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

July 25, 2000

Mr. John Kieling, Manager
Hazardous Waste Permits Program
hazardous and Radioactive Materials Bureau
New Mexico Environment Department
2044 Galesteo Street
Santa Fe, NM 87502-6110

SUBJECT: TRANSMITTAL OF APPROVED WASTE STREAM PROFILE FORM INW 276.003 FOR IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY (INEEL)

Dear Mr. Kieling:

The Department of Energy, Carlsbad Area Office, has approved INEEL Waste Stream Profile Form INW276.003. 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.

Please contact Kerry Watson at 505-234-7357 should you have any questions regarding this matter.

Sincerely,

Inés Triay

Dr. Inés R. Triay
Manager

Enclosure

cc w/enclosure:
J. Plum, CAO
E. Rose, CAO
K. Watson, CAO
C. Walker, TechLaw
G. Barne, WID
J. Cotton, WID
J. Epstein, WID
K. Mikus, WID
L. Stevens, WID

CAO:NTP:RAS 00-1137
UFC 5822

WIPP WASTE STREAM PROFILE FORM

Waste Stream Profile Number: INW276.003

Generator site name: INEEL | Technical contact: Dr. Rodney Arbon

Generator site EPA ID: ID4890008952 | Technical contact phone number: (208) 526-1867

Date site certified by CAO: June 14, 2000

Title, version number, and date of documents used for WAC certification: See continuation sheet 1 – Heading: WAC Certification

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

Rocky Flats Environmental Technology Site, CO7890010526

Waste Stream Information[1]

WIPP ID: IN-W276 | Summary Category Group: S5000

Waste Matrix Code Group: S5126 | Waste Stream Name: Graphite

Description from the WTWBIR: Graphite Molds used in casting plutonium processed in foundry and casting operations of Building 707.

Defense TRU Waste: ☒Yes ☐No Spent Nuclear Fuel: ☐Yes ☒No High Level Waste: ☐Yes ☒No

Check one: ☒CH ☐RH Number of SWBs 0 Number of Drums 942 Number of Canisters 0

Date package numbers supporting this waste stream characterization: See Waste Stream Characterization Summary Report, Table 6

List applicable EPA Hazardous Waste Codes:[2] None (See Continuation sheet 1 - Heading: Nonmixed Determination)

Applicable TRUCON Content Codes: ID115A, ID215A

Acceptable Knowledge Information[1]

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

Required Program Information

- Map of site: Acceptable Knowledge Document for INEL Stored Transuranic Waste – Rocky Flats Plant Waste, January 1998, INEL-96/0280, Figure 3.1; Drawing 175603 (BBWXT), Rev. 7, 2/24/00.
- Facility mission description: INEL-96/0280, Section 3.1; PLN-579
- Description of operations that generate waste: INEL-96/0280
- Waste identification/categorization schemes: INEL-96/0280, Section 3.3.2
- Types and quantities of waste generated: INEL-96/0280, Section 3.5, Sections 5-26; HWMP/RCRA Permit, Permit Condition II K-4 Report, June 2000.
- Correlation of waste streams generated from the same building and process, as appropriate: INEL-96/0280, Section 3.2, Sections 5-26
- Waste certification procedures: PLN-579

Required Waste Stream Information

- Area(s) and building(s) from which the waste stream was generated: INEL-96/0280, Section 12, Waste Stream Summary Sheet – Graphite, EDF-1175, Rev. 2
- Waste stream volume and time period of generation: INEL-96/0280, Table 12-1, II K-4 Report
- Waste generating process description for each building: INEL-96/0280, Section 12.1
- Process flow diagrams: INEL-96/0280, Figure 12-1,
- Material inputs or other information identifying chemical/radionuclide content and physical waste form: INEL-96/0280, Section 12 ; EDF-1242, Default Plutonium Mass Fractions for Rocky Flats Plant Waste, Waste Stream Summary Sheet – Graphite, EDF-1175, Rev. 2, Nonmixed Waste Determination for IDC 300 Waste (Graphite Molds), INEEL/EXT-98-01137, February 1999.

WIPP WASTE STREAM PROFILE FORM

- Which Defense Activity generated the waste: (check one) G.E. Dials, "Identification of Defense Waste Streams Generated at Rocky Flats Environmental Technology Site (RFETS)," U.S. Department of Energy, memorandum to Jessie M. Robertson and John M. Wilcynski, May 20, 1997.

☒ 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 material production
☐ Defense nuclear waste and materials security and safeguards and security investigations

Supplemental Documentation INEL 96/280 encompasses several different reference sources. Many of the references used fall into the supplemental documentation category.

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

Sampling and Analysis Information[2]

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

☒ Radiography: RWMC Technical Procedure (TPR)-1572, Operating the Real-Time Radioscopic (RTR) System (Rev. 25 and Rev. 26)

☒ Visual Examination: HFEF-OI-6890, Waste Characterization *None of the drums reported in this WSPF have visual data, but this is the procedure used to visually examine drums used in establishing miscertification rates.*, Rev. 4a, 2/11/00

☒ **Headspace Gas Analysis**

VOCs: ACMM-9930, GC/MS for VOCs in Gas (Rev. 3 and Rev. 4), ACMM-9910, Analysis of Gas Samples for VOCs by GC/FID (Rev. 3), ACLP-4.10, Determination of Method Detection Limits for Gas Analysis, Rev. 2; ACLP-4.45, Gas Transfer Manifold Systems, Rev. 1

Flammable: ACMM-9920, Analysis of Gas Samples for Hydrogen and Methane by GC/TCD (Rev. 3)

Other gases (specify): N/A

☐ **Homogeneous Solids/Soils/Gravel Sample Analysis**

Total metals: N/A for debris

PCBs: N/A for debris

VOCs: N/A for debris

Nonhalogenated VOCs: N/A for debris

Semi-VOCs: N/A for debris

Other (specify): N/A for debris

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.

Thomas Hugh Monk | Thomas Hugh Monk | 7/20/00

Signature of Site Project Manager | Printed Name and Title | Date

WIPP WASTE STREAM PROFILE FORM

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 summary reports documenting this determination.

Continuation Sheet 1:

WAC Certification Documents:

- Program Plan for Certification of INEEL Contact-Handled Stored Transuranic Waste, Rev. 0, March 21, 2000, PLN-579
- TRUPACT-II Authorized Methods for Payload Compliance (TRAMPAC) Plan, PLN-577, 3/14/00
- INEEL TRU Waste Characterization, Certification. And Transportation Quality Program Plan, Rev 4., INEEL-PLN-182, 5/18/00
- Quality Assurance Project Plan for the Transuranic Waste Characterization Program, Rev. 4, PLN-190, 5/18/00

Nonmixed Determination:

Ongoing characterization and acceptable knowledge activities are summarized in the attached Waste Stream Characterization Summary Report and the Acceptable Knowledge Waste Stream Summary Sheet. The UCL_{90} for each VOC was evaluated. 1,1,1-Trichloroethane was found to exceed the program required quantitation limit. Acceptable Knowledge information was evaluated and it was determined that graphite molds are nonmixed. AK documentation demonstrates that no listed hazardous waste came in direct contact with the graphite during or after the production process. AK documentation notes that carbon tetrachloride, 1,1,1-trichloroethane, and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon^{TM}) was used for cleaning gloveboxes, equipment, and plutonium metal in the building where the graphite molds were produced. The AK documentation states that although incidental solvent contamination of the molds could have been possible (i.e., residual carbon tetrachloride and/or 1,1,1-Trichloroethane contamination within the glovebox), such contamination does not meet the regulatory definition of any listed hazardous wastes. In addition AK documentation states the polyethylene liner lids were glued in place with Raycohesive (tradename). Trichloroethane is a constituent of this adhesive. This taken in conjunction with potential incidental contamination due to glovebox cleaning is the most likely source of 1,1,1-trichloroethane. The nonmixed (nonhazardous) determination for the graphite molds generated in the foundry and casting operations of building 707 is based on acceptable knowledge which includes TCLP sampling, headspace gas sampling, and analysis. Results and conclusions are summarized in a report titled Nonhazardous Waste Determination for IDC 300 (Graphite Molds) Waste Stream, INEEL/EXT-98-01137, Rev.2, July 1999. In addition, two other waste stream profile forms (IN-W276.001 and INW276.002) have been previously submitted for this waste stream, which supports the conclusion above.

Reconciliation with Data Quality Objectives

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

Check	Reconciliation Parameter
✓	Waste Matrix Code as reported in WWIS.
✓	Waste Material Parameter Weights for individual containers as reported in WWIS.
✓	The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.
✓	The TRU activity reported in WWIS demonstrates that the waste is TRU waste and not low-level radioactive waste.
✓	The potential flammability of TRU waste headspace gases.
✓	Mean concentrations, upper 90% confidence limit (UCL_{90}) values for the mean concentration standard deviations, and the number of samples collected for each VOC in the headspace gas of each container were calculated and compared with the program required quantitation limits, as reported in Waste Stream Characterization Summary Table 2, and additional EPA codes were assigned as required.
N/A	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, number of samples collected for metals were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in Waste Stream Characterization Summary Table 3, and EPA codes were assigned as required.
N/A	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, number of samples collected for total VOCs were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in Waste Stream Characterization Summary Table 4, and EPA codes were assigned as required.
N/A	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, number of samples collected for total SVOCs were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in Waste Stream Characterization Summary Table 5, and EPA codes were assigned as required.
✓	Waste stream evaluated to determine if it exhibits toxicity characteristic (TC) under 40 CFR Part 261, Subpart C and TC codes assigned as appropriate.
N/A	Sufficient number of samples were taken to meet statistical sampling requirements, as documented on Summary Data Report Table 1.
✓	Only validated data were used in the above calculations, as documented through the site data review and validation forms and process.
✓	Waste containers were selected randomly for sampling, as documented in site procedures.
✓	Sufficient number of waste containers have been visually examined to determine the UCL_{90} for the miscertification rate is less than 14%.
✓	All TICs were appropriately identified and reported in accordance with the requirements of Section B3-1 of the WAP prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
✓	The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WAP Sections B3-2 through B3-9 prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
✓	The PRQLs for all analyses were met.

Check (√) indicates that data are sufficient to determine the waste parameters and that the waste parameters have been reported in the listed document or database. NA indicates that parameter not applicable to the waste stream.

Signature of Site Project Manager	Printed Name	Date
Thomas Hugh Monk	Thomas Hugh Monk	7/20/00

Waste Stream Characterization Summary

Table 1. Solid sampling summary.

Determination of Number of Containers to Sample (S3000, S4000)
Preliminary Estimates of Mean, Variance, and Coefficient of Variation:
Attach a table(s) that correlates container identification numbers to data packages, if different from containers used for characterization.
Description of Source Data N/A
Samples Randomly Selected from Waste Stream (yes/no)? N/A
Treatment of less-than-detectable measurements: N/A
Analytes that are listed as spent solvents and therefore are not included in the calculation to determine the number of containers to sample: N/A
Selected coefficient of variation and associated analyte: N/A
Total Calculated number of containers to sample: N/A
Attach preliminary estimates: N/A
Sampling Results
Samples Randomly Selected from Waste Stream (yes/no)? N/A
Analytes that are listed as spent solvents and therefore are not included in the UCL_{90} estimate calculation to determine the toxicity characteristic: N/A
Largest Coefficient of Variation and associated analyte: N/A
Comparison of largest coefficient of variation with coefficient of variation selected from preliminary estimate N/A
Treatment of less-than-detectable measurements: N/A
Transformations applied to data and justification: N/A

Waste Stream Characterization Summary

Table 2. Headspace gas summary data.

Analyte	Number of samples	Number of samples above MDL[a]	Mean (ppmv)	Standard deviation (ppmv)	Upper 90% confidence limit (ppmv)	PRQL (ppmv)	EPA Code
1,1,1-Trichloroethane	19	16	19.3	35.0	31.1	10	N/A
1,1,2,2-Tetrachloroethane	19	0	0.058	0.081	[b]	10	N/A
1,1,2-Trichloro-1,2,2-Trifluoroethane	19	0	0.029	0.041	[b]	10	N/A
1,1-Dichloroethane	19	0	0.033	0.047	[b]	10	N/A
1,1-Dichloroethylene	19	0	0.062	0.086	[b]	10	N/A
1,2,4-Trimethylbenzene	19	2	0.092	0.227	0.586	10	N/A
1,2-Dichloroethane	19	0	0.046	0.063	[b]	10	N/A
1,3,5-Trimethylbenzene	19	3	0.053	0.099	0.16	10	N/A
Acetone	19	19	6.61	8.22	9.12	100	N/A
Benzene	19	0	0.033	0.047	[b]	10	N/A
Bromoform	19	0	0.037	0.051	[b]	10	N/A
Butanol	19	4	0.370	1.17	1.33	100	N/A
Carbon Tetrachloride	19	0	0.036	0.05	[b]	10	N/A
Chlorobenzene	19	0	0.029	0.041	[b]	10	N/A
Chloroform	19	11	0.239	0.404	0.406	10	N/A
Cis-1,2-Dichloroethylene	19	0	0.032	0.045	[b]	10	N/A
Cyclohexane	19	0	0.050	0.070	[b]	10	N/A
Ethyl Benzene	19	1	0.114	0.274	[b]	10	N/A
Ethyl Ether	19	0	0.095	0.133	[b]	10	N/A
Methanol	19	0	1.90	0.518	[b]	10	N/A
Methyl Ethyl Ketone	19	10	0.413	1.00	0.852	100	N/A
Methyl Isobutyl Ketone	19	0	0.072	0.101	[b]	100	N/A
Methylene Chloride	19	5	0.324	0.614	0.745	10	N/A
Tetrachloroethylene	19	1	0.050	0.076	[b]	10	N/A
Toluene	19	4	0.182	0.322	0.446	10	N/A
Trichloroethylene	19	8	0.099	0.131	0.164	10	N/A
M&p-Xylene	19	2	0.223	0.727	1.8	10	N/A
o-Xylene	19	1	0.092	0.272	[b]	10	N/A

Did the data verify the Acceptable Knowledge[c]? Yes ✓ No____

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

a. When a measurement is reported as below detection, one-half the analysis method detection limit (MDL) is used. Note that the MDL for a given analyte may vary from sample to sample.

b. The mean and standard deviation presented are the mean and standard deviation of the method detection limits (after dividing by 2) since all measurements (or all but one) are below detection. Therefore, there are no degrees of freedom associated with the t statistic and the upper 90% confidence limit cannot be calculated.

c. See *Nonmixed Waste Determination for IDC 300 Waste (Graphite Molds),* INEEL/EXT-98-00137.

Waste Stream Characterization Summary

Table 2B. Headspace gas summary data – tentatively identified compounds.

Tentatively Identified Compound	Maximum Observed Estimated Concentrations (ppmv)	# Samples Containing TIC
Isopropyl Alcohol	1.8	2
2-Pentanol	0.47	1
Did the Data verify the Acceptable Knowledge	Yes ✓	No _____
If no, describe the basis for assigning the EPA Hazardous Waste Codes: N/A		

Waste Stream Characterization Summary

Table 3. Metals summary data. – Not applicable to debris

ANALYTE	# Samples	Mean (mg/kg)	SD (mg/kg)	UCL_{90} (mg/kg)	RTL (mg/kg)	EPA Code [a] (D004-11)
Arsenic	N/A	N/A	N/A	N/A	100	N/A
Barium	N/A	N/A	N/A	N/A	2000	N/A
Cadmium	N/A	N/A	N/A	N/A	20	N/A
Chromium	N/A	N/A	N/A	N/A	100	N/A
Lead	N/A	N/A	N/A	N/A	100	N/A
Mercury	N/A	N/A	N/A	N/A	4	N/A
Selenium	N/A	N/A	N/A	N/A	20	N/A
Silver	N/A	N/A	N/A	N/A	100	N/A
Antimony	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium	N/A	N/A	N/A	N/A	N/A	N/A
Nickel	N/A	N/A	N/A	N/A	N/A	N/A
Thalium	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	N/A	N/A	N/A	N/A	N/A	N/A

Did the data verify the Acceptable Knowledge? Yes N/A No _____

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

NOTES:

[a] No entry indicates no associated EPA Code assigned to the waste stream.

Waste Stream Characterization Summary

Table 4A. Total VOC summary data. – Not applicable to debris

ANALYTE	# Samples	Mean (mg/kg)	SD (mg/kg)	UCL_{90} (mg/kg)	RTL (mg/kg)	EPA Code [a] (D018-40,43)
1,1-Dichloroethylene	N/A	N/A	N/A	N/A	14	N/A
1,2-Dichloroethane	N/A	N/A	N/A	N/A	10	N/A
1,4-Dichlorobenzene	N/A	N/A	N/A	N/A	150	N/A
Benzene	N/A	N/A	N/A	N/A	10	N/A
Carbon Tetrachloride	N/A	N/A	N/A	N/A	10	N/A
Methyl ethyl ketone	N/A	N/A	N/A	N/A	2000	N/A
Chloroform	N/A	N/A	N/A	N/A	120	N/A
Chlorobenzene	N/A	N/A	N/A	N/A	4000	N/A
Pyridine	N/A	N/A	N/A	N/A	100	N/A
Tetrachloroethylene	N/A	N/A	N/A	N/A	14	N/A
Trichloroethylene	N/A	N/A	N/A	N/A	10	N/A
Vinyl chloride	N/A	N/A	N/A	N/A	4	N/A

ANALYTE	# Samples	Mean (mg/kg)
1,1,1-Trichloroethane	N/A	N/A
1,1,2-Trichloro-1,2,2-Trifluoroethane	N/A	N/A
1,1,2-Trichloroethane	N/A	N/A
Acetone	N/A	N/A
Butanol	N/A	N/A
Carbon disulfide	N/A	N/A
Ethyl benzene	N/A	N/A
Ethyl ether	N/A	N/A
m-Xylene	N/A	N/A
Methanol	N/A	N/A
Methylene chloride	N/A	N/A
o-Xylene	N/A	N/A
Ortho-Dichlorobenzene	N/A	N/A
p-Xylene	N/A	N/A
Toluene	N/A	N/A
Butanol	N/A	N/A
Ethyl ether	N/A	N/A
Formaldehyde	N/A	N/A
Hydrazine	N/A	N/A
Isobutanol	N/A	N/A
Methanol	N/A	N/A

[a] No entry indicates no associated EPA Code assigned to the waste stream.

Waste Stream Characterization Summary

Table 4A. (continued)

ANALYTE	# Samples	Mean (mg/kg)	SD (mg/kg)	UCL_{90} (mg/kg)	PRQL (mg/kg)	EPA Code [a] (F001-5)
Benzene	N/A	N/A	N/A	N/A	10	N/A
Carbon tetrachloride	N/A	N/A	N/A	N/A	10	N/A
Methyl ethyl ketone	N/A	N/A	N/A	N/A	100	N/A
Chlorobenzene	N/A	N/A	N/A	N/A	10	N/A
Pyridine	N/A	N/A	N/A	N/A	100	N/A
Tetrachloroethylene	N/A	N/A	N/A	N/A	10	N/A
Trichloroethylene	N/A	N/A	N/A	N/A	10	N/A
1,1,1-Trichloroethane	N/A	N/A	N/A	N/A	10	N/A
1,1,2-Trichloro-1,2,2-Trifluoroethane	N/A	N/A	N/A	N/A	10	N/A
1,1,2-Trichloroethane	N/A	N/A	N/A	N/A	10	N/A
Acetone	N/A	N/A	N/A	N/A	100	N/A
Butanol	N/A	N/A	N/A	N/A	100	N/A
Carbon disulfide	N/A	N/A	N/A	N/A	10	N/A
Ethyl benzene	N/A	N/A	N/A	N/A	10	N/A
Ethyl ether	N/A	N/A	N/A	N/A	100	N/A
m-Xylene	N/A	N/A	N/A	N/A	10	N/A
Methanol	N/A	N/A	N/A	N/A	100	N/A
Methylene chloride	N/A	N/A	N/A	N/A	10	N/A
o-Xylene	N/A	N/A	N/A	N/A	10	N/A
Ortho-Dichlorobenzene	N/A	N/A	N/A	N/A	10	N/A
p-Xylene	N/A	N/A	N/A	N/A	10	N/A
Toluene	N/A	N/A	N/A	N/A	10	N/A

Did the data verify the Acceptable Knowledge? Yes N/A No _____

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

NOTES:

[a] No entry indicates no associated EPA Code assigned to the waste stream.

Waste Stream Characterization Summary

Table 4B. Total VOC summary data – tentatively identified compounds. – Not applicable for debris

Tentatively Identified Compound	Maximum Observed Estimated Concentrations (ppmv)	# Samples Containing TIC
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
Did the Data verify the Acceptable Knowledge	Yes N/A	No
If no, describe the basis for assigning the EPA Hazardous Waste Codes: N/A		

Waste Stream Characterization Summary

Table 5A. Total SVOC summary data. – Not applicable for debris

ANALYTE	# Samples	Mean (mg/kg)	SD (mg/kg)	UCL_{90} (mg/kg)	RTL (mg/kg)	EPA Code [a] (D027-38)
1,4-Dichlorobenzene	N/A	N/A	N/A	N/A	150	N/A
2,4-Dinitrotoluene	N/A	N/A	N/A	N/A	2.6	N/A
Cresols	N/A	N/A	N/A	N/A	4000	N/A
Hexachlorobenzene	N/A	N/A	N/A	N/A	2.6	N/A
Hexachloroethane	N/A	N/A	N/A	N/A	60	N/A
Nitrobenzene	N/A	N/A	N/A	N/A	40	N/A
Pentaclorophenol	N/A	N/A	N/A	N/A	2000	N/A
Pyridine	N/A	N/A	N/A	N/A	100	N/A

ANALYTE	# Samples	Mean (mg/kg)
2,4-Dinitrophenol	N/A	N/A
Aroclor 1016	N/A	N/A
Aroclor 1221	N/A	N/A
Arocol 1232	N/A	N/A
Aroclor 1242	N/A	N/A
Aroclor 1248	N/A	N/A
Aroclor 1254	N/A	N/A
Aroclor 1260	N/A	N/A
Ortho-Dichlorobenzene	N/A	N/A

ANALYTE	# Samples	Mean (mg/kg)	SD (mg/kg)	UCL_{90} (mg/kg)	PRQL (mg/kg)	EPA Code [a] (F004)
Cresols	N/A	N/A	N/A	N/A	40	N/A
Nitrobenzene	N/A	N/A	N/A	N/A	40	N/A

Did the data verify the Acceptable Knowledge? Yes N/A No _____

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

NOTES:

[a] No entry indicates no associated EPA Code assigned to the waste stream.

Waste Stream Characterization Summary

Table 5B. Total SVOC Summary data – tentatively identified compounds. – Not applicable for debris.

Tentatively Identified Compound	Maximum Observed Estimated Concentrations (ppmv)	# Samples Containing TIC
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
Did the Data verify the Acceptable Knowledge	Yes N/A	No
If no, describe the basis for assigning the EPA Hazardous Waste Codes: N/A		

Waste Stream Characterization Summary

Table 6. Correlation of container identification numbers to data package.

Container Number	Barcode	Headspace Gas Data Package[a]	RTR Data Package	RA Data Package	Visual Examination Data Package	PRF Headspace Gas Sampling Data Package
IDRF001200837	013619	ECL00006	RTR000017	SAS000012	N/A	PRF000003
IDRF001209068	030564	ECL00006	RTR000012	SAS000002	N/A	PRF000003
IDRF001209681	024202	ECL00006	RTR000012	SAS000005	N/A	PRF000003
IDRF001209777	027822	ECL00011	RTR000017	SAS000011	N/A	PRF000007
IDRF001209800	027348	ECL00011	RTR000015	SAS000009	N/A	PRF000007
IDRF001209965	025511	ECL00005	RTR000012	SAS000005	N/A	PRF000002
IDRF001210070	024715	ECL00006	RTR000012	SAS000002	N/A	PRF000003
IDRF001210780	024100	ECL00013	RTR000017	SAS000012	N/A	PRF000010
IDRF001210889	022918	ECL00005	RTR000012	SAS000003	N/A	PRF000002
IDRF001211214	032654	ECL00013	RTR000023	SAS000018	N/A	PRF000010
IDRF001211253	031832	ECL00010	RTR000012	SAS000002	N/A	PRF000006
IDRF001211264	031626	ECL00013	RTR000023	SAS000018	N/A	PRF000010
IDRF001211669	026994	ECL00005	RTR000012	SAS000005	N/A	PRF000002
IDRF001212316	000356	ECL00013	RTR000017	SAS000012	N/A	PRF000010
IDRF001212867	001618	ECL00011	RTR000017	SAS000011	N/A	PRF000007
IDRF001213221	001623	ECL00011	RTR000015	SAS000009	N/A	PRF000007
IDRF001213918	001619	ECL00013	RTR000023	SAS000018	N/A	PRF000010
IDRF001214006	000804	ECL00006	RTR000012	SAS000002	N/A	PRF000003
IDRF001215626	007605	ECL00013	RTR000023	SAS000018	N/A	PRF000010

a. An ECL Gas Data Package is composed of three separate reports. For example, ECL00006 contains ECL00006M, ECL00006G, and ECL00006C.

ENGINEERING DESIGN FILE

ORIGINAL - RED
COPY - BLACK

1. Project File No. N/A 2. Project/Task RWMC/SWEPP Programs

3. Subtask Transuranic Waste Characterization Program Acceptable Knowledge

4. Title: Waste Stream Summary Sheet – Graphite

5. Summary:

As required by MCP-2988, "Confirmation, Resolution and Re-evaluation of Acceptable Knowledge Information", this Engineering Design File (EDF) formally issues the Waste Stream Summary (WSS) sheet for graphite (IDC 300). The WSS sheet for graphite molds combines some basic acceptable knowledge information with the results of the characterization performed at INEEL to date on graphite. Characterization to date has concentrated on IDC 300, and is complete enough for the issuance of a waste stream profile form for IDC 300 graphite generated in Building 707. This EDF will be revised to include ongoing characterization of IDC 300 graphite generated in Building 707 and will be revised to support any issuance of a Waste Stream Profile Form for IDCs 300 (not generated in building 707), 303, 310, and 312. Cited references can be obtained from the Acceptable Knowledge Expert (AKE).

6. Distribution (complete package): M. Anderson, 4201; R. E. Arbon, 4201; L. Blackwood, 4113; D. Bryngelson, 6000-774; T. L. Clements, 4201; P. Contreras, 4201; G. W. Custer, 4202; M. S. DeHaan, 3730; E. Dumas, 4201; W. M. Heileson, 4201; B.K. Ford, 4201; L. R. Frost, 4201; S.M. Hailey, 4201; Y. Harker, 2114, G. R. Hayes, 4201; T. H. Johnsen, 4201; D. E. Menkhaus, 4201; T. H. Monk, 4201; D. G. Pound, 4201; T. W. Preston, 4201; S. J. Sailer, 5210; M.T. Sharp, 4201; G. K. Tedford, 4201; J. Wells, 1118; Project EDF File Log, EDF Serial No. Log

Distribution (summary package only):

7. Review (R) and Approval (A) Signatures: (Minimum reviews and approvals are listed. Additional reviews/approvals may be added as necessary.)

	R/A	Printed Name	Signature	Date
Author	R	S. M. Hailey (AKE)	S M Hailey	7/20/00
Characterization Task Leader	R	M. J. Sherick	M J Sherick	7/20/00
Independent Verification	R	L. R. Frost	Lisa Frost	7/20/00
Site Project Office Chief Scientist	A	R. E. Arbon	Fred E Arbon	7/20/00
Site Project Manager	A	T. H. Monk	Fred E Arbon for T. Monk	7/20/00

07/20/2000
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RELEASED
Judy Anderson 7/20/00
SIGNATURE/DATE
RWMC DOCUMENT CONTROL

INEEL Acceptable Knowledge Waste Stream Summary
Graphite

Note: Unless otherwise indicated information as been obtained from Reference 1.

Waste Stream: Graphite Waste, RFP IDC 300

Generation Buildings: Building 707

Waste Stream Volume: 1069 55-gallon drums[2,61,62,63]

Generation Dates: November 1972 – June 1988

TRUCON Content Codes[3, 36] ID 115A, ID 215A

Waste Stream Description:

TRU graphite waste consists of graphite molds (IDC 300), scarfed graphite chunks (IDC 303), graphite scarfings and fines (IDC 310), and coarse graphite (IDC 312). This EDF concentrates on IDC 300.

IDC: 300, Graphite Molds
Waste Matrix Code (WMC): S5126[4]

WMC Description: WMC S5126 should consist of >80% by volume graphite debris[7].

Waste Description/Inner Packaging:
Graphite items include molds from plutonium casting operations and chunks generated during mold cleaning. The majority of drums (based on visual examination results) also contain a bag-out end. A PVC bag was attached to a glove-box portal with an elastic band. When it was time to attach a new bag to the glovebox portal, the old bag-out end was placed in the current drum.[21] Most drums also contain some yellow tape that was used to hold bagging material in place while the drum was being filled.

Typically graphite was placed directly into a lined 55-gallon drum or bagged out of the glovebox line into one or two PVC or polyethylene bags.[39]

Some alternate inner packaging methods have also been identified during characterization. These include the following.

Graphite molds packaged in 1-gallon paint cans.[6]
Graphite molds within Fibre-pak containers[8]
Wide-mouthed poly bottles containing graphite powder[18]
Plastic sheets wrapped around graphite molds[19]
Graphite molds packaged in volrath cans[45]
Graphite molds packaged in small cardboard containers[47]
Graphite molds packaged in metal containers greater than 4 liters[52]

Miscellaneous Items:

The following table lists some of the items that have been identified in a small percentage of the containers during characterization of graphite molds. Since the volume percent of these items is insignificant, they are not included as part of the potential waste material parameters.

Item	Source	Comment
Thermocouple	PSD86-061	
Blotter paper	EDF-RWMC-844 ANL033847 ANL034869	The drums with blotter paper were later re-examined and it was determined that the items originally described as blotter paper were just part of the cardboard liner.
Bungee cords	EDF-RWMC-844	Items described as "bungee cords" at ANL-W are the elastic bands that hold bag-out end to glovebox portal.
Paper Clips	EDF-RWMC-844	
Lead sheeting	IDRF001214252[22]	This was identified through RTR. There are no plans to confirm the identity of lead through visual examination.
Outlet Cover	IDRF001214950[23]	
Loose Wire	IDRF007300572[24]	
Liner Lid	IDRF007300572[24]	
Coveralls	IDRF001210739[25]	
Wooden Handled Brush	IDRFRD1209654[26]	
Surgeons Gloves	AK-98-017[27]	Surgeons gloves were identified in 4 drums during visual examinations at ANL-W.
Small Metal Cap	IDRFRD1212648[28]	
Miscellaneous Plastic	IDRFRD1210631[29]	
Small metal items - hooks and clips	AK-99-029[35] AK-00-001[38]	Several containers have been identified as containing small metal items. These small metal items are negligible in weight and volume contributions
Plastic bags identified as waste items. (May include descriptions such as o-ring bag, drum bag, glovebox liner, etc.)	AK-00-004[41, 50, 53]	RTR has identified drums that contain o-ring bags as a waste item. Based on several visual examinations, it is likely that these o-ring bags are just the bag-out ends, not the entire bag. However, it is appropriate for RTR to conservatively assume that the entire bag is present when the horsetail as a waste item is identified.
Cardboard roll end	AK-00-041[48]	
Metal scraping tool (Razor blade)	AK-00-045[49]	

Item	Source	Comment
Metal bolt	AK-00-050[54]	
Plastic spacer	AK-00-52[56]	

Absorbent:
1972 – February 1982: 0 to 4 gallons of Oil-Dri[5,10,12,20]
February 1982 - 1988: 0 to 12 pounds of vermiculite[5]

For the most part, oil-dri was the absorbent used through February 1982 and vermiculite was the predominant absorbent material used after February 1982. However, there are a number of containers that have contained a different than expected absorbent. These containers have been identified during both visual examinations and RTR examinations.[12,13,14,15]

Drum Packaging Configurations:
1972: 1-2 Polyethylene drum bags and potential cardboard liner
1972-1988: 90 mil rigid liner (All drums)

One of the following combinations of drum bags:
1 polyethylene round bottom drum liner
2 polyethylene drum bags
PVC o-ring bag and a polyethylene drum bag
PVC o-ring bag and 2 polyethylene drum bags[16]
1 polyethylene round bottom drum liner, 1 polyethylene drum bag, and 1 o-ring bag[34]
PVC o-ring bag[46]
No drum bags[55]

Note: There are number of combinations of drum bags, poly bags, and o-ring bags that may be identified by SWEPP. Any combination of these plastic bags provided that 4 layers of containment is not exceeded does not impact acceptability of the drum. The IDC and hazardous waste number are not impacted by these atypical packaging configurations.[16, 34, 46, 55, 57]

In addition:

Fiberboard liner and discs may also have been included.

In a few cases drums have been packaged with more drum bags than would be expected and exceed TRUPACT allowed containment layers .[10, 32] These drums are rejected by RTR because the packaging layers exceed the maximum allowed by TRUPACT. In other instances, RTR has identified 3 or 4 drum bags without horsetails.[40] These packaging configurations are unusual, but do not impact WMC assignment or hazardous waste number assignment.

Potential Waste Material Parameter	Description	Expected Weight Range (kg)
Steel (packaging materials)	55-gallon drum	27[a]
Plastics (packaging materials)	90 mil drum liner, o-ring bags, drum bags, inner container bags, possible poly bottles	2 – 13[b]
Other Inorganic Materials	Graphite molds, vermiculite, oil-dri	12 – 186[c]
Cellulosics	Cardboard liner, fibre-pak	0 – 5[b]
Iron Metals/Alloys	1-gallon "paint cans" used as inner containers	0 – 4[b]
Rubber	Elastic bands from bag-out ends	0 – 1[b]

a. Standard drum weight
b. Packaging descriptions and examination estimates.
c. Derived from drum weight ranges in reference 37 and potential packaging configurations.

Areas of Operation

TRU graphite wastes were primarily generated by the following operations:

- Plutonium Production
- Plutonium Recovery
- Research and Development
- Laboratory

Generation Processes

During plutonium weapons production at RFETS, graphite molds were used in foundry operations to cast plutonium parts, shapes, and ingots. In RFETS Building 444, molds were cut from solid blocks, logs, or slabs of graphite. The new molds were transferred to Building 707. The molds were bagged into the glovebox line where they were assembled, prepared, and conveyed to the casting furnaces. In the gloveboxes, plutonium metal was placed inside a tantalum crucible and heated in a furnace vessel. The molten metal was poured from the crucible into the graphite mold. After the castings cooled, the molds were separated from the castings.

Once a mold was no longer usable, it was subjected to a discard process, shown in Figure 1 along with the respective graphite IDCs generated by this process. Graphite molds to be reused were mechanically cleaned to remove the plutonium metal from the surface of the mold, generating IDC 310 (graphite scarfings & fines). Both graphite molds (IDC 300) and graphite cores (IDC 301) were nondestructively assayed. Scarfing operations removed plutonium metal from those components contaminated above the economic-discard limit (EDL), generating IDCs 303 (scarfed graphite chunks), 310 (graphite scarfings & fines), and 312 (coarse graphite). Graphite molds and cores (IDCs 300 and 301, respectively) found to be below the EDL were stored for disposal or, in the case of IDC 301, subjected to size-reduction operations to meet security requirements.

At no point were solvents employed in the production of new molds, or in the recovery or cleanup of used molds. Carbon tetrachloride was hard-piped into the furnace gloveboxes and used to clean the gloveboxes, but not the castings or the

molds. After glovebox cleaning was completed, all liquids were removed. Graphite molds are relatively soft, and contact with any liquids would cause the molds to crumble, rendering them useless. Therefore, the graphite molds were removed from the glovebox before cleaning took place.

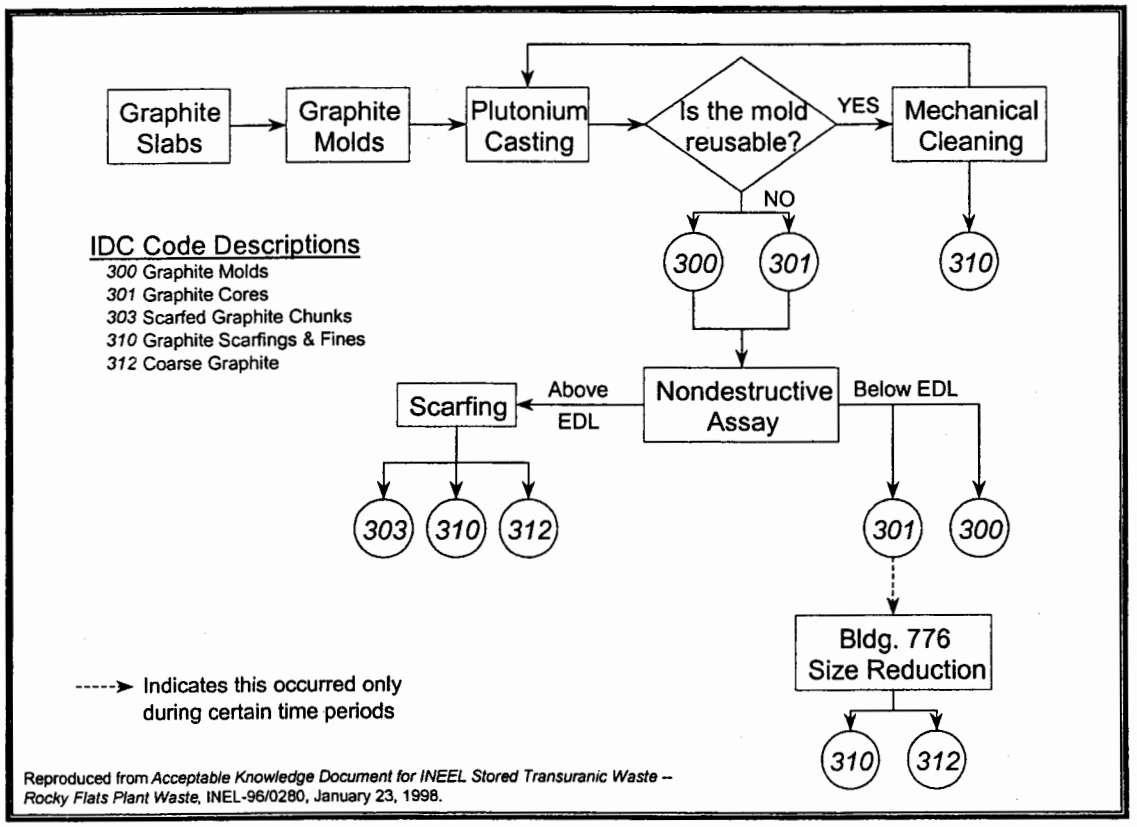

Figure 1. Graphite waste generation flow diagram.

RCRA Characterization

The following table presents the EPA Hazardous Waste Numbers currently associated with the TRU graphite waste containers. These EPA HWNs are subject to change as characterization is conducted.

IDC	Title	EPA Hazardous Waste Numbers
300	Graphite Molds	None[a,b]

a. One container of graphite molds (IDRF001214252[22]) was identified by RTR as containing lead sheeting. This individual container will be assigned the D008 code for lead. No other containers within the waste stream are impacted.

b. Graphite molds packaged in Building 707 have had a nonmixed waste determination performed and documented.[43] Graphite molds packaged in other areas are still undergoing final characterization.

Radionuclides

The following table provides the prefixes assigned to graphite waste containers, generation buildings, and potential radionuclides contained in the waste. Specific levels of radionuclides are established during assay and are based to some extent on expected mass fractions.[42]

The historical mission of the Rocky Flats Environmental Technology Site (RFETS), formerly the Rocky Flats Plant, was the manufacture of plutonium parts for nuclear weapons. As such, the majority of the TRU waste generated at RFETS was generated through defense program activities. There is no historical record or evidence of spent nuclear fuel or high–level waste ever having been handled at the facility.[44]

Generation Building	Container Prefix	Prefix Description	Potential Radionuclides
371	11	Note 1	WG Pu, Am-241, EU, DU
371	32	Aqueous Recovery	WG Pu (Note 2)
371	39	Note 1	WG Pu, Am-241, EU, DU
371	73	Aqueous Recovery	WG Pu
359	29	Analytical Laboratory	WG Pu, EU
707	12	Metallurgy Operations, Casting	WG Pu (Note 2)
707	28	Note 1	WG Pu (Note 2)
707	31	Metal Fabrication-Assembly	WG Pu
771	01	Aqueous Recovery	WG Pu
771	02	Aqueous Recovery	WG Pu
771	42	Chemical Technology	WG Pu, Am-241, EU, DU
771	78	Plutonium Metallurgy Development	WG Pu, Am-241, EU, DU, U-233
771	0743	Graphite Scarfing	WG Pu
776	19	Size Reduction	WG Pu, Am-241, EU, DU, U-233
776	25	Drum Repack	WG Pu, Am-241, EU, DU, U-233
776	26	Size Reduction	WG Pu, Am-241, EU, DU, U-233
776	40	Waste Processing/Final Packaging	WG Pu, Am-241, EU, DU, U-233
776	41	Waste Processing/Final Packaging	WG Pu, Am-241, EU, DU, U-233

Notes: 1. See Reference 1, Appendix B for an explanation of these prefix descriptions.
2. There have been isolated incidences of uranium being detected in drums that were packaged in areas where only plutonium is expected to be present.[17, 30, 58, 59, 60]
3. Am-241 is expected to be present in weapons grade plutonium drums as a decay product of Pu-241. If the source of the Am-241 is listed as "From PU239 Ratio", the presence of Am-241 is within the expected range for the container.[31]

References:

1. 1. LMITCO 1998, Acceptable Knowledge Document for INEEL Stored Transuranic Waste- Rocky Flats Plant Waste, Revision 2. INEL-96/0280.

2. 2. TRIPS Query – Lot INW276.003, Created October 14, 1999.
3. DOE 1996. TRUPACT-II Content Codes (TRUCON), Revision 9. DOE/WIPP 89-004.
4. LITCO 1997, Engineering Design File. Matrix Parameter Category Groups (MPCG) RWMC-805/INEL-95/029
5. AK-98-002
6. AK-98-007
7. DOE 1995, DOE Waste Treatability Group Guidance, DOE/LLW-217, Revision 0, January 1995.
8. AK-98-009
9. AK-98-010
10. AK-98-011
11. AK-98-012
12. AK-98-024
13. AK-98-024
14. AK-99-009
15. AK-99-010
16. AK-99-002
17. AK-99-003
18. AK-99-001
19. AK-98-018
20. AK-99-007
21. AK-99-020
22. AK-99-005
23. AK-99-008
24. AK-99-006
25. AK-98-013
26. AK-98-023
27. AK-98-017
28. AK-98-019
29. AK-98-016
30. AK-99-024
31. AK-99-025
32. AK-99-026
33. AK-99-027
34. AK-99-028
35. AK-99-029
36. BBWI, EDF-RWMC-1327, INEEL Item Description Code and Shipping Category Cross Correlation, Rev. 0, 4/18/00.
37. WM-F1-82-021, Content Code Assessments for INEL Contact-Handled Stored Transuranic Wastes, October 1982
38. AK-00-001
39. AK-00-002
40. AK-00-003
41. AK-00-004
42. EDF-1242, Default Plutonium Mass Fractions for Rocky Flats Plant Waste, September 1999.
43. INEEL/EXT-98-01137, Nonmixed Waste Determination for IDC 300 Waste (Graphite Molds).
44. G.E. Dials, "Identification of Defense Waste Streams Generated at Rocky Flats Environmental Technology Site (RFETS)," U.S. Department of Energy, memorandum to Jessie M. Robertson and John M. Wilcynski, May 20, 1997.
45. AK-00-038
46. AK-00-039
47. AK-00-040

48. AK-00-041
49. AK-00-045
50. AK-00-046
51. AK-00-047
52. AK-00-048
53. AK-00-049
54. AK-00-050
55. AK-00-051
56. AK-00-052
57. AK-00-053
58. AK-00-056
59. AK-00-057
60. AK-00-058
61. Waste Stream Profile Form IN-W276.001
62. Waste Stream Profile Form INW276.002
63. Characterization Data Set INW276.002.01