

PDR



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV
URANIUM RECOVERY FIELD OFFICE
BOX 23326
DENVER, COLORADO 80226

NOV 29 1990

URFO:DCW
Docket No. 40-9027
SUA-1010

MEMORANDUM FOR: Docket File No. 40-8027
FROM: Dana C. Ward, Project Manager
SUBJECT: SEQUOYAH FUELS, BETA-GAMMA SURVEY OF RUBBER OVERBOOTS

On November 20, 1990, a survey was conducted of a single contaminated rubber overboot at the Sequoyah Fuels Corp. (SFC) facility near Gore, Oklahoma. The overboot along with two boot covers and a small quantity of soil were determined to have elevated readings of fixed contamination above what would be expected for items that were released for unrestricted use. Mr. Michael Vasquez, RIV, first determined that the released equipment may have been contaminated above appropriate levels as defined in SFC's license during the week of November 11, 1990. Due to time and equipment limitations, only the boot which during Vasquez's initial survey produced the highest readings was surveyed. An alpha survey was conducted of the boot using the licensee's Ludlum Model 12 with a 43-5 thin window alpha probe. A beta-gamma survey was conducted using a Ludlum Model 12 with a 44-9 pancake G-M detector. Both instruments were in calibration during the time of the survey.

The efficiency of the 44-9 was not known for the mixed energies emitted by the aged yellowcake. It can be assumed with good confidence that the efficiency of the Model 12/44-9 system would be under 100 percent. The efficiency of the Model 12/43-5 was known to be 50 percent. A check of the GM probe was made with three planchets that were counted by a Nuclear Measurements Corporation PC5 Gas Proportional Counter. The pancake probe measured the activities of the planchets with good agreement to the PC5.

The boot was first surveyed by Mr. Michael Nichols of SFC using the alpha surveying system. I observed and recorded the data. I then did my own survey while Mr. Nichols observed. An average alpha reading over the entire outside area of the boot of 600 cpm and a maximum of 1400 cpm on the heel of the boot were obtained (600 cpm = 1200 dpm and 1400 cpm = 2800 dpm using a 50 percent efficiency). After the alpha survey was completed a very thorough survey was

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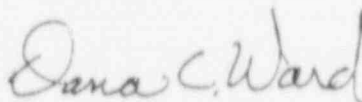
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conducted using the beta-gamma surveying system. Both Mr. Nichols and I surveyed the boot and recorded the results. An average beta-gamma reading of 29,000 cpm over the entire external surface of the boot was found with a maximum of 45,000 cpm on an approximate 5 cm² area of the sole of the boot. Mr. Nichols and I exchanged photocopies of our data at the end of the surveys.

The pancake GM probe is capable of registering alpha, beta and gamma radiations. To obtain an accurate final beta-gamma reading in dpm, alpha dpm must be subtracted from the beta-gamma result. Beta-gamma background readings were also subtracted from the final result. The findings of the survey are presented in Table 1. From this table it can be seen that the average beta-gamma results are 29,000 dpm with a maximum of 45,050 dpm, assuming a conservative 100 percent efficiency.

From the data obtained it would appear that the boot was released for unrestricted use when according to beta-gamma release criteria, referenced in SFC's license, the boot should have remained on site.



Dana C. Ward
Project Manager

cc:

Mike Vasquez, RIV
Bill Fisher, RIV
Merri Horn, NMSS

bcc:

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TABLE 1

BOOT SURVEY, NOVEMBER 20, 1990, SEQUOYAH FUELS CORP. OKLAHOMA

	<u>Average^a</u>	<u>Maximum 100 cm²</u>
Release Limits: Alpha	5,000 dpm	15,000 dpm
Beta-gamma	5,000 dpm	15,000 dpm
Survey Results: <u>Sole</u>		
Beta-gamma	38,000 cpm	45,000 cpm ^b
Alpha	600 cpm	1,400 cpm
Beta-gamma Background	150 cpm	150 cpm
<u>Sides</u>		
Beta-gamma	20,000 cpm	28,000 cpm
Alpha	600 cpm	1,400 cpm
Beta-gamma Background	150 cpm	150 cpm
Average and Maximum	29,000 cpm	45,000 cpm
Summary	29,000 dpm ^c	45,000 dpm ^c
	-1,200 dpm ^c	-2,800 dpm ^c
	<u>-150 dpm^c</u>	<u>-150 dpm^c</u>
	27,650 dpm ^c	42,050 dpm ^c

^aBoot is less than 1 m², therefore average is for the total outside area of boot.

^bThe maximum cpm was found on the heel of boot in an approximate 5 cm² area.

^cAssuming 100% efficiency, cpm = dpm for GM results.