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TMI-2 Cleanup Project Directorate  
Attn: Dr. W. D. Travers  
Director  
US Nuclear Regulatory Commission  
c/o Three Mile Island Nuclear Station  
Middletown, PA 17057

Dear Dr. Travers:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)  
Operating License No. DPR-73  
Docket No. 50-320  
Safety Evaluation for the Modification of  
Reactor Building Penetration R-536

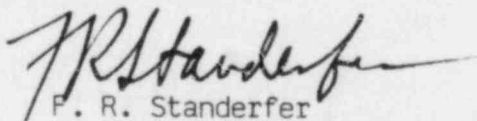
Attached for your review and approval is a Safety Evaluation for the Modification of Reactor Building (RB) Penetration R-536. The penetration is being modified to accept water supply lines for the ultra-high pressure decontamination system. The penetration modification will be in general compliance with the design criteria for temporary modifications to existing primary containment piping penetrations as transmitted by GPU Nuclear letter 4410-83-L-0185, dated August 25, 1983. However, the modification will deviate from the design criteria in that the high pressure tubing, which conveys the ultra-high pressure water through the penetration, will not comply with ANSI B31.1.

The attached safety evaluation demonstrates that the proposed modification to RB Penetration R-536 will have no unacceptable impact on the health and safety of the public.

Per the requirements of 10 CFR 170, an application fee of \$150.00 is enclosed.

Sincerely,

8603210063 860318  
PDR ADOCK 05000320  
P PDR

  
F. R. Standerfer  
Vice President/Director, TMI-2

FRS/CJD/eml

Attachment

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Enclosed: GPU Nuclear Corp. Check No. 00021202

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SAFETY EVALUATION FOR THE  
MODIFICATION OF REACTOR BUILDING PENETRATION R-536,  
REVISION 1

It is currently planned to use an ultrahigh pressure (UHP) water jet inside the Reactor Building as part of the decontamination operations. In order to support the decontamination activities, a connection from the UHP pump located outside of the Reactor Building to the applicator/nozzle inside the Reactor Building will be provided. This connection will be made through a modification to an existing spare Reactor Building penetration.

Penetration R-536 will be modified to pass three water supply lines and two hydraulic lines through the penetration for operation of the ultrahigh pressure decontamination system. The penetration is located at Elevation 334'-0" and azimuth 194°8' and connects the northeast quadrant of the Reactor Building with the annulus south of the Fuel Handling Building. The penetration modification will include two isolation valves, both located outside the Reactor Building, for each line passing through the penetration.

The penetration modification will be in general compliance with the Design Criteria - "Temporary Modification to Existing Primary Containment Piping Penetrations," attached to GPU Nuclear letter 4410-83-1-0185 of August 26, 1983, from B. K. Kanga to L. H. Barrett. This design criteria document ensures compliance with the requirements of TMI-Unit 2 Recovery Technical Specifications, Section 3.6.1.1, "Containment Integrity."

The proposed modification deviates from the design criteria document only with respect to the requirement that modifications to existing penetrations shall comply with ANSI B31.1. Although this particular modification is generally in compliance with ANSI B31.1, the high pressure tubing (three 9/16" OD lines), which convey the decontamination water through the penetration, and the associated valves and fittings have not been designed, fabricated or tested in accordance with ANSI standards. The tubing is a patented, standardized, design which has not been used for power piping applications. Thus, the manufacturer has made no attempt to comply with ANSI B31.1. According to the tubing supplier, the tubing is produced commercially as a standard item and has a rated burst pressure of 85,000 psig. The supplier has further stated that the tubing, valves, and fittings have been used in a variety of applications with operating pressures up to 60,000 psig; and, if installed in a fixed location and operated at 35,000 psig, failure should not occur. For the TMI-2 decontamination activities the tubing will be pressurized to no more than 35,000 psig.

A tubing failure inside containment will have no impact on containment integrity. In addition, since the water flow rate through the tubing is only 3 gpm, the operating pressure will dissipate rapidly in the event of a tube burst. There is no nuclear safety related systems in the vicinity of the penetration. Consequently, a tube break inside containment will have no impact on nuclear safety.

A tube break outside the Reactor Building would theoretically provide an open flow path through the penetration. The flow path created, however, would be so small (i.e., no more than 3/16" diameter), that it is considered insignificant.

The only nuclear safety related components located near the penetration piping are other Reactor Building penetrations. Although a pin-pole leak could damage an adjacent penetration, the probability of any type of tube break occurring coincident with an accident which would pressurize the Reactor Building is considered insignificant.

The only other postulated failure which could potentially impact Reactor Building integrity is a failure of the seal around the tube where it passes through the penetration sleeve end plate. The resulting leakage path, however, is negligible.

The preceding demonstrates that a failure of the non-code tubing is unlikely. Further, the consequences of a tube break will be acceptable. In addition, the NRC stated in their letter of July 17, 1984, "in an evaluation associated with a Modification of Order dated April 9, 1982, the staff concluded that the maximum credible Containment Building pressure was approximately 2 psig. Calculated offsite doses resulting from a failed penetration in conjunction with a 2 psig driving head and the associated Reactor Building airborne contamination were well below the limits of 10 CFR 20 and within the scope of impacts assessed in the "Final Programmatic Environmental Impact Statement" dated March 1981.

The referenced NRC letter also notes that a penetration design which includes two manual isolation valves outside the Reactor Building is considered an acceptable design since "all conceivable accident scenarios still permit access to the isolation valves."

The holder of an operating license is permitted, under the provisions of 10 CFR 50, Paragraph 50.59 to make changes to the facility, if this change is determined not to be an unreviewed safety question and does not involve a modification of the Plant Technical Specifications. This Safety Evaluation demonstrates that the probability of occurrence or consequences of the failure of the containment boundary has not been increased by this modification. The Safety Evaluation also shows that the possibility of an accident of a different type than evaluated in the TMI-2 Final Safety Analysis Report has not been created. The modification will be tested in accordance with GPUN procedures and will include redundant isolation valves on the ultrahigh pressure water and hydraulic lines. Finally, the margin of safety as stated in the bases for the TMI-2 Technical Specifications has not been reduced as potential offsite releases to the environment are limited by the design of the modified penetration and are bounded by previously submitted Safety Evaluation Reports. Based on the above discussion and noting that the modified penetration will be leak tested in accordance with Unit Work Instructions that will be approved by the NRC, the modification of this penetration does not present an unreviewed safety question as defined in 10 CFR 50, Paragraph 50.59.

It can, therefore, be concluded that the proposed modification to Reactor Building Penetration R-536 will have no unacceptable impact on the health and safety of the public.