

April 2, 1974

Memo to File

THRU: H. W. Crocker, Senior Inspector  
Directorate of Regulatory Operations, RO:I

NUCLEAR METALS, INC.  
CONCORD, MASSACHUSETTS  
SNM-65, INSPECTION 70-82/74-01

INSPECTOR'S EVALUATION

This inspection resulted from the unusual occurrence involving five 5-gallon pails being filled with liquid-type uranium scrap. On February 15, when the occurrence was reported to Region I, Nuclear Metals determined from a chemical analysis that one of the pails contained from 1800 to 4000 grams of uranium. The U-235 content of the uranium was not known. Of concern was the fact that the material in the pails came from the cleaning of a power hacksaw which had been used in cutting uranium-aluminum metal alloys which contained uranium enriched to 93% U-235.

In a meeting at Region I offices on March 28, Nuclear Metals made known their rationale for placing the liquid waste in 5-gallon pails. Nuclear Metals knew from accountability data that the material balance area for the power hacksaw contained less than 200 grams of U-235. According to their license application for processing small quantities of special nuclear material, they could perform any operation within its in-house capability with special nuclear material of any enrichment and in any physical geometry or form as long as the quantity of U-235 within a given exclusion area was limited to 350 grams. Also, in another place in the application, a mass of 200 grams of U-235 may be stored in any volume as a single unit or subdivided and stored at several locations. Nuclear Metals considered the power hacksaw being in an exclusion area with less than 350 grams of U-235. Also they considered the mass of U-235 involved to be less than 200 grams and as such it could be involved in any volume of material and stored in any size containers.

When the analytical data showed that one of the pails contained from 1800-4000 grams of uranium, the above reasoning was made questionable. It showed that Nuclear Metals really did not know what material was contained in the sump of power hacksaw and in the power hacksaw exclusion area. It showed that Nuclear Metals had not taken the conservative approach for criticality prevention.

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The prudent approach would have been to place the material with unknown amounts of U-235 into 3.6 liter containers in accord with Table I of their license application. The 3.6 liter containers should have been treated as individual units of U-235 and should have been stored on 22 inch centers in the storage facility.

The circumstances of this occurrence amplify my concern about the decontamination of the equipment and facilities that were involved in the manufacture of the CP-5 fuel elements. This concern was first expressed in my evaluation letter of Inspection No. 70-82/73-04, dated December 3, 1973. The licensee in his letter of March 19, 1974, on the subject, Decontamination of Power Hacksaw, states, "After successful subdivision, further analysis showed some 2000 grams total uranium and 70 grams U-235 to have been in the pail, which confirms the original engineering determination of low U-235 content but also proved that sump cleanup had been incomplete from work involving natural uranium which had taken place some ten years ago under earlier owners." (The underlining is mine.) The licensee admits that they did not decontaminate this saw before it went into service on CP-5 fuel tube work and it wasn't decontaminated before or after seven programs with Al-U alloy. The licensee further states in this letter, "Between work programs with Al-U, the saw was used for general purpose cutting." Obviously contaminated lubricating oil was used during this general purpose cutting.



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