

January 31, 1989

Docket No. 50-320

Mr. M. B. Roche  
Vice President/Director, TMI-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,

"ORIGINAL SIGNED BY"  
JOHN F. STOLZ

John F. Stolz, Director  
Project Directorate I-4  
Division of Reactor Projects 1/11  
Office of Nuclear Reactor Regulation

Enclosure:  
As stated

cc w/enclosures:  
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S. Varga (14E4)

B. Boger (14A2)

S. Norris

M. Masnik

L. Thonus

OGC

Howard J. Richings (8E23)

E. Jordan (MNBB 3302)

B. Grimes (9A2)

ACRS (10)

8902030146 890131  
PDR ADUCK 05000320  
PDC

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SNorris

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PM-PDI-4

MMasnik

01/31/89

PM-PDI-4

LThonus

01/31/89

PD-PDI-4

JStolz

01/31/89

Mr. M. B. Roche  
GPU Nuclear Corporation

Three Mile Island Nuclear Station  
Unit No. 2

cc:

Regional Administrator, Region I  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

Frank Lynch, Editorial  
The Patriot  
812 Market Street  
Harrisburg, PA 17105

Dr. Judith H. Johnsrud  
Environmental Coalition on Nuclear Power  
433 Orlando Avenue  
State College, PA 16801

Robert B. Borsum  
Babcock & Wilcox  
Nuclear Power Division  
Suite 525  
1700 Rockville Pike  
Rockville, MD 20852

Ernest L. Blake, Jr., Esquire  
Shaw, Pittman, Potts, and Trowbridge  
2300 N Street, N.W.  
Washington, DC 20037

Marvin I. Lewis  
7801 Roosevelt Blvd. #62  
Philadelphia, PA 19152

Secretary  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Jane Lee  
183 Valley Road  
Etters, PA 17319

Sally S. Klein, Chairperson  
Dauphin County Board of Commissioners  
Dauphin County Courthouse  
Front and Market Streets  
Harrisburg, PA 17101

Walter W. Cohen, Consumer  
Advocate  
Department of Justice  
Strawberry Square, 14th Floor  
Harrisburg, PA 17127

Thomas M. Gerusky, Director  
Bureau of Radiation Protection  
Department of Environmental Resources  
P. O. Box 2063  
Harrisburg, PA 17120

Mr. Edwin Kinter  
Executive Vice President  
GPU Nuclear Corporation  
100 Interpace Parkway  
Parsippany, NJ 07054

Ad Crable  
Lancaster New Era  
8 West King Street  
Lancaster, PA 17601

U.S. Environmental Prot. Agency  
Region III Office  
Attn: EIS Coordinator  
Curtis Building (Sixth Floor)  
6th and Walnut Streets  
Philadelphia, PA 19106

U.S. Department of Energy  
P. O. Box 88  
Middletown, PA 17057

David J. McGoff  
Office of LWR Safety and Technology  
NE-23  
U.S. Department of Energy  
Washington, DC 20545

Richard Conte  
Senior Resident Inspector (TMI-1)  
U.S.N.R.C.  
Post Office Box 311  
Middletown, Pennsylvania 17057

Mr. M. B. Roche  
GPU Nuclear Corporation

Three Mile Island Nuclear Station  
Unit No. 2

cc:

G. Kuehn  
GPU Nuclear Corporation

R. E. Rogan  
GPU Nuclear Corporation

J. J. Byrne  
GPU Nuclear Corporation

S. Levin  
GPU Nuclear Corporation

W. J. Marshall  
GPU Nuclear Corporation



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

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 conservatisms were 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