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September 25, 1986  
hRC/TMI 86-096

Docket No. 50-320

Mr. F. R. Standerfer  
Vice President/Director, THI-2  
GPU Nuclear Corporation  
P. O. Box 480  
Hiddletown, PA 17057

Dear Mr. Standerfer:

Subject: Storage of Upper End Fittings

- References:
1. GPUN letter, 410-86-L-0132, dated August 16, 1986, F. R. Standerfer to W. D. Travers, "Storage of Upper End Fittings"
  2. GPUN letter, 4410-86-L-0160, dated September 9, 1986, F. R. Standerfer to W. D. Travers, "End Fitting Storage"
  3. NRC memorandum, C. K. Harotta, NRCSS-TCB, to L. H. Thonus, NRR-THICPD, dated September 18, 1986, regarding criticality analyses of 55 gallon drums

The Nuclear Regulatory Commission (NRC) staff has completed its review of your August 16, 1986 proposal for storage of upper end fittings and the additional information provided in your September 9, 1986 letter (references 1 and 2). The methodology and assumptions used in your calculational models are conservative. In addition, the staff has performed independent confirmatory calculations. Both your results and the staff's results demonstrate that a large shutdown margin exists for both single drums and a large planar array of 55 gallon drums.

We therefore approve loading and storage of the array of 55 gallon drums as described in your submittal. This approval is contingent upon submittal of related procedures subject to Technical Specification 6.8.2. Since the shutdown margin is provided by the soluble boron your operational procedures should limit those activities (i.e. hydrolasing) which could introduce non-borated water in the storage area. These procedures should also provide for periodic reverification of the boron concentration if the storage interval is protracted.

Sincerely,

ORIGINAL SIGNED BY:

W. D. Travers

W. D. Travers

Director

THI-2 Cleanup Project Directorate

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September 25, 1986

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ATTACHMENT  
SAFETY EVALUATION

Introduction

During defueling the licensee intends to place end fittings in shielded 55 gallon drums which will be inside an overpack container. The drums will be transferred to and placed in a storage area adjacent to the west "D" ring on the 347 ft. elevation of the reactor building. As tooling and methodologies are developed the end fittings will be sized to fit through the openings in defueling canisters and ultimately transferred off site. There may be some fuel attached to or packed in flow spaces in the end fittings. Since the accumulated fuel contained in a drum or several drums could exceed the minimum mass required for criticality, criticality evaluations were performed taking geometry and neutron absorption into account.

Evaluation

GPUR performed criticality calculations that indicated a shutdown margin significantly greater than 5% ( $K_{eff}$  was .918 for the worst case planar array). The model they used was very conservative. Among the principal conservatisms are:

1. Neglecting neutron absorption by the stainless steel end fittings.
2. Use of drums full of fuel when a few kilograms at most is expected.
3. Use of entirely region 3 fuel (highest enrichment) and optimum fuel to water ratio.

the NRC staff's calculations using similar conservative models independently confirmed GPUR's results. The effects of dropping a 55 gallon drum of end fittings or dropping a load onto a stored drum are bounded by previously analyzed canister drop accidents.

Conclusions

The staff has determined that the transfer and storage of end fittings in shielded 55 gallon drums does not present a significant criticality risk provided that 4950 ppm boron is maintained in any contained water. Load drop accidents have been bounded by previous analyses regarding fuel canisters. The scope of activities falls within the bounds of the activities previously analyzed in the Programmatic Environmental Impact Statement. The end fitting transfer and storage does not constitute an unreviewed safety question as defined by 10 CFR 50.59 and can be implemented without significant risk to the health and safety of the public.

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