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

ENTERED

APR 2 4 2012

APR 2012

Mr. John Kieling, Acting Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Subject: Review of Savannah River Site-Central Characterization Project Waste Stream Profile Form Number SR-MD-PAD1, Revision 1

Dear Mr. Kieling:

The Department of Energy, Carlsbad Field Office has approved the Waste Stream Profile Form (WSPF) Number SR-MD-PAD1, Revision 1, *Heterogeneous Debris from Mound Site*, for the Central Characterization Project at the Savannah River Site.

The WSPF was originally approved on July 29, 2010. This WSPF was revised in accordance with criteria developed to comply with the Permit Attachment C, Section C-1d and the changes address the addition of the Standard Large Box 2 payload container and associated TRUPACT-III Content Code Number to Waste Stream SR-MD-PAD1. The changes do not affect the waste stream designation or assignment of Environmental Protection Agency (EPA) hazardous waste numbers, as identified in the previously approved WSPF.

Enclosed is a copy of the WSPF as required by Section C-5a of the Waste Isolation Pilot Plant, Hazardous Waste Facility Permit, No. NM4890139088-TSDF.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have questions, please contact Mr. J. R. Stroble, Director of the Office of the National TRU Program, at (575) 234-7313.

Sincerely,

Jose R. Franco, Manager
Carlsbad Field Office

Enclosure

120431

CBFO:NTP:JRS:PG:12-0469:UFC 5900.00

cc: w/enclosure

J. R. Stroble, CBFO	*ED
N. Castaneda, CBFO	ED
B. Mackie, CBFO	ED
T. Morgan, CBFO	ED
M. Pinzel, CBFO	ED
T. Hall, NMED	ED
S. Holmes, NMED	ED
T. Kliphuis, NMED	ED
CBFO M&RC	

*ED denotes electronic distribution

CBFO:NTP:JRS:PG:12-0469:UFC 5900.00

Attachment 2 – CCP Waste Stream Profile Form

(1) Waste Stream Profile Number: SR-MD-PAD1, Revision 1		
(2) Generator site name: Savannah River Site	(3) Generator site EPA ID: SC1890008989	
(4) Technical contact: Beverly Schrock	(5) Technical contact phone number: 575-234-7444	
(6) Date of audit report approval by New Mexico Environment Department (NMED): March 3, 2011		
(7) Title, version number, and date of documents used for WIPP-WAP Certification: CCP-PO-001, CCP Transuranic Waste Characterization Quality Assurance Project Plan, Revision 20, June 16, 2011; CCP-PO-002, CCP Transuranic Waste Certification Plan, Revision 26, July 14, 2011 CCP-PO-004, CCP/SRS Interface Document, Revision 30, October 17, 2011		
(8) Did your facility generate this waste? YES [ ] NO [X]		
(9) If no, provide the name and EPA ID of the original generator: Mound Site, EPA ID OH6890008984		
Waste Stream Information		
(10) WIPP ID: SR-MD-PAD1	(11) Summary Category Group: S5000 – Debris Waste	
(12) Waste Matrix Code Group: Heterogeneous Debris Waste	(13) Waste Stream Name: Heterogeneous Debris from Mound Site	
(14) Description from the ATWIR: This CH TRU waste stream consists of debris shipped to the SRS from the Mound Plant in 1971 and 1972. SR-MD-PAD1 is comprised primarily of numerous organic and inorganic debris waste items and generally consists of combustible, plastic, rubber, glass, and metal.		
(15) Defense TRU Waste: YES [X] NO [ ]		
(16) Check One: CH [X] RH [ ]		
(17) Number of SWBs: 30[2] (17a) Number of SLB2: 17	(18) Number of Drums 865[3]	(19) Number of Canisters: NA
(20) Batch Data Report numbers supporting this waste stream characterization: See Characterization Information Summary (CIS) Correlation of Container Identification Numbers to Batch Data Report Numbers		
(21) List applicable EPA Hazardous Waste Numbers:[1] D004, D005, D006, D007, D008, D009, D010, D011, D019, D022, D027, D028, D029, D030, D032, D034, D037, D043, F002, F004 and F005		
(22) Applicable TRUCON Content Numbers: SR 125/225, SQ 125/225 SQ 154, SR 425		
(23)**Acceptable Knowledge Information**		
(For the following, enter the supporting documentation used [i.e., references and dates])		
Required Program Information		
(23A) Map of site: CCP-AK-SRS-9, Revision 3, November 1, 2011, Figures 1, 2, 4 and 5		
(23B) Facility mission description: CCP-AK-SRS-9, Revision 3, November 1, 2011, Section 4.2		
(23C) Description of operations that generate waste: CCP-AK-SRS-9, Revision 3, November 1, 2011, Section 4.3		
(23D) Waste identification/categorization schemes: CCP-AK-SRS-9, Revision 3, November 1, 2011, Section 4.5		
(23E) Types and quantities of waste generated: CCP-AK-SRS-9, Revision 3, November 1, 2011, Section 4.4.1		
(23F) Correlation of waste streams generated from the same building and process, as applicable: CCP-AK-SRS-9, Revision 3, November 1, 2011, Section 4.4.2		
(24) Waste certification procedures: CCP-TP-030, Revision 29, April 26, 2011		

(25)Required Waste Stream Information			
(25A) Area(s) and building(s) from which the waste stream was generated: CCP-AK-SRS-9, Revision 3, November 1, 2011, Section 5.1			
(25B) Waste stream volume and time period of generation: CCP-AK-SRS-9, Revision 3, November 1, 2011, Section 5.2			
(25C) Waste generating process description for each building: CCP-AK-SRS-9, Revision 3, November 1, 2011, Section 5.3			
(25D) Waste Process flow diagrams: CCP-AK-SRS-9, Revision 3, November 1, 2011, Figures 6, 7, 8 and 9			
(25E) Material inputs or other information identifying chemical/radionuclide content and physical waste form: CCP-AK-SRS-9, Revision 3, November 1, 2011, Section 5.4			
(25F) Waste Material Parameter Weight Estimates per unit of waste: See table entitled "Waste Stream SR-MD-PAD1 Waste Material Parameters" in Summation of Aspects of AK Summary Report: Waste Stream SR-MD-PAD1			
(26) Which Defense Activity generated the waste:			
	Weapons activities including defense inertial confinement fusion		Naval Reactors development
	Verification and control technology	X	Defense research and development
	Defense nuclear waste and material by products management	X	Defense nuclear material production
	Defense nuclear waste and materials security and safeguards and security investigations		
(27)Supplemental Documentation:			
(27A) Process design documents: NA			
(27B) Standard operating procedures: See P119, P120, P121, P122, P123, P124 and P126 in Summation of Aspects of AK Summary Report: Waste Stream SR-MD-PAD1, Source Documents			
(27C) Safety Analysis Reports: See P036 in Summation of Aspects of AK Summary Report: Waste Stream SR-MD-PAD1, Source Documents			
(27D) Waste packaging logs: NA			
(27E) Test plans/research project reports: NA			
(27F) Site databases: See P096 in Summation of Aspects of AK Summary Report: Waste Stream SR-MD-PAD1, Source Documents			
(27G) Information from site personnel: See C003, C007, C008, C009, C010, C011, C012, C016, C019, C020, C036, C037, C038 and C039 in Summation of Aspects of AK Summary Report: Waste Stream SR-MD-PAD1, Source Documents			
(27H) Standard industry documents: See I011 in Summation of Aspects of AK Summary Report: Waste Stream SR-MD-PAD1, Source Documents			
(27I) Previous analytical data: See I011 in Summation of Aspects of AK Summary Report: Waste Stream SR-MD-PAD1, Source Documents			
(27J) Material safety data sheets: See P095 in Summation of Aspects of AK Summary Report: Waste Stream SR-MD-PAD1, Source Documents			
(27K) Sampling and analysis data from comparable/surrogate Waste: NA			
(27L) Laboratory notebooks: NA			
Confirmation Information			
For the following, when applicable, enter procedure title(s), number(s) and date(s)			
(28)	Radiography: CCP-TP-053, Revision 11, July 20, 2011		
	Visual Examination: NA		

(29) Comments: For a list of the waste characterization procedures used and date of respective procedures see the list of procedures on the attached CIS.

Reviewed by AK Expert:	**YES** [X]		**Date:** 3/27/2012
Reviewed by STR (if necessary):	**YES** [X]	**N/A** [ ]	**Date:** 3/27/2012

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.

BSSchrock	Beverly Schrock	3/27/12
Signature of Site Project Manager	Printed Name	Date

NOTE: (1) If, radiography, visual examination were used to confirm EPA Hazardous Waste Numbers, attach signed Characterization Information Summary documenting this determination
(2) There are an additional 21 polyboxes that will either be repackaged into 10 SWBs or 3 SLB2. These polyboxes were conservatively presented as an additional 10 SWBs.
(3) This volume consists of 818 55-gallon drums and 47 85-gallon overpacks that will be repackaged totaling an estimated 865 55-gallon drums.

CHARACTERIZATION INFORMATION SUMMARY

WSPF #: SR-MD-PAD1 Rev. 1

Lot #: 37

TABLE OF CONTENTS

CCP Characterization Information Summary Cover Page

Waste Stream #	SR-MD-PAD1	Lot #:	37
AK Expert Review:	N/A	Date:	N/A
SPM Review:	Richard Kantrowitz [signature]	Date:	4/9/2012

SPM signature certifies that through Acceptable Knowledge testing and/or analysis that the waste identified in this summary is not corrosive, ignitable, reactive, or incompatible with the TSDF.

A summary of the Acceptable Knowledge regarding this waste stream containing specific information about the corrosivity, reactivity, and ignitability of the waste stream is included as an attachment to the Waste Stream Profile Form. By reference, that information is included in this lot.

List of procedures used:

Radiography (RTR):

CCP-TP-053	Rev. 9	09/30/10	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
CCP-TP-053	Rev. 10	03/04/11	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
CCP-TP-053	Rev. 11	07/20/11	CCP Standard Real-Time Radiography (RTR) Inspection Procedure

Headspace Gas Sampling and Analysis (HSG):

CCP-TP-093	Rev. 15	03/10/11	CCP Sampling of TRU Waste Containers
CCP-TP-093	Rev. 16	09/07/11	CCP Sampling of TRU Waste Containers
CCP-TP-106	Rev. 7	12/29/10	CCP Headspace Gas Sampling Batch Data Report Preparation
CCP-TP-175	Rev. 2	12/29/10	CCP Analysis of Gas Samples for VOCs by GC/MS
CCP-TP-175	Rev. 3	08/02/11	CCP Analysis of Gas Samples for VOCs by GC/MS
CCP-TP-173	Rev. 1	09/30/09	CCP Analysis of Gas Samples for VOCs by GC/FID

Project Level Data Validation / DQO Reconciliation:

CCP-TP-001	Rev. 18	08/09/10	CCP Project Level Data Validation and Verification
CCP-TP-001	Rev. 19	12/29/10	CCP Project Level Data Validation and Verification
CCP-TP-002	Rev. 22	06/30/10	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-002	Rev. 23	12/29/10	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-002	Rev. 24	12/28/11	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-003	Rev. 17	11/09/09	CCP Data Analysis for S3000, S4000, and S5000 Characterization
CCP-TP-003	Rev. 18	12/29/10	CCP Data Analysis for S3000, S4000, and S5000 Characterization
CCP-TP-005	Rev. 22	04/21/11	CCP Acceptable Knowledge Documentation
CCP-TP-005	Rev. 23	06/30/11	CCP Acceptable Knowledge Documentation
CCP-TP-005	Rev. 24	11/28/11	CCP Acceptable Knowledge Documentation
CCP-TP-030	Rev. 26	05/27/09	CCP CH TRU Waste Certification and WWIS Data Entry
CCP-TP-030	Rev. 27	12/14/09	CCP CH TRU Waste Certification and WWIS Data Entry
CCP-TP-030	Rev. 28	05/12/10	CCP TRU Waste Certification and WWIS/WDS Data Entry
CCP-TP-030	Rev. 29	04/26/11	CCP TRU Waste Certification and WWIS/WDS Data Entry

WAP Certification:

CCP-PO-001	Rev. 18	06/30/10	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-001	Rev. 19	12/29/10	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-001	Rev. 20	06/16/11	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-002	Rev. 23	04/07/10	CCP Transuranic Waste Certification Plan
CCP-PO-002	Rev. 24	06/30/10	CCP Transuranic Waste Certification Plan
CCP-PO-002	Rev. 25	12/29/10	CCP Transuranic Waste Certification Plan
CCP-PO-002	Rev. 26	07/14/11	CCP Transuranic Waste Certification Plan
CCP-PO-004	Rev. 27	05/22/09	CCP/SRS Interface Document
CCP-PO-004	Rev. 28	12/29/10	CCP/SRS Interface Document
CCP-PO-004	Rev. 29	07/05/11	CCP/SRS Interface Document
CCP-PO-004	Rev. 30	10/17/11	CCP/SRS Interface Document

CCP Correlation of Container Identification Numbers to Batch Data Report Numbers

Waste Stream # SR-MD-PAD1 Lot # 37

Container ID Number	NDA BDR	RTR BDR	VE BDR	Load Management/ Overpack Yes	Headspace Gas BDR Sample	Analysis	
SR46038R	SRLBC0225	SRSRTR0371	N/A		SRHSG1204	ECL12006M	N/A
**SR46047N	SRLBC0238	SRSRTR0382	N/A		SRHSGS1101	ECL11002M	ECL11002G
**SR46053T	SRLBC0236	SRSRTR0364	N/A		SRHSGS1101	ECL11002M	ECL11002G
**SR46053Y	SRLBC0220	SRSRTR0364	N/A		SRHSGS1101	ECL11002M	ECL11002G
**SR46056Q	SRLBC0239	SRSRTR0382	N/A		SRHSGS1101	ECL11002M	ECL11002G
SR46056X	SRLBC0237	SRSRTR0381	N/A		SRHSG1204	ECL12006M	N/A
SR46057R	SRLBC0217	SRSRTR0363	N/A		SRHSG1204	ECL12006M	N/A
**SR46057X	SRLBC0219	SRSRTR0365	N/A		SRHSGS1101	ECL11002M	ECL11002G
**SR46069X	SRLBC0270	SRSRTR0407	N/A		SRHSGS1101	ECL11002M	ECL11002G
**SR66202	SRLBC0182	SR4RTR0077	N/A		SRHSGS090006	ECL09041M	ECL09041G
**SR66204	SRLBC0182	SR4RTR0077	N/A		SRHSGS090006	ECL09041M	ECL09041G
**SR66205	SRSGS312	SR4RTR0077	N/A		SRHSGS090006	ECL09041M	ECL09041G
**SR66207	SRLBC0272	SR4RTR0077	N/A		SRHSGS090006	ECL09041M	ECL09041G
**SR66211	SRSGS310	SR4RTR0076	N/A		SRHSGS090006	ECL09041M	ECL09041G
**SR66212	SRSGS311	SR4RTR0076	N/A		SRHSGS090006	ECL09041M	ECL09041G
**SR66213	SRSGS311	SR4RTR0076	N/A		SRHSGS090006	ECL09041M	ECL09041G
**SR66216	SRSGS312	SR4RTR0077	N/A		SRHSGS090006	ECL09041M	ECL09041G
**SR66221	SRSGS314	SR4RTR0076	N/A		SRHSGS090006	ECL09041M	ECL09041G
**SR66223	SRLBC0182	SR4RTR0076	N/A		SRHSGS090006	ECL09041M	ECL09041G

** Previously Certified and are listed for information. Containers SR46038R, SR46056X, and SR46057R are being certified.

CIS003

Signature of Site Project Manager

Richard Kantrowitz
Printed Name

4/9/2012
Date

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: SR-MD-PAD1 Rev. 1 **Waste Stream Headspace Gas Lot Number** 1 through 3

ANALYTE	Transform Data Used (No, Data-Log, SQRT, other)	# Samples above MDL (1)	# Samples	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	Transformed PRQL (N/A or Value)	UCL_{90} > PRQL Yes	EPA Code
Acetone	Log	16	19	4.94	0.19	1.99	0.80	10	2.30		
Benzene	Log	14	19	-1.14	-2.50	0.88	-2.23	10	2.30		
Bromoform	Log	0	19	-2.04	-4.73	0.86	-4.46	10	2.30		
Butanol	Log	8	19	-0.43	-2.73	0.94	-2.44	10	2.30		
Carbon Disulfide[2]	Log	3	19	-0.69	-3.21	0.68	-3.00	10	2.30		
Carbon tetrachloride	Log	1	19	-1.90	-4.39	0.87	-4.12	10	2.30		
Chlorobenzene	Log	1	19	-1.39	-3.96	0.80	-3.71	10	2.30		
Chloroform	Log	7	19	-1.05	-3.14	1.10	-2.80	10	2.30		
Chloromethane[2]	Log	16	19	2.94	-0.02	1.87	0.55	10	2.30		
Cyclohexane[a]	Log	0	19	-1.29	-3.77	0.88	-3.51	10	2.30		
1,1-Dichloroethane	Log	1	19	-1.29	-3.85	0.73	-3.63	10	2.30		
1,2-Dichloroethane	Log	1	19	-1.20	-3.57	0.64	-3.38	10	2.30		
1,1-Dichloroethylene	Log	0	19	-1.47	-3.99	0.67	-3.78	10	2.30		
cis-1,2-Dichloroethylene[a]	Log	1	19	-1.12	-3.52	0.82	-3.27	10	2.30		
trans-1,2-Dichloroethylene	Log	1	19	-0.84	-3.44	0.81	-3.19	10	2.30		
1,2-Dichloropropane[2]	Log	1	19	-1.80	-4.26	0.97	-3.96	10	2.30		
Ethyl benzene	Log	0	19	-1.39	-4.03	0.84	-3.78	10	2.30		
Ethyl ether	Log	0	19	-0.69	-3.47	0.85	-3.21	10	2.30		
Methanol	Log	3	19	2.67	1.57	1.10	1.90	10	2.30		
Methyl ethyl ketone	Log	10	19	1.61	-1.95	1.47	-1.51	10	2.30		
Methyl isobutyl ketone	Log	6	19	-0.15	-3.61	0.98	-3.31	10	2.30		
Methylene chloride	Log	10	19	-0.84	-2.51	1.14	-2.16	10	2.30		
1,1,2,2-Tetrachloroethane	Log	1	19	-1.35	-4.09	1.04	-3.78	10	2.30		
Tetrachloroethylene	Log	1	19	-0.78	-4.03	1.17	-3.67	10	2.30		
Toluene	Log	16	19	2.14	-0.51	2.00	0.10	10	2.30		
1,1,1-Trichloroethane	Log	0	19	-1.63	-4.25	0.79	-4.01	100	4.61		
Trichloroethylene	Log	1	19	-1.56	-4.05	0.97	-3.75	100	4.61		
Trichlorofluoromethane[2]	Log	0	19	-1.90	-4.10	0.74	-3.87	100	4.61		

CIS 004

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: SR-MD-PAD1 Rev. 1 **Waste Stream Headspace Gas Lot Number** 1 through 3

ANALYTE	Transform Data Used (No, Data-Log, SQRT, other)	# Samples above MDL (1)	# Samples	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	Transformed PRQL (N/A or Value)	UCL_{90} > PRQL Yes	EPA Code
1,1,2-Trichloro-1,2,2-trifluoroethane	Log	0	19	-1.86	-4.43	0.87	-4.17	100	4.61		
1,3,5-Trimethylbenzene[a]	Log	0	19	-1.11	-3.93	1.02	-3.62	100	4.61		
1,2,4-Trimethylbenzene[a]	Log	1	19	-1.06	-3.73	0.84	-3.47	10	2.30		
m,p-Xylene[b]	Log	0	19	-1.41	-3.94	0.93	-3.66	10	2.30		
o-Xylene	Log	0	19	-1.27	-3.83	0.94	-3.54	10	2.30		
Formaldehyde[c]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydrazine[d]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[a] These compounds are from CCP-PO-003, CCP Transuranic Authorized Methods for Payload Control (CCP CH-TRAMPAC) and are flammable VOCs that do not appear in CCP-PO-001. These are not part of the target analyte 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 Savannah River Site.

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

[e] Results provided by the laboratory. Included for completeness only.

Comments:

(1) For analytes where there were no samples measured above the MDL value, 1/2 of the MDL value was used. (Per section C4 of the WAP, 1/2 of the MDL value is used in calculating the mean concentration.)

(2) The noted analytes are not included in the target analyte list Table C3-2 of HWFP Attachment C3. The analytes are reported in the analysis Batch Data Report provided by the Idaho lab and included on the UCL_{90} for completeness.

Signature of Site Project Manager	Printed Name	Date
	Richard Kantrowitz	4/9/2012

CIS005

CCP Headspace Gas Summary Data

Waste Stream # SR-MD-PAD1 Lot Number (s) 37

Tentatively Identified Compound	Maximum Observed Estimated Concentrations (ppmv)	# Samples Containing TIC	% Detected
None	N/A	N/A	N/A

Data Supports EPA Hazardous Waste Numbers Assigned by AK? Yes ☑ No ☐

If no, describe the basis for assigning the EPA Hazardous Waste Codes:

SPM Signature [signature] Date 4/9/2012

 CIS006

CCP RTR/VE Summary of Prohibited Items and AK Confirmation

Waste Stream #: SR-MD-PAD1 Lot #: 37

Container Number	RTR Prohibited Items [a,b]	Visual Examination Prohibited Items [a,b]
See correlation of container ID numbers for list of remaining drum numbers in this Lot.	None of the containers in this lot had prohibited items identified during RTR.	VE was not used to certify any containers in this Lot.

a. See Batch Data Reports

b. If AK has assigned U134 to this waste stream, then any liquids in these containers are prohibited items (not acceptable by the TSDF).

Justification for the selection of RTR and/or VE: RTR was selected as the characterization method for this lot because the waste was previously packaged and RTR meets all the Data Quality Objectives for waste stream SR-MD-PAD1.

Site Project Manager Signature	Printed Name	Date
[signature]	Richard Kantrowitz	4/9/2012

 CIS007

CCP Reconciliation with Data Quality Objectives

Waste Stream #: SR-MD-PAD1 Lot #: 37

Sampling Completeness

RTR/VE

Number of Valid Samples: 19 Number of Total Samples Analyzed: 19
Percent Complete: 100 (QAO is 100%)

NDA

Number of Valid Samples: 19 Number of Total Samples Analyzed: 19
Percent Complete: 100 (QAO is 100%)

HSG

Number of Valid Samples: 19 Number of Total Samples Collected: 19
Percent Complete: 100 (QAO is ≥90%)
Number of Valid Samples: 19 Number of Total Samples Analyzed: 19
Percent Complete: 100 (QAO is ≥90%)

Total VOC

Number of Valid Samples: NA Number of Total Samples Collected: NA
Percent Complete: NA (QAO is ≥90%)
Number of Valid Samples: NA Number of Total Samples Analyzed: NA
Percent Complete: NA (QAO is ≥90%)

Total SVOC

Number of Valid Samples: NA Number of Total Samples Collected: NA
Percent Complete: NA (QAO is ≥90%)
Number of Valid Samples: NA Number of Total Samples Analyzed: NA
Percent Complete: NA (QAO is ≥90%)

Total Metals

Number of Valid Samples: NA Number of Total Samples Collected: NA
Percent Complete: NA (QAO is ≥90%)
Number of Valid Samples: NA Number of Total Samples Analyzed: NA
Percent Complete: NA (QAO is ≥90%)

CCP Reconciliation with Data Quality Objectives

Waste Stream #: SR-MD-PAD1 Lot #: 37

	Y/N/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 the BDRs for each container demonstrates with a 95% probability that the container of waste contains TRU radioactive waste.
5	N	AK Sufficiency. Is there an approved AK sufficiency Determination for this waste stream?
6	Y	Mean concentrations, UCL_{90} values for the mean concentration, standard deviations, and the number of samples collected for each VOC in the HSG of each container were calculated and compared with the program required quantitation limits, as reported in CCP-TP-003, Attachment 3, and additional U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers 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 solids VOCs were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003 Attachment 4, and additional EPA HWNs were assigned as required. Samples were randomly collected.
7b	NA	Mean concentrations, (UCL_{90}) values for the mean concentration, standard deviations, and the number of samples collected for solids SVOCs were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003 Attachment 5, and additional EPA HWNs were assigned as required. Samples were randomly collected.
7c	NA	Mean concentrations, (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, CCP-TP-003 Attachment 6, and additional EPA HWNs were assigned as required. Samples were randomly collected.

CCP Reconciliation with Data Quality Objectives

Waste Stream #: SR-MD-PAD1 Lot #: 37

8	Y	The data demonstrates whether the waste stream exhibits a toxicity characteristic under Title 40 Code of Federal Regulations (CFR), Part 261, Identification and Listing of Hazardous Waste, Subpart C, Characteristics of Hazardous Waste.
9	Y	Does the waste stream contain listed waste found in 20.4.1.200 NMAC incorporating 40 CFR Part 261, Subpart D, Lists of Hazardous Wastes.
10	Y	Waste stream can be classified as hazardous or nonhazardous at the 90-percent confidence level.
11	Y	Appropriate packaging configuration and Drum Age Criteria (DAC) is applied and documented in the headspace gas sampling documentation, and the drum age met prior to sampling.
12	Y	TICs were appropriately identified and reported in accordance with the requirements of Section C3-1 of the QAPjP.
13	Y	The PRQLs for headspace gas VOCs were met for all analyses as evidenced by the analytical batch data reports.
14		The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WAP Sections C3-2 through C3-9 prior to submittal of a waste stream profile form for a waste steam or waste stream lot.

14	Completeness	Comparability	Representativeness
Radiography	Y	Y	Y
VE	NA	NA	NA
Headspace Gas Analysis	Y	Y	Y
Solids Sampling	NA	NA	NA
Solids VOCs	NA	NA	NA
Solids SVOCs	NA	NA	NA
Solids Metals	NA	NA	NA

Comments: None

Signature of Site Project Manager	Richard Kantrowitz Printed Name	4/9/2012 Date

 CIS010

SUMMATION OF ASPECTS OF AK SUMMARY REPORT: Waste Stream SR-MD-PAD1

Overview:

Waste stream SR-MD-PAD1 consists of contact-handled (CH) transuranic (TRU) heterogeneous debris waste generated in the Special Metallurgical (SM) Building and Research (R) Building at the Mound Site and stored by the Savannah River Site (SRS). The SM Building was used for plutonium (Pu)-238 processing until operations were transferred to the Plutonium Processing (PP) Building in 1967. Initial decontamination and decommissioning (D&D) of the SM Building began in August 1968 and ceased in August 1972. The R Building was used for research and development (R&D) for the polonium (Po)-210 program, which was phased out by 1971. Pu-238 research in the R Building began in 1959. Most of the Pu-238 work ended in about 1978. This waste was transferred to SRS between 1970 and 1972 for retrievable storage and is stored on E-Area TRU Waste Storage Pads 1 and 2.

Waste stream SR-MD-PAD1 was contaminated with or generated by Mound operations in support of defense nuclear materials production and defense R&D. Therefore, this waste stream is defense related waste.

This summation of the Acceptable Knowledge (AK) Summary Report includes information to support Waste Stream Profile Form (WSPF) number SR-MD-PAD1, Rev. 1 for mixed heterogeneous debris waste stored at SRS. The WSPF was originally approved on July 19, 2010. This WSPF was revised to address the addition of the standard large box 2 payload container and associated TRUPACT-III Content Code Number SR 425 to waste stream SR-MD-PAD1. The primary source of information for this Summation is CCP-AK-SRS-9, Central Characterization Project Acceptable Knowledge Summary Report For Mound Site Transuranic Waste in Retrievable Storage at the Savannah River Site, Waste Stream: SR-MD-PAD1, Revision 3, November 1, 2011.

Waste Stream Identification Summary:

Waste Stream Name:	Heterogeneous Debris from Mound Site
Waste Stream Number:	SR-MD-PAD1
Dates of Waste Generation:	1959 - 1972
Waste Stream Volume – Current:	865 55-gallon drums[1] 30 standard waste boxes (SWBs)[2] 17 standard large box 2s (SLB2s)
Waste Stream Volume – Projected:	None
Summary Category Group:	S5000 – Debris Waste
Waste Matrix Code Group:	Heterogeneous Debris Waste
Waste Matrix Code:	S5400

1. This volume consists of 818 55-gallon drums and 47 85-gallon overpacks that will be repackaged totaling an estimated 865 55-gallon drums.
2. There are an additional 21 polyboxes that will either be repackaged into 10 SWBs or 3 SLB2s. These polyboxes were conservatively presented as an additional 10 SWBs.

TRUPACT-II Content Code Numbers:	SR 125/SR 225, SQ 125/SQ 225, SQ 154
TRUPACT-III Content Code Number:	SR 425
Annual Transuranic Waste Inventory Report (ATWIR) Identification Number:	SR-MD-PAD1

Waste Stream Description and Physical Form:

Waste stream SR-MD-PAD1 is comprised primarily of organic and inorganic debris waste items and generally consists of combustible, plastic, rubber, glass, and metal. Waste items include High Efficiency Particulate Air (HEPA) filters containing asbestos filter media, fiberglass pre-filters, lime filters, hoods and hood fronts, large equipment (i.e., cut-off saw, evaporators, microscopes, presses, tanks), aerosol cans, batteries, bolts, dissolvers, metal beakers, hotplates, lathes, lead bricks, lead shot, nuts, pans, plastic and metal piping, plates, ring stands, spatulas, tables, plastic and metal tanks, valves, wrenches, glass flasks, glass and plastic sample vials, spun glass filters, cardboard, cartons, cloth rags, paper, wipes, wood, lead-lined gloves, gloves, o-rings, gaskets, tubing, evaporator and dissolver sludge, fused poly beads, and resin.

The waste stream meets the definition of waste materials that have common physical form, that contain similar hazardous constituents, and that are generated from a single process or activity. This waste stream was generated during Pu-238 heat source production and associated R&D, plutonium recovery, analytical laboratory, D&D, and liquid waste treatment operations.

Point of Generation:

<u>Location</u>

Waste stream SR-MD-PAD1 was generated at the Mound Site in Miamisburg, Ohio. The waste is currently stored at the SRS E-Area TRU Waste Storage Pads 1 and 2 in Aiken, South Carolina.

<u>Area and/or Buildings of Generation</u>

Waste stream SR-MD-PAD1 was generated at the Mound Site in the SM and R Buildings.

Generating Processes:

Description of Waste Generating Processes

Waste stream SR-MD-PAD1 was generated in the SM and R Buildings during Pu-238 heat source production and associated R&D, plutonium recovery, analytical laboratory, D&D, and liquid waste treatment operations.

<u>Plutonium-238 Heat Source Production</u>

In the metal production process, plutonium nitrate solution was precipitated with oxalic acid. The plutonium oxalate was filtered, and the filtrate was returned to plutonium recovery. The plutonium oxalate precipitate was washed and dried. The oxalate was placed in a platinum crucible and converted to plutonium tetrafluoride using hydrogen fluoride gas. The plutonium tetrafluoride was transferred to a magnesium crucible, and finely divided calcium metal and iodine were added. The crucible was placed in a steel reduction bomb. The bomb assembly was placed in an induction furnace and heated. After the bomb was allowed to cool, the Pu-238 metal was broken away from the slag and crucible. The slag and calcium metal were sent to plutonium recovery, and will not be in this waste stream. The clean plutonium metal then went to the foundry. The crucible went through a leaching process to recover the residual Pu-238. The plutonium metal "button" was placed in a crucible, and the metal was melted and poured into a mold that had the shape of a truncated cone. After the metal cooled, it was removed from the mold. All solid materials coming in contact with plutonium in this process were treated to recover plutonium (Reference I090).

The metal production process was replaced by the microsphere process which used powdered plutonium dioxide received from SRS. The plutonium dioxide material was first dissolved in a mixture of nitric-hydrofluoric acids. After dissolution, the resulting plutonium nitrate solution was adjusted with nitric acid. The solution was filtered, and the plutonium precipitate was washed with dilute ammonium hydroxide solution. The washed precipitate was then vacuum dried. The dried plutonium precipitate was crushed to produce a fine powder. The powder was fed through a plasma torch, producing microspheres of uniform size that went directly to the hot press facility (References I090 and P054).

Research and Development

Heat source R&D work was conducted in both SM and R Buildings. In addition to the metal and microsphere production operations described above, other heat source operations were developed. The two primary operations developed were the Plutonium-Molybdenum Cermet (PMC) process and the Pressed Plutonium Oxide (PPO) shard process (Reference P054).

The PPO process began by dissolving Pu-238 dioxide in a mixture of nitric acid-hydrofluoric acid. After dissolution, the resulting plutonium nitrate solution was adjusted with nitric acid. The solution was filtered, and the plutonium precipitate was washed with dilute ammonium hydroxide solution. The washed precipitate was vacuum dried, crushed to produce a fine powder, sieved, and heated to produce a sintered Pu-238/oxygen-16. The sintered oxide was then hot-pressed to produce a sphere. The die body was sprayed with colloidal graphite and then charged with plutonium dioxide particles. The die was loaded into the press and a sphere of plutonium dioxide was formed. The plutonium dioxide sphere was removed from the die, weighed, and gauged. The sphere was placed in a furnace and treated, allowed to outgas, and then encapsulated. Encapsulation involved welding a machined metal cover over the sphere. Encapsulation materials included iridium, graphite, tantalum, titanium, and Hastelloy (References I090 and P054).

The initial steps of the PMC process were identical to the PPO process. Plutonium dioxide underwent dissolution with nitric acid and hydrofluoric acid followed by a hydrogen ion concentration and valance adjustment using nitric acid. Precipitation took place using ammonium hydroxide, and the plutonium precipitate was separated from the supernatant liquid by filtration. The precipitate was washed with dilute ammonium hydroxide and then dried. The dried precipitate was sized, sintered, coated with molybdenum, and pressed into discs. This cermet material was machined into discs. The discs were then assembled into the heat source capsules. Materials used in fabrication included Inconel, tantalum, platinum-rhodium, yttrium, and iridium (References I090 and P054).

Plutonium Recovery

Plutonium-238 heat source activities resulted in byproducts and waste materials that were evaluated for appropriate treatment, recovery, and disposition (Reference I090).

During the first years of SM operation, plutonium-bearing solutions were accumulated in holding tanks. Aqueous liquids included nitric and hydrofluoric acids, hydroxylamine, sodium carbonate, ferrous sulfamate, and sodium hydroxide used in leaching and dissolution operations. Caustic wastes were generated when ammonium hydroxide was used to precipitate plutonium from the solution. These solutions were processed in a steam evaporator, and the evaporator condensate was processed by an ion exchange column. This system was taken out of service in 1962. From 1963 to 1968, the plutonium recovery process for aqueous wastes consisted of two ion exchange columns. The effluent from the ion exchange columns was sent to an in-line glovebox evaporator (References I090 and P054).

The major steps in recovery of plutonium from solids included physical and chemical processing. The physical process included ultrasonic wash, evaporation, and filtration. Simple washing and leaching of glovebox material occurred in the process since the beginning of the program. Chemical processing included dissolution, precipitation, fusion, incineration, ion exchange, and fluorination. In gloveboxes, solid objects contaminated with plutonium would be washed or leached in water or solutions, such as nitric and hydrofluoric acids, hydroxylamine, sodium carbonate, ferrous sulfamate, and sodium hydroxide, with the aid of ultrasonic cleaning equipment. The wash water and leachate were sent to plutonium recovery. Plutonium oxide and ceramic Radioisotopic Thermoelectric Generator (RTG) materials not meeting product specifications were dissolved in a mixture of nitric and hydrofluoric acid or underwent fusion with pyrosulfate. Glass fiber filters were dissolved in a hydrofluorinator pressurized vessel, and the volatile silicon tetrafluoride generated in the process was removed using a caustic scrubber. The highly acidic solutions containing plutonium were sent to the plutonium recovery process (References I090 and P054).

Combustible wastes generated in the glovebox line were processed in one of two ways. If paper towels or rags accumulated significant quantities of Pu-238, the thermal energy released by the plutonium would cause the towel or rag to start smoldering. The glovebox operator would put the towels and rags in an open-topped metal can and allow the process to continue. After a period of time, the can contained a carbonized ash that contained plutonium oxide. All other combustible wastes including paper, wood, leaded neoprene gloves, and in-line glovebox HEPA filters were treated in an incinerator installed in a glovebox. The incinerator consisted of a large steel tub that was heated by means of a natural gas burner. The ash residue from the incinerator was sent back for dissolution and leaching (Reference I090).

<u>Support Laboratories</u>

Operations in support of the Pu-238 heat source programs included analytical laboratory and metallurgical laboratory operations conducted in R and SM Buildings. Specific analytical procedures included titrations, alpha counting, atomic absorption, and mass spectroscopy. Thorium (Th)-232 was often used to simulate plutonium because the physical characteristics are similar. Solid wastes included glass, paper, and plastic contaminated with Pu-238 and Pu-239. Numerous chemicals were used during these operations including nitric acid, hydrofluoric acid, mercury, and complexing agents (e.g., ethylenediaminetetraacetic acid and citrates) (References C036, C037, C039, and P054).

<u>Decontamination and Decommissioning</u>

Waste stream SR-MD-PAD1 includes some waste from D&D of SM Building. Process equipment inside a glovebox was cleaned by washing the external surfaces with water from a high pressure cleaning unit. All services connected to a glovebox (e.g., piping) were then dismantled (References C037 and U016). Gloveboxes and fume hoods were cleaned manually (e.g., sand paper, paint remover, or rags with nitric acid solutions) (Reference C037) or with a high pressure cleaning unit. To eliminate the expense and hazards of removing process equipment from the glovebox, the inside of the glovebox was filled with polyurethane foam (References P036, P055, and U016). Additional foam was used to stabilize gloveboxes in the shipping container (Reference U016).

Stainless steel process tanks were emptied of their contents, and then cut up and packaged. Vacuum and acid transfer stainless steel piping located overhead in the building crawl space was removed. Small tools such as brushes were used to clean the piping. One of the last operations was the removal of the building HEPA filters and interior filter bank parts (Reference U016).

Liquid Waste Treatment

The SM waste treatment facility was located in room SM-1 and was used to process low- and high-risk wastes generated by plutonium production and plutonium recovery operations. The treatment plant was in operation from the start of plutonium operations until the waste transfer pipelines were installed from the SM to the Waste Disposal buildings in 1967 (References I090 and P054).

In the first few years of the SM Building's operations, all high-risk aqueous wastes were processed for possible plutonium recovery. Plutonium-bearing acidic solutions were accumulated in holding tanks and processed in a steam evaporator. The evaporator condensate was then processed by an ion exchange column, and the effluent from the ion exchange column was treated as either low-risk waste or released to the storm sewer. This system was taken out of service in late 1962, and the processing of high risk wastes was curtailed. When Mound began to distinguish between recoverable and disposable high-risk wastes, the plutonium aqueous recovery operations were moved out of the waste treatment area into the process area (References I090 and P054).

The low-risk alpha wastewater from Pu-238 production and recovery operations was transferred to influent tanks located on the west side of SM Building. Wastewater was transferred from the influent tanks to a mixing tank in room SM-1. Calcium chloride and ferrous sulfate were added to the mixing tank, followed by the addition of activated carbon. Sodium hydroxide was used to adjust the solution in the mixing tank to pH 11. A precipitate formed as a consequence of the pH change and the contents of the tank were transferred to a clarifier. When the sludge blanket in the clarifier reached the desired depth, the clarification process was stopped. The water from the clarifier was siphoned off, filtered using cartridge flow-through filters, and then pumped to a holding tank. The treated water in the holding tank was sampled and the activity of the water was determined. If the activity was below the Radioactivity Concentration Guide (RCG) value, the treated liquid was considered suitable for discharge to the storm sewer and the plant drainage ditch. If the activity of the treated liquid exceeded the RCG value, the waste was returned to the first step of the treatment process and underwent a second cycle of treatment (References I090 and P054).

Waste Stream Material and Chemical Inputs

The following table identifies the Resource Conservation and Recovery Act (RCRA) toxicity characteristic and listed constituents identified in this waste stream.

Toxicity Characteristic and Listed Constituents in Waste Stream SR-MD-PAD1

Chemical	EPA HWN	Use	References
Arsenic	D004	Analysis in R Building	P020
Barium (e.g., Rods)	D005	Analysis in R Building Present in Material Code 824 Moderator Chemical used in SM and R Buildings	C016, C036, I008, I011, I067, M004, P020, U003
Benzene	F005	Chemical used in SM and R Buildings	C011, C016
Cadmium (e.g., metal, oxide, shot)	D006	Analysis in R Building Present in Material Code 824 Chemical used in SM and R Buildings	C009, C016, I008, I011, I067, M004, P020, U003
Carbon disulfide	F005	Chemical used in SM and R Buildings	C016
Carbon tetrachloride	D019	Solvent extraction in R Building Chemical used in SM and R Buildings	C016, I090
Chloroform	D022	Chemical used in R Building separations research	P020
Chromium (e.g., metal, oxide)	D007	Analysis in R Building Present in Material Code 824 Chemical used in SM and R Buildings	C009, C016, I008, I011, I067, M004, P020, U003
1,4-Dichlorobenzene	D027	Chemical used in SM and R Buildings	C016
ortho-Dichlorobenzene	F002	Chemical used in SM and R Buildings	C016
1,2-Dichloroethane	D028	Chemical used in SM and R Buildings	C016
1,1-Dichloroethylene	D029	Chemical used in SM and R Buildings	C016
2,4-Dinitrotoluene	D030	Chemical used in SM and R Buildings	C016
2-Ethoxyethanol	F005	Chemical used in SM and R Buildings	C016
Hexachlorobenzene	D032	Chemical used in SM and R Buildings	C016
Hexachloroethane	D034	Chemical used in SM and R Buildings	C016
Isobutanol	F005	Chemical used in SM and R Buildings	C016
Lead (e.g., metal, oxide)	D008	Analysis in R Building Component of bricks, circuit boards (with lead solder), granules, rubber gloves, and shot Present in Material Codes 824 and 827	C012, C020, C036, C037, I011, I067, I090, P020, P081, P111, U003
Mercury (e.g., metal, oxide)	D009	Analysis in SM Building and R Building Component of batteries, thermometers, and switches Present in Material Codes 803, 805, 810, 811, 813, 824, 826, 827	C010, C019, C036, C037, C039, I011, I067, P020, U003
Methyl ethyl ketone	F005	Chemical used in SM and R Buildings	C011, C016
Methylene chloride	F002	Solvent extraction in R Building Ultrasonic cleaning in R Building Chemical used in SM and R Buildings	C016, I090, P020
Nitrobenzene	F004	Chemical used in SM and R Buildings	C016
2-Nitropropane	F005	Chemical used in SM and R Buildings	C016
Pentachlorophenol	D037	Chemical used in SM and R Buildings	C016
Pyridine	F005	Chemical used in SM and R Buildings	C016

Chemical	EPA HWN	Use	References
Selenium	D010	Analysis in R Building Present in Material Code 824 Chemical used in SM and R Buildings	C016, I008, I011, I067, M004, P020, U003
Silver	D011	Analysis in R Building Present in Material Code 824 Silver solder Chemical used in SM and R Buildings	C009, C036, C037, C038, I008, I011, I067, M004, P020, U003
Tetrachloroethylene	F002	Chemical used in SM and R Buildings	C011, C016
Toluene	F005	Chemical used in SM and R Buildings	C011, C016
1,1,1-Trichloroethane	F002	Solvent extraction in R Building Chemical used in SM and R Buildings	C016, I090
1,1,2-Trichloroethane	F002	Chemical used in SM and R Buildings	C016
Trichloroethylene	F002	SM and R wastewater Degreasing in SM Chemical used in SM and R Buildings	C007, C010, C011, C016, I045, I090, P065
1,1,2-Trichloro-1,2, 2-trifluoroethane	F002	Chemical used in SM and R Buildings	C016
Vinyl chloride	D043	Chemical used in SM and R Buildings	C016

RCRA Determinations

Historical Waste Management

The subject waste has historically been managed in accordance with the generator site requirements and in compliance with the requirements of the South Carolina Department of Health and Environment Control. This material was declared waste in 1972 prior to the enactment of the RCRA. SRS originally managed this waste as hazardous waste but had not assigned specific Environmental Protection Agency (EPA) hazardous waste numbers (HWNs) (Reference I092). CCP assigned EPA HWNs to waste stream SR-MD-PAD1 based on a review of available AK documentation to identify chemical usage and potentially hazardous materials that may have been introduced into the waste stream. AK was collected from a variety of sources, including technical reports, waste inventories, and generator interviews (References C007, C009, C010, C011, C012, C016, C019, C020, C036, C037, C038, C039, I008, I011, I045, I067, I090, M004, P020, P054, P065, P081, P095, P111, P119, U003, and U017).

Hazardous Waste Determinations

Ignitability, Corrosivity, Reactivity

<u>Ignitability</u>

The waste material in waste stream SR-MD-PAD1 does not meet the definition of ignitability as defined in 40 CFR 261.21. The material is not a liquid, an ignitable compressed gas, or an oxidizer, and is not capable of causing fire through friction, absorption of moisture, or spontaneous chemical change. Therefore, the waste number for ignitability (D001) does not apply to this waste stream.

According to procedure, containers of burnables (e.g., rags, paper, wood) must not include highly flammable materials. Ignitable liquids were used in SM and R Buildings and some examples include acetone, n-butyl alcohol, cyclohexanone, ethanol, methyl ethyl ketone, toluene, and xylene. However, liquids were removed from equipment. Burnable and non-burnable materials were dried to prevent chemical reaction (References C036, C037, C039, and P119).

Aerosol cans are expected to be present in this waste stream (References C036, C037, C039, and U017). Any container identified with unpunctured aerosol cans or compressed gas cylinders will be segregated from the waste stream and will not be eligible for disposal at WIPP until the cans are either punctured or removed from the waste stream.

Evaporator and dissolver sludge are listed as oxidizers (EPA HWN D001) for presence of nitrates (Reference I011). Tests performed by SRS in 1984 to determine burning characteristics of wipes and mop heads contaminated with nitric acid and potassium permanganate indicated that these wastes should not be classified as oxidizers. Although sludge is not the same waste type as wipes and mop heads, it is less likely to stimulate combustion because it is primarily inorganic.

Non-radionuclide pyrophorics were not used in production operations and will not be present in this waste stream (References C036, C037, and C039).

Corrosivity

The waste material in waste stream SR-MD-PAD1 is not liquid and does not contain unreacted corrosive chemicals; therefore, it does not meet the definition of corrosivity as defined in 40 CFR 261.22. Corrosive liquids were used in SM and R Buildings and some examples include ammonium hydroxide, formic acid, hydrochloric acid, hydrofluoric acid, nitric acid, and potassium hydroxide. However, liquids were removed from equipment, and burnable and non-burnable materials were dried to prevent chemical reaction. In addition, acidic evaporator sludge and caustic filtration sludge were dried an oven and then visually checked for dryness (References C036, C037, C039, and P119). Therefore, the waste number for corrosivity (D002) does not apply to this waste stream.

Reactivity

The waste material in waste stream SR-MD-PAD1 does not meet the definition of reactivity as defined in 40 CFR 261.23. The materials are stable and will not undergo violent chemical change without detonating. The materials will not react violently with water, form potentially explosive mixtures with water, or generate toxic gases, vapors, or fumes when mixed with water. Personnel familiar with Buildings SM and R indicated that cyanides and sulfides were not used and would not be present in the waste. Therefore, this waste is not a cyanide or sulfide bearing material. The materials are not capable of detonation or explosive reaction or decomposition (References C036, C037, C039, and P119). Therefore, the waste number for reactivity (D003) does not apply to this waste stream.

Finely divided calcium metal was used to reduce plutonium tetrafluoride to metal until 1965. After the reduction process, the Pu-238 metal was broken away from the slag, and the metal was cleaned with a brush to remove adherent slag and calcium metal. The slag and calcium metal were sent to plutonium recovery, and therefore, will not be in this waste stream (Reference I090). Laboratory operations may have used reactive materials (e.g., potassium, sodium), but it would have been in small quantities and are not expected to be in the waste (References C036, C037, and C039).

Burnable and non-burnable materials, according to procedure, were dried to prevent chemical reaction and pressure build-up while in storage (Reference P119). Explosive chemicals were not used in production areas. It is possible that explosive chemicals were used in the laboratory areas, but would have been rare and only in small quantities. Work with radioactive materials was kept separate from work done with explosive materials (References C036, C037, and C039). Any explosive materials would have been rendered non-explosive prior to disposal. Explosives were burned in Area H starting in the 1950s and continued into the 1990s (References I090 and P058).

The containers in the waste stream will be evaluated in accordance with the WIPP-WAP using radiography and/or visual examination prior to shipment to ensure the waste is not ignitable, reactive, or corrosive.

Toxicity Characteristic

Toxicity characteristic metals listed in 40 CFR 261.24 have been identified in the container contents and in other AK documentation. Since data are not available that demonstrate the concentration of these constituents is less than the toxicity characteristic regulatory level, EPA HWNs D004, D005, D006, D007, D008, D009, D010, and D011 are applied to waste stream SR-MD-PAD1 (References C009, C010, C012, C016, C019, C020, C036, C037, C038, C039, I008, I011, I067, I090, M004, P020, P081, P111, and U003).

Toxicity characteristic organics listed in 40 CFR 261.24 have been identified in AK documentation. Since data are not available that demonstrate the concentration of these constituents is less than the toxicity characteristic regulatory level, EPA HWNs D019, D022, D027, D028, D029, D030, D032, D034, D037, and D043 are applied to waste stream SR-MD-PAD1 (References C016, I090, and P020).

F-listed HWNs have been assigned for benzene, methyl ethyl ketone, nitrobenzene, pyridine, tetrachloroethylene, and trichloroethylene. Since the more specific F-listed EPA HWNs have been assigned for these compounds, D018 (benzene) D035 (methyl ethyl ketone), D036 (nitrobenzene), D038 (pyridine), D039 (tetrachloroethylene), and D040 (trichloroethylene) are not assigned to the waste stream.

Listed Waste

F-Listed Waste

F-listed solvents were identified in AK source documentation. Many of these constituents are known to have been used for their solvent properties, and therefore meet the definition of an F-listed waste in 40 CFR 261.31. For those constituents where a use was not specifically identified, it is assumed that they were used as solvents. Therefore, EPA HWNs F002, F004, and F005 are applied to waste stream SR-MD-PAD1 (References C007, C009, C010, C011, C016, I045, I090, P020, and P065).

Although several F001-listed solvents were used at Mound, EPA has provided a regulatory clarification that the F001 listing is only appropriate when the listed solvents are used in a large-scale degreasing operation such as cold cleaning or vapor degreasing on an industrial scale. Based on a review of the AK documentation, this waste was not generated from large-scale degreasing operations and these operations were not present in Buildings SM and R. Therefore, F001 is not assigned to this waste stream (References C009, I090, and P054).

Several F003-listed solvents were identified as potentially present in this waste stream as contaminants of debris waste. However, F003-listed solvents are listed solely for ignitability, and this waste stream does not exhibit the characteristic of ignitability because the solvents are not in liquid form. Therefore, F003 is not assigned to this waste stream.

K-Listed Waste

Waste stream SR-MD-PAD1 does not include any of the manufacturing process wastes from the specific industries or sources listed in 40 CFR 261.32.

P- and U-listed Wastes

Waste stream SR-MD-PAD1 does not contain a discarded commercial chemical product, an off-specification commercial chemical product, or a container residue or spill residue thereof as defined in 40 CFR 261.33. Numerous P- and U-listed chemicals were identified in Mound facilities; however, none of the AK documentation reviewed indicates that pure product or unused chemicals were placed into TRU waste. EPA HWN P015, beryllium powder, was listed for Material Type Code 811 (Reference I011). Material Type Code 811 is sludge material that did not dissolve by normal recovery processing; however, this material is not present in this waste stream. Small pieces of beryllium metal were used in the SM laboratories gloveboxes. However, if present, this type of beryllium contamination does not meet the definition of a P-listed waste because it is not in powder form. Hydrofluoric acid had several uses in heat source production, plutonium recovery, and analytical operations. The review of the AK source documentation did not identify the disposal of unused hydrofluoric acid or disposal of materials contaminated with spills of this acid; therefore, the EPA HWN U134 is not assigned. Therefore, waste stream SR-MD-PAD1 is not assigned P- or U-Listed EPA hazardous waste numbers (References C016, DR001, I090, P054, P119, U015, and U017).

Polychlorinated Biphenyls (PCBs)

This waste stream contains PCBs greater than 50 parts-per-million (ppm) and is therefore regulated as a Toxic Substances Control Act waste under 40 CFR 761. The primary source for PCBs in this waste stream is from painted surfaces. According to 40 CFR 761.50, materials with painted surfaces are considered PCB bulk product waste if the PCBs were added to the paint during its manufacture. Because PCB use in manufacturing was not banned until 1979, it is assumed that paint from Mound contains PCBs greater than 50 ppm. One other possible source of PCBs is from oil-containing equipment (e.g., presses). Liquids were removed from equipment but may not have been completely flushed so there could be some residual oil remaining in equipment. Any of these presses containing liquids are prohibited from WIPP disposal until the liquids have been completely absorbed (References C020, C036, C037, C039, P119, and U015).

Prohibited Items

The most common prohibited item in waste stream SR-MD-PAD1 will likely be sealed containers greater than four liters. Some of the drums contain metal cans that have press-fit lids and are about five liters in volume. There are also overpack configurations that include an inner 30-gallon drum and/or a 55-gallon drum. Other SRS debris waste streams have identified prohibited liquids (both containerized and uncontainerized) and unpunctured aerosol cans have been observed; therefore, they are expected to be present in this waste stream. Containers with prohibited waste items identified during real-time radiography and/or visual examination will be segregated and then remediated prior to certification and shipment (References P119, P120, P121, P123, P124, U015, and U017).

Method for Determining Waste Material Parameters (WMPs) Weights per Unit of Waste

To estimate the WMPs for waste stream SR-MD-PAD1, waste descriptions from a Pad 1 inventory were evaluated by their Content Codes. This inventory gives general waste descriptions and volumes on a container-by-container basis. To estimate WMP's, the Content Codes were assigned to one of the WMPs. For example, if the Content Code for a container was given as 801 – Combustibles (e.g., wood, rags, paper, cartons), the container was assigned the WMP of Cellulosics. To account for the difference in the weight of different types of materials, the volume of the container was multiplied by the density of the type of material in the container to get an estimate of the weight of the containers. An analysis of this data was performed, the results of which are presented in the below table.

Waste Stream SR-MD-PAD1 Waste Material Parameters

Waste Material Parameter	Average Weight Percent	Weight Percent Range
Iron-based Metals/Alloys	35.3%	0 - 100%
Aluminum-based Metals/Alloys	0.1%	0 - 100%
Other Metals	45.2%	0 - 100%
Other Inorganic Materials	14.4%	0 - 100%
Cellulosics	3.6%	0 - 100%
Rubber	0.5%	0 - 29.4%
Plastics (waste materials)	0.9%	0 - 100%
Organic Matrix	<0.1%	0 - <0.1%
Inorganic Matrix	<0.1%	0 - <0.1%
Soils/gravel	<0.1%	0 - <0.1%

List of AK Sufficiency Determinations Requested for the Waste Stream

There are no AK sufficiency determination requests for this waste stream.

Transportation

This waste stream and its chemical constituents have been reviewed for consistency with listed TRUCON codes and they are consistent.

Beryllium

Beryllium will not be present in amounts greater than 1% by weight of the waste in each payload container.

Radionuclide Information

AK indicates that the two predominant isotopes by mass for waste stream SR-MD-PAD1 are Pu-238 and Pu-239; however as a result of 50-year decay, Pu-238 and U-234 will likely be the most prevalent radionuclides by mass. Over 95 percent of the radioactive hazard can be attributed to Pu-238.

Radiological Distribution for Waste Stream SR-MD-PAD1

Radionuclide[1]	Total Radionuclide Wt%[2]	Radionuclide Wt% Range for Individual Containers[3]	Total Radionuclide Ci%[4]	Radionuclide Ci% Range for Individual Containers[5]	Expected Present (Yes/No)
WIPP Required Radionuclides					
Am-241	Not reported	Not reported	Not reported	Not reported	Yes[6]
Pu-238	81.42%	80.00% – 81.49%	97.65%	92.88% – 97.87%	Yes
Pu-239	15.73%	15.70% – 15.73%	0.07%	0.065% – 0.068%	Yes
Pu-240	2.37%	2.34% – 3.10%	0.04%	0.04% – 0.05%	Yes
Pu-242	0.16%	0.16% – 2.00%	Trace[11]	0% – Trace	Yes
U-233	Not reported	Not reported	Not reported	Not reported	No
U-234	Not reported	Not reported	Not reported	Not reported	Yes[7]
U-238	Trace	0% – 95.66%	Trace	0% – Trace	Yes[10]
Cs-137	Not reported	Not reported	Not reported	Not reported	No[8]
Sr-90	Not reported	Not reported	Not reported	Not reported	No[8]
Additional Radionuclides					
Th-230	Not reported	Not reported	Not reported	Not reported	Yes[7]
Np-237	Not reported	Not reported	Not reported	Not reported	Yes[6]
Pu-236	Not reported	Not reported	Not reported	Not reported	Yes[9]
Pu-241	0.31%	0.28% – 1.00%	2.25%	2.03% – 7.01%	Yes
Other Radionuclides Not Reported but May Be Present in Trace Amounts [12]					
Ac-227	Cm-244	H-3	Pa-231	P2-233	Po-210
Ra-226	Th-232	U-235			

1. These data are not decay-corrected and therefore may not accurately reflect certified assay, especially Pu-238 and Pu-241 due to their relatively short half-lives.
2. This listing indicates the total Wt% of each radionuclide over the entire Waste Stream.
3. This listing is the Wt% range of each radionuclide on a container-by-container basis.
4. This listing indicates the total activity (Ci) percent of each radionuclide over the entire Waste Stream.
5. This listing is the Ci percent range of each radionuclide on a container-by-container basis.
6. Am-241 will be present due to Pu-241 decay. Np-237 may also be present as a daughter product of Am-241.
7. U-234 will be present due to Pu-238 decay. Th-230 may also be present as a daughter product of U-234.
8. Sr-90 cannot be quantified by gamma spectroscopy. Its value is calculated based on measured Cs-137 values. A Sr-90/Cs-137 scaling factor of 1.0 is used to calculate Sr-90.
9. Pu-236 is a minor constituent in heat source plutonium and may be present in trace amounts.
10. Ranges reported are from CCP NDA reported data, not generator reported data.
11. "Trace" indicates <0.01 Wt% for that radionuclide.
12. These radionuclides were not reported for this waste stream but were historically processed in SM and R Buildings at Mound; therefore, they may be present in this waste stream. Only trace amounts are assumed to be present in the waste stream.

Payload management will not be utilized for this waste stream.

Source Documents

Source Document Number	Title
C003	Interview with Bill Franz
C007	Interview with Dr. Bernie Kokenge
C008	Interview with Toby Elswick
C009	Interview with Paul Figgins
C010	Interview/Clyde Chong
C011	Interview/Ron Goss
C012	Interview/Bill Davis
C016	Interview/Ron Saun
C019	Interview/Mike Deaton
C020	Record of Communication Don Luthey
C023	Letter to N. Stetson, USAEC, Re: Recovery of Pu-238 Scrap from Burial Ground
C036	Interview with Don Luthey
C037	Interview with Bill Davis and Ron Saun
C038	Interview with Dick Blauvelt
C039	Interview with Toby Elswick
C045	Letter to AK Record from James Schoen Re: Updated Evaluation of Calculation of Individual and Total Radionuclide Masses and Activities for Waste Stream SR-MD-PAD1
C055	E-mail from Jeff Lunsford to Mike Papp: Subject Packaging Procedures: Repackaging Plans for Mound Pad1 Containers
DR001	Discrepancy Resolution Physical Form of Waste Stream SR-MD-PAD1
I008	Drum Container Tables
I011	EPA Hazardous Waste Codes found in INEL Stored TRU Waste Content Code
I030	Mound Lab Annual Report
I032	Mound Heat Source
I036	Mound Laboratory
I043	Mound Laboratory Fact Book
I044	Pu-238 Fuel Data Sheets
I045	TRU Waste Certification Task Sludge From the Waste Disposal Plant
I067	Verification Methods Matrix
I090	Operable Unit 9, Site Scoping Report: Volume 7 - Waste Management
I092	Go West Data Base From SRS
I093	Works Technical Department
I094	Special Permit No. 5915 First Revision
M004	"Summary Report on Mound Boxes," E-mail to KellyCR@wipp.carlsbad.nm.us [Clint Kelley]
M014	Programmatic Impact
M017	E-mail to HERTFR@doe-md.gov, Re: Emailing: space-desc [Office of Space and Defense Power System]
M025	Notes from a draft document [title not given]
M027	Mound Laboratory-Classified Document, Summary ADC Unclassified 4/1/03, Defense Processes at Mound
M042	Current Scope of Activities at Mound (a presentation)
M071	Memorandum to B.A. Daugherty Re: Description of Mound and LANL Waste Stored on Pad 1, E-Area, SWD Burial Ground (U)
M072	Nuclear Criticality Safety and Packaging Survey of Mound Laboratory
M073	Memorandum to E.L. Albenesius, Re: Inventory of TRU Solid Wastes in Storage at SRP
M074	Memorandum to C.C. Robbins, SRP, Re: Description of Types of Waste, April 10, 1970

Source Document Number	Title
M075	U.S.A.E.C. Nuclear Material Transfer Report: Transfer Series: AVA DZA 29 through 34, and 37
M078	CCP-AK-SRS-9 Mound Radioassay Data
P020	Characterization of Mounds Hazardous, Radioactive, and Mixed Waste
P023	Mound Facility Physical Characterization
P036	Hazard Evaluation of the Special Metallurgical (SM) Building at Mound Laboratory
P044	Final Safety Analysis Report for Building 38
P053	Ten Year Plan for Decontamination and Decommissioning for Mound
P054	Mound Site Radionuclides by Location
P055	A Summary Review of Mound Laboratories Experience in D&D of Radioactive Facilities
P056	Decontamination and Decommissioning Projects Findings of No Significant Impact
P058	Mound Site Waste Management Reports and Site Plans 1977-1980
P063	Mound Site Waste Management Reports and Site Plans 1972 to 1976
P064	Mound Site Waste Management Reports and Site Plans 1981 to 1989
P065	Mound WIPP Certification Program for Newly Generated Contact Handled (CH) Transuranic Waste
P066	Maps Site Plans
P081	Approved Site Treatment Plan for Mixed Wastes at the Mound Facility
P095	Material Safety Data Sheets for commercial products used at Mound
P096	1996 and 1998 Chemical Inventory and 1991 Carcinogen list.
P097	An Early History of U.S. Radioisotope Thermoelectric Generators
P100	Mound Quality Control Plan for the Control of Radioactive Waste
P111	Site Treatment Plan for the Mixed Wastes at the Mound Facility Miamisburg, Ohio, Background and Plan Volumes
P116	Nuclear Power in Space
P118	Works Technical Department, (Extracts from) Report for October 1970, November 1970, and Unidentified Month
P119	Technical Manual MD-20734 Plutonium Processing-Material Control
P120	TRU Drum Repackaging
P121	Absorbing Containerized Liquids
P122	Shipment Preparation for TRU Containers to SWMF
P123	Absorbing Containerized Liquids
P124	Transuranic (TRU) Waste Repackaging in H-Canyon
P126	Standard Waste Box Operations
U003	List of Chemicals and Materials in TRU Waste Content Codes
U007	Content Code Assessments for INEL Contact Handled Stored TRU Waste
U015	Memorandum to E.L. Albenesius, Re: Description of Mound and LASL Solid ^{238}Pu Waste Stored at SRP
U016	Decommissioning of the Special Metallurgical Building at Mound Laboratory
U017	TRU Waste