

September 21, 1998

Mr. Richard W. Boyle, Chief
Radioactive Materials Branch
Office of Hazardous Materials Technology
U.S. Department of Transportation
400 7th Street, SW
Washington, DC 20590

SUBJECT: TRANSPORTATION OF THE SAXTON REACTOR VESSEL

Dear Mr. Boyle:

By letter dated September 4, 1998, you requested that the Spent Fuel Project Office review aspects of the June 24, 1998, application from the Saxton Nuclear Experimental Corporation and GPU Nuclear, Inc. (the applicants) for regulatory relief from U.S. Department of Transportation (DOT) shipping requirements. The application requested authorization to classify the reactor vessel from the Saxton Nuclear Experimental Facility (Saxton) as low specific activity (LSA) material and to transport it, under a specified transport plan, from Saxton to a disposal site in Barnwell, South Carolina. You requested our recommendation concerning issuance of an exemption for the Saxton Reactor Vessel Transportation System (SRVTS) as LSA material.

We have reviewed the activation analysis method used by the applicants to determine the amount and distribution of radioactive material within the reactor vessel and the applicants' LSA-III determination. The use of the ORIGEN code by the applicants to determine activation levels in the reactor vessel is acceptable to the staff. The applicant treated the reactor vessel components as a collection of solid objects and determined that the worse case component (lower guide blocks) is less than 4 percent of the LSA-III limit. The staff finds the applicants' method of determining the specific activity of the reactor vessel to be acceptable.

Based on our review, we recommend that the SRVTS be classified as LSA-III (see enclosure). If you have any questions concerning our review, please contact Mr. Earl Easton of my staff at 301-415-8520.

Sincerely,

[Charles J. Haughney for:]

William F. Kane, Director
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Docket No. 50-146

Enclosure: As stated

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SAXTON REACTOR VESSEL TRANSPORTATION SYSTEM Determination as Low Specific Activity Material

As part of the decommissioning of the GPU Saxton Nuclear Experimental Facility, various facility components must be shipped to a radioactive waste disposal facility. By letter dated September 4, 1998, the U.S. Department of Transportation (DOT) requested NRC's recommendation concerning DOT issuance of an exemption to transport the Saxton Reactor Vessel Transportation System (SRVTS) as Low Specific Activity (LSA). At issue is whether the vessel, as prepared for transport, satisfies the applicable definition for LSA as provided in US Nuclear Regulatory Commission (NRC) and DOT regulations.

By memorandum dated August 19, 1998, NRC's Division of Waste Management (DWM) provided the results of its review of Saxton Nuclear Experimental Corporation's (SNEC's) waste classification of the reactor vessel and its components, to the Non-Power reactors and Decommissioning Project Directorate (NPRDPD). DWM concluded that it had no objection to SNEC's blending of components for waste classification purposes and agreed with the classification of the components as Class C waste. SNEC was advised of the staff's waste classification review by NPRDPD memorandum, dated August 24, 1998. Although this determination concerned the suitability of the material for disposal, the analyses performed involved average activity concentration and are directly applicable to the determination of the specific activity of the components for transportation purposes.

SNEC estimated the total activity of the SRVTS at 1285 curies, with 1282 curies contained as activated metal, and 3 curies as surface contamination. The SNEC classification shows that on average, the vessel and internals have a specific activity of $1.7 \times 10^{-6} \text{ A}_2/\text{g}$ (<0.1 percent of the LSA-III limit), and that the lower guide blocks have the greatest specific activity, at 4 percent of the applicable LSA limit. On this basis, the components qualify as low specific activity material.

The regulations also require that the radioactive material be distributed throughout a collection of solid objects, such as the vessel components. This requirement was intended to prohibit the situation in which a small component with very high activity could be packaged with very low specific activity materials such that the package contents would still meet the overall LSA limit. In an accident, if the high activity item were released, the public health hazard could be considerable. While there is variability in the radioactive material distribution in the vessel components, two factors provide reasonable assurance that components will not become separated in an accident: the components are permanently attached and all the components are grouted inside the vessel. Even if such an accident and separation were to occur, a scenario the staff believes to be non-credible, the fact that each component meets the LSA definition by a wide margin tends to minimize the potential for impact on public health. Accordingly, the staff believes an exemption from the "distributed throughout" requirement is warranted.

Staff concludes the SRVTS may be classified as LSA-III and has no objection to the issuance of an exemption for its transport as LSA material.

Enclosure