



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

JAN 25 2005



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

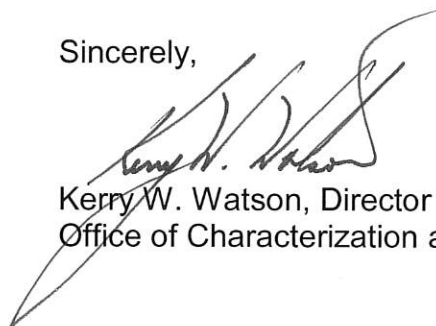
Subject: Transmittal of Approved Change Notice Number 1 for Rocky Flats  
 Environmental Technology Site Waste Stream Profile Form Number  
 RF008.01, TRU Ceramic Crucibles

Dear Mr. Zappe:

The Carlsbad Field Office (CBFO) has approved the change notice number 1 for Rocky Flats Environmental Technology Site (RFETS), Waste Stream Profile Form RF008.01. 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, Director  
 Office of Characterization and Transportation

Enclosure

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



**Update for WIPP Operating Record (Change Notice #1)**

**TRU Ceramic Crucibles**

**WSPF RF008.01**

Please add the following information to the WIPP Operating Record for WSPF # RF008.01, Revision 0. This waste stream is TRU Ceramic Crucibles and was approved by DOE/CBFO on March 9, 2001. Please update related files as you deem appropriate.

The Waste Stream Profile Form (WSPF) is being revised. The WSPF components are bolded. The updates are:

**1. Waste Stream Information:**

- **Number of Drums:** Changed to 459
- **Applicable TRUCON Content Codes, Page 1:** Add the following TRUCON codes: RF 118H, RF118I, and RF 118T.

The Acceptable Knowledge (AK) Summary attachment to the WSPF is being revised. The AK Summary components are bolded. The updates are:

- 1. Waste Stream Volume (Current):** Changed to 459 55-gallon drums.
- 2. Generation Dates (Current):** Changed to September 1985 through September 2003.
- 3. Waste Stream Volume (Projected):** Changed to none.
- 4. Waste Stream Volume (Projected):** Changed to Not Applicable.
- 5. TRUCON Content Codes:**
  - Add the following TRUCON codes: RF 118H, RF118I, and RF 118T
- 6. References:**
  - Changed Reference Number 1 as follows:  
DOE 2005, CH-TRU Waste Content Codes (CH-TRUCON), Revision 3. DOE/WIPP 01-3194.
  - Changed Reference Number 8 as follows:  
WASTREN 2005. Interoffice Memorandum from M. L. Johnson to Waste Records Center. Current and Projected Waste Volumes for TRU Ceramic Crucibles, Profile Number RF008.01, MLJ-016-2005, January 21, 2005.
  - Changed Reference Number 12 as follows:  
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.

**Reason/Justification for Change:**


The changes to the volume estimates and generating buildings are needed to more accurately reflect the known increase in the waste generation volume with respect to what was originally estimated at the time of preparation and approval of the subject waste stream profile form (RF008.01, Revision 0). Specifically, the volume estimate increased by 34 drums from the original profile submission estimate. This increase of 34 drums was due to additional generation as a result of decontamination and decommissioning (D&D) activities in Building 776 and the generation of an increased number of repackaged drums due to repackaging of legacy waste to meet Pu-239 fissile gram equivalent (FGE) limits.

The new TRUCON codes are for new packaging configurations. These new TRUCON codes were approved and incorporated into the CH-TRUCON document (DOE/WIPP 01-3194) after preparation and approval of the subject waste stream profile form (RF008.01, Revision 0).

All changes submitted in this change notice do not affect the assignment of Hazardous Waste Numbers and/or the Waste Matrix Code as identified in the previously approved Waste Stream Profile Form.

**Update for WIPP Operating Record (WSPF RF008.01) certification:**

I hereby certify that I have reviewed the information in this Update for WIPP Operating Record, 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

1/25/05  
\_\_\_\_\_  
Date



**Department of Energy**  
Carlsbad Field Office  
P. O. Box 3090  
Carlsbad, New Mexico 88221  
March 9, 2001

Mr. Steve Zappe  
Hazardous Waste Permits Program  
Hazardous and Radioactive Materials Bureau  
New Mexico Environment Department  
2044 - A Galisteo  
Santa Fe, New Mexico 87502-6110

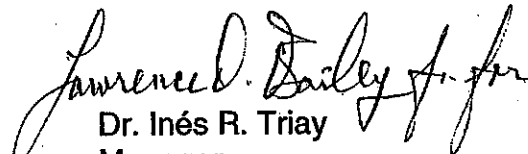
RE: Transmittal of Approved Waste Stream Profile Form for Rocky Flats  
Environmental Technology Site, Waste Stream Profile Form Number RF008.01

Dear Mr. Zappe:

The Department of Energy, Carlsbad Field Office has approved the Rocky Flats Environmental Technology Site, Waste Stream Profile Form for Waste Stream RF008.01. Enclosed is a copy of the approved form as required by Section B-4(b)(1) of the WIPP's Hazardous Waste Permit No. NM4890139088-TSDF.

If you have any questions on this matter, please contact Mr. Kerry Watson at (505) 234-7357.

Sincerely,

  
Dr. Inés R. Triay  
Manager

Enclosure

cc: w/o enclosure  
K. Watson, CBFO  
S. Hunt, CBFO  
H. Johnson, CBFO  
J. Kieling, NMED  
C. Walker, TechLaw  
J. Cotton, WTS  
B. Kehrman, WTS  
C. Riggs, CTAC

CBFO:NTP:KWW:VW:01-0548:UFC 5822

WIPP WASTE STREAM PROFILE FORM

RF008.01, Revision 0

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March 9, 2001

Waste Stream Profile Number: RF008.01  
 Generator site name: RFETS Technical contact: Eric D'Amico  
 Generator site EPA ID: CO7890010526 Phone number: (303) 966-6362  
 Date of audit report approval by NMED: March 9, 2000 as amended February 7, 2001  
 Title, version number, and date of documents used for WAC certification: Rocky Flats Environmental Technology Site TRU Waste Characterization Program Quality Assurance Project Plan, Revision 4, 95-QAP/P-0050, January 2001.  
Transuranic (TRU) Waste Management Manual, Revision 4, 1-MAN-008-WM-001, January 2001. WIPP Waste Acceptance Criteria, Revision 7, DOE/WIPP-069, November 1999.

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

Waste Stream Information <sup>(1)</sup>

WIPP ID: RF-MT-0368 (RF-W056), RF-TR0368 (RF-W114), RF-TR0601 (RF-W123), RF-TR0655 (RF-W116)  
 Summary Category Group: S5000<sup>(3)</sup> Waste Matrix Code Group: Inorganic Nonmetal Waste  
 Waste Stream Name: Mg Oxide Crucibles/TRM, Mg Oxide Crucibles/TRU (IDC 368), Oxides/TRU (IDC 601), Sand, Slag and Crucible/TRU (IDC 655).<sup>(6)</sup>  
 Description from the WTWBIR: This waste stream includes any type or size of ceramic crucibles or liners including LECO crucibles.<sup>(3)</sup>  
 Defense TRU Waste:  Yes  No  
 Check one:  CH  RH Number of SWBs N/A Number of Drums 425 Number of Canisters N/A  
 Batch Data Report numbers supporting this waste stream characterization: See Table 7  
 List applicable EPA Hazardous Waste Codes <sup>(2)</sup>: None  
 Applicable TRUCON Content Codes: RF 118A, RF 118B, RF 118C, RF 118D, RF 118E, RF 118F, RF 118N

Acceptable Knowledge Information <sup>(1)</sup>

[For the following, enter supporting the documentation used (i.e., references and dates)]

Required Program Information

- Map of site: Reference List, No. 4
- Facility mission description: Reference List, No. 4
- Description of operations that generate waste: Reference List, Nos. 1, 2, 3, 4, 7
- Waste identification/categorization schemes: Reference List, Nos. 12, 13
- Types and quantities of waste generated: Reference List, Nos. 1, 2, 3, 4, 7
- Correlation of waste streams generated from the same building and process, as appropriate: Reference List, Nos. 1, 2, 3, 7
- Waste certification procedures: Reference List, No. 6

Required Waste Stream Information

- Area(s) and building(s) from which the waste stream was generated: Reference List, Nos. 1, 2, 3, 7
- Waste stream volume and time period of generation: Reference List, Nos. 5, 7
- Waste generating process description for each building: Reference List, Nos. 1, 2, 3, 7
- 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, 4, 7
- Which Defense Activity generated the waste: (Check one) Reference List, No. 4
  - 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

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Supplemental Documentation

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

Sampling and Analysis Information<sup>(1)</sup>

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

- Radiography: Reference List, Nos. 8, 9
- Visual Examination: Reference List, No. 10
- Headspace Gas Analysis
  - VOCs: Reference List, No. 11
  - Flammable: Reference List, No. 11
  - 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]  
Signature of Site Project Manager

G.A. O'Leary / Mr. TRU Reg  
Printed Name and Title

3/9/01  
Date

- NOTE**
- (1) Use back of sheet or continuation sheets, if required.
  - (2) If radiography, visual examination, headspace gas analysis, and/or homogeneous solids/soils/gravel sample analysis were used to determine EPA Hazardous Waste Codes, attach signed Characterization Information Summary documenting this determination.
  - (3) The waste stream may be size reduced by crushing to provide a more uniform matrix for radioassay. Consequently, particle size is typically less than 2.36 inches; however, Summary Category Group S5000 is still valid because the waste material predominantly consists of manufactured objects (crucibles) that are not particles of S3000 or S4000 material. The information in the TWBIR is incorrect. The waste stream name and summary category group for IDC 655 are incorrect as this IDC consists of magnesium oxide crucibles (see Section 6.B.1 of profile Reference 7 for the physical description) which meet the definition of debris. Also, IDC 368 was re-characterized as nonhazardous waste (Reference No. 1). Additionally, the waste stream description is incorrect as the waste stream excludes LECO crucibles. The correct waste stream name is TRU Ceramic Crucibles. Waste stream RF008.01 also includes IDC 360, but the TWBIR does not include IDC 360.

## REFERENCE LIST

1. Backlog Waste Reassessment Baseline Book, Waste Form 58, Crucibles, March 2001.
2. Backlog Waste Reassessment Baseline Book, Waste Form 29, Oxide, March 1995.
3. Waste Stream and Residue Identification and Characterization (WSRIC), Revision 6, and archived versions.
4. RFETS TRU Waste Acceptable Knowledge Supplemental Information, RF/RMRS-97-018, Revision 8, December 2000.
5. Waste and Environmental Management System (WEMS) database.
6. Transuranic (TRU) Waste Certification, PRO-X05-WC-4018, Revision 2, December 2000.
7. Acceptable Knowledge TRU/TRM Waste Stream Summaries, RMRS-WIPP-98-100, Revision 10, January 2001.
8. Real-Time Radiography Testing of Transuranic and Low-Level Waste, 4-W30-NDT-00664, Revision 3, February 2001
9. Real-Time Radiography Testing of Transuranic and Low-Level Waste in Building 569, 4-H19-NDT-00569, Revision 5, February 2001.
10. Visual Examination for Confirmation of RTR, 4-H80-778-ASRF-007, Revision 3, February 2001.
11. GC/MS Determination of Volatile Organics Waste Characterization, L-4111-U, December 2000.
12. Waste Characterization, Generation, and Packaging, 1-PRO-079-WGI-001, Revision 3, January 2001.
13. Waste Characterization Program Manual, 1-MAN-036-EWQA-Section 1.6.1, Revision 2, September 2000.
14. Interoffice Memorandum from Thomas R. Galliffe to Eric L. D'Amico, Headspace Gas Analysis Data Evaluation Report For Waste Stream Profile RF008.01 (TRU Magnesium Oxide Crucibles (Not LECO) Debris) Lot 1, TRG-026-01, February 2001.

CHARACTERIZATION INFORMATION SUMMARY

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Form A

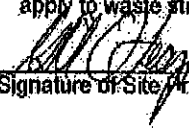
Reconciliation with Data Quality Objectives

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

WSPP # RF008.01

Item	Check Box	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 <sub>90</sub> 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 <sub>90</sub> 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 <sub>90</sub> 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 <sub>90</sub> 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 <sub>90</sub> for the misclassification 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 QA/QCs 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., FRQLs) for all analyses were met prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
19	✓	Whether the waste stream can be classified as hazardous or non-hazardous at the 90-percent confidence limit.

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

GA O'Leary  
 Printed Name

3/9/01  
 Date



Data Summary Report—Table 2: Headspace Gas Summary Data

WSPF # RF008.01

Sampling and Analysis Method (check one):

100% Sampling

Reduced Sampling

2A

ANALYTE	# Samples <sup>b</sup>	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL <sub>95</sub> (ppmv)	RTL <sup>c</sup> (ppmv)	EPA Code <sup>a</sup>
1,1-Dichloroethane						NA	
1,2-Dichloroethane						10	
1,1-Dichloroethylene						10	
cis-1,2-Dichloroethylene						NA	
1,1,2,2-Tetrachloroethane						10	
1,1,1-Trichloroethane						10	
1,1,2-Trichloro-1,2,2-Trifluoroethane						10	
Acetone	3	4.4	1.49	1.00	1.83	100	
Benzene						10	
Bromoform						NA	
Butanol						100	
Carbon disulfide						10	
Carbon tetrachloride						10	
Chlorobenzene						10	
Chloroform	3	1.2	0.25	0.27	0.34	10	
Ethyl benzene						10	
Ethyl ether						100	
Methanol	3	23	6.96	4.92	8.61	100	
Methyl ethyl ketone						100	
Methyl isobutyl ketone						100	
Methylene chloride						10	
o-Xylene						10	
m,p-Xylene						10	
Tetrachloroethylene						10	
Toluene	10	1.7	0.66	0.57	0.85	72.02 <sup>d</sup>	
Trichloroethylene						10	

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

WSPP # RF008.01

2B

TENTATIVELY IDENTIFIED COMPOUND	Maximum Observed Estimated Concentrations (ppmv) <sup>b</sup>	# Samples Containing TIC <sup>b</sup>
No TICs included in the 40 CFR 261 Appendix VIII list were detected in at least 25 percent of the headspace gas samples for the waste stream lot.		

Did the data verify the acceptable knowledge?  Yes  No

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

NOTES:

- <sup>a</sup> No entry indicates no associated EPA Code assigned to the waste stream.
- <sup>b</sup> No entry indicates no detectable measurements available for statistics.
- <sup>c</sup> 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 hazardous waste constituent and so has no associated regulatory threshold.
- <sup>d</sup> Limit used for evaluating EPA Hazardous Waste Code for toluene (Reference No. 4).

**Data Summary Report—Table 6: Exclusion of  
Prohibited Items****WSPF # RF008.01**

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
- PCBs in concentrations greater than or equal to 50 ppm
- Waste exhibiting the characteristics of ignitability, corrosivity or reactivity

CHARACTERIZATION INFORMATION SUMMARY

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 March 9, 2001

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

WSPF # RF008.01

Drum No.	Inner Can No.	Radioassay Data Package	Headspace Sample Batch No	Headspace VOC Data Package	RTR Data Package	VE Data Package <sup>a</sup>
D95306	X12058	707SG5-DP-021599	01W0092	HVOC-DP-00420	5T-0164	
D95443	X12047	707SG4-DP-021289	01W0092	HVOC-DP-00422	5T-0163	VE-2001-002
D95619	X12337	707SG4-DP-022599	01W0092	HVOC-DP-00420	5T-0163	
D95736	X12211	707SG4-DP-011199	01W0092	HVOC-DP-00420	5T-0158	
D95907	X12190	CALG-DP-00271	01W0092	HVOC-DP-00422	5T-0159	
D95992	X12327 X12328	707SG5-DP-022599	01W0092	HVOC-DP-00420	5T-0159	
D96298	X12384	707SG4-DP-022599	01W0092	HVOC-DP-00420	5T-0163	
D96332	X12082	707SG4-DP-012899	01W0092	HVOC-DP-00420	5T-0164	
D96373	X12041	707SG4-DP-012899	01W0092	HVOC-DP-00420	5T-0159	
D96476	X12292	707SG5-DP-022599	01W0092	HVOC-DP-00420	5T-0164	
D96825	X12146	707SG5-DP-011899	01W0092	HVOC-DP-00420	5T-0160	
D97276	X12269 X12281	707SG4-DP-021899 707SG5-DP-021999	01W0092	HVOC-DP-00420	5T-0160	VE-2001-002
D97313	X12389	707SG4-DP-030899	01W0092	HVOC-DP-00420	5T-0160	
D97660	X12371	707SG5-DP-031099	01W0092	HVOC-DP-00420	5T-0160	VE-2001-002
D97668	X12402	707SG5-DP-031099	01W0092	HVOC-DP-00420	5T-0160	
D98107	X13174	707SG5-DP-032499	01W0092	HVOC-DP-00422	5T-0163	

NOTES:

<sup>a</sup> No entry indicates container was not selected for visual examination.

**Acceptable Knowledge Summary**

**WSPF # RF008.01**

RMRS-WIPP-98-100, Acceptable Knowledge TRU/TRM Waste Stream Summaries, Section 6.8, TRU Ceramic Crucibles (attached).

6.8 TRU Ceramic Crucibles

Profile No. RF008.01

**Acceptable Knowledge Waste Stream Summary**

Waste Stream Name: TRU Ceramic Crucibles

Generation Buildings: Building 371, 707, 771, 776, 779<sup>(3,4,5,7,8,11,12)</sup>

Waste Stream Volume (Current): 422 55-gallon drums<sup>(7,8,12)</sup>

Generation Dates (Current): May 1988 – November 1999<sup>(7,8)</sup>

Waste Stream Volume (Projected): 3 55-gallon drums<sup>(8,9)</sup>

Generation Dates (Projected): July 2000 – February 2006<sup>(8,9)</sup>

TRUCON Content Codes: RF 118A, RF 118B, RF 118C, RF 118D, RF 118E, RF 118F, RF 118N<sup>(1)</sup>

**Transuranic Waste Baseline Inventory Report Information<sup>(2)</sup>**

WIPP Identification Numbers: RF-MT-0368, RF-TR0368, RF-TR0601, RF-TR0655

Summary Category Group: (IDC 655) S3000, (IDC 368) S5000

Waste Matrix Code Group: Inorganic Nonmetal Waste

Waste Matrix Code: Not identified in TWBIR

Waste Stream Name: Mg Oxide Crucibles/TRM, Mg Oxide Crucibles/TRU (IDC 368), Oxides/TRU (IDC 601), Sand, Slag and Crucible/TRU (IDC 655)

Description from the TWBIR: This waste stream includes any type or size of ceramic crucibles or liners including LECO crucibles.

NOTE: The information in the TWBIR is incorrect. The waste stream name and Summary Category Group for IDC 655 is incorrect as this IDC consists of magnesium oxide crucibles, which meet the definition of debris. Also, IDC 368 was re-characterized as nonhazardous waste. Additionally, the waste stream description is incorrect as the waste stream excludes LECO crucibles. The TWBIR does NOT include IDC 360.

6.8.1 Waste Stream Description

Table 6-25 presents the waste matrix codes and waste material parameters for ceramic crucibles.<sup>(2,6)</sup>

Table 6-25, Ceramic Crucible Waste Description

IDC	Waste Matrix Code	Waste Material Parameters	Weight % (Average)
360	S5123, Ceramic/Brick Debris	Other Inorganic Materials	100%
368	S5123, Ceramic/Brick Debris	Other Inorganic Materials	100%
601	S5123, Ceramic/Brick Debris	Other Inorganic Materials	100%
655	S5123, Ceramic/Brick Debris	Other Inorganic Materials	100%

CHG-2

This waste stream may be mechanically size-reduced to provide a more uniform matrix for radioassay. Consequently, particle size may be less than 2.36 inches; however, Summary Category Group S5000 (debris waste) is still valid because the waste material predominantly consists of manufactured objects (crucibles) that are not particles of S3000 or S4000 material. Pyrochemical salts may exist in varying amounts but comprise less than 50 percent by volume of the waste stream.

**IDC 360, Al Oxide Crucibles:** Aluminum oxide crucibles and crucible pieces from pyrochemistry research. Crucible pieces are irregularly shaped. Pyrochemical salts may exist in varying amounts.<sup>(3,4,11)</sup>

**IDC 368, Mg Oxide Crucibles:** Magnesium oxide crucibles and crucible pieces from pyrochemistry operations. Crucibles may be crushed to pass through a ¼ inch sieve. Pyrochemical salts may exist in varying amounts. This waste stream does not include LECO crucibles or crucible inserts.<sup>(3,4,11)</sup>

**IDC 601, Al/Mg Oxide Crucibles (Crushed):** Aluminum oxide and magnesium oxide crucibles from pyrochemistry research. Crucibles are crushed to pass through a ¼ inch sieve. Pyrochemical salts may exist in varying amounts.<sup>(3,5,11)</sup>

**IDC 655, ER Ceramics from Pu/Np Recovery (Crushed):** Magnesium oxide crucibles and crucible pieces from electrorefining of plutonium-neptunium alloy. Crucibles are crushed to pass through a ¼ inch sieve. Pyrochemical salts may exist in varying amounts.<sup>(3,4,11)</sup>

### 6.8.2 Areas of Operation

TRU ceramic crucible wastes are generated by the following defense operations:<sup>(6)</sup>

- Plutonium Recovery and Purification
- Research and Development
- Residue Repackaging
- Decontamination and Decommissioning Operations

01/29/01

### 6.8.3 Generation Processes

Broken magnesium oxide crucible pieces (IDC 368) were historically generated through normal plutonium recovery operations, special limited recovery operations, and research and development. Normal operations included electrorefining, reduction and button breakout, direct oxide reduction, and salt scrub processes, which were conducted in Buildings 371, 771, 776, and 779. Generally, the crucibles were utilized to heat plutonium in combination with salts and accelerators. The heat catalyzed the chemical reactions necessary to refine the plutonium. The crucibles were then cooled, broken, and the refined plutonium and salts separated and removed. Aluminum oxide crucibles (IDC 360) were generated from the development of the molten salt extraction process in Building 776 and 779. Special limited operations in Buildings 776 and 779 generated magnesium crucibles (IDC 655) from the electrorefining of plutonium-neptunium alloy.<sup>(4)</sup> Aluminum oxide and magnesium oxide crucible pieces (IDC 601) were generated from pyrochemical research of crucible materials, conducted in Buildings 776 and 779.<sup>(5)</sup> Additionally, magnesium oxide crucibles are generated during decontamination and decommissioning operations in Buildings 771 and 776.<sup>(10)</sup> A process flow diagram for pyrochemistry operations is provided in the BWR Baseline Book, Waste Form 58, Figure 2.1.<sup>(4)</sup>

Magnesium oxide and aluminum oxide crucibles are repackaged in Buildings 371 and 707 to meet residue safe-storage criteria and WAC for the WIPP. The drum contents are transferred to the glovebag system, sized reduced, and homogenized. The residue is conveyed to the bagout glovebox, bagged out, then placed into a second convenience container for transport and nondestructive assay. After assay, the convenience container is packed into a "pipe" component and drum, then sent to storage pending transfer to WIPP. Process flow diagrams for ash residue stabilization/repack and dry residue repack are provided in the WSRIC Books, 371-27 Figure 27.1a, 371-28 Figure 28.1, 707-1 Figure 1.3, 707-41 Figure 41.1a, and 707-42 Figure 42.1.<sup>(3,11)</sup>

The salt stabilization process in Building 707 also generates magnesium oxide crucibles. Crucible pieces found in the salt containers are removed and prior to stabilization of the salts. The process flow diagram for salt stabilization is provided in the WSRIC Book, 707-39 Figure 1.1.<sup>(3)</sup>

Since all materials contained in the ceramic crucibles were molten at the time of the original process operation the temperatures involved (over 700 °C for salt processing and over 640 °C for reduction) would drive off compounds of concern for headspace gas analysis. There were no VOCs introduced as part of the initial reagents, processing, or subsequent handling. Therefore, the ceramic crucibles waste stream is a candidate for reduced headspace gas sampling as waste from a high-temperature thermal process.<sup>(12)</sup>



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6.8.4 RCRA Characterization

Table 6-26 presents the chemical constituent codes (CCCs) and EPA Hazardous Waste Numbers associated with the BWR Subpopulations and WSRIC Waste Streams assigned to TRU ceramic crucible containers.

A few containers in this waste stream are contaminated with beryllium. The beryllium contamination occurred during the visual examination process, not the original generation of this waste. The beryllium is not unused commercial chemical product, and therefore is not a P-listed waste.<sup>(14)</sup>

Table 6-26, Ceramic Crucible RCRA Characterization

IDC	BWR Subpopulation	WSRIC Waste Stream	RCRA CCCs	Non-RCRA CCCs	EPA Hazardous Waste Numbers
<i>Al Oxide Crucibles</i>					
360		371 - 27 - 8	00	00	None
360		707 - 1 - 49	00	00	None
360		707 - 41 - 8	00	00	None
360	58A		00	00	None
<i>Mg Oxide Crucibles</i>					
368		371 - 28 - 12	00	IIA	None
368		707 - 39 - 22	00	00	None
368		707 - 42 - 12A <sup>2</sup>	00	HA	None
368		771 - 44 - 0	N/A <sup>1</sup>	N/A <sup>1</sup>	N/A <sup>1</sup>
368		776_777 - 6 - 161	00	HA	None
368	58B		00	00	None
<i>Al/Mg Oxide Crucibles</i>					
601		707 - 42 - 15	00	MNHA	None
601		371 - 28 - 15	00	MNHA	None
<i>ER Ceramics from Pu/Np Recovery</i>					
655		707 - 42 - 17	00	HA	None
655		371 - 28 - 17	00	HA	None

Note:

1. WSRIC waste streams with an output number of "0" refer to a D&D process which does not include specific outputs. The specific outputs associated with the D&D process are identified by a D&D WSRIC waste stream that is also assigned to the waste.
2. This WSRIC waste stream has been revised as indicated by the alpha character suffix. The characterization of the revised waste stream supercedes the previous characterization and therefore is also applicable to waste generated prior to the revision. The alpha character will be applied to individual waste packages generated since the revision; however, it will not be assigned to individual waste packages generated before the revision.

6.8.5 Radionuclides

Table 6-27 presents the radionuclides potentially in ceramic crucibles.<sup>(6)</sup>

Table 6-27, Ceramic Crucible Radionuclides

IDC	IDC Description	Radionuclides
360	Al Oxide Ceramic Crucibles	WG Pu, Am-241

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IDC	IDC Description	Radionuclides
368	MgO Crucibles	WG Pu, Am-241
601	Al/Mg Oxide	WG Pu, Am-241
655	ER Ceramics	WG Pu, Np-237

6.8.6 References

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2. DOE 1995. Transuranic Waste Baseline Inventory Report, Revision 2. DOE/CAO-95-1121.
3. RFETS 2000. Waste Stream and Residue Identification and Characterization, Building 707, Version 6.0.
4. RFETS 2001. Backlog Waste Reassessment Baseline Book, Waste Form 58, Crucibles.
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6. RFETS 2000. RFETS TRU Waste Acceptable Knowledge Supplemental Information. RF/RMRS-97-018, Revision 8.
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11. RFETS 2000. Waste Stream and Residue Identification and Characterization, Building 371, Version 6.0.
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13. Kaiser-Hill 2001. Interoffice Memorandum from V. S. Sendelweck to Jerry O'Leary, et al. Ceramic Crucibles High-Temperature Thermal Process Documentation. VSS-006-01. January 24.
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