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

NOV 0 4 2004

ENTERED

RECEIVED
NOV 2004
NMED Hazardous
Waste Bureau

Mr. Steve Zappe, WIPP Project Leader
Hazardous Waste Permits Program
New Mexico Environment Department
2905 E. Rodeo Park Drive, Bldg. 1
Santa Fe, NM 87505

Subject: Transmittal of Approved RFETS WSPF Number RF134.02, TRM SOIL (F001, F002, F005)

Dear Mr. Zappe:

The Department of Energy, Carlsbad Field Office (CBFO) has approved the Rocky Flats Environmental Technology Site (RFETS) Waste Stream Profile Form (WSPF) RF 134.02, TRM SOIL (F001, F002, F005)

Enclosed is a copy of the approved form as required by Section B-4(b)(1) of the WIPP Hazardous Waste Facility Permit, No. NM4890139088-TSDF.

If you have any questions on this matter, please contact me at (505) 234-7357 or (505) 706-0066.

Sincerely,

Kerry W. Watson
Office Director
Office of Characterization and Transportation

Enclosure

cc: w/o enclosure
J. Kieling, NMED *ED
C. Walker, TechLaw *ED
M. Strum, WTS *ED
R. Chavez, WRES *ED
L. Greene, WRES *ED
K. Zbryk, WRES *ED
W. Ledford, CTAC *ED
CBFO M&RC

*ED denotes Electronic Distribution
CBFO:NTP:KWW:GS:04-2066:UFC:5822

041112

Waste Stream Profile Number: RF134.02

Generator site name: RFETS
Technical contact: Eric D'Amico
Generator site EPA ID: CO7890010526
Phone number: (303) 966-5362

Date of audit report approval by NMED: March 9, 2000 as amended February 6, 2001; May 24, 2001; June 5, 2001; April 5, 2002; April 8, 2002; August 20, 2002; August 29, 2002; December 20, 2002; April 8, 2003; September 19, 2003; and December 30, 2003, July 14, 2004, and September 14, 2004

Title, version number, and date of documents used for WAP certification: Rocky Flats Environmental Technology Site TRU Waste Characterization Program Quality Assurance Project Plan, 95-QAPjP-0050, Version 10, August 2004. Transuranic (TRU) Waste Management Manual, Version 7, 1-MAN-008-WM-001, February 2004. Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, Revision 1.0. March 2004.

Did your facility generate this waste? ☑ Yes ☐ No If no, provide the name and EPA ID of the original generator:

Waste Stream Information[1]

WIPP ID: RF134.02[2]
Summary Category Group: S4000[2] Waste Matrix Code Group: Soils[2]
Waste Stream Name: TRM Soil (F001, F002, F005)[2]
Description from the WTWBIR: This waste stream consists of contaminated soil.[2]
Defense TRU Waste: ☑ Yes ☐ No
Check one: ☑ CH ☐ RH Number of SWBs 6 Number of Drums 0 Number of Canisters N/A
Batch Data Report numbers supporting this waste stream characterization: See Table 7.
List applicable EPA Hazardous Waste Codes[3]: F001, F002, F005
Applicable TRUCON Content Codes: RF 121F

Acceptable Knowledge Information[1]

Required Program Information

- Map of site: Reference List, No. 3
- Facility mission description: Reference List, No. 3
- Description of operations that generate waste: Reference List, Nos. 1, 2, 3, 6
- Waste identification/categorization schemes: Reference List, Nos. 13, 14
- Types and quantities of waste generated: Reference List, Nos. 1, 2, 3, 6
- Correlation of waste streams generated from the same building and process, as appropriate: Reference List, Nos. 1, 2, 6
- Waste certification procedures: Reference List, No. 5

Required Waste Stream Information

- Area(s) and building(s) from which the waste stream was generated: Reference List, Nos. 1, 2, 6
- Waste stream volume and time period of generation: Reference List, Nos. 4, 6
- Waste generating process description for each building: Reference List, Nos. 1, 2, 6
- Process flow diagrams: Reference List, Nos. 1, 2
- Material inputs or other information identifying chemical/radionuclide content and physical waste form: Reference List, Nos. 1, 2, 3, 6
- Which Defense Activity generated the waste: (Check one) Reference List, No. 3

☑ 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 materials production

Supplemental Documentation:

- Process design documents: Note 4
- Standard operating procedures: Note 4
- Safety Analysis Reports: Note 4
- Waste packaging logs: Note 4
- Test plans/research project reports: Note 4
- Site data bases: Note 4
- Information from site personnel: Note 4
- Standard industry documents: Note 4
- Previous analytical data: Note 4
- Material safety data sheets: Note 4
- Sampling and analysis data from comparable/surrogate Waste: Note 4
- Laboratory notebooks: Note 4

Sampling and Analysis Information[1]

[*For the following, when applicable, enter procedure title(s), number(s) and date(s)*]

☑ Radiography: Reference List, Nos. 24, 25
☑ Visual Examination: Reference List, Nos. 17, 26, 27
☑ Headspace Gas Analysis
VOCs: Reference List, No. 7, 22, 23
Flammable: Reference List, No. 7, 22, 23
Other gases (specify): N/A
☑ Homogeneous Solids/Soils/Gravel Sample Analysis
Total metals: Reference List, Nos. 10, 11, 12
PCBs: N/A
VOCs: Reference List, No. 8
Nonhalogenated VOCs: Reference List, No. 8
Semi-VOCs: Reference List, No. 9
Other (specify): N/A

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.

Signature of Site Project Manager	G. A. O'Leary, Manager TRU Programs Printed Name and Title	10/4/04 Date
Signature of Site QA Officer	C. L. Ferrera, TWCP Site QAO Printed Name and Title	10/4/04 Date

NOTE (1) Use back of sheet or continuation sheets, if required.
(2) This waste stream is not specifically identified in the the WTWBIR. The WIPP ID corresponds to the Waste Stream Profile Number. The Waste Stream Name, Description, Summary Category Group, Waste Matrix Code Group, and Waste Matrix Code (S4200) are based on the acceptable knowledge for this waste stream (see attached Acceptable Knowledge Summary).
(3) EPA Hazardous Waste Codes were determined using acceptable knowledge and confirmed using solids and headspace gas sampling and analysis (see attached Characterization Information Summary documenting this determination).
(4) See the References section in the Acceptable Knowledge Summary (attached) for additional backup documentation associated with this waste stream.

REFERENCE LIST

1. Backlog Waste Reassessment Baseline Book, Waste Form 23, Soil and Cleanup Debris, January 2004.
2. Waste Stream and Residue Identification and Characterization (WSRIC), Version 7, February 2004, and archived versions.
3. RFETS TRU Waste Acceptable Knowledge Supplemental Information, RF/RMRS-97-018, Revision 11, December 2003.
4. Waste and Environmental Management System (WEMS) database.
5. Transuranic (TRU) Waste Certification, PRO-X05-WC-4018, Revision 5, December 2003.
6. Acceptable Knowledge TRU/TRM Waste Stream Summaries, RMRS-WIPP-98-100, Section 7.21, Revision 0, March 2004.
7. GC/MS Determination of Volatile Organics Waste Characterization, L-4111-X, January 2002.
8. GC/MS Determination of Volatile Organic Compounds (Solids, Liquids, and TCLP Extracts), L-4165- L, January 2002.
9. GC/MS Determination of Total SVOCs for WIPP, L-4215-E, April 2002.
10. Waste Analysis by Atomic Absorption Spectroscopy, L-4151-J, September 2000.
11. Mercury Analysis in Waste (Cold-Vapor Technique), L-4152- K, July 2002.
12. Trace Metals by ICP Spectrometry (Solids, Liquids, and TCLP Extracts), L-4153-H, September 2000.
13. Waste Characterization, Generation, and Packaging, 1-PRO-079-WGI-001, Revision 4, May 2002.
14. Waste Characterization Program Manual, 1-MAN-036-EWQA-Section 1.6.1, Revision 3, May 2002.
15. Interoffice Memorandum from Douglas K. Sullivan to Eric L. D'Amico, Headspace Gas Analysis Data Evaluation Report For Waste Stream Profile RF134.02 Lot 1, DKS-005-04, February 2004.
16. Interoffice Memorandum from Thomas R. Gatliffe to Eric L. D'Amico, Statistical Solid Analysis Data Evaluation Report For Waste Stream RF134.02 [TRM Soils (F001, F002, F005)], TRG-059-04, February 2004.
17. TRU/TRM Waste Visual Verification (V^2) and Data Review, PRO-1031-WIPP-1112, Revision 2, February 2003.
18. 903 Pad Soil Removal/Repack and Characterization Plan, PRO-1730-903-001, Revision 0, August 2003.
19. Soil Removal from Pre-Selected Areas, 903 Pad, PRO-1729-903-SOIL, Revision 0, August 2003.
20. Small Container Waste Sampling – TRU Projects, PRO-1623-SCWS-440, Revision 1, May 2003.
21. Interoffice Memorandum from V. S. Sendelweck to E. L. D'Amico, Tentatively Identified Compounds in TRM Soils Waste Lot 1, VSS-012-2004, March 2004.
22. Headspace Gas Sampling And Analysis Using An Automated Manifold, L-4231-F, March 2002
23. Headspace Gas Sampling and Analysis Using An On-Line Integrated System, PRO-1676-HGAS-S&A, Revision 0, June 2003.
24. Real-Time Radiography Testing of Transuranic and Low-Level Waste in Building 569, 4-I19-NDT-00569, Revision 6, January 2002.
25. Mobile Real-Time Radiography Testing of Transuranic and Low-Level Waste, PRO-1520-Mobile-RTR, Version 2, November 2003.
26. Glovebox and C-Cell Waste Operations, PRO-1358-440-VERP, Version 5, February 2004.
27. RTR Visual Examination Confirmation, Building 371, PRO-1608-VECRTR-371, Revision 0, October 2002.

Form A
Reconciliation with Data Quality Objectives

I certify by signature (below) that sufficient data have been collected to determine the following Program-required waste parameters:

WSPF # RF134.02

Item	Check Box[a]	Reconciliation Parameter
1	✓	Waste Matrix Code as reported in WEMS.
2	✓	Waste Material Parameter Weights for individual containers as reported in WEMS.
3	✓	The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.
4	✓	Container mass and activities of each radionuclide of concern as reported in WEMS.
5	✓	Each waste container of waste contains TRU radioactive waste.
6	✓	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, and the number of samples collected for each VOC in the headspace gas of waste containers in the waste stream/waste stream lot.
7	✓	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, and number of samples collected for VOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
8	✓	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, number of samples collected for SVOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
9	✓	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, and number of samples collected for metals in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
10	✓	Sufficient number of samples was taken to meet statistical sampling requirements.
11	✓	Only validated data were used in the above calculations, as documented through the site data review and validation forms and process.
12	✓	Waste containers were selected randomly for sampling, as documented in site procedures.
13	✓	The potential flammability of TRU waste headspace gases.
14	✓	Sufficient number of waste containers was visually examined to determine with a reasonable level of certainty that the UCL_{90} for the miscertification rate is less than 14 percent.
15	✓	Whether the waste stream exhibits a toxicity characteristic (TC) under 40 CFR Part 261, Subpart C.
16	✓	All TICs were appropriately identified and reported in accordance with the requirements of the WIPP WAP prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
17	✓	The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WIPP WAP Sections B3-2 through B3-9 prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
18	✓	The RTLs (i.e., PRQLs) for all analyses were met prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
19	✓	Appropriate packaging configuration and DAC were met and documented in the headspace gas sampling documentation and the drum age was met prior to sampling.
20	✓	Whether the waste stream can be classified as hazardous or non-hazardous at the 90-percent confidence limit.

[a] Check (✓) indicates that data or acceptable knowledge are sufficient to determine the waste parameters and that the waste parameters have been reported in the listed document or database. N/A indicates parameter does not apply to waste stream. ND indicates data are insufficient.

Signature of Site Project Manager | G. A. O'Leary, Printed Name | 10/4/04, Date

Data Summary Report—Table 1: Solid Sampling Summary

WSPF # RF134.02

Determination of Number of Retrievably Stored Waste Containers to Sample (S3000,S4000)

Preliminary Estimates of Mean, Variance, and Coefficient of Variation:

Attach a table(s) that correlates container identification numbers to data packages if different from containers used for characterization.

Description of Source Data: Preliminary samples were collected and analyzed in compliance with all requirements (specified in the WIPP Waste Analysis Plan Section B2-2a) for being counted as part of the total number of calculated required samples. Sufficient preliminary samples were collected to demonstrate sampling sufficiency – i.e., collection of additional samples other than the preliminary samples was not required. See Reference List, No 16.

Samples Randomly Selected from Waste Stream (yes/no)? Yes.

Treatment of less-than-detectable measurements: This pertains only to data for analytes in which at least one detectable measurement was obtained. Data were evaluated using one half the method detection limit (MDL) for less-than-detectable observations. See Reference List, No. 16.

Analytes that are listed spent solvents and therefore not included in the calculation to determine the number of containers to sample: Benzene, Carbon Disulfide, Carbon Tetrachloride, Chlorobenzene, o-Dichlorobenzene, Methylene Chloride, Methyl Ethyl Ketone, Pyridine, Tetrachloroethylene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, 1,1,2-Trichloro-1,2,2-trifluoroethane, Trichloromonofluoromethane and Toluene.

Largest Calculated Sample Size selection and associated analyte: Pertains only to toxicity characteristic or listed waste analytes and only to those analytes where the associated EPA hazardous waste number is not assigned (i.e., it only applies to those cases where a site intends to establish that the constituent is below the regulatory threshold and the associated EPA hazardous waste number does not apply). Largest value is 0.129 for Lead.

Minimum number of containers to sample: 5 (based on WIPP Waste Analysis Plan Section B2-2a requirement that preliminary estimates be based on samples from a minimum of 5 waste containers).

Attach preliminary estimates: See Reference List, No. 16. Preliminary estimates are identical to final results because sufficient preliminary samples were collected and analyzed in compliance with all requirements for being used as required samples.

Data Summary Report—Table 1: Solid Sampling Summary (continued)

Retrievably Stored Waste Sampling Results

Analytes that are listed spent solvents and therefore not included in the UCL_{90} estimate calculation to determine the toxicity characteristic: Benzene, Carbon Tetrachloride, Chlorobenzene, Methyl Ethyl Ketone, Pyridine, Tetrachloroethylene, and Trichloroethylene.

Largest Calculated Sample Size and associated analyte: Pertains only to toxicity characteristic or listed waste analytes and only to those analytes where the associated EPA hazardous waste number is not assigned (i.e., it only applies to those cases where a site intends to establish that the constituent is below the regulatory threshold and the associated EPA hazardous waste number does not apply). Largest value is 0.129 for Lead.

Comparison of largest calculated sample size with largest calculated sample size selected from preliminary estimate: 0.129 vs. 0.129 (for Lead)

Treatment of less-than-detectable measurements: This pertains only to data for analytes in which at least one detectable measurement was obtained. Data were evaluated using one half the method detection limit (MDL) for less-than-detectable observations. See Reference List, No. 16.

Transformations applied to data and justification: Logarithmic or Square Root transformations were applied to the data as necessary to achieve (or better achieve) a normal probability distribution of the data for UCL_{90} comparison to RTL values.

Drums overpacked for shipment/WWIS tracking (Yes/No)? No. SWBs are direct loaded.
If yes, overpack container identification number: _____

Sampled drums included in waste stream lot reported here (Yes/No)? Yes.
If no, WSPF # including sampled drums: _____

Newly Generated Waste Sampling Results

Batch or continuous process? N/A[a]

Samples randomly selected from Waste Stream? (yes/no) N/A[a]

Sample locations (part of process): N/A[a]

Treatment of less-than-detectable measurements: N/A[a]

Transformations applied to data and justification: N/A[a]

NOTES:

[a] This waste stream is comprised of soil (S4200); therefore, Newly Generated Waste Sampling is not applicable per Section B-3d(1)(b) of the WIPP WAP.

Data Summary Report—Table 2: Headspace Gas Summary Data

WSPF # RF134.02

Sampling and Analysis Method (check one):

☑ 100% Sampling ☐ Reduced Sampling

2A

ANALYTE[a]	# Samples[b]	Transform Applied[c]	Normality Test (Pass/Fail)[d]	Max. Value (ppmv)	Mean[d]	Std. Dev.[d]	UCL_{90}[d]	Transformed RTL[e]	Un-Transformed RTL[e] (ppmV)	EPA Code[f]
1,1-Dichloroethane	0			2.6	1.275				10	
1,2-Dichloroethane	0			2.7	1.25				10	
1,1-Dichloroethylene	0			3.2	1.35				10	
cis-1,2-Dichloroethylene	0			3.2	1.475				10	
trans-1,2-Dichloroethylene	0			2.5	1.2				10	
1,1,2,2-Tetrachloroethane	0			3.4	1.325				10	
1,1,1-Trichloroethane	2	Log	Fail[g]	17	0.886	0.996	1.486	2.303	10	
1,1,2-Trichloro-1,2,2-Trifluoroethane	0			2.6	1.125				10	
1,2,4-Trimethylbenzene	0			2.4	1.2				NA	
1,3,5-Trimethylbenzene	0			2.9	1.2				NA	
Acetone	0			36	14.75				100	
Benzene	0			2.7	1.2				10	
Bromoform	0			2.3	1.15				10	
Butanol	0			33	13				100	
Carbon disulfide	0			3.6	1.525				10	
Carbon tetrachloride	2	None	Fail[g]	23	8.3	10.631	14.705	N/A	10	F001
Chlorobenzene	0			2.8	1.025				10	
Chloroform	0			2.5	1.2				10	
Cyclohexane	0			3.4	1.5				NA	
Ethyl benzene	0			2.1	1.0				10	
Ethyl ether	0			3.5	1.525				10	
Methanol	0			30	12.25				100	
Methyl ethyl ketone	0			34	15				100	
Methyl isobutyl ketone	0			25	11				100	
Methylene chloride	0			3.0	1.4				10	
o-Xylene	2	Log	Fail[g]	4.9	0.508	0.703	0.931	2.303	10	
m,p-Xylene	2	Log	Fail[g]	6.0	1.029	0.577	1.377	2.303	10	
Tetrachloroethylene	0			2.5	1.25				10	
Toluene	0			3.0	1.275				72.02[h]	
Trichloroethylene	0			2.4	1.075				10	

NOTES:

[a] A total of 6 samples were collected and analyzed. Analysis was performed for all analytes identified. Samples were not composited.

[b] Identifies the number of samples in which the associated analyte was detected.

[c] Identifies the type of data transformation used, if applicable, to achieve (or better achieve) a normal probability distribution of the data.

Data Summary Report—Table 2: Headspace Gas Summary Data (continued)

NOTES (continued):

[d] Statistics calculated based on using ½ the MDL for less-than-detectable observations with data transformation as identified (Reference 15). When transformation was applied, the Mean and UCL_{90} values presented are the transformed values (Reference 15). With no detectable concentrations, listed mean reflects average of one-half of reported MDL values for analyte and calculation of standard deviation and UCL_{90} values is not meaningful. With fewer than five detectable concentrations, calculated values for UCL_{90} are subject to potentially large relative error.

[e] RTLs for headspace gas analysis results correspond to the analyte PRQL for analytes that are WIPP WAP target analytes. "NA" means the analyte is not a WIPP WAP target analyte, but instead a flammable VOC that is analyzed for compliance with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC).

[f] No entry indicates that the applicable UCL_{90} value did not exceed the associated RTL.

[g] Data set (with or without transformation) did not pass the test for normality. The data set that most approximated a normal distribution was used for computation of statistics.

[h] Limit used for evaluation of EPA Hazardous Waste Code for toluene (Reference No. 3).

Data Summary Report—Table 2: Headspace Gas Summary Data (continued)

WSPF # RF134.02

2B

TENTATIVELY IDENTIFIED COMPOUND (TIC)	Maximum Observed Estimated Concentrations (ppmV)	# Samples Containing TIC
No TICs identified in the headspace gas samples for the waste stream lot.		

Did the data verify the acceptable knowledge? ☑ Yes ☐ No

Data as reported in Data Summary Report – Table 2 confirms acceptable knowledge in that no toxicity characteristic volatile organic or F-listed solvent EPA codes, other than those already assigned by acceptable knowledge, are applicable.

If not, describe the basis for assigning the EPA Hazardous Waste Codes:

Data Summary Report—Table 3: Metals Summary Data

WSPF # RF134.02

Sampling and Analysis Method/Units (check one):

☑ Totals (units are in mg/kg) ☐ TCLP (units are in mg/l)

ANALYTE[a]	# Samples[b]	Transform Applied[c]	Normality Test (Pass/Fail)[d]	Min. Sample Size[d]	Mean[d]	Std. Dev.[d]	UCL_{90}[d]	Transformed RTL[e]	Un-Transformed RTL[e] (mg/kg)	EPA Code[f]
Antimony	0				4.84				100	
Arsenic	2	Log	Fail[h]	0.037	1.774	0.384	2.0	4.605	100	
Barium	8	Log	Pass	0.003	4.33	0.132	4.4	7.601	2000	
Beryllium[g]	6	None	Pass	0.000	0.551	0.234	0.7	N/A	100	
Cadmium	0				0.48				20	
Chromium	8	Log	Pass	0.014	2.483	0.179	2.573	4.605	100	
Lead	8	Log	Fail[h]	0.129	2.64	0.499	2.89	4.605	100	
Mercury	0				0.05				4	
Nickel	8	Log	Pass	0.012	2.611	0.154	2.688	4.605	100	
Selenium	0				0.48				20	
Silver	3	None	Fail[h]	0.000	2.169	1.005	2.671	N/A	100	
Thallium	0				4.84				100	
Vanadium	8	None	Pass	0.002	19.5	2.39	20.696	N/A	100	
Zinc	8	Log	Pass	0.161	3.865	0.21	3.97	4.605	100	

Did the data verify the acceptable knowledge? ☑Yes ☐ No

If not, describe the basis for assigning the EPA Hazardous Waste Codes.

Data as reported in Data Summary Report – Table 3 confirm acceptable knowledge in that no toxicity characteristic metal EPA codes are applicable (see attached AK Summary).

NOTES:

[a] A total of 8 samples were collected and analyzed. Waste material was collected into small containers (4 liters or smaller in size) from randomly selected locations within interim intermodal containers in accordance with References 18 and 19 prior to packaging the soil into SWBs. The small containers were subsequently sampled in accordance with Reference 20. Analysis was performed for all analytes identified.

[b] Identifies the number of samples in which the associated analyte was detected.

[c] Identifies the type of data transformation used, if applicable, to achieve (or better achieve) a normal probability distribution of the data.

[d] Statistics calculated based on using ½ the MDL values for all less-than-detectable observations with data transformation as identified (Reference 16). When transformation was applied, the Mean and UCL_{90} values presented are the transformed values (Reference 16). No entry indicates no detectable measurements available for statistics.

[e] RTLs correspond to the analyte PRQL for analytes that are not characteristic hazardous waste constituents.

[f] No entry indicates that the applicable UCL_{90} value did not exceed the associated RTL.

Data Summary Report—Table 3: Metals Summary Data (continued)

NOTES (continued):

[g] The EPA hazardous waste number P015, beryllium powder, is not applicable to this waste stream. The applicable regulations controlling the identification of U and P listed hazardous wastes are given in 40 CFR 261.33, Discarded Commercial Chemical Products, Off-Specification Species, Container Residues, and Spill Residues Thereof. Within this regulation, it states that "The phrase 'commercial chemical product or manufacturing chemical intermediate having the generic name listed in...' refers to a chemical which is manufactured or formulated for commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient. It does not refer to a material, such as a manufacturing process waste, that contains any of the substances listed in paragraph (e) or (f). Where a manufacturing process waste is deemed to be a hazardous waste because it contains a substance listed in paragraph (e) or (f), such waste will be listed in either Sec. 261.31 or Sec. 261.32 or will be identified as a hazardous waste by the characteristics set forth in subpart C of this part." Beryllium parts were used in the manufacture/assembly of weapons components, and residual beryllium contamination of plutonium parts may have occurred. As a result beryllium may be present in the spent solvents and end up in the contaminated soil. Any beryllium is present as a contaminant of the process and not as unused commercial chemical product, and therefore is not a P015-listed waste.

[h] Data transformation did not pass the test for normality. The data transformation that most approximated a normal distribution was used for computation of statistics.

Data Summary Report—Table 4: Total VOC Summary Data

WSPF # RF134.02

4A

ANALYTE[a]	# Samples[b]	Transform Applied[c]	Normality Test (Pass/Fail)[d]	Min. Sample Size[d]	Mean[d]	Std. Dev.[d]	UCL_{90}[d]	Transformed RTL[e]	Un-Transformed RTL[e] (mg/kg)	EPA Code[f]
1,1-Dichloroethylene	0				0.5				14	
trans-1,2-Dichloroethylene	0				0.5				10	
1,2-Dichloroethane	0				0.5				10	
1,1,1-Trichloroethane	0				0.5				10	
1,1,2-Trichloro-1,2,2-Trifluoroethane	0				0.5				10	
1,1,2-Trichloroethane	0				0.5				10	
1,1,2,2-Tetrachloroethane	0				0.5				10	
Acetone	0				5				100	
Benzene	0				0.5				10	
Bromoform	0				0.5				10	
Butanol	0				5				100	
Carbon disulfide	0				0.5				10	
Carbon tetrachloride	0				0.5				10	
Chloroform	0				0.5				120	
Chlorobenzene	0				0.5				2,000	
Chloromethane	0				0.5				10	
Ethyl benzene	0				0.5				10	
Ethyl ether	0				5				100	
Isobutanol	0				5				100	
Methanol	0				5				100	
o-Xylene	0				0.5				10	
m,p-Xylene	0				0.5				10	
Methyl ethyl ketone	0				5				100	
Methylene chloride	0				0.5				10	
Tetrachloroethylene	0				0.5				14	
Toluene	1	Log	Fail[g]	0.074	-0.502	0.54	-0.232	2.303	10	
Trichloroethylene	0				0.5				10	
Trichlorofluoromethane	0				0.5				10	
Vinyl chloride	0				0.5				4	

NOTES:

[a] A total of 8 samples were collected and analyzed. Waste material was collected into small containers (4 liters or smaller in size) from randomly selected locations within interim intermodal containers in accordance with References 18 and 19 prior to packaging the soil into SWBs. The small containers were subsequently sampled in accordance with Reference 20. Analysis was performed for all analytes identified.

[b] Identifies the number of samples in which the associated analyte was detected.

[c] Identifies the type of data transformation used, if applicable, to achieve (or better achieve) a normal probability distribution of the data.

Data Summary Report—Table 4: Total VOC Summary Data (continued)

NOTES (continued):

[d] Statistics calculated based on using ½ the MDL values for all less-than-detectable observations with data transformation as identified (Reference 16). No entry indicates no detectable measurements available for statistics.

[e] RTLs correspond to the analyte PRQL for analytes that are F-listed hazardous waste constituents or to the applicable total RTL value as calculated from the TC RTL. RTLs correspond to the analyte PRQL for analytes that are not F-listed or characteristic hazardous waste constituent.

[f] No entry indicates that the applicable UCL_{90} value did not exceed the associated RTL.

[g] Data transformation did not pass the test for normality. The data transformation that most approximated a normal distribution was used for computation of statistics.

Data Summary Report—Table 4: Total VOC Summary Data (continued)

WSPF # RF134.02

4B

TENTATIVELY IDENTIFIED COMPOUND (TIC) CHEMICAL ABSTRACTS SERVICE (CAS) Number	Maximum Observed Estimated Concentrations (mg/kg)	# Samples Containing TIC
No TICs identified in the solid VOC samples for the waste stream lot.		

Did the data verify acceptable knowledge? ☑ Yes ☐ No

Data as reported in Data Summary Report – Table 4 confirm acceptable knowledge in that no toxicity characteristic organic or F-listed solvent EPA codes, other than those already assigned by acceptable knowledge, are applicable.

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

Data Summary Report—Table 5: Total SVOC Summary Data

WSPF # RF134.02

5A

ANALYTE[a]	# Samples[b]	Transform Applied[c]	Normality Test (Pass/Fail)[d]	Min. Sample Size[d]	Mean[d]	Std. Dev.[d]	UCL_{90}[d]	Transformed RTL[e]	Un-Transformed RTL[e] (mg/kg)	EPA Codes[f]
1,2-Dichlorobenzene	0				0.5				40	
1,4-Dichlorobenzene	0				0.5				150	
2,4-Dinitrophenol	0				0.5				40	
2,4-Dinitrotoluene	0				0.1				2.6	
2-Methylphenol (o-Cresol)	0				0.5				40	
3-&4-Methylphenol (m,p-Cresol)	0				0.5				40	
Hexachlorobenzene	0				0.1				2.6	
Hexachloroethane	0				0.5				60	
Nitrobenzene	0				0.5				40	
Pentachlorophenol	0				0.5				2,000	
Pyridine	0				0.5				40	

NOTES:

[a] A total of 8 samples were collected and analyzed. Waste material was collected into small containers (4 liters or smaller in size) from randomly selected locations within interim intermodal containers in accordance with References 18 and 19 prior to packaging the soil into SWBs. The small containers were subsequently sampled in accordance with Reference 20. Analysis was performed for all analytes identified.

[b] Identifies the number of samples in which the associated analyte was detected.

[c] Identifies the type of data transformation used, if applicable, to achieve (or better achieve) a normal probability distribution of the data.

[d] Statistics calculated based on using ½ the MDL values for all less-than-detectable observations with data transformation as identified (Reference 16). No entry indicates no detectable measurements available for statistics.

[e] RTLs correspond to the analyte PRQL for analytes that are F-listed hazardous waste constituents or to the applicable total RTL value as calculated from the TC RTL. RTLs correspond to the analyte PRQL for analytes that are not F-listed hazardous waste constituents or characteristic hazardous waste constituents.

[f] No entry indicates that the applicable UCL_{90} value did not exceed the associated RTL.

Data Summary Report—Table 5: Total SVOC Summary Data (continued)

WSPF # RF134.02

5B

TENTATIVELY IDENTIFIED COMPOUND (TIC) CHEMICAL ABSTRACTS SERVICE (CAS) Number	Maximum Observed Estimated Concentrations (mg/kg)	# Samples Containing TIC
1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester (CAS No. 117-81-7)	0.56	1
Fluoranthene (CAS No 206-44-0)	0.46	1
1,1'-Biphenyl, Pentachloro- (CAS No 25429-29-2)[a]	2.8	4
1,1'-Biphenyl, 2,3',4,4',5-Pentachloro (CAS No 31508-00-6)	0.82	1
1,1'-Biphenyl, 2,2',4,5,5'-Pentachloro (CAS No 37680-73-2)[a]	2.7	4
1,1'-Biphenyl, 2,2',4,4',5-Pentachloro (CAS No 38380-01-7)[a]	1.7	3
1,1'-Biphenyl, 2,2'3,3'-Tetrachloro (CAS No 38444-93-8)[a]	0.71	2
1,1'-Biphenyl, 2,2',3',4,5-Pentachloro (CAS No 41464-51-1)	1.8	1
1,1'-Biphenyl, 2,2',4,6-Tetrachlor (CAS No 62796-65-0)[a]	3.1	3
1,2-Benzenedicarboxylic Acid, Dibutyl Ester (CAS No 84-74-2)[b]	4.1	5

Did the data verify acceptable knowledge? ☑ Yes ☐ No

Data as reported in Data Summary Report – Table 5 confirm acceptable knowledge in that no toxicity characteristic organic or F-listed solvent EPA codes, other than those already assigned by acceptable knowledge, are applicable.

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

NOTES:

[a] TIC was detected in 25 percent or more of the samples, but is not listed in 40 CFR 261, Appendix VIII.
[b] TIC was determined not to be a listed hazardous waste based on comparison of the TIC identification to acceptable knowledge. TIC was added to the SVOC target analyte list for the subject waste stream (see Reference No. 21).

Data Summary Report—Table 6: Exclusion of Prohibited Items

WSPF # RF134.02

The absence of prohibited items is documented through acceptable knowledge. Radiography or visual examination is performed on each container in this waste stream to verify the absence of the following prohibited items:

- Liquids
- Non-radionuclide pyrophoric materials
- Waste incompatible with backfill, seal and panel closure materials, container and packaging materials, shipping container materials, or other wastes
- Explosives or compressed gases
- Waste exhibiting the characteristics of ignitability, corrosivity or reactivity
- Non-mixed hazardous waste

Newly generated waste is characterized by visual verification (VV) at the time of waste packaging using the visual examination (VE) technique unless the use of radiography in lieu of, or in combination with, visual verification is justified by any of the following criteria:

- Visual verification was conducted during packaging, but was unacceptable,
- Visual verification requires extensive handling of high gram content waste that results in high radioactive exposure for the VV personnel,
- Situations where waste packaging is conducted at numerous locations generating small quantities of transuranic waste requiring a large number of VV personnel, and/or
- Where waste was originally packaged as low-level waste, but subsequently determined to be transuranic.

Each container of waste is certified and shipped only after radiography and/or VE either:

- Did not identify any prohibited items in the waste container, or
- All prohibited items found in a waste container by radiography or VE are identified and corrected (i.e., eliminated or removed) through the site non-conformance reporting system.

Data Summary Report—Table 7: Correlation of Container Identification to Batch Data Reports

WSPF # RF134.02

Package No.	Sampled Small Container ID [a]	Radioassay Data Package	Solid Sample Batch No.	Metals Data Package	VOC Data Package	SVOC Data Package	Headspace Sample Batch No.	Headspace VOC Data Package	VV Data Package [b]
S03341	L02174-6C-5	664MP1-DP-111203	SC440-SB-1007	MTLS-DP-00055	VOCS-DP-00057	SVOA-DP-00058	04W0157	HGAS-DP-00873	VV-903PAD-000
S03342	L02186-2B-7	664MP1-DP-111803	SC440-SB-1007	MTLS-DP-00055	VOCS-DP-00057	SVOA-DP-00058	04W0158	HGAS-DP-00874	VV-903PAD-0000
S03355	L02174-18C-6	664MP1-DP-111303	SC440-SB-1007	MTLS-DP-00055	VOCS-DP-00057	SVOA-DP-00058	04W0157	HGAS-DP-00873	VV-903PAD-00001
S03360	L01988-16A-3 L01988-4B-4	664MP1-DP-111403	SC440-SB-1007 SC440-SB-1007	MTLS-DP-00055 MTLS-DP-00055	VOCS-DP-00057 VOCS-DP-00057	SVOA-DP-00058 SVOA-DP-00058	04W0157	HGAS-DP-00873	VV-903PAD-00001
S03373	L02186-14C-8	664MP1-DP-111803	SC440-SB-1007	MTLS-DP-00055	VOCS-DP-00057	SVOA-DP-00058	04W0158	HGAS-DP-00874	VV-903PAD-00001
S03395	L01704-C3-2 L01704-15A-1	664MP1-DP-112003	SC440-SB-1007 SC440-SB-1007	MTLS-DP-00055 MTLS-DP-00055	VOCS-DP-00057 VOCS-DP-00057	SVOA-DP-00058 SVOA-DP-00058	04W0158	HGAS-DP-00874	VV-903PAD-00001

NOTES:

[a] Waste material was collected into small containers (4 liters or smaller in size) from randomly selected locations within interim intermodal containers in accordance with References 18 and 19 prior to packaging the soil into SWBs. The small containers were subsequently sampled in accordance with Reference 20.

[b] Radiography was not performed on any of the containers identified here. Instead, the waste contents for these containers were visually examined prior to or at the time of packaging using the VE technique.

Acceptable Knowledge Summary

WSPF # RF134.02

RMRS-WIPP-98-100, Acceptable Knowledge TRU/TRM Waste Stream Summaries, Section 7.21, TRM Soil (F001, F002, F005) (attached).

Rocky Flats Environmental Technology Site

ACCEPTABLE KNOWLEDGE INFORMATION

ACCEPTABLE KNOWLEDGE TRU/TRM WASTE STREAM SUMMARIES

RMRS-WIPP-98-100

Section 7.21

TRM Soil (F001, F002, F005)

Profile No. RF134.02

Revision 1

Reviewed for Classification/UCNI
By: Unclassified Not UCNI
Reference Exemption Number CEX-032-00
Date: September 14, 2004

Approval signatures in Site Document Control history file

7.21 TRM Soil — Profile No. RF134.02 (F001, F002, F005)

Acceptable Knowledge Waste Stream Summary

Waste Stream Name: TRM Soil (F001, F002, F005)

Generation Buildings: Building 903 PAD [1,6,7,8]

Waste Stream Volume (Newly Generated): 6 Standard Waste Boxes [1,6]

Generation Dates (Newly Generated): November 2003 [1,6]

Waste Stream Volume (Projected): None [1,2]

Generation Dates (Projected): N/A [1,2]

TRUCON Content Code [3]: RF121F

Process Knowledge Demonstrates Flammable VOCs in Headspace < 500 ppm: Yes (see Sec. 7.21.6)

7.21.1 WIPP Transuranic Waste Baseline Inventory Report (WTWBIR) Information [4]

WIPP Identification Numbers: RF134.02

Summary Category Group: S4000 Waste Matrix Code Group: Soils

Waste Matrix Code: S4200 Waste Stream Name: TRM Soil (F001, F002, F005)

Description from the WTWBIR: This waste stream consists of contaminated soil.

NOTE: This waste stream is not specifically identified in the WTWBIR. Therefore, the WIPP ID corresponds to the Waste Stream Profile Number and the Summary Category Group, Waste Matrix Code Group, Waste Matrix Code and Waste Stream Name are based on the acceptable knowledge for this waste stream.

7.21.2 Waste Stream Description

Transuranic Mixed (TRM) Soil assigned Environmental Protection Agency (EPA) Hazardous Waste Numbers F001, F002, and F005 is comprised of soil generated during environmental restoration activities at the 903 PAD. This waste is generated by similar activities, and is similar in material, physical form and hazardous constituents and therefore is considered a single waste stream. Table 7.21-1 presents the waste matrix code and waste material parameters for this waste stream.[5]

Table 7.21-1, Inorganic Composite Debris Wastes Description

IDC	Description	Waste Matrix Code	Waste Material Parameters	Weight % (Average)
0374	Blacktop, Concrete, Dirt, & Sand	S4200, Soil/Debris	Soil	100%

Note: The above Waste Material Parameter addresses the IDC only and does not include internal packaging (e.g., inner bags), container packaging (e.g., fiberboard liner), absorbent (inorganic or polymer), secondary waste, etc.

IDC 374, Blacktop, Concrete, Dirt and Sand: This waste stream is comprised of contaminated soil generated from environmental remediation activities under the 903 Pad. A polymer absorbent (e.g., AquaSorbe, sodium polyacrylate) may also be added during packaging to prevent accumulation of liquid due to moisture in the soil and/or water spray used for dust/contamination control. The waste may also contain secondary material generated during the soil environmental remediation activities (e.g., personnel protective equipment, plastic sheeting, HEPA filter media, filter housing). This waste stream does not include blacktop or concrete.[6,8,9,17]

7.21.3 Areas of Operation

TRM Soil assigned EPA Hazardous Waste Numbers F001, F002, and F005 is generated by the following operation at the 903 Pad.[6,7,8]

- Environmental Remediation Activities

7.21.4 Generation Processes

The 903 Drum Storage Area (903 Pad) was originally used from 1958 to 1967 for the storage of up to approximately 5240 55-gallon or 30-gallon drums of contaminated oil. Approximately three-fourths of the drums were plutonium-contaminated and the balance uranium-contaminated. Of those containing plutonium, most included lathe coolant consisting of straight chain hydrocarbon mineral oil (Shell Vitrea) and carbon tetrachloride in varying proportions that were generated in Building 776. Other liquids included hydraulic oils, vacuum pump oil, trichloroethylene, tetrachloroethylene, silicone oils, acetone still bottoms, etc. The contaminated oils were stored with the intent to recover the plutonium. In July 1959, the first drum leakage was discovered. Rust inhibitor, ethanolamine, was added to drums prior to storage to minimize corrosion. By the mid-1960s, workers discovered large scale deterioration of the drums in that many of the drums had corroded and leaked, spilling contaminated oils into the ground. Approximately 420 drums leaked to some degree, of these, about 50 leaked totally empty. An estimated 5,000 gallons of oil containing 86 grams plutonium leaked from the drums into the soil before the drums were removed. The soil in the area exhibiting the greatest contamination was covered with fill, a base course, soil sterilant, asphalt prime coat, and asphalt from July to November 1969. Before the pad was installed, however, high winds and rainstorms spread contamination to the east and

south of the pad area, into the Buffer Zone. The 903 Pad area is located in the southeast corner of the site's industrial area.[7,10,11,12,13,14,19,20,21,22]

In 1999, an investigation was conducted to provide characterization data for subsequent evaluation of remedial alternatives for site cleanup. Based on this evaluation the following organic contaminants of concern were identified: chloroform, 1,2-dichloroethane, and methylene chloride in addition to carbon tetrachloride, tetrachloroethylene, and trichloroethylene identified in the historical documents. The data also indicated that most of the surface soil (0 to 6 inches) was contaminated above the Tier I and Tier II Radionuclide Soil Action Levels; therefore, remediation activities were conducted in 2003 and 2004 to remove the asphalt pad and the contaminated soil. As a result of these activities, the asphalt pad itself and the majority of the contaminated soil were generated as low level waste that will not be disposed of at WIPP; however, limited quantities of TRM Soil with EPA Hazardous Waste Numbers F001, F002, and F005 were generated during 2003.[1,6,7,8,14]

The process description for the generation of TRM soil is documented in the 903 Pad and D&D WSRIC Building Books.[7,8]

7.21.5 RCRA Characterization

This waste stream is characterized as a mixed waste. As described in Section 7.21.2, this waste is generated from similar activities, and is similar in material, physical form, and hazardous constituents, and is therefore considered a single waste stream. The specific BWR Baseline Book Subpopulations and WSRIC Process Numbers associated with TRM Soil assigned EPA Hazardous Waste Numbers F001, F002, and F005 are listed in the WEMS AK Waste Stream Summary for Profile Number RF134.02.[6]

The output is nonline generated in a Radioactive Materials Management Area. Characterization of this output is based on process knowledge and supported by analytical data. This output is environmental media that contains spent solvents used for cleaning and degreasing (e.g., carbon tetrachloride, tetrachloroethylene, trichloroethylene, etc.). Based on process knowledge, the soil may contain flammable solvents (e.g., acetone); however, F003 is not applicable because the soil is not a liquid waste and consequently does not exhibit the characteristic of ignitability. Although the contaminated soil contains chloroform and 1,2-dichloroethane, EPA Hazardous Waste Numbers D022 and D028 were not added because the levels detected by chemical analysis were below the regulatory limits. Therefore, this waste was assigned EPA Waste Codes F001, F002, and F005 based on acceptable knowledge.[8,10,14,20,21]

Visual examination of waste contents at the time of packaging and/or RTR is used to verify that the waste stream is not a liquid waste and does not contain explosives, non-radionuclide pyrophoric materials, compressed gasses, or reactive waste. Therefore, this waste stream does not exhibit the characteristics of ignitability (D001), corrosivity (D002), or reactivity (D003).[7]

No discarded chemical products, off-specification species, chemical residues, and spill residues thereof (40 CFR 261.33) were included in this waste stream and no hazardous waste from specific sources (40 CFR 261.32) was generated at the site. Therefore no K, U, or P listings have been applied to this waste stream.(7)

Confirmatory solid samples were analyzed for total metal, VOC and SVOC constituents. Statistics were calculated based on using one-half the method detection limit (MDL) for less-than-detectable observations with data transformation applied where appropriate. Using this "WIPP directed" method, the calculated 90 percent upper confidence limit (UCL_{90}) of the mean concentrations did not exceed its associated PRQL value for any of the analytes. Consequently, no new EPA Hazardous Waste Codes are required to be added to the EPA Hazardous Waste Codes F001, F002, and F005 assigned by AK for this waste stream.(15)

Headspace gas sampling and analysis of all containers assigned to this waste stream by AK detected 4 VOCs. Statistics were calculated based on using one-half the method detection limit (MDL) for less-than-detectable observations with data transformation applied where appropriate. Using this "WIPP directed" method, the calculated 90 percent upper confidence limit (UCL_{90}) of the mean concentrations for only carbon tetrachloride was found to exceed its associated RTL value. The detection of the 4 VOCs confirmed the AK assigned EPA hazardous waste codes F001 and F002 for this waste stream, consequently, no new VOC EPA Hazardous Waste Codes are required to be assigned.(16)

1,2-Benzenedicarboxylic acid, dibutyl ester, which is a U-listed compound, was detected as a tentatively identified compound (TIC) in greater than 25 percent of the confirmatory solid samples. An evaluation was completed that determined this compound was not used in the processes that generated this waste stream and is not present as an unused commercial chemical product. Therefore, the presence of this TIC does not render the waste stream a U-listed hazardous waste.(18)

7.21.6 Transportation

The payload containers in this waste stream must also comply with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC) requirements. This waste stream is comprised of only six containers. Flammable volatile organic compounds (VOCs) were not detected above 500 ppm in headspace gas sampling and analysis for any of the containers that comprise this waste stream.(16)

None of the six individual payload containers contain greater than one weight percent depleted uranium. (6)

7.21.7 Radionuclides

Table 7.21-2 summarizes the radionuclides potentially present in TRM Soil. The predominant radionuclide detected during the 1999 investigation is WG Pu. The weapons design change made in 1958 associated with the ratio of plutonium to uranium does not affect the radiological information because these radionuclides are measured per the WIPP requirements. Because the plutonium radioisotope ratios have fluctuated over time, the range of values as reported in the Supplemental Information document is used for the waste generated at the Site, including the soil generated from the 903 Pad. (5,14)

Table 7.21-2, Inorganic Composite Debris Wastes Radionuclides

IDC	Description	Radionuclides
374	Blacktop, Concrete, Dirt, and Sand	WG Pu, Am-241, Am-243, DU, EU, Np-237

Key: WG Pu weapons-grade plutonium
Am-241 americium-241
DU depleted uranium
EU enriched uranium
Np-237 neptunium-237
Am-243 americium-243

7.21.8 References

1. WASTREN 2004. Interoffice Memorandum from M. L. Johnson to Waste Records Center, Current and Projected Waste Volumes for RF134.02, TRM Soil (F001, F002, F005), MLJ-018-2004,dated March 3, 2004.

2. Interoffice e-mail from Steve Nesta to Micheline Johnson, 903Pad TRU Waste (projections), dated March 2, 2004.

3. RFETS 2004. Transuranic (TRU) Waste Management Manual, Version 7, 1-MAN-008-WM-001.

4. DOE 1995. WIPP Transuranic Waste Baseline Inventory Report, Revision 2. DOE/CAO-95-1121.

5. RFETS 2004. RFETS TRU Waste Acceptable Knowledge Supplemental Information. RF/RMRS-97-018, Revision 13.

6. RFETS 2004. Waste and Environmental Management System (WEMS) Database.

7. RFETS 2004. Waste Stream and Residue Identification and Characterization, Building 903PAD, Version 7.0.

8. RFETS 2004. Waste Stream and Residue Identification and Characterization, D&D Building, Version 7.0.

9. Aquadox, Material Safety Data Sheet for AquaSorbe-HP Superabsorbent Polymer.

10. DOW 1970. Memorandum from Lloyd M. Joshel to H. C. Donnely, Chronological History Regarding Leakage in Drum Storage Area, dated February 17, 1970.

11. DOW 1970. Interoffice memorandum from K. J. Freiberg to E. A. Putzler, 903 Oil Drum Storage Area, dated April 14, 1970.

12. DOW 1970. Interoffice memorandum from K. W. Calkins to L. M. Joshel, Summary – Drum Field Activity, dated August 19, 1970.

13. DOW. History of Plutonium Contaminated Oil Drum Storage Area, RFP-INV-10.

14. RFETS 2000. Characterization Report for the 903 Drum Storage Area, 903 Lip Area, and Americium Zone, RF/RMRS-99-427.UN, Revision 1, dated June 26, 2000.

15. Interoffice Memorandum from Thomas R. Gatliffe to Eric L. D'Amico, Statistical Solid Analysis Data Evaluation Report For Waste Stream Profile RF134.02 (TRM Soils [F001, F002, F005]), TRG-059-04; dated February 24, 2004.

16. Interoffice Memorandum from Douglas K. Sullivan to Eric L. D'Amico, Headspace Gas Analysis Data Evaluation Report For Waste Stream Profile RF134.02 Lot 1, DKS-005-04, dated February 26, 2004.

17. RFETS 2004. Solid Radioactive Waste Packaging Requirements Manual, 1-M12-WO-4034, Version 10.

18. Wastren 2004. Interoffice Memorandum from Vivian S. Sendelweck to Eric D'Amico, Tentatively Identified Compounds in TRM Soils (F001, F002, F005) Waste, Solid Sampling Lot 1, VSS-012-2004, dated March 9, 2004.

19. U. S. Department of Energy (DOE) 1992. Final Historical Release Report for the Rocky Flats Plant, Environmental Restoration Program, PAC Reference Number 900-112, 903 Pad, dated June 1992.

20. U. S. Department of Energy (DOE) 1991. Final Phase II RCRA Facility Investigation Remedial Investigation Work Plan (Alluvial), Rocky Flats Plant 903 Pad, Mound, and East Trenches Areas (Operable Unit No. 2), Environmental Restoration Program, dated August 19, 1991.

21. U. S. Department of Energy (DOE) 1995. Phase II RFI/RI Report 903 Pad, Mound and East Trenches Area Operable Unit No. 2, dated October 1995.

22. Wastren 2004. Interoffice Memorandum from M. L. Johnson to Waste Records, AK Discrepancies Waste Stream Profile RF134.02, MLJ-025-04, dated April 1, 2004.