

Kaiser Aluminum
Corporate Environmental Affairs

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
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August 3, 2004

Dr. D. Blair Spitzberg
Fuel Cycle and Decommissioning Branch
Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-4005

Subject: NRC Inspection Report 040-02377/04-001
License No. STB-472 (terminated)

Dear Dr. Spitzberg:

In response to your July 6, 2004 letter Kaiser offers the following responses to the three deviations identified in the subject inspection report.

- a. Failure to have the radiation safety officer review all work activities involving radioactive materials;

Corrective Action:

The RSO has adopted the following practices: The review of plans and procedures are documented by formal letter. At the time of the review of radiological surveys and analytical data, the forms are initialed and dated.

- b. Failure to make or cause to be made, surveys of waste containers to evaluate any potential offsite release of radiological hazards;

Corrective Action:

As indicated in your letter, a revised form was sent to you on June 18, 2004. Personnel subject to conducting surveys of waste being transported off-site have been made aware that in addition to the waste, the containers must be surveyed.

- c. Failure to complete all forms related to decommissioning in accordance with procedural guidance.

Corrective Action:

The Kaiser RSO has discussed the form completion requirements with all personnel who are tasked with completion of forms.

Additionally, enclosed is a revised copy of the technical justification for continued use of the β/γ sensitive GM detectors for personnel contamination surveys. This is one of the follow-up items in the inspection report. The formulas in the previously submitted version were corrupted in the conversion from Word Perfect to Word. We apologize for any inconvenience this may have caused.

If you have any questions concerning this submittal please call me at 225-231-2116.

Sincerely,



J. W. Vinzant
Manager, Corporate Environmental Affairs

JWV/shh

Cc: Mr. John T. Buckley – US Nuclear Regulatory Commission
US Nuclear Regulatory Commission
Mr. Douglas Wilson – City of Tulsa
Mr. George Brozowski – USEPA Region VI
Ms. Pamela L. Bishop – State of Oklahoma
Ms. Kelly Hunter Burch – State of Oklahoma
Mr. Scott Van Loo – City of Tulsa
Ms. Roberta Fowlkes – CCF Associates
Mr. Paul Handa – Tulsa
Dr. Max Scott – ADA Consultants
Mr. Danny Brown - Recon
File – Tulsa – 3.12.07

Technical Justification for Beta Scanning of Rubber Boots

Background:

Initially the procedure for persons leaving the remediation area was to wash off their boot at the west entrance to the concrete pad west of the flux building and then proceed into the flux building for beta scanning. During an NRC inspection on May 4-5, 2004, the inspectors suggested that Kaiser (Recon) discontinue beta scanning and commence alpha scanning for personal contamination. Additionally, they felt that there was an opportunity for contamination to be transferred from the boots to the concrete pad and then washed off site. Due to the difficulties of maintaining an alpha detector under field conditions, it was decided to establish a beta scanning station near the flux building to scan boots. Alpha surveying for personal contamination was initiated within the flux building. During an NRC inspection on June 9-10, 2004, the inspector continued to express concern regarding the beta scanning and the possibility of material being washed off site.

Justification:

The procedure of washing the boot prior to conducting a scan should remove all or most of the contamination. In order to do an alpha survey either the boots would have to be allowed to dry or would have to be dried off. Neither of these appeared to be a reasonable approach.

A beta scan can be effectively conducted on wet boots. The following calculations confirm that the amount of contamination that might remain undetected on a boot transferred to the concrete pad and subsequently washed off-site is a small fraction of the uncontrolled release limit for ^{232}Th of 3×10^{-2} pCi/ml (3×10^{-8} $\mu\text{Ci/ml}$) of water (Title 10 CFR Part 20 Appendix B Table 2 Column 2). The release limits for ^{230}Th and ^{228}Th are factors of 3 and 6 respectively, more than for ^{232}Th and will not contribute significantly.

Parameters and Assumptions:

Each atom of ^{232}Tl that decays in secular equilibrium with its daughters will result in 3.48 beta emissions (Radiological Health handbook page 110). To be conservative for these calculations it is assumed that there is a 1:1 ratio.

The MDC for the two Ludlum model 3s with model 44-9 probes range from 495 dpm/100 cm^2 to 725 dpm/100 cm^2 (personal communications Tyrone Trent). For the following calculations, it is assumed that no more than 750 dpm/100 cm^2 will go undetected.

It is assumed that each day 10 employees will miss 750 dpm/100 cm^2 for a 6 day work week.

Total sole and heel area of boots 400 cm^2

Rains once every two weeks

Quantity released to Fulton Creek each 2 weeks:

$$10 \text{ employees/days} \times 12 \text{ days} \times 750 \text{ dpm/100 cm}^2/\text{employee} \times 4 \div 2.22 \text{ dpm/pCi} = 1.62 \times 10^5 \text{ pCi/12 days (2 work weeks)}$$

Dilution necessary to meet the limit at the outfall from Fulton Creek:

$$1.62 \times 10^5 \text{ pCi} \div 3 \times 10^{-2} \text{ pCi/ml} = 5.4 \times 10^6 \text{ ml}$$

$$5.4 \times 10^6 \text{ ml} \div 28317 \text{ ml/ft}^3 = 191 \text{ ft}^3$$

Assuming a water shed of 1 acre, then a rain of 0.053 inches is equivalent to 191 ft³. The water shed that drains into Fulton Creek upstream from where the drainage from the concrete pad west of the flux building empties into Fulton Creek is conservatively estimated at 10 acres. Therefore, there appears no practical scenario that can result in a significant fraction of the uncontrolled release limit being tracked onto the concrete from contaminated boots and subsequently released to Fulton Creek.

Based on the above, it appears reasonable that beta scanning of boots will not lead to significant missed contamination which could be washed off site.

As additional assurance, weekly contamination surveys will be conducted of the area between the boot washing station and the flux building.

L. Max Scott
Kaiser Radiation Safety Officer
6/11/2004