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March 16, 1988
4410-88-L-0044/0365P

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
Criticality Safety Assessment for Use of the Plasma Arc Torch

GPU Nuclear letter 4410-87-L-0139, dated November 30, 1987, submitted the subject document for NRC review and approval. That document includes the following operational limitation: "All standing fuel assemblies must be removed from the core region prior to the use of plasma arc torch in the reactor vessel."

GPU Nuclear has currently removed all standing fuel assemblies with the exception of R-6. Due to the unique condition of the R-6 assembly, as documented in the below analysis, GPU Nuclear believes that the above stated condition has been satisfied to the best of our ability and need not be imposed for the remaining fuel material at R-6.

The reasoning which led to the inclusion of the above noted restriction was based on the modeling assumptions that were used in the subject criticality safety analysis. In this analysis, a homogeneous mixture (i.e., core average fuel) of all three fuel batches was assumed to surround the unborated batch 3 fuel region of the model. Only a limited quantity of segregated batch 3 fuel was included in the model. A review of the available core debris data and planned plasma arc torch usage was performed to evaluate whether a fuel configuration could develop which would not be bounded by the modeled geometry. It was concluded that the most likely scenario in which such a configuration could occur would require the presence of several standing batch 3 fuel assemblies. If a leak of the unborated cooling water were to occur within the standing batch 3 assemblies or if these assemblies were to fall into an area in which the torch was operating, a potential exists for a large

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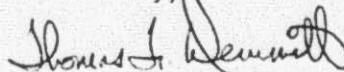
pocket of batch 3 fuel to develop. Thus, the requirement to remove all standing fuel assemblies was imposed to ensure that the torch cooling water would not leak into a region containing a substantial quantity of pure batch 3 fuel.

Considering the rationale used to develop the restriction, it is now concluded that this restriction need not be imposed for the material remaining at location R-6. This conclusion is based on the following:

- o A video survey of material in the R-6 position indicates the presence of resolidified molten material not resembling original R-6 material which was Batch 3 fuel. Although no samples of the R-6 material have been analyzed, analyses of resolidified material throughout the debris bed have yielded average enrichments consistent with the core average.
- o It is unlikely that the material at R-6 is pure Uranium Dioxide (UO_2). Analyses provided in the subject document show that a significant reduction in neutron multiplication can occur if the presence of impurities is considered.
- o The fuel mass at location R-6 is isolated from the majority of the fuel remaining in the vessel and is in a geometry which does not pose a criticality safety concern.
- o The amount of material at position R-6 is limited (measuring approximately 8.5" x 8.5" x 18" high) and is not expected to fall into the areas in which the torch will be operating. Based on the arguments above, potential relocation of the fuel would not be a criticality safety concern.

GPU Nuclear believes that the above analysis does not challenge the validity of the safety analyses in our submittal of November 30, 1987. Thus, GPU Nuclear requests timely NRC review and approval of our November 30, 1987, submittal.

Sincerely,



for F. R. Standerfer
Director, TMI-2

RDW/emf

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