GPU Nuclear

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April 29, 1988
4410-88-L-0067/0376P

US Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Dear Sirs:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Plasma Arc Torch Coolant System

This is to advise you of a modification to the Plasma Arc Torch Cooling Unit (HE-200) described in GPU Nuclear letters 4410-87-L-0139, dated November 30, 1987; and 4410-88-L-0026, dated February 26, 1988. Specifically, GPU Nuclear has added a ten (10) gallon reservoir to the HE-200 unit in order to achieve more cuts between system flushes. It is noteworthy that the capability exists to operate the HE-200 unit without this reservoir.

The referenced letter of November 30, 1987, which was approved by the NRC on April 15, 1988, limits the inventory of unborated water in the HE-200 unit to less than four (4) gallons. The subject modification increases this inventory by ten (10) gallons. However, the attached evaluation notes that this reservoir does not increase the maximum amount of unborated water that can inadvertently drain from the HE-200 unit (i.e., three (3) gallons). Based on the attached evaluation, GPU Nuclear concludes that this modification does not constitute an unreviewed safety question pursuant to 10 CFR 50.59.

Sincerely,

F. R. Standerfer
Director, TMI-2

RDW/emf

A001
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Attachments

cc: Senior Resident Inspector, TMI - R. J. Conte
Regional Administrator, Region 1 - W. T. Russell
Director, Plant Directorate IV - J. F. Stolz
Systems Engineer, TMI Site - L. H. Thonus

INTRODUCTION

GPU Nuclear letter 4410-87-L-0139, dated November 30, 1987, submitted to the NRC the Criticality Safety Assessment for Use for the Plasma Arc Torch to Cut the Lower Core Support Assembly (LCSA). This safety assessment was utilized in support of Revision 2 to the LCSA Safety Evaluation Report (SER), reference GPU Nuclear letter 4410-88-L-0005 dated January 18, 1988, which was approved by the NRC on April 1, 1988.

The referenced GPU Nuclear letter of November 30, 1987, states that the plasma arc torch cooling unit (i.e., HE-200) is a closed, circulated cooling system having an inventory of less than four (4) gallons. The HE-200 unit inventory has been increased to a maximum inventory of less than 14 gallons via the addition of a ten (10) gallon reservoir to the HE-200 unit. This modification has been made in order to achieve more cuts between system flushes.

DESCRIPTION OF MODIFICATION

Attachments 2 and 3 provide diagrams of the HE-200 with the 10 gallon reservoir added. The modification added a 10 gallon reservoir to the rear of the frame which houses the HE-200 heat exchanger and pump. The reservoir is designed such that the 10 gallon inventory cannot be exceeded. The reservoir is attached to the HE-200 unit in a manner to preclude it from dislocating from the HE-200 unit. The unit will be operated with valves PAW-V003 closed, PAW-V006 open, and PAW-V005 positioned to direct the radiator discharge to the fill/stand pipe in the 10 gallon tank. This fills the 10 gallon tank until a water level is established in the 10 gallon tank standpipe. This level is sufficient to permit the water level in the 1-1/2 inch discharge pipe from the 10 gallon reservoir to reach an elevation where it will drain into the standpipe, which is the suction for the circulating pump (see Attachment 2). Therefore, the system is open to the atmosphere at two locations (i.e., the fill line to the 10 gallon tank and the stand pipe on the suction side of the pump). Consequently, should a leak occur in the system in the Reactor Vessel, only the water in the piping systems between the two (2) atmospheric vented pipes will drain. This was demonstrated during four (4) drain down tests with the HE-200 unit and 10 gallon reservoir. Between 3.42 and 3.46 gallons were drained. The draindown tests of the HE-200 unit with the 10 gallon reservoir added were performed with the hoses in air, thus, the resulting draindown tests are reduced by the inventory that would not drain because the torch hoses will be immersed in Reactor Vessel water (i.e., 0.47 gallons). Substracting the 0.47 gallons inventory yields draindown results of between 2.95 to 2.99 gallons with the 10 gallon reservoir added. During these tests, the system pump was permitted to operate. With valve PAW-V003 open and PAW-V006 closed, the return flow from the radiators bypasses the 10 gallon tank and flows direct to the pump.

In order to maintain an acceptable drainable volume of the enclosed portion of the system, the hoses from the HE-200 to the plasma junction box (i.e., 2 hoses each approximately 18 feet in length) were reduced in internal diameter from 9/16 inch to 1/2 inch. This decreased the volume in the hoses by approximately 0.1 gallons which was offset by the additional volume added to obtain drainable piping to and from the 10 gallon tank.

Additionally, the 10 gallon reservoir and the HE-200 unit are both vented to the atmosphere in order to prevent the siphoning of unborated water to the Reactor Vessel. On the inlet standpipe to the 10 gallon tank a sparger is provided. On the pump suction standpipe atmospheric connections are provided at the top of the 1-1/2 inch diameter pipe, at the top of the overflow operation level gauge, and at the slip fit joint between the 2 inch section and the 1-1/2 inch section. Consequently, inadvertent blocking or plugging of the atmospheric vents is unlikely to occur.

SAFETY EVALUATION JUSTIFYING CHANGE

The Criticality Safety Assessment for Use of the Plasma Arc Torch to Cut the LCSA limits the maximum amount of unborated water that will drain from the torch coolant system to less than three (3) gallons following the subtraction of the amount of the coolant inventory that would not drain because the torch hoses will be immersed in the Reactor Vessel (i.e., 0.47 gallons). This volume (i.e., 3 gallons) was used as the base case model in the Criticality Safety Assessment and the SER attached to the NRC letter of April 1, 1988, which determined that the plasma arc torch can be used to cut the LCSA without developing a criticality safety concern within the Reactor Vessel.

The referenced GPU Nuclear letter of November 30, 1987, and GPU Nuclear letter 4410-88-L-0026, dated February 26, 1988, which responded to NRC comments on the Plasma Arch Torch Criticality Analysis, provided the NRC with the methodology for performing the draindown testing of the HE-200 unit which established the limit of 3 gallons for the amount of unborated water that will drain from the torch coolant system. This methodology was utilized in conducting draindown test of the HE-200 unit with the 10 gallon reservoir. Specifically, four (4) draindown tests were conducted with the 10 gallon reservoir added. The results of these tests ranged from 2.95 to 2.99 gallons after subtracting the 0.47 gallons. Therefore, the 10 gallon reservoir does not increase the maximum amount of unborated water that can drain from the HE-200 unit. The draindown tests of the HE-200 unit with the 10 gallon reservoir were conducted with Quality Assurance (QA) Department oversight. Water containing parts of the HE-200 unit are classified Important-To-Safety for coolant volume only; thus, the volume replacement components in the plasma are torch coolant system (including the reservoir) will be controlled.

10 CFR 50.59 EVALUATION

10 CFR 50, Paragraph 50.59, permits the holder of an operating license to make changes to the facility or perform a test or experiment, provided the change, test, or experiment is determined not to be an unreviewed safety question and does not involve a modification of the plant technical specifications.

10 CFR 50, Paragraph 50.59, states a proposed change involves an unreviewed safety question if:

a. The probability of occurrence or the consequence of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report may be increased; or

b. The possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report may be created; or

c. The margin of safety, as defined in the basis for any technical specification, is reduced.

Has the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated been increased?

The above evaluation demonstrates that the addition of the 10 gallon reservoir to the HE-200 unit does not cause the limit of unborated water that can drain from the HE-200 unit to be exceeded. Furthermore, the 10 gallon reservoir and the HE-200 unit is designed to prevent siphoning; thus, the use of the reservoir does not increase the potential for a criticality event due to boron dilution.

Based on this analysis, use of the HE-200 unit with the 10 gallon reservoir added is bounded by the safety evaluation attached to GPU Nuclear letter 4410-87-L-0139, dated November 30, 1987, "Criticality Safety Assessment for Use of the Plasma Arc Torch to Cut the Lower Core Support Assembly." Thus, this activity does not increase the probability of occurrence or the consequence of an accident or malfunction of equipment important to safety.

Has the possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report may been created?

This evaluation demonstrates that operation of the HE-200 unit with the 10 gallon reservoir added is bounded by the Criticality Safety Assessment for Use of the Plasma Arc Torch to Cut the Lower Core Support Assembly. Additionally, the 10 gallon reservoir and the HE-200 unit have been designed to prevent siphoning of unborated water into the Reactor Vessel. Thus, this activity does not create the possibility for a accident or malfunction of a different type than any evaluated.

Has the margin of safety, as defined in the basis for any technical specifications, been reduced?

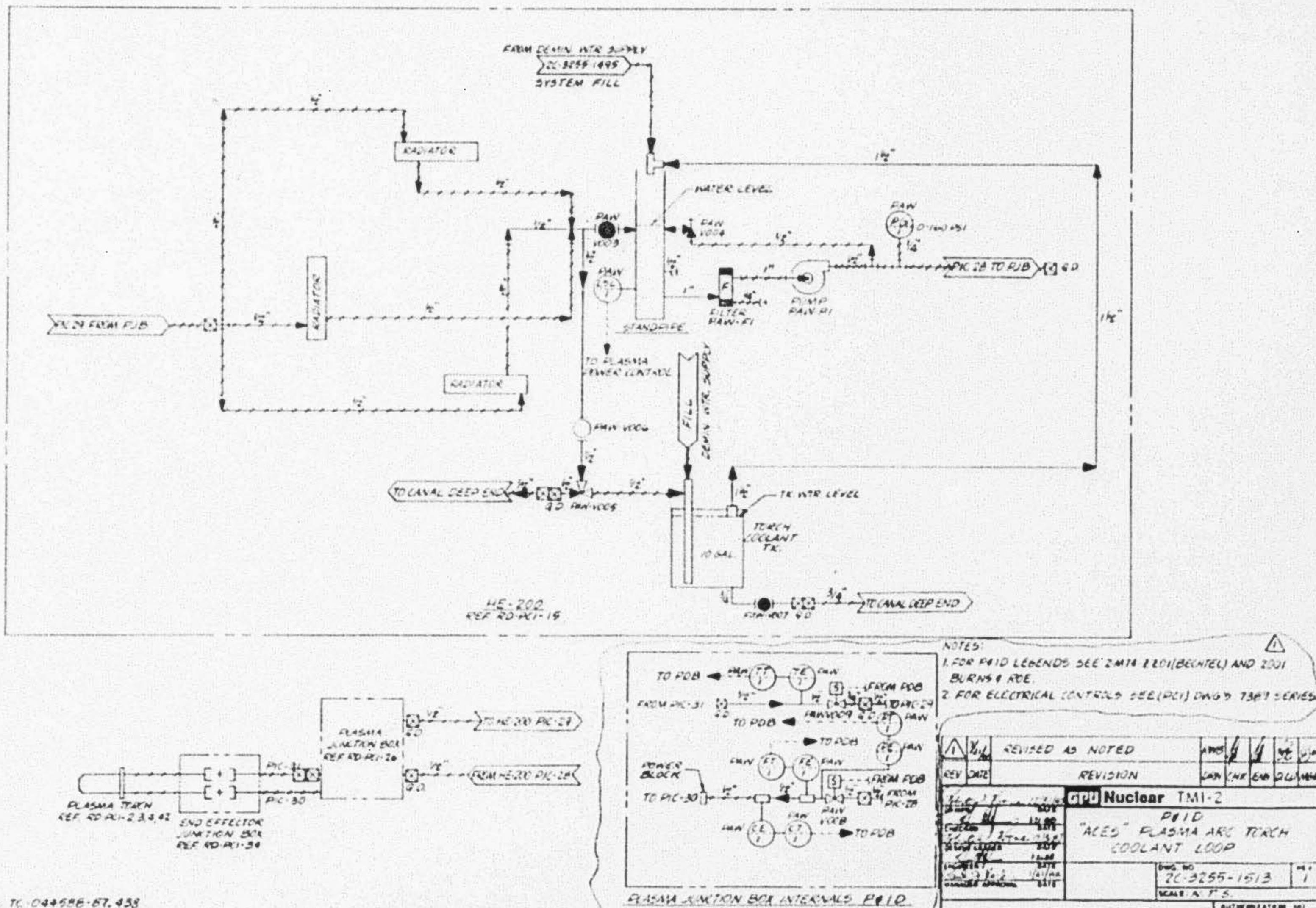
TMI-2 Technical Specification 3.1.1, "Boration Controlled and Borated Cooling Water Injection," requires the boron concentration in all filled portions of the Reactor Coolant System to be maintained between 4350 and 6000 ppm. The basis for this specification states, "The limitation or minimum boron concentration ensures that the core will remain subcritical under all credible conditions which exist during the long-term cooling mode."

The Criticality Safety Assessment for Use of the Plasma Arc Torch to Cut the Lower Core Support Assembly demonstrates that the limit of 3 gallons of unborated water that can drain from the plasma arc torch coolant

ensures that the core will remain subcritical. This evaluation demonstrates that operation of the HE-200 unit with the 10 gallon reservoir added does not exceed the 3 gallon limit. Thus, this activity does not reduce the margin of safety defined in a Technical Specification basis.

Based on the above evaluation, GPU Nuclear concludes that this activity does not constitute an unreviewed safety question pursuant to 10 CFR 50.59.

ATTACHMENT 3
4410-88-L-0067



NOTES:
1. FOR P&ID LEGENDS SEE 2M74 2201(BECHTEL) AND 2201 BURNS & ROE.
2. FOR ELECTRICAL CONTROLS SEE (PCI) DWG'S 7387 SERIES.

REV	DATE	REVISION
1		REVISED AS NOTED

GPU Nuclear TMI-2

P&ID
"ACES" PLASMA ARC TORCH
COOLANT LOOP

DWG NO 2C-3255-1513
SCALE: N.T.S.

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