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,

[Signature]

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
WIPP WASTE STREAM PROFILE FORM

Waste Stream Profile Number: RF031.01
Generator site name: RFETS
Generator site EPA ID: C07890010526
Technical contact: Eric D’Amico
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


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

Waste Stream Information

WIPP ID: RF-TR0430, RF-IT0430, RF-TR0431, RF-IT0431
Summary Category Group: Solidified Organics
Waste Stream Name: Organic Resins/TRU
Description from the WTBIR: 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: ☑ None
Applicable TRICON 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 121K/221K, RF 121N/221N, RF 121T/221T

Acceptable Knowledge Information

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/radioactive 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
WIPP WASTE STREAM PROFILE FORM

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
[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/Solids/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 knowingly violating.

[Signatures and Dates]

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 WTTWBRIR has been changed to TRU Resins. The Waste Matrix Code is not included in the WTTWBRIR. The Summary Category Group and Waste Matrix Code are based on acceptable knowledge (see attached AK Summary). The BIR ID reported in WWVIS is assigned using standard BIR conventions for those containers that do not have a valid BIR ID in the WTTWBRIR.
(4) See the References section in the Acceptable Knowledge Summary (attached) for additional backup documentation associated with this waste stream.
REFERENCE LIST

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:

<table>
<thead>
<tr>
<th>Item</th>
<th>Check Box</th>
<th>Reconciliation Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>✓</td>
<td>Waste Matrix Code as reported in WEMS.</td>
</tr>
<tr>
<td>2</td>
<td>✓</td>
<td>Waste Material Parameter Weights for individual containers as reported in WEMS.</td>
</tr>
<tr>
<td>3</td>
<td>✓</td>
<td>The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.</td>
</tr>
<tr>
<td>4</td>
<td>✓</td>
<td>Container mass and activities of each radionuclide of concern as reported in WEMS.</td>
</tr>
<tr>
<td>5</td>
<td>✓</td>
<td>Each waste container of waste contains TRU radioactive waste.</td>
</tr>
<tr>
<td>6</td>
<td>✓</td>
<td>Mean concentrations, UCL90 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.</td>
</tr>
<tr>
<td>7</td>
<td>N/A</td>
<td>Mean concentrations, UCL90 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.</td>
</tr>
<tr>
<td>8</td>
<td>N/A</td>
<td>Mean concentrations, UCL90 for the mean concentrations, standard deviations, number of samples collected for SVOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.</td>
</tr>
<tr>
<td>9</td>
<td>N/A</td>
<td>Mean concentrations, UCL90 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.</td>
</tr>
<tr>
<td>10</td>
<td>N/A</td>
<td>Sufficient number of samples was taken to meet statistical sampling requirements.</td>
</tr>
<tr>
<td>11</td>
<td>✓</td>
<td>Only validated data were used in the above calculations, as documented through the site data review and validation forms and process.</td>
</tr>
<tr>
<td>12</td>
<td>✓</td>
<td>Waste containers were selected randomly for sampling, as documented in site procedures.</td>
</tr>
<tr>
<td>13</td>
<td>✓</td>
<td>The potential flammability of TRU waste headspace gases.</td>
</tr>
<tr>
<td>14</td>
<td>✓</td>
<td>Sufficient number of waste containers was visually examined to determine with a reasonable level of certainty that the UCL90 for the misidentification rate is less than 14 percent.</td>
</tr>
<tr>
<td>15</td>
<td>✓</td>
<td>Whether the waste stream exhibits a toxicity characteristic (TC) under 40 CFR Part 261, Subpart C.</td>
</tr>
<tr>
<td>16</td>
<td>✓</td>
<td>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.</td>
</tr>
<tr>
<td>17</td>
<td>✓</td>
<td>The overall completeness, comparability, and representativeness QAQs 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.</td>
</tr>
<tr>
<td>18</td>
<td>✓</td>
<td>The RTUs (i.e., PRQI) for all analyses were met prior to submittal of a waste stream profile form for a waste stream or waste stream lot.</td>
</tr>
<tr>
<td>19</td>
<td>✓</td>
<td>Appropriate packaging configuration and DAC were met and documented in the headspace gas sampling documentation and the drum age was met prior to sampling.</td>
</tr>
<tr>
<td>20</td>
<td>✓</td>
<td>Whether the waste stream can be classified as hazardous or non-hazardous at the 90-percent confidence limit.</td>
</tr>
</tbody>
</table>

* 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

Date 6-1-09
### Characterization Information Summary

**Data Summary Report—Table 2: Headspace Gas Summary Data**

**WSPF #: RF031.01**

**Sampling and Analysis Method (check one):**
- ☑ 100% Sampling
- ☐ Reduced Sampling

#### Table 2A

<table>
<thead>
<tr>
<th>Analyte*</th>
<th># Samples</th>
<th>Transform Applied</th>
<th>Normality Test (Pass/Fail)*</th>
<th>Mean*</th>
<th>UCL₆₉</th>
<th>Transformed RTL*</th>
<th>Un-Transformed RTL* (ppmV)</th>
<th>EPA Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1-Dichloroethane</td>
<td>0</td>
<td></td>
<td></td>
<td>0.96</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>0</td>
<td></td>
<td></td>
<td>1.019</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>1,1-Dichloroethylene</td>
<td>0</td>
<td></td>
<td></td>
<td>1.209</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
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<tr>
<td>cis-1,2-Dichloroethylene</td>
<td>0</td>
<td></td>
<td></td>
<td>1.139</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>trans-1,2-Dichloroethylene</td>
<td>0</td>
<td></td>
<td></td>
<td>1.042</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
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<tr>
<td>1,1,2,2-Tetrachloroethane</td>
<td>0</td>
<td></td>
<td></td>
<td>1.173</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>1,1,1-Trichloroethane</td>
<td>0</td>
<td></td>
<td></td>
<td>1.174</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
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<tr>
<td>1,1,2-Trichloro-1,2,2-Trifluoroethane</td>
<td>0</td>
<td></td>
<td></td>
<td>1.107</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>0</td>
<td></td>
<td></td>
<td>1.063</td>
<td></td>
<td></td>
<td>NA</td>
<td></td>
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<tr>
<td>1,3,5-Trimethylbenzene</td>
<td>0</td>
<td></td>
<td></td>
<td>1.125</td>
<td></td>
<td></td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Acetone</td>
<td>0</td>
<td></td>
<td></td>
<td>13.664</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td>1</td>
<td>Sq. Rt.* Fail*</td>
<td></td>
<td>0.998</td>
<td>1.039</td>
<td>3.162</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Bromoform</td>
<td>0</td>
<td></td>
<td></td>
<td>1.005</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Butanol</td>
<td>0</td>
<td></td>
<td></td>
<td>12.29</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Carbon disulfide</td>
<td>0</td>
<td></td>
<td></td>
<td>1.195</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>0</td>
<td></td>
<td></td>
<td>1.299</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Chlorobenzene</td>
<td>0</td>
<td></td>
<td></td>
<td>1.14</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Chloroform</td>
<td>0</td>
<td></td>
<td></td>
<td>1.003</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
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<tr>
<td>Cyclohexane</td>
<td>0</td>
<td></td>
<td></td>
<td>1.21</td>
<td></td>
<td></td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Ethyl benzene</td>
<td>0</td>
<td></td>
<td></td>
<td>0.997</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Ethyl ether</td>
<td>0</td>
<td></td>
<td></td>
<td>1.181</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Methanol</td>
<td>12</td>
<td>Log</td>
<td>Fail*</td>
<td>2.813</td>
<td>2.999</td>
<td>4.605</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Methyl ethyl ketone</td>
<td>0</td>
<td></td>
<td></td>
<td>13.145</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Methyl isobutyl ketone</td>
<td>0</td>
<td></td>
<td></td>
<td>12.068</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Methylene chloride</td>
<td>0</td>
<td></td>
<td></td>
<td>1.07</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>o-Xylene</td>
<td>0</td>
<td></td>
<td></td>
<td>1.088</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
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<tr>
<td>m,p-Xylene</td>
<td>0</td>
<td></td>
<td></td>
<td>2.046</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Tetrachloroethylene</td>
<td>0</td>
<td></td>
<td></td>
<td>1.031</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Toluene</td>
<td>23</td>
<td>Sq. Rt.* Fail*</td>
<td></td>
<td>1.728</td>
<td>1.880</td>
<td>8.487</td>
<td>72.02*</td>
<td></td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>0</td>
<td></td>
<td></td>
<td>1.008</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

#### Notes:
- *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.*
- *Identifies the number of samples in which the associated analyte was detected.*
- *Identifies the type of data transformation used, if applicable, to achieve (or better achieve) a normal probability distribution of the data.*
NOTES: (continued)

d Statistics calculated based on using \( \frac{1}{2} \) 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

<table>
<thead>
<tr>
<th>TENTATIVELY IDENTIFIED COMPOUND</th>
<th>Maximum Observed Estimated Concentrations (ppmv)</th>
<th># Samples Containing TIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>No TICs identified in the headspace gas samples for the waste stream lot.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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:
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.
## CHARACTERIZATION INFORMATION SUMMARY

**WSPF # RF031.01**

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

<table>
<thead>
<tr>
<th>Package No.</th>
<th>Radioassay Data Package</th>
<th>Headspace Sample Batch No.</th>
<th>Headspace VOC Data Package</th>
<th>RTR Data Package</th>
<th>VE or VV Data Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>D19557</td>
<td>440IP1-DP-030404</td>
<td>04W0092</td>
<td>HGAS-DP-00810</td>
<td>MT-0083</td>
<td></td>
</tr>
<tr>
<td>D46897</td>
<td>440IP1-DP-022604</td>
<td>04W0114</td>
<td>HGAS-DP-00831</td>
<td>6T-2193</td>
<td></td>
</tr>
<tr>
<td>D53078</td>
<td>440IP1-DP-031004</td>
<td>04W0147</td>
<td>HGAS-DP-00863</td>
<td>MT-0086</td>
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</tr>
<tr>
<td>D53501</td>
<td>440IP1-DP-122303</td>
<td>04W0104</td>
<td>HGAS-DP-00821</td>
<td>6T-2139</td>
<td>VV-2004-001</td>
</tr>
<tr>
<td>D54120</td>
<td>440IP1-DP-030304</td>
<td>04W0110</td>
<td>HGAS-DP-00827</td>
<td>6T-2194</td>
<td></td>
</tr>
<tr>
<td>D54529</td>
<td>440IP1-DP-063003</td>
<td>04W0213</td>
<td>HGAS-DP-00629</td>
<td>MT-0085</td>
<td></td>
</tr>
<tr>
<td>D55698</td>
<td>440IP1-DP-070103</td>
<td>04W0098</td>
<td>HGAS-DP-00815</td>
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</tr>
<tr>
<td>D56240</td>
<td>440IP1-DP-032404</td>
<td>04W0141</td>
<td>HGAS-DP-00857</td>
<td>MT-0080</td>
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</tr>
<tr>
<td>D57191</td>
<td>440IP1-DP-031804</td>
<td>04W0111</td>
<td>HGAS-DP-00828</td>
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<tr>
<td>D57421</td>
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<td>04W0110</td>
<td>HGAS-DP-00827</td>
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</tbody>
</table>
WSPF # RF031.01

NOTES:

* No entry indicates visual verification (VV) at the time of waste packaging using the visual examination (VE) technique was performed for the container.

* 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

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: _________________

Approval signatures in Site Document Control history file
6.15 TRU Resin

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>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
<th>Waste Matrix Code</th>
<th>Waste Material Parameters</th>
<th>Weight % (Average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>430</td>
<td>Resin, Unleached</td>
<td>S5313, Non-Halogenated Plastic Debris</td>
<td>Plastics</td>
<td>100%</td>
</tr>
<tr>
<td>431</td>
<td>Resin, Leached</td>
<td>S5313, Non-Halogenated Plastic Debris</td>
<td>Plastics</td>
<td>100%</td>
</tr>
</tbody>
</table>

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

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

6.15.8 References


