Department of Energy
Carlsbad Field Office
P. O. Box 3090
Carlsbad, New Mexico 88221

23 SEP 2002

ENTERED

SEP 2002

Mr. Steve Zappe
Hazardous Waste Permits Program
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
2905 E. Rodeo Park Drive, Bldg. 1
Santa Fe, NM 87505

RE: Transmittal of the Approved Waste Stream Profile Form Number SR-W027-FB-Pre86-C for the Central Characterization Project at the Savannah River Site

Dear Mr. Zappe:

The Carlsbad Field Office (CBFO) has evaluated the Waste Stream Profile Form (WSPF) SR-W027-FB-Pre86-C and concluded that the WSPF is complete and that the waste stream determinations made were made in accordance with CBFO procedures and guidance. The CBFO therefore approves the WSPF for waste characterization at Savannah River Site (SRS) through the use of the Central Characterization Project (CCP) process line.

If you have any questions on this matter, please contact me at (505) 234-7357 or (505) 361-0265.

Sincerely,

Kerry W. Watson
Assistant Manager
Office of National TRU Program

Enclosure

cc: w/o enclosure
J. Kieling, NMED
C. Walker, TechLaw
J. Bennett, WTS
P. Roush, WTS
S. Calvert, CTAC

020924

CBFO:NTP:KWW:VW:02-3000:UFC:5822

Waste Stream Profile Number: SR-W027-FB-Pre86-C

Generator site name: Savannah River

Technical contact: Adela M. Cantu

Generator site EPA ID: SC1890008989

Technical contact phone number: 1-505-234-7498

Date of audit report approval by NMED: February 27, 2002

Title, version number, and date of documents used for WAP Certification:

SEE CONTINUATION SHEET

Did your facility generate this waste? ☐Yes ☒No

If no, provide the name and EPA ID of the original generator: Savannah River , SC1890008989

Waste Stream Information[1]

WIPP ID: SR-W027-FB-Pre86-C

Summary Category Group: S 5000

Waste Matrix Code Group: Heterogeneous Debris Waste

Waste Stream Name: Pre 1986 Waste from FB Line

Description from the TWBIR: SR-W027-221F-HET Heterogeneous Process Waste (MWIR: SR-W027)

Defense TRU Waste: ☒Yes ☐No

Check One: ☒CH ☐RH

Number of SWBs 0

Number of Drums 6,994

Number of Canisters 0

Batch Data report numbers supporting this waste stream characterization: See Attachment 3 Table 1

List applicable EPA Hazardous Waste Codes:[2] F001, F002, F003, F005 , U151, U002, D005, D006, D007, D008, D009, D011

Applicable TRUCON Content Codes: SR 225A and SR 225C

Acceptable Knowledge Information[1]

[For the following, enter supporting the documentation used (i.e., references and dates)]

Required Program Information

Map of site: CCP-AK-SRS-2, June 26, 2002, Attachment 2

Facility mission description: CCP-AK-SRS-2, June 26, 2002, Section 4.1.4

Description of operations that generate waste: CCP-AK-SRS-2, June 26, 2002, Section 4.3

Waste identification/categorization schemes: CCP-AK-SRS-2, June 26, 2002, Section 4.4

Types and quantities of waste generated: CCP-AK-SRS-2, June 26, 2002, Section 5.4

Correlation of waste streams generated from the same building and process, as appropriate: CCP-AK-SRS-2, June 26, 2002, Section 4.2.2

Waste certification procedures: SEE CONTINUATION SHEET

Required Waste Stream Information

Area(s) and building(s) from which the waste stream was generated: CCP-AK-SRS-2, June 26, 2002, Section 5.1

Waste stream volume and time period of generation: CCP-AK-SRS-2, June 26, 2002, Section 5.2

Waste generating process description for each building: CCP-AK-SRS-2, June 26, 2002, Section 4.3

Process flow diagrams: CCP-AK-SRS-2, June 26, 2002, Section 4.3, Figures 4-4 & 4-5

Material inputs or other information identifying chemical/radionuclide content and physical waste form: CCP-AK-SRS-2, June 26, 2002, Section 5.4

Waste Stream Profile Number: SR-W027-FB-Pre86-C

Which Defense Activity generated the waste: (check one)

☐ Weapons activities including defense inertial confinement fusion

☐ Verification and control technology

☐ Defense nuclear waste and material by products management

☐ Defense nuclear waste and materials security and safeguards and security investigations

☐ Naval Reactors development

☐ Defense research and development

☒ Defense nuclear material production

Supplemental Documentation

Process design documents:	D43, D47 (see Attachment 1 – AK Source Documents)
Standard operating procedures:	C67, D37, P12, P14,P15, P16, P17, P18, P19, P20, and P21
Safety Analysis Reports:	D41, D42
Waste packaging logs:	M27
Test plans/research project reports:	D33
Site databases:	C77, D01, M19, M29, M31, M32
Information from site personnel:	C18, C21, C22, C24, C25, C26, C27, C28, C29, C31, C32, C53, C54, C55, C56, C67, C71, C76, C77, C79, C82, M38
Standard industry documents:	N/A
Previous analytical data:	C63, D31, D50, M23
Material safety data sheets:	C04, M30
Sampling and analysis data from comparable/surrogate Waste:	N/A
Laboratory notebooks:	N/A

Sampling and Analysis Information[2]

Radiography	SEE CONTINUATION SHEET
Visual Examination:	SEE CONTINUATION SHEET

Headspace Gas Analysis

VOC:	SEE CONTINUATION SHEET
Flammable:	See above
Other gases (specify):	NA

Homogeneous Solids/Soils/Gravel Sample Analysis

Total metals:	NA (Not homogeneous solids/Soil/Gavel)
PCBs:	NA (Not homogeneous solids/Soil/Gavel)
VOCs:	NA (Not homogeneous solids/Soil/Gavel)
Nonhalogenated VOCs:	NA (Not homogeneous solids/Soil/Gavel)
Semi-VOCs:	NA (Not homogeneous solids/Soil/Gavel)
Other (specify):	NA (Not homogeneous solids/Soil/Gavel)

Waste Stream Profile Form Certification:

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Adela M. Cantu — Adela M. Cantu SRS Site Project Manager — 9/20/02

Signature of Site Project Manager | Printed Name and Title | Date

NOTE: (1) Use back of sheet or continuation sheets, if required.

(2) If radiography, visual examination, headspace gas analysis, and/or homogeneous solids/soils/gravel sample analysis were used to determine EPA Hazardous Waste Codes, attach signed Characterization Information Summary documenting this determination.

Continuation Sheet:

NOTE: Currently the CCP Program at SRS is running jointly between SRS and CCP. In the future, these two programs will be collapsed into a single CCP Program.

WAP Certification Documents:

CCP-PO-001, rev. 4, CCP Transuranic Waste Characterization Quality Assurance Project Plan, May 31, 2002.
CCP-PO-001, rev. 3, CCP Transuranic Waste Characterization Quality Assurance Project Plan, January 14, 2002.

CCP-PO-002, rev. 4, CCP Transuranic Waste Certification Plan, May 17, 2002.
CCP-PO-002, rev. 3, CCP Transuranic Waste Certification Plan, January 21, 2002.

CCP-PO-004, rev. 10, CCP/SRS Interface Document, June 27, 2002.
CCP-PO-004, rev. 9, CCP/SRS Interface Document, May 9, 2002.
CCP-PO-004, rev. 8, CCP/SRS Interface Document, February 8, 2002.

DOE/WIPP-02-3122, rev.0, Contact Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, May 17, 2002.

WSRC-RP-99-01097, SRS WIPP Disposal Program QAPjP, September 5, 2000.

WSRC-RP-99-01095, SRS WIPP Disposal Program Waste Certification Plan (U), August 3, 2000.

Waste Certification Procedures:

CCP-AK-SRS-2, SRS Waste Management Procedures and CCP Certification Procedures. June 26, 2002.
CCP-PO-001, rev. 4, CCP Transuranic Waste Characterization Quality Assurance Project Plan, May 31, 2002.
CCP-PO-002, rev. 4, CCP Transuranic Waste Certification Plan, May 17, 2002.
CCP-TP-030, rev. 5, CCP WWIS Data Entry and TRU Waste Certification, June 27, 2002.

CCP-TP-030, rev. 4, CCP WWIS Data Entry and TRU Waste Certification, May 21, 2002.

CCP-TP-030, rev. 3, CCP WWIS Data Entry and TRU Waste Certification, October 24, 2001.

Radiography Procedures:

CCP-TP-011, CCP Radiography Inspection Operating Procedures, May 16,2002.

Visual Examination Procedures:

SW15.7-SOP-TVEF-01, TVEF Operations, April 11, 2001.
SW15.7-SOP-TVEF-01, TVEF Operations, October 30, 2001.

Headspace Gas Analysis Procedures:

VOCs:

CCP-TP-007, Rev. 12, CCP Single Sample Manifold Headspace Gas Sampling and Analysis Procedure, July 23, 2002.

CCP-TP-007, Rev. 11, CCP Single Sample Manifold Headspace Gas Sampling and Analysis Procedure, January 28, 2002.

CCP-TP-009, Rev. 8, CCP Single Sample Manifold Data Handling Procedure, January 30, 2002.

CCP-TP-029, Rev 7, CCP Single Sample Manifold Headspace Gas Sampling and Analysis Methods and Equipment Calibration, January 30, 2002.

CCP-TP-032, Rev. 6, CCP Single Sample Manifold Data Validation Procedure, January 29, 2002.

Attachment 1- AK Source Documents

The following list is taken from CCP-AK-SRS-2, Central Characterization Project, Acceptable Knowledge Summary Report For Savannah River Site SR-W027-FB-Pre86-C

C04: TRU Mixed Waste Generation and Characterization, letter from O. M. Morris, Attachment C, MSDS for chemicals, April 8, 1988, E.I. du Pont de Nemours & Company, Savannah River Plant.

C18: Record of Communication-Interview of May P. Rodriguez, FB-Line Engineer by W. G. Estill. January 10, 2002.

C21: Record of Communication-Interview of Chip Harris, FB-Line Engineer by J. Whitworth, S. Fevig, and G. Lunsford, January 10, 2002.

C22: Record of Communication-Interview of Jeff Overcash, FB-Line Operator/Manager by S. Fevig, D. Guerin, January 11, 2002.

C24: Record of Communication-Interview of Joe Stapf, Process Engineer and MC&A Shipping Supervisor at FB-Line, 1978-1982 by W. G. Estill, January 14, 2002.

C25: Record of Communication-Interview of Ed Moore, FB-Line Supervisor by J. Whitworth, S. Fevig, and G. Lunsford, January 10, 2002.

C26: Record of Communication-Interview of Les Sonnenberg, FB-Line Engineering Support by J. Whitworth, S. Fevig, and G. Lunsford, January 10, 2002.

C27: Record of Communication-Interview of Ann Gibbs, SRS Solid Waste Management by J. Whitworth, S. Fevig, January 15, 2002.

C28: Record of Communication-Interview of Charley Williams, FB-Line Operator by J. Whitworth, S. Fevig, January 15, 2002.

C29: Record of Communication-Interview of Dorey Rogers, FB-Line Operator/Supervisor, 1980-1987 by J. Whitworth, S. Fevig, January 15, 2002.

C31: Record of Communication-Interview of Richard Runnels, FB-Line Process Engineer, 1986-1987. W.G. Estill, January 16, 2002.

C32: Record of Communication-Interview of John Crim, FB-Line Maintenance. J. Whitworth, S. Fevig. January 17, 2002.

C53: Record of Communication-Interview of Tom Campbell, Fellow Technical Advisor. W. G. Estill. January 31, 2002.

C54: Record of Communication-Interview of Robert Lynn, FB-Line Operator, Special Recovery Isotopic Distribution. W. G. Estill. January 30, 2002.

C55: Record of Communication-Interview of James Satkowski. W. G. Estill, A. Gibbs. January 30, 2002.

C56: Record of Communication-Interview of Harry Smiley, FB-Line Supervisor, 1974-1980. W. G. Estill, January 28, 2002.

C63: Telephone Call to O. Fordham: Pb-Lined Gloves and Request for Concurrence to use the Exemption from Particle Size Reduction in the TCLP Method 11311 for Lead Lined Gloves (U). Memo from K. Wolfe. May 30,1996. Savannah River Site. Letter from J. V. Odum. ESH-FSS-95-0140. March 17, 1995. Westinghouse Savannah River Company.

C67: Record of Communication-Written Response to Interview Questions by Ron Burns, FB-Line Engineer, 1983-1987. J. Whitworth, S. Fevig. January 9, 2002.

C71: Record of Communication-Interview of FB-Line Personnel. J. Harrison, J. Whitworth. January 16, 2001.

C76: Record of Communication-Interview of Bob Brookshire and Cary Stephens. J. Whitworth, S. Fevig. January 14, 2002.

C77: Record of Communication-Interview of Chip Harris, FB-Line Engineer. S. Fevig. March 11, 2002.

C79: Review of Radiobench Waste. Email from Steve Mentrup. March 13, 2002.

C82: Record of Communication-Interview of Mr. Odum and Mr. Maloney. Interview by J. Whitworth. December 4, 2001.

D01: TRU Waste Characterization Summary, Volume 1, Main Report. WSRC-RP-99-00477, Revision 0, Issued June 1, 1999.

D31: Transuranic Waste Vent and Purge Timeline and Authorization Basis Chronology (Discovery Unreviewed Safety Question and References). E.B. Donner, W.T. Goldston. WSRC-TR-98-00154. Revision 0, June 2, 1998. Westinghouse Savannah River Company.

D33: The FB-Line Facility-A Training Aid Document. G.G. Molen, L. W. Gray. DPST-86-449. September 1986. E.I. du Pont de Nemours & Company.

D37: System Analysis 200 Area SR Plant. JB Line Operations, D. H. Stoddard, R. V. Slates, DPSTSY-200-10.

D41: Supplemental Nuclear Safety Limits for Revised JB-Line Technical Standards. J. L. Forstner, DPSPU-68-187. May 27, 1968.

D42: Applicability of Bldg. 643-G Nuclear Safety Limits to Two New TRU Waste Containers. J. L. Forstner, DPSPU-82-272-53. April 29, 1982.

D43: Savannah River Site Transuranic Waste Facility Throughput Study. H. Bhula, W. Perry. WSRC-RP-91-497. EWR #866789, Revision 0. June 12, 1991. Savannah River Site.

D47: Development of an Integrated Facility for Processing TRU Wastes at the Savannah River Plant. M.D. Boersma, H.E. Hootman, P.H. Permar. DP-MS-77-74. 12/5/1977. Savannah River Laboratory, E.I. du Pont de Nemours & Co.

D50: Old Radioactive Waste Burial Ground. Revised draft 8/92.

M19: COBRA Conversion Table. 05/31/95.

M23: Fluorescent Tube Disposal Gets OK, "Pollution Prevention Advisor," Vol. 5, May 1995. Contact shown is Dudley Russell, REECo.

M27: Pre-86 AK Tracking Spreadsheet. 2002.

M29: Container Examination and Evaluation Program Data. Steve Mentrup, SRS SWM; dates vary from 1998-1999.

M30: MSDSs. Obtained from commercial sites and/or SRS.

M31: Steve Mentrup's Access Database. Steve Mentrup.

M32: Pre-86 FB-Line Overpack Spreadsheet. M. Clary, SRS SWM; Provided on March 8, 2002.

M38: Unpublished database spreadsheet. E-mail message from Stephanie Fevig, IT Corp 04/30/02.

P12: Handling Transuranium Waste 221-H Canyon & 211-H Facility. DPSOL 221-H-8028. Revision 0. November 1974. Separations Department.

P14: Cleaning and Removing a Plastic Hut. DPSOL 221-F-JB-1516. Revision 0. June 1965. Separations Department.

P15: Introducing or Removing Material Through Bag Ports. DPSOL 221-F-JB-1525. Revision 1. May 1965. Separations Department.

P16: Handling and Packaging Radioactive Waste. DPSOL 221-F-JB-1523. Revision 3. July 1976. Separations Department.

P17: Identifying TRU Drums with Missing Container ID Tags (U), Solid Waste Management Facility Operating Procedure, Standard Operating Procedure (U). D. J. Wolfe. 643-E-88 Q-R-S-NCSC. Revision 3. Effective Date August 7, 2001.

P18: Burying Classified Waste at Building 643-G. DPSOL-643-G-2012. Revision 3. Approved March 1978. Separations Department, Waste Handling Facilities.

P19: Handling Radioactive Waste. DPSOL-221-HB-2393. Revision 0. Approximately July 1974. Separations Department.

P20: Operating the NaI PHA Manually. DPSOL 221-F-JB-1419. Approved September 21, 1976.

P21: Flushing Precipitator (FLSH). DPSOL 221-FB-2125. Approved February 1987. Separations Department.

Reconciliation with Data Quality Objectives

WSPF# SR-W027-FB-Pre86-C Lot# 1

	YN/NA	Reconciliation Parameter
1.	Y	Waste Matrix Code.
2.	Y	Waste Material Parameter Weights.
3.	Y	The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.
4.	Y	The TRU activity reported in WWIS demonstrates with a 95% probability that the waste is TRU waste and not low-level radioactive waste.
5.	Y	Potential Flammability. Is there sufficient AK or analytical data to demonstrate that the waste meets the potential flammability limits (Headspace Gas, BDR and Summary Sheet)?
6.	Y[1]	Mean concentrations, upper 90% confidence limit (UCL_{90}) values for the mean concentration, standard deviations, and the number of samples collected for each **VOC** in the headspace gas of each container were calculated and compared with the program required quantitation limits, as reported in the Characterization Information Summary Table 2, and additional EPA Hazardous Waste codes were assigned as required. Samples were randomly collected (when appropriate).
7a.	NA*	Mean concentrations, UCL_{90} values for the mean concentration, standard deviations, and the number of samples collected for **total VOCs** were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary Table 3, and additional EPA Hazardous Waste codes were assigned as required. Samples were randomly collected.
7b.	NA*	Mean concentrations, upper 90% confidence limit (UCL_{90}) values for the mean concentration, standard deviations, and the number of samples collected for **total SVOCs** were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary Table 4, and additional EPA Hazardous Waste codes were assigned as required. Samples were randomly collected.
7c.	NA*	Mean concentrations, upper 90% confidence limit (UCL_{90}) values for the mean concentration, standard deviations, and the number of samples collected for **total metals** were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary Table 5, and additional EPA hazardous Waste codes were assigned as required. Samples were randomly collected.
8.	Y	The data demonstrates whether the waste stream exhibits a toxicity characteristic under 40 CFR 261, Subpart C.
9.	Y	Waste stream can be classified as hazardous or nonhazardous at the 90-percent confidence level.

10.	Y[2]	Sufficient number of waste containers have been visually examined to determine the UCL_{90} for the miscertification rate is less than 14%.			
11.	Y	TICs were appropriately identified and reported in accordance with the requirements of Section B3-1 of the QAPjP.			
12.	Y	The PRQLs for headspace gas VOCs, were met for all analyses as evidenced by the analytical batch data reports.			
13.	Y	The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WAP Sections B3-2 through B3-9 prior to submittal of a waste stream profile form for a waste stream or waste stream lot.			
			Completeness	Comparability	Representativeness
		Radiography	Y	Y	Y
		Headspace Gas Sampling and Analysis	Y	Y	Y
		Solids Sampling	NA*	NA*	NA*
		Total VOCs	NA*	NA*	NA*
		Total SVOCs	NA*	NA*	NA*
		Total Metals	NA*	NA*	NA*

1. No additional EPA Hazardous Waste Codes assigned
2. Miscertification rate determined to be 6% from Lot 1

* Not analyzing homogenous waste

UCL_{90} Evaluation Form

WSPF #: SR-W027-FB-PRE86-C **Waste Stream Lot Number:** 1

ANALYTE	# Samples	# Samples above MDL	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	UCL_{90} > PRQL Yes	EPA Code
Benzene	36	0	6.08	3.87	---	---	10		
Bromoform	36	0	6.96	4.15	---	---	10		
Carbon tetrachloride	36	1	5.35	2.11	0.53	2.23	10		
Chlorobenzene	36	0	6.50	6.23	---	---	10		
Chloroform	36	0	7.26	3.77	---	---	10		
Cyclohexane[a]	0	---	---	---	---	---			
1,1-Dichloroethane	36	0	6.63	4.21	---	---	10		
1,2-Dichloroethane	36	0	5.45	3.80	---	---	10		
1,1-Dichloroethylene	36	0	5.92	3.96	---	---	10		
cis-1,2-Dichloroethylene	36	0	6.14	5.06	---	---	10		
trans-1,2-Dichloroethylene	36	0	7.48	4.32	---	---	10		
Ethyl benzene	36	1	15.5	3.07	2.11	3.53	10		
Ethyl ether	36	0	5.48	4.19	---	---	10		
Formaldehyde[c]	0	---	---	---	---	---	10		
Hydrazine[d]	0	---	---	---	---	---	10		
Methylene chloride	36	1	12.6	2.36	1.96	2.79	10		
1,1,2,2-Tetrachloroethane	36	0	4.71	4.31	---	---	10		
Tetrachloroethylene	36	0	6.94	5.14	---	---	10		
Toluene	36	7	11.4	3.30	2.00	3.72	10		
1,1,1-Trichloroethane	36	32	239	29.1	46.38	39.2	10	YES	F001, F002
Trichloroethylene	36	0	5.97	4.66	---	---	10		
1,1,2-Trichloro-1,2,2-trifluoroethane	36	0	6.30	4.28	---	---	10		
1,2,4-Trimethylbenzene[a]	0	---	---	---	---	---			
1,3,5-Trimethylbenzene[a]	0	---	---	---	---	---			
m-Xylene[b]	36	1	44.3	3.80	6.85	5.29	10		
p-Xylene[b]	36	1	44.3	3.80	6.85	5.29	10		
o-Xylene	36	1	9.20	2.89	1.07	3.13	10		
Acetone	36	24	74.3	26.3	15.9	29.7	100		
Butanol	36	9	141.8	22.1	31.2	28.9	100		
Methanol	36	1	55.8	5.4	9.3	7.37	100		
Methyl ethyl ketone	36	1	110	13.1	16.4	16.7	100		
Methyl isobutyl ketone	36	0	35.7	27.6	---	---	100		

[a]These compounds are from the TRAMPAC and are flammable VOCs that do not appear in the QAPjP or the WIPP WAP. These are not part of the target analysis list, but samples may be analyzed for these compounds.

[b]These xylene isomers cannot be resolved by the analytical methods employed in the program. M-xylene and p-xylene will be reported as "Total m-p-Xylene."

[c]Required only for homogenous solids and soil/gravel waste from Los Alamos National Laboratory and Savannah River Site.

[d]Required only for homogenous solids and soil/gravel waste from Oak Ridge National Laboratory and Savannah River Site.

Waste Stream Tentatively Identified Compounds

WSPF Number: SR-W027-FB-Pre86-C Waste Stream Lot Number 1
Number of samples evaluated to date in the Waste Stream: 36
The following TICs were detected during Headspace Gas Analysis of this Waste Steam

Tentatively Identified Compound	CAS Number	Total Number of Samples Containing TIC	% TIC Detected In Waste Stream	Greater than 25%? Yes
2-methyl, 2-propanol	75-65-0	8	22.2%	No
cyclohexanone	108-94-1	1	2.8%	No

Lot #1 of waste stream SR-W027-FB-Pre86-C consisted of a total of 36 drums. Implementation of trans 1,2-dichloroethylene to the target analyte list was completed January 9, 2002 per the implementation schedule in July 18, 2001 letter from CBFO to the NMED and corresponding letter to generator sites from the CBFO. All samples in WS SR-W027-FB-Pre86-C will contain the trans 1,2-dichloroethylene as part of the target analyte list.

Two tentatively identified compound that were identified in Lot 1. They are 2-methyl, 2-propanol and cyclohexanone. None of the TICS identified were found in more than 25% of the containers in Lot 1 or were listed in Appendix VIII of 40 CFR Part 261.

1,1,1-trichloroethane was identified as having a calculated UCL_{90} limits above the program required quantitation limits, 10 parts per million per volume (ppmv). Thirty-two of 36 samples in Lot 1 had hits above the method detection limit for 1,1,1-trichloroethane, with a maximum value of 239 ppmv. The mean value for the analyte was 29.1 ppmv and resulted in a UCL_{90} value of 67.1 ppmv. EPA codes F001 and F002 for spent halogenated solvents have been previously established by CCP-AK-SRS-2, Central Characterization Project Acceptable Knowledge Summary Report For Savannah River Site, SR-W027-FB-Pre86-C. The calculated UCL_{90} value supports the AK document.

Did the data verify the acceptable knowledge? YES

Correlation of Container Identification Numbers to Batch Data Report Numbers

Container ID	HSG BDR Number	NDA BDR Number	Radiography BDR Number	Solids Sampling BDR	Solids Analytical BDR
101162	052302B	SRS-NDA-020506	SRRTR0165	NA	NA
116171	052302B	SRS-NDA-020506	SRRTR0165	NA	NA
119780	052202A	SRS-NDA-020429	SRRTR0159	NA	NA
120297	052402B	SRS-NDA-020506	SRRTR0165	NA	NA
123388	052202A	SRS-NDA-020506	SRRTR0165	NA	NA
130680	052002A	SRS-NDA-020506	SRRTR0165	NA	NA
138824	052202A	SRS-NDA-020506	SRRTR0165	NA	NA
142401	050302A	SRS-NDA-020408	SRRTR0142	NA	NA
142402	050302A	SRS-NDA-020409	SRRTR0142	NA	NA
142403	041702B	SRS-NDA-020409	SRRTR0144	NA	NA
144839	041902B	SRS-NDA-020411	SRRTR0146	NA	NA
148866	041902B	SRS-NDA-020411	SRRTR0146	NA	NA
148957	050302A	SRS-NDA-020415	SRRTR0145	NA	NA
148964	050102A	SRS-NDA-020416	SRRTR0145	NA	NA
148968	050302A	SRS-NDA-020415	SRRTR0145	NA	NA
152279	041702B	SRS-NDA-020409	SRRTR0144	NA	NA
152378	050902A	SRS-NDA-020419	SRRTR0146	NA	NA
152381	050102A	SRS-NDA-020416	SRRTR0145	NA	NA
152456	051302A	SRS-NDA-020419	SRRTR0146	NA	NA
152466	041702A	SRS-NDA-020410	SRRTR0142	NA	NA
152494	051302A	SRS-NDA-020411	SRRTR0146	NA	NA
152499	041902B	SRS-NDA-020411	SRRTR0146	NA	NA
152760	041702A	SRS-NDA-020409	SRRTR0144	NA	NA
152771	041502A	SRS-NDA-020409	SRRTR0142	NA	NA
152787	051602A	SRS-NDA-020411	SRRTR0142	NA	NA
152791	051302A	SRS-NDA-020419	SRRTR0145	NA	NA
152849	051002A	SRS-NDA-020419	SRRTR0146	NA	NA
152858	042602B	SRS-NDA-020415	SRRTR0145	NA	NA
152876	041702A	SRS-NDA-020410	SRRTR0145	NA	NA
152889	051602A	SRS-NDA-020415	SRRTR0146	NA	NA
152951	050802A	SRS-NDA-020415	SRRTR0146	NA	NA
152977	042602B	SRS-NDA-020415	SRRTR0146	NA	NA
152993	041702A	SRS-NDA-020409	SRRTR0142	NA	NA
159764	042602B	SRS-NDA-020415	SRRTR0145	NA	NA
162471	041702A	SRS-NDA-020410	SRRTR0145	NA	NA
162486	041702A	SRS-NDA-020410	SRRTR0142	NA	NA

WASTE STREAM PROFILE FORM ATTACHMENT
SUMMATION OF ASPECTS OF AK SUMMARY REPORT

Overview:

The SRS facility mission was to process and convert dilute plutonium (Pu) solution into highly purified weapons grade Pu metal. As a result of various activities conducted in support of the mission (e.g., operation, maintenance, construction, repair, cleaning, and facility modifications), the facility generated TRU waste. Waste contaminated primarily with defense-related Pu material was generated by these activities at SRS.

Beginning in 1954, the SRS FB-Line facility conducted atomic energy defense activities consistent with Section 10101(3) of the Nuclear Waste Policy Act of 1982. Defense Waste generated from these activities is consistent with guidance from the Carlsbad Field Office for waste disposal at the WIPP. The FB-Line (formerly JB-Line or FJB-Line) was a defense nuclear materials production facility.

This summation of the AK Summary Report includes information to support Waste Stream Profile Form (WSPF) Number SR-W027-FB-PRE86-C for Heterogeneous Debris Waste relating to the facility's history, configuration, equipment, process operations, and waste management practices. Information contained in this summary was obtained from numerous sources, including facility safety basis documentation, historical document archives, generator and storage facility waste records and documents including SRS Burial Ground Records and databases, and interviews with operational and waste management personnel. Additional details are discussed in CCP-AK-SRS-2, *Central Characterization Project Acceptable Knowledge Summary Report for Savannah River Site SR-W027-FB-Pre86-C,* Revision 1, dated June 26, 2002.

Waste Stream Identification Summary:

Site Where TRU Waste Was Generated:	Savannah River Site
Waste Stream Name:	Pre-1986 Waste from FB-Line
Waste Stream Number:	SR-W027-FB-PRE86-C
Dates of Waste Generation:	December 1972 – March 1986
Facility Where TRU Waste Was Generated:	Building 221-F, FB-Line
Waste Stream Volume: (including approximately 3,462 that could be low-level waste containers) (including 93 85-gallon overpack drums)	6,994 drums
Summary Category Group:	S5000 – Debris Waste
Waste Stream TWBIR Identification:	SR-W027-221F-HET
Waste Stream MWIR Identification:	SR-W027
Site-Specific Item Description Code:	IDC 001 (Job control waste)
Waste Matrix Code Group:	Heterogeneous Debris
RCRA Hazardous Waste Codes:	D005, D006, D007, D008, D009, D011, F001, F002, F003, F005, U002, U151
Waste Matrix Code:	S5400 – Heterogeneous Debris

This waste stream is assigned the waste matrix code (WMC) S5400 "Heterogeneous Debris" because the waste is not dominantly organic or inorganic as defined by the DOE Waste Treatability Group Guidance document. It has not been quantified that the waste stream is > 80% inorganic (S5100 Inorganic Debris) or organic (S5300 Organic Debris) by volume.

TRUPACT-II Content Code (TRUCON): SR 225A & SR 225C

Waste Stream Description:

The process by which the waste streams under consideration were generated is described in detail in CCP-AK-SRS-2 Section 4.3 with detailed process flow diagrams. Much of the work performed in FB-Line took place within areas contaminated with radioactive material. Waste materials and items contained in this stream result from various activities that took place in these areas. Routine operational activities (housekeeping/cleaning, process equipment adjustments, radiological surveys, etc.) and preventive and corrective maintenance were the major waste producers. Other contributing activities included facility modifications, decontamination, sump cleanout, absorption of liquids, glove replacement on process cabinets and gloveboxes, various mechanical and electrical repairs, maintenance, and change-outs of process equipment, piping, cabinet panels, and other equipment.

The waste in this waste stream was generated between December 1972 and March 1986.

Example of Typical FB-Line Waste Materials

Paper/wipes	Mop heads/handles	Hoses/tubing/pipe-metal/plastic
Valves	Pumps/motors	Cloth-uniforms/rags
Planchettes	Glassware/Labware	Tools
Agitators	Plexiglas/Lexan®	Metal hardware-nuts/bolts, etc.
Gloves-lead/rubber/plastic	Resins	Plastic-bottles/film/sheeting
Instruments	Mirrors	Lead-bricks/sheets/gloves
Hot plates	Scales	Aerosol cans-punctured & unpunctured-paint /Magnaflux®/detergents/insecticides/Scene®/Spot Check®
Thermometers-mercury	Ceramics	Cartons-cardboard/plastic
Lead columnators	Brooms	Absorbents-Soda Ash/Celite®/ Oil Dri®
Fluorescent bulbs	Fluorescent ballasts	Flashlights & flashlight batteries
Paint cans	Wood	Cabinet sweepings
Rotameters	Filters	Metal 5-gallon pails
Rubber-miscellaneous	Leather	Shipping containers
Crucibles	Sponges	Oils-hydraulic
Frits	Tape	Sump waste
Metals- aluminum, copper, iron, lead, cadmium, stainless steel, tantalum, tungsten	Bakelite™	Polyethylene/ polypropylene/ PVC
Sand (MgO)/Calcium Slag	Insulation	Concrete

The above table identifies several items that are prohibited from certification and disposal at the WIPP. During the confirmation process, the waste containers undergo 100% RTR to ensure that prohibited items are not included in the waste drums as specified in the operating procedures.

Point of Generation

Location

The SRS is located in South Carolina on approximately 310 square miles. It is bounded on the southwest by the Savannah River and occupies parts of Aiken, Barnwell, and Allendale counties. The FB-Line facility is located inside the 221-F Building in the 200-F Area of the SRS.

Area and Building of Generation

All waste from this waste steam described in the AK Summary Report (CCP-AK-SRS-2) were generated by the FB-Line facility located inside the 221-F Canyon Building. FB-Line partially occupies the third and fourth levels and all of the fifth and sixth levels of Building 221-F. Waste was generated from areas inside process cabinets or gloveboxes, huts erected around glovebox entry ports, or areas contaminated with radioactive material adjacent to the process cabinets/gloveboxes.

Generating Processes

Description of Waste Generating Process

The waste streams under consideration were generated in FB-Line as the result of operations related to processes involving concentration and refinement of dilute Pu solutions to solid Pu buttons usable in weapons production.

Primary Processes

Purified Pu isotopes contained in a dilute nitric acid and hydroxylamine nitrate solution were transferred from the 221-F Canyon Building process to the FB-Line where it was processed to either Pu metal or plutonium oxide form.

The unit operations are concentration of plutonium nitrate by cation exchange, precipitation of Pu as a trifluoride, filtration, and washing, warm air-drying, oxidation, and reduction with calcium metal to purified Pu metal form. The waste was generated during operations of these processes. Waste materials from these operations and offsite scrap with recoverable amounts of Pu were recycled through the Recovery and Special Recovery process lines.

Maintenance/Housekeeping Activities

Maintenance and housekeeping activities conducted on FB-Line included the following:

Glove repair and/or removal
Equipment repair
Construction- new cabinets
Furnace, hydraulic lift, lighting fixture/bulb, and dumper station repair/change out
Transfer/conveyor trolley repair/lubrication
Cabinet window replacement
Cabinet glove change out
Drying/roasting filter or pan replacement
Electrical repairs
Cabinet exhaust pre-filter and High Efficiency Particulate Air (HEPA) filter replacement
Plastic sleeve replacement from bag-out an bag-in operations
Cabinet sweeping in dry cabinets
Sump flushes/clean-outs
Cabinet wipe downs in both the dry and pickling cabinets

Spill cleanups of material contained by the cabinet and sump
Material releases from the cabinet–cleanup and decontamination efforts
Lead-lined glove replacements
Repair of leaks
Changing panels on cabinets and huts
Equipment repair (valve replacement, etc.)
Inspection and cleaning of exhaust ducts to remove any Pu accumulation
Absorption of liquids
Construction, breakdown, and disposal of huts adjacent to cabinets
Bagging trash out of glove boxes and cabinets

These activities did not consistently generate TRU and/or low-level waste during the waste generation time period.

RCRA Determinations

Hazardous Waste Determinations

Ignitability

Ignitable free liquids such as Magnaflux®, Spot Check® were used from aerosol cans. Ignitable liquids in unpunctured aerosol containers would be detected and the drum would be rejected during the RTR process. In addition, free liquids in containers greater than 1 inch on the bottom of the container or greater than 1% volume of the container would be detected in the drum and would be rejected by RTR. Only WIPP WAP compliant drums will be shipped to WIPP (i.e. less than or equal to 1 inch of liquid in internal containers and less than 1% of the waste containers volume).

Corrosivity

Under 40 CFR 261.22, a solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

- It is aqueous with a pH less than or equal to 2, or greater than or equal to 12.5, as determined by a pH meter using Method 9040 in "Test Methods for Evaluation Solid Waste, Physical and Chemical Methods," EPA Publication SW-846.

- It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55 degrees Celsius (130 degrees Fahrenheit) as determined by its test method specified in National Association of Corrosion Engineer (NACE) Standard TM-01-69 as standardized in SW-846.

FB-Line personnel were directed in 1976 to rinse waste to remove all acid or caustic-exposed combustibles and package them with enough "Celite" (diatomaceous earth) to absorb any excess liquid. Wet solid waste from the Mechanical Line and other dry cabinets were to be handled by a special procedure). By 1977, any free liquids disposed from the FB-Line were to be absorbed on appropriate media, such as soda ash, Celite®, or Oil-Dri ® in a 3-to-1 ratio of absorbent to liquid. This waste is not an aqueous liquid. As determined by radiography and visual examination, none of the drums to be shipped contained greater than 1 volume percent liquid (present as residual liquid). The corrosive characteristic (D002) does not apply to the waste.

Reactivity

The waste stream does not meet the characteristic of reactivity as defined under RCRA 40 CFR 261.23. The waste materials are stable based on procedures used during FB-line processing and

will not react violently with water, form potentially explosive mixtures with water, or generate toxic gases, vapors or fumes when mixed with water.

The materials do not contain sulfides and are not capable of detonation or explosive reaction. Further, this waste does not present a compatibility hazard due to the chemicals identified with each other with the packaging of the waste. Therefore, the waste code for reactivity (D003) is not assigned to this waste stream.

Calcium metal was used in the FB-Line reduction process. Waste calcium metal was segregated and managed separate from typical cabinet waste. Calcium waste that was not radiologically contaminated was disposed as hazardous waste rather than TRU waste otherwise it was recycled with cabinet sweepings or with slag and crucible scrap through the D-1 dissolver. The calcium that would be potentially present in the waste is oxide, which is non-reactive.

Toxicity

The presence of RCRA toxicity characteristic metals arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver was investigated for this waste stream based on information presented in the TWIBR and other programmatic documents used to assign waste codes for the waste stream SR-W027-221F-HET; which this waste stream is similar. This list of applicable hazardous waste numbers is identical to the list employed for other buildings and the analytical laboratory waste streams at SRS. As a result, none of the documentation reviewed, including generator interviews and FB-Line programmatic documents, identified any potential sources for selenium and arsenic; therefore, hazardous waste numbers for selenium and arsenic are not assigned to this waste stream.

Barium (D005)

Although no documentation reviewed identified a potential source of barium in FB-Line waste, barium is a chemical component that was used in filter media and is present in other wastes resulting from metallurgy processes. No analytical data is available to exclude the potential for barium to be present in the waste. D005 is conservatively applied by SRS and is assigned to this waste stream.

Cadmium (D006)

The FB-Line Safety Analysis Report indicates that cadmium was used as neutron shielding for cation exchange columns, although it is expected to be uncommon in TRU waste. In addition the post-closure permit for TRU pads 1 – 5, states that cadmium served as a corrosion inhibitor and neutron absorber on various pieces of old equipment. Cadmium was listed with a 0 – 10% waste component for the FB-Line waste. Therefore, D006 has been conservatively assigned to the subject waste stream.

Chromium (D007)

Chromium was used as a biocide ingredient in the building air conditioning system; therefore waste chromium may be present waste associated with the air conditioning system. Chromium contaminated waste may be a component of the corrosion products in stainless steel ducts from decontamination and removal efforts. Therefore, D007 has been conservatively assigned to the waste stream.

Lead (D008)

Lead was used throughout the FB-Line as radiation shielding; therefore, D008 has been conservatively assigned to the waste stream. The lead in the TRU waste could be in the form of

lead sheets and bricks or as a component of a piece of equipment, such as lead-lined cabinet gloves or leaded glass for cabinet panels.

Mercury (D009)

Mercury was identified in the chemical flow sheet of the FB-Line for dissolving aluminum. The JB-Line Operation manual describes the use of mercuric nitrate as a process chemical. The mercury was part of instruments used in the production process that were replaced according to a post-closure permit for TRU pads 1-5. Only non-hazardous flashlight batteries were discarded as TRU waste; as a result, no lead-acid batteries are part of the waste stream. Based on the potential sources and other information summarized above, D009 has been conservatively assigned to the subject waste stream.

Silver (D011)

Silver solder was used for repairs that may have been disposed of as TRU waste as a component of electrical equipment. Silver was also used as a precipitant for chloride solutions. Waste contaminated with this solution or its precipitate may have been disposed of as TRU waste. It is difficult to determine whether sufficient quantities of solder or precipitant would be present in waste to support the assignment of a hazardous waste number. No analytical data on the drums is available to exclude the potential of silver from the waste. Therefore, D011 has been conservatively assigned to the waste stream.

Summary

In summary, EPA hazardous waste numbers D005, D006, D007, D008, D009, and D011 have been assigned to all drums of the waste stream.

Listed Waste
F-Listed and Other Solvents

Many chemicals were used as solvents and decontaminating agents. Based on document reviews and interviews the listed solvents used include acetone; TCE; toluene; xylene; halogenated organics; freon; ethanol; and isobutanol. Benzene may also have been used for its solvent properties.

In addition, trade-name products having listed solvents include the following:

- PVC Pipe Cement — MEK and cyclohexanone
- Magnaflux® (Spot Check developer) — acetone
- Magnaflux® (SKC-NF Cleaner-Remover) — 1,1,1-trichloroethane
- Raycohesive®/MOR-AD® --- trichloroethylene, methylene chloride, 1,1,1-trichloroethane
- Swish® Aerosol — chlorinated hydrocarbons
- Paints — MEK, n-butanol, toluene (based on Imron ® Enamel) and n-butyl acetate (based on Ceilcote®)

Based on this information, SRS has conservatively applied the following hazardous waste numbers to the subject waste stream: F001, F002, F003, and F005.

U- and P-Listed Chemicals

In June 1997, SRS conservatively applied hazardous waste numbers to numerous compounds for the various waste streams. However, SRS has since determined that U codes are not applicable for compounds except for Mercury either because the chemicals were not routinely used as pure commercial chemicals or as the sole active ingredient in trade-name products or because they would only have been disposed in solid waste once used.

In the case of acetone, SRS staff could not rule out the possibility that pure acetone might have been used in FB-Line and is present in spill cleanup materials; as a result, the hazardous waste number U002 has been conservatively applied. Also, SRS concluded that it is possible that pure mercury was used in FB-Line and is present in spill cleanup materials; as a result, the hazardous waste number U151 has also been conservatively applied to the subject waste stream.

Conclusion

The following EPA hazardous waste numbers are assigned to waste stream SR-W027-FB-Pre86-C constituents: D005, D006, D007, D008, D009, D011, U002, U151, F001, F002, F003, and F005.

Polychlorinated Biphenyls

No capacitors or transformers were stored inside the FB-Line cabinets. There were PCB-containing capacitors that were part of reduction furnaces, but they were located outside of cabinets and were segregated from TRU waste when replaced. The annual PCB Inventory Change Report for calendar year 1984 stated that no large capacitors were in service at the SRS.

Oils, including hydraulic oils, were commonly used in the FB-Line during this time frame but Arochlor oils (PCB containing oils) were not. Therefore this type of PCB is not expected.

PCBs may also be present in fluorescent light ballasts (transformers). No fluorescent light were located inside of the cabinets (globe lights were used), there is the potential that this type of lighting was used to augment normal cabinet lights. In addition, fluorescent light ballasts may have been discarded as TRU waste during decontamination and removal efforts. This is the only type of PCB waste anticipated in this waste stream. As a conservative approach, fluorescent lights with ballasts have been identified as a prohibited item. RTR operators have been trained to look for light ballasts in drums and segregate drums that indicate the presence of these items.

Physical Form

Combustible is defined as "organic material capable of being burned, except that if the only combustible content of a package is plastic lining or wrapping used for contamination control purposes around incombustible objects or materials, the contents of the package as a whole may be considered noncombustible."

Waste material parameters anticipated to be present in the waste stream include iron-based metals (and steel alloys), aluminum-based metals, other metals, other inorganic materials (such as glass and ceramic), cellulosics, rubber, plastics, inorganic matrix (solidified liquids), and steel and plastic packaging materials such as drums and liners. Based on historical information the following table estimates of the material parameters that are expected to be included in the waste stream. Steel and plastic packaging materials (e.g., drums and liners) are not included in the estimate.

SRS Waste Matrix Constituents	
Matrix Description	**Volume %**
Organic liquids	1
Inorganic sludges	2
Organic resins	2
Metal equipment	2
Metal Debris	18
Plastic job control waste	58
Organic debris	17

The approximate waste material parameters are examined during RTR and visual examination to ensure that the physical form conforms to the requirement of >50% debris and the majority is combustible.

Prohibited Items

Containers from this waste stream are retrievably stored and the waste will be characterized using RTR. Visual examination of a statistically selected sub-population of containers from this waste stream will be conducted as a quality control check of the RTR process. This process is used to determine that the containers do not include prohibited items, such as free liquids. This information is documented during the RTR process. In addition, packaging procedures required absorption or removal of liquids. By 1977, any free liquids disposed from the FB-Line as TRU waste were to be absorbed on appropriate media, such as soda ash, Celite®, and Oil-Dri® in a 3-to-1 ratio of absorbent to liquid.

The RTR and visual examination process is used to ensure that sealed containers present in the waste are less than the four-liter limit. This information is documented during the RTR process.

The RTR and visual examination process is used to ensure that aerosol cans have been punctured or they are removed from the waste drum. This information is documented during the RTR and visual examination process.

Potentially explosive electrical discharge plugs (also known as squibs) used in Halex® fire suppression systems located in the FB-Line facility were not disposed of as TRU waste because they were not located in gloveboxes or cabinets. In addition squibs were segregated during decontamination and removal efforts and not discarded as TRU waste.

Hydrazine, an explosive nitrate when dry, was used in the FB-Line Special Recovery operations up until 1986 as a dissolution process catalyst and poses an explosion hazard. Special precautions were taken to cleanup hydrazine spills in cabinets and send the solutions to F-Canyon recycle or waste tanks. In addition sumps were routinely flushed to remove possible Pu buildup. These flushes removed any hydrazine residue and were also transferred to F-Canyon. Because spills and process leaks were cleaned up immediately and slumps flushed periodically the presence of even trace amounts hydrazine liquid or dried hydrazine salt is unlikely.

Pyrophorics were not disposed in FB-Line waste streams. The most prevalent pyrophoric was Pu metal, which was valued product. Material possible contaminated with recoverable quantities of Pu metal were stored in vaults or processed through D-1 dissolver.

Headspace Gas/Volatile Organic Compound Information

Lot #1 of waste stream SR-W027-FB-Pre86-C consists of a total of 36 drums. Implementation of *trans* 1,2-dichloroethylene to the target analyte list was completed January 9, 2002 per the implementation schedule in July 18, 2001 letter from CBFO to the NMED and corresponding letter to generator sites from the CBFO. All samples in waste stream SR-W027-FB-Pre86-C contain the *trans* 1,2-dichloroethylene as part of the target analyte list.

Two tentatively identified compounds were identified in Lot 1. They are 2-methyl, 2-propanol and cyclohexanone. Neither of the TICS identified were found in more than 25% of the containers in Lot 1 or were listed in Appendix VIII of 40 CFR Part 261.

1,1,1-trichloroethane was identified as having a calculated UCL_{90} value above the program required quantification limit of 10 parts per million per by volume (ppmv). Thirty-two of thirty-six samples in Lot 1 had hits above the method detection limit for 1,1,1-trichloroethane, with a

maximum value of 239 ppmv and a measured mean value of 29.1ppmv. EPA codes F001 and F002 for spent halogenated solvents have been previously established by CCP-AK-SRS-2, Central Characterization Project Acceptable Knowledge Summary Report For Savannah River Site, SR-W027-FB-Pre86-C. The calculated UCL_{90} value supports the AK document.

The specifics of this information are included in the attached Headspace Gas Summary report.

Radionuclide Information

Radiological Characterization

Waste from this stream is contaminated primarily with Pu, predominantly high Pu-239 waste consisting of the following radioisotopes and corresponding ranges of weight percent (wt %) distribution:

Pu-238: 0-1 wt%, typically less than1%
Pu-239: 70-95 wt%, typically 92-94% except for special campaigns
Pu-240: 1-23 wt%, typically about 6% except for special campaigns
Pu-241: 0-5 wt%, typically less than1%
Pu-242: 0-3 wt%, typically less than1%
Americium (Am)-241 (decay daughter of Pu-241)[1]: 0-1 wt%; typically less than1%
Uranium (U, all isotopes): 0-70 wt%

High Pu-242 waste was generated from October 1972 – March 1973, March-July of 1975, and the first six months of 1979. The radioisotopes and corresponding ranges of weight percent (wt %) distribution are as follows:

Pu-238: 0-1 wt%
Pu-239: 0-4 wt%
Pu-240: 2-32 wt%
Pu-241: 1-11 wt%
Pu-242: 52-96 wt%
Am-241: trace
U (all isotopes): 0-70 wt%

[1] Am-241 may be significantly higher than indicated because of in growth from radiological decay of Pu-241 during years of storage.