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**From:** "Hansen, John (Defense)" <John\_Hansen@ATK.COM>  
**To:** "rafael rodriguez" <rlr1@nrc.gov>  
**Date:** Thu, Dec 5, 2002 11:23 AM  
**Subject:** TCAAP Dose Assessment

Attached is the dose assessment for the TCAAP waste stream. This assessment is based on the previously approved exemption granted on essentially the same material at another Army facility. The change in transportation mode required some additional analysis for the transport personnel.

Please feel free to contact myself or Sammy Jones, SEC Project Manager if you have any questions.

<<-MAP0007.PDF>> <<120502-ATK SEC WCS-dose-rev08.DOC>>

**CC:** "Persoon, Jim" <Jim\_Persoon@ATK.COM>, "Mike McCann" <gmm@nrc.gov>, "Sammy Jones" <sjones@sec-tn.com>

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**DOSE ASSESSMENT FOR DISPOSAL OF TWIN CITIES ARMY AMMUNITION PLANT  
(TCAAP) WASTE CONTAINING LESS THAN 0.05 WT% SOURCE MATERIAL AT WCS  
ANDREWS FACILITY**

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## **1. INTRODUCTION**

- 1) The following consists of analysis performed for the TCAAP waste stream as compared to data collected for the Lake City Army Ammunition Plant (LCAAP) waste stream. The LCAAP waste stream was approved for shipment as an unimportant quantity of source material in a letter from Mr. Stewart W. Brown, USNRC, dated March 26, 2001. (Attachment 1)
- 2) Based on the extremely small difference in the concentration of the isotopes between the two facilities (LCAAP and TCAAP), the resulting doses which were determined in the previously approved analysis for LCAAP are applicable to the source material from the TCAAP. The only difference is the mode of transportation of the waste. The TCAAP waste will be transported by truck whereas rail was used for the LCAAP waste. The following analysis will demonstrate that the shipment method results in a dose which is very low when compared to the NRC limits.

## **2. SAFETY ANALYSIS AND DOSE ASSESSMENT (EXCLUDING DOSE TO THE PUBLIC) FOR DISPOSAL OF TCAAP WASTE AT THE WCS ANDREWS FACILITY**

### **2.1. SOURCE TERM**

The TCAAP waste contains depleted uranium, but essentially no thorium or radium. Uranium is present as a result of depleted uranium munitions manufacturing conducted at TCAAP during the 1970's and 1980's. During decommissioning and characterization efforts, the Army confirmed that the isotope U-238 would comprise 87.7% of the total uranium activity. The remaining activity consists of approximately 10.7% U-234 and 1.6% U-235. Based on the site specific isotopic uranium ratio ( 68.1% U-238, 30.5% U-234, and 1.4% U-235), the unimportant quantity of source material threshold (i.e., less than 0.05% by weight) is 250 pCi/g. (All external dose calculations in this assessment were developed on the maximum allowed average (total uranium) concentration of 250 pCi/g and are worse case levels).

### **2.2. DOSE TO TRANSPORT PERSONNEL**

The dose to the transport vehicle driver is calculated using MICROSIELD and the TCAAP waste profile. 18 super-sack waste containers will be loaded into the cubic volume of the truck. This should measure 337.79 cm Length, 337.79 cm Width, 337.79 cm Height external dimensions and will hold 50 cy of waste. The driver is assumed to be 2 meters from the waste and requires 1 hour to load the truck. Transportation to the disposal cell is assumed to require 27 hours one way (the truck will be empty

on the return trip. Unloading time should take about 1 hour. The resulting dose is  $7.837e-4$  mrem/hr x (2 hours load & unload time + 27 hours travel time) per load. This yields a dose of 0.022 mrem per trip for the driver. Assuming 1 driver hauls the entire waste stream, 900 cy of waste, and 50 cy per load, the individual driver dose is calculated as follows:

$$\text{Dose}_{\text{WCS Driver}} = \frac{(7.837e-4 \text{ mrem/hr per load})(900 \text{ cy waste}) \times 29 \text{ hours}}{(1 \text{ Driver})(50 \text{ cy/load})} = 0.409 \text{ mrem}$$

### 3. CONCLUSIONS OF ANALYSES

The U.S. Army proposes to dispose of contaminated material from its TCAAP facility by transfer to the WCS Andrews facility. The Army will only transfer waste containing unimportant quantities of source material, i.e., less than 0.05 wt%. Estimates of individual and collective dose to members of the public and to WCS workers were made to evaluate the consequence of disposing similar waste and was performed as noted in Attachment 1. The dose estimate to the transport vehicle driver and to members of the public is very low when compared to the NRC limits. It has been concluded by all parties that the incurred dose from the TCAAP waste would be negligible.