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

ENTERED

APR 14 2004

RECEIVED
APR 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 RF141.02-Mixed Low-Grade Oxide

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) RF141.02.

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
CBFO Assistant Manager
Office of National TRU Program

Enclosure

cc: w/o enclosure
J. Kieling, NMED
C. Walker, TechLaw
M. Strum, WTS *ED
R. Chavez, WRES *ED
WIPPP Operating Record
L. Greene, WRES
S. Calvert, CTAC *ED
CBFO M&RC

*ED denotes Electronic Distribution

040408

CBFO:NTP:KWW:VW:04-1115:UFC:5822

WASTE STREAM PROFILE FORM

Waste Stream Profile Number: RF141.02

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

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 9, February 2004. Transuranic (TRU) Waste Management Manual, Revision 6, 1-MAN-008-WM-001, Version 7, February 2004. Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, Revision 1, 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: RF141.02[2]

Summary Category Group: S3000[2] Waste Matrix Code Group: Solidified Inorganics[2]

Waste Stream Name: TRM Low-Grade Oxides (D007, D008)[2]

Description from the WTWBIR: The waste consists of low-purity oxide assigned EPA Hazardous Waste Numbers D007 and D008.[2]

Defense TRU Waste: ☑ Yes ☐ No

Check one: ☑ CH ☐ RH Number of SWBs N/A Number of Drums 846 Number of Canisters N/A

Batch Data Report numbers supporting this waste stream characterization: See Table 7.

List applicable EPA Hazardous Waste Codes[3]: D007, D008

Applicable TRUCON Content Codes: RF 130A, RF 130B, RF 130BA, RF 130D, RF 130DF, RF 130E, RF 130F, RF 130G, RF 130GF, RF 130H, RF 130I, RF 130J, RF 130K, RF 130N, RF 130P, RF 130PA, RF 130PAF, RF 130 PF, RF 130Q, RF 130R, RF 130RF, RF 130S, RF 130SF, RF 130T, RF 130U, RF 130V, RF 130VF

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
☐ Naval Reactors development
☐ Verification and control technology
☐ Defense research and development
☐ Defense nuclear waste and material by products management
☐ Defense nuclear materials production
☐ Defense nuclear waste and materials security and safeguards and security investigations

Reviewed For Classification/UCNI
By V S SENDELWECK
Date 24 MAR 04
APPROVED PUBLIC RELEASE

Supplemental Documentation: See the References section in the Acceptable Knowledge Summary (attached) for additional backup documentation associated with this waste stream.

- 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, 19, 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	3/24/04 Date
Signature of Site QA Officer	C. L. Ferrera, TWCP Site QAO Printed Name and Title	3/24/04 Date

NOTE

(1) IDC 532A, 532C and 532D are not included in the WTWBIR.

(2) This waste stream is derived from repackaging low-grade oxides, which some are included in the WTWBIR (e.g. RF-TR0067, RF-TR0080, RF-TR0081, RF-TR0083, RF-TR0087, RF-TR0146, RF-TR0289, and RF-TR0653). Per the WTWBIR, low-grade oxides were characterized as TRU; however current AK does not support this non-hazardous characterization. In addition, this waste stream only includes low-grade oxides and does not include incineration sludge, miscellaneous sludge, sludge from size reduction area, grit, soot, or soot heel. The WIPP ID corresponds to the Waste Stream Profile Number. The Summary Category Group, Waste Matrix Code Group, Waste Matrix Code and Waste Stream Description are based on acceptable knowledge (see attached AK Summary). The BIR ID reported in WWIS is assigned using standard BIR conventions for those containers that do not have a valid BIR ID in the WTWBIR.

(3) EPA Hazardous Waste Codes were determined using acceptable knowledge and confirmed using homogeneous solids and headspace gas sampling and analyses (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 29, Oxide, February 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, Version 11, January 2004.
4. Waste and Environmental Management System (WEMS) database.
5. Transuranic (TRU) Waste Certification, PRO-X05-WC-4018, Revision 6, February 2004.
6. Acceptable Knowledge TRU/TRM Waste Stream Summaries, RMRS-WIPP-98-100, Section 7.17, 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 RF141.02 Lot 1, DKS-001-04, January 2004.
16. Interoffice Memorandum from Thomas R. Gatliffe to Eric L. D'Amico, Statistical Solid Analysis Data Evaluation Report For Waste Stream RF141.02 [TRM Low-Grade Oxide (D007, D008)] Solid Sampling Lot 1, TRG-039-04, February 2004.
17. Residue Repack, Building 371, PRO-544-SALT REPACK-371, Revision 5, January 2002.
18. Grid Method - Repack Solid Sampling and Analysis, RS-012-004, Version 4, November 2003.
19. Repack Sampling, Building 371, PRO-860-RS-0156, Revision 1, January 2001.
20. Interoffice Memorandum from E. L. D'Amico to Waste Records, Solid Sampling Control Chart Effectiveness Evaluation for Waste Stream Profile RF141.02, ELD-011-04, January 2004.
21. Interoffice Memorandum from V. S. Sendelweck to E. L. D'Amico, Tentatively Identified Compounds in TRM Low-Grade Oxide (D007, D008) Waste, Solid Sampling Lot 1, VSS-003-2004, 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 2, January 2004.
24. Real-Time Radiography Testing of Transuranic and Low-Level Waste, 4-W30-NDT-00664, Version 8, November 2003.
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 # RF141.02

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. NO indicates data are insufficient.

Signature of Site Project Manager	G. A. O'Leary Printed Name	3/24/04 Date

Data Summary Report—Table 1: Solid Sampling Summary

WSPF # RF141.02

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: None.

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 0.75 for Toluene.

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: None

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 0.75 for Toluene.

Comparison of largest calculated sample size with largest calculated sample size selected from preliminary estimate: 0.75 vs. 0.75 (for Toluene)

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.
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] Control charting for this waste stream was determined not to be applicable and sampling and analysis was conducted using the retrievably-stored characterization strategy (see Reference No. 20).

Data Summary Report—Table 2: Headspace Gas Summary Data

WSPF # RF141.02

Sampling and Analysis Method (check one):

☐ 100% Sampling ☑ Reduced Sampling

2A

ANALYTE[a]	# Samples[b]	Transform Applied[c]	Normality Test (Pass/Fail)[d]	Min. Sample Size[d]	Mean[d]	UCL_{90}[d]	Transformed RTL[e]	Un-Transformed RTL[e] (ppmV)	EPA Code[f]
1,1-Dichloroethane	0				0.957			10	
1,2-Dichloroethane	0				1.043			10	
1,1-Dichloroethylene	0				1.28			10	
cis-1,2-Dichloroethylene	0				1.147			10	
trans-1,2-Dichloroethylene	0				1.063			10	
1,1,2,2-Tetrachloroethane	0				1.247			10	
1,1,1-Trichloroethane	0				1.21			10	
1,1,2-Trichloro-1,2,2-Trifluoroethane	0				1.193			10	
1,2,4-Trimethlybenzene	0				1.12			NA	
1,3,5-Trimethylbenzene	0				1.21			NA	
Acetone	0				14.533			100	
Benzene	0				1.03			10	
Bromoform	0				1.043			10	
Butanol	0				13.033			100	
Carbon disulfide	0				1.213			10	
Carbon tetrachloride	0				1.37			10	
Chlorobenzene	0				1.267			10	
Chloroform	0				1.037			10	
Cyclohexane	0				1.247			NA	
Ethyl benzene	0				1.077			10	
Ethyl ether	0				1.163			10	
Methanol	0				10.733			100	
Methyl ethyl ketone	0				13.8			100	
Methyl isobutyl ketone	0				13.3			100	
Methylene chloride	0				1.073			10	
o-Xylene	0				1.167			10	
m,p-Xylene	0				2.21			10	
Tetrachloroethylene	0				1.063			10	
Toluene	5	Log	Fail[g]	0.00012	0.335	0.5	4.277	72.02[h]	
Trichloroethylene	0				1.067			10	

NOTES:

[a] A total of 15 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 no associated EPA Code assigned to the waste stream based on headspace analysis.

[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 # RF141.02

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 confirm acceptable knowledge in that no toxicity characteristic volatile organic or F-listed solvent EPA codes are applicable.

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

Data Summary Report—Table 3: Metals Summary Data

WSPF # RF141.02

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]	UCL_{90}[d]	Transformed RTL[e]	Un-Transformed RTL[e] (mg/kg)	EPA Code[f]
Antimony	2	Log	Fail[h]	0.293	2.085	2.497	4.605	100	
Arsenic	1	Sq. Rt.	Fail[h]	0.332	3.101	4.299	10	100	
Barium	11	Log	Pass	0.072	2.905	3.286	7.601	2000	
Beryllium[g]	7	Log	Fail[h]	0.615	0.759	1.669	4.605	100	
Cadmium	3	Log	Pass	0.224	0.009	0.435	2.996	20	
Chromium	11	Log	Pass	48.032	4.345	4.889	4.605	100	D007
Lead	7	Log	Pass	0.770	2.263	2.883	4.605	100	
Mercury	5	Log	Fail[h]	0.091	-2.396	-2.051	1.386	4	
Nickel	11	Log	Pass	25.915	4.059	4.897	4.605	100	none
Selenium	0				0.496			20	
Silver	7	Log	Pass	0.436	1.879	2.422	4.605	100	
Thallium	0				5.877			100	
Vanadium	9	Sq. Rt.	Pass	0.024	2.881	3.212	10	100	
Zinc	11	Log	Fail[h]	1.262	3.47	3.854	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 additional toxicity characteristic metal EPA codes, other than those assigned by acceptable knowledge are applicable. EPA Codes D007 and D008 were initially assigned to this waste stream based on acceptable knowledge (see attached AK Summary).

NOTES:

[a] A total of 11 samples were collected and analyzed. 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."

The low-grade oxide waste stream is a manufacturing process waste that is a characteristic waste listed in Section 261.31. 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 recovery stream and end up in the low-grade oxide waste stream. 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 # RF141.02

4A

ANALYTE[a]	# Samples[b]	Transform Applied[c]	Normality Test (Pass/Fail)[d]	Min. Sample Size[d]	Mean[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	1	Sq. Rt.	Fail[g]	0.01	0.765	0.844	3.162	10	
Ethyl ether	0				5			100	
Isobutanol	0				5			100	
Methanol	0				5			100	
o-Xylene	1	Sq. Rt.	Fail[g]	0.04	0.813	0.958	3.162	10	
m,p-Xylene	1	Sq. Rt.	Fail[g]	0.24	0.944	1.27	3.162	10	
Methyl ethyl ketone	1	Sq. Rt.	Fail[g]	0.01	2.385	2.589	10	100	
Methylene chloride	0				0.5			10	
Tetrachloroethylene	0				0.5			10	
Toluene	5	Log	Fail[g]	0.75	0.289	0.813	2.303	10	
Trichloroethylene	0				0.5			10	
Trichlorofluoromethane	0				0.5			10	
Vinyl chloride	0				0.5			4	

NOTES:

[a] A total of 11 samples were collected and analyzed. 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 or characteristic hazardous waste constituent.

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

NOTES (continued):

[1] No entry indicates no associated EPA Code assigned to the waste stream based on confirmatory solid VOC sampling and analysis.

[9] 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 # RF141.02

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 are applicable.

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

Data Summary Report—Table 5: Total SVOC Summary Data

WSPF # RF141.02

5A

ANALYTE[a]	# Samples[b]	Transform Applied[c]	Normality Test (Pass/Fail)[d]	Min. Sample Size[d]	Mean[d]	UCL_{90}[d]	Transformed RTL[e]	Un-Transformed RTL[e] (mg/kg)	EPA Codes[f]
1,2-Dichlorobenzene	0				0.5			10	
1,4-Dichlorobenzene	0				0.5			150	
2,4-Dinitrophenol	1	Sq. Rt.	Fail[g]	0.00	0.761	0.836	6.325	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			100	

NOTES:

[a] A total of 11 samples were collected and analyzed. 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 no associated EPA Code assigned to the waste stream due to confirmatory solid SVOC sampling and analysis.
[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 5: Total SVOC Summary Data (continued)

WSPF # RF141.02

5B

TENTATIVELY IDENTIFIED COMPOUND (TIC) CHEMICAL ABSTRACTS SERVICE (CAS) Number	Maximum Observed Estimated Concentrations (mg/kg)	# Samples Containing TIC
1-Propene, 1,3-dichloro-, (E)- (CAS No. 10061-02-6)	0.97	2
Toluene (CAS No. 108-88-3) [b]	4.0	3
1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester (CAS No. 117-81-7) [c]	1.2	4
Pentachloroethane (CAS No. 76-01-7)	1.4	1
Propylidene chloride (CAS No. 78-99-9) [a]	2.9	7
1,1,2-Trichloroethane (CAS No. 79-00-5) [b]	41	10
1,1,2,2-Tetrachloroethane (CAS No. 79-34-5) [b]	15	10
1,2-Benzenedicarboxylic acid, dibutyl ester (CAS No. 84-74-2) [d]	1.1	4
o-Xylene (CAS No. 95-47-6)	2.6	1
1,2,3-Trichloropropane (CAS No. 96-18-4) [b]	0.91	3

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 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 detected in 25 percent or more of the samples and is listed in 40 CFR 261, Appendix VIII, but the TIC is identified as a volatile organic compound (VOC) in Method 8260B and as such was not added to the SVOC target analyte list. The TIC was not identified during the solid VOC analysis and so it was not added to the VOC target analyte list. The TIC was determined not to be a listed hazardous waste based on comparison of the TIC identification to acceptable knowledge (see Reference No. 21).

[c] TIC is a constituent in an F-listed waste whose presence is attributable to waste packaging materials. TIC was determined not to be a listed hazardous waste based on comparison of the TIC identification to acceptable knowledge (see Reference No. 21).

[d] TIC was detected in the sample method blanks for two of the four associated samples in which it was detected. This indicates that the source of the TIC in these two samples was due to laboratory contamination. Therefore, the TIC was actually detected in only two samples which does not satisfy the criterion for addition of the TIC to the target analyte list for the waste stream.

Data Summary Report—Table 6: Exclusion of Prohibited Items

WSPF # RF141.02

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 # RF141.02

Package No.[c]	Inner Can No.	Radioassay Data Package	Solid Sample Batch No.[a]	Metals Data Package[a]	VOC Data Package[a]	SVOC Data Package[a]	Headspace Sample Batch No.[b]	Headspace VOC Data Package[b]	VV Data Package
DD9200	Z27506	371TG3-DP-070203	OX-SB-1002	MTLS-DP-00046	VOCS-DP-00054	SVOA-DP-00055	04W0118	HGAS-DP-00835	SO-DP-145
DD9484	Z28005	371TG5-DP-070903	OX-SB-1002	MTLS-DP-00046	VOCS-DP-00054	SVOA-DP-00055			SO-DP-145
DD9217	Z28060 Z28484	CALG-DP-02312 371TG5-DP-052103	OX-SB-1002	MTLS-DP-00046	VOCS-DP-00054	SVOA-DP-00055			SO-DP-145 SO-DP-130
DD9213	Z28305	371TG5-DP-070903	OX-SB-1002	MTLS-DP-00046	VOCS-DP-00054	SVOA-DP-00055			SO-DP-145
DD9199	Z28342	371TG5-DP-070903	OX-SB-1002	MTLS-DP-00046	VOCS-DP-00054	SVOA-DP-00055			SO-DP-145
DD9405	Z28437[d]	CALG-DP-02367	OX-SB-1002	MTLS-DP-00046	VOCS-DP-00054	SVOA-DP-00055	04W0019	HGAS-DP-00836	SO-DP-133
DD8989	Z28442	371TG3-DP-070203	OX-SB-1002	MTLS-DP-00046	VOCS-DP-00054	SVOA-DP-00055			SO-DP-145
DD9453	Z28498 Z28482	371TG3-DP-070903 371TG5-DP-052203	OX-SB-1002	MTLS-DP-00046	VOCS-DP-00054	SVOA-DP-00055			SO-DP-145 SO-DP-130
DD9497	Z28638 Z28444	371TG3-DP-070203 371TG5-DP-052003	OX-SB-1002	MTLS-DP-00046	VOCS-DP-00054	SVOA-DP-00055			SO-DP-145 SO-DP-136
DD9485	Z28778	371TG5-DP-070203	OX-SB-1002	MTLS-DP-00046	VOCS-DP-00054	SVOA-DP-00055			SO-DP-130
DD8433	Z28946 Z28947 Z28948	CALG-DP-02382 CALG-DP-02381 CALG-DP-02380	OX-SB-1004	MTLS-DP-00050	VOCS-DP-00052	SVOA-DP-00056			SO-DP-142 SO-DP-134 SO-DP-134
DD2047	Z27300	CALG-DP-02244					04W0118	HGAS-DP-00835	SO-DP-072
DD2228	Z27485	371TG5-DP-031103					04W0118	HGAS-DP-00835	SO-DP-078
DD2403	Z27559	371TG5-DP-032603					04W0118	HGAS-DP-00835	SO-DP-082
DC0890	Z27633	371TG5-DP-040103					04W0118	HGAS-DP-00835	SO-DP-084
DD8227	Z27655	371TG5-DP-040803					04W0118	HGAS-DP-00835	SO-DP-087
DB8107	Z27680	CALG-DP-02291					04W0019	HGAS-DP-00836	SO-DP-089
DD8350	Z27991	371TG3-DP-042803					04W0118	HGAS-DP-00835	SO-DP-105
DD8292	Z28076	371TG5-DP-050303					04W0019	HGAS-DP-00836	SO-DP-097
DD8955	Z28351	371TG3-DP-051503					04W0019	HGAS-DP-00836	SO-DP-111
DD8944	Z28466	371TG5-DP-052103					04W0019	HGAS-DP-00836	SO-DP-110
DD9065	Z28578	371TG3-DP-060203					04W0019	HGAS-DP-00836	SO-DP-113
DD9077	Z28623	371TG5-DP-060403					04W0019	HGAS-DP-00836	SO-DP-115
DD9263	Z28671	371TG5-DP-060903					04W0019	HGAS-DP-00836	SO-DP-126

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

NOTES:

[a] No entry indicates container was not selected or used for solid sampling.
[b] No entry indicates container was not selected for reduced headspace gas sampling.
[c] 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/repackaging using the VE technique.
[d] Z28437 was repacked into Z28895 which was packed into DD9405

Acceptable Knowledge Summary

WSPF # RF141.02

RMRS-WIPP-98-100, Acceptable Knowledge TRU/TRM Waste Stream Summaries, Section 7.17, TRM Low-Grade Oxide (D007, D008) (attached).

Rocky Flats Environmental Technology Site

ACCEPTABLE KNOWLEDGE INFORMATION

ACCEPTABLE KNOWLEDGE TRU/TRM WASTE STREAM SUMMARIES

RMRS-WIPP-98-100

Section 7.17

TRM Low-Grade Oxide (D007, D008)

Profile No. RF141.02

Revision 1

Reviewed for Classification/UCNI
By: Unclassified Not UCNI
Reference Exemption Number CEX-032-00
Date: March 24, 2004

Approval signatures in Site Document Control history file

7.17 TRM Low-Grade Oxide (D007, D008)

Profile No. RF141.02

Acceptable Knowledge Waste Stream Summary

Waste Stream Name: TRM Low-Grade Oxide (D007, D008)

Generation Buildings: Buildings 371 [4,5,6]

Waste Stream Volume (Newly Generated): 846 55-gallon drums [5,15]

Generation Dates (Newly Generated): January 2002-September 2003 [5,15]

Waste Stream Volume (Projected): None [15, 18]

Generation Dates (Projected): N/A [15, 18]

TRUCON Content Code [1]: RF 130A, RF 130B, RF 130BA, RF 130D, RF 130DF, RF 130E, RF 130F, RF 130G, RF 130GF, RF 130H, RF 130I, RF 130J, RF 130K, RF 130N, RF 130P, RF 130PA, RF 130PAF, RF 130 PF, RF 130Q, RF 130R, RF 130RF, RF 130S, RF 130SF, RF 130T, RF 130U, RF 130V, RF 130VF

Process Knowledge Demonstrates Flammable VOCs in Headspace < 500 ppm: Yes (see Section 7.17.6)

7.17.1 Transuranic Waste Baseline Inventory Report Information [2]

WIPP Identification Number(s): RF141.02

Summary Category Group: S3000 Waste Matrix Code Group: Solidified Inorganics

Waste Matrix Code: S3119 Waste Stream Name: TRM Low-Grade Oxide (D007, D008)

Description from the WTWBIR: The waste consists of low-purity oxides assigned EPA Hazardous Waste Numbers D007 and D008.

NOTE: IDC 532A, 532C and 532D are newly created IDCs for repack operations and thus are not identified in the TWBIR. This waste stream is derived from repackaging low-grade oxides, of which some are included in the TWBIR (e.g. RF-TR0067, RF-TR0080, RF-TR0081, RF-TR0083, RF-TR0087, RF-TR0146, RF-TR0289, and RF-TR0653). Per the TWBIR, low-grade oxides were characterized as TRU; however current AK does not support this non-hazardous characterization. In addition, this waste stream only includes low-grade oxides and does not include incineration sludge, miscellaneous sludge, sludge from size reduction area, grit, soot, or soot heel. The WIPP ID corresponds to the Waste Stream Profile Number. The Summary Category Group, Waste Matrix Code Group, Waste Matrix Code, and Waste Stream Description are based on the acceptable knowledge for this stream as provided in Section 7.17.2.

7.17.2 Waste Stream Description

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. TRM Low-Grade Oxides is assigned EPA Hazardous Waste Numbers D007 and D008. Table 7.17-1 presents the waste matrix codes and waste material parameters for this waste stream.[3]

Table 7.17-1, TRM Low-Grade Oxide (D007 and D008)

IDC	IDC Description	Waste Matrix Code	Waste Material Parameters	Weight % (Average)
532A	Downblended Oxides <10%, Contains Uranium	S3119, Unknown/Other Inorganic Particulates	Other Inorganic Materials	100%
532C	Downblended Oxides <10%, Downblended Misc. Oxides	S3119, Unknown/Other Inorganic Particulates	Other Inorganic Materials	100%
532D	Downblended Oxides <10%, Contains Neptunium	S3119, Unknown/Other Inorganic Particulates	Other Inorganic Materials	100%

IDC 532A, Downblended Oxides <10%, Contains Uranium: This IDC includes low-grade oxide waste derived from repackaging plutonium oxide wastes containing less than 10,000-ppm uranium (IDC U61W), plutonium oxide wastes contain more than 10,000-ppm uranium (IDC Y61W). The "W" appended to the feed oxide IDCs is to designate which containers of oxides are waste.[4,6]

IDC 532C, Downblended Oxides <10%, Downblended Misc. Oxides: This IDC includes low-grade oxide waste derived from repackaging of various plutonium oxide wastes (IDCs 057W, 060W, 061W, 081W, 083W, 087W, and 146W); plutonium oxide heel wastes (IDC 062W, 065W, and 289W); electrorefining scrape-out material (IDC 067W); and plutonium peroxide cake (IDC 080W). The "W" appended to the feed oxide IDCs is to designate which containers of oxides are waste.[4,6]

IDC 532D, Downblended Oxides <10%, Contains Neptunium: This IDC includes low-grade oxide waste derived from repackaging plutonium oxide wastes containing less than 10,000-ppm uranium (IDC 653W). The "W" appended to the feed oxide IDCs is to designate which containers of oxides are waste.[4,6]

7.17.3 Areas of Operation

TRM Low-Grade Oxide wastes assigned EPA Hazardous Waste Numbers D007 and D008 were generated by the following defense operations and later repackaged in Building 371:[3,4,5,6,7,8,9,10,11,12,13]

- Plutonium Recovery
- Laboratory Operations
- Research and Development
- Waste and Residue Repackaging

7.17.4 Generation Processes

These oxide wastes were feed to, or intermediate materials from, historical recovery and purification operations generated by many production, recovery, and research and development (R&D) activities on site. Residual plutonium in the form of casting skulls, plutonium metal, metal turnings, floor sweepings, fines, and other miscellaneous materials containing plutonium were oxidized in furnaces at temperatures at or above 450°C. Following oxidation, the plutonium oxides were fed to recovery operations. The recovery operations included a variety of pyrochemical and aqueous operations. Historically, the site segregated these oxide materials by IDC based on process origin and/or to designate the subsequent steps for plutonium recovery operations. Only the recovery operations for those IDCs that resulted in repackaged waste are described below.[4]

Plutonium oxide generated during foundry, disassembly, fabrication, and laboratory operations in Building 559, 707, 776, 777 and 779, was designated IDC 057 when awaiting disposition. Upon receipt of analytical results, the oxide was designated IDC 060 (if relatively pure) or IDC 061 (low-plutonium-content) and staged for dissolution in Buildings 371 or 771. In addition, oxide failing the loss-on-ignition test (greater than 0.5-wt. % loss when heated to 1000°C) twice was designated IDC 146, sent to Building 771 and reburned for dissolution. In Buildings 371 and 771, oxides were dissolved in nitric acid solutions and filtered. The undissolved solids filtered from the dissolution processes were either high-purity oxide heel (IDC 062 or IDC 065 if packaged in small stacker cans instead of Vollrath cans) or the low-purity oxide heel (IDC 289). These undissolved solids were dried on a hot plate and staged to be recycled back into the dissolution process. The dissolution solutions were then further processed by filtrate evaporation, peroxide precipitation, and calcination to remove impurities and concentrate the plutonium. The resulting product, peroxide cake, was designated IDC 080 if pure, IDC 081 if impure, or IDC 087 if impure and packed into small stacker cans. Plutonium oxides generated in Building 771 recovery processes were designated IDC U61 if the oxide contained less than 10,000-ppm uranium or IDC Y61 if the oxide contained more than 10,000-ppm uranium. Flow diagrams for these processes are provided in the archived WSRIC processes for Building 771.[4,6,7,8,9,10,11,12]

Electrorefining (ER) operations in Building 371 and 776 were used primarily to purify metal from other production processes that did not meet the purity specification required by the Foundry. An oxide generated from ER included scrape-out material (IDC 067) that was calcined to oxidize the plutonium prior to being screened, loss-on-ignition tested, and packaged. Process flow diagrams for ER are provided in the archived WSRIC process 776-1.[4,7,11]

The primary mission of Building 779 was to provide R&D support for the production processes. Testing and development of ER and Direct Oxide Reduction (DOR) were conducted in this building. Oxides generated from these research and development programs included high-fired oxide (IDC 083) designated for use as feed to DOR and plutonium-neptunium alloyed oxide (IDC 653) cast into anodes for ER. The DOR and ER process flow diagrams are provided in the archived WSRIC processes for Building 779.[4,13]

Prior to repackaging in Building 371, a "W" was appended to the feed oxide IDCs to designate which containers were waste in accordance with the requirements of DOE direction concerning the disposition of low-grade oxides to WIPP rather than to the Savannah River Site. This direction is based on the Amendment to the Record of Decision on Waste Isolation Pilot Plant Disposal Phase Supplemental Environmental Impact Statement and the Supplement Analysis for the Disposal of Certain Rocky Flats Plutonium-Bearing Materials at the Waste Isolation Pilot Plant. These oxide waste materials were repackaged to meet the requirements for interim safe storage criteria (ISSC), as well as the WIPP WAC and WAP requirements. The cans were opened inside the glovebox, and the material was inspected to verify that it is consistent with the assigned IDC. High and low plutonium concentration materials of the same IDC could be combined to ensure that the safeguard termination limits are not exceeded. The safeguard termination limit for low-grade oxide is "less than 10 weight percent plutonium" criterion. If sufficient amounts of low plutonium concentration material were not available for batching, an inert nonhazardous additive was mixed with the material to decrease the concentration of fissile material and to make plutonium recovery impractical. A process flow diagram for the Low-Grade Oxide Repackaging process is provided in WSRIC Process 371-35, Figure 35.1.[6, 19, 20]

Section B-3a(1)(ii) of the WIPP WAP allows for reduced headspace gas sampling for thermally treated waste streams. Specifically, a waste stream may qualify for reduced headspace gas sampling if it complies with the following three criteria:

- The waste stream or waste stream lot must consist of more than 10 containers.
- The waste stream must have either been generated using a high-temperature thermal process or been subjected to a high-temperature thermal process after generation that resulted in the reduction of matrix-related VOCs in the headspace to concentrations below the PRQLs in Permit Attachment B3, Table B3-2.
- The site must have documentation demonstration that high-temperature thermal processes were used.

The TRM Inorganic Low-Grade Oxide (D006, D007) waste stream complies with each of these criteria as follows:

- The waste stream consists of 846 containers of waste.[15]
- The waste stream was generated in drying or furnace operations in which the temperatures were in excess of 200°C. This temperature would have effectively removed VOCs and semi-VOCs that may have been present in the waste matrix. Confirmatory headspace gas sampling of a random selection of 15 containers from the waste stream demonstrates that the concentrations of matrix-related VOCs in the headspace gas is below their associated PRQLs.[17]
- Reference 14 provides the acceptable knowledge documentation of the high-temperature thermal processes used.

7.17.5 RCRA Characterization

This waste stream is characterized as a mixed waste. The specific BWR Baseline Book Subpopulations and WSRIC Process Numbers associated with TRM Low-Grade Oxide wastes assigned EPA hazardous waste number D007 and D008 are listed in the WEMS AK Waste Stream Summary for Profile Number RF141.02.[5]

Containers in this waste stream consist of low-grade oxide wastes assigned EPA Waste Numbers D007 and D008 and were repackaged under WSRIC process 371-35 in Building 371 as IDCs 532A, 532C or 532D. The low-grade oxide wastes were generated by similar plutonium recovery activities and are considered one waste stream.[4,6]

Several of the operations that generated oxide used acids (e.g., nitric, hydrochloric, and sulfuric) and bases (e.g., sodium and potassium hydroxide) which may be corrosive under RCRA. However, the wastes from these operations are the result of being dried to an oxide form and will not contain free or residual liquid. Since there is no free liquid present, the waste cannot exhibit the characteristic of corrosivity.[4]

The scrape-out material (IDC 067) produced by electrorefining may have contained small amounts of sodium metal. However, this material was calcined to oxidize the plutonium and any other potentially reactive materials. Therefore, this oxide does not exhibit the characteristics of ignitability or reactivity.[4]

Operations in Buildings 559, 707, 777, and 779 that generated oxides (IDCs 057, 060, and 061) used F-listed and toxicity characteristic organic solvents (primarily carbon tetrachloride, 1,1,1-trichloroethane, Freon, and methanol) for cleaning and degreasing plutonium metal parts and machine turnings. Plutonium metal from these operations was either re-used in the foundry or oxidized and the oxide sent for plutonium recovery. The oxidation of the plutonium metal would drive off any organics, and therefore, the oxides will not exhibit the characteristic of toxicity for organic compounds. Also, because the solvents came into contact with the plutonium metal that was not a solid waste, the

"mixture rule" does not apply to the oxides. Therefore, oxides are not F-listed wastes.[4,8,9,12,13]

RCRA-regulated organic and metal compounds were not used in any of the other oxide generating or repackaging processes.[4,6,7,8,10,11]

Because these IDCs were generated from the same or similar recovery and purification operations, the historical total metals data for oxide IDCs were evaluated together. Historical analytical data are not available for every IDC, but these data represent a large majority of the oxide IDCs. Statistical analysis completed on this data indicates that the concentrations of chromium and lead may exceed regulatory levels. Based on historical analytical data, EPA Waste Codes D007 and D008 are applied to this waste stream.[4]

Visual examination of waste contents at the time of packaging, and/or RTR is used to verify that the waste stream does not contain free liquid, explosive, 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).

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.[4,5,6,7,8,9,10,11,12,13]

Beryllium parts were used in the manufacture/assembly of weapons components, and residual beryllium contamination of plutonium parts may have occurred; therefore, the oxides may have been contaminated with beryllium and residual quantities of beryllium may be present in the waste stream. Any beryllium present (less than 1 % by weight) is as a contaminant of the process and not as unused commercial chemical product, and therefore is not a P015-listed waste.[3,4]

Confirmatory solid samples that were analyzed for total metal, VOC and SVOC constituents substantiate the mixed acceptable knowledge characterization. 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 one analyte (chromium) was found to exceed its associated PRQL value. However, no changes to the AK assigned EPA hazardous waste codes were made based on this data (i.e., EPA hazardous waste codes D007 and D008 assigned by AK are retained for this waste stream).[16]

Headspace gas sampling and analysis detected only one VOC (toluene). 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 none of the analytes were found to exceed their associated RTL values. Therefore, the headspace data confirms the acceptable knowledge characterization that no characteristic volatile organic or F-listed solvent EPA codes are applicable.[17]

7.17.6 Transportation

The payload containers in the waste stream must also comply with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC) requirements. Flammable volatile organic compounds (VOCs) were not identified in this waste stream based on the descriptions in the *BWR Baseline Book* and *WSRIC Building Books,* and headspace gas sampling and analysis. Therefore, flammable VOCs in the payload container headspace do not exceed 500 ppm.[4,5,6,7,8,9,10,11,12,13,17]

7.17.7 Radionuclides

Table 7.17-3 summarizes the radionuclides that may be present in TRM Low-Grade Oxide stream.[3]

Table 7.17-3, TRM Low-Grade Oxide (D007, D008)

IDC	Description	Radionuclides
532A	Downblended Oxides <10%, Contains Uranium	WG Pu, Am-241, DU, EU
532C	Downblended Oxides <10%, Downblended Misc. Oxides	WG Pu, Am-241, DU, EU
532D	Downblended Oxides <10%, Contains Neptunium	WG Pu, Am-241, DU, EU, Np-237

Key: WG Pu - weapons-grade plutonium

Note: Am-243 and Np-237 may also be present due to ingrowth in waste containing WG Pu.[3]

7.17.8 References

1. RFETS 2004. Transuranic (TRU) Waste Management Manual, Version 7, 1-MAN-008-WM-001.
2. DOE 1995. Transuranic Waste Baseline Inventory Report, Revision 2. DOE/CAO-95-1121.
3. RMRS 2004. RFETS TRU Waste Acceptable Knowledge Supplemental Information. RF/RMRS-97-018, Revision 11.
4. RFETS 2003. Backlog Waste Reassessment Baseline Book, Waste Form 29, Oxide.
5. Waste and Environmental Management System (WEMS) database.
6. RFETS 2003. Waste Stream and Residue Identification and Characterization Building 371, Version 7.0.

7. RFETS 1991. Waste Stream and Residue Identification and Characterization Building 371, Version 3.2.

8. RFETS 1991. Waste Stream and Residue Identification and Characterization Building 559, Version 3.2.

9. RFETS 1991. Waste Stream and Residue Identification and Characterization Building 707, Version 3.2.

10. RFETS 1991. Waste Stream and Residue Identification and Characterization Building 771, Version 3.2.

11. RFETS 1991. Waste Stream and Residue Identification and Characterization Building 776, Version 3.2.

12. RFETS 1991. Waste Stream and Residue Identification and Characterization Building 777, Version 3.2.

13. RFETS 1991. Waste Stream and Residue Identification and Characterization Building 779, Version 3.2.

14. WASTREN 2003. Interoffice Memorandum from Vivian S. Sendelweck to Waste Records. Oxide High-Temperature Thermal Process Documentation. VSS-025-2003. August 12, 2003.

15. WASTREN 2004. Interoffice Memorandum from M. L. Johnson to Waste Records, Waste Stream Volume for RF141.02 (D007, D008), MLJ-012-2004, February 12, 2004.

16. Interoffice Memorandum from Thomas R. Gatliffe to Eric L. D'Amico, Statistical Solid Analysis Data Evaluation Report For Waste Stream RF141.02 (TRM Low Grade Oxide (D007, D008) Lot 1, TRG-039-04, February 6, 2004.

17. Interoffice Memorandum from Douglas K. Sullivan to Eric L. D'Amico, Headspace Gas Analysis Data Evaluation Report For Waste Stream Profile Number RF141.02 Lot 1, DKS-001-04, January 27, 2003.

18. Interoffice memorandum from D. F. Dustin to V. S. Sendelweck, Acceptable Knowledge Discrepancy Report for Building 371 Post-Ulrich Repackaging for the Month of June 2003, July 23, 2003.

19. DOE 2001. Memorandum from Barbara A. Mazurowski to Robert E. Tiller, Approval of Variance Request RFPK-DOE-474.1-VR-062B, Termination of Safeguards on Attractiveness Level D Waste, AMFPA:NRD:SB:01-00441, March 15, 2001.

20. DOE 2002. Memorandum from Charles A Dan, Jr. to Leonard A. Martinez, Request for Department of Energy Direction on Disposal of Low Assay Oxides to the Waste Isolation Plant (with 2 attachments: Amendment to the Record of Decision on Waste Isolation Pilot Plant Disposal Phase Supplemental Environmental Impact Statement; Supplement Analysis for the Disposal of Certain Rocky Flats Plutonium-Bearing Materials at the Waste Isolation Pilot Plant), AMP:FCWM:GIN:02-01731, November 26, 2002.