Project Directorate I-4  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation  

Enclosure:

cc w/enclosures:

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GPU Nuclear Corporation  

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Unit No. 2

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PLASMA ARC CUTTING OF UPPER CORE SUPPORT ASSEMBLY

GPU NUCLEAR CORPORATION

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 2

DOCKET NO. 50-320

INTRODUCTION

GPU Nuclear Corporation (GPUN, the licensee) submitted (References 1 and 2) for NRC review and approval a Safety Evaluation Report (SER). The SER evaluated the potential for an inadvertent criticality during plasma arc cutting of the Core Support Assembly (CSA) components. The NRC staff had previously reviewed and approved the use of the plasma arc torch to cut Lower Core Support Assembly (LCSA) components in Reference 3. The current proposal differs from that previously approved proposal in that 3.5 gallons of non-borated water is the maximum postulated torch leakage versus 3 gallons in the previous analysis.

EVALUATION

The increase in potential torch coolant (non-borated water) leakage is due to an increase in the amount of the coolant hose above the water line. The analysis assumed that the entire hose was out of the water and could gravity drain into an underwater fuel bearing area. The geometry in which fuel and non-borated water could collect is much more restrictive in the area behind the core baffle plates than the previously considered LCSA. The core baffle plates and core barrel allow fuel to collect in a relatively narrow annular region versus the large lenticular hemisphere considered for the LCSA.

The licensee's analysis was well conceived, conservative, and acceptable to the NRC staff. The principal conservatism was in geometry, fuel-to-water ratio, and, neglecting all diluents, poisons and mixing of borated with non-borated water. The staff had previously determined that defueling activities which could result in core alterations should have a multiplication factor \( K_{eff} \) of less than 0.99. The resultant \( K_{eff} \) for this case was less than 0.93 including the uncertainty factor. The licensee's methods to assure that potential leakage of non-borated water is limited to less than 3.5 gallons are acceptable.
CONCLUSIONS

The staff has reviewed and evaluated the criticality safety of using the plasma arc torch to cut UCSA components. The staff concludes that the proposed activities can be accomplished without significant risk to the health and safety of the public provided that they are in accordance with the limitations stated in the licensee's submittals and the limitations for this safety evaluation. This activity falls within the scope of activities previously considered in the "Programmatic Environmental Impact Statement."

REFERENCES

1. GPUN letter, 4410-88-L-006/0253P, F. R. Standerfer to NRC Document Control Desk, criticality safety assessment for use of the plasma arc torch to cut the Upper Core Support Assembly baffle plates and the core support shield, dated August 11, 1988

2. GPUN letter, 4410-88-L-0192/0381P, M. B. Roche to NRC Document Control Desk, 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 2, dated December 27, 1988

3. NRC letter, J. F. Stolz to F. R. Standerfer, GPUN, Three Mile Island Nuclear Station, Unit No. 2, Lower Core Support Assembly Defueling, dated April 1, 1988

Principal Contributors: Lee H. Thonus
                      Howard J. Richings

Dated: January 31, 1989