June 25, 2010

Bruce Elliott, Director
Safety/Rad Waste Directorate
Department of the Army
Headquarters, U.S. Joint Munitions Command
1 Rock Island Arsenal
Rock Island, IL 61299-6000

SUBJECT: APPROVAL OF REQUEST TO TRANSFER DEPLETED URANIUM UNDER 10 CFR 40.13, "UNIMPORTANT QUANTITIES OF SOURCE MATERIAL," TO RESOURCE CONSERVATION AND RECOVERY ACT SUBTITLE C FACILITY IN GRAND VIEW, IDAHO (MAIL CONTROL #318758)

Dear Mr. Elliott:

By letter dated January 19, 2010 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML100200958), the Department of the Army notified the U.S. Nuclear Regulatory Commission (NRC) of its intentions to transfer 2,200 tons of soil and sand containing depleted uranium (DU) of unimportant quantities of source material to the U.S. Ecology Idaho (USEI) Resource Conservation and Recovery Act Subtitle C facility located near Grand View, Idaho, for disposal.

The staff has reviewed the Department of the Army's January 19, 2010, submittal regarding the transfer of the 2,200 tons of soil and sand containing DU to USEI in accordance with Title 10, *Code of Federal Regulations* (CFR), Section 40.13, "Unimportant Quantities of Source Material," and concluded the proposed action to be acceptable. The U.S. Environmental Protection Agency and the Missouri Department of Natural Resources, who have immediate over sight authority for the Lake City Army Ammunition Plant (LCAAP) clean-up, will be informed concurrently of the NRC finding. The staff's detailed review of the Department of the Army's submittal is provided in the enclosed Safety Evaluation report. Please note that once materials at issue have been transferred, the disposition of those materials is a matter under the jurisdiction of the State of Idaho.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

We appreciate your cooperation and if you have any questions, please do not hesitate to contact Ms. Katie Streit at (630) 829-9621.

Sincerely,

/RA/

Christine Lipa, Chief
Materials Control, ISFSI, and
Decommissioning Branch
Division of Nuclear Materials Safety

Docket No.: 040-08767
License No.: SUC-01380

Enclosure:
Safety Evaluation Report

cc w/encl: C. Sperry, USEPA
B. Doster, MDNR
K. Stein, LCAAP
T. Buechler, LCAAP

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SAFETY EVALUATION REPORT
REQUEST TO TRANSFER DEPLETED URANIUM-CONTAMINATED SAND FROM LAKE CITY ARMY AMMUNITION PLANT TO U.S. ECOLOGY, INC., UNDER 10 CFR 40.13, "UNIMPORTANT QUANTITIES OF SOURCE MATERIAL"

1.0 BACKGROUND

On June 25, 2008, the U.S. Army Joint Munitions Command (Army) provided the U.S. Nuclear Regulatory Commission (NRC) with a notice of intent to dispose of sand from the Area 10 Sand Piles at the Lake City Army Ammunition Plant (LCAAP), Independence, Missouri (ML081920211). At the time LCAAP was planning on transporting and disposing of the sand, contaminated with low levels of depleted uranium (DU), in an industrial landfill in Johnson County, Kansas using a limit of 0.31 Becquerel per gram [(Bq/g), (8.4 picocuries per gram (pCi/g)] for the sand. A Safety Evaluation Report (SER) was conducted by NRC staff to document the risks associated with this proposed change and determined that the revised Derived Concentration Guideline Level (DCGL) is consistent with NRC policy.

On January 19, 2010, the Army notified the NRC of its intent to transport 2,200 tons of soil and sand containing DU from LCAAP to U.S. Ecology Idaho, Inc. (USEI) for disposal (ML100200958). The contaminated material consists of two waste streams associated with the remediation of Area 10 of the site. The Army requested confirmation from the NRC to allow the alternative disposal of the DU waste as an "unimportant quantity of source material" under the criteria discussed in 10 CFR 40.13(a).

It should be noted that the USEI is permitted by the Idaho Department of Environmental Quality (IDEQ) to operate a Resource Conservation and Recovery Act (RCRA) Subtitle C facility located near Grand View, Idaho and is not a NRC licensee. However, as a matter of policy the NRC reviews the safety implications of disposing of unimportant quantities of material at sites other than Atomic Energy Act-licensed disposal facilities.

2.0 EVALUATION

The Army supplied information on the DU contents of the waste and evaluated different possible exposure scenarios for workers and members of the public. These scenarios include dose to the transportation workers, USEI workers, and post-closure dose to the general public. It should also be noted that Idaho's state RCRA permit allows the disposal of exempted radioactive material including uranium as either naturally occurring radioactive material or unimportant quantities of source material provided they meet the requirements outlined in 10 CFR 40.13(a) and can demonstrate that no individual would receive a dose in excess of 0.15 mSv/yr (15 mrem/yr) for a period of 100 years after closure of the facility.

3.0 SOURCE MATERIAL

The LCAAP utilized DU for the body of small ammunition rounds known as the "Davy Crockett" during the 1960s and 1970s. In 1971, LCAAP demilitarized 44,000 remaining rounds by shooting them into a sand-filled catch box. The impacted sand was removed from the catch box and stored onsite in Area 10. During remediation of Area 10 soil was identified as approaching or exceeding the NRC-approved DU DCGL. Further surveys of the soil in the elevated areas were completed in one foot lift increments to segregate and remove discrete particles of DU and contaminated surrounding soils.

Two thousand two hundred (2,200) tons of soil were removed and further segregated into two waste streams. The first stream consists of the higher activity discrete particles and soil with a concentrations up to 1.11 Bq/g (30 pCi/g) while the second stream is the segregated soil with lower concentrations (approximately 0.11 Bq/g [3 pCi/g]) that remained after the removal of the discrete particles and surrounding soil associated with the first stream.

4.0 SCENARIOS

The Army performed a dose assessment for a variety of scenarios to determine the critical group associated with the transport and disposal of the materials. The Army plans to use a combination of gondola railcars and trucks to transport the material to USEI. It is estimated that 22 gondola cars will be required to ship the entire 2,200 tons of material to USEI for disposal. Upon arrival at the Rail Transfer Facility (RTF) the material will be transferred and trucked to the disposal site. Surveys of the material will be conducted prior to removal from the rail cars and after being loaded onto the trucks for transport. Several different worker doses are calculated, including surveyors, excavator operators, truck drivers, and cell workers. Post-closure analysis has also been included in the analyzed scenario. Intrusion to the site following disposal is also considered.

5.0 RESULTS

Both Microshield and RESRAD were used, as appropriate, to evaluate each of the scenarios. Appropriate site-specific parameters and realistic exposure times were considered. Overall, the staff finds the selection of scenarios and the conservative use of site-specific parameter values to be acceptable.

External Dose

The dose to individuals involved with the transport and disposal activities were determined using Microshield. Individual dose rates were converted to an estimated dose by taking into consideration an assumed time of exposure and an estimated number of workers required to complete the task. The calculated dose during rail transport of the material is not significant since the material is covered and the driver is a distance away from the material and not involved in the loading and unloading processes. The stabilization operator mixes any material requiring treatment as hazardous waste with a predetermined mixture of chemical agents which have been demonstrated to immobilize metallic hazardous constituents in order to meet applicable EPA Land Disposal Restrictions. These duties are similar enough to the excavator operator that the same dose rate is used for both scenarios. The annual or projected dose (mrem) per person for each of individual is presented in Table 1.

Internal Dose

Since the material being shipped to USEI will be contained in sealed shipping containers internal exposures to transport workers is considered minimal and not significant. The greatest potential of internal exposure is associated with the transport and disposal processes that will occur at the USEI RTF. An airborne dust study conducted at the RTF indicated that respirable dust levels ranged from 0.17 to 0.23 mg/m^3, averaging 0.2 mg/m^3. The internal doses associated with airborne radionuclides are based on a variety of factors including the concentration of airborne radionuclides, time of exposure, and an individual's inhalation rate.

The excavator operator was identified as the Maximally Exposed Individual (MEI) at USEI for inhalation due to the constraints of his job and the need to be present during the entire process of trans-loading materials from the rail cars to the trucks. However, due to the small number of gondola cars that will require unloading and the low dust levels routinely measured at the RTF the inhalation dose calculated for the excavator operator was low (Table 2).

Table 1. External Dose Estimations for Operators and Surveyors

Function	Number of People	Dose Rate From Microshield (mrem/hr)	Time to perform task (hr)	Number of Iterations	Multiplier to equate to one gondola volume	Annual/Project Dose (mrem) per person
Gondola Surveyor	4	1.56E-03	0.33	22	1	2.83E-03
Excavator Operator	4	5.19E-04	0.58	22	1	1.66E-03
Truck Surveyor	4	1.24E-03	0.083	22	3	1.70E-03
Truck Driver	14	1.25E-03	0.75	22	3	4.42E-03
Stab Operator	4	5.19E-04	0.5	22	1	1.43E-03
Cell Operator	2	7.47E-04	0.167	22	1	1.37E-03

Table 2. Estimation of Inhalation Dose

	U-238	U-234	U-235	Th-234	Pa-234m
Conc. in Waste (pCi/g)	167	28	3	165	165
Inhalation Factor ($g_{inhaled}$/rc)	3.99E-04	3.99E-04	3.99E-04	3.99E-04	3.99E-04
Dose Conv. Factor (mrem/pCi)	4.17E-02	4.67E-02	4.33E-02	2.18E-05	8.33E-07
Dose/Railcar/nuclide (mrem)	2.78E-03	5.23E-04	5.18E-05	1.43E-06	5.48E-08
No. Railcars per year	22				
Dose/Nuclide (mrem)	6.11E-02	1.15E-02	1.40E-03	3.16E-05	1.21E-06
Total Dose (mrem)	7.38E-02				

Post Closure Dose

The USEI permit with the IDEQ requires that it demonstrate that no person will receive a dose exceeding 0.15 mSv/yr (15 mrem/yr) for 1000 years after closure of the facility. A post closure dose analyses were completed for a resident farmer scenario using RESRAD. Laboratory-measured values for DU and a site-specific erosion rate previously approved by the State of Idaho were used. The resulting doses ranged from 5E-11 mSv/yr (5E-9 mrem/yr) when assuming waste disposition over the entire USEI site (88221 m^2) to 9.4E-9 mSv/yr (9.4E-7 mrem/yr) for waste consolidated in a single lift of 4301 m^2 and 0.3 m deep.

Since the resident farmer scenario does not consider impacts associated with direct exposure to the disposed waste NRC staff conducted an analysis using an inadvertent intruder construction scenario. This screening analysis assumes that someone would intrude into the site and then live on the site, which includes the construction of a house with basement. A factor of four reductions in concentration is considered due to inadvertent mixing during construction based on guidance provided in Appendix G of NUREG-0782, “Draft Environmental Impact Statement on 10 CFR Part 61 Licensing Requirements for Land Disposal of Radioactive Waste.” Results from these analyses are provided in Table 3 and are below the 1 mSv/yr (100 mrem/yr) dose

thresholds for the general public. The most bounding screening scenario is based on the waste being disposed of as one lift at the top of a cell and the intruder only interacting with the cover and waste layer. The result of this bounding assessment calculates a potential dose over 0.25 mSv/yr (25mrem/yr). A more realistic analysis of the intruder scenarios (e.g., accounting for additional mixing with non-radioactive waste, the actual depth of disposal, etc) would result in the dose being much lower than the bounding assessment. The staff has reasonable assurance that the consequences of intrusion would be below 0.25 mSv/yr (25mrem/yr) to the average member of the critical group.

6.0 FINDINGS

Based on the analyses summarized above the NRC staff finds that the transfer of 2,200 tons of sand from the Area 10 Sand Piles, contaminated with DU, to USEI in accordance with 10 CFR 40.13, “Unimportant Quantities of Source Material” and acceptable with current Commission policy.

Table 3. RESRAD Analyses Evaluated and Resulting Doses

	Area (m^2)	Thickness (m)	Cover Depth (m)	U-238	U-235	U-234	Dose (mSv/yr)	Dose (mrem/yr)	at t= (yrs)
Analysis 1:	88221	33.6	3.6	7.30E-02	1.30E-03	1.24E-02	4.76E-09	4.76E-07	1.00E+03
	Original Analysis using bounding concentrations and considering homogeneous disposition across entire site								
Inadvertent Intruder Resident Farmer Scenario									
Analysis 2:	88221	33.6	3.6	6.80E-04	8.50E-06	1.30E-04	4.99E-11	4.99E-09	1.00E+03
	Laboratory values for DU and considering homogeneous disposition across entire site								
Analysis 3:	4301	0.3	3.6	1.53E+00	1.93E-02	2.86E-01	9.39E-09	9.39E-07	1.00E+03
	Laboratory values for DU and considering waste disposed of in more consolidated fashion								
Inadvertent Intruder Construction Scenario									
Analysis 4:	88221	33.6	3.6	1.70E-04	2.13E-06	3.25E-05	5.50E-06	5.50E-04	1.00E+03
	Laboratory values for DU and considering homogeneous disposition across entire site and dilution (divided by 4) due to mixing								
Analysis 5:	4301	0.3	3.6	3.83E-01	4.83E-03	7.15E-02	6.99E-03	6.99E-01	1.00E+03
	Laboratory values for DU and considering waste disposal in more consolidated fashion and dilution (divided by 4) due to mixing								