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

JUN 24 2004

ENTERED

RECEIVED
JUN 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 RF031.01- TRU Resin

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) RF031.01, TRU Resin.

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,

for

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
L. Greene, WRES
S. Calvert, CTAC *ED
WIPP Operating Record
CBFO M&RC

*ED denotes Electronic Distribution

040635

CBFO:NTP:KWW:JGW:04-1608:UFC:5822

WIPP WASTE STREAM PROFILE FORM

Waste Stream Profile Number: RF031.01

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-QAP|P-0050, Version 9, February 2004. Transuranic (TRU) Waste Management Manual, 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: RF-TR0430, RF-TT0430, RF-TR0431, RF-TT0431

Summary Category Group: S5000[3] — Waste Matrix Code Group: Solidified Organics[3]

Waste Stream Name: Organic Resins/TRU[3]

Description from the WTWBIR: It consists of unleached resin (IDC 430) and leached resin (IDC 431).

Defense TRU Waste: ☑ Yes ☐ No

Check one: ☑ CH ☐ RH — Number of SWBs N/A — Number of Drums 98 — Number of Canisters N/A

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

List applicable EPA Hazardous Waste Codes[2]: None

Applicable TRUCON Content Codes: RF 121A/221A, RF 121D/221D, RF 121DF/221DF, RF 121DA/221DA, RF 121DAF/221DAF, RF 121E/221E, RF 121F/221F, RF 121H/221H, RF 121I/221I, RF 121K/221K, RF 121N/221N, RF 121T/221T

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. 8, 9
- 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

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. 13, 14, 19

☑ Visual Examination: 11, 12, 16, 17, 18, 20

☑ Headspace Gas Analysis

VOCs: Reference List, No. 7, 15, 21

Flammable: Reference List, No. 7, 15, 21

Other gases (specify): N/A

☐ Homogeneous Solids/Soils/Gravel Sample Analysis **(Tables 1, 3, 4, and 5 are not applicable and not included)**

Total metals: N/A

PCBs: N/A

VOCs: N/A

Nonhalogenated VOCs: N/A

Semi-VOCs: N/A

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	6/1/04 Date
C. L. Ferrera Signature of Site QA Officer	C. L. Ferrera, TWCP Site QAO Printed Name and Title	6/1/04 Date

NOTE

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

(2) EPA Hazardous Waste Codes were determined using acceptable knowledge and confirmed using headspace gas sampling and analysis (see attached Characterization Information Summary documenting this determination).

(3) The waste stream name (Organic Resins/TRU) identified in the WTWBIR has been changed to TRU Resins. The Waste Matrix Code is not included in the WTWBIR. The Summary Category Group and Waste Matrix Code 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.

(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 45, Organic Residues, May 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 13, April 2004.
4. Waste and Environmental Management System (WEMS) database.
5. Transuranic (TRU) Waste Certification, PRO-X05-WC-4018, Version 7, March 2004.
6. Acceptable Knowledge TRU/TRM Waste Stream Summaries, RMRS-WIPP-98-100, Section 6-15, Revision 0, May 2004.
7. GC/MS Determination of Volatile Organics Waste Characterization, L-4111-X, January 2002.
8. Waste Characterization, Generation, and Packaging, 1-PRO-079-WGI-001, Revision 4, May 2002.
9. Waste Characterization Program Manual, 1-MAN-036-EWQA-Section 1.6.1, Revision 3, May 2002.
10. Interoffice Memorandum from Douglas K. Sullivan to Eric L. D'Amico, Headspace Gas Analysis Data Evaluation Report For Waste Stream Profile RF031.01 Lot 1, DKS-010-04, May 2004.
11. Visual Examination for Confirmation of RTR, 4-H80-776-ASRF-007, Revision 5, June 2001.
12. TRU/TRM Waste Visual Verification (V^2) and Data Review, PRO-1031-WIPP-1112, Version 3, March 2004.
13. Real-Time Radiography Testing of Transuranic and Low-Level Waste, 4-W30-NDT-00664, Version 10, March 2004.
14. Real-Time Radiography Testing of Transuranic and Low-Level Waste in Building 569, 4-I19-NDT-00569, Revision 6, January 2002.
15. Headspace Gas Sampling And Analysis Using An Automated Manifold, L-4231-F, March 2002.
16. Visual Examination for Confirmation of RTR, PRO-1471-VE-771, Revision 0, November 2001.
17. Glovebox and C-Cell Waste Operations, PRO-1358-440-VERP, Version 6, March 2004.
18. RTR Visual Examination Confirmation, Building 371, PRO-1608-VECRTR-371, Revision 0, October 2002.
19. Mobile Real-Time Radiography Testing of Transuranic and Low-Level Waste, PRO-1520-Mobile-RTR, Version 3, March 2004.
20. Residue Repack, Building 371; PRO-544-SALT REPACK-371, Revision 5, January 2002.
21. Headspace Gas Sampling and Analysis Using An On-Line Integrated System, PRO-1676-HGAS-S&A, Version 2, January 2004.

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 # RF031.01

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	N/A	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	N/A	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	N/A	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	N/A	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 | 6-1-04 Date

Data Summary Report—Table 2: Headspace Gas Summary Data

WSPF # RF031.01

Sampling and Analysis Method (check one):

☑ 100% Sampling ☐ Reduced Sampling

2A

ANALYTE[a]	# Samples[b]	Transform Applied[c]	Normality Test (Pass/Fail)[d]	Mean[d]	UCL_{90}[d]	Transformed RTL[e]	Un-Transformed RTL[e] (ppmV)	EPA Code[f]
1,1-Dichloroethane	0			0.96			10	
1,2-Dichloroethane	0			1.019			10	
1,1-Dichloroethylene	0			1.209			10	
cis-1,2-Dichloroethylene	0			1.139			10	
trans-1,2-Dichloroethylene	0			1.042			10	
1,1,2,2-Tetrachloroethane	0			1.173			10	
1,1,1-Trichloroethane	0			1.174			10	
1,1,2-Trichloro-1,2,2-Trifluoroethane	0			1.107			10	
1,2,4-Trimethylbenzene	0			1.063			NA	
1,3,5-Trimethylbenzene	0			1.125			NA	
Acetone	0			13.664			100	
Benzene	1	Sq. Rt.	Fail[h]	0.998	1.039	3.162	10	
Bromoform	0			1.005			10	
Butanol	0			12.29			100	
Carbon disulfide	0			1.195			10	
Carbon tetrachloride	0			1.299			10	
Chlorobenzene	0			1.14			10	
Chloroform	0			1.003			10	
Cyclohexane	0			1.21			NA	
Ethyl benzene	0			0.997			10	
Ethyl ether	0			1.181			10	
Methanol	12	Log	Fail[h]	2.813	2.999	4.605	100	
Methyl ethyl ketone	0			13.145			100	
Methyl isobutyl ketone	0			12.068			100	
Methylene chloride	0			1.07			10	
o-Xylene	0			1.088			10	
m,p-Xylene	0			2.046			10	
Tetrachloroethylene	0			1.031			10	
Toluene	23	Sq. Rt.	Fail[h]	1.728	1.880	8.487	72.02[g]	
Trichloroethylene	0			1.008			10	

NOTES:

[a] A total of 42 samples were collected and analyzed. Analysis was performed for all analytes identified. Samples were not composited. Headspace gas sampling and analysis was conducted on 1 of the 42 containers prior to the addition of trans-1,2-dichloroethylene to the target analyte list.

[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 10). When transformation was applied, the Mean and UCL_{90} values presented are the transformed values (Reference 10). 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 hazardous waste constituents. "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] Limit used for evaluation of EPA Hazardous Waste Code for toluene (Reference No. 3).

[h] 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.

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

WSPF # RF031.01

2B

TENTATIVELY IDENTIFIED COMPOUND	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 additional toxicity characteristic volatile organic or F-listed solvent EPA codes, other than those assigned by acceptable knowledge, are applicable.

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

Data Summary Report—Table 6: Exclusion of Prohibited Items

WSPF # RF031.01

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 wastes

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:

1. Did not identify any prohibited items in the waste container, or
2. 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 # RF031.01

Package No.	Radioassay Data Package	Headspace Sample Batch No.	Headspace VOC Data Package	RTR Data Package[a]	VE or VV Data Package[b]
D19557	440IP1-DP-030404	04W0092	HGAS-DP-00810	MT-0083	
D46897	440IP1-DP-022604	04W0114	HGAS-DP-00831	6T-2193	
D52741	440IP1-DP-031004	04W0201	HGAS-DP-00917	MT-0082	VE-2004-001
D53078	440IP1-DP-031004	04W0147	HGAS-DP-00863	MT-0086	
D53501	440IP1-DP-122303	04W0104	HGAS-DP-00821	6T-2139	VE-2004-001
D54120	440IP1-DP-030304	04W0110	HGAS-DP-00827	6T-2194	
D54529	440IP1-DP-063003	04W0213	HGAS-DP-00929	MT-0085	
D55698	440IP1-DP-070103	04W0098	HGAS-DP-00815	6T-2195	
D56240	440IP1-DP-032404	04W0141	HGAS-DP-00857	MT-0080	
D57191	440IP1-DP-031804	04W0111	HGAS-DP-00828	6T-2171	
D57421	440IP1-DP-030304	04W0110	HGAS-DP-00827	6T-2194	
D57732	440IP1-DP-040604	04W0154	HGAS-DP-00870	6T-2193	
D58018	440IP1-DP-010604	2001-203	HVOC-DP-00557	6R-050	VE-2004-001
D58148	440IP1-DP-022604	04W0115	HGAS-DP-00832	6T-2193	
D58382	440IP1-DP-022604	04W0115	HGAS-DP-00832	6T-2193	
D58797	440IP1-DP-030504	04W0151	HGAS-DP-00867	MT-0053	
D59012	440IP1-DP-031704	04W0141	HGAS-DP-00857	MT-0080	
D59916	440IP1-DP-122603	04W0115	HGAS-DP-00832	MT-0086	
D59919	440IP1-DP-031704	04W0147	HGAS-DP-00863	MT-0084	
D59926	440IP1-DP-040604	04W0154	HGAS-DP-00870	6T-2193	
D59938	440IP1-DP-032204	04W0146	HGAS-DP-00862	MT-0084	
D60568	440IP1-DP-031704	04W0061	HGAS-DP-00780	6T-2194	
D61524	440IP1-DP-032204	04W0146	HGAS-DP-00862	MT-0084	
D62088	440IP1-DP-032204	04W0146	HGAS-DP-00862	MT-0084	
D62325	440IP1-DP-031904	04W0141	HGAS-DP-00857	MT-0080	
D62586	440IP1-DP-041604	04W0056	HGAS-DP-00775	MT-0084	
D62593	440IP1-DP-031704	04W0147	HGAS-DP-00863	MT-0084	
D62649	440IP1-DP-022604	04W0117	HGAS-DP-00834	MT-0083	
D63055	440IP1-DP-022604	04W0114	HGAS-DP-00831	6T-2193	
D63195	440IP1-DP-031704	04W0146	HGAS-DP-00862	6T-2194	
D63220	440IP1-DP-032504	04W0116	HGAS-DP-00833	MT-0054	
D63234	440IP1-DP-123003	04W0130	HGAS-DP-00846	6T-2186	VE-2004-001
D63238	569IP1-DP-100101	04W0115	HGAS-DP-00832	5T-0234	
D66974	440IP1-DP-030404	04W0131	HGAS-DP-00847	MT-0054	
D73427	440IP1-DP-042004	04W0111	HGAS-DP-00828	MT-0084	
D84706	CPN-00-020	04W0074	HGAS-DP-00792	5T-0126	
D84708	440IP1-DP-031604	04W0153	HGAS-DP-00869	5T-0126	
D84901	CPN-00-020	04W0104	HGAS-DP-00821	5T-0126	
D86441	440IP1-DP-030904	04W0116	HGAS-DP-00833	6T-2171	
D86878	440IP1-DP-030904	04W0116	HGAS-DP-00833	MT-0054	
D86880	440IP1-DP-030204	04W0131	HGAS-DP-00847	6T-2171	
DD9711	440IP1-DP-080803	04W0210	HGAS-DP-00926		VV-707-00087

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

WSPF # RF031.01

NOTES:

[a] No entry indicates visual verification (VV) at the time of waste packaging using the visual examination (VE) technique was performed for the container.
[b] No entry indicates container was not selected for visual examination to confirm RTR or did not undergo VV at the time of waste packaging using the VE technique.

Acceptable Knowledge Summary

WSPF # RF031.01

RMRS-WIPP-98-100, Acceptable Knowledge TRU/TRM Waste Stream Summaries, Section 6-15: TRU Resin (attached).

Rocky Flats Environmental Technology Site

ACCEPTABLE KNOWLEDGE INFORMATION

ACCEPTABLE KNOWLEDGE TRU/TRM WASTE STREAM SUMMARIES

RMRS-WIPP-98-100

Section 6.15

TRU Resin

Profile No. RF031.01

Revision 2

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

Approval signatures in Site Document Control history file

6.15 TRU Resin

Profile No. RF031.01

Acceptable Knowledge Waste Stream Summary

Waste Stream Name: TRU Resin

Generation Buildings: Buildings 371, 771, and 776 (1)

Waste Stream Volume (Retrievably Stored): 93 55-Gallon Drums (1)

Generation Dates (Retrievably Stored): November 1986 – August 2000 (1)

Waste Stream Volume (Newly Generated): 5 55-Gallon Drums (1)

Generation Dates (Newly Generated): July 2003 – April 2004 (1)

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

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

TRUCON Content Codes (3): RF 121A/221A, RF 121D/221D, RF 121DF/221DF, RF 121DA/221DA, RF 121DAF/221DAF, RF 121E/221E, RF 121F/221F, RF 121H/221H, RF 121I/221I, RF 121K/221K, RF 121N/221N, RF 121T/221T

Process Knowledge Demonstrates Flammable VOCs in Headspace < 500 ppm: No (see Sec. 6.15.6)

6.15.1 WIPP Transuranic Waste Baseline Inventory Report Information (4)

WIPP Identification Numbers: RF-TR0430, RF-TT0430, RF-TR0431, and RF-TT0431

Summary Category Group: S5000 Waste Matrix Code Group: Solidified Organics

Waste Matrix Code: S5313 Waste Stream Name: Organic Resins/TRU

Description from the WTWBIR: It consists of unleached resin (IDC 430) and leached resin (IDC 431).

NOTE: This waste stream name identified in the WTWBIR does not exactly match the name of the profile, TRU Resin. The Waste Matrix Code is not included in the WTWBIR. The Summary Category Group and Waste Matrix Code are based on acceptable knowledge as provided in Section 6.15.2.

6.15.2 Waste Stream Description

Transuranic (TRU) Resin waste debris was generated from a variety of operations in support of weapons fabrication including plutonium recovery operations, waste repackaging operations, and deactivation of the facilities and equipment utilized in these operations. This waste is generated from similar activities; is similar in material, physical form, and hazardous constituents; and is, therefore, considered a single waste stream. TRU Resin consists of manufactured objects (i.e., resin beads) having a particle size less than 2.36 inches in size. As such the TRU Resin waste is categorized as S5000 debris waste because the particles smaller than 2.36 inches in size are manufactured objects that are not particles of S3000 or S4000 material. Table 6.15-1 presents the waste matrix code and waste material parameters for TRU Resin. (5)

Table 6.15-1, TRU Resin Description

IDC	Description	Waste Matrix Code	Waste Material Parameters	Weight % (Average)
430	Resin, Unleached	S5313, Non-Halogenated Plastic Debris	Plastics	100%
431	Resin, Leached	S5313, Non-Halogenated Plastic Debris	Plastics	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), secondary waste, etc.

Unleached resin: Unleached resin was produced when the resin in the ion exchange columns was replaced. Though this IDC is titled "unleached" resin, all resins were rinsed with, at least, weak acid before the resins were removed from the columns. (7)

Leached resin: Leached resin was produced when the resin in the ion exchange columns were replaced. The resin was leached (rinsed) with water before the resin was removed from the columns. (7)

6.15.3 Areas of Operation

TRU Resin in this waste stream is generated by the following defense operations:(6,7,8,9,10,11)

- Plutonium Recovery
- Waste Treatment and Repackaging
- General Waste and Deactivation Operations

6.15.4 Generation Processes

TRU Resin debris waste was generated as part of the plutonium recovery operations in Buildings 371 and 771. These resins were used in the ion exchange processes that removed metallic impurities from plutonium containing solutions. The ion exchange resins are small beads of polymeric material (plastic) that have been chemically

modified to contain active sites that are either negatively charged (cation exchange) or positively charged (anion exchange). [7]

Plutonium-contaminated materials dissolved in nitric acid were processed through anion exchange. The acidity and valence of the plutonium-contaminated solutions is adjusted prior to loading of the ion exchange columns. The feed solution is filtered to remove suspended solids from solution prior to loading the ion exchange columns. During loading, the plutonium (in the form of plutonium nitrate anion complex) is preferentially sorbed by the resin while the other solutes (metallic impurities such as aluminum, americium, iron, and nickel) stay in solution and pass through the column. The column is then washed with strong nitric acid solution to remove any residual impurities from the resin. During elution, the plutonium nitrate anion complex is stripped off the resin with a dilute nitric acid solution. The column is reconditioned by flushing with strong nitric acid to adjust the activity of the resin beads. [7,8,10]

Chloride solutions containing plutonium were processed through cation exchange. The operation of the cation exchange process is similar to the anion exchange process except for the normalities of the acid and the fact that the cationic species loads on the resin. The acidity and valence of the solutions is adjusted prior to loading of the ion exchange columns. During loading, the cationic species containing the plutonium and americium are preferentially sorbed by the resin while the other solutes (metallic impurities) stay in solution and pass through the column. The column is then washed with dilute acid solution to remove any residual impurities from the resin. During elution, the plutonium is stripped off the resin with a concentrated acid solution. The column is reconditioned by flushing with dilute acid to adjust the activity of the resin beads. [7,10]

The resin was periodically replaced when its efficiency had depleted. The depleted resins were flushed with weak nitric acid or water prior to removal from the ion exchange columns. A more detailed description of the anion and cation exchange processes can be found in the WSRIC Building Books. [7,8,10]

More recently, TRU Resin was generated during deactivation operations in Building 371. TRU Resin is also repackaged in Buildings 371, 440, and 776 to meet WIPP waste acceptance criteria. A more detailed description of the repackaging and deactivation processes and their process flow diagrams can be found in the WSRIC Building Books or archived WSRIC files. [9,11]

6.15.5 RCRA Characterization

This waste stream is **NOT** characterized as a mixed waste. As described in Section 6.15.2, this waste is generated from similar activities; 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 the TRU Resin waste stream are listed in the WEMS AK Waste Stream Summary for Profile Number RF031.01. [6]

The resins were drained of liquids before removal from the columns. Visual examination of waste contents at the time of packaging and/or RTR is also used to verify that the waste stream is not 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).

The resins are relatively inert plastic beads into which long-chain organic compounds with an activated group are embedded (e.g., Dowex 1 x 4, a microporous copolymer of styrene and divinylbenzene embedded with trimethyl ammonium). The resin beads are not RCRA-regulated hazardous waste when they are disposed of. RCRA-regulated organic and metal compounds were not used in any of the generating or repackaging processes. Historical sampling and TCLP analysis of residue resins did not detect any RCRA regulated metals above their regulatory levels. Therefore, the resin waste is not a F-, P- or U-listed waste nor does it exhibit a hazardous characteristic. [7,8,9,10,11]

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. [7,8,9,10,11]

Beryllium parts were used in the manufacture/assembly of weapons components, and residual beryllium contamination of plutonium parts may have occurred. TRU Resin debris associated with these operations may have been contaminated with beryllium; and, therefore, trace quantities (less than one weight percent) of beryllium may be present in the waste stream. Any beryllium present is a contaminant of the process; is not unused commercial chemical product; and, therefore, is not a P015-listed waste. [9]

Headspace gas sampling and analysis of the first lot of containers assigned to this waste stream by AK detected three 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 none of the analytes were found to exceed their associated PRQL value. Therefore, the headspace data confirms the acceptable knowledge characterization that no characteristic volatile organic or F-listed solvent EPA codes are applicable. [12]

6.15.6 Transportation

The payload containers in this waste stream must also comply with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC) requirements. Flammable volatile organic compounds (VOCs) including benzene, methanol, and toluene were detected by headspace gas sampling/analysis. Therefore, flammable VOCs in the payload container headspace have the potential to exceed 500 ppm. All payload

containers, including those that exceed 500-ppm flammable VOCs in the headspace gas, are evaluated for compliance with the applicable TRAMPAC requirements using the eTRAMPAC system prior to shipment. Any containers not passing the eTRAMPAC compliance evaluation are identified and corrected through the site non-conformance reporting system. [12]

6.15.7 Radionuclides

Table 6.15-2 summarizes the radionuclides potentially present in TRU Resin. [5]

Table 6.15-2, TRU Resin Radionuclides

IDC	Description	Radionuclides	Rationale
430	Unleached Ion Exchange Resin	WG Pu, Am-241, DU, EU, Np-237, Am-243	IDC generated from Pu recovery in which Pu was selectively loaded onto the resin.
431	Leached Ion Exchange Resin	WG Pu, Am-241, DU, EU, Np-237, Am-243	IDC generated by several processes in Building 371 and Building 771; radionuclides dependent on generation process.

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

6.15.8 References

1. WASTREN 2004. Interoffice Memorandum from M. L. Johnson to Waste Records Center. Current and Projected Waste Volumes for TRU Resin, Profile Number RF031.01, MLJ-035-2004. May 18, 2004.

2. WASTREN 2003. Interoffice Memorandum from Jeff Harrison to Eric D'Amico. Projected Waste Stream Volumes and Generation Dates for TRU and TRM Waste, JLH-011-2003. February 12, 2003.

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

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

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. Backlog Waste Reassessment Baseline Book, Waste Form 45, Organic Residues.

8. EG&G 1993. Waste Stream and Residue Identification and Characterization, Building 371, Version 3.2.

9. RFETS 2004. Waste Stream and Residue Identification and Characterization, Building 371, Version 7.0.

10. EG&G 1992. Waste Stream and Residue Identification and Characterization, Building 771, Version 3.2.

11. RFETS 2004. Waste Stream and Residue Identification and Characterization, Building 776/777, Version 7.0.

12. Interoffice Memorandum from Douglas K. Sullivan to Eric L. D'Amico, Headspace Gas Analysis Data Evaluation Report For Waste Stream Profile RF031.01 Lot 1, DKS-010-04, May 18, 2004.