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June 4, 1986
NRC/THI-86-055

Docket No. 50-320

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

Dear Mr. Standerfer:

Subject: Heavy Duty Tong Tool, Heavy Duty Spade Bucket, Hydraulic
Impact Chisel

By letter dated June 2, 1986, GPU Nuclear requested NRC approval for use of the subject tools in performing limited bulk defueling operations on the hard crust layer of the damaged THI-2 core. Approval for the use of the hydraulic impact chisel had previously been granted by the staff in a letter dated January 30, 1986; however, the use of that tool has been restricted to those activities covered by the staff's approval of the GPUN Safety Evaluation Report (SER) for Early Defueling. The staff is currently reviewing Revision 10 to the Defueling SER submitted by GPU on May 15, 1986, which incorporates changes and additions in support of proposed bulk defueling activities.

With several weeks available prior to your planned commencement of core stratification sample acquisition activities and the fact that "pick-in-place" defueling is essentially completed, we understand that you propose to use the subject tools for limited bulk defueling activities in advance of our approval of the revised SER, in order to make the most efficient use of time and resources. It is also our understanding that your primary purpose in using these tools at this time will be to develop operational experience and identify potential problems with their use, although actual defueling activities, including loading and transfer of canisters, may also be performed.

The staff has reviewed your proposed use of these tools as documented in your letter of June 2, 1986 and has also completed a preliminary review of the applicable portions of Revision 10 to your Defueling SER. Based on our review, we approve your proposed initial use of the subject defueling tools, with the following restrictions:

1. The lifting force applied in using these tools must not exceed 2000 pounds in order to minimize the potential for accidental failure of an incore instrument line (as proposed in your letter of June 2, 1986); and

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2. You shall provide a report or presentation to the NRC staff at the end of the activity period (estimated at 2-3 weeks) assessing the experience gained from these initial bulk defueling activities.

In the event of a significant slip (greater than one week) in the schedule for core stratification sample acquisition activities or following their completion, NRC approval will again be required to continue bulk defueling activities with these tools, pending our approval of your Defueling SER-Revision 10. Notwithstanding the physical constraints of the core bore equipment, initial bulk defueling may not take place concurrently with core bore activities. As documented in our enclosed safety evaluation, we find that the potential risks resulting from the proposed limited bulk defueling activities are acceptably low during the period that they will be performed. We conclude that the proposed activities can be conducted without significant risk to the public health and safety and that they fall within the scope of activities considered in the Programmatic Environmental Impact Statement (PEIS). The proposed activities may commence subject to our approval of the related procedures in accordance with Technical Specification 6.8.2.

Sincerely,

ORIGINAL SIGNED BY:
William D. Travers

William D. Travers, Director
TMI-2 Cleanup project Directorate

Enclosure: As stated

cc: T. F. Demmitt
R. E. Rogan
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SAFETY EVALUATION FOR LIMITED TESTING OF BULK DEFUELING TOOLS

INTRODUCTION

By letter dated June 2, 1986 (Reference 1), GPU Nuclear submitted a request for NRC approval of the use of three defueling tools for initial testing of bulk defueling techniques. The three tools - a heavy duty tong tool, a heavy duty spade bucket and a hydraulic impact chisel - will be used to perform operations on the core debris bed or "hard crust" layer which formed during the TMI-2 accident. These activities fall within the scope of the bulk defueling activities addressed in the licensee's Revision 10 to the Defueling SER, dated May 15, 1986 (Reference 2), which is currently under review by the NRC staff. Pending staff approval of this latest revision to the Defueling SER, the licensee proposes to conduct initial bulk defueling tests during the time available prior to the commencement of core stratification sample acquisition ("core bore") activities, currently scheduled for late June 1986. With "pick-in-place" early defueling activities essentially completed, initial experience in bulk defueling operations could be gained in the several weeks available before core bore activities begin. This safety evaluation addresses those aspects of the proposed activities that are not covered by a previous NRC approval.

EVALUATION

In Reference 1, the licensee stated that certain events associated with the proposed bulk defueling activities have not been previously evaluated in approved SERs. These events include the breaking up of the hard crust layer of the core, the removal of partial fuel assemblies, and the potential for inadvertent pulling of an incore instrument string. Although the first two activities have not yet been explicitly approved, as they constitute bulk defueling operations, the potential consequences resulting from these activities are bounded by the events analyzed in the early defueling SER, which was approved by the NRC in Reference 3. The breaking up of the crust will not cause inadvertent recriticality; as stated in Reference 3, the boron concentration maintained in the RCS provides adequate margin to ensure subcriticality for any postulated fuel configuration. Potential releases of radioactivity or hydrogen due to breaking of the crust are bounded by previous analyses and will be mitigated by defueling procedures and equipment, as discussed in Reference 3. The manipulation of partial fuel assemblies is similarly bounded by the activities approved in Reference 3, and the design of fuel canisters will prevent criticality during loading, transfer and storage of the partial fuel assemblies or pieces from the hard crust layer of the core. The conclusions of Reference 3 regarding the limited potential for boron dilution also apply to the proposed activities. The potential for a pyrophoric event due to breaking of the hard crust from the proposed operations is acceptably low, based on the staff's approval of the proposed core bore activities in Reference 4.

The proposed activities do present a somewhat greater likelihood for damage to the incore instrumentation guide tubes than those activities previously approved;

however, the probability that an unisolable RCS leak will result is low. The most likely failure mode during the proposed activity would be the failure of an incore instrument guide tube nozzle or weld due to inadvertent grappling and lifting of an incore instrument string using the heavy duty spade bucket tool. Available data indicate that as a result of the accident, it is probable that most of the incore instrument guide tubes do not extend very far into the original core volume, thus making it unlikely that one would be inadvertently grappled during operations conducted on the hard crust layer. Additionally, the licensee will limit the lifting force applied to the tested tools to 2000 pounds, in excess of tool weight, thereby limiting the potential loads placed on the incore guide tubes, nozzles and welds. The staff finds that this limitation is likely to preclude damage to the incore guide tubes, and components sufficient to cause an unisolable leak. If an instrument string is inadvertently grappled during the proposed activities and RCS leakage results, as discussed in Reference 3, adequate leak detection capability and RCS makeup capacity are available to identify the leak and maintain the required volume of borated water in the reactor vessel.

CONCLUSION:

The staff has reviewed the licensee's proposal for testing of the specified defueling tools and bulk defueling techniques during the few weeks prior to initiation of core bore activities. We have determined that the potential for failure of the incore instrumentation guide tubes nozzles and welds as a result of the proposed activities is acceptably low and that adequate methods of detection and corrective actions are available in the unlikely event of unisolable RCS leakage. The long-term use of these tools and methods will be addressed in the course of the staff review of Reference 2. We therefore conclude that the proposed limited testing of the heavy duty tong tool, the heavy duty spade bucket and the hydraulic impact chisel for bulk defueling operations can be performed without significant risk to the health and safety of the public.

References:

1. GPUN letter from F. R. Standerfer to W. D. Travers, dated June 2, 1986. Subject: Testing of Core Region Defueling Techniques.
2. GPUN letter and SER from F. R. Standerfer to W. D. Travers, dated May 15, 1986. Subject: Defueling SER-Revision 10.
3. NRC letter and Safety Evaluation from W. D. Travers to F. R. Standerfer dated November 12, 1985. Subject: Safety Evaluation for Early Defueling.
4. NRC letter and Safety Evaluation from W. D. Travers to F. R. Standerfer dated May 5, 1986. Subject: Safety Evaluation for Core Stratification Sample Acquisition, Revision 1.

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