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Docket 50-320

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July 23, 1982
NRC/TMI-82-047

Docket No. 50-320

Mr. John J. Barton
Acting Director, TMI-2
GPU Nuclear Corporation
P.O. Box 480
Middletown, PA 17057

Dear Mr. Barton:

Subject: Inerting and Shipping of EPICOR-PF Liners

This letter is in response to your letters, 4400-82-L-0062, dated May 14, 1982 and 4400-82-L-0113, dated July 22, 1982, in which you forwarded your plans for preparing the 49 EPICOR II Prefilters (PF) for safe shipment to a DOE facility. This preparation for shipment involves inerting each PF with a nitrogen cover gas, in order to ensure that noncombustible conditions will exist within the liner during all periods of handling and transport.

The staff has reviewed the safety related issues associated with, (1) radiological controls, (2) the potential for a combustible gas burn within the solid waste storage facility (SWSF), (3) the potential release of radioactive material from the SWSF to the offsite environs, and (4) the shipping criteria and control for transport to the DOE facility. Our review included the safety evaluation for onsite EPICOR II PF inerting, the safety analysis for EPICOR shipments and the detailed operating procedures for sampling, inerting and transporting the PF liners.

Radiological Controls

We have reviewed the structural design of the PF liner, the inerting tool, the blockhouse, the SWSF, and the remote support facility (RSF), in conjunction with the specially designed HEPA filtration system and the staff concludes sufficient safety margin exists for maintaining adequate radiation control during the liner sampling and inerting. The concrete blockhouse provides sufficient radiation shielding to maintain the ambient dose field to less than 10 mrem/hr.

If significant airborne contamination is detected within the storage cell, the cell will be vented through the HEPA filtration system prior to blockhouse removal. We concur that the accumulative occupational exposure estimates for all 49 EPICOR PF's will be less than 15 man-rem. The blockhouse placement and inerting tool positioning will contribute most to this occupation exposure.

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Potential for Combustible Gas Burn in the SWSF

The removal of the liner vent plug for sampling and inerting the PF's, is expected to communicate hydrogen gas to the inerting tool sample system and potentially to the SWSF cell. We have reviewed your system designs and procedures for the prevention of a combustible gas mixture and the staff finds them acceptable.

The inerting tool sample system will be purged and inerted with nitrogen gas prior to the vent plug removal and the storage cell and blockhouse internals will also be purged with nitrogen to maintain the oxygen to less than 4% by volume. Since a mixture of greater than 4% hydrogen and 5% oxygen will potentially produce a combustible mixture, your procedures and safety controls are designed to prevent such a combustible mixture from forming within the sample system and storage cell. Additionally, PF-16 data demonstrated an oxygen depleted condition and a nonflammable gas mixture when analyzed at the Battelle-Columbus Laboratory. These data, in conjunction with other oxygen removal information (on organic resin systems under-going radiolysis) indicate that all 49 EPICOR liners are expected to be oxygen depleted. With the use of non-ignition-source components and sparkless tools, the staff believes that the potential is acceptably low for a combustible gas burn within the EPICOR PF liner and/or the storage cell and that adequate controls and safety exist.

Release of Radioactive Material

Your analysis has shown that no measurable release of radioactive material is expected during EPICOR II inerting and shipment operation. The staff has reviewed all the containment components (liner, cell, sample system boundaries, etc.) and transport pathways during the vent plug removal, sampling, inerting and shipment. The initial vent plug removal and sampling will be conducted in a closed, leak tested system with gases recirculated and therefore, no anticipated releases. When purging and inerting the PF's, all gases will be processed through a HEPA filtering system to removal all potential airborne particulate radioactivity. Any gas leakage from the inerting tool sample chamber will be contained within the storage cell cavity and be processed through the ventilation HEPA system prior to being released. Because of the low partition factors (ratio of radionuclide airborne concentrations to liquid/resin concentrations) and nitrogen dilution effects, the staff agrees that no measurable release of radioactive material should occur during normal processing. However, as required by procedures, air particulate monitors (AMS-3) will be used to continuously monitor both the SWSF cell cavity and any discharge from the ventilation system.

Your safety assessment on hypothetical accidents with the EPICOR II PF demonstrates that the consequences are bounded by accidents previously considered in the FSAR and PEIS. The staff concurs with these analyses and believes that because of the substantial defense in-depth design for combustible gas control, the probability and consequences are significantly low and adequate assurance exists for protection of the health and safety of the public.

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Shipping Criteria and Conditions

We have reviewed your safety criteria and preparations for ensuring compliance with applicable DOT and NRC shipping requirements. All PF's will be inerted with nitrogen and sampled prior to shipment. Several liners (which have the higher curie loadings, different resin mixes, and are representative of other PF's) will undergo gas measurements over a period of at least twice the expected shipment period. The acceptance criteria for H₂ will be less than 4.1% to ensure nonflammable conditions exist. If hydrogen gas composition is greater than the nonflammable limits the cask will also be inerted with nitrogen to insure the O₂ concentration is less than 5%. Because each inerted PF liner will be demonstrated by gas measurements to be noncombustible over a period of twice the expected shipment period, we conclude that an acceptable shipment safety margin exists. Additionally, since each EPICOR liner will be prepared for shipment in accordance with NRC approved procedures, pursuant to Technical Specification 6.8 and also meet the requirements of the type B (designed to withstand transport accidents) shipping cask certificate of compliance, the staff believes adequate controls and safety features exist.

We conclude that the EPICOR II PF inerting and shipment evolutions can be conducted in a safe manner with the controls and precautions provided for in the preparations, handling and transport of each PF liner. Additionally, the staff believes the risk to the health and safety of the public and the occupational work force is minimal. We therefore, approve your plans for preparing and shipping the EPICOR II prefilters.

Original signed by
Lake H. Barrett

Lake H. Barrett
 Deputy Program Director
 TMI Program Office

cc: See Service Distribution List

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