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

September 10, 2010

Mr. James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Review of Advanced Mixed Waste Treatment Project Waste Stream Profile Form BN510.1, Supercompacted Debris Waste

Dear Mr. Bearzi:

The Department of Energy Carlsbad Field Office has approved the subject Advanced Mixed Waste Treatment Project Waste Stream Profile Form BN510.1, Supercompacted Debris Waste. Enclosed is a copy of the form as required by Section B-5a of the WIPP Hazardous Waste Facility Permit No. NM4890139088-TSDF.

If you have questions on this matter, please contact me at (575) 234-7300.

Sincerely,

David C. Moody
Manager

Enclosure(s)

cc: w/enclosure
[redacted] *ED

cc: w/o enclosure

J. Kieling, NMED	ED
G. Basabilvazo, CBFO	ED
N. Castaneda, CBFO	ED
C. Fesmire, CBFO	ED
C. Gadbury, CBFO	ED
S. McCauslin, CBFO	ED
G. Sena, CBFO	ED
J. R. Stroble, CBFO	ED
K. Watson, CBFO	ED
W. Ledford, CTAC	ED
P. Gilbert, LANL	ED
G. Lyshik, LANL	ED
C. Walker, TechLaw	ED
CBFO M&RC	

*ED denotes electronic distribution

CBFO:NTP:DCG:GS:10-1520:UFC 5900.00

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WASTE STREAM PROFILE FORM

Waste Stream Profile Number: BN510.1

Generator site name: Advanced Mixed Waste Treatment Project | Technical contact: Eric Schweinsberg

Generator site EPA ID: ID4890008952 | Technical contact phone number: (208)557-6425

Date of Audit report approval by NMED: 4/29/2005 (Revised 5/3/2005), 6/16/06, 1/18/08, 1/9/09, 1/8/2010

Title, version number, and date of documents used for WAP certification:

Certification Plan for INL Transuranic Waste, MP-TRUW-8.1, Rev 19, 6/30/2010

Quality Assurance Project Plan, MP-TRUW-8.2, Rev 13, 6/30/10

CCP Transuranic Authorized Method for Payload Control (CCP CH-TRAMPAC), CCP-PO-003, Rev. 11, 6/4/2009

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

Waste Stream Information[1]

WIPP ID: IN-BN510.1 [3] | Summary Category Group: S5000

Waste Matrix Code Group: Heterogeneous Debris Waste | Waste Stream Name: Supercompacted Debris Waste

Description from the WTWBIR: BN510.1 is a newly generated debris waste stream generated from supercompacted 55-gallon containers of debris waste. [3]

Defense TRU Waste: (ref 1) ☒Yes ☐No | Check One: ☒CH ☐RH

Number of SWBs 105 | Number of Drums 16,000 | Number of Canisters 0

Batch Data report numbers supporting this waste stream characterization: See Characterization Information Summary Report, Table 5

List applicable EPA Hazardous Waste Numbers:[2] D004, D005, D006, D007, D008, D009, D010, D011, D022, D027, D028, D029, D030, D034, D037, D043, F001, F002, F004, F005, F006, F007, and F009

Applicable TRUCON Content Codes: ID121

Acceptable Knowledge Information[1]

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

Required Program Information

Map of site: Reference No. 2

Facility mission description: Reference No.3

Description of operations that generate waste: References No.1 and 3

Waste identification/categorization schemes: Reference Nos. 1, 3, 4, and 5

Types and quantities of waste generated: Reference No. 1 and 3

Correlation of waste streams generated from the same building and process, as appropriate: Reference Nos. 1 and 3

Waste certification procedures: Reference No. 7

Required Waste Stream Information

Area(s) and building(s) from which the waste stream was generated: Reference Nos. 1and 3

Waste stream volume and time period of generation: Reference No. 1

Waste generating process description for each building: Reference Nos. 1 and 3

Process flow diagrams: Reference Nos. 1 and 3

Material inputs or other information identifying chemical/radionuclide content and physical waste form: Ref. Nos. 1, 3, 4, 5, and 6

Waste Material Parameter Weight Estimates per unit of waste: Reference No. 1

Which Defense Activity generated the waste: (check one)

☒	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

Process design documents:	N/A
Standard operating procedures:	Reference No. 13
Safety Analysis Reports:	Reference No. 14
Waste packaging logs:	N/A
Test plans/research project reports:	N/A
Site databases:	Reference No 15
Information from site personnel:	N/A
Standard industry documents:	N/A
Previous analytical data:	Reference Nos. 16, 17, 18, and 19
Material safety data sheets:	Reference No. 1, 16, 17, 18, 19, and 20
Sampling and analysis data from comparable/surrogate Waste:	N/A
Laboratory notebooks:	N/A

Sampling and Analysis Information[2]

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

Radiography:	Reference No. 8
Visual Examination:	Reference Nos. 9 and 10
Headspace Gas Analysis	
VOCs:	Reference No. 11
Flammable:	Reference No. 12
Other gases (specify):	N/A
Homogeneous Solids/Soils/Gravel Sample Analysis	
Total metals:	N/A
PCBs:	N/A
VOCs:	N/A
Nonhalogenated VOCs:	N/A
Semi-VOCs:	N/A
Other (specify):	N/A

Waste Stream Profile Form Certification:

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Signature of Site Project Manager	Printed Name and Title	Date
	Steve Carpenter SPM	9,10,10

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 Environmental Protection Agency (EPA) Hazardous Waste Numbers (HWNs), attach signed Characterization Information Summary documenting this determination.

(3) The BN510.1 waste stream includes waste from the following Annual Transuranic Waste Inventory Report (ATWIR) waste streams: IN-BN510, RLPFP-01, RL325-01, and RL231Z-01. The ATWIR waste stream ID "IN-BN510.1"and the waste stream description "BN510.1 is a newly generated debris waste stream generated from supercompacted 55-gallon containers of debris waste" will be added in the annual update of the ATWIR to be issued in 2011.

WASTE STREAM PROFILE CONTINUATION SHEET

Reference List:

1. RPT-TRUW-83, Acceptable Knowledge Summary for Supercompacted Debris Waste (BN510.1), Rev. 0, September, 2010
2. BNFL-5232-52-0101, Site Plan of the Advanced Mixed Waste Treatment Facility, Rev. 0, April 1999
3. RPT-TRUW-06, AMWTP Baseline AK for Newly-generated Waste, Rev. 12, August 16, 2010
4. RPT-TRUW-12, AMWTP Waste Stream Designations, Rev. 14, August 2, 2010
5. RPT-TRUW-05, Waste Matrix Code Reference Manual, Rev. 24, June 16, 2010
6. RPT-TRUW-07, Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge, Rev. 16, August 12, 2010
7. MP-TRUW-8.5, TRU Waste Certification, Rev. 25, December10, 2009
8. INST-OI-12, Real Time Radiography Operations (Drum), Rev. 44, June 30, 2010
9. INST-OI-34, Non-Facility Visual Examination Operations, Rev. 22, June 30, 2010
10. INST-FOI-17, Facility Visual Examination Operations, Rev. 19, June 30, 2010
11. INST-OI-43, HGAS Sampling and Analysis Operations, Rev.18, April 7, 2010
12. DOE/WIPP 06-3345, Waste Isolation Pilot Plant Flammable Gas Analysis, Rev. 3.2, May 22, 2009
13. INST-FOI-20, Supercompactor and Post-Compaction Operations, Rev. 30, March 4, 2010
14. RPT-DSA-02, Documented Safety Analysis, Rev. 6, December 2, 2009
15. BBWI-Generated Drum Data, including Data from the Transuranic Waste Management Information System (TWMIS).
16. RPT-TRUW-30, Acceptable Knowledge Summary for Supercompacted Debris Waste (BN510), Rev. 6, September 11, 2008
17. RPT-TRUW-56, Acceptable Knowledge Document for INL Stored Transuranic Waste-Rocky Flats Plant, Rev. 3, August 19, 2010
18. RPT-TRUW-04, Acceptable Knowledge Document for the Battelle Columbus Laboratories, Building JN-4 Plutonium Laboratory, Rev. 5, July 18, 2007
19. RPT-TRUW-13, Acceptable Knowledge Document for INL Stored Transuranic Waste-Mound Plant Waste, Rev. 6, August 21, 2008
20. RPT-TRUW-82, Acceptable Knowledge Document for Hanford Debris Waste Shipped to AMWTP, Rev. 1, June 21, 2010
21. MP-TRUW-8.1, Certification Plan for INL Transuranic Waste, Rev. 19, 6/30/2010
22. MP-TRUW-8.2, Quality Assurance Project Plan, Rev. 13, 6/30/2010

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

WSPF No.: BN510.1

Data Quality Objective	Yes	No	N/A	Comment
1. Have all containers in the lot been assigned an appropriate Waste Matrix Code?	☒	☐	☐	
2. Have waste material parameter weights been established for each container in the lot?	☒	☐	☐	
3. Does each waste container of waste contain transuranic (TRU) radioactive waste?	☒	☐	☐	
4. Have mean concentrations, 90 % Upper Confidence Level (UCL_{90}) values for the mean concentration, standard deviations, and the number of samples collected for each Volatile Organic Compound (VOC) in the headspace gas of waste containers in the waste stream lot been evaluated against the constituent hazardous waste number assignments?	☒	☐	☐	
5. Has the potential flammability of TRU waste headspace gases been evaluated for the lot?	☐	☐	☒	Central Characterization Project (CCP) will evaluate containers on an individual basis through transportation headspace gas and WIPP Data System (WDS).
6. Have mean concentrations, UCL_{90} values for the mean concentrations, standard deviations, and number of samples collected for VOCs, Semi-Volatile Organic Compounds (SVOCs), and metals in the waste stream lot been evaluated against the constituent hazardous waste number assignments? (if applicable)	☐	☐	☒	WAP solid sampling not required for this S5000 waste stream.

WSPF No.: BN510.1

Data Quality Objective	Yes	No	N/A	Comment
7. Does the waste stream exhibit a toxicity characteristic (TC) under 40 CFR Part 261, Subpart C?	☒	☐	☐	
8. Does the waste stream contain listed waste found in 20.4.1.200 NMAC incorporating 40 CFR Part 261, Subpart D?	☒	☐	☐	
9. Can the waste stream be classified as hazardous or nonhazardous at the UCL_{90}?	☒	☐	☐	
10. Was an appropriate packaging configuration and Drum Age Criteria (DAC) applied and documented in the headspace gas sampling documentation and was the drum age criteria met prior to sampling?	☒	☐	☐	
11. Have all tentatively identified compounds (TICs) been appropriately identified and reported in accordance with the requirements of MP-TRUW-8.2, Quality Assurance Project Plan, Section B3-1, for the lot?	☒	☐	☐	
12. Have the overall completeness, comparability, and representativeness quality assurance objectives (QAOs) been met for each of the analytical and testing procedures as specified in the QAPjP, Sections B3-2 through B3-9, for the lot?	☒	☐	☐	WAP solid sampling not required for this S5000 waste stream.
13. Have the program required quantitation limit (PRQLs) for all analyses been met for the lot?	☒	☐	☐	

WSPF No.: BN510.1

Data Quality Objective	Yes	No	N/A	Comment
14. Was an Open nonconformance report (NCR) search performed for all containers/pucks/source containers on the final list for the waste stream profile/reconciliation lot?	☒	☐	☐	
15. Was an Open NCR search performed for all batches in the final list for the waste stream profile/reconciliation lot?	☒	☐	☐	
16. Were all batches identified in the waste stream profile form (WSPF) or reconciliation lot complete through site project manager (SPM) signature release? List any batches identified as not complete through validation.	☒	☐	☐	
17. Were any open NCRs found that are applicable to the waste stream profile/reconciliation lot? List NCR, container, and batch.	☐	☒	☐	
18. Is there an approved AK Sufficiency Determination for this waste stream?	☐	☒	☐	

	Signature	Printed Name	Date
Site Project Manager		Steve Carpenter	9,10,10
2nd Site Project Manager	George Byram	George Byram	9-10-10

WSPF Number: BN510.1 Lot Number: Boxline 1

SPM

Printed Name: Steve Carpenter Signature: [signature] Date: 9.10.10

2nd SPM

Printed Name: George Byram Signature: George Byram Date: 9-10-10

SPM signature indicates that the information presented in this package is consistent with analytical batch reports and indicates concurrence with all information presented in this report.

WSPF Number: BN510.1 Lot Number: Boxline 1

Characterization Information Summary

Characterization Description:

Container selection and number of samples for Headspace Gas Sampling of S5000 waste streams and Solids Sampling of S3000/S4000 waste streams have been evaluated and meet the requirements established in MP-TRUW-8.25, Random Selection of Containers for Headspace Gas and Solids Sampling and Analysis.

Y ☒ N ☐ NA ☐

For "N" or "NA," provide rationale.

Introduction

Advanced Mixed Waste Treatment Project (AMWTP) has compiled Acceptable Knowledge (AK) information for waste stream BN510.1 Supercompacted Debris Waste as required by MP-TRUW-8.1, Certification Plan for INL Transuranic Waste and MP-TRUW-8.2, Quality Assurance Project Plan (QAPjP). [21, 22] In addition, AMWTP has conducted characterization testing and analysis using visual examination (VE), headspace gas sampling and analysis, and radioassay.

Justification for Selection of Radiography and/or VE as an appropriate method for characterizing the waste

The boxline waste is characterized using VE and the direct feed waste is characterized by RTR or VE. The supercompactor feed waste is amenable to using either real time radiography (RTR) or VE. Both methods are equally capable of providing qualified personnel the means to examine the waste and meet the data quality objectives (DQOs). VE is the appropriate method for characterizing boxline waste because it can be accomplished and recorded per the QAPjP (MP-TRUW-8.2) during sorting, size reduction, and repackaging into 55 gallon drums. Radiography is the appropriate method the direct feed line because it can be readily accomplished per the QAPjP (MP-TRUW-8.2) on direct feed drums. However, where dense or otherwise impenetrable objects and/or lead shielding that may create a

condition or configuration where examination using radiography will not yield acceptable DQOs, only direct visual examination is appropriate.
This Characterization Information Summary (CIS) presents the headspace gas analytical data from fourteen containers. These data meet the necessary characterization requirements for S5000 debris waste. The headspace gas sampling data from these fourteen containers is summarized in Tables 1A and 1B. Table 5 lists the correlation of container numbers to characterization data packages. Table 6 presents the RTR/VE summary of prohibited items. Table 7 presents the correlation between the container numbers and the headspace gas sample numbers.

The Site Project Manager (SPM) signature certifies that through AK, testing and/or analysis that the waste included in this waste stream is not corrosive, ignitable, reactive, or incompatible with the Treatment, Storage, and Disposal Facility (TSDF) and does not contain prohibited liquids. The AK Summary for this waste stream contains specific information about the corrosivity, reactivity, and ignitability of the waste stream and is included as an attachment to the Waste Stream Profile Form. By reference, that information is included in this profile.

Data Results

Headspace gas sampling was performed on all fourteen containers included in Boxline Lot 1 for BN510.1 waste stream. The statistical evaluation of the analytical data collected for BN510.1, Boxline Lot 1 is presented in Table 1. Table 5 lists the correlation of container numbers to characterization data packages. Table 7 lists the correlation of container number to headspace gas sample numbers. The data are used to determine the maximum and mean concentrations, standard deviation (SD), and 90% upper confidence level (UCL_{90}) for each volatile compound and to resolve the assignment of EPA HWNs for the BN510.1 waste stream. Per Section B2-2a of MP-TRUW-8.2, Quality Assurance Project Plan, the AMWTP used the data to calculate the UCL_{90} values for the waste stream and assign EPA HWNs as appropriate.

HWNs are assigned based on AK. HWNs assigned by AK are retained for the waste stream even if the headspace gas sampling analytical results for the assigned compounds are not above the program required quantitation limit (PRQL). No sampling UCL_{90} results are above the PRQL values for constituents associated with the toxicity characteristic HWNs (Table 1). The HWN assignment for this waste stream includes:

- Toxicity characteristic metals – D004 (arsenic), D005 (barium), D006 (cadmium), D007 (chromium), D008 (lead), D009 (mercury), D010, (selenium), and D011 (silver).
- Toxicity characteristic organics – D022 (chloroform), D027 (1,4- dichlorobenzene), D028 (1,2-dichloroethane), D029 (1,1-dichloroethylene), D030 (2,4-dinitrotoluene), D034 (hexachloroethane), D037 (pentachlorophenol), and D043 (vinyl chloride).
- F-Listed HWNs for spent solvents used for cleaning and degreasing , and in laboratory operations – F001 (1,1,1- trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,2,2-tetrachloro-1,2-difluoroethane, carbon tetrachloride, methylene chloride, tetrachloroethylene, trichloroethylene, and trichlorofluoromethane); F002 (1,1,1- trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,2-dichlorobenzene, chlorobenzene, methylene chloride, tetrachloroethylene, trichloroethylene, and trichlorofluoromethane); F004 (cresols and nitrobenzene); and F005 (2-ethoxyethanol, 2-nitropropane, benzene, carbon disulfide, isobutanol, methyl ethyl ketone, pyridine, and toluene).
- F-Listed HWNs from electroplating operations – F006, F007 and F009 waste generated as a result of contact with electroplating waste.

Headspace sampling results support AK. No additional EPA HWNs are required.

WSPF Number: BN510.1 Lot Number: Boxline 1

Table 1A. Headspace gas summary data.

Analyte	No. of Samples	No. of Samples above MDL [a]	Trans-formation Used [b]	Maxi-mum (ppmv)	Mean (ppmv)	Standard Deviation (ppmv)	UCL_{90} (ppmv)	Trans-formed PRQL	PRQL (ppmv)	EPA Number
Chloromethane [e]	14	0	None	1.20	1.20	0	[c]		10	
Methanol	14	0	None	34.5	34.5	0	[c]		100	
Ethyl ether	14	0	None	1.00	1.00	0	[c]		10	
1,1,2-Trichloro-1,2,2-trifluoroethane	14	0	None	1.15	1.15	0	[c]		10	F001, F002 [d]
1,1-Dichloroethylene	14	0	None	1.05	1.05	0	[c]		10	D029 [d]
Acetone	14	0	None	10.5	10.5	0	[c]		100	
Methylene chloride	14	9	Natural log	4.61	1.52	1.43	2.03	2.30	10	F001, F002 [d]
trans-1,2-Dichloroethylene	14	0	None	1.25	1.25	0	[c]		10	
1,1-Dichloroethane	14	0	None	1.25	1.25	0	[c]		10	
cis-1,2-Dichloroethylene	14	0	None	1.40	1.40	0	[c]		10	
Methyl ethyl ketone	14	0	None	12.0	12.0	0	[c]		100	F005 [d]
Chloroform	14	1	Natural log	1.25	0.435	0.236	0.519	2.30	10	D022 [d]
1,1,1-Trichloroethane	14	1	Natural log	1.39	0.719	0.192	0.788	2.30	10	F001, F002 [d]
Carbon tetrachloride	14	0	None	3.00	3.00	0	[c]		10	F001 [d]
Benzene	14	0	None	1.10	1.10	0	[c]		10	F005 [d]
1,2-Dichloroethane	14	0	None	2.10	2.10	0	[c]		10	D028 [d]
Butanol	14	0	None	30.0	30.0	0	[c]		100	
Trichloroethylene	14	1	None	7.50	1.65	1.68	2.26		10	F001, F002 [d]
Methyl isobutyl ketone	14	0	None	18.5	18.5	0	[c]		100	
Toluene	14	0	None	0.950	0.950	0	[c]		10	F005 [d]
Tetrachloroethylene	14	0	None	1.05	1.05	0	[c]		10	F001, F002 [d]
Chlorobenzene	14	0	None	1.05	1.05	0	[c]		10	F002 [d]
Ethyl benzene	14	0	None	1.15	1.15	0	[c]		10	
m- & p-Xylene	14	0	None	1.15	1.15	0	[c]		10	
o-Xylene	14	0	None	1.15	1.15	0	[c]		10	
Bromoform	14	0	None	1.55	1.55	0	[c]		10	
1,1,2,2-Tetrachloroethane	14	0	None	1.30	1.30	0	[c]		10	
Cyclohexane [f]	14	0	None	1.30	1.30	0	[c]		10	
Carbon disulfide [e]	14	0	None	1.25	1.25	0	[c]		10	F005 [d]
1,2,4-Trimethylbenzene [f]	14	0	None	1.35	1.35	0	[c]		10	
1,3,5-Trimethylbenzene [f]	14	0	None	1.35	1.35	0	[c]		10	

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 Shapiro-Wilk test for normality was applied to data prior to determination of the maximum, mean, SD, and UCL_{90}.

c. The mean and standard deviation presented are the mean and standard deviation of the method detection limits (after dividing by 2). All measurements are below detection; therefore, the upper 90% confidence limit is not calculated,

d. The HWNs for these constituents have been applied based on acceptable knowledge. No additional HWNs were added as a result of headspace gas sampling

e. Carbon disulfide (CAS No. 75-15-0) and chloromethane (CAS No. 74-87-3) are not target analytes for this waste stream but will be reported because they have been added as a target compound for other waste streams at AMWTP.

f. Cyclohexane (CAS No. 110-82-7), 1,2,4-trimethylbenzene (CAS No. 95-63-6), and 1,3,5-trimethylbenzene (CAS No. 108-67-8) are not target analytes for this waste stream but will be reported because they have been added as target compounds on the Agilent system at the AMWTP.

Did the data support EPA Hazardous Waste Numbers assigned by AK? Yes ✓ No _____

If no, describe the basis for assigning EPA Hazardous Waste Number(s):

Statistics Performed by:

Printed Name: J. Kettel Signature: [signature] Date: 9/9/10

WSPF Number: BN510.1 Lot Number: Boxline 1

Table 1B. Headspace gas summary data – tentatively identified compounds.

Tentatively Identified Compound	Maximum Observed Estimated Concentrations (ppmv)	No. of Samples Containing TIC	No. of Containers in Lot	% Detected	No. of Containers in Waste Stream to Date	% Detected
Cyclotetrasiloxane, octamethyl-	110	13	14	93	14	93
Trichlorofluoromethane	87	1	14	7.1	14	7.1

Notes:

Octamethylcyclotetrasiloxane is not listed in Appendix VIII of 40 CFR Part 261.

Did the data support EPA Hazardous Waste Numbers assigned by AK? Yes ✓ No _____

If no, describe the basis for assigning EPA Hazardous Waste Number(s):

Calculations performed by:

Printed Name: M. Johnson Signature: MJJohnson Date: 9/9/10

Verification of % Detected Calculation:

Printed Name: J. Kettel Signature: [signature] Date: 9/9/10

WSPF Number: BN510.1 Lot Number: Boxline 1

Table 5. Correlation of container identification numbers to data package.

Container No. [a]	Headspace Gas Analysis Data Package	RTR Data Package	RA Data Package	VE Data Package	Solid Sampling Data Package [b]	Solid Analysis Data Package [b]
BN10376274	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379527	N/A	N/A	ASY10-01896	VEB10-00906	N/A	N/A
10379532	N/A	N/A	ASY10-01905	VEB10-00909	N/A	N/A
10379533	N/A	N/A	ASY10-01896	VEB10-00905	N/A	N/A
10379536	N/A	N/A	ASY10-01905	VEB10-00906	N/A	N/A
10379541	N/A	N/A	ASY10-01896	VEB10-00905	N/A	N/A
10379598	N/A	N/A	ASY10-01905	VEB10-00906	N/A	N/A
BN10376278	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379487	N/A	N/A	ASY10-01906	VEB10-00906	N/A	N/A
10379560	N/A	N/A	ASY10-01906	VEB10-00910	N/A	N/A
10379577	N/A	N/A	ASY10-01905	VEB10-00910	N/A	N/A
10379583	N/A	N/A	ASY10-01906	VEB10-00909	N/A	N/A
10379592	N/A	N/A	ASY10-01905	VEB10-00909	N/A	N/A
10379593	N/A	N/A	ASY10-01906	VEB10-00909	N/A	N/A
10379751	N/A	N/A	ASY10-01906	VEB10-00910	N/A	N/A
BN10376279	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379440	N/A	N/A	ASY10-01893	VEB10-00903	N/A	N/A
10379530	N/A	N/A	ASY10-01906	VEB10-00906	N/A	N/A
10379568	N/A	N/A	ASY10-01905	VEB10-00910	N/A	N/A
10379569	N/A	N/A	ASY10-01906	VEB10-00910	N/A	N/A
10379571	N/A	N/A	ASY10-01905	VEB10-00909	N/A	N/A
10379573	N/A	N/A	ASY10-01905	VEB10-00909	N/A	N/A
BN10376281	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379563	N/A	N/A	ASY10-01907	VEB10-00910	N/A	N/A
10379578	N/A	N/A	ASY10-01905	VEB10-00910	N/A	N/A
10379581	N/A	N/A	ASY10-01906	VEB10-00909	N/A	N/A
10379737	N/A	N/A	ASY10-01907	VEB10-00911	N/A	N/A
10379743	N/A	N/A	ASY10-01907	VEB10-00911	N/A	N/A
10379746	N/A	N/A	ASY10-01910	VEB10-00911	N/A	N/A
BN10376282	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379105	N/A	N/A	ASY10-01896	VEB10-00907	N/A	N/A
10379543	N/A	N/A	ASY10-01893	VEB10-00905	N/A	N/A
10379551	N/A	N/A	ASY10-01893	VEB10-00905	N/A	N/A
10379552	N/A	N/A	ASY10-01893	VEB10-00905	N/A	N/A
10379601	N/A	N/A	ASY10-01897	VEB10-00908	N/A	N/A

WSPF Number: BN510.1 Lot Number: Boxline 1

Table 5. Correlation of container identification numbers to data package (continued).

Container No. [a]	Headspace Gas Analysis Data Package	RTR Data Package	RA Data Package	VE Data Package	Solid Sampling Data Package [b]	Solid Analysis Data Package [b]
BN10379513	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379492	N/A	N/A	ASY10-01893	VEB10-00905	N/A	N/A
10379547	N/A	N/A	ASY10-01893	VEB10-00905	N/A	N/A
10379553	N/A	N/A	ASY10-01893	VEB10-00905	N/A	N/A
10379554	N/A	N/A	ASY10-01893	VEB10-00905	N/A	N/A
BN10379514	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379356	N/A	N/A	ASY10-01885	VEB10-00899	N/A	N/A
10379371	N/A	N/A	ASY10-01885	VEB10-00898	N/A	N/A
10379439	N/A	N/A	ASY10-01893	VEB10-00903	N/A	N/A
10379481	N/A	N/A	ASY10-01893	VEB10-00904	N/A	N/A
10379499	N/A	N/A	ASY10-01892	VEB10-00904	N/A	N/A
10379502	N/A	N/A	ASY10-01893	VEB10-00904	N/A	N/A
BN10379515	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379314	N/A	N/A	ASY10-01885	VEB10-00897	N/A	N/A
10379484	N/A	N/A	ASY10-01893	VEB10-00904	N/A	N/A
10379501	N/A	N/A	ASY10-01893	VEB10-00904	N/A	N/A
10379537	N/A	N/A	ASY10-01896	VEB10-00906	N/A	N/A
10379556	N/A	N/A	ASY10-01893	VEB10-00904	N/A	N/A
BN10379516	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379312	N/A	N/A	ASY10-01885	VEB10-00897	N/A	N/A
10379365	N/A	N/A	ASY10-01885	VEB10-00898	N/A	N/A
10379370	N/A	N/A	ASY10-01885	VEB10-00898	N/A	N/A
10379503	N/A	N/A	ASY10-01892	VEB10-00904	N/A	N/A
BN10379517	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379490	N/A	N/A	ASY10-01893	VEB10-00905	N/A	N/A
10379491	N/A	N/A	ASY10-01896	VEB10-00905	N/A	N/A
10379498	N/A	N/A	ASY10-01892	VEB10-00904	N/A	N/A
10379548	N/A	N/A	ASY10-01896	VEB10-00905	N/A	N/A
10379588	N/A	N/A	ASY10-01897	VEB10-00906	N/A	N/A
10379599	N/A	N/A	ASY10-01897	VEB10-00906	N/A	N/A
BN10379518	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379488	N/A	N/A	ASY10-01893	VEB10-00904	N/A	N/A
10379534	N/A	N/A	ASY10-01897	VEB10-00905	N/A	N/A
10379538	N/A	N/A	ASY10-01896	VEB10-00906	N/A	N/A
10379542	N/A	N/A	ASY10-01896	VEB10-00905	N/A	N/A
10379595	N/A	N/A	ASY10-01897	VEB10-00906	N/A	N/A
10379596	N/A	N/A	ASY10-01897	VEB10-00906	N/A	N/A

WSPF Number: BN510.1 Lot Number: Boxline 1

Table 5. Correlation of container identification numbers to data package (continued).

Container No. [a]	Headspace Gas Analysis Data Package	RTR Data Package	RA Data Package	VE Data Package	Solid Sampling Data Package [b]	Solid Analysis Data Package [b]
BN10379521	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379500	N/A	N/A	ASY10-01893	VEB10-00904	N/A	N/A
10379544	N/A	N/A	ASY10-01896	VEB10-00905	N/A	N/A
10379546	N/A	N/A	ASY10-01896	VEB10-00905	N/A	N/A
10379550	N/A	N/A	ASY10-01893	VEB10-00905	N/A	N/A
10379589	N/A	N/A	ASY10-01897	VEB10-00906	N/A	N/A
10379597	N/A	N/A	ASY10-01896	VEB10-00905	N/A	N/A
BN10379523	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379441	N/A	N/A	ASY10-01892	VEB10-00904	N/A	N/A
10379486	N/A	N/A	ASY10-01893	VEB10-00904	N/A	N/A
10379489	N/A	N/A	ASY10-01893	VEB10-00904	N/A	N/A
10379549	N/A	N/A	ASY10-01896	VEB10-00905	N/A	N/A
10379557	N/A	N/A	ASY10-01896	VEB10-00904	N/A	N/A
BN10379713	HS110-00021	N/A	N/A	N/A	N/A	N/A
10379528	N/A	N/A	ASY10-01910	VEB10-00911	N/A	N/A
10379561	N/A	N/A	ASY10-01910	VEB10-00911	N/A	N/A
10379567	N/A	N/A	ASY10-01907	VEB10-00910	N/A	N/A
10379586	N/A	N/A	ASY10-01906	VEB10-00909	N/A	N/A
10379742	N/A	N/A	ASY10-01910	VEB10-00911	N/A	N/A
10379744	N/A	N/A	ASY10-01910	VEB10-00911	N/A	N/A

a. Container numbers are listed in a sequence with the 100-gallon container first, then subsequently listed are the corresponding 55-gallon containers that were supercompacted to pucks and placed in the 100-gallon container.
b. WAP solid sampling is not required for S5000 waste

WSPF Number: BN510.1 Lot Number: Boxline 1

Table 6. RTR/VE summary of prohibited items.

Container No. [a]	RTR Prohibited Items [b]	VE Prohibited Items [c]
BN10376274	N/A	Completed [d]
10379527	N/A	Completed
10379532	N/A	Completed
10379533	N/A	Completed
10379536	N/A	Completed
10379541	N/A	Completed
10379598	N/A	Completed
BN10376278	N/A	Completed [d]
10379487	N/A	Completed
10379560	N/A	Completed
10379577	N/A	Completed
10379583	N/A	Completed
10379592	N/A	Completed
10379593	N/A	Completed
10379751	N/A	Completed
BN10376279	N/A	Completed [d]
10379440	N/A	Completed
10379530	N/A	Completed
10379568	N/A	Completed
10379569	N/A	Completed
10379571	N/A	Completed
10379573	N/A	Completed
BN10376281	N/A	Completed [d]
10379563	N/A	Completed
10379578	N/A	Completed
10379581	N/A	Completed
10379737	N/A	Completed
10379743	N/A	Completed
10379746	N/A	Completed
BN10376282	N/A	Completed [d]
10379105	N/A	Completed
10379543	N/A	Completed
10379551	N/A	Completed
10379552	N/A	Completed
10379601	N/A	Completed

WSPF Number: BN510.1 Lot Number: Boxline 1

Table 6. RTR/VE summary of prohibited items (continued).

Container No. [a]	RTR Prohibited Items [b]	VE Prohibited Items [c]
BN10379513	N/A	Completed [d]
10379492	N/A	Completed
10379547	N/A	Completed
10379553	N/A	Completed
10379554	N/A	Completed
BN10379514	N/A	Completed [d]
10379356	N/A	Completed
10379371	N/A	Completed
10379439	N/A	Completed
10379481	N/A	Completed
10379499	N/A	Completed
10379502	N/A	Completed
BN10379515	N/A	Completed [d]
10379314	N/A	Completed
10379484	N/A	Completed
10379501	N/A	Completed
10379537	N/A	Completed
10379556	N/A	Completed
BN10379516	N/A	Completed [d]
10379312	N/A	Completed
10379365	N/A	Completed
10379370	N/A	Completed
10379503	N/A	Completed
BN10379517	N/A	Completed [d]
10379490	N/A	Completed
10379491	N/A	Completed
10379498	N/A	Completed
10379548	N/A	Completed
10379588	N/A	Completed
10379599	N/A	Completed
BN10379518	N/A	Completed [d]
10379488	N/A	Completed
10379534	N/A	Completed
10379538	N/A	Completed
10379542	N/A	Completed
10379595	N/A	Completed
10379596	N/A	Completed

WSPF Number: BN510.1 Lot Number: Boxline 1

Table 6. RTR/VE summary of prohibited items (continued).

Container No. [a]	RTR Prohibited Items [b]	VE Prohibited Items [c]
BN10379521	N/A	Completed [d]
10379500	N/A	Completed
10379544	N/A	Completed
10379546	N/A	Completed
10379550	N/A	Completed
10379589	N/A	Completed
10379597	N/A	Completed
BN10379523	N/A	Completed [d]
10379441	N/A	Completed
10379486	N/A	Completed
10379489	N/A	Completed
10379549	N/A	Completed
10379557	N/A	Completed
BN10379713	N/A	Completed [d]
10379528	N/A	Completed
10379561	N/A	Completed
10379567	N/A	Completed
10379586	N/A	Completed
10379742	N/A	Completed
10379744	N/A	Completed

a. Container numbers are listed in a sequence with the 100-gallon container first, then subsequently listed are the corresponding 55-gallon containers that were supercompacted to pucks and placed in the 100-gallon container.
b. RTR was not performed on any of the containers in Boxline Lot 1.
c. See Table 5 for the associated VE data packages. None of the identified containers contain prohibited items as defined by Section B-1c of the AMWTP Quality Assurance Project Plan QAPjP, MP-TRUW-8.2.
d. VE is performed on the 55-gallon containers prior to supercompaction and placement of the pucks in the 100-gallon containers; therefore, verification of no prohibited items for the contents of the 100-gallon container has been completed.

WSPF Number: BN510.1 Lot Number: Boxline 1

Table 7. Correlation of container numbers to sample numbers.

Container No.	Headspace Gas Sample Number	Solid Sample Number(s) [a]
BN10376274	57658	N/A
BN10376278	57662	N/A
BN10376279	57659	N/A
BN10376281	57661	N/A
BN10376282	57670	N/A
BN10379513	57669	N/A
BN10379514	57667	N/A
BN10379515	57664	N/A
BN10379516	57663	N/A
BN10379517	57665	N/A
BN10379518	57666	N/A
BN10379521	57668	N/A
BN10379523	57671	N/A
BN10379713	57660	N/A

a. WAP solid sampling is not required for S5000 waste

Attachment A
Evaluation of Required Number of Samples. BN510.1 Boxline Lot 1

ANALYTE	Number of Samples	Number of Samples above MDL [a]	Trans-formation Used [b]	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	UCL_{90} (mg/kg)	Trans-formed PRQL	PRQL (mg/kg)	Required number of samples [c, d, e]	Comments
Chloromethane [f]	14	0	None	1.20	1.20	0			10		No samples above MDL
Methanol	14	0	None	34.5	34.5	0			100		No samples above MDL
Ethyl ether	14	0	None	1.00	1.00	0			10		No samples above MDL
1,1,2-Trichloro-1,2,2-trifluoroethane	14	0	None	1.15	1.15	0			10		HWNs F001/F002 applied
1,1-Dichloroethylene	14	0	None	1.05	1.05	0			10		HWN D029 applied
Acetone	14	0	None	10.5	10.5	0			100		No samples above MDL
Methylene chloride [c]	14	9	Natural log	4.61	1.52	1.43	2.03	2.30	10	10	HWNs F001/F002 applied
trans-1,2-Dichloroethylene	14	0	None	1.25	1.25	0			10		No samples above MDL
1,1-Dichloroethane	14	0	None	1.25	1.25	0			10		No samples above MDL
cis-1,2-Dichloroethylene	14	0	None	1.40	1.40	0			10		No samples above MDL
Methyl ethyl ketone	14	0	None	12.0	12.0	0			100		HWN F005 applied
Chloroform	14	1	Natural log	1.25	0.435	0.236	0.519	2.30	10	10	HWN D022 applied
1,1,1-Trichloroethane	14	1	Natural log	1.39	0.719	0.192	0.788	2.30	10	10	HWNs F001/F002 applied
Carbon tetrachloride	14	0	None	3.00	3.00	0			10		HWN F001 applied
Benzene	14	0	None	1.10	1.10	0			10		HWN F005 applied
1,2-Dichloroethane	14	0	None	2.10	2.10	0			10		HWN D028 applied
Butanol	14	0	None	30.0	30.0	0			100		No samples above MDL
Trichloroethylene	14	1	None	7.50	1.65	1.68	2.26		10		HWNs F001/F002 applied
Methyl isobutyl ketone	14	0	None	18.5	18.5	0			100		No samples above MDL
Toluene	14	0	None	0.950	0.950	0			10		HWN F005 applied
Tetrachloroethylene	14	0	None	1.05	1.05	0			10		HWN F001/F002 applied
Chlorobenzene	14	0	None	1.05	1.05	0			10		HWN F002 applied
Ethyl benzene	14	0	None	1.15	1.15	0			10		No samples above MDL
m- & p-Xylene	14	0	None	1.15	1.15	0			10		No samples above MDL

Attachment A
Evaluation of Required Number of Samples. BN510.1 Boxline Lot 1

ANALYTE	Number of Samples	Number of Samples above MDL [a]	Trans-formation Used [b]	Maximum (mg/kg)	Mean (mg/kg)	SD (mg/kg)	UCL_{90} (mg/kg)	Trans-formed PRQL	PRQL (mg/kg)	Required number of samples [c, d, e]	Comments
o-Xylene	14	0	None	1.15	1.15	0			10		No samples above MDL
Bromoform	14	0	None	1.55	1.55	0			10		No samples above MDL
1,1,2,2-Tetrachloroethane	14	0	None	1.30	1.30	0			10		No samples above MDL
Cyclohexane [g]	14	0	None	1.30	1.30	0			10		No samples above MDL
Carbon disulfide [f]	14	0	None	1.25	1.25	0			10		HWN F005 applied
1,2,4-Trimethylbenzene [g]	14	0	None	1.35	1.35	0			10		No samples above MDL
1,3,5-Trimethylbenzene [g]	14	0	None	1.35	1.35	0			10		No samples above MDL

a. The mean and standard deviation presented are the mean and standard deviation of the MDLs (after dividing by 2) for all measurements that are below detection. If all measurements are below detection, the UCL_{90} is not calculated.

b. The Shapiro-Wilk test for normality was applied to data prior to determination of maximum, mean, SD, and UCL_{90}.

c. If there are no samples above the MDL for a given analyte, then that analyte will not be used to define the number of required samples.

d. If the calculated sample size is less than 10, then the number of required samples is set to the program-defined minimum of 10.

e. The required number of samples for VOCs listed in Table IV.D.1 of the WIPP Hazardous Waste Facility Permit was calculated using equation A-8 in MP-TRUW-8.25.

f. Carbon disulfide (CAS No. 75-15-0) and chloromethane (CAS No. 74-87-3) are not target analytes for this waste stream but will be reported because they have been added as a target compound for other waste streams at AMWTP.

g. Cyclohexane (CAS No. 110-82-7), 1,2,4-trimethylbenzene (CAS No. 95-63-6), and 1,3,5-trimethylbenzene (CAS No. 108-67-8) are not target analytes for this waste stream but will be reported because they have been added as target compounds on the Agilent system at the AMWTP

Acceptable Knowledge Summary for Supercompacted Debris Waste (BN510.1)

Advanced Mixed Waste Treatment Project

Approved:

E. Torres 9/10/10

Enrique Torres
TRU Programs Manager

Pending CBFO Approval
Date

REVISION LOG

Revision Number	Date Approved	Pages Affected	Description of Revision
0	Pending CBFO Approval	All	DCR-9081. Initial issue.

CONTENTS

FIGURES

TABLES

ACRONYMS

AK	acceptable knowledge
AMWTF	Advanced Mixed Waste Treatment Facility
AMWTP	Advanced Mixed Waste Treatment Project
ATWIR	Annual Transuranic Waste Inventory Report
BC	Battelle Columbus (prefix)
BN	AMWTP (prefix)
CBFO	Carlsbad Field Office
CCP	Central Characterization Project
CFR	Code of Federal Regulations
CH	contact-handled
CH-TRAMPAC	Contact-Handled Transuranic Waste Authorized Methods for Payload Control
CWS	Chemical Warfare Service
D&D	decommissioning and dismantling
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DU	depleted uranium
DWPG	drummed waste packaging glovebox
EDMS	electronic document management system
EPA	U.S. Environmental Protection Agency
EU	enriched uranium
HEPA	high efficiency particulate air
HENC	High-Efficiency Passive Neutron Counter
HSG	headspace gas
HWN	hazardous waste number
IDC	Item Description Code
INL	Idaho National Laboratory
LLD	lower limit of detection
LLNL	Lawrence Livermore National Laboratory
LSA	low specific activity
MD	Mound Plant (prefix)
MEK	methyl ethyl ketone
MPFPD	Mixed Plutonium Finishing Plant Debris
NDA	non-destructive analysis
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration

PCB	polychlorinated biphenyl
PFP	plutonium finishing plant
PK	process knowledge
PMC	plutonium-molybdenum cermet
POS	Plant Optimization System
PPE	personal protective equipment
PPO	pressed plutonium oxide
R&D	research and development
RCRA	Resource Conservation and Recovery Act
RF	Rocky Flats Plant (prefix)
RL	Richland, Washington Hanford Site (prefix)
RLMPFPCD	Richland Mixed Plutonium Finishing Plant Comprehensive Debris
RTG	radioisotopic thermoelectric generators
RTR	real-time radiography
SCW	special case waste
SWB	Standard Waste Box
TRU	transuranic
TRUCON	TRU waste content codes
TSCA	Toxic Substance Control Act
TWBIR	Transuranic Waste Baseline Inventory Report
VE	visual examination
VOC	volatile organic compound
WAC	Waste Acceptance Criteria
WAP	Waste Analysis Plan
WETP	WIPP experimental test program
WG Pu	weapons-grade plutonium
WIPP	Waste Isolation Pilot Plant
WMC	Waste Matrix Code
WMF	Waste Management Facility
WMP	waste material parameter
WSPF	Waste Stream Profile Form
WTS	AMWTP Waste Tracking System

Advanced Mixed Waste Treatment Project

Acceptable Knowledge Summary for Supercompacted Debris Waste (BN510.1)

1.0 WASTE STREAM DESCRIPTION

1.1 Waste Stream Number

BN510.1

1.2 Basic Waste Stream Information

1.2.1 Waste Stream Name

Supercompacted Debris Waste

1.2.2 Point of Generation

Advanced Mixed Waste Treatment Facility (AMWTF), Building Waste Management Facility (WMF)-676.

1.2.3 Waste Stream Volume (Newly Generated)

Projected Volumes:

16,000 100-gallon drums (3,330 m^3)[2]

105 Standard Waste Boxes (SWBs) (198 m^3)[2]

Fifty percent of the debris waste feedstock is estimated to contain greater than 100 nanocuries per gram (nCi/g) transuranic (TRU) alpha activity and 50% contains less than 100 nCi/g TRU alpha activity.[14]

1.2.4 Generation Dates and Rate of Generation

August 2010 – December 2018

The average generation rate is estimated to be 120 m^3 per month.[28]

1.2.5 TRUCON Codes

ID121[3]

1.2.6 Waste Isolation Pilot Plant (WIPP) Waste Stream ID

Waste Stream ID: IN-BN510.1.[a]

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a. The BN510.1 waste stream includes waste from the following Annual Transuranic Waste Inventory Report (ATWIR) waste streams: IN-BN510, RLPFP-01, RL325-01, and RL231Z-01. The ATWIR waste stream ID "IN-BN510.1" will be added in the annual update of the ATWIR to be issued in 2011.[28]

1.2.7 Summary Category Group

S5000 – Debris Waste[4]

1.2.8 Waste Matrix Code Group

Heterogeneous Debris Waste.

1.2.9 Waste Matrix Code

S5490 – Unknown/Other Heterogeneous Debris Category.

The unknown/other-heterogeneous Waste Matrix Code (WMC) includes waste that is consistent with the definition for the Heterogeneous Debris (S5400), but does not meet the criteria for assignment into the S5410, S5420, S5440, S5450, or S5460 specific-detailed categories.[4] The waste stream consists of supercompacted debris waste.

1.2.10 Description from the ATWIR

The proposed Annual Transuranic Waste Inventory Report (ATWIR) description for waste stream BN510.1 is a newly generated debris waste stream generated from supercompacted 55-gallon containers of debris waste. This description is identical to the BN510 waste stream that is currently included in the ATWIR, with the exception of the stream number "BN510.1."[b]

1.2.11 Defense Determination for AMWTP Waste

The supercompacted debris waste stream (BN510.1) generated at the Advanced Mixed Waste Treatment Project (AMWTP) is a result of compaction of waste generated at the Rocky Flats (RF), Mound (MD), Battelle Columbus (BC), Hanford (RL), and AMWTP (BN). The debris wastes identified as feedstock to the AMWTP supercompactor were generated from defense-related processes or activities at the five U.S. Department of Energy (DOE) sites as follows:

- The transuranic (TRU) debris wastes generated at RF and shipped to the Idaho National Laboratory (INL) were generated through defense program activities, or commingled with non-defense program waste that cannot be segregated. Furthermore, there is no historical record or evidence of spent nuclear fuel or high-level waste ever having been handled at the RF facility.[7, 19]

- The majority of the MD debris waste feedstock was generated during defense-related operations conducted at the MD for a variety of customers, including Lawrence Livermore National Laboratory (LLNL), Hanford, Oak Ridge National Laboratory (ORNL), and the Space Program. Plutonium-238 heat sources were designed and developed for spacecraft, generators, and satellites used directly by the U.S. Department of Defense (DOD) or in support of DOD missions. One of the major space programs supported by MD was the

b. The waste stream description for the new waste stream BN510.1 will be added in the annual update of the ATWIR to be issued in 2011.

Space Nuclear Auxiliary Power system, which was sponsored by the DOD. Operations at the facility included processing and recovering plutonium, developing reactor fuels, conducting reactor fuel waste studies, and recovery of tritium and other isotopes for both DOD and domestic or private entities. The radioisotopic content (e.g., plutonium and other TRU isotopes of interest) of the MD debris waste feedstock is the result of commingling of wastes from both defense-related and domestic activities.[8, 20]

- Debris waste feedstock shipped from BC to the INL was generated during decommissioning and dismantling (D&D) of the JN-3 (Research Reactor Building) and other facilities. Defense-related operations were conducted at BC in support of Army, Navy, and Air Force programs. These operations included weapons-related activities and defense research into plutonium materials properties and development, plutonium metallurgy, actinide joining, and weapons production and assembly. Processing of test shot samples, development of ^{238}Pu heat sources for spacecraft for DOD, and some specialized work for Los Alamos were conducted in the JN-4 Plutonium Laboratory.[9, 21, 22, 23]

- The debris waste feedstock generated at RL and shipped to the AMWTP was generated during nuclear materials production, nuclear waste and materials by-products management, and defense research and development (R&D) activities conducted at RL facilities. Due to the nature of the work performed at RL analytical facilities, defense-related activities were carried out concurrent with non-defense projects and the wastes were commingled at the point of generation. Segregation of waste into defense and non-defense portions is not feasible. The RL debris waste may contain debris waste that has been determined to be waste that is incidental to reprocessing of spent nuclear fuel. The debris waste is not spent nuclear fuel or high-level waste.[29]

- The waste generated at the AMWTF is the result of contact with defense related TRU debris waste feedstock during treatment, characterization, maintenance, repackaging, and management.[6]

In accordance with interim guidance, defense wastes are identified as those wastes generated during work involving only defense activities, or during work in which defense and non-defense wastes were inadvertently mixed in the past and from which the non-defense portion cannot be segregated. The TRU wastes included in the BN510.1 Waste Stream Profile Form (WSPF) meet this definition.[24, 25]

1.3 Waste Stream Description

The newly generated debris waste stream (BN510.1) is generated from supercompaction of 55-gallon containers of debris waste. The supercompacted debris waste (i.e., BN510.1) is generated from a single process (i.e., supercompaction). The waste produced from supercompaction is similar in material, physical form, and hazardous constituents, and is a single waste stream (Table 1). A list of authorized debris waste feedstock (by original generator and Item Description Code [IDC]) is presented in Appendix A.[31] A description of the processes that generated the supercompacted debris waste is presented in Section 1.4.4.

Table 1. Physical waste form description for BN510.1.

ATWIR Number	IDC	WMC	Description
IN-BN510.1[a]	BN-550	S5490	Debris waste from multiple debris waste feedstock sources that have been supercompacted into pucks and packaged into 100-gallon drums.[b]

a. Waste stream BN510.1 will be added to the ATWIR after it is approved by the Carlsbad Field Office (CBFO).[28]

b. A list of debris waste feedstock IDCs is presented in Appendix A of this report.

Supercompacted debris waste consists of various combustible and noncombustible debris materials that originated from multiple DOE sites (i.e., RF, MD, BC, RL, and BN).[6]

The BN510.1 supercompacted debris waste stream includes waste from Hanford Richland Mixed Plutonium Finishing Plant Comprehensive Debris (RLMPFPCD) stream and the following previously approved WIPP-WSPFs: [29, 31, 37, 40, 41]

- AMWTP BN510 [31, 37]
- Hanford RLM231ZD.001 [29, 37]
- Hanford RLM325D.001 [29, 37]
- Hanford RLMPDT.001 [Mixed Plutonium Finishing Plant Debris (MPFPD)] [29, 37, 40]

Supercompacted debris waste includes: paper and rags; gloves; wipes; asbestos; personal protective equipment (PPE); plastic and rubber items; filters; leaded gloves, aprons, bricks, and sheeting; metal with and without lead or cadmium; floor tiles, piping, sheet rock, insulation, and glass; raschig rings; crucibles; fire brick; wood; Plexiglas®; Benelex®; pieces of equipment and tools; graphite; grit; and asphalt and concrete packaged in 55-gallon drums, supercompacted, and packaged into 100-gallon product drums. Supercompacted debris may contain small amounts of non-debris waste such as absorbed liquids, soil, dirt, sand, absorbent, or homogeneous solids. Non-debris waste will be less than 50% by volume in each 100-gallon drum of compacted debris.[7, 8, 9, 29]

1.4 Process Description

1.4.1 Areas of Operation

The BN510.1 waste stream is generated by supercompaction of debris waste feedstock at the AMWTF in Building WMF-676. The debris waste feedstock is introduced into the supercompactor as any of the following:

- Direct feed (in original 55-gallon drums from the generator site).
- From the drummed waste packaging glovebox (DWPG) where drummed waste is sorted and repackaged into new 55-gallon drums.

- From the waste treatment boxline(s) where boxed waste is sorted, size-reduced, and repackaged into 55-gallon drums.

The supercompactor, a glovebox with a 2,000-ton capacity compactor, size-reduces 55-gallon waste drums to roughly one-fifth their normal size. The supercompacted drums (pucks) are then packaged into 100-gallon containers (puck drums).

1.4.2 Process Flow Diagram

Figure 1 presents a flow diagram illustrating the generation and processing of AMWTP supercompacted debris waste.

1.4.3 Waste Generating Process

The AMWTP waste generation process is supercompaction of individual 55-gallon drums of debris waste feedstock into pucks (the final waste form). Debris waste feedstock contained in 55-gallon drums is characterized and validated through radioassay and real-time radiography (RTR)/visual examination (VE) to verify contents and then sent directly to the supercompactor for processing.[11, 32, 33, 34, 35]

Debris waste feedstock drums (e.g., 55- or 85-gallon drums) that require repackaging are introduced into the DWPG. Boxed waste, including six-drum overpacks (containing 55- or 85-gallon drums), are introduced into a boxline for sorting and repackaging into 55-gal drums. Prohibited items are processed in the boxline or SCW glovebox (prohibited items processed in the SCW glovebox are not returned as feedstock). After treating, sorting, and/or removal of prohibited item(s), the waste is repackaged into 55-gallon drums as IDC BN-508.[10, 11] No campaigning of feedstock type or generator site debris waste feedstock occurs during the supercompaction process. There is no cleanout of the boxline(s) except for periodic housekeeping. Repackaged waste drums and direct feed drums (not requiring repack) are fed into the supercompactor.

Supercompaction is the treatment for unprotected sharp objects and sealed containers greater than four liters that do not contain prohibited liquids. Because there are no layers of confinement following supercompaction, it is also the treatment for excess layers of confinement. After compaction, the drum pucks are loaded into 100-gallon drums (IDC BN-550).[10] No additional chemicals or waste constituents are added to the supercompacted debris waste as a result of this process.

Debris waste generated during repackaging and VE is also included in the supercompactor feedstock. This facility-generated waste is visually examined.[11]

The plant optimization system (POS) is used to optimize processing drums through the supercompactor to produce 100-gallon drums (containing compacted drum pucks) to meet the WIPP Waste Acceptance Criteria (WAC).[10, 27]

1.4.3.1 Liquid Waste Generation

Any liquids that may be generated as a consequence of supercompaction are removed from the supercompactor sump, absorbed, packaged, and dispositioned.[10, 11, 30] This liquid waste is not included in the supercompacted debris waste stream (BN510.1) and is managed as a separate waste.

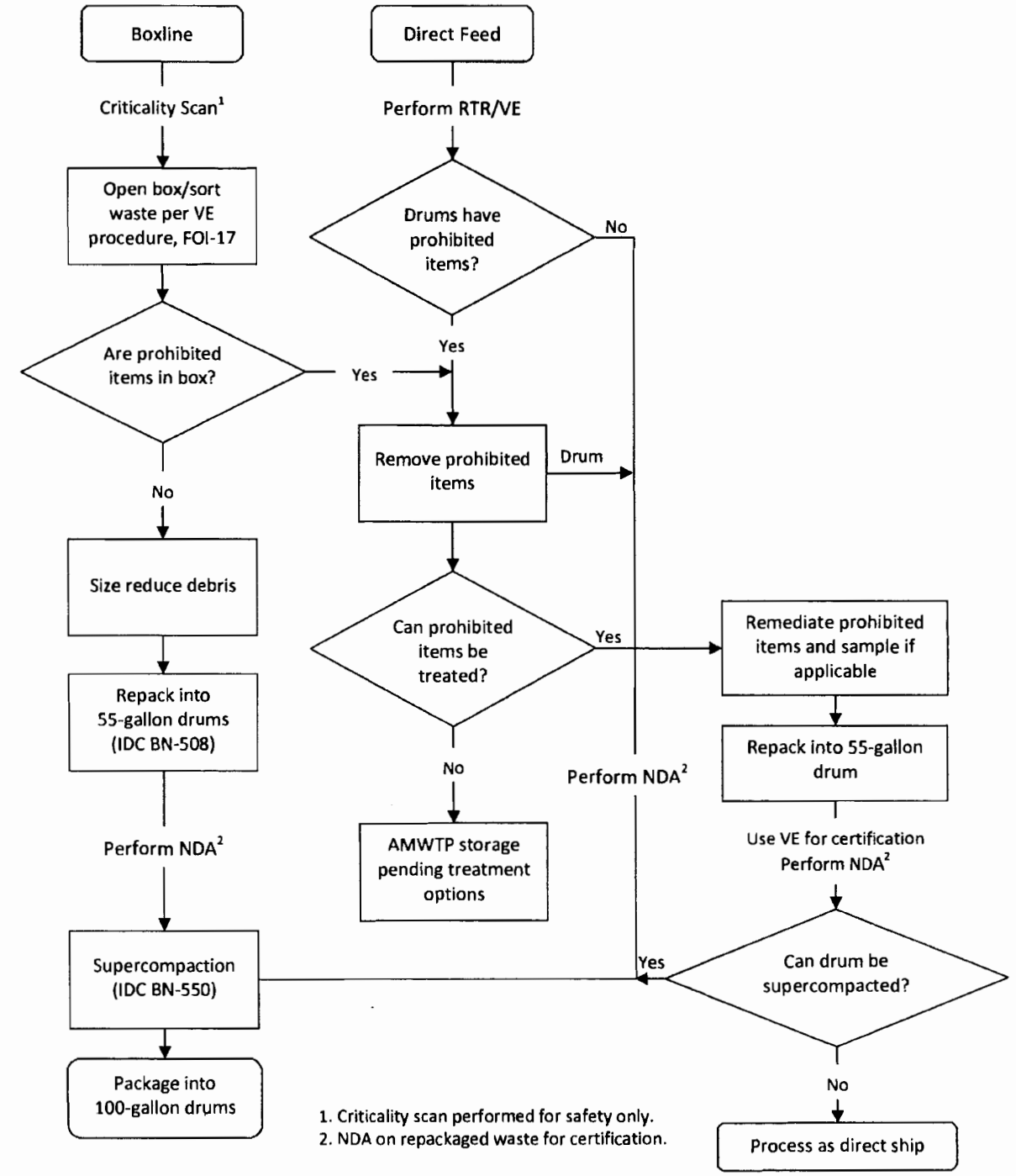

Figure 1. General flowchart for supercompacted debris waste generation and processing at the AMWTP.

1.4.4 Material Inputs

The heterogeneous debris waste feedstock to the supercompactor originated from multiple DOE sites (i.e., RF, MD, BC, RL, and BN).

The AMWTP retrievably-stored debris waste feedstock was generated at the RF, MD, and BC. The debris waste feedstock was generated during plutonium pit production; depleted uranium component fabrication; enriched uranium processing; support operations including radionuclide recovery, waste treatment, maintenance, laboratory analysis, and machining of non-nuclear weapon components; R&D; special order work; fabrication of ^{238}Pu heat sources and manufacture of radioisotopic thermoelectric generators (RTGs); D&D activities; and materials development.[7, 8, 9]

The RL debris waste feedstock shipped to the AMWTP was generated during plutonium production and fabrication; radiochemical processing and plutonium metallurgy laboratory activities; R&D; D&D technology development; and maintenance, cleanout, stabilization, and D&D activities.[29]

The BN debris waste feedstock is generated as a result of AMWTP waste facility maintenance operations, treatment (i.e., supercompaction, absorption of prohibited liquids, and removal of prohibited items), characterization, and general container management activities.[6]

The processes that generated debris wastes are listed below:

- RF

  Plutonium metal and plutonium-containing materials manufacture, recovery, and treatment[7]

  Plutonium production support operations including maintenance, laboratory activities, and R&D[7]

  Non-routine events including renovations, spills, fires, and decommissioning[7]

  Construction, demolition, and D&D operations.[7]

- MD

  D&D of the Mound Plant Facility[8]

  Pressed plutonium oxide (PPO) sphere and plutonium-molybdenum cermet (PMC) production[8]

  Plutonium and other isotopic recovery[8]

  Plutonium manufacture support such as laboratory activities and R&D[8]

  Facility maintenance.[8]

- BC

  Research into the metallurgical and ceramic properties of plutonium and its alloys[9]

  Plutonium processing[9]

  Development of nuclear fuels[9]

  D&D of the BC facilities.[9]

- RL

  Plutonium Finishing Plant production, maintenance, cleanout, stabilization, and D&D[29]

  - RLMPDT.001 (MPFPD)[29, 40]
  - RLMPFPCD[29, 41]

  Building 325 Radiochemical Processing Laboratory activities (RLM325D.001)[29]

  Building 231-Z cleanout operations/activities, metallurgy R&D, plutonium fabrication, and D&D technology development (RLM231ZD.001).[29]

- BN

  Characterization activities[6]

  Repackaging activities[6]

  Waste treatment activities including supercompaction, absorption of prohibited liquids, and removal of prohibited items[6]

  Facility operations including waste management and maintenance.[6]

The debris waste feedstock received and stored at the AMWTP is packaged in 55- or 85-gallon drums and a variety of boxes, bins, and crates. These boxes, bins, and crates are constructed of metal or fiberglass reinforced plywood. The types of supercompactor debris waste feedstock containers are as follows:

- Direct feed 55-gallon drums without rigid liners identified by generator (RF, MD, BC, BN) assigned IDCs.
- Direct feed 55-gallon drums with rigid liners identified by generator (RF, MD, BC) assigned IDCs.
- Repackaged RF, MD, BC, RL and BN debris waste from the boxline or DWPG in 55-gallon drums.

The first two bulleted types of debris waste feedstock containers retain their generator assigned IDCs until compaction.[1]

The AMWTP Baseline AK for Newly Generated Waste, RPT-TRUW-06[6] was compiled to provide the AK baseline report for the AMWTP newly generated wastes in accordance with MP-TRUW-8.13, Collection, Review, and Management of Acceptable Knowledge Documentation.[13] RPT-TRUW-56, Acceptable Knowledge Document for INL Stored Transuranic Waste – Rocky Flats Plant Waste; RPT-TRUW-13, Acceptable Knowledge Document for INL Stored Waste-Mound Plant Waste; RPT-TRUW-04, Acceptable Knowledge Document for the Battelle Columbus Laboratories Building JN-4 Plutonium Laboratory; and RPT-TRUW-82, Acceptable Knowledge Document for Hanford Debris Waste Shipped to AMWTP, are the AMWTP baseline documents for the RF, MD, BC, and RL facilities, respectively.[7, 8, 9, 29]

Non-hazardous solidification agents Aquaset®, Aquaset II-G®, Micro-Cel® E, Petroset II® or Petroset IIG® may be added to the waste by AMWTP to absorb prohibited liquids within debris waste.[38, 39, 42]

The flow of the AMWTP AK documentation is presented in Figure 2.

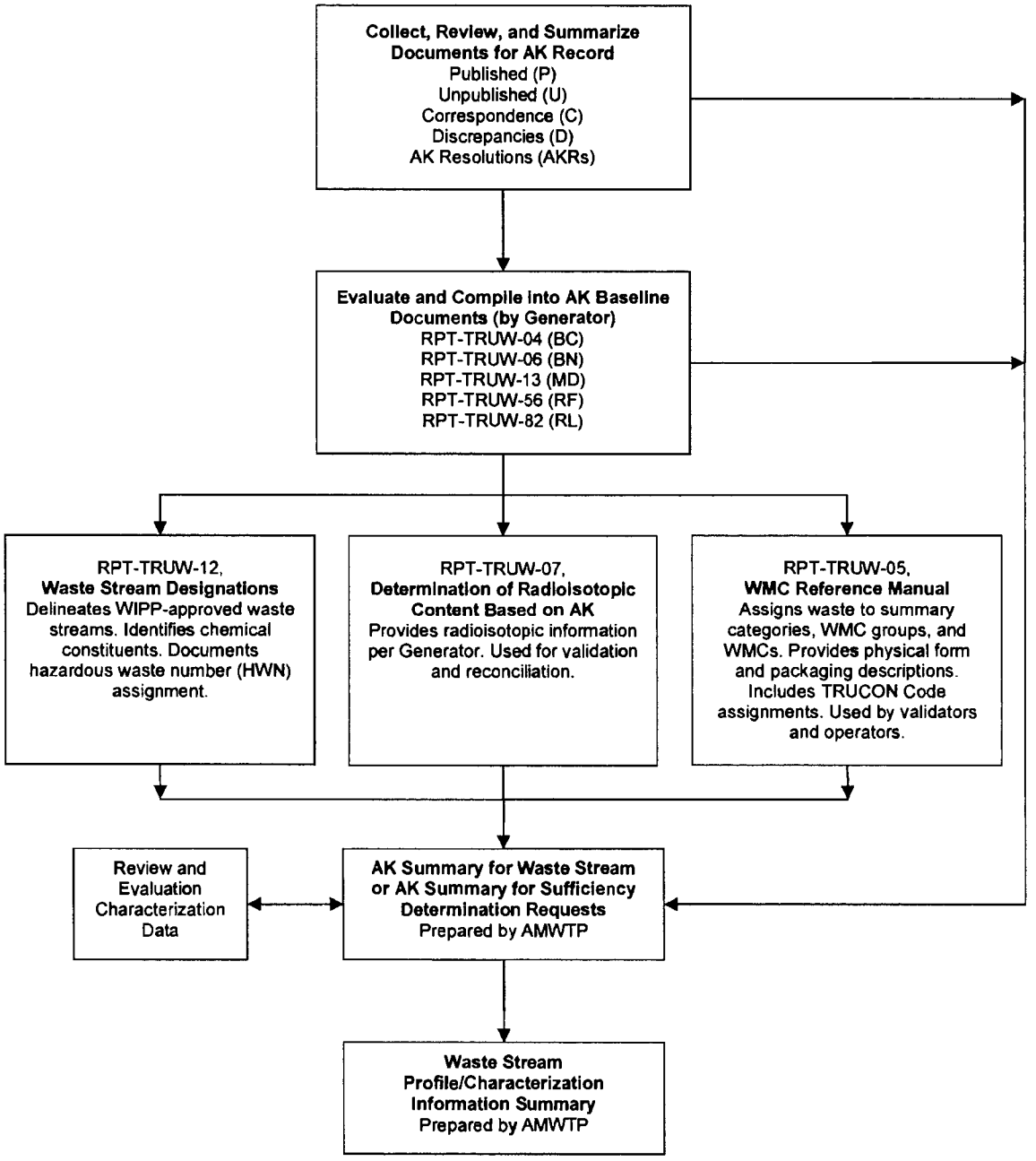

Figure 2. Document hierarchy and information flow for AK.

1.4.5 Waste Material Parameters

Product drums from the BN510 supercompacted debris waste stream generated from 2005 through 2009 were used to estimate the waste material parameter (WMP) weight percentages for the BN510.1 waste stream. WMP data for 22,399 containers with completed RTR/VE data from the BN510 waste stream were obtained from the AMWTP Waste Tracking System (WTS) database for containers examined prior to January 1, 2010. This population represents approximately 54% of the estimated volume of supercompacted waste (i.e., 22,399 out of 41,600 drums projected for BN510 and BN510.1 waste streams). The estimated WMP weights (by percent) for the BN510.1 waste stream, excluding 100-gallon drum packaging, were calculated in accordance with the requirements of MP-TRUW-8.13. The estimated WMP weight parameters are representative of the BN510.1 waste stream and are summarized in Table 2.[12, 13]

Table 2. Waste material parameters for supercompacted debris waste.

Waste Material Parameters	Estimated Percent WMP weight/unit waste
Iron-based Metals/Alloys	52
Aluminum-based Metals/Alloys	<1
Other Metals	<1
Other Inorganic Materials	3
Cellulosics	22
Rubber	1
Plastics (waste materials)	22
Inorganic Matrix	<1
Organic Matrix	<1
Soils/Gravel	<1

1.5 AK Sufficiency Determination

No AK sufficiency determinations apply to this waste stream.

1.6 Prohibited Items

The following items are prohibited at the WIPP facility in accordance with Section B-1c of the WIPP Waste Analysis Plan (WAP).[27]

- Liquid waste and prohibited observable liquids.
- Sealed containers greater than 4 liters.
- Non-radionuclide pyrophoric materials.

- Hazardous wastes not occurring as co-contaminants with TRU mixed wastes.
- Wastes incompatible with backfill, seal and panel closure materials, container and packaging materials, shipping container materials, or other wastes.
- Wastes containing explosives or compressed gases.
- Wastes with polychlorinated biphenyls (PCBs) not authorized under an Environmental Protection Agency (EPA) PCB waste disposal authorization.
- Wastes exhibiting the characteristic of ignitability, corrosivity, or reactivity (Hazardous Waste Numbers [HWNs] D001, D002, or D003).
- Waste that has ever been managed as high-level waste and waste from tanks specified in Table B-8 of MP-TRUW-8.2, Quality Assurance Project Plan, unless specifically approved though a Class 3 permit modification.[27]
- Any waste container from a waste stream (or waste stream lot) that has not undergone either RTR or VE of a statistically representative subpopulation of the waste stream in each shipment, as described in Attachment B7 of MP-TRUW-8.2.[27]

Debris waste feedstock containers that are identified as containing prohibited items during RTR or VE are treated (to absorb prohibited liquids or to remove prohibited items) or are rejected, as appropriate. None of the supercompacted debris drums shipped to WIPP will contain prohibited items.

Boxline(s) are used to VE and repackage the boxed debris waste into 55-gallon drums. Debris waste feedstock treated or examined in the DWPG, and waste from maintenance and cleanup activities, which is visually examined, are repackaged into 55-gallon drums. The 55-gallon drums are non-destructive assayed to determine suitability for supercompaction. These drums of debris waste feedstock are then supercompacted and the pucks packaged into a 100-gallon product drum (IDC BN-550).[10, 11]

Prohibited items that can be treated to remove the prohibited characteristic are managed as newly generated waste. Containers with WIPP-prohibited liquids may be treated using non-hazardous solidification agents (e.g., Aquaset®, Aquaset II-G®, Petroset II® or Petroset IIG® or Micro-Cel® E) to render the waste acceptable prior to shipment.[38, 39, 42] Newly generated waste is characterized and assigned to an appropriate waste stream. [5, 27] In the event the treatment renders a debris waste form that can be compacted, it is included in BN510.1 as IDC BN-508.

1.7 Resource Conservation and Recovery Act Determination

1.7.1 EPA Hazardous Waste Numbers

Supercompacted debris is characterized as mixed TRU waste. The HWNs assigned to the authorized supercompacted debris waste feedstock include HWNs associated with the debris waste feedstock as originally compiled in the AK baseline documents.[6, 7, 8, 9, 29]

Toxicity characteristic HWNs applied to the supercompacted debris waste are:

D004 (arsenic)], D005 (barium), D006 (cadmium), D007 (chromium), D008 (lead), D009 (mercury), D010 (selenium), D011 (silver) D022 (chloroform), D027 (1,4-dichlorobenzene), D028 (1,2-dichloroethane), D029 (1,1-dichloroethylene), D030 (2,4-dinitrotoluene), D034 (hexachloroethane), D037 (pentachlorophenol), and D043 (vinyl chloride).

Listed HWNs applied to this waste stream are:

F001: 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,2,2-tetrachloro-1,2-difluoroethane, carbon tetrachloride, methylene chloride, tetrachloroethylene, trichloroethylene, and, trichlorofluoromethane;

F002: 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,2-dichlorobenzene , chlorobenzene, methylene chloride, tetrachloroethylene, trichloroethylene, and trichlorofluoromethane;

F004: cresols and nitrobenzene;

F005: 2-ethoxyethanol, 2-nitropropane, benzene, carbon disulfide, isobutanol, methyl ethyl ketone (MEK), pyridine, and toluene; and

F006, F007, and F009: electroplating waste.

The HWNs assigned to the BN wastes generated in the facility as a result of handling and processing feedstock waste are derived from the compilation of all EPA HWNs assigned to the authorized debris waste feedstock from the contributing generator sites (Table 3).[6, 7, 8, 9, 29]

Table 3. HWN assignment by generator site.

Generator Site/Activity	Arsenic D004	Barium D005	Cadmium D006	Chromium D007	Lead D008	Mercury D009	Selenium D010	Silver D011	Chloroform D022	1,4-Dichlorobenzene D027	1, 2-Dichloroethane D028	1,1-Dichloroetthylene D029	2,4-Dinitrotoluene D030	Hexachloroethane D034	Pentachlorophenol D037	Vinyl Chloride D043	Spent Solvents F001	Spent Solvents F002	Spent Solvents F004	Spent Solvents F005	Electroplating waste F006 F007 F009
Rocky Flat[7]																					
Isotope recovery [b]	•	•	•	•	•	•	•	•													
Laboratory reagents, research	•	•	•	•	•	•	•	•	•											• [a]	
Degreasing, decontamination																	• [a]	• [a]			
Cleaning, spill clean up																				• [a]	
Electroplating																					• [a]
Based on AK/HSG											•	•									
Mound Plant[8]																					
PPO & PMC production and isotope recovery [b]	•	•	•	•	•	•	•	•													
Cleaning and degreasing																	• [c]	• [c]		• [c]	
Electroplating																					• [c]
Based on AK/HSG									•			•									

Table 3 (continued)

Activity	Arsenic D004	Barium D005	Cadmium D006	Chromium D007	Lead D008	Mercury D009	Selenium D010	Silver D011	Chloroform D022	1,4-Dichlorobenzene D027	1, 2-Dichloroethane D028	1,1-Dichloroetthylene D029	2,4-Dinitrotoluene D030	Hexachloroethane D034	Pentachlorophenol D037	Vinyl Chloride D043	Spent Solvents F001	Spent Solvents F002	Spent Solvents F004	Spent Solvents F005	Electroplating waste F006 F007 F009
Battelle Columbus [9]																					
Metallurgical research		•	•	•	•	•		•													
Cleaning and degreasing																	•[d]	•[d]		•[d]	
Hanford [32, 42]																					
PFP plutonium metal production operations and glovebox activities including maintenance, clean out, D&D and stabilization:																					
• RLMPDT.001 (MFPFP)	•	•	•	•	•	•	•	•					•								
• RLMPFPCD	•	•	•	•	•	•	•	•	•				•				•[e]	•[e]	•[e]	•[e]	
Radiochemistry Processing Laboratory operations and maintenance (RLM325D.001)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•[e]	•[e]	•[e]	•[e]	
Metallurgy operations, cleanout, and D&D (RLM231ZD.001)			•	•	•	•											•[e]	•[e]		•[e]	

Table 3 (continued)

Activity	Arsenic D004	Barium D005	Cadmium D006	Chromium D007	Lead D008	Mercury D009	Selenium D010	Silver D011	Chloroform D022	1,4-Dichlorobenzene D027	1, 2-Dichloroethane D028	1,1-Dichloroetthylene D029	2,4-Dinitrotoluene D030	Hexachloroethane D034	Pentachlorophenol D037	Vinyl Chloride D043	Derived-From Rule F001	Derived-From Rule F002	Derived-From Rule F004	Derived-From Rule F005	Derived-From Rule F006 F007 F009
AMWTP[7, 8, 9, 32, 42]																					
Newly generated waste from composited feedstock (i.e., supercompaction operations),	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•[f]	•[f]	•[f]	•[f]	•[f]

a. RF – F001 =, 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, carbon tetrachloride, tetrachloroethylene and trichloroethylene; F002 = 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, methylene chloride, tetrachloroethylene, and trichloroethylene; and F005 = 2-ethoxyethanol, benzene, carbon disulfide, methyl ethyl ketone, and toluene; and F006, F007, and F009 are assigned due to electroplating waste contamination.

b. Process used to recover radioisotopes (e.g., plutonium, americium, neptunium, etc.) which caused precipitation of metals as well as the radionuclides.

c. MD - F001 = 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, carbon tetrachloride, and methylene chloride; F002 =1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, and methylene chloride; F005 = benzene, carbon disulfide, MEK, and toluene. F007 and F009 HWNs are assigned due to electroplating waste contamination

d. BC – F001= methylene chloride and trichloroethylene; F002 = methylene chloride and trichloroethylene; and F005 = benzene, MEK, and toluene.

e. RL – F001=1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,2,2-tetrachloro-1,2-difluoroethane, carbon tetrachloride, methylene chloride, tetrachloroethylene, trichloroethylene, and trichlorofluoromethane; F002 = 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,2-dichlorobenzene, chlorobenzene, methylene chloride, tetrachloroethylene, trichloroethylene, and trichlorofluoromethane; F004 = cresols and nitrobenzene; and F005 = 2-nitropropane, benzene, carbon disulfide, isobutanol, MEK, pyridine and toluene.

f. BN (product drum)– F001= 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,2,2-tetrachloro-1,2-difluoroethane, carbon tetrachloride, methylene chloride, tetrachloroethylene, trichloroethylene and trichlorofluoromethane; F002 = 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane; 1,2-dichlorobenzene, chlorobenzene, methylene chloride; tetrachloroethylene, trichloroethylene, and trichlorofluoromethane; F004 = cresols and nitrobenzene; F005 = 2-ethoxyethanol, 2-nitropropane, benzene, carbon disulfide, isobutanol, MEK, pyridine and toluene; and F006, F007, and F009 are assigned due to electroplating waste contamination.

1.7.2 Hazardous Determination

The hazardous waste determination for supercompacted debris waste is described in the following subsections.

1.7.2.1 Ignitability

The waste materials in this waste stream do not meet the 40 Code of Federal Regulation (CFR) 261.21 definition of ignitability. Ignitable wastes are prohibited from entering the supercompactor. The supercompacted debris waste is not a liquid, an ignitable compressed gas, or an oxidizer. If found, liquid in excess of WIPP-WAC limits will be removed or undergo treatment (absorption) prior to supercompaction and WIPP disposal. Containers that are identified as having prohibited liquids may be treated using Aquaset®, Aquaset II-G®, Petroset II®, Petroset IIG® or Micro-Cel® E absorbents to ensure that the waste is acceptable for disposal at WIPP.[38, 39,42] The waste materials in this waste stream are not compressed gas and do not contain compressed gas. The waste does not meet the U.S. Department of Transportation (DOT) definition of an oxidizer as defined in 49 CFR 173. Finally, the waste is not capable of causing fire through friction, absorption of moisture, or spontaneous chemical change. This waste stream does not exhibit the characteristic of ignitability (D001).

1.7.2.2 Corrosivity

The materials in this waste stream do not meet the 40 CFR 261.22 definition of corrosivity. The supercompacted debris waste is not liquid waste and does not contain liquids in excess of WIPP-WAC limits. If found, liquid in excess of WIPP-WAC limits will be removed or treated (absorbed) prior to supercompaction and WIPP disposal. Containers that are identified as having prohibited liquids may be treated using Aquaset®, Aquaset II-G®, Petroset II®, Petroset IIG® or Micro-Cel® E absorbents to ensure that the waste is acceptable for disposal at WIPP. [38, 39,42] Therefore, this waste stream does not exhibit the characteristic of corrosivity (D002).

1.7.2.3 Reactivity

The waste materials in this waste stream do not meet the 40 CFR 261.23 definition of reactivity. Reactive wastes are prohibited from entering the supercompactor. Supercompacted debris is not a liquid waste. Any containers that are identified as having prohibited liquids may be treated using Aquaset®, Aquaset II-G®, Petroset II® or Petroset IIG®, or Micro-Cel® E absorbents to ensure that the waste is acceptable for disposal at WIPP.[38, 39,42] The BN510.1 waste stream is stable and will not undergo violent chemical change, react violently with water, form potentially explosive mixtures with water, or generate toxic gases, vapors, or fumes when mixed with water. The waste does not contain sulfide waste which, when exposed to a pH between 2 and 12.5 can generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment. The waste is not capable of detonation or explosive reaction if subjected to a strong initiating source if heated under confinement. The waste is not readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure. The materials do not contain explosive material and are not forbidden explosives or Division 1.1, 1.2, or 1.3 (Class A or B) explosives as defined in 49 CFR Part, 173. Although the waste contains wastes that are assigned F006, F007, and F009 listed HWNs that are associated with cyanide electroplating operations, the waste when exposed to a pH between 2 and 12.5 will not generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment. This non-reactive position is based on AMWTP AK documents that debris waste being used as feedstock

is a non-reactive Resource Conservation and Recovery Act (RCRA) waste. This waste stream does not exhibit the characteristic of reactivity (D003).

1.7.2.4 Toxicity

The supercompacted debris waste stream contains RCRA toxicity constituents associated with toxicity characteristic metals and organics. See Table 3 for process related activities associated with the HWNs.

The RCRA toxicity characteristic metals and organics assigned to this waste stream are: D004 (arsenic); D005 (barium); D006 (cadmium); D007 (chromium); D008 (lead); D009 (mercury); D010 (selenium); D011 (silver); D022 (chloroform); D027 (1,4-dichlorobenzene); D028 (1,2-dichloroethane); D029 (1,1-dichloroethylene); D030 (2,4-dinitrotoluene); D034 (hexachloroethane); D037 (pentachlorophenol); and D043 (vinyl chloride).[1, 6, 7, 8, 9, 18, 29, 31]

The RCRA toxicity characteristic metal HWNs: D004 (arsenic); D005 (barium); D006 (cadmium); D007 (chromium); D008 (lead); D009 (mercury); D010 (selenium); D011 (silver) were identified based on AK documentation associated with RF, MD, BC, BN and RL feedstock for the BN510.1 WSPF. The D004, D005, D006, D007, D008, D009, D010, and D011 HWNs are assigned to the supercompacted debris waste stream. [1, 6, 7, 8, 9, 29, 31]

The HWN D022 (chloroform) was assigned based on AK documentation associated with RF, MD, and RL feedstock to the BN510.1 WSPF. The associated toxicity characteristic HWN D022 is assigned to the supercompacted debris waste stream.[29, 31]

The HWNs D027 (1,4-dichlorobenzene); D030 (2,4–dinitrotoluene); D034 (hexachloroethane); D037 (pentachlorophenol); and D043 (vinyl chloride) were assigned based on AK documentation associated with RL feedstock to the BN510.1 WSPF. The associated toxicity characteristic HWNs D027, D030, D034, D037 and D043 are assigned to the supercompacted debris waste stream.[29]

The HWNs D028 (1,2-dichloroethane) and D029 (1,1-dichloroethylene) were assigned in the AK documentation associated with RF and RL feedstock to the BN510.1 WSPF. The D028 and D029 HWNs are assigned to the supercompacted debris waste stream.[18, 29, 31]

1.7.2.5 Listed Waste

F-Listed HWNs. The supercompacted debris waste stream contains constituents associated with RCRA listed waste HWNs. See Table 3 for process related activities associated with the HWNs.

The BN510.1 supercompacted debris waste stream is assigned the F-listed HWNs: F001, F002, F004, F005, F006, F007, and F009. These F-Listed HWNs were historically assigned to feedstock waste by the original generator of the waste, for spent solvents used for cleaning, degreasing, and laboratory operations, and from electroplating operations. [1, 6, 7, 8, 9, 16, 29]

The HWNs: F001 (1,1,1- trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,2,2-tetrachloro-1,2-difluoroethane, carbon tetrachloride, methylene chloride, tetrachloroethylene, trichloroethylene, and trichlorofluoromethane) and F002 (1,1,1- trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,2-dichlorobenzene, chlorobenzene, methylene chloride, tetrachloroethylene, trichloroethylene, and

trichlorofluoromethane) were assigned based on AK documentation associated with RF, MD, BC and RL feedstock to the BN510.1 WSPF. In addition, the F002 hazardous waste constituents 1,2-dichlorobenzene, chlorobenzene were assigned based on AK documentation associated with RL feedstock to the BN510.1 WSPF. Therefore, supercompacted debris waste stream is assigned the EPA HWNs F001 and F002.[1, 6, 7, 8, 9, 29]

Non-halogenated F003 solvent constituents (e.g., acetone, cyclohexanone, ethyl benzene, ethyl ether, methanol, methyl isobutyl ketone, n-butly alcohol, and xylenes) were identified in the AK and process knowledge (PK) record as contaminants associated with the supercompactor debris waste feedstock. The BN510.1 waste stream does not exhibit the characteristic of ignitability. Therefore the F003 HWN is not assigned to the supercompacted debris waste stream.[1]

The HWN F004 (cresols and nitrobenzene) were assigned based on AK documentation associated with RL feedstock to the BN510.1 WSPF. The resultant supercompacted debris waste retains the listed HWNs assigned to the supercompactor feedstock based on current regulatory requirements (i.e., the RCRA derived from rule). Therefore, supercompacted debris waste stream is assigned the EPA HWN F004.[29]

The HWN F005 (2-ethoxyethanol, 2-nitropropane, benzene, carbon disulfide, isobutanol, MEK, pyridine, and toluene) were assigned based on AK documentation associated with RF, MD, BC and RL feedstock to the BN510.1 WSPF. Therefore, supercompacted debris waste stream is assigned the EPA HWN F005.[1, 6, 7, 8, 9, 29]

The HWNs F006, F007 and F009 were assigned based on AK documentation associated with RF feedstock and HWNs F007 and F009 were also assigned based on AK documentation associated with MD feedstock to the BN510.1 WSPF. Therefore, supercompacted debris waste is assigned the F006, F007, and F009 EPA HWNs.[1, 6, 7, 16]

P-, U- and K- Listed HWNs. The feedstock debris wastes in this waste stream are not discarded, unused, commercial chemical products, off-specification species, or manufacturing intermediates and do not contain spill residues thereof that would meet the listing of P- or U-listed hazardous waste as identified in 40 CFR 261.33. In addition, the waste materials in this waste stream were not mixed with, or derived from, the treatment, storage, or disposal of P- or U-listed waste. As a result, P- or U-listed HWNs are not assigned to this waste stream.[1, 6, 7, 8, 9, 29]

Although hydrofluoric acid was identified as a chemical contaminant associated with the supercompactor debris waste feedstock, only spent forms of hydrofluoric acid would have contaminated the feedstock debris waste. Based on this information, the U134 HWN is not assigned to this waste stream.[1, 6, 7, 8, 9, 29]

Based on a review of AK, it was determined that the BN510.1 waste stream will contain less than one percent beryllium by weight. Beryllium is a contaminant associated with this waste. The source of the beryllium is not associated with a powdered form and is not associated with unused commercial chemical product, an off-specification species, or a container residue, and does not contain a spill residue thereof. The P015 HWN for beryllium powder is not assigned to this waste stream.[1, 6, 7, 8, 9, 29]

The waste materials within this waste stream are not hazardous waste from specific sources listed in 40 CFR 261.32 (i.e., K-listed hazardous waste) and they have not been mixed with; derived from the

treatment, storage, or disposal of K-listed wastes; and do not contain spill residues thereof. The waste materials in this waste stream are not assigned K-listed HWNs. [1, 6, 7, 8, 9, 29]

Toxic Substances Control Act (TSCA) Regulated Contaminants. PCB items with PCB concentrations equal to or exceeding 50 parts per million are not expected in the BN510.1 waste stream.

Drums of debris waste feedstock identified during RTR/VE as containing PCB items are segregated or sent to DWPG or SCW for item removal.[1, 17, 30, 31] PCB items identified in boxed debris are removed during boxline operations. PCB items removed from debris waste feedstock drums and boxes are packaged as newly generated waste and are not authorized as supercompactor debris waste feedstock.

Asbestos has been identified in some of the debris feedstock waste. Any containers identified as containing regulated types or quantities (e.g., greater than 1% of friable asbestos) will be labeled, as required, in accordance withToxic Substance Central Act (TSCA) and Occupational Safety and Health Administration (OSHA) regulations.

Other Applicable Waste Streams. The AMWTP BN510 waste stream is pertinent to the BN510.1 waste stream. The IDCs identified within Appendix A includes IDCs previously identified within the BN510 WIPP-approved WSPF. The EPA HWNs assigned to the BN510 WSPF included D004 through D011, D022, D028, D029, F001, F002, F005, F006, F007, and F009.[31] The EPA HWNs assigned to BN510.1 include D004 through D011, D022, D027, D028, D029, D034, D037, D043, F001, F002, F004, F005, F006, F007, and F009. The addition of the D027, D034, D037, D043 and F004 HWNs is due to AK associated with the inclusion of RL debris waste into the supercompactor feedstock.[29]

1.8 Radionuclides

The radionuclides of concern for BN510.1 are ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{233}U, ^{234}U, ^{238}U, and ^{241}Am. The remaining WIPP-tracked radionuclides, ^{137}Cs and ^{90}Sr, are not expected to be present in measurable quantities in debris waste feedstock from RF except for IDC RF-480 due to disposal of isotopic sealed source material. Cesium-137 and computed ^{90}Sr are anticipated radionuclides for IDC RF-480 feedstock and may be detected during non-destructive analysis (NDA). Cesium-137 and ^{90}Sr were identified as potentially present in MD, BC, and RL debris waste. [7, 8, 9, 14, 29]

At a minimum, the ratios of the two most prevalent radionuclides in the isotopic mix are compared to confirm existing AK data in compliance with contact handled (CH)-WAC requirements. The two most prevalent radionuclides expected in the majority of AMWTP supercompacted debris waste product drums are ^{239}Pu and ^{240}Pu. This is based on a review of product drums included in the BN510 WSPF; however, the prevalent radioisotopes in some product drums of supercompacted debris waste may be a combination of ^{239}Pu and a different second TRU or uranium isotope due to commingling of wastes.

Table 4 identifies the predominant radionuclides and the principle source of those radionuclides for each of the original generators and for the supercompacted debris wastes.[7, 8, 9, 14, 29] For waste containers that have multiple generators and therefore a mixture of weapons grade plutonium (WG Pu), enriched uranium (EU), depleted uranium (DU), heat source isotopes, and fuel grade plutonium, a combination of any two of the common isotopes identified may be detected as the most prevalent. Radioassay data are reviewed and assessed by AMWTP NDA personnel as described in the RPT-TRUW-03, Drum Assay Technical Review Report.[15]

The radioisotopic content for each AMWTP supercompacted debris waste 100-gallon product drum will be calculated based on the aggregate of the non-destructive analysis (NDA) results for each of the compacted debris waste feedstock drums contained therein. The POS is used to ensure that each payload container does not exceed WAC weight or dose limits and complies with the required TRU activity (greater than 100 nCi/g). The direct feed 55-gallon drums will contain at least one TRU radionuclide greater than the lower limit of detection (LLD). The 100-gallon product drums that contain puck(s) with TRU radionuclides at less than LLD from the boxline feed, as determined by 55-gallon drum assay, are assayed using the Super high energy neutron counter (HENC) for final TRU determination.

Table 4. Predominant radionuclides expected in debris wastes by generator site.

Generator Site	Principal Plutonium Source	Predominant Radionuclides by Activity
RF	WG	^{239}Pu, ^{240}Pu
RF	WG, DU, EU	^{239}Pu (^{235}U or ^{238}U)
MD	WG	^{239}Pu, ^{240}Pu
MD	Heat source	^{238}Pu, ^{239}Pu
BC	WG	^{239}Pu, ^{240}Pu
RL	Combination WG Pu, fuels-grade Pu	^{239}Pu (^{241}Pu or ^{241}Am)
BN	WG (RF waste)	^{239}Pu, ^{240}Pu
BN	Combination WG Pu, heat source Pu	^{238}Pu, ^{239}Pu
BN	Combination WG Pu, heat source Pu, uranium, fuels-grade Pu	^{239}Pu (^{240}Pu, ^{241}Pu, ^{238}Pu, ^{241}Am, ^{235}U or ^{238}U)

2.0 SHIPPING CONSIDERATIONS

2.1 Waste Packaging

BN510.1 consists of supercompacted drums of debris waste (pucks) placed directly into 100-gallon product drums. There are no inner packaging or layers of confinement associated with the 100-gallon product drums. There is a filtered lid on the 100-gallon drums. If 100-gallon drums become damaged, they are packaged into SWBs for shipment to WIPP.

2.2 Flammability Consideration

The payload containers in the waste stream must comply with the Contact-Handled Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC) requirements. As specified in the CH-TRAMPAC, a determination of compliance with the flammable gas limits will be performed for volatile organic compounds (VOCs), hydrogen, and methane. Headspace gas (HSG) sampling and analysis is performed when required by the WIPP-WAP and/or CH-TRAMPAC. At a minimum, the HSG analytical results are evaluated to determine the total concentration of flammable VOCs present in the waste. Payload containers, including those with HSG results exceeding 500 parts per million flammable VOCs, are evaluated for compliance with applicable CH-TRAMPAC requirements prior to shipment.

Payloads containing flammable VOCs are managed in accordance with CCP-PO-003, CCP Transuranic Authorized Methods for Payload Control (CCP CH-TRAMPAC).[26]

3.0 REFERENCES

NOTE: AMWTP documents such as procedures, AK reports, and operating instructions, are cited without revision numbers or dates. The most recent revisions of these documents are available through the AMWTP Electronic Document Management System (EDMS). Previous revisions are available on EDMS.

1. RPT-TRUW-12, AMWTP Waste Stream Designations
2. MLJ-004-10, Revised Estimated Number of Containers for the BN510.1 Supercompacted Debris Waste Stream, September 1, 2010. [C850A]
3. DOE/WIPP 01-3194, CH-TRU Waste Content Codes (CH-TRUCON)
4. DOE/LLW-217, DOE Waste Treatability Group Guidance, 1995. [P670A]
5. MP-TRUW-8.1, Certification Plan for INL Transuranic Waste
6. RPT-TRUW-06, AMWTP Baseline AK for Newly Generated Waste
7. RPT-TRUW-56, Acceptable Knowledge Document for INL Stored Transuranic Waste – Rocky Flats Plant Waste
8. RPT-TRUW-13, Acceptable Knowledge Document for INL Stored Transuranic Waste – Mound Plant Waste
9. RPT-TRUW-04, Acceptable Knowledge Document for the Battelle Columbus Laboratories, Building JN-4 Plutonium Laboratory
10. INST-FOI-20, Supercompactor and Post-Compaction Operations
11. INST-FOI-17, Facility Visual Examination Operations
12. MLJ-02-10, Memorandum to File, Waste Material Parameter (WMP) Weight per Unit of Waste Calculations for the BN510.1 Supercompacted Debris Waste Stream, March 10, 2010. [C851A]
13. MP-TRUW-8.13, Collection, Review, and Management of Acceptable Knowledge Documentation
14. RPT-TRUW-07, Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge
15. RPT-TRUW-03, Drum Assay Technical Review Report
16. Rocky Flats Environmental Technology Site Backlog Waste Reassessment Baseline Book, May 5, 1994-March 5 2001. [P052A]
17. Summary of PCB AK Sources, Wastren, Inc., September 5, 2001. [C207A]

18. Memorandum from Steve Carpenter to Eric Schweinsberg, Detection of 1,1-Dichloroethylene in BNINW216, Rev.1 Reconciliation Lots, April 2005. [C311A]

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22. Interview of David Freas, BCL, regarding Historical Operations in Building JN-4, September 2000. [C259A]

23. Interview of William Pardue, BCL, regarding Historical Operations in Building JN-4, October 2000. [C260A]

24. DOE, Interim Guidance on Ensuring that Waste Qualifies for Disposal at the Waste Isolation Pilot Plant, 1997. [P203A]

25. Correspondence from Frank Marcinowski to EM-13 (Stan Wolf, 301-903-7962), Process for TRU Waste Defense Determination, February 2005. [C329A]

26. CCP-PO-003, CCP Transuranic Authorized Methods for Payload Control (CCP CH-TRAMPAC), Central Characterization Project [P672A]

27. MP-TRUW-8.2, Quality Assurance Project Plan

28. DOE/TRU-09-3425, Annual Transuranic Waste Inventory Report - 2009, U.S. Department of Energy, Carlsbad Field Office, Rev. 0. [P838A]

29. RPT-TRUW-82, Acceptable Knowledge Document for Hanford Debris Waste Shipped to AMWTP

30. INST-FOI-23, Special Case Waste Operations

31. RPT-TRUW-30, Acceptable Knowledge Summary for Supercompacted Debris Waste (BN510)

32. INST-OI-12, Real-Time Radiography Operations

33. INST-OI-34, Non-Facility Visual Examination Operations

34. INST-FOI-01, In-Plant Drum Assay Operations

35. INST-OI-14, Drum Assay Operations

36. RPT-TRUW-05, Waste Matrix Code Reference Manual

37. Correspondence from the EPA to Donald C. Cadbury, National TRU Program CBFO, June 10, 2010. [C869S]

38. Material Safety Data Sheet, Micro-Cel®E, Celite Corporation, January 17, 2007 [P808S]

39. Material Safety Data Sheets, Aquaset® (sodium montmorillonite) and Aquaset II-G® (sepiolite), Fluid Tech, January 1, 2005 and November 11, 2008 [P881S]

40. HNF-6489, Acceptable Knowledge Document for Plutonium Finishing Plant Mixed Debris Waste Stream MPFPD, September 21, 2006. [P1024A]

41. HNF-36515, Acceptable Knowledge Document for the Richland Mixed Plutonium Finishing Plant Comprehensive Debris Waste Stream, RLMPFPCD, June 5, 2009. [P1023A]

42. Material Safety Data Sheets for Petroset II and Petroset IIG, Fluid Tech, Inc. June 8, 1998 and March14, 2006. [P657S]

Appendix A
Supercompactor Debris Waste Feedstock

The following table lists the authorized debris waste feedstock by original generator and IDC.[7, 8, 9, 29, 36]

Waste Type	Site	IDC	Description
COMBUSTIBLES	RF	33A	WIPP Experimental Test Program (WETP) Bin Program-Combustibles A (IDCs 335, 336, 337 and 339)
	RF	33B	WETP Bin Program – Combustibles B (IDCs 330, 337, and 339)
	RF	302	Benelex® and Plexiglas®
	RF	330	Paper and Rags-Dry
	RF	336	Paper and Rags-Moist
	RF	337	Plastic, Teflon®, Washables, PVC
	RF	339	Leaded Rubber Gloves and Aprons
	RF	460	Washables, Rubber, Plastic
	RF	463	Leaded Rubber Gloves and Aprons
	RF	464	Benelex® and Plexiglas®
	RF	833	Plastics, TRU Mixed
	RF	831	Dry Combustibles
	RF	832	Wet Combustibles
	RF	900	Low specific activity (LSA) Paper, Plastics, Etc.
	RF	970	Wood
FILTERS	RF	328	Ful-Flo® Incinerator Filters
	RF	335	Absolute 8 × 8 Filters
	RF	338	Insulation and Chemical Warfare Service (CWS) Filter Media
	RF	360	Insulation
	RF	376	Cemented Insulation & Filter Media
	RF	490	High efficiency particulate air (HEPA) Filters and CWS Filters
	RF	491	Plenum Prefilters

Waste Type	Site	IDC	Description
GRAPHITE	RF	300	Graphite Molds
	RF	301	Graphite Cores
	RF	303	Scarfed Graphite Chunks
	RF	310	Graphite Scarfings
	RF	312	Coarse Graphite
HETEROGENEOUS	BC	201	Non-combustible solids
	BC	202	Combustible Solids-Paper/Cloth
	BN	508	AMWTP Newly Generated Debris
	MD	801	Rags, Paper, Wood, etc.
	MD	802	Dry Box Gloves & O-Rings
	MD	803	Metal, Equipment, Pipe, Valves, etc.
	MD	804	Plastic, Tygon®, Mani-Boots, etc.
	MD	805	Asbestos Filters
	MD	810	Glass, Flasks, Sample Vials, Etc.
	MD	813	Glass Filters and Fiberglass
	MD	814	Graphite Waste
	MD	824	Equipment Boxes, Non-combustible
	MD	825	Equipment Drums, Non-combustible
	MD	826	Equipment Boxes, Combustible
	MD	827	Equipment Drums, Combustible
	MD	838	<10 nCi/g Non-combustible
	MD	847	Low Specific Activity (LSA) <100 nCi/g Combustible
	MD	848	LSA <100 nCi/g Non-combustible
	RF	372	Grit
	RF	374	Blacktop, Concrete, Dirt, and Sand
	RF	950	LSA Metal, Glass, etc.
	RF	960	Concrete, Asphalt, etc.
	RL	712	Hanford Plutonium Finishing Plant Debris
	RL	714	Hanford Radiochemical Processing Lab 325 Bldg Debris
	RL	716	Hanford 231-Z Building Debris

Waste Type	Site	IDC	Description
INORGANIC NON-METAL	RF	440	Glass
	RF	441	Raschig Rings, Unleached
	RF	442	Raschig Rings, Leached
	RF	44A	WETP Bin Program – Glass (IDCs 440 and 442)
	RF	368	Magnesium Oxide Crucibles
	RF	370	LECO Crucibles
	RF	371	Fire Brick
	RF	377	Coarse Fire Brick
	RF	391	Crucibles & Sand
	RF	392	Sand, Slag, and Crucible
LEAD/CADMIUM METAL	RF	488	Glovebox Parts w/Lead
UNCATEGORIZED METAL	RF	48A	WETP Bin Program – Metals (IDCs 480 and 481)
	RF	320	Heavy Nonspecial Source Metal
	RF	321	Lead
	RF	416	Zinc Magnesium Alloy Metals
	RF	480	Scrap Metal (Non SS)
	RF	481	Leached Metals (Non SS)