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MAR 0 6 2006

CBU-WMAP-2006-00010
RSM Track #: 10048

Mr. Douglas E. Hintze
Waste Disposition Programs Division
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29808

Dear Mr. Hintze:

CLASSIFICATION OF AM-CM WASTE AS LOW-LEVEL WASTE (OBU-TRU-2006-00021)

As discussed with your staff, the attachment demonstrates that the AM-CM waste, originally stored as TRU waste due to the previous 10nCi/g TRU limit, is LLW (less than the current TRU limit of 100nCi/g). In addition, the South Carolina Department of Health and Environmental Control (SCDHEC) has concurred that this LLW is not RCRA hazardous and agreed to the removal of the hazardous codes from the storage drum labels.

In addition, the Am-Cm waste is not classified as High-Level Waste (HLW), in that it is experimental equipment and job control waste resulting from the SRNL cell's experimental scale processing of Pu-242 targets using ion exchange techniques to separate Am-Cm. The Am-Cm was converted into targets used to create Cf-252 as part of the Cf-252 research program.

We plan to remove this Am-Cm LLW from the TRU inventory and dispose it in the E-Area LLW Facilities. Also we will add this document to our Radioactive Waste Management Basis (RWMB) at its next revision.

Any questions you or your staff may have may be directed to W. T. Goldston of my staff.

Sincerely,

J. L. Stevens, Manager
Waste Management Area Project

wtg/ccc
Att.
c: H. L. Pope, DOE SR, 704-S
J. M. Simmons, 704-S
ECATS, 730-B
W. A. Morrison, WSRC, 705-3C
D. J. Swale, 704-59E
L. T. Reid, 705-3C
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D. F. Sink, 704-56E
A. Gibbs, 704-36E
L. Williams, 705-3C
E. H. Helmich, 704-56E
Document Control, 642-E

OBU-TRU-2006-00021
March 3, 2006

TO: W. T. Goldston, 705-3C

3/3/06
FROM: A. Gibbs, 704-36E

Subject: Disposal of Am-Cm Waste as Low Level Waste with Cm-244 Content Greater than Class C.

Summary

SRS has stored a quantity of Am-Cm waste which was generated in the Savannah River National Laboratory (SRNL) high level cells (HLC) during the precursor programs to the Cf-252 program. This waste was originally stored because of the 10 nCi/g transuranic (TRU) limit. TRU is defined as alpha emitting nuclides with half-lives greater than 20 years. When the TRU limit was raised to 100 nCi/g this waste was no longer TRU, but was recalculated only recently. Generation of the wastes has also been researched and they have been found to be non-hazardous. (Attachment 1) SC DHEC has concurred with the removal of hazardous codes placed during the wholesale placement of "solvent rag" designations on all stored wastes in the Solid Waste Management Facility (SWMF). (Attachment 2) During transfer of the wastes from TRU to LLW for disposal at SRS the calculation of "greater than Class C" (GTCC) waste in the Nuclear Regulatory Commission (NRC) rules was tripped. This is caused by the NRC use of a 5 year half-life for alpha emitters to determine GTCC, while the DOE uses a 20 year half-life for alpha emitters to determine TRU waste. The 18 year half-life Cm-244 is over 8 times the NRC limit for Class C waste. This GTCC has, in turn, generated a question on whether the waste is high level waste (HLW) and should be classified as waste incidental to reprocessing (WIR).

Cm-244 has been analyzed in the Performance Assessment and Composite Assessment of the SWMF and found to have a high disposal limit before causing deleterious consequences to the environment/personnel in the future. This is due to its half-life and chemical properties. The PA limit exceeds the quantity in the Am-Cm waste by several orders of magnitude. The waste is not HLW because it does not fit any of the regulatory definitions for HLW.

Greater than Class C (GTCC) Wastes

10 CFR61.55 which regulates NRC licensed disposal facilities has the following:

" §55. Waste classification

(a) Classification of waste for near surface disposal. (1) *Considerations.* Determination of the classification of radioactive waste involves two considerations. First, consideration must be given to the concentration of long-lived radionuclides (and their shorter-lived precursors) whose potential hazard will persist long after such precautions as institutional controls, improved waste form, and deeper disposal have ceased to be effective. These precautions delay the time when long-lived radionuclides could cause exposures. In addition, the magnitude of the potential dose is limited by the concentration and availability of the radionuclide at the time of exposure. Second, consideration must be given to the concentration of shorter-lived radionuclides for which requirements on institutional controls, waste form, and disposal methods are effective.

...(2) ... (iii) Class C waste is waste that not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in §61.56.

(iv) Waste that is not generally acceptable for near-surface disposal is waste for which form and disposal methods must be different, and in general more stringent, than those specified for Class C waste. In the absence of specific requirements in this part, such waste must be disposed of in a geologic repository as defined in part 60 or 63 of this chapter unless proposals for disposal of such waste in a disposal site licensed pursuant to this part are approved by the Commission.

(3) Classification determined by long-lived radionuclides. If radioactive waste contains only radionuclides listed in Table 1, classification shall be determined as follows:

(i) If the concentration does not exceed 0.1 times the value in Table 1, the waste is Class A.

(ii) If the concentration exceeds 0.1 times the value in Table 1 but does not exceed the value in Table 1, the waste is Class C.

(iii) If the concentration exceeds the value in Table 1, the waste is not generally acceptable for near-surface disposal.

(iv) For wastes containing mixtures of radionuclides listed in Table 1, the total concentration shall be determined by the sum of fractions rule described in paragraph (a)(7) of this section.

Table 1

Radionuclide	Concentration curies per cubic meter
C-14	8
C-14 in activated metal	80
Ni-59 in activated metal	220
Nb-94 in activated metal	0.2
Tc-99	3
I-129	0.08
Alpha emitting transuranic nuclides with half-life greater than 5 years	\1\ 100
Pu-241	\1\ 3,500
Cm-242	\1\ 20,000

\1\ Units are nanocuries per gram. "

Discussion of GTCC Issue

Using Container SR 11551 as an example, these 85 Am-Cm waste containers have the following typical radionuclide distribution and concentrations:

Radionuclide	Activity, Ci	Radionuclides, nCi/g	TRU Limit, nCi/g	GTCC Limit, nCi/g
AM241	1.78E-02	1.78E+01	100	100
AM242M	5.26E-04	5.264E-01	100	100
AM243	1.04E-04	1.04E-01	100	100
BA137M	6.73E-02	6.73E+00	unlimited	unlimited
CM244	**8.70E-01**	**8.70E+02**	**unlimited**	**100**
CM245	2.27E-04	2.27E-01	100	100
CM246	3.48E-04	3.48E-01	100	100
CM247	7.02E-10	7.02E-07	100	100
CM248	4.01E-09	4.01E-06	100	100
CS137	6.73E-02	6.73E+00	unlimited	unlimited
EU154	3.64E-01	3.64E+01	unlimited	unlimited
NP239	2.62E-01	2.62E+01	unlimited	unlimited
PU238	2.50E-02	2.50E+01	100	100
PU239	4.23E-05	4.23E-02	100	100
PU240	7.81E-03	7.81E+00	100	100
PU241	1.15E-07	1.15E-05	unlimited	3500
PU242	7.27E-06	7.27E-03	100	100

The Performance Assessment (PA) and Composite Assessment (CA) for the SWMF have calculated the following limits for trench disposal of Cm-244

Resident intruder	4.4E+11 Curies
Post Drilling intruder	1.0E+05 Curies
GW1 (1-12 years)	1.5E+05 Curies
GW2(12-100 years)	1.5E+05 Curies
GW3 (100-1000 years)	1.5E+05 Curies

The PA and CA take into account similar criteria for the isolation of waste from intruders and environmental conditions that are used by the NRC for waste disposal at their licensed facilities. The waste packaging criteria at SRS is essentially identical to that required by the NRC.

There are 12 orders of magnitude difference between the GTCC value of 100 nCi/g value for Cm-244 (t1/2 = 18.1 years) of the NRC and the 1E+05 Curies/trench analyzed value for the SWMF at SRS. The entire group of Am-Cm containers will contribute 3.61E-03% to the most restrictive PA/CA trench value for Cm-244. The contributions of this and other radionuclides for the Am-Cm waste cohort are shown in the following table.

Radionuclide	Half-life	Total Am-Cm Waste Activity, Ci	/1/ SRS PA/CA Most Restrictive Trench limits, Ci	% of Limit Used by Am-Cm Waste
AM241	432 yr	7.38E-02	9.80E+01	0.0753%
AM242M	141 yr	2.18E-03	1.40E+03	0.0002%
AM243	7380 yr	4.33E-04	5.40E+02	0.0001%
BA137M	2.55 min	1.38E+01	2.40E+04	0.0575%
CM244	18.4 yr	3.61E+00	1.00E+05	0.0036%
CM245	8500 yr	1.20E-03	2.70E+02	0.0004%
CM246	4730 yr	1.84E-03	1.50E+03	0.0001%
CM247	1.56E+07 yr	3.71E-09	7.90E+01	0.0000%
CM248	3.4E+05 yr	2.12E-08	4.00E+02	0.0000%
CS137	30.1 yr	1.38E+01	2.40E+04	0.0575%
EU154	8.59 yr	3.85E+01	1.10E+07	0.0004%
NP239	2.36 days	2.77E+01	no limit	
PU238	87.7 yr	1.32E-01	4.40E+02	0.0300%
PU239	2.41E+04 yr	2.23E-04	4.00E+02	0.0001%
PU240	6.56E+03 yr	4.13E-02	4.00E+02	0.0103%
PU241	14.4 yr	6.09E-07	4.00E+03	0.0000%
PU242	3.73E+05 yr	3.84E-05	4.10E+02	0.0000%
Total		9.77E+01	1.12E+07	0.0009%

/1/ WSRC-TR-2004-00300, Rev. 0.

The contribution of the Am-Cm wastes will have little consequence upon the Performance Assessment or the Composite Assessment of the SWMF at SRS. The NRC definition of GTCC for the short-lived Cm-244 does not make these wastes of any greater consequence than the Cs-137. Since the SWMF is (1) not a NRC licensed facility, (2) SRS has an analysis and limits for disposal within its boundaries (3) the Cm-244 value for all the wastes is well within the analysis and (4) the other radioisotopes are also well within the analysis conditions, these Am-Cm wastes should be disposed of as the low level wastes they are.

HLW Regulatory Definitions

The first legal definition of HLW was established in 1970 by the Atomic Energy Commission (AEC) defined in 10CFR50 Appendix F as:

"...those aqueous wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, in a facility for reprocessing irradiated reactor fuel."

The Nuclear Regulatory Commission (NRC) defined HLW in 10CFR60.02 as:

".... (1) Irradiated reactor fuel, (2) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated waste from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated fuel, and (3) solids into which such liquid wastes have been converted."

The Nuclear Waste Policy Act (NWPA) of 1982 defined HLW as:

"....(a) The highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and (b) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation."

The Department of Energy (DOE) Order 435.1 definition of HLW is similar to the NWPA of 1982 except for the reference to the "Commission" and is follows:

"High-level waste is the highly radioactive waste material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations, and other highly radioactive material that is determined, consistent with existing law, to require permanent isolation."

Discussion of HLW Issue

These Am-Cm wastes arise from the experimental laboratory scale production of Am-Cm targets for the production of Cf-252. The target material (irradiated Pu-242) was separated using ion exchange techniques in the high level cells of SRNL. The separated Am-Cm was converted into solid targets for the next irradiation which eventually led to Cf-252. The experimental laboratory scale separation, conversion, and analysis equipment and job control materials make up the Am-Cm wastes which are being disposed of.

The wastes do not arise from irradiated reactor fuel, they originated as Pu-242 targets made especially for the production of Am-Cm. They are not liquid wastes resulting from the operation of a first cycle solvent extraction system, or equivalent, and the concentrated waste from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated fuel. The Am-Cm separated from the Pu-242 targets was processed in the high level cells of SRNL using ion exchange methods. And, the Am-Cm wastes are not solids into which such liquid wastes have been converted, they are equipment and materials used to separate the irradiated Pu-242targets into Am-Cm.

The solid Am-Cm wastes do not meet any of the definitions of high-level waste. They are wastes arising from the processing of irradiated Pu-242 targets specifically produced to make Am-Cm. In addition these wastes are not wastes which contain fission products or other highly radioactive material in sufficient concentrations to require permanent isolation.

Conclusion of HLW Issue

The definitions contained in the regulations and DOE orders define LLW, transuranic (TRU) and HLW.

Low-level waste is any nuclear waste not defined as HLW or TRU. According to DOE Order 435.1, transuranic waste is radioactive waste containing more than 100 nano curies of alpha emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years. These wastes do not have concentrations greater than 100 nCi/g of any alpha emitter with a half-life greater than 20 years, therefore, they are not TRU waste.

These wastes consist of material and equipment used in the HLC of SRNL to recover Am-Cm from irradiated Pu-242 targets. The recovery of Am-Cm used a dedicated laboratory scale system completely separated by miles from the large-scale facilities doing solvent extraction of irradiated fuel in F and H areas.

High-level waste is defined as "highly radioactive waste material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing..." These wastes

result from the recovery of irradiated targets, no nuclear fuel was involved in this recovery process.

These Am-Cm wastes do not meet the definition of TRU waste or high-level waste. Therefore, they are not WIR, but LLW and shall be managed and disposed of according to DOE Order 435.1 and other applicable regulations. In the case of the Am-Cm wastes under discussion, this means that the containers will be disposed of in trenches at the SWMF at SRS as they meet all the criteria for low level waste and the greater than Class C activity of the Cm-244 is well within the analyzed limits for its disposal.

ATTACHMENT 1 to OBU-TRU-2006-0021

WASHINGTON SAVANNAH RIVER COMPANY
INTEROFFICE MEMORANDUM

Originally Letter OBU-GSE-2004-00083
May 24, 2004 to H. W. MORRIS 705-3C

January 19, 2006

TO: DAVID COLE, 704-36E

FROM: A. GIBBS, 704-36E A. Gibbs 1/30/06

Transfer of Am-Cm Containers from TRU to LLW

Technical Reviewer: N. S. Roddy / N. S. Roddy Date: 1/30/06

Summary

Stored in the Solid Waste Management Facility at WSRC are containers of waste from the High Level Cells in Building 773-A and Building 776-A. These containers of job control waste are from the programs which produced americium and curium for the californium project and heat source investigations. The waste discussed in this document contains high dose rate radionuclides, but is not transuranic (TRU) waste. All of these containers were stored in E-Area Solid Waste Management Facility (SWMF) prior to June 1981.

Calculation of the radioactive components of the Am-Cm wastes shows that there are 79 containers which are low-level waste which can be disposed of at the SWMF with considerable reduction in risks to personnel and cost savings if the hazardous codes are removed.

"Solvent rag" hazardous material codes were assigned to this waste in 1990 due to its storage in the SWMF at the time. This mass designation of all wastes in the SWMF as hazardous was done in lieu of actual investigation of the wastes to determine if they had any hazardous materials present. Investigation of the Am-Cm processes which produced these wastes shows that there were no hazardous materials used which could be in the solid waste and the codes should be removed from this waste.

Discussion

Irradiation of Pu-239 targets for production of a few kilograms of Cm-244 started in May 1964. Processing in the high level cells (HLC) of the Savannah River Laboratory (SRL) began in mid-1967. Dissolution and recovery of the plutonium target assemblies were done in the plant separation facilities. The crudely separated Am/Cm fraction was transferred to be purified in special facilities at SRL for research into heat generation sources. At SRL, the tanks, miniature mixer-settlers, and other process equipment were assembled, connected, and tested on frames before being placed in the HLC. Transfers were made to SRL in 120 liter increments in a 10-ton cask so the scale of the operations was not large. In the liquid-liquid extraction phase, the rare earths were separated by amine extraction, then the curium from the americium. There was a precipitation as curium carbonate with conversion to oxide for final purification of the curium.

The processing in liquid phases had sumps and pumps to liquid waste handling facilities so no liquids are in the solid waste stored in the SWMF. The precipitation and roasting phases generated solid waste. Reagent chemicals for processing and analytical chemistry were generated in a cold feed area adjacent to the HLC. No wastes from this area were disposed of in the containers under discussion. Analytical chemistry was done on dilutions from the HLC in adjacent facilities which also connected all liquid wastes to common high activity and low activity drain systems. These wastes were transferred either to the SRL seepage basin after further processing or to the plant high level wastes in the Separations areas.

Materials Used

The following list of chemicals and materials used in the research on and processing of Cm-244 in Buildings 772-A and 776-A was compiled from the documents listed in the Reference section. Not all of the chemicals and materials were used in the operations which produced the wastes in SWMF, but they are included for completeness of the record. To visualize a scale of operation and quantities of chemicals used the batches of product were approximately 60 grams of curium starting with a volume of 120 liters.

Gadolinium oxide (stand-in for curium)
Cerium aluminate
Promethium oxide
Sodium nitrate
Tri-isooctyl amine (TIOA)-xylene
Bidentate(dibutyl, N,N, diethycarbamylphosphonate)
Diethylenetriaminepentacetic acid (DTPA)
Ammonium iodide
Aluminum stearate in dodecanol (die lubricant)
Oakite (sodium phosphate, tribasic)
Hydrochloric Acid, 38% solution
Nitric Acid, 70% solution
Potassium Carbonate
Sodium Hydroxide
Oxalic Acid
Potassium Persulfate
Sulfuric Acid, 18M
30% tri-n-octylamine and tri-n-decylamine in diethylbenzene.
Aluminum nitrate
Ethylenediaminetetraacetic acid (EDTA)
Lanthanum nitrate solution
Sulfosalicylic acid
Arsenazo indicator solution
Lithium nitrate
Lithium chloride (in lithium nitrate-hydrazine scrub solution)
Calcium fluoride
Ozone
Argon
Carbon tetrachloride for entrained organic (drawn in by vacuum and flushed to liquid drain)
Alcohol for titration (introduced by funnel and released to liquid drain) "No solvent is placed unvented by vacuum in glove box"
Ammonium fluoride
Magnesium
Zinc
Magnesium chloride
Magnesium fluoride
Tungsten
Beryllia (casting crucible)
Tantalum (foil)
Steel
Zircaloy
Dowex 50W-X8, -400 mesh in 'An form
Ferric nitrate solution
Mercuric nitrate solution
Molybdenum
Rhenium
Nitriloacetic Acid (NTA)

Hot presses with fused silica vacuum changers and graphite die
Leak testers
Welders
Thermal Analyzers
Vacuum induction heater
Microbalance
Ultrasonic weld inspection
Manipulators
Microburets
Micropipets (glass)
Centrifuge
Vortex Mixer
Vacuum filtration apparatus
pH electrodes

All liquid wastes were disposed of to the high activity drain system for the laboratory and transported for direct disposal in the High Level Waste Tanks.

Conclusion

There is no evidence that hazardous materials were used in the processes for production of curium oxide in the HLC in SRL. There is evidence that a considerable effort was made to exclude materials which had any chance of ignition because of the high radioactivity being worked with. All liquid materials were sent to drains which led to monitored processes or to the high level waste tanks in the SRS Separations areas.

Solid waste stored in the SWMF should contain no hazardous materials in the containers of waste being considered for burial. The imputed hazardous codes should be removed from these containers of waste.

References

Note: Over 200 documents were examined for this report. Many reports contained repetitive information. The following references are those which contain the most information on chemicals and materials used in the HLC operations were the wastes were generated.

1. DP-65-133, Curium Processing in High Level Caves, R. N. Ransom, November 1964.

2. DP-972, Isolating Americium and Curium from Aluminum Nitration-Sodium Nitrate-Nitric Acid Solutions by Batch Extraction with Tributyl Phosphate, H. E. Henry, October, 1965.

3. DP-1009, Curium Process Development, I. General Process Description, I. D. Eubanks and G. A. Burney, April, 1966.

4. DP-1039, Curium Process Development, III-3. Analytical Control, E. K. Dukes, August, 1966.

5. DP-1105-II, SRL Isotopic Power and Heat Sources, January-March, 1967

6. DP-1109, Curium Processing Development, II-I, Separation of Americium from Curium by Precipitation of $K_3AmO_2(CO_3)_2$, G. A. Burney, February, 1968

7. DP-1120-II, SRL Isotopic Power and Heat Sources, April-June, 1967

8. DP-1129-02, SRL Isotopic Power and Heat Sources, July-September, 1967

9. DP-1137, Yields of Transcurium Nuclides in the SRP High Flux Reactor, H. P. Holcomb, December, 1967.

10. DP-1142, Curium Process Development, III-4, Evaluation of Potential Hazard from Chlorination of Amines and Ammonia, M. L Hyder et al, July, 1969
11. DP-1169-II, SRL Isotopic Power and Heat Sources, April-June, 1968

12. DP-1177-II, SRL Isotopic Power and Heat Sources, July-September, 1968

13. DP-1192-II, SRL Isotopic Power and Heat Sources, October-December, 1968

14. DP-1196-II, SRL Isotopic Power and Heat Sources, January-March, 1969

15. DP-1230, Curium Process Development, III-5 Quantitative Determination of Diethylbenzene in Air, B. Tiffany, April, 1970.

16. DP-1302, Curium Process Development, R. L. Prout, et al, December, 1972

17. DP-1308, Ion Exchange Process for Separating Americium and Curium from Irradiated Plutonium, J. A. Kelly, November, 1972.

18. DP-MS-66-40, Design of a Close-Coupled Analytical Facility for Curium Process Control, G. A. Carothers and E. K. Dukes, September, 1966

19. DP-MS-68-53, Facilities, Equipment, and Techniques for Analytical Control of Curium Production at Savannah River Laboratory, E. K. Dukes and G. A. Carothers, October, 1968

20. DP-MS-68-90, Preparation of Curium Metal, I. D. Eubanks and M. C. Thompson, October 17, 1968

21. DP-MS-68-121, Rapid, Gram-Scale Separation of Curium from Americium and Lanthanides by Cation Exchange Chromatography, W. H. Hale, and J. T. Lowe, January, 1969.

22. DP-MS-72-23, Preparation of Curium Oxysulfate and Curium Oxide by Resin Calcination, W. H. Hale and W. C. Mosley, March 23, 1972

23. DPST-66-211, Curium Processing in the High Level Caves, G. A. Burney, January 12, 1966.

24. DPST-66-435 and SEP-MIS-27, Waste from Recovery of 3 KG Curium, Harcourt Bull, III, June 24, 1966.

25. DPST-66-471 and SEP-MIS-27, 4.5 KG Curium Waste Processing, H. Bull, III, August 5, 1966.

26. DPST-68-00226, Modifications to the Conversion Cycle to Accommodate Iron and Mercury Present in Cm-I- Solution, January 19, 1968

27. DPST-69-356, Use of Rapid Ion Exchange for Supplemental Production During Cm-II Campaigns, June 2, 1969.

28. DPST-71-301, Volume 1. Curium Technical Assistance Group Summary, 1968 (219 pages of HLC Operations)

29. DPSTS-773-Cm, Curium Processing- Building 773-A, June, 1970 (superseded DPST-69-213, Technical Manual - Technical Data Summary - Cm Processing the High Level Caves).

30. SRL-65-013, Processing of Curium-244 - Status of the Pilot Production Program at Savannah River, G. A. Burney, et al., 1965.

D H E C
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Attachment 2 to OBM-TRU-2006-00021

November 23, 2004

Mr. Hal W. Morris
Solid Waste Engineering
Westinghouse Savannah River Company, LLC
Post Office Box 616, Building 705-3C
Aiken, South Carolina 29808

Re: Your request of November 10, 2004 for the removal of the hazardous waste labels from 85 containers of Americium/Curium Waste located on the TRU Pads

Based on the information supplied in your request, this office has no objections to the removal of the hazardous waste labels from the above referenced containers.

Sincerely,

James M. Burckhalter

James M. Burckhalter, MPH, CHMM
District Program Manager
Solid & Hazardous Waste
& Emergency Response
Edisto Savannah District
Environmental Quality Control

cc: David F. Hoel, DOE, 730-B, Room 2293
Bobby Lee, Land & Waste Management, SC DHEC
Shelly Sherritt, Land & Waste Management, SC DHEC
Richard T. Caldwell, Edisto Savannah District EQC, SCDHEC