

**ATTACHMENT C**  
**WASTE ANALYSIS PLAN**

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**ATTACHMENT C**  
**WASTE ANALYSIS PLAN**

This Waste Analysis Plan (WAP) presents the characterization procedures used to determine the chemical and physical nature of non-mixed hazardous waste, the hazardous component of mixed low-level waste (MLLW), the hazardous component of mixed transuranic waste (MTRUW), and high explosives (HE) and HE-contaminated waste stored and treated at the Facility in accordance with 40 CFR § 264.13. The waste characterization requirements contained in this WAP are used for characterization of wastes stored in containers and tanks, and to support treatment by open burning (OB) and the stabilization processes. Waste analysis regulatory requirements are specified in 40 CFR §§ 264.13, 270.14(b) and 268.7. Waste analysis permit requirements are specified in Permit Section 2.4. This WAP discusses how the waste characterization data prepared by generators are reviewed, supplemented, and used by the Permittees to comply with 40 CFR Part 264 and Part 268 regulatory requirements.

This WAP is organized as follows:

- Section C.1 Facility Description: Includes a general description of the Facility; general descriptions of the wastes stored and treated and the activities that generate waste.
- Section C.2 Waste Analysis Parameters: Includes a discussion of the proposed analytical parameters and methods used by the Permittees and the criteria/rationale for parameter selection.
- Section C.3 Characterization Procedures: Includes the characterization approach (e.g., acceptable knowledge, sampling and analysis) for each waste classification stored and treated at the Facility.
- Section C.4 Off-Site Waste: Includes a discussion of procedures in place for acceptance of waste from off-site facilities.
- Section C.5 Special Procedural Requirements: Includes a discussion of the procedures in place for ignitable, reactive, and incompatible wastes; procedures to ensure compliance with land disposal restrictions (LDR); and procedures to ensure compliance with Subpart CC requirements.
- Section C.6 References.

## 1 C.1 FACILITY DESCRIPTION

2 LANL (the *Facility*) is located in Los Alamos County in north-central New Mexico. It is  
3 approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe.  
4 The Facility and the associated residential and commercial areas of Los Alamos County are  
5 situated on the Pajarito Plateau. The Facility is owned by the U.S. Department of Energy (DOE)  
6 and is operated jointly by DOE and Los Alamos National Security, LLC (collectively the  
7 *Permittees*). A more complete Facility description is provided in Attachment A.

### 8 C.1.1 Facility Waste-Generating Processes and Activities

9 Wastes are generated at the Facility primarily from research and development (R&D) activities,  
10 processing and recovery operations, decontamination and decommissioning (D&D) projects, and  
11 environmental restoration (ER) activities. Wastes generated from these types of processes and  
12 activities may also be received from off-site facilities (see Attachment L (*Off-Site*  
13 *Facilities*)). Tables C-2 through C-6 present descriptive information on non-mixed hazardous  
14 wastes, MLLW, MTRUW, HE wastes, and HE-contaminated wastes potentially generated at the  
15 Facility. Wastes generated at off-site facilities that may be received at the Facility are described  
16 in Table C-8. These tables include brief waste descriptions, brief descriptions of the waste-  
17 generating process or activity, the characterization basis for waste designation, potential EPA  
18 Hazardous Waste Number(s), the hazardous constituent(s) listed in Appendix VIII of 40 CFR  
19 Part 261 and/or the characteristic(s) defined at 40 CFR Part 261, Subpart C that make the waste  
20 hazardous, and the regulatory limits, as appropriate.

### 21 C.1.2 Stored Waste

22 Non-mixed hazardous waste, MLLW, and MTRUW are stored at various container storage units  
23 throughout the Facility. The following sections contain general descriptions of these wastes and  
24 the processes that generate them.

#### 25 C.1.2.1 Non-Mixed Hazardous Waste

26 Non-mixed hazardous wastes are generated at the Facility primarily from R&D activities,  
27 general facility operations, D&D projects, and ER activities. Non-mixed hazardous waste  
28 streams may be of uniform physical composition (i.e., homogeneous) or of diverse composition  
29 (i.e., heterogeneous). Homogeneous waste is defined as waste that contains only one material or  
30 substance or waste that has its components mixed so that representative samples can be drawn  
31 throughout. Homogeneous waste streams can be either solids or liquids.

32 Heterogeneous waste is defined as waste that contains multiple components that are separate  
33 because of density or specific gravity, are located in different places within the mixture, or are  
34 discrete and different articles. Heterogeneous wastes (e.g., debris) do not lend themselves to  
35 representative sampling and analysis.

36 Routinely managed non-mixed hazardous wastes and their waste-generating processes are  
37 provided below and summarized in Table C-2.

1 Spent Solvents

2 Spent solvents and spent solvent mixtures may contain organic or inorganic compounds, heavy  
3 metals, oils, and other contaminants. Waste-generating activities include R&D, laser research,  
4 organic and inorganic chemistry research, cleaning, and degreasing.

5 Contaminated Solid Wastes

6 Contaminated solid wastes (i.e., wastes of a solid physical form) include mixtures of rags, spill  
7 cleanup materials, Kimwipes™, gloves, filters, plastic and paper products, and personal  
8 protective equipment. These wastes may also consist of disposable equipment contaminated  
9 with organic or inorganic compounds, heavy metals, oils, and other contaminants. Waste-  
10 generating activities include machining operations, chemistry research, D&D projects, metal  
11 finishing operations, and general maintenance operations.

12 Paint and Related Wastes

13 Paint and paint-related wastes consist of excess paint, paint strippers and thinners, and sludges of  
14 paints and thinners. Possible contaminants include heavy metals used as paint pigments and  
15 solvents contained in thinners and lacquers. Waste-generating activities include painting and  
16 finishing operations and general facility maintenance.

17 Photographic and Photocopier Wastes

18 Photographic wastes include spent or excess film developers, fixer solutions, and bleach  
19 solutions that may be contaminated with heavy metals. Photocopier wastes include kerosene-  
20 based toners and dispersants. These wastes are generated from photographic processing and  
21 photocopier operations.

22 Corrosive Liquid Wastes

23 These wastes consist of acidic or alkaline solutions that may contain organics, inorganics,  
24 metals, oils, and other contaminants. Waste-generating activities include analytical chemistry  
25 research, electro-etching, and electro-polishing.

26 Solid Metals and Metallic Compounds

27 These wastes consist of metal chips and turnings from machining and cutting operations. They  
28 also consist of metal powders; metal salts; metal sheets; reactive metals used in synthesis  
29 reactions; solders from electronic manufacturing, repair, and brazing operations; and grinding  
30 operations. Other solid metals and metallic compounds include lead shot, bricks, plate, and  
31 shielding.

1 Contaminated Non-Corrosive Aqueous and Non-Aqueous Solutions and Sludges

2 These wastes are non-corrosive aqueous and non-aqueous solutions and sludges that are  
3 contaminated with non-mixed hazardous wastes or hazardous residues. Waste-generating  
4 activities include vacuum pump maintenance, analytical spectrometry, equipment cleaning and  
5 maintenance, vehicle maintenance, synthesis reactions, metal-polishing operations, and chemical  
6 research.

7 Mercury Wastes

8 Mercury wastes include free elemental mercury, mercuric compounds, articles and instruments  
9 containing mercury, fluorescent light fixtures, and gels containing mercuric compounds. Waste-  
10 generating activities include lamp replacement, chemical research, mercury spill cleanup, and  
11 equipment cleaning and maintenance.

12 Used Batteries and Battery Fluids

13 Used batteries and battery fluids contain heavy metals such as cadmium, lead, mercury, and  
14 silver. Waste-generating activities include routine equipment maintenance.

15 Unused and Off-Specification Commercial Chemical Products

16 These wastes consist of discarded solid and liquid chemical reagents that are off-specification,  
17 unused, outdated or are spill residues.

18 Gas Cylinder Waste

19 These wastes include pressurized gas cylinders, including aerosol cans, which may contain  
20 regulated hazardous metals, organic compounds, or exhibit the hazardous characteristics of  
21 ignitability, corrosivity, and reactivity.

22 Soils and Sludges

23 These wastes consist of environmental media and sludges generated through various activities,  
24 including site decommissioning, site characterization, and site remediation. Waste-generating  
25 activities include septic tank and detention basin closure, removal actions, and other remedial  
26 actions and site closures.

27 Aqueous Liquids

28 These wastes consist of liquids generated during various activities, including decontamination of  
29 remedial equipment, drilling fluids and well development fluids, septic tank liquids, and  
30 contaminated stormwater runoff.

1 Debris

2 These wastes consist of debris (such as concrete, vitrified clay pipe, steel baffles, and building  
3 materials) generated through various activities, including site decommissioning, site  
4 characterization, and site remediation. Waste-generating activities include septic tank and  
5 detention basin closure, removal actions, and other remedial actions and site closures.

6 **C.1.2.2 Mixed Low-Level Waste**

7 Low-level waste is defined in DOE Order 435.1, "Radioactive Waste Management" (DOE,  
8 1999), as "radioactive waste that is not classified as high-level waste, spent nuclear fuel,  
9 transuranic waste, by-product material [as defined in Section 11(e)(2) of the Atomic Energy Act,  
10 as amended], or naturally occurring radioactive material". MLLW is any low-level waste that  
11 has a hazardous waste component.

12 MLLW is generated at the Facility primarily from R&D activities, processing and recovery  
13 operations, D&D projects, and ER activities. MLLW waste streams may be homogeneous or  
14 heterogeneous, as defined in Section C.1.2.1. Descriptions of the MLLW and their waste-  
15 generating processes are provided below and summarized in Table C-3.

16 Soils with Heavy Metals

17 Soil waste contaminated with heavy metals is generated during D&D and ER activities. This  
18 waste consists of soils contaminated with varying concentrations of lead or other heavy metals.

19 Environmental Restoration Soils

20 This waste consists of soils contaminated with heavy metals and organic compounds. They are  
21 generated by activities such as the remediation of spill and release sites and D&D activities.

22 Inorganic Solid Oxidizers

23 These wastes are discarded reagent powders and crystalline materials. Most of these items are in  
24 the original manufacturer's containers, some of which may be hydrated. Many of these  
25 containers are unopened but are suspected to have radioactive surface contamination. Waste-  
26 generating activities include D&D of research laboratories and R&D.

27 Lead Waste

28 Lead waste consists of contaminated and activated lead shielding used as radiation shielding,  
29 inseparable lead, lead blankets, and lead requiring sorting. It is generated primarily from  
30 radioisotope experiments and other reactor, accelerator, laser, and x-ray activities. The lead may  
31 be in the form of sheets, pigs, bricks, shot, shavings, slag, dross, and other shapes.

1 Noncombustible Debris

2 Noncombustible debris consists of discarded hazardous and contaminated scrap metals that are  
3 generated by maintenance, D&D of research laboratories or equipment, R&D, and ER activities.  
4 Additionally, discarded bricks and glass are generated through dismantling of Facility buildings,  
5 including plating shops and machine sheds. The waste may be considered hazardous due to the  
6 metal content or by virtue of contamination during use.

7 Combustible Debris

8 Maintenance, D&D, R&D, and ER activities generate rags and combustible debris with heavy  
9 metals and possibly organics, some of which contain residual liquids. Examples include solvents  
10 and lubricants that are used in metal-cutting operations. Much of this waste is generated during  
11 the processing of lead and barium resulting in heavy metal contamination.

12 Organic-Contaminated Noncombustible Solids

13 These wastes include absorbed oils, laboratory trash, and discarded equipment. Absorbed oil  
14 waste is comprised of drums containing vermiculite or other inorganic sorbents used to absorb  
15 oil from spills and routine maintenance operations. Some of the oil originates from vacuum  
16 pumps and may be contaminated by mercury, lead, or cadmium. Laboratory trash consists of  
17 noncombustible solid materials with residual solvent contamination. The laboratory debris  
18 includes reagent bottles, broken glassware, and disposable lab ware. Large quantities of  
19 chemicals are not placed in this trash; however, residual liquids or powders may have remained  
20 on some of the discarded material. Discarded equipment may have contained residual solvents.

21 Organic-Contaminated Combustible Solids

22 These wastes are similar to combustible debris waste and include rags, cardboard, protective  
23 clothing, and paint-stripper trash. They are potentially contaminated with methyl ethyl ketone  
24 and other solvents. Waste-generating activities include maintenance, D&D, and ER activities.

25 Water-Reactive Wastes

26 Water-reactive wastes consist of reactive metal debris generated through the cleanup of HE  
27 firing-site debris and from machining and disassembly of test components. They include  
28 calcium, lithium hydride, lithium metal, and magnesium.

29 Mercury Wastes

30 Mercury-contaminated instruments and equipment consist of discarded or broken equipment  
31 containing liquid mercury such as broken thermometers, vacuum tubes, vacuum pumps with  
32 residual mercury, activated or contaminated fluorescent light bulbs, and mercury absorbed into a  
33 paper or solid matrix. Most of this waste is generated by cleanup operations.

1 Unused Solid Reagent Chemical Wastes

2 Many different types of discardable off-specification unused solid reagent chemical wastes are  
3 generated at the Facility by R&D programs. Most of these items are in their original containers.

4 Spent Solvents and Contaminated Solvent Mixtures

5 These are spent solvents and spent solvent mixtures that contain organic or inorganic  
6 compounds, heavy metals, oils, and other contaminants. Waste-generating activities include a  
7 wide variety of maintenance, cleaning and degreasing, R&D, and processing operations, such as  
8 extraction, bench-scale experimental inorganic chemistry, environmental analysis, and  
9 radiochemistry.

10 Corrosive Liquid Wastes

11 These wastes are acidic or alkaline solutions that contain organics, inorganics, metals, oils,  
12 and/or other contaminants. Waste-generating activities include radiochemistry research,  
13 plutonium processing, and analytical chemistry.

14 Aqueous and Non-aqueous Liquids Contaminated with Heavy Metals and/or Organics

15 These wastes consist of aqueous and non-aqueous solutions that contain heavy metals and  
16 possibly organics. Waste-generating activities include metal-polishing operations,  
17 radiochemistry research, and ER activities.

18 Oil Wastes

19 Oil wastes at the Facility are generated during equipment maintenance operations. Possible  
20 contaminants include heavy metals and solvents.

21 Unused Liquid Reagent Chemical Wastes

22 Many different types of discarded off-specification unused liquid reagent chemical wastes are  
23 generated at the Facility by R&D programs. Most of these items are in their original containers.

24 Gas Cylinder Waste

25 These wastes consist of pressurized gas cylinders, including aerosol cans, which contain  
26 regulated hazardous metals, organic compounds, or exhibit the hazardous characteristics of  
27 ignitability, corrosivity, and reactivity.

28 **C.1.2.3 Mixed Transuranic Waste**

29 Transuranic isotopes are those with atomic numbers greater than 92. MTRUW contains both a  
30 hazardous waste component and a TRU waste component.

1 MTRUW is generated at the Facility primarily from R&D activities, processing and recovery  
2 operations, and D&D projects. Limited quantities of MTRUW from off-site facilities will be  
3 accepted at LANL for additional characterization and management. (see Table C-8). MTRUW  
4 at the Facility includes four broad categories that can be described by a Summary Category  
5 Group, which is further subdivided into Waste Matrix Codes.

6 Summary Category Groups are used to define waste characterization groupings for the Federal  
7 Facility Compliance Order (Los Alamos National Laboratory) (New Mexico Environment  
8 Department [NMED], 1995) requirements and are based on the physical and chemical forms of  
9 the waste. Complete descriptions of the Summary Category Groups are contained in DOE Waste  
10 Treatability Groups Guidance (DOE, 1995).

11 The Summary Category Groups applicable to the MTRUW stored and treated at the Facility are  
12 listed as follows:

- 13 1. *Summary Category Group S3000 (Homogeneous Solids)*: defined as solid waste materials,  
14 excluding soil and gravel, that do not meet the EPA LDR criteria for classification as debris;
- 15 2. *Summary Category Group S4000 (Soil/Gravel)*: defined as solid waste materials that are at  
16 least 50 percent by volume soil and gravel;
- 17 3. *Summary Category Group S5000 (Debris)*: defined as heterogeneous waste materials that  
18 are at least 50 percent by volume solid materials exceeding a 2.36-inch particle size that are  
19 intended for disposal and include manufactured objects, plant or animal matter, or natural  
20 geologic material. Particle sizes smaller than 2.36 inches in size may be considered debris if  
21 the debris is a manufactured object and if it is not a particle of S3000 or S4000 material; and
- 22 4. *Summary Category Group L1000 (Aqueous Liquids/Slurries)*: defined as aqueous liquids  
23 and slurries that meet the EPA LDR criteria for wastewaters (i.e., <1 percent total suspended  
24 solids).

25 Summary Category Groups are applied to MTRUW streams to distinguish between waste types.  
26 More specific waste identification systems (i.e., Waste Matrix Codes [WMC] and Facility TRU  
27 Waste Stream ID numbers) are used for supplementary purposes as part of waste management  
28 operations. The WMCs that are applicable to the solid MTRUW stored at the Facility are:

- 29 1. *WMC S3100 (Inorganic Homogeneous Solid Waste)*: includes mixed inorganic homogeneous  
30 waste (cemented inorganics, organics on vermiculite, non-cemented, salts, and cemented  
31 organics);
- 32 2. *WMC S4100 (Soil)*: consists of radioactive contaminated solid waste materials that are at  
33 least 50 percent by volume soil/gravel;
- 34 3. *WMC S5300 (Organic Debris Waste)*: consists of mixed combustible debris waste (plastic,  
35 cellulose, and rubber); and

1       4. *WMC S5400 (Heterogeneous Debris Waste)*: includes mixed heterogeneous debris waste  
2       (varying amounts of combustible and noncombustible debris, with a small amount of  
3       homogeneous waste present).

4       Solid MTRUW is assigned a WMC and is further identified with a Facility TRU Waste Stream  
5       ID number. Using the WMC, waste streams are further delineated based on the following  
6       prioritized criteria: 1) waste-generating process (to the degree to which waste has been  
7       segregated by process); 2) Summary Category Group (i.e., homogeneous or debris waste); 3)  
8       waste matrix; and 4) hazardous chemical content (i.e., organics and/or inorganics).

9       The following are general descriptions of types of MTRUW waste streams:

- 10       1. *Homogeneous Inorganic, Cemented*: includes solidified aqueous or homogeneous inorganic  
11       solids, solidified inorganic process solids, leached process residues, evaporator  
12       bottoms/salts, and/or cement paste;
- 13       2. *Homogeneous Inorganic, Cemented Organics*: major portion of the waste is cement (i.e.,  
14       inorganic) containing a minor portion of cemented solidified organic process solids;
- 15       3. *Homogeneous Inorganic, Non-cemented*: includes solid (non-cemented) inorganic waste,  
16       ash, dewatered aqueous sludge, and/or chemical treatment sludge;
- 17       4. *Homogeneous Inorganic, Salts*: includes pyrochemical, nitrate, and/or chloride salts;  
18       hydroxide cake; and/or other salt waste;
- 19       5. *Homogeneous Inorganic, Vermiculite*: includes vermiculite-absorbed hydrocarbon oil,  
20       vermiculite-absorbed silicon-based liquid, and solidified (non-cemented) organic waste.
- 21       6. *Soil*: includes all radioactive-contaminated soil;
- 22       7. *Combustible debris*: includes greater than 50% by volume combustible decontamination  
23       waste, cellulose, plastics, rubber, laboratory trash, building debris, hot cell waste, and/or  
24       other combustibles; and
- 25       8. *Heterogeneous debris*: includes greater than 50% by volume noncombustible waste, metal  
26       scrap, glass, metal waste, metal crucibles and dies, precious metals, filter media and residue,  
27       beryllium-contaminated debris, ion-exchange resins, irradiation sources, firing point sources,  
28       leaded rubber, graphite waste, high-efficiency particulate air (HEPA) filter waste, skull and  
29       oxide, slag and porcelain, and/or other noncombustible waste.

30       The WMCs correspond to other historical and current waste identification systems used at the  
31       Facility. Table C-4 lists the MTRUW streams stored at the Facility by their Summary Category  
32       Group, WMC, and general matrix description and provides a cross-reference between past and  
33       present waste identification systems.

34       Facility TRU Waste Stream ID numbers are applied to the MTRUW streams described above.  
35       Facility TRU Waste Stream ID numbers are assigned the prefix "LA", followed by a unique  
36       identifier that further specifies the waste stream. MTRUW information is summarized in  
37       Table C-5.

1 The following are some examples of MTRUW waste streams stored, and in some cases treated,  
2 at the Facility.

3 LA-TA-55-19: Mixed Combustible Debris Waste

4 This waste stream consists of mixed combustible debris waste generated by plutonium recovery,  
5 R&D processes, and facility and equipment operations and maintenance. The debris waste  
6 includes paper, rags, plastic, rubber, wood-based HEPA filters, and other plastic-based and  
7 cellulose-based items.

8 LA-TA-55-30: Mixed Heterogeneous Debris Waste

9 This waste stream consists of mixed heterogeneous debris waste generated by plutonium  
10 recovery, R&D processes, and facility and equipment operations and maintenance. The waste  
11 includes plutonium-contaminated noncombustible and combustible debris waste.

12 LA-MIN01-CIN: Mixed Inorganic Homogeneous Waste, Cemented Inorganics

13 This waste stream consists of mixed inorganic homogeneous waste generated by plutonium  
14 recovery, R&D processes, facility and equipment operations and maintenance, and liquid waste  
15 treatment operations. The waste includes cemented sludge, solidified aqueous waste, and  
16 solidified inorganic process solids.

17 LA-MIN02-V: Mixed Inorganic Homogeneous Waste, Organics on Vermiculite

18 This waste stream consists of mixed inorganic homogeneous waste generated by plutonium  
19 recovery, R&D processes, and facility and equipment operations and maintenance. The waste is  
20 comprised of organic liquids (oils and solvents) adsorbed on vermiculite.

21 LA-MIN03-NC: Mixed Inorganic Homogeneous Waste, Non-cemented

22 This waste stream consists of mixed inorganic homogeneous waste generated by plutonium  
23 recovery, R&D processes, and liquid waste treatment operations. It consists of vacuum filter  
24 cake solid waste.

25 LA-MIN04-S: Mixed Inorganic Homogeneous Waste, Salts

26 This waste stream consists of mixed inorganic homogeneous waste generated by plutonium  
27 recovery, R&D processes, and facility and equipment operations and maintenance. It is  
28 comprised of non-cemented inorganic process solids (salts).

29 LA-MIN05-COR: Mixed Inorganic Homogeneous Waste, Cemented Organics

30 This waste stream consists of mixed inorganic homogeneous solidified (cemented) organic  
31 process solids and emulsified solvents and oils generated by plutonium recovery, R&D  
32 processes, and facility and equipment operations and maintenance.

1 LA-MHD02-238: Mixed Heterogeneous Debris Waste, Pu-238

2 This waste stream consists of mixed heterogeneous debris waste generated by Pu-238 processing  
3 operations (primarily heat-source fabrication) and facility and equipment operations and  
4 maintenance. The waste includes Pu-238 contaminated noncombustible and combustible debris  
5 waste.

6 LA-MIN06-C238: Mixed Inorganic Homogeneous Waste, Cemented Inorganics, Pu-238

7 This waste stream consists of mixed inorganic homogeneous waste comprised of solidified  
8 (cemented) inorganic process solids. This waste stream is generated by Pu-238 processing  
9 operations (primarily heat-source fabrication) and facility and equipment operations and  
10 maintenance.

11 LA-MHD03-DD: Mixed Heterogeneous Debris Waste, D&D

12 This waste stream consists of mixed heterogeneous debris waste generated from facility and  
13 equipment D&D, including associated sectioning, size reduction, and packaging operations. The  
14 waste is comprised of plutonium-contaminated noncombustible and combustible debris waste.

15 LA-MHD05-ITRI: Mixed Heterogeneous Debris Waste, ITRI

16 This waste stream consists of mixed heterogeneous debris generated between 1975 and 1984 by  
17 the Inhalation Toxicology Research Institute, which is currently operated by Lovelace at the  
18 Kirtland Air Force Base, New Mexico. The waste is comprised of laboratory waste that may  
19 contain rags, tools, and biological waste contaminated with Pu-239.

20 LA-MHD04-RH: Mixed Heterogeneous Debris Waste, Remote-Handled

21 This waste stream consists of mixed remote-handled heterogeneous debris waste generated by  
22 hot cell operations. This waste is comprised of combustible and noncombustible waste.

23 **C.1.3 Treated Wastes**

24 MTRUW, High Explosive (HE) waste, and HE-contaminated wastes are treated at permitted  
25 units at the Facility. MTRUW is treated by cementation to stabilize the waste for storage and to  
26 meet the WIPP waste acceptance criteria. HE waste and HE-contaminated waste are treated by  
27 OB to remove their reactive and ignitable characteristics.

28 **C.1.3.1 Treated Mixed TRU Wastes**

29 MTRUW that require treatment is generated primarily from R&D and processing and recovery  
30 operations. Treatment of MTRUW at the Facility may consist of stabilization by cementation to  
31 form a noncorrosive solid matrix. Additional specific information on the stabilization treatment  
32 process is provided in Section C.3.2.3 of this WAP.

1 **C.1.3.2 HE Waste and HE-Contaminated Waste Treated by Open Burning (OB)**

2 HE waste and HE-contaminated waste are non-mixed hazardous wastes treated by OB at the  
3 Facility to remove the hazardous characteristics of reactivity and ignitability. HE waste consists  
4 of discrete pieces or volumes of HE while HE-contaminated waste consists of solid or liquid  
5 wastes that have been contaminated with HE.

6 HE waste and HE-contaminated waste are generated at the Facility primarily from HE-  
7 processing operations such as machining and pressing and R&D activities (including pilot-scale  
8 HE production). Table C-6 provides a summary of available information on HE waste and HE-  
9 contaminated waste treated by OB. The categories of waste streams include homogeneous and  
10 heterogeneous wastes, as defined in Permit Section C.1.2.1, are described as follows:

11 HE Contaminated Bulk Solvents

12 The only waste in this category is HE-contaminated dimethyl sulfoxide (DMSO) and water.  
13 The waste stream is generated primarily by laboratory analysis, R&D activities, HE production,  
14 and the dissolving of HE and polymers.

15 HE-Contaminated Used Oils

16 This waste category consists of HE-contaminated used hydraulic fluids, lubricants, and heat  
17 transfer liquids generated from hydraulic presses and lubrication systems associated with HE-  
18 processing operations, emergency response, and R&D areas.

19 Solid and Scrap HE

20 This waste category consists of off-specification or obsolete powder, pieces, fragments, and bulk  
21 HE generated from HE processing, testing operations, disposition of weapons, and R&D  
22 activities.

23 HE Process Waste from Water Filtration

24 This waste category consists of various HE solids in water with an average ratio of  
25 approximately 50% by volume. The solid portion includes wet HE-machining chips, sludges,  
26 spent activated carbon, filters, and filter solids that result primarily from the filtration of HE  
27 wastewater. This waste category is generated primarily from HE processing activities and from  
28 R&D activities.

1 HE-Contaminated Combustible Solid Waste

2 This waste category includes rags, cardboard, paper, Kimwipes<sup>TM</sup>, plastic bags, small pieces of  
3 metal, and small glass pieces that are contaminated with HE. These wastes may also be  
4 contaminated with *de minimis* amounts of solvents or oil. This waste stream is generated  
5 primarily from HE-processing activities and R&D laboratory use.

6 HE-Contaminated Equipment

7 This waste category consists of discarded, noncombustible equipment and materials, such as  
8 pipes and metallic debris from HE-processing and R&D laboratory areas, contaminated with HE.  
9 This waste may also be contaminated with *de minimis* amounts of solvents or oil.

10 **C.1.4 Description of Permitted Units**

11 The permitted units used for storage and treatment of wastes addressed in this WAP are located  
12 within various TAs at the Facility. These units are listed in Attachment J (*Hazardous Waste*  
13 *Management Units*). Detailed information on the permitted units is provided in Attachment A  
14 (*Technical Area Unit Descriptions*).

15 **C.2 WASTE ANALYSIS PARAMETERS**

16 The Permittees shall conduct detailed chemical and physical characterization on non-mixed  
17 hazardous wastes, the hazardous component of MLLW, and the hazardous component of  
18 MTRUW as required by 40 CFR § 264.13 and Permit Section 2.4. The Permittees shall select  
19 waste analysis parameters to ensure that the waste characterization documentation will contain  
20 the information necessary to manage the waste in accordance with Resource Conservation and  
21 Recovery Act (RCRA) general facility standards in 40 CFR Part 264 and the LDR requirements  
22 in 40 CFR Part 268.

23 **C.2.1 Analytical Parameters and Methods**

24 The Permittees shall use the characterization methods for non-mixed hazardous wastes, MLLW,  
25 MTRUW, and HE and HE-contaminated wastes summarized in Tables C-9 through C-12 to  
26 quantify the waste characterization parameters in those tables. The Permittees shall comply with  
27 the sampling and analysis requirements of Permit Sections 2.4.1 through 2.4.9. The Permittees  
28 shall use the methods listed below, as necessary, for the wastes listed in Section C.1.

- 29 1. Acceptable Knowledge (AK);  
30 2. Sampling and laboratory analysis to determine the presence and concentrations of:  
31 - RCRA-regulated metals  
32 - RCRA-regulated volatile organic compounds (VOC)  
33 - RCRA-regulated semivolatile organic compounds (SVOC)  
34 3. Additional MTRUW characterization sampling methods;

- 1           -       Headspace gas sampling to determine the presence of VOCs in container
- 2                    headspace
- 3           -       Physical waste from characterization through real-time radiography (RTR)
- 4                    and/or visual examination
- 5       4. Flash point characterization;
- 6       5. pH characterization;
- 7       6. Reactivity characterization; and
- 8       7. Free liquid determination via the paint filter test.

### 9   **C.2.2 Criteria and Rationale for Characterization Methodology Selection**

10   The Permittees shall select methods for waste characterization based on the physical form of the  
11   waste (e.g., debris) and on knowledge of the process generating the waste. To determine  
12   whether a solid waste is hazardous, the Permittees shall use AK as described in Section C.3.1.1.  
13   When deemed necessary, the Permittees shall use sampling and laboratory analysis as described  
14   in Section C.3.1.2 and other characterization methodologies to evaluate the analytical parameters  
15   to confirm knowledge-based waste characterization for non-mixed hazardous waste, MLLW, and  
16   MTRUW based upon the rationales identified in Tables C-9, C-10, and C-11, respectively.

17   The Permittees shall characterize HE waste and HE-contaminated waste to evaluate the  
18   hazardous and explosive components of the waste based on knowledge of raw materials and  
19   physical and chemical processes of waste-generating activities. When deemed necessary, the  
20   Permittees shall use other characterization methodologies including sampling and laboratory  
21   analysis to confirm knowledge-based waste characterization. The rationale for HE waste and  
22   HE-contaminated waste characterization method selection is identified in Table C-12.

23   40 CFR § 260.11 lists approved analytical methods to determine the concentrations of hazardous  
24   constituents in the liquid and solid fractions and extracts of waste samples. All the methods are  
25   described in the most recent version of the U.S. EPA's "Test Methods for Evaluating Solid  
26   Waste, Physical/Chemical Methods" (SW-846). The Permittees shall use these and other  
27   approved methods approved by the Department, as necessary, to determine whether a waste  
28   stream is hazardous and to identify underlying hazardous constituents. The Permittees shall  
29   analyze samples for all hazardous constituents likely to be present based on the source of the  
30   waste stream and AK. The Permittees shall require the analytical laboratory to report all  
31   constituents the laboratory analytical method is capable of measuring as specified in the most  
32   recent version of the U.S. EPA's Test Methods for Evaluating Solid Wastes (SW-846). Any  
33   hazardous constituents identified during analysis shall be included on the waste profile form.  
34   Detailed instructions for conducting Toxicity Characteristic Leaching Procedure (TCLP) waste  
35   analysis are found in the most recent version of SW-846 and are incorporated by reference in 40  
36   CFR § 260.11. Also listed in SW-846 is the appropriate analytical method for each hazardous  
37   constituent required to determine whether or not the waste contains a contaminant in excess of  
38   the maximum contaminant concentration regulated under 40 CFR Part 261.

1 TCLP is a method for leaching hazardous constituents from the solid portion of the waste and is  
2 used only if the solids constitute more than 0.5% of the waste by weight. The laboratory can  
3 also forego analysis by extraction if: 1) total analysis of the waste shows the concentrations of  
4 the analytes are so low that an extract of the waste could not contain analytes at concentrations  
5 above the regulatory limits (see Section C.3.1.2.1); or 2) analysis of any liquid portion of the  
6 waste contains such high concentrations of hazardous constituents that, even accounting for  
7 dilution, the entire sample would be hazardous.

8 Many hazardous wastes are restricted from land disposal under the Hazardous and Solid Waste  
9 Amendments unless they are treated to diminish their toxicity and reduce the likelihood that  
10 hazardous constituents will migrate from the disposal site. As required by 40 CFR Part 268,  
11 each waste shipment must be accompanied by a notification stating whether the restricted waste  
12 meets specific LDR treatment standards promulgated for hazardous constituents or is otherwise  
13 exempt. In most cases, the notification can be completed after laboratory analysis of the waste.  
14 If an LDR notification is based solely on knowledge of the waste, the Permittees shall keep the  
15 supporting documentation on record, in accordance with 40 CFR § 268.7.

### 16 **C.3 CHARACTERIZATION METHODS**

17 The Permittees' operating procedures consider characterization of wastes before a waste-  
18 generating process will begin. The preliminary characterization of waste begins prior to actual  
19 generation (at the point of concept and design of a process or system) so that the generator can  
20 determine whether AK, sampling and analysis, or a combination of the two will be required for  
21 waste characterization.

22 The Permittees shall characterize non-mixed hazardous wastes, MLLW, MTRUW, HE wastes,  
23 and HE-contaminated wastes based on the chemical, physical, and radiological nature of the  
24 waste stream. The Permittees shall perform characterization by using AK or sampling and  
25 analysis or both, as described below.

26 The Permittees shall record information for each waste stream on a waste profile form  
27 accompanied by sampling and analysis data or AK documentation. These documents are  
28 collectively referred to as the waste characterization documentation. Such documentation may  
29 include items referred to by a traceable identifier and separately located within the Facility. The  
30 Permittees shall ensure that waste characterization documentation is reviewed and approved  
31 prior to acceptance at a permitted unit. If the documentation is incomplete or does not contain  
32 sufficient information to characterize the waste, the Permittees shall return the documentation to  
33 the generator and shall not accept the waste for storage or treatment.

34 Before accepting waste for storage or treatment, the Permittees shall determine that waste  
35 characterization documentation satisfies the information requirements of Permit Section 2.4,  
36 including but not limited to the assignment of all applicable EPA Hazardous Waste Numbers and  
37 the LDR status of the waste. Once the waste characterization documentation is reviewed and  
38 approved, the Permittees may notify the generator and authorize the transfer of the waste to a  
39 permitted unit. Before the waste is transferred, the Permittees' waste management personnel

1 shall review any transfer documentation to ensure that it accurately pertains to the waste being  
2 transferred and that it corresponds with the waste characterization documentation. If the transfer  
3 documentation does not correspond with the characterization documentation, the Permittees shall  
4 not transfer the waste. The Permittees shall maintain the waste characterization documentation  
5 and the transfer documentation shall be part of the Facility Operating Record. After approval of  
6 waste characterization of a waste stream by waste management personnel, the Permittees shall  
7 approve subsequent transfer of waste from that waste stream based upon the generator's  
8 statement that the waste stream is accurately represented by the previously approved waste  
9 characterization information.

10 Training for use of waste characterization documentation is included in a facility waste  
11 documentation course. This training provides step-by-step instructions on how to complete and  
12 review forms for characterizing wastes.

13 The Permittees shall perform reevaluation of initial characterization information and annual  
14 verification in accordance with Permit Section 2.4.7.

15 The Permittees shall deem a waste container to contain free liquids if any of the following  
16 characterization methods so demonstrate:

- 17 1. generator waste-characterization knowledge;
- 18 2. visual examination;
- 19 3. radiography; or
- 20 4. the Paint Filter Test (SW-846, Method 9095).

21

## 22 **Hazardous and Mixed Low-Level Waste Characterization**

23 The Permittees shall select characterization methods for non-mixed hazardous waste and MLLW  
24 based on the physical nature of the waste stream (i.e., homogeneous or heterogeneous). The  
25 Permittees shall characterize homogeneous solid waste for the presence of hazardous  
26 constituents (e.g., VOCs, SVOCs, metals) on the basis of AK and, if necessary, sampling and  
27 analysis.

28 The Permittees shall characterize heterogeneous solid waste solely on the basis of AK for the  
29 following reasons:

- 30 1. the physical, chemical, and/or radiological nature of the waste makes it difficult to obtain  
31 representative samples;
- 32 2. the lack of appropriate sampling methodology; and
- 33 3. for MLLW, safety concerns associated with unnecessary exposure to the radioactive  
34 component of the waste.

35

36 In using AK to characterize waste, the Permittees shall review characterization documents with  
37 the help of subject matter experts, when necessary.

1 The Permittees shall characterize chemicals of an unknown nature by assembling all knowledge  
2 of the operations and activities that were performed at the site of generation relevant to waste  
3 generation and management. The Permittees shall test unknown wastes in volumes greater than  
4 one gallon for ignitability, corrosivity, reactivity, toxicity characteristics, and any other  
5 parameters indicated by the initial data gathered on the material. Based on that determination,  
6 the Permittees shall assign the waste the proper EPA Hazardous Waste Number(s) and LDR  
7 status. The Permittees shall use the characterization methods provided in Tables C-9 and C-10.

8 For purposes of managing unknown wastes, a small volume is defined as one liquid gallon or  
9 less. The rationale for this basis is that one gallon is the minimum quantity of sample needed to  
10 determine whether or not the waste is hazardous. The Permittees shall analyze small volumes of  
11 unknown wastes for pH, flash point, and reactivity.

## 12 **HE wastes**

13 The Permittees shall determine whether or not a waste is HE-contaminated based on the  
14 properties of the chemicals known or suspected to be in the waste, field screening, or laboratory  
15 analysis. (*see* Table C-13) The Permittees shall characterize HE contaminated homogeneous  
16 wastes (i.e., sand and liquids) to determine whether HE is present at a minimum of 25% HE by  
17 volume for liquid wastes and at a minimum of 10% HE by weight for hazardous wastes  
18 comprised of sand.

19 The Permittees shall characterize HE-contaminated heterogeneous wastes by process knowledge.  
20 If heterogeneous wastes contain visible HE, they shall be considered reactive. If heterogeneous  
21 wastes come into direct contact with HE and all of the surfaces cannot be tested or visually  
22 examined (e.g., equipment), it shall be assumed that there is a reactive amount of HE associated  
23 with the wastes.

24 The Permittees shall characterize HE wastes and HE contaminated waste for other relevant  
25 parameters using the methods in Table C-12.

## 26 **Open Burn Residues**

27 The Permittees shall analyze any OB residues remaining after treatment each time a new waste  
28 stream is treated. The Permittees shall employ the sampling and analysis methods for ash  
29 generated by OB in Table C-14.

30 HE wastes that generate a residue in treatment shall have their characterization verified by  
31 analysis of the treatment residue. If analysis of the residue identifies constituents not identified  
32 in the waste characterization documentation, those constituents shall be included on the waste  
33 profile form for the untreated waste.

### 34 **C.3.1.1. Acceptable Knowledge**

35 *Acceptable* knowledge (AK) includes process knowledge, additional characterization data, and  
36 facility records of analysis (EPA, 1994A).

1 *Process knowledge (PK)* includes information about the process used to generate the waste,  
2 material inputs to the process, and the time period during which the waste was generated. PK is  
3 described in 40 CFR § 264.13(a)(2) as data developed under 40 CFR Part 261 and existing  
4 published or documented data on a specific hazardous waste or hazardous waste generated from  
5 similar processes. PK may include off-site facility waste characterization data pertaining to a  
6 specific waste and laboratory analysis data performed prior to the effective date of applicable  
7 RCRA regulations.

8 Additional characterization data includes data obtained after the advent of RCRA and from  
9 chemical or physical analysis that is not subject to the most recent version of SW-846 and other  
10 approved methods, or through testing of similar or surrogate waste streams. This includes  
11 previous analytical data relevant to the waste stream including results from fingerprint analyses,  
12 spot checks, or routine waste verification sampling.

13 Facility records of analysis consist of waste analysis and physical characterization performed  
14 prior to the effective date of RCRA regulations.

15 The Permittees may use AK alone or in conjunction with sampling and analysis in the following  
16 instances (EPA, 1994A):

- 17 1. hazardous wastes from specific processes that are well documented;
- 18 2. F and K-listed wastes;
- 19 3. wastes are discarded, unused, commercial chemical products, reagents, or chemicals of  
20 known physical and chemical properties (P and U-listed wastes);
- 21 4. health and safety risks to personnel would not justify sampling and analysis ; and
- 22 5. physical nature of the waste does not lend itself to taking a laboratory sample (e.g.,  
23 heterogeneous waste streams).

24 The Permittees shall document the basis for using AK on a waste profile form. The Permittees  
25 shall maintain AK information in accordance with Permit Section 2.12.2 in a format that allows  
26 waste management personnel and subject matter experts to either obtain copies or, in the case of  
27 classified or sensitive AK documentation that cannot be sent to TA-54 due to security  
28 requirements, review the documentation at the point of waste generation. The Permittees shall  
29 assign a traceable identifier (i.e., process or AK document number or alphanumeric designation)  
30 in accordance with Permit Section 2.4.10 to the waste characterization documentation so that the  
31 Permittees can obtain the information for as long as required by RCRA regulation and this  
32 Permit.

### 33 **C.3.1.1.1 Process Knowledge**

34 The Permittees shall obtain, assemble, and prepare the process knowledge documentation for  
35 each waste stream. The Permittees may substantiate process knowledge for a specific waste  
36 stream using documentation such as:

- 1 1. laboratory notebooks that detail the research processes and raw materials used in an  
2 experiment;
- 3 2. process or experiment design documents;
- 4 3. safety analysis reports;
- 5 4. standard operating procedures and detailed operating procedures, which can include a list of  
6 the raw materials or reagents, a description of the process or experiment that uses the  
7 materials, and a description of the wastes generated and how the wastes are handled;
- 8 5. waste packaging logs;
- 9 6. test plans or research project reports that describe the reagents and other raw materials used  
10 in an experiment;
- 11 7. chemical inventory database for particular processes or experiments;
- 12 8. information from site personnel (e.g., documented interviews);
- 13 9. industry reports on a similar process when there is a clear connection between the Facility  
14 process/experiment and the industry's similar process or experiment;
- 15 10. Material Safety Data Sheets, product labels, and other product package information; and
- 16 11. ER site and waste characterization data.

### 17 **C.3.1.2 Sampling and Analysis**

18 For waste streams that can be representatively sampled (i.e., homogeneous), the Permittees shall  
19 conduct sampling and analysis when there is insufficient AK. The Permittees shall collect a  
20 representative sample of the waste and handle it by a means that preserves its original physical  
21 form and composition and prevents contamination or changes in concentration of the  
22 constituents to be analyzed. The Permittees shall, when it is necessary to conduct sampling and  
23 analysis to fully characterize a waste, utilize the analytical methods specified in Tables C-9  
24 through C-18 for the identification of any hazardous constituents likely to be present based on  
25 the source of the waste stream and AK. Personnel involved in sampling and analysis shall  
26 comply with the most recent version of SW-846 and other Department approved methods. The  
27 Permittees shall obtain samples representative of the waste stream in accordance with Permit  
28 Section 2.4.2.

#### 29 **C.3.1.2.1 Solid Waste Analysis**

30 The Permittees shall, if necessary for waste characterization purposes, sample and analyze  
31 homogeneous waste streams for the toxicity characteristic (TC) contaminants listed in 40 CFR §  
32 261.24, which is incorporated herein by reference. The Permittees may conduct analysis for  
33 total concentration of TC contaminants on samples in a screening step, as described in  
34 Section 1.2 of Method 1311, the toxicity characteristic leaching procedure (TCLP). If total  
35 concentrations are used in the waste characterization process, the Permittees shall compare  
36 analytical data to the TC regulatory levels expressed as total values. These total values will be  
37 considered the regulatory threshold limit (RTL) values for the determination of whether a

1 particular waste exhibits a TC. The Permittees shall obtain RTL values by calculating the  
2 weight/weight concentration (in the solid) of a TC contaminant that would give the regulatory  
3 weight/volume concentration in the TCLP extract. If the total concentrations are less than the  
4 RTL value, then it may be assumed that the waste does not exhibit the toxicity characteristic and  
5 the TCLP does not need to be completed for the screened TC contaminants.

#### 6 **C.3.1.2.2 Liquid Waste Analysis**

7 Liquid wastes generated at the Facility consist of aqueous solutions, slurries, and organic liquids.  
8 The Permittees shall sample and analyze these wastes, if necessary for waste characterization  
9 purposes, for total metal content, VOCs, and SVOCs. In accordance with Method 1311 (TCLP),  
10 liquid wastes (i.e., those wastes that contain less than 0.5 percent dry solids) do not require  
11 extraction. The liquid waste, after filtration, is defined as the TCLP extract. Liquid waste,  
12 therefore, is characterized by filtering the waste, measuring total contaminant concentrations in  
13 the resulting filtrate, and comparing these concentrations to the TC regulatory levels in 40 CFR §  
14 261.24.

15 The Permittees shall characterize wastes that contain both a liquid and a solid phase using total  
16 analytical data for the solid phase to determine toxicity characteristics. The Permittees shall  
17 compare with the TC regulatory levels for each phase in a manner consistent with the discussion  
18 in Section C.3.1.2.1. The following formula (EPA, 1994b) will be used to calculate the  
19 maximum theoretical leachate concentrations for the combined phases:

$$20 \quad \frac{[A \times B] + [C \times D]}{21 \quad B + [20 \text{ liters/kilogram} \times D]} = M$$

22 Where:

23 A = concentration of the analyte in the liquid portion of the sample (milligrams/liter);

24 B = volume of the liquid portion of the sample (liter);

25 C = concentration of the analyte in the solid portion of the sample (milligrams/kilogram);

26 D = weight of the solid portion of the sample (kilogram); and

27 M = maximum theoretical leachate concentration (milligrams/liter).  
28  
29

#### 30 **C.3.1.2.3 Sample Handling, Preservation, and Storage**

31 Table C-15 presents requirements specified in the most recent version of *SW-846* regarding  
32 sample containers, preservation techniques, and holding times associated with sample collection.  
33 The Permittees shall adhere to these requirements. In the event the specified criteria are not met,  
34 the Permittees shall collect another sample and submit it for analysis.

1 **C.3.1.2.4 Analytical Laboratory Selection and Analytical Methods**

2 The Permittees shall ensure that analytical laboratories at the Facility and approved contractor  
3 laboratories conduct the detailed qualitative and quantitative chemical analyses specified in  
4 Tables C-16 and C-17. These laboratories must have:

- 5 1. a documented and comprehensive QA/QC program;
- 6 2. technical analytical expertise;
- 7 3. a document control and records management plan; and
- 8 4. the capability to perform data reduction, validation, and reporting.

9 **C.3.1.3 Verification Frequencies**

10 The Permittees shall comply with the waste characterization verification procedures identified in  
11 Permit Section 2.4.7.3. The Permittees shall place a non-conformance report in the Facility  
12 Operating Record if the characterization for the waste stream is found to be inconsistent with the  
13 documentation. The Permittees shall decline to accept any waste from the waste stream in issue  
14 until the characterization deficiency is remedied.

15 **C.3.2 Mixed Transuranic Waste Characterization**

16 The Permittees characterize MTRUW for the information specified in Permit Section 2.4.1 in  
17 accordance with the parameters and methods shown in Tables C-11 and C-18 for management,  
18 storage, and treatment at the Facility. Characterization of the hazardous component of MTRUW  
19 to be stored and treated at the Facility shall be conducted in accordance with the procedures  
20 discussed in the following sections.

21 Initial characterization of MTRUW for the purpose of storage at the Facility is based primarily  
22 on AK (see Section C.3.1.1) with additional procedures applied to confirm the AK. The  
23 Permittees shall begin the AK process by reviewing the available generator documentation for  
24 the waste stream. This includes process knowledge, any extant analytical data, and the  
25 information included with the waste documentation forms associated with the individual waste  
26 containers.

27 The Permittees shall categorize MTRUW streams by Summary Category Groups based on the  
28 physical and chemical form of the waste as established by AK. The Permittees shall assign  
29 individual waste containers to waste streams based upon AK.

30 The Permittees shall utilize AK to determine the hazardous waste codes applicable to the waste  
31 stream or container under consideration. The Permittees shall utilize AK to determine whether  
32 the container requires additional waste management procedures such as secondary containment  
33 for liquid waste or segregation of incompatible, ignitable, or reactive wastes. If AK is  
34 insufficient to determine needed information (e.g., ignitability), the Permittees shall use  
35 headspace gas sampling to provide the needed information.

1 Until it is determined that a container does not contain free liquids, the Permittees shall manage  
2 MTRUW container storage in accordance with regulations and Permit requirements applicable to  
3 containers holding free liquids (i.e., with secondary containment and appropriate labeling).

4 If AK is inadequate to characterize a homogeneous MTRUW stream or container (e.g.,  
5 homogeneous solids, soil and gravel, aqueous liquids and slurries) the Permittees shall collect a  
6 representative sample of the waste and submit the waste for laboratory analysis.

### 7 **C.3.2.1 Real-Time Radiography**

8 MTRUW containers generated after the effective date of the Permit and that are not wastes taken  
9 from retrievable storage after that date are not required to undergo RTR if associated AK  
10 documentation contains the information necessary to fully characterize the waste in accordance  
11 with Permit Section 2.4.1. Otherwise, all MTRUW containers require RTR prior to storage at  
12 the Facility.

13 RTR is a nondestructive, qualitative, and semi-quantitative assay technique that involves x-ray  
14 scanning of waste containers to identify and verify the physical form(s) of waste container  
15 contents using appropriate equipment and qualified operators. The Permittees shall use RTR to  
16 verify the absence of free liquids, to confirm the physical form of containerized waste, and to  
17 document the materials present.

18 The Permittees shall ensure that during RTR the waste container is scanned while the operator  
19 views and permanently records the image from the television screen on audio and videotape.  
20 The Permittees shall utilize a radiography data form to document the materials present and all  
21 other relevant characterization information about the containerized waste.

22 The Permittees shall allow only properly trained personnel to operate radiography equipment.  
23 Standardized training requirements for radiography operators are based upon existing industry  
24 standard training requirements. Operators must requalify at least every two years.

25 The Permittees shall examine the radiography image produced for evidence of liquids by  
26 repetitively moving the container-handling system and searching for evidence of wave motion.

27 The Permittees may visually examine the contents of a MTRUW container as a substitute to  
28 RTR. The Permittees shall ensure that waste characterization determined through visual  
29 examination is recorded in the associated waste's AK documentation.

### 30 **C.3.2.2 Characterization to Meet LDR Requirements**

31 The Permittees shall characterize MTRUW to determine its land disposal restriction status in  
32 accordance with Section C.5.2.

1 **C.3.2.3 WIPP Characterization**

2 Most MTRUW waste at the Facility is destined for disposal at the Waste Isolation Pilot Project  
3 (WIPP) in Carlsbad, New Mexico. Therefore, prior to shipment to WIPP, additional  
4 characterization to meet WIPP certification procedures will be implemented to meet  
5 requirements of the WIPP permit for these wastes. Waste information that is derived from the  
6 WIPP waste characterization will be used for Facility MTRUW characterization as additional  
7 information for AK.

8 **C.3.2.4 Characterization Procedures Prior to Treatment of Mixed TRU Wastes**

9 The Permittees shall adhere to the waste characterization procedures specific to waste treatment  
10 in the stabilization unit at TA-55, Building 4, Room 401, outlined below. The stabilization unit  
11 is a miscellaneous unit pursuant to 40 CFR Part 264, Subpart X and is used to treat liquid and  
12 solid mixed wastes by stabilization in cement to form a noncorrosive solid matrix.

13 The stabilization unit treats homogeneous liquid and solid mixed waste generated primarily from  
14 R&D and processing and recovery operations at TA-55 and at the Chemistry and Metallurgy  
15 Research Building at TA-3. The liquid wastes (Summary Category Group L1000) generally  
16 consist of evaporator bottoms solutions and laboratory solutions that may exhibit the hazardous  
17 characteristics of corrosivity and toxicity for metals (including arsenic, barium, cadmium,  
18 chromium, lead, mercury, and silver) as defined in 40 CFR §§ 261.22 and 261.24, which are  
19 incorporated herein by reference. The homogeneous solid process wastes (Summary Category  
20 Group S3000) consist of process residue from the evaporator, process leached solids, filter cake,  
21 and other miscellaneous solids. This waste stream typically exhibits the hazardous  
22 characteristics of toxic metals. These waste streams are mixed with cement in 55-gallon drums  
23 and allowed to cure into a noncorrosive solid matrix. Table C-19 provides a description of the  
24 waste streams associated with the stabilization unit and identifies their potentially applicable  
25 EPA Hazardous Waste Numbers. The resulting cemented waste is identified by Summary  
26 Category Group S3000 and typically carries the Waste Matrix Code S3100.

27 **C.3.2.4.1 Characterization Procedures for Waste to Be Treated by Stabilization**

28 The Permittees shall conduct chemical and physical characterization prior to treatment of  
29 MTRUW. The Permittees shall use documented AK, as described in Section C.3.1.1, to  
30 determine whether or not the waste stream is regulated as a hazardous waste. The Permittees  
31 shall use process knowledge, chemical analytical data, or both to adequately characterize the  
32 MTRUW prior to stabilization. If process information is not sufficient, the Permittees shall  
33 periodically sample and analyze the wastes to be treated by stabilization for pH and for TC  
34 metals listed in 40 CFR § 261.24 to establish a baseline, as appropriate. Based on documented  
35 AK, these wastes do not contain VOCs or SVOCs. Parameters and analytical methods for  
36 specific hazardous constituents are presented in Table C-18.

37 To ensure that proper procedures and considerations for sample collection and preservation,  
38 QA/QC, and occupational safety and health are followed, the Permittees shall comply with the

1 Facility-specific protocol consistent with the most recent version of *SW-846*. For purposes of  
2 collecting a representative sample of MTRUW, the Permittees shall collect and handle the  
3 sample in a manner that preserves its original physical form and composition and prevents  
4 contamination or changes in concentration of the parameters to be analyzed. Specific  
5 requirements as for sampling, parameters, and analytical methods are outlined in Tables C-11  
6 and C-18. Reevaluation frequency is addressed in Section C.3.

#### 7 **C.3.2.4.2 Characterization Procedures for Waste Treated by Stabilization**

8 The Permittees shall characterize waste treated by stabilization (i.e., MTRUW) in accordance  
9 with Section C.3.2.

#### 10 **C.3.2.5 Sample Handling, Preservation, and Storage**

11 Table C-15 presents the most recent *SW-846* requirements regarding sample containers,  
12 preservation techniques, and holding times associated with sample collection. The Permittees  
13 shall adhere to these requirements to ensure that sampling and analysis meet quality objectives  
14 for data.

### 15 **C.4 OFF-SITE WASTE ACCEPTANCE PROCEDURES**

16 For off-site waste, the Permittees shall require the generator to provide waste characterization  
17 documentation equivalent to that prepared by the Permittees for waste generated on site. The  
18 Permittees shall review such documentation for completeness and accuracy prior to approving  
19 the waste for shipment to the Facility.

20 The Permittees shall verify that off-site waste documentation, including Uniform Hazardous  
21 Waste Manifests and LDR Notification Forms, corresponds to the waste received and its  
22 associated characterization documentation.

23 The Permittees shall physically examine waste shipments upon receipt for correct  
24 documentation, correctness and completeness of waste container identification and labeling, and  
25 conformance with permitted container types and waste compatibility for storage and segregation,  
26 as appropriate. If the Permittees find discrepancies between the wastes received and the  
27 manifest or during further characterization find such discrepancies, the Permittees shall notify  
28 the Department in accordance with Permit Section 2.4.5. If the Permittees cannot resolve the  
29 discrepancies, the waste shall be returned to the generator in accordance with Section 2.4.5.

### 30 **C.5 SPECIAL PROCEDURAL REQUIREMENTS**

31 Waste management requirements specific to ignitable, reactive, and incompatible waste as well  
32 as requirements for compliance with LDR and 40 CFR Subparts BB and CC are described  
33 below.

1 **C.5.1 Procedures for Ignitable, Reactive, and Incompatible Wastes to be Stored or**  
2 **Treated**

3 The Permittees shall characterize all waste to be stored or treated under this Permit to identify  
4 applicable and appropriate classes and divisions contained in 49 CFR § 177.848, which is  
5 incorporated herein by reference, and shall label the container or tank to reflect that  
6 classification.

7 **C.5.2 Procedures to Ensure Compliance with LDR Requirements**

8 The Permittees shall evaluate all waste streams to identify all applicable underlying hazardous  
9 constituents (UHCs) exceeding treatment standards in accordance with 40 CFR § 268.7(a)(1),  
10 which is incorporated herein by reference. Waste designated to be disposed of at the Waste  
11 Isolation Pilot Plant (WIPP) must undergo characterization to determine whether it is subject to  
12 the land disposal prohibitions, but it is not required to be characterized to determine all  
13 applicable underlying hazardous constituents listed in 40 CFR §268.48.

14 If waste is to be treated on site to meet the LDR requirements, the Permittees shall comply with  
15 the testing and reporting requirements of 40 CFR § 268.7(b), which is incorporated herein by  
16 reference. The Permittees shall identify and document before treatment all waste whose  
17 treatment goal is to meet the LDR requirements. After treating such waste, the Permittees shall  
18 characterize the treated waste or residue to determine whether all treatment standards have been  
19 met. The Permittees shall analyze residues from wastes with concentration-based treatment  
20 standards by the appropriate methods described in Section C.3.1.2 to assure that the waste meets  
21 applicable treatment standards.

22 The Permittees shall prepare certifications required by the 40 CFR § 268.7(b), which is  
23 incorporated herein by reference, appropriate to formerly characteristic wastes for which all  
24 characteristics have been deactivated and all Universal Treatment Standards have been met,  
25 formerly characteristic wastes for which all characteristics have been deactivated but not all  
26 treatment standards are achieved, and other special certifications as required. The Permittees  
27 shall prepare new waste characterization documentation for the treated waste or residue, as  
28 appropriate, incorporating the treatment facility paperwork requirements of 40 CFR § 268.7(b)  
29 or the generator paperwork requirements of 40 CFR § 268.7(a), which is incorporated herein by  
30 reference, if the residue is considered a newly-generated waste

31 **C.5.3 Procedures to Ensure Compliance with Subpart BB Requirements**

32 The Permittees shall comply with 40 CFR Part 264, Subpart BB, as described below, as to  
33 equipment at the facility that is subject to specific requirements for test methods and procedures  
34 at 40 CFR Part 264, which is incorporated herein by reference.

35 **C.5.3.1 Requirements for Leak Detection and Monitoring**

36 The Permittees shall ensure that monitoring complies with Reference Method 21 at 40 CFR Part  
37 260.

1 The detection instrument shall meet the performance criteria of Reference Method 21. The  
2 Permittees shall use Reference Method 21 procedures to calibrate the detection instrument prior  
3 to each day it is used. The calibration gases shall be:

- 4 1. less than 10 parts per million (ppm) of hydrocarbon in air; and
- 5 2. methane or n-hexane mixed with air at approximately, but less than, 10,000 ppm methane or  
6 n-hexane.

7 The Permittees shall measure all potential leak interfaces as close to the interface as possible.  
8 For determining compliance with “no detectable emissions” requirements (40 CFR § 264.1054,  
9 which is incorporated herein by reference), the Permittees shall meet all of the above  
10 requirements as well as the following:

- 11 1. background shall be determined pursuant to Reference Method 21; and
- 12 2. the arithmetic difference between background and the maximum concentration detected shall  
13 be compared with 500 ppm.

#### 14 **C.5.3.2 Determination of Hazardous Waste Concentration**

15 The Permittees shall determine whether hazardous waste contained in, or in contact with, the  
16 equipment is greater than or equal to 10% by weight organics using one of the following (*see* 40  
17 CFR § 264.1063(d)):

- 18 1. ASTM Methods D 2267-88, E 169-87, E 168-88, E 260-85 (*see* 40 CFR § 260.11);
- 19 2. *SW-846* Method 9060 or 8260 (*see* 40 CFR § 260.11); or
- 20 3. acceptable knowledge with documentation (e.g., production process information,  
21 measurements from an identical process at another facility).

22 If concentration of the hazardous waste changes such that it is believed to be greater than 10%  
23 by weight organics, the Permittees shall revise the determination only after chemical analyses is  
24 performed in accordance with the methods listed above (*see* 40 CFR § 264.1063(e)). If the  
25 Department does not agree with the determination, chemical analyses using the methods listed  
26 above can be used to resolve the dispute (*see* 40 CFR § 264.1063(f)). Samples used to make this  
27 determination shall be representative of the highest total organic concentration expected (*see* 40  
28 CFR § 264.1063(g)).

#### 29 **C.5.4 Procedures to Ensure Compliance with Subpart CC Requirements**

30 The Permittees’ waste streams described in this document may be subject to 40 CFR Part 264,  
31 Subpart CC “Air Emission Standards for Tanks, Surface Impoundments, and Containers” based  
32 on applicability criteria specified in 40 CFR § 264.1080, incorporated herein by reference. For  
33 waste units that are not exempt from this Subpart under 40 CFR §264.1080(b), the Permittees  
34 shall address the applicable Subpart CC requirements. In addition, exemption from the standards  
35 specified in 40 CFR §§ 264.1084 through 264.1087, incorporated herein by reference, can be  
36 demonstrated if the average VOC concentration is less than 500 parts per million by weight

1 (ppmw) at the point of waste origination, as described at 40 CFR § 264.1082(c)(1), incorporated  
2 herein by reference. The Permittees shall make this determination in accordance with 40 CFR §  
3 264.1083(a) and shall review and update it as necessary at least every twelve months.

4 If the Permittees claim a 40 CFR § 264.1082(c) exemption for any hazardous waste management  
5 units, the Permittees shall document the determination for each waste stream. Permittees may  
6 use AK or process knowledge to make the determination. However, if sampling and analysis is  
7 needed, the Permittees shall conduct it in accordance with the approved methods identified at 40  
8 CFR §§ 265.1084(a)(3)(iii)(A) through 265.1084(a)(3)(iii)(I), and listed in Tables A-11, A-12,  
9 and A-13. The Permittees shall review the characterization documentation before acceptance of  
10 the waste at TA-54 as required in Section A.3.

11 Characterization requirements for waste that has been treated to meet the exemptions allowed at  
12 40 CFR §§ 264.1082(c)(2) and (4) are summarized below:

- 13 1. in accordance with 40 CFR § 264.1082(c)(2)(i), waste is treated to reduce the volatile  
14 organic (VO) concentration to less than 500 ppmw that is measured in either a waste from a  
15 single point of origination or individual wastes from multiple points of origination  
16 commingled before treatment. The Permittees shall analyze the waste prior to and after  
17 treatment pursuant to provisions at 40 CFR § 264.1083(a) and (b);
- 18 2. in accordance with 40 CFR § 264.1082(c)(2)(ii), waste is treated to reduce the VO  
19 concentrations by at least 95% and the treated waste VO concentration is ensured to be less  
20 than 100 ppmw. The Permittees shall analyze the waste prior to and after treatment pursuant  
21 to provisions at 40 CFR § 264.1083(a) and (b);
- 22 3. in accordance with 40 CFR § 264.1082(c)(2)(iii), waste is treated to remove VO mass  
23 greater than or equal to the VO mass that exceeded the 500 ppmw. The Permittees shall  
24 analyze the waste prior to and after treatment pursuant to provisions at 40 CFR §  
25 264.1083(a) and (b);
- 26 4. in accordance with 40 CFR § 264.1082(c)(2)(v), waste is treated to reduce the VO  
27 concentration to less than the lowest VO concentration for all individual waste streams  
28 mixed together at the point of origin and less than 500 ppmw. The Permittees shall analyze  
29 the waste prior to and after treatment pursuant to provisions at 40 CFR § 264.1083(a) and  
30 (b);
- 31 5. in accordance with 40 CFR § 264.1082(c)(2)(vi), waste is treated to reduce the VO  
32 concentration by 95% and each individual waste stream entering the treatment process is  
33 certified to be less than 10,000 ppmw. The Permittees shall analyze the waste prior to and  
34 after treatment pursuant to provisions at 40 CFR § 264.1083(a) and (b); and
- 35 6. in accordance with 40 CFR § 264.1082(c)(4), waste is treated to meet LDR standards, either  
36 concentration-based or technology-based. LDR compliance is determined for concentration-  
37 based using either analysis or AK.

38 Details for specific treatment criteria and analytical requirements associated with each  
39 exemption can be found at the regulations cited.

1 **C.6 REFERENCES**

- 2 ASTM, 1991, "Standard Practice for Sampling Waste and Soils for Volatile Organic  
3 Compounds," ASTM D4547-91, *Annual Book of ASTM Standards*, Philadelphia,  
4 Pennsylvania, American Society for Testing and Materials.
- 5 DOE, 1999, "Radioactive Waste Management," *DOE Order 435.1*, U.S. Department of  
6 Energy, Washington, D.C.
- 7 DOE, 1995, "DOE Waste Treatability Groups Guidance," Revision 0.0, U.S. Department of  
8 Energy, Idaho Operations Office.
- 9 EPA, 1994a, "Waste Analysis at Facilities that Generate Treat, Store, and Dispose of  
10 Hazardous Wastes, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental  
11 Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
- 12 EPA, 1994b, "Use of Total Waste Analysis in Toxicity Characteristic Determinations,"  
13 FAXBACK 13647, U.S. Environmental Protection Agency, Office of Solid Waste and  
14 Emergency Response, Washington, D.C.
- 15 EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste,  
16 Physical/Chemical Methods," *SW-846*, U.S. Environmental Protection Agency, Office of  
17 Solid Waste and Emergency Response, U.S. Government Printing Office, Washington,  
18 D.C.
- 19 NMED, 1995, "Federal Facility Compliance Order (Los Alamos National Laboratory),"  
20 New Mexico Environment Department, Santa Fe, New Mexico.

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**Table C-1**  
**(reserved)**

**Table C-2**  
**Descriptions of Hazardous Waste Stored at the Facility**  
(This table is for informational purposes only)

Waste Description <sup>a</sup>	Waste-Generating Process <sup>a</sup>	Basis for Characterization <sup>a</sup>	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents
Spent Solvents	Research and development (R&D) activities; laser research; organic and inorganic chemistry research (e.g., solvent extractions, liquid chromatography solvents, polymer synthesis, and distillations); cleaning; and degreasing operations	Acceptable Knowledge <sup>d</sup>  Sampling and Analysis	D001	Ignitability	NA <sup>e</sup>	Antimony, Arsenic, Barium, Cadmium, Cyanides (Total), Chromium (Total), Lead, Mercury-all others, Selenium, Silver, Acetone, Acetonitrile, Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, Cresol, 1,4-Dichlorobenzene, 1,2-Dichloroethane, 1,1-Dichloroethylene,  2,4-Dinitrotoluene, 1,4-Dioxane, Ethyl ether, Hexachlorobenzene,  Hexachloroethane, Methanol, Methylene chloride, Methyl ethyl ketone, Nitrobenzene, Pentachlorophenol, Pyridine, Toluene, Triethylamine,  Trichloroethylene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, Vinyl chloride and all applicable constituents identified above the UHC regulatory limit.
			D002	Corrosivity	NA <sup>e</sup>	
			D003	Reactivity	NA <sup>e</sup>	
			D004	Arsenic	5.0	
			D005	Barium	100.0	
			D006	Cadmium	1.0	
			D007	Chromium	5.0	
			D008	Lead	5.0	
			D009	Mercury	0.2	
			D010	Selenium	1.0	
			D011	Silver	5.0	
			D018	Benzene	0.5	
			D019	Carbon tetrachloride	0.5	
			D021	Chlorobenzene	100.0	
			D022	Chloroform	6.0	
			D026	Cresol	200.0 <sup>h</sup>	
			D027	1,4-Dichlorobenzene	7.5	
			D028	1,2-Dichloroethane	0.5	
			D029	1,1-Dichloroethylene	0.7	
			D030	2,4-Dinitrotoluene	0.13	
			D032	Hexachlorobenzene	0.13	
			D034	Hexachloroethane	3.0	
			D035	Methyl ethyl ketone	200.0	
			D036	Nitrobenzene	2.0	
			D037	Pentachlorophenol	100.0	
			D038	Pyridine	5.0	
			D040	Trichloroethylene	0.5	
D041	2,4,5-Trichlorophenol	400.0				
D042	2,4,6-Trichlorophenol	2.0				
D043	Vinyl chloride	0.2				
F001	Spent halogenated solvents	NA <sup>e</sup>				
F002	Spent halogenated solvents	NA <sup>e</sup>				
F003	Spent non-halogenated solvents	NA <sup>e</sup>				
F004	Spent non-halogenated solvents	NA <sup>e</sup>				
F005	Spent non-halogenated solvents	NA <sup>e</sup>				
U213	Tetrahydrofuran					

					NA <sup>e</sup>	
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**Table C-2 (continued)**

Waste Description <sup>a</sup>	Waste-Generating Process <sup>a</sup>	Basis for Characterization <sup>a</sup>	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents
Contaminated Solid Wastes	Machining operations, chemistry research, decontamination and decommissioning projects, metal finishing operations, HE wastewater filtration, and general maintenance operations	Acceptable Knowledge <sup>d</sup>	D001	Ignitability	NA <sup>e</sup>	Arsenic, Barium, Beryllium, Cadmium, Chromium, Lead, Mercury-all others, Selenium, Silver, Thallium, Benzene, Carbon Disulfide, Carbon Tetrachloride, Chlorobenzene, Chloroform, o-Cresol, m-Cresol, p-Cresol  Cresol, 1,4-Dichlorobenzene  1,1-Dichloroethylene, 2,4-Dinitrotoluene, Ethyl Ether, Heptachlor (and its epoxide), Hexachlorobenzene  Hexachlorobutadiene,  Hexachloroethane, Methanol, Methyl ethyl ketone, Methylene Chloride, Nitrobenzene,  Pentachlorophenol, Phenol, p,p'-DDT, Pyridine, Tetrachloroethylene, Trichloroethylene,  2,4,5-Trichlorophenol,  2,4,6-Trichlorophenol,  Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit
		Sampling and Analysis	D003	Reactivity	NA <sup>e</sup>	
			D004	Arsenic	5.0	
			D005	Barium	100.0	
			D006	Cadmium	1.0	
			D007	Chromium	5.0	
			D008	Lead	5.0	
			D009	Mercury	0.2	
			D010	Selenium	1.0	
			D011	Silver	5.0	
			D018	Benzene	0.5	
			D019	Carbon tetrachloride	0.5	
			D021	Chlorobenzene	100.0	
			D022	Chloroform	6.0	
			D023	o-Cresol	200.0 <sup>h</sup>	
			D024	m-Cresol	200.0 <sup>h</sup>	
			D025	p-Cresol	200.0 <sup>h</sup>	
			D026	Cresol	200.0 <sup>h</sup>	
			D027	1,4-Dichlorobenzene	7.5	
			D028	1,2-Dichloroethane	0.5	
			D029	1,1-Dichloroethylene	0.7	
			D030	2,4-Dinitrotoluene	0.13	
			D031	Heptachlor (and its epoxide)	0.008	
			D032	Hexachlorobenzene	0.13	
			D033	Hexachlorobutadiene	0.5	
			D034	Hexachloroethane	3.0	
			D035	Methyl ethyl ketone	200.0	
			D036	Nitrobenzene	2.0	
			D037	Pentachlorophenol	100.0	
			D038	Pyridine	5.0 <sup>f</sup>	
			D039	Tetrachloroethylene	0.7	
			D040	Trichloroethylene	0.5	
			D041	2,4,5-Trichlorophenol	400.0	
			D042	2,4,6-Trichlorophenol	2.0	
D043	Vinyl chloride	0.2				
F001	Spent halogenated solvents	NA <sup>e</sup>				
F002	Spent halogenated solvents	NA <sup>e</sup>				
F003	Spent non-halogenated solvents	NA <sup>e</sup>				
F004	Spent non-halogenated solvents	NA <sup>e</sup>				
F005	Spent non-halogenated solvents	NA <sup>e</sup>				
K045	Spent carbon	NA <sup>e</sup>				

**Table C-2 (continued)**

<b>Waste Description<sup>a</sup></b>	<b>Waste-Generating Process<sup>a</sup></b>	<b>Basis for Characterization<sup>a</sup></b>	<b>Potential EPA<sup>b</sup> Hazardous Waste Numbers</b>	<b>Potential Hazardous Waste Constituents and/or Characteristics</b>	<b>Regulatory Limits<sup>c</sup> (milligrams per liter)</b>	<b>Potential Underlying Hazardous Constituents</b>
Paint and Related Wastes	Painting and finishing operations, and general facility maintenance	Acceptable Knowledge <sup>d</sup>  Sampling and Analysis	D001 D005 D006 D007 D008 D009 D011 D036 F003 F005	Ignitability Barium Cadmium Chromium Lead Mercury Silver Nitrobenzene Spent non-halogenated solvents Spent non-halogenated solvents	NA <sup>e</sup> 100.0 1.0 5.0 5.0 0.2 5.0 2.0 NA <sup>e</sup> NA <sup>e</sup>	Barium, Cadmium, Chromium (Total), Lead, Mercury –all others, Silver, Methyl ethyl ketone, Nitrobenzene and all applicable constituents above the UHC regulatory limit
Photographic and Photocopier Wastes	Photographic film processing and photocopier operations	Acceptable Knowledge <sup>d</sup>  Sampling and Analysis	D001 D002 D006 D007 D008 D011	Ignitability Corrosivity Cadmium Chromium Lead Silver	NA <sup>e</sup> NA <sup>e</sup> 1.0 5.0 5.0 5.0	Cadmium, Chromium, Lead, Silver and all applicable constituents above the UHC regulatory limit
Corrosive Liquid Wastes	Analytical chemistry research, electro-etching, and electro-polishing	Acceptable Knowledge <sup>d</sup>  Sampling and Analysis	D001 D002 D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D022 D038 F002 F003 F005 P023	Ignitability Corrosivity Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene Chloroform Pyridine Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Chloroacetaldehyde	NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 6.0 5.0 NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup>	Acetone, Arsenic, Barium, Benzene, Cadmium, Chromium (Total), Chloroform, Cyanides (Total), 2,4-Dinitrophenol, Fluoride, Isobutyl alcohol, Lead, Mercury-all others, Methanol, Nickel, o-Nitrophenol, Pyridine, Selenium, Silver, Sulfide, Thallium, Triethylamine, Zinc, and all applicable constituents above the UHC regulatory limit

Solid Metals and Metallic Compounds	Machining and cutting operations; synthesis reactions; solder from electronic manufacturing, repair, and brazing operations; and grinding operations	Acceptable Knowledge <sup>d</sup>  Sampling and Analysis	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	NA <sup>e</sup> NA <sup>e</sup> 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury-all others, Nickel, Silver, and all applicable constituents above the UHC regulatory limit
Waste Description <sup>a</sup>	Waste-Generating Process <sup>a</sup>	Basis for Characterization <sup>a</sup>	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents
Contaminated Non-corrosive Aqueous and Non-aqueous Solutions and Sludges	Vacuum pump maintenance, analytical spectrometry, equipment cleaning and maintenance, vehicle maintenance, synthesis reactions, metal-polishing operations, and chemical research	Acceptable Knowledge <sup>d</sup>  Sampling and Analysis	D001 D002 D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D021 D022 D023 D024 D025 D026 D027 D028 D029 D030 D032 D033 D034 D035 D036 D037 D038 D039 D040 D041	Ignitability Corrosivity Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform o-Cresol m-Cresol p-Cresol Cresol 1,4-Dichlorobenzene 1,2-Dichloroethane 1,1-Dichloroethylene 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Methyl ethyl ketone Nitrobenzene Pentachlorophenol Pyridine Tetrachloroethylene Trichloroethylene 2,4,5-Trichlorophenol	NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 200.0 <sup>h</sup> 200.0 <sup>h</sup> 200.0 <sup>h</sup> 200.0 <sup>h</sup> 7.5 0.5 0.7 0.13 <sup>f</sup> 0.13 <sup>f</sup> 0.5 3.0 200.0 2.0 100.0 5.0 0.7 0.5 400.0	Acetone, Acetonitrile, Antimony, Arsenic, Barium, Benzene, Cadmium, Carbon tetrachloride, Chlorobenzene, Chloroform  Chromium (Total), Chrysene, o-Cresol, m-Cresol p-Cresol, Cresol  m-Dichlorobenzene, 1,4-Dichlorobenzene  1,2-Dichloroethane, 1,1-Dichloroethylene, 2,4-Dinitrotoluene,  4,6-Dinitro-o-cresol, 1,4-Dioxane, Fluorine, Indeno(1,2,3-c,d) pyrene, Hexachlorobenzene,  Hexachlorobutadiene,  Hexachloroethane,  Lead, Mercury-all others, Methanol, Methyl ethyl ketone, Methylene chloride, Naphthalene, Nitrobenzene,  p-Nitrophenol, Pentachlorophenol,  Pyridine, Selenium, Silver, Tetrachloroethylene, Toluene, Trichloroethylene, 2,4,5-

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			D042 D043 F001 F002 F003 F004 F005	2,4,6-Trichlorophenol Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	2.0 0.2 NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup>	Trichlorophenol 2,4,6-Trichlorophenol, Zinc Vinyl chloride and all applicable constituents  above the UHC regulatory limit
<b>Waste Description<sup>a</sup></b>	<b>Waste-Generating Process<sup>a</sup></b>	<b>Basis for Characterization<sup>a</sup></b>	<b>Potential EPA Hazardous Waste Numbers</b>	<b>Potential Hazardous Waste Constituents and/or Characteristics</b>	<b>Regulatory Limits<sup>c</sup> (milligrams per liter)</b>	<b>Potential Underlying Hazardous Constituents</b>
Mercury Wastes	Lamp replacement, chemical research, mercury spill cleanup, and equipment cleaning and maintenance	Acceptable Knowledge  Sampling and Analysis	D003 D008 D009 D011 U151	Reactivity Lead Mercury Silver Mercury	NA <sup>e</sup> 5.0 0.2 5.0 NA <sup>e</sup>	Barium, Chromium (Total), Lead, Mercury-all others, Silver Thallium, Zinc and all applicable constituents above the UHC regulatory limit
Used Batteries and Battery Fluids	Equipment maintenance	Acceptable Knowledge	D002 D003 D006 D007 D008 D009 D011 D038	Corrosivity Reactivity Cadmium Chromium Lead Mercury Silver Pyridine	NA <sup>e</sup> NA <sup>e</sup> 1.0 5.0 5.0 0.2 5.0 5.0f	Cadmium, Chromium, Lead, Mercury-all others, Pyridine, Silver and all applicable constituents above the UHC regulatory limit
Unused/Off-specification Commercial Chemical Products	R&D, spill residues, and general facility operations	Acceptable Knowledge  Sampling and Analysis	D001 D002 D003 D004 through D043  All P- and U-listed EPA Hazardous Waste Numbers <sup>g</sup>	Ignitability Corrosivity Reactivity Toxicity characteristic wastes  Discarded commercial chemical products and off-specification species	NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> -c  NA <sup>e</sup>	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Nickel, Selenium, Silver, Acetonitrile, Benzene, Carbon tetrachloride Chlorobenzene, Chloroform, o-Cresol, m-Cresol, p-Cresol, Cresol, 2, 4-D, 1,4-Dichlorobenzene, 1-Dichlorobenzene, 1,1-Dichloroethylene, 2,4-Dinitrotoluene, Endrin, Heptachlor (and its epoxide), Hexachlorobenzene Hexachlorobutadiene, Hexachloroethane, Lindane, Methoxychlor, Methyl ethyl ketone, Nitrobenzene, Pentachlorophenol Pyridine, Tetrachloroethylene, Toluene, Toxaphene, Trichloroethylene, 2,4,5-Trichlorophenol,

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July 6, 2009

Waste Description <sup>a</sup>	Waste-Generating Process <sup>a</sup>	Basis for Characterization <sup>a</sup>	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents
						2,4,6-Trichlorophenol, 2,4,5-TP (Silvex), Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit
Gas Cylinder Waste	R&D and general facility operations	Acceptable Knowledge	D001 D002 D003 Potential D-coded EPA Hazardous Waste Numbers Potential P-and U-listed EPA Hazardous Waste Numbers	Ignitability Corrosivity Reactivity Toxicity characteristic wastes  Discarded commercial chemical products and off-specification species	NAe NAe NAe -c  NAe	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Selenium, Silver, Benzene, Carbon tetrachloride Chlorobenzene, Chloroform o-Cresol, m-Cresol, p-Cresol, Cresol, 2,4-D, 1,4-Dichlorobenzene 1,1-Dichloroethylene, 2,4-Dinitrotoluene, Endrin, Heptachlor (and its epoxide), Hexachlorobenzene Hexachlorobutadiene, Hexachloroethane, Lindane, Methoxychlor, Methyl ethyl ketone, Nitrobenzene, Pentachlorophenol Pyridine, Tetrachloroethylene, Toxaphene, Trichloroethylene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, 2,4,5-TP (Silvex) Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit
Environmental Restoration (ER) Soils and Sludges	Site decommissioning, site characterization, and site remediation; includes septic tank and detention basin closure, removal actions, and other remedial actions and site closures	Acceptable Knowledge  Sampling and Analysis	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D022 D030 D032	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene Chloroform 2,4-Dinitrotoluene Hexachlorobenzene	NAe NAe 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 6.0 0.13f 0.13f	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury-all others, Selenium, Silver, Benzene, Chloroform, 2,4-Dinitrotoluene, Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane, Nitrobenzene, Tetrachloroethylene, Trichloroethylene, 2,4,6-Trichlorophenol, and all applicable constituents

			D033	Hexachlorobutadiene	0.5	identified above the UHC regulatory limit
			D034	Hexachloroethane	3.0	
			D036	Nitrobenzene	2.0	
			D039	Tetrachloroethylene	0.7	
			D040	Trichloroethylene	0.5	
			D042	2,4,6-Trichlorophenol	2.0	
			F001	Spent halogenated solvents	NAe	
			F002	Spent halogenated solvents	NAe	
			F003	Spent non-halogenated solvents	NAe	
			F005	Spent non-halogenated solvents	NAe	

**Table C-3**  
**Descriptions of Mixed Low-Level Waste Stored at the Facility**  
(This table is for informational purposes only)

Waste Description <sup>a</sup>	Waste Generating Activity <sup>a</sup>	Basis for Hazardous Waste Designation <sup>a</sup>	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents
<b>Solid Wastes</b>						
Soils with Heavy Metals	Decontamination and decommissioning (D&D) and Environmental Restoration (ER) activities	Acceptable Knowledge <sup>d</sup> and Preliminary Analysis <sup>e</sup>	D004 D005 D006 D007 D008 D009 D010 D011	Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0	Arsenic, Barium, Cadmium, Chromium (Total), Mercury-all others, Lead, Selenium, Silver, Vanadium, Zinc and those constituents identified above the UHC regulatory limit
Environmental Restoration Soils	Remediation of release sites and D&D activities	Acceptable Knowledge <sup>d</sup>  Sampling and Analysis	D005 D006 D007 D008 D009 D028 D029 F001 F002 F004 F005	Barium Cadmium Chromium Lead Mercury 1,2-Dichloroethane 1,1-Dichloroethylene Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	100.0 1.0 5.0 5.0 0.2 0.5 0.7 NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup>	Barium, Cadmium, Chromium (Total), Lead, Mercury 1,2-Dichloroethane 1,1-Dichloroethylene and all applicable constituents identified above the UHC regulatory limit.
Inorganic Solid Oxidizers	D&D of research laboratories and research and development (R&D)	Acceptable Knowledge <sup>d</sup>	D001 D003 D005	Ignitability Reactivity Barium	NA <sup>e</sup> NA <sup>e</sup> 100.0	Barium and all applicable constituents identified above the UHC limit
Lead Waste	Radioisotope experiments and other reactor, accelerator, laser, and x-ray activities	Acceptable Knowledge <sup>d</sup>	D002 D003 D007 D008	Corrosivity Reactivity Chromium Lead	NA <sup>e</sup> NA <sup>e</sup> 5.0 5.0	Chromium, Lead, Mercury-all others and all applicable constituents identified above the UHC

			D009	Mercury	0.2	regulatory limit
Noncombustible Debris	Maintenance, D&D, R&D, and ER activities	Acceptable Knowledge <sup>d</sup>	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011 F002 F005	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Spent halogenated solvents Spent non-halogenated solvents	NA <sup>e</sup> NA <sup>e</sup> 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 NA <sup>e</sup> NA <sup>e</sup>	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Selenium, Silver, and all applicable constituents identified above the UHC regulatory limit

**Table C-3 (continued)**

Waste Description <sup>a</sup>	Waste Generating Activity <sup>a</sup>	Basis for Hazardous Waste Designation <sup>a</sup>	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents
<b>Solid Wastes (Continued)</b>						
Combustible Debris	Maintenance, R&D, D&D, and ER activities	Acceptable Knowledge <sup>d</sup>	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011 F001 F002 F003 F005	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA <sup>e</sup> NA <sup>e</sup> 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup>	Arsenic, Barium, Chromium, Lead, Mercury-all others, Selenium, Silver, Nickel, Zinc and all applicable constituents identified above the UHC regulatory limit
Organic-Contaminated Noncombustible Solids	Vacuum pump maintenance, R&D, D&D, and ER activities	Acceptable Knowledge <sup>d</sup>	D001 D004 D005 D006 D007 D008 D009 D010 D011 D018 D027 D030 D032 D033 D034 D035 D037 D038 D041 D042 F001 F002 F004 F005	Ignitability Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene 1,4-Dichlorobenzene 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Methyl ethyl ketone Pentachlorophenol Pyridine 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA <sup>e</sup> 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 7.5 0.13 <sup>f</sup> 0.13 <sup>f</sup> 0.5 3.0 200.0 100.0 5.0 <sup>f</sup> 400.0 2.0 NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup>	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver, Benzene, 1,4-Dichlorobenzene, 2,4-Dinitrotoluene, Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane, Methoxychlor, Methyl ethyl ketone, Pentachlorophenol, Pyridine, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol and all applicable constituents identified above the UHC regulatory limit

**Table C-3 (continued)**

Waste Description <sup>a</sup>	Waste Generating Activity <sup>a</sup>	Basis for Hazardous Waste Designation <sup>a</sup>	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents
<b>Solid Wastes (Continued)</b>						
Organic-Contaminated Combustible Solids	Maintenance, D&D, and ER activities	Acceptable Knowledge <sup>d</sup>	D001 D003 D007 D008 D009 D030 D035 F001 F002 F003 F005	Ignitability Reactivity Chromium Lead Mercury 2,4-Dinitrotoluene Methyl ethyl ketone Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA <sup>e</sup> NA <sup>e</sup> 5.0 5.0 0.2 0.13 <sup>f</sup> 200.0 NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup>	Chromium, Lead Mercury-all other, 2,4-Dinitrotoluene, Methyl ethyl ketone and all applicable constituents identified above the UHC regulatory limit
Water-Reactive Wastes	Cleanup of HE firing-site debris, machining and disassembly of test components	Acceptable Knowledge <sup>d</sup>	D001 D003 D005 F002	Ignitability Reactivity Barium Spent halogenated solvents	NA <sup>e</sup> NA <sup>e</sup> 100.0 NA <sup>e</sup>	Barium, and all applicable constituents identified above the UHC regulatory limit
Mercury Wastes	Cleanup operations	Acceptable Knowledge <sup>d</sup>	D005 D007 D008 D009 F001	Barium Chromium Lead Mercury Spent halogenated solvents	100.0 5.0 5.0 0.2 NA <sup>e</sup>	Barium, Chromium, Lead, Mercury-all others and all applicable constituents identified above the UHC regulatory limit
Unused Solid Reagent Chemical Wastes	R&D activities	Acceptable Knowledge <sup>d</sup>	D001 D002 D003 All P- and U- listed EPA Hazardous Waste Numbers <sup>h</sup>	Ignitability Corrosivity Reactivity Discarded commercial chemical products and off-specification species	NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup>	All applicable constituents above the UHC regulatory limit

**Table C-3 (continued)**

Waste Description <sup>a</sup>	Waste Generating Activity <sup>a</sup>	Basis for Hazardous Waste Designation <sup>a</sup>	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents
<b>Liquid Wastes</b>						
Spent Solvents and Contaminated Solvent Mixtures	Maintenance, cleaning, and degreasing activities: R&D; processing operations, such as extraction, bench-scale experimental inorganic chemistry, environmental analysis, radiochemistry	Acceptable Knowledge <sup>d</sup>	D001	Ignitability	NA <sup>e</sup>	Arsenic, Barium, Chromium, Lead, Mercury-all others, Selenium, Silver, Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, 1,4-Dichlorobenzene, 1,2-Dichloroethane, 2,4-Dinitrotoluene, Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane, Nitrobenzene, Tribromomethane (Bromoform), 2,4,6-Trichlorophenol, Vinyl chloride and all applicable constituents identified above the UHC regulatory limit
			D002	Corrosivity	NA <sup>e</sup>	
			D004	Arsenic	5.0	
			D005	Barium	100.0	
			D007	Chromium	5.0	
			D008	Lead	5.0	
			D009	Mercury	0.2	
			D010	Selenium	1.0	
			D011	Silver	5.0	
			D018	Benzene	0.5	
			D019	Carbon tetrachloride	0.5	
			D021	Chlorobenzene	100.0	
			D022	Chloroform	6.0	
			D027	1,4-Dichlorobenzene	7.5	
			D028	1,2-Dichloroethane	0.5	
			D030	2,4-Dinitrotoluene	0.13 <sup>f</sup>	
			D032	Hexachlorobenzene	0.13 <sup>f</sup>	
			D033	Hexachlorobutadiene	0.5	
			D034	Hexachloroethane	3.0	
			D036	Nitrobenzene	2.0	
D042	2,4,6-Trichlorophenol	2.0				
D043	Vinyl chloride	0.2				
F001	Spent halogenated solvents	NA <sup>e</sup>				
F002	Spent halogenated solvents	NA <sup>e</sup>				
F003	Spent non-halogenated solvents	NA <sup>e</sup>				
F005	Spent non-halogenated solvents	NA <sup>e</sup>				
<b>Liquid Wastes (Continued)</b>						
Corrosive Liquid Wastes	Radiochemistry research, plutonium-processing operations, and analytical chemistry	Acceptable Knowledge <sup>d</sup>	D001	Ignitability	NA <sup>e</sup>	Arsenic, Barium, Cadmium, Bromodichloromethane, Chromium (Total), Lead, Mercury-all others, Nitrobenzene, Nickel, Selenium, Silver, Vinyl Chloride and all applicable constituents identified above the UHC regulatory limit
			D002	Corrosivity	NA <sup>e</sup>	
			D004	Arsenic	5.0	
			D006	Cadmium	1.0	
			D007	Chromium	5.0	
			D008	Lead	5.0	
			D009	Mercury	0.2	
			D010	Selenium	1.0	
			D011	Silver	5.0	
			D036	Nitrobenzene	2.0	
D043	Vinyl chloride	0.2				

			F001 F002 F005	Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents	NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup>	
Aqueous and Nonaqueous Liquids Contaminated with Heavy Metals and/or Organics	ER activities, metal-polishing operations, and radiochemistry research	Acceptable Knowledge <sup>d</sup>	D001	Ignitability	NA <sup>e</sup>	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Selenium, Silver, Benzene, Carbon Tetrachloride, Chlorobenzene, Chloroform, o-cresol, m-cresol, 1,2-Dichloroethane, and all applicable constituents identified above the UHC regulatory limit
			D003	Reactivity	NA <sup>e</sup>	
		Sampling and Analysis <sup>i</sup>	D004	Arsenic	5.0	
			D005	Barium	100.0	
			D006	Cadmium	1.0	
			D007	Chromium	5.0	
			D008	Lead	5.0	
			D009	Mercury	0.2	
			D010	Selenium	1.0	
			D011	Silver	5.0	
			D018	Benzene	0.5	
			D019	Carbon tetrachloride	0.5	
			D021	Chlorobenzene	100.0	
			D022	Chloroform	6.0	
			D023	o-Cresol	200.0 <sup>g</sup>	
			D024	m-Cresol	200.0 <sup>g</sup>	
			F002	Spent halogenated solvents	NA <sup>e</sup>	
F005	Spent non-halogenated solvents	NA <sup>e</sup>				
<b>Liquid Wastes (Continued)</b>						

Oil Wastes	Equipment maintenance operations	Acceptable Knowledge <sup>d</sup>	D004 D005 D006 D007 D008 D009 D010 D018 D019 D027 D028 D030 D032 D033 D034 D036 D037 D038 D041 D042 D043 F001 F002 F003 F005	Arsenic Barium Cadmium Chromium Lead Mercury Selenium Benzene Carbon tetrachloride 1,4-Dichlorobenzene 1,2-Dichloroethane 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene Pentachlorophenol Pyridine 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	5.0 100.0 1.0 5.0 5.0 0.2 1.0 0.5 0.5 0.5 7.5 0.5 0.13 <sup>f</sup> 0.13 <sup>f</sup> 0.5 3.0 2.0 100.0 5.0 <sup>f</sup> 400.0 2.0 0.2 NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup>	Arsenic, Barium, Cadmium, Chromium Lead, Mercury-all others, Selenium, Silver, Thallium, Benzene, Carbon tetrachloride, 1,4-Dichlorobenzene, 1,2-Dichloroethane, 2,4-Dinitrotoluene, Diethylphthalate, Di-n-butyl phthalate, Hexachlorobutadiene, Hexachlorobenzene, Hexachloroethane, Hexachlorocyclopentadiene, Nitrobenzene, Pentachlorophenol, Pyridine, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, Vinyl chloride and all applicable constituents identified above the UHC regulatory limit
Unused Liquid Reagent Chemical Wastes	R&D activities	Acceptable Knowledge <sup>d</sup>	D001 D002 D035 All P- and U-listed EPA Hazardous Waste Numbers <sup>h</sup>	Ignitability Corrosivity Methyl ethyl ketone Discarded commercial chemical products and off-specification species	NA <sup>e</sup> NA <sup>e</sup> 200.0 NA <sup>e</sup>	Methyl ethyl ketone and all applicable constituents identified above the UHC regulatory limit
<b>Gas Cylinder Waste</b>						

Gas Cylinder Waste	R&D and general facility operations	Acceptable Knowledge <sup>d</sup>	D001 D002 D003 Potential D-coded EPA Hazardous Waste Numbers  Potential P- and U-listed EPA Hazardous Waste Numbers <sup>i</sup>	Ignitability Corrosivity Reactivity Toxicity characteristic wastes  Discarded commercial chemical products and off-specification species	NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> - <sup>c</sup>  NA <sup>e</sup>	<b>All applicable constituents above the UHC regulatory limit</b>
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<sup>a</sup> Denotes information from the Los Alamos National Laboratory waste characterization documentation database.

<sup>b</sup> U.S. Environmental Protection Agency.

<sup>c</sup> A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986), the extract from a representative sample of the waste contains any of the contaminants listed (D004-D043) at a concentration equal to or greater than the respective value given in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20.4.1 NMAC), Subpart II, Part 261, Subpart C [6-14-00].

<sup>d</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938,4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

<sup>e</sup> Not applicable: Refers to the absence of regulatory limits for ignitable, corrosive, and reactive characteristic wastes and F-, P-, and U-listed wastes.

<sup>f</sup> The quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level (20.4.1 NMAC, Subpart II, 261.24, Table 1 [6-14-00]).

<sup>g</sup> If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 milligrams per liter.

<sup>h</sup> Refers to the P- and U-listed wastes found in the "Los Alamos National Laboratory General Part A Permit Application," Revision 3.0, 2002, Los Alamos National Laboratory, Los Alamos, New Mexico.

Note: Fluoride, sulfide, vanadium, and zinc are not "underlying hazardous constituents" in characteristic wastes, according to the definition in § 268.2(i). Selenium is not an underlying hazardous constituent as defined at § 268.2(i) because its Universal Treatment Standard level is greater than its Toxicity Characteristic level, thus a treated selenium waste would always be characteristically hazardous, unless it is treated to below its characteristic level.

**Table C-4**  
**Facility MTRUW Stream Waste Matrix Codes Correlated with Facility Waste Identification Systems**  
(This table is for informational purposes only)

Summary Category Group	Waste Matrix Code	Waste Stream Description	RSWD Code <sup>a</sup>		IDC <sup>b</sup>		TRUCON Code <sup>c</sup>	
S3000 - Homogeneous	S3100	Homogeneous Inorganic, Cemented	A-25	Leached Process Residues	002	Cemented Aqueous Waste	LA111	Solidified Aqueous or Homogeneous Inorganic Solids
			A-26	Evaporator Bottoms/Salts	006	Solidified Inorganic and Organic Process Solids	LA114	Solidified Inorganic Process Solids
			A-76	Cement Paste				
	S3100	Homogeneous Inorganic, Cemented Organics					LA126	Solidified Organic Process Solids
	S3100	Homogeneous Inorganic, Non-cemented	A-75	Chemical Treatment Sludge	003	Stabilized Aqueous Waste (dewatered sludge)	LA122	Solid Inorganic Waste
							LA130	Ash
	S3100	Homogeneous Inorganic, Salts	A-27	Nitrate Salts		Salt Waste	LA124	Pyrochemical Salt Waste
			A-28	Chloride Salts				
			A-29	Hydroxide Cake				

Summary Category Group	Waste Matrix Code	Waste Stream Description	RSWD Code <sup>a</sup>		IDC <sup>b</sup>		TRUCON Code <sup>c</sup>	
	S3100	Homogeneous Inorganic, Vermiculite	A-20	Hydrocarbon Oil – Liquid (Absorbed)			LA112	Solidified Organic Waste
			A-21	Silicon-Based - Liquid (Absorbed)				
S4000 – Soil/Gravel	S4100	Soil	A-90	Radioactively-Contaminated Soil				

**Table C-4 (continued)**

Summary Category Group	Waste Matrix Code	Waste Stream Description	RSWD Code <sup>a</sup>		IDC <sup>b</sup>		TRUCON Code <sup>c</sup>	
S5000 - Debris	S5300	Combustible Debris	A-14	Combustible Decon Waste	004	Combustible Waste	LA116	Combustible Debris
			A-15	Cellulosics				
			A-16	Plastics				
			A-17	Rubber Materials				
			A-18	Combustible Lab Trash				
			A-35	Combustible Building Debris				
			A-40	Combustible Hot-Cell Waste				
			A-60	Other Combustibles				
	S5400	Heterogeneous Debris	A-10	Graphite Solids	001	Metal Scrap and Incidental Combustibles	LA115	Graphite Waste
A-19			Combined Combustible/Non-Combustible Lab Trash	005	Combined Noncombustible / Combustible Waste	LA117	Metal Waste	
A-30			PN Equipment	005LG	Glass Waste	LA118	Glass Waste	

			A-31	Non-PN Equipment	005LM	Metal Waste	LA119	HEPA Filter Waste
			A-36	Noncombustible Building Debris	005P1	Leaded Rubber and Metal Waste	LA123	Leaded Rubber and Metal Waste

**Table C-4 (continued)**

Summary Category Group	Waste Matrix Code	Waste Stream Description	RSWD Code <sup>a</sup>	IDC <sup>b</sup>	TRUCON Code <sup>c</sup>
			A-41 Noncombustible Hot-Cell Waste	005P2G Graphite Waste	LA125 Mixed Combustible / Noncombustible Waste
			A-46 Skull and Oxide		
			A-47 Slag and Porcelain		
			A-50 Metal Crucibles, Scrap, Dies		
			A-51 Precious Metals		
			A-52 Scrap Metal		
			A-55 Filter Media		
			A-56 Filter Media Residue		
			A-61 Other Noncombustibles		
			A-72 Beryllium Contaminated Debris		
			A-74 Ion Exchange Resin		
			A-80 Irradiation Sources		

			A-85 Firing Point Residues		
			A-95 Glass		

- <sup>a</sup> RSWD = Radioactive Solid Waste Disposal [codes]
- <sup>b</sup> IDC = Item Description Code
- <sup>c</sup> TRUCON = TRUPACT-II Content [codes]

**Table C-5**  
**Descriptions of Mixed Transuranic Waste Stored at the Facility<sup>a</sup>**  
(This table is for informational purposes only)

Summary Category Group	Waste Matrix Code	Waste Stream Description	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and /or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents <sup>f</sup>
S3000 - Homogeneous	S3100	Homogeneous Inorganic, Cemented	Plutonium processing operations	Acceptable Knowledge <sup>d</sup>	D002	Corrosive	NA <sup>e</sup>	
		Homogeneous Inorganic, Cemented Organics	Plutonium processing operations	Acceptable Knowledge <sup>d</sup>	D003	Reactive	NA <sup>e</sup>	
					D004	Arsenic	5.0	
					D005	Barium hydroxide	100.0	
	Homogeneous Inorganic, Non-cemented	Plutonium processing operations	Acceptable Knowledge <sup>d</sup>	D006	Cadmium	1.0		
				D007	Chromium	5.0		
				D008	Lead	5.0		
				D009	Mercury	0.2		
				D010	Selenium	1.0		
				D011	Silver	5.0		
				D018	Benzene	0.5		
				D019	Carbon tetrachloride	0.5		
				D021	Chlorobenzene	100.0		
				D022	Chloroform	6.0		
				D035	Methyl ethyl ketone	200.0		
				D038	Pyridine	5.0 <sup>g</sup>		
D039	Tetrachloroethylene	0.7						
D040	Trichloroethylene	0.5						
F001	Spent halogenated solvents	NA <sup>e</sup>						
F002	Spent halogenated solvents	NA <sup>e</sup>						
F003	Spent non-halogenated solvents	NA <sup>e</sup>						
F005	Spent non-halogenated solvents	NA <sup>e</sup>						

**Table C-5 (continued)**

Summary Category Group	Waste Matrix Code	Waste Stream Description	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents <sup>f</sup>
S3000 - Homogeneous	S3100	Homogeneous Inorganic, Vermiculite	Plutonium processing operations	Acceptable Knowledge <sup>d</sup>	D002	Corrosive	NA <sup>e</sup>	
					D004	Arsenic	5.0	
					D005	Barium hydroxide	100.0	
					D006	Cadmium	1.0	
					D007	Chromium	5.0	
					D008	Lead	5.0	
					D009	Mercury	0.2	
					D010	Selenium	1.0	
					D011	Silver	5.0	
					D018	Benzene	0.5	
					D019	Carbon tetrachloride	0.5	
					D021	Chlorobenzene	100.0	
					D022	Chloroform	6.0	
					D027	1,4-Dichlorobenzene	7.5	
					D028	1,2-Dichloroethane	0.5	
					D030	2,4-Dinitrotoluene	0.13 <sup>g</sup>	
					D032	Hexachlorobenzene	0.13 <sup>g</sup>	
					D033	Hexachlorobutadiene	0.5	
					D034	Hexachloroethane	3.0	
					D035	Methyl ethyl ketone	200.0	
					D036	Nitrobenzene	2.0	
					D037	Pentachlorophenol	100.0	
					D038	Pyridine	5.0 <sup>g</sup>	
					D039	Tetrachloroethylene	0.7	
					D040	Trichloroethylene	0.5	
					D042	2,4,6-Trichlorophenol	2.0	
					D043	Vinyl Chloride	0.2	
F001	Spent halogenated solvents	NA <sup>e</sup>						
F002	Spent halogenated solvents	NA <sup>e</sup>						
F003	Spent non-halogenated solvents	NA <sup>e</sup>						
F005	Spent non-halogenated solvents	NA <sup>e</sup>						

**Table C-5 (continued)**

Summary Category Group	Waste Matrix Code	Waste Stream Description	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents <sup>f</sup>
S4000 – Soil/ Gravel	S4100	Soil	D&D	Acceptable Knowledge <sup>d</sup>	D004	Arsenic	5.0	D004
					D005	Barium hydroxide	100.0	D005
					D006	Cadmium	1.0	D006
					D007	Chromium	5.0	D007
					D008	Lead	5.0	D008
					D009	Mercury	0.2	D009
					D010	Selenium	1.0	D010
					D011	Silver	5.0	D011
					D018	Benzene	0.5	D018
					D019	Carbon tetrachloride	0.5	D019
					D021	Chlorobenzene	100.0	D021
					D022	Chloroform	6.0	D022
					D035	Methyl ethyl ketone	200.0	D035
					D038	Pyridine	5.0 <sup>e</sup>	D038
					D039	Tetrachloroethylene	0.7	D039
					D040	Trichloroethylene	0.5	D040
					F001	Spent halogenated solvents	NA <sup>e</sup>	F001
					F002	Spent halogenated solvents	NA <sup>e</sup>	F002
F003	Spent non-halogenated solvents	NA <sup>e</sup>	F003					
F005	Spent non-halogenated solvents	NA <sup>e</sup>	F005					

**Table C-5 (continued)**

Summary Category Group	Waste Matrix Code	Waste Stream Description	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA <sup>b</sup> Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits <sup>c</sup> (milligrams per liter)	Potential Underlying Hazardous Constituents <sup>f</sup>
S5000 - Debris	S5300	Combustible Debris	Plutonium processing operations	Acceptable Knowledge <sup>d</sup>	D003 D004 D005 D006 D007	Reactive Arsenic Barium hydroxide Cadmium Chromium	NA <sup>e</sup> 5.0 100.0 1.0 5.0	
	S5400	Heterogeneous Debris	Plutonium processing operations; D&D	Acceptable Knowledge <sup>d</sup>	D008 D009 D010 D011 D018 D019 D021 D022 D035 D038 D039 D040 D043 F001 F002 F003 F004 F005 U080	Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform Methyl ethyl ketone Pyridine Tetrachloroethylene Trichloroethylene Vinyl Chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Methylene Chloride	5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 200.0 5.0 <sup>g</sup> 0.7 0.5 0.2 NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup> NA <sup>e</sup>	

<sup>a</sup> This table is based on information from the *Acceptable Knowledge Information Summary for Los Alamos National Laboratory Transuranic Waste Streams* (AKIS), (TWCP-AK-2.1-019, R.0) (LA-UR-03-4870); and from waste characterization documentation information maintained by the Facility and Waste Operations Division. Waste with EPA Hazardous Waste Numbers that are not included in the Waste Isolation Pilot Plant (WIPP) Hazardous Waste Facility Permit will not be transported to WIPP.

<sup>b</sup> U.S. Environmental Protection Agency.

- <sup>c</sup> A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (EPA, 1986), the extract from a representative sample of the waste contains any of the contaminants listed at a concentration equal to or greater than the respective value given in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, Part 261, Subpart C [6-14-00].
- <sup>d</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, “Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual,” *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
- <sup>e</sup> Not Applicable.
- <sup>f</sup> Potential underlying hazardous constituents (UHC) have been included, where the information is available. UHC characterization for the purpose of Land Disposal Restrictions will apply for mixed transuranic waste to be disposed of at WIPP.
- <sup>g</sup> Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.
- Note: Fluoride, sulfide, vanadium, and zinc are not “underlying hazardous constituents” in characteristic wastes, according to the definition in § 268.2(i). Selenium is not an underlying hazardous constituent as defined at § 268.2(i) because its Universal Treatment Standard level is greater than its Toxicity Characteristic level, thus a treated selenium waste would always be characteristically hazardous, unless it is treated to below its characteristic level.

**Table C-6**  
**Descriptions of High Explosives (HE) Waste and HE-Contaminated Waste Treated by Open Burning at the Facility**  
(This table is for informational purposes only)

Waste Description	Waste Generating Activity	Basis for Hazardous Waste Designation	Potential EPA <sup>a</sup> Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits <sup>b</sup> (milligrams per liter)
HE-Contaminated Water	Laboratory analysis; HE processing; maintenance and R&D	Acceptable Knowledge <sup>c</sup>	D003 D005 D006 D007 D008 D009 D011 D018 D030 D035 D036 D038 F004 F005	Reactivity Barium Cadmium Chromium Lead Mercury Silver Benzene <del>Chloroform</del> <del>1,2-Dichloroethane</del> 2,4-Dinitrotoluene Methyl ethyl ketone Nitrobenzene Pyridine <del>Trichloroethylene</del>	NA <sup>d</sup> 100.0 1.0 5.0 5.0 0.2 5.0 0.5 0.13 200.0 2.0 5.0 NA <sup>d</sup> NA <sup>d</sup> NA <sup>d</sup> NA <sup>d</sup>
HE-Contaminated Used Oils	Laboratory analysis; dissolving HE and polymers; HE production; spills; and R&D activities	Acceptable Knowledge <sup>c</sup>	D001 D002 D003 D005 D006 D007 D008 D009 D011 D018 D030 D035 D036	Ignitability Corrosivity Reactivity Barium Cadmium Chromium Lead Mercury Silver Benzene <del>Chloroform</del> <del>1,2-Dichloroethane</del> 2,4-Dinitrotoluene	NA <sup>d</sup> NA <sup>d</sup> NA <sup>d</sup> 100.0 1.0 5.0 5.0 0.2 5.0 0.5 0.13 200.0 2.0

Waste Description	Waste Generating Activity	Basis for Hazardous Waste Designation	Potential EPA <sup>a</sup> Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits <sup>b</sup> (milligrams per liter)
HE-Contaminated Used Oils			D038 F003 F004 F005	Methyl ethyl ketone Nitrobenzene Pyridine <del>Trichloroethylene</del>	5.0 NA <sup>d</sup> NA <sup>d</sup> NA <sup>d</sup> NA <sup>d</sup>
Solid and Scrap HE	HE-processing; R&D activities; testing operations; disposition of weapons	Acceptable Knowledge <sup>c</sup>	D001 D003 D005 D006 D007 D008 D018 D030	Ignitability Reactivity Barium Cadmium Chromium Lead Benzene 2,4-Dinitrotoluene	NA <sup>d</sup> NA <sup>d</sup> 100.0 1.0 5.0 5.0 0.5 0.13
HE Process Waste from Water Filtration	Filtration of HE wastewater; R&D, and HE processing	Acceptable Knowledge <sup>c</sup>	D001 D003 D005 D006 D007 D008 D009 D011 D018 D030 D035 D036 D038 F003 F004 F005 K044 K045	Ignitability Reactivity Barium Cadmium Chromium Lead Mercury Silver Benzene <del>Chloroform</del> <del>1,2-Dichloroethane</del> 2,4-Dinitrotoluene Methyl ethyl ketone Nitrobenzene Pyridine <del>Trichloroethylene</del>  Wastewater sludges Spent carbon	NA <sup>d</sup> NA <sup>d</sup> 100.0 1.0 5.0 5.0 0.2 5.0 0.5 0.13 200.0 2.0 5.0 NA <sup>d</sup> NA <sup>d</sup> NA <sup>d</sup> NA <sup>d</sup> NA <sup>d</sup>

Waste Description	Waste Generating Activity	Basis for Hazardous Waste Designation	Potential EPA <sup>a</sup> Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits <sup>b</sup> (milligrams per liter)
HE-Contaminated Solid Waste	HE processing activities; R&D and laboratory use	Acceptable Knowledge <sup>c</sup>	D001 D002 D003 D005 D006 D007 D008 D009 D011 D018 D030 D035 D036 D038 F003 F004 F005	Ignitability Corrosivity Reactivity Barium Cadmium Chromium Lead Mercury Silver Benzene <del>Chloroform</del> <del>1,2-Dichloroethane</del> 2,4-Dinitrotoluene Methyl ethyl ketone Nitrobenzene Pyridine <del>Trichloroethylene</del>	NA <sup>d</sup> NA <sup>d</sup> NA <sup>d</sup> 100.0 1.0 5.0 5.0 0.2 5.0 0.5 0.13 200.0 2.0 5.0 NA <sup>d</sup> NA <sup>d</sup> NA <sup>d</sup>
HE-Contaminated Equipment	HE processing; R&D activities and laboratory use	Acceptable Knowledge <sup>c</sup>	D003 D005 D006 D007 D008 D009 D011 D030	Reactivity Barium Cadmium Chromium Lead Mercury Silver 2,4-Dinitrotoluene	NA <sup>d</sup> 100.0 1.0 5.0 5.0 0.2 5.0 0.13

Waste Description	Waste Generating Activity	Basis for Hazardous Waste Designation	Potential EPA <sup>a</sup> Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits <sup>b</sup> (milligrams per liter)
HE-Contaminated Solvents in <i>de minimis</i> quantities (liquid acids, bases, and Inorganic salt solutions)	Materials used as titrants, solvents, and cleaning fluids and material from hydrolysis research	Acceptable Knowledge <sup>c</sup>	D002 D003 D018 D030 D035 D036 D038 F003 F004 F005	Corrosivity Reactivity Benzene <del>Chloroform</del> 2,4-Dinitrotoluene Methyl ethyl ketone Nitrobenzene Pyridine	NA <sup>d</sup> NA <sup>d</sup> 0.5 0.13 200.0 2.0 5.0 NA <sup>d</sup> NA <sup>d</sup> NA <sup>d</sup>

<sup>a</sup> U.S. Environmental Protection Agency. Note that these constituents will likely be present only in trace amounts.

<sup>b</sup> A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (EPA, 1986), the extract from a representative sample of the waste contains any of the contaminants listed at a concentration equal to or greater than the respective value given in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, Part 261, Subpart C [6-14-00]. These constituents are included if they are likely to be present; however, they are not expected to exceed the toxicity characteristic limits on a routine basis.

<sup>c</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, “Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual,” *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

<sup>d</sup> Not applicable: refers to the absence of regulatory limits for ignitable, corrosive, reactive wastes, and F-, K-, and U-listed wastes. The amount of F-listed waste is expected to be trace in all waste streams, with the exception of the HE-contaminated spent solvent waste, which is expected to be 30 percent or more (by volume) solvent.

**TABLE C-7**  
(reserved)

**Table C-8**

**Descriptions of Waste Generated at Off-Site Facilities That May Be Received at the Facility**

(This table is reserved)

**Table C-9**  
**Parameters, Characterization Methods, and Rationale for Parameter Selection**  
**for Hazardous Waste**

Waste Description <sup>a</sup>	Parameters <sup>b</sup>	Characterization Methods	Rationale
Spent Solvents	<input type="checkbox"/> Flash point (for liquid waste) <input type="checkbox"/> pH (for liquid waste) <input type="checkbox"/> RCRA <sup>c</sup> -regulated metals <input type="checkbox"/> Volatile organic compounds (VOC) <input type="checkbox"/> Semivolatile organic compounds (SVOC) <input type="checkbox"/> Free liquids	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for ignitability, corrosivity, reactivity, and toxicity <input type="checkbox"/> Determine concentration of F-listed solvents <input type="checkbox"/> Determine underlying hazardous constituents
Contaminated Solid Wastes	<input type="checkbox"/> RCRA <sup>c</sup> -regulated metals <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for ignitability, reactivity, and toxicity <input type="checkbox"/> Determine concentration of F-listed solvents
Paint and Related Wastes	<input type="checkbox"/> Flash point (for liquid waste) <input type="checkbox"/> RCRA <sup>c</sup> -regulated metals <input type="checkbox"/> VOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for ignitability and toxicity <input type="checkbox"/> Determine concentration of F-listed solvents
Photographic and Photocopier Wastes	<input type="checkbox"/> Flash point (for liquid waste) <input type="checkbox"/> pH (for liquid waste) <input type="checkbox"/> RCRA <sup>c</sup> -regulated metals	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for ignitability, corrosivity, and toxicity
Corrosive Liquid Wastes	<input type="checkbox"/> Flash point (for liquid waste) <input type="checkbox"/> pH (for liquid waste) <input type="checkbox"/> RCRA <sup>c</sup> -regulated metals <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for ignitability, corrosivity, and toxicity <input type="checkbox"/> Determine concentration of F-listed solvents
Solid Metals and Metallic Compounds	<input type="checkbox"/> RCRA <sup>c</sup> -regulated metals	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for ignitability, reactivity, and toxicity
Contaminated Noncorrosive Aqueous and Nonaqueous Solutions and Sludges	<input type="checkbox"/> Flash point <input type="checkbox"/> RCRA <sup>c</sup> -regulated metals <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for ignitability, reactivity, and toxicity <input type="checkbox"/> Determine concentration of F-listed solvents
Mercury Wastes	<input type="checkbox"/> RCRA <sup>c</sup> -regulated metal	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for toxicity <input type="checkbox"/> Determine the presence of a U-listed unused commercial chemical product
Used Batteries and Battery Fluids	<input type="checkbox"/> pH (for liquid waste) <input type="checkbox"/> RCRA <sup>c</sup> -regulated metals	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine characteristic for corrosivity and toxicity
Unused/Off-specification Commercial Chemical Products	<input type="checkbox"/> Flash point (for liquid waste) <input type="checkbox"/> pH (for liquid waste) <input type="checkbox"/> RCRA <sup>c</sup> -regulated metals <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for ignitability, corrosivity, reactivity, and toxicity <input type="checkbox"/> Determine presence of P-listed or U-listed unused commercial chemical products
Gas Cylinder Waste	<input type="checkbox"/> RCRA <sup>c</sup> -regulated metals <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine characteristic for ignitability, corrosivity, and reactivity <input type="checkbox"/> Determine presence of D-coded and U- and P-listed wastes
Environmental Restoration (ER) Soils and Sludges	<input type="checkbox"/> RCRA <sup>c</sup> -regulated metals <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine characteristic for ignitability, reactivity, and toxicity <input type="checkbox"/> Determine concentration of F-

Waste Description <sup>a</sup>	Parameters <sup>b</sup>	Characterization Methods	Rationale
			listed solvents

Waste Description <sup>a</sup>	Parameters <sup>b</sup>	Characterization Methods	Rationale
ER Aqueous Liquids	<input type="checkbox"/> pH <input type="checkbox"/> RCRA <sup>c</sup> -regulated metals <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine characteristic for ignitability, corrosivity, reactivity, and toxicity <input type="checkbox"/> Determine concentration of F-listed solvents
ER Debris	<input type="checkbox"/> RCRA <sup>c</sup> -regulated metals <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine characteristic for ignitability, reactivity, and toxicity <input type="checkbox"/> Determine concentration of F-listed solvents

<sup>a</sup> Information contained in this column is from the Los Alamos National Laboratory waste characterization documentation database.

<sup>b</sup> Parameter selection is based on acceptable knowledge for each waste stream. Additional parameters may be selected for each waste stream as necessary.

<sup>c</sup> Resource Conservation and Recovery Act. Use of the term "RCRA-regulated metals" refers to hazardous waste as defined in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, 261.24 [6-14-00].

<sup>d</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

**Table C-10**  
**Parameters, Characterization Methods, and Rationale for Parameter Selection**  
**for Mixed Low-Level Waste**

Waste Description <sup>a</sup>	Parameter <sup>b</sup>	Characterization Method	Rationale
Soils with Heavy Metals	<input type="checkbox"/> RCRA-regulated metals <sup>c</sup>	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sample and analyze randomly selected drums in waste stream	<input type="checkbox"/> Determine toxicity characteristic
Environmental Restoration Soils	<input type="checkbox"/> RCRA-regulated metals <sup>c</sup> <input type="checkbox"/> Volatile organic compounds (VOC)	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sample and analyze randomly selected drums in waste stream	<input type="checkbox"/> Determine presence of F-listed solvents <input type="checkbox"/> Determine toxicity characteristic
Inorganic Solid Oxidizers	<input type="checkbox"/> RCRA-regulated metals <sup>c</sup>	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sample and analyze randomly selected drums in waste stream	<input type="checkbox"/> Determine toxicity characteristic <input type="checkbox"/> Determine characteristic for ignitability and reactivity
Lead Waste	<input type="checkbox"/> RCRA-regulated metals <sup>c</sup>	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine characteristic for reactivity <input type="checkbox"/> Determine toxicity characteristic
Noncombustible Debris	<input type="checkbox"/> RCRA-regulated metals <sup>c</sup>	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine toxicity characteristic <input type="checkbox"/> Determine characteristic for ignitability and reactivity
Combustible Debris	<input type="checkbox"/> RCRA-regulated metals <sup>c</sup> <input type="checkbox"/> VOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine toxicity characteristic <input type="checkbox"/> Determine presence of F-listed solvents <input type="checkbox"/> Determine characteristic for ignitability and reactivity
Organic-Contaminated Noncombustible Solids	<input type="checkbox"/> RCRA-regulated metals <sup>c</sup> <input type="checkbox"/> VOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine toxicity characteristic <input type="checkbox"/> Determine presence of F-listed solvents
Organic-Contaminated Combustible Solids	<input type="checkbox"/> RCRA-regulated metals <sup>c</sup> <input type="checkbox"/> VOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine characteristic for ignitability and reactivity <input type="checkbox"/> Determine toxicity characteristic <input type="checkbox"/> Determine presence

**Table C-10 (continued)**

Waste Description <sup>a</sup>	Parameter <sup>b</sup>	Characterization Method	Rationale
<b>Solid Wastes (Continued)</b>			
Mercury Wastes	<input type="checkbox"/> RCRA-regulated metals <sup>c</sup> <input type="checkbox"/> VOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sample and analyze randomly selected drums in waste stream	<input type="checkbox"/> Determine toxicity characteristic <input type="checkbox"/> Determine presence of F-listed solvents
Unused Solid Reagent Chemical Wastes	<input type="checkbox"/> RCRA-regulated metals <sup>c</sup>	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine characteristic for ignitability and corrosivity <input type="checkbox"/> Determine the presence of P- and U-listed unused commercial chemical product
<b>Liquid Wastes</b>			
Spent Solvents and Contaminated Solvent Mixtures	<input type="checkbox"/> Flash point <input type="checkbox"/> pH <input type="checkbox"/> RCRA-regulated metals <sup>c</sup> <input type="checkbox"/> VOCs <input type="checkbox"/> Semivolatile organic compounds (SVOC)	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for ignitability, corrosivity, and toxicity <input type="checkbox"/> Determine concentration of F-listed solvents
Corrosive Liquid Wastes	<input type="checkbox"/> Flash point <input type="checkbox"/> pH <input type="checkbox"/> RCRA-regulated metals <sup>c</sup> <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for ignitability, corrosivity, and toxicity <input type="checkbox"/> Determine concentration of F-listed solvents
Aqueous and Nonaqueous Liquids Contaminated with Heavy Metals and/or Organics	<input type="checkbox"/> Flash point <input type="checkbox"/> RCRA-regulated metals <sup>c</sup> <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and Analysis	<input type="checkbox"/> Determine characteristic for ignitability and toxicity <input type="checkbox"/> Determine concentration of F-listed solvents
Oil Wastes	<input type="checkbox"/> RCRA-regulated metals <sup>c</sup> <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup> <input type="checkbox"/> Sampling and analysis	<input type="checkbox"/> Determine characteristic for toxicity <input type="checkbox"/> Determine concentration of F-listed solvents
Unused Liquid Reagent Chemical Wastes	<input type="checkbox"/> Flash point <input type="checkbox"/> pH	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine characteristic for ignitability and corrosivity <input type="checkbox"/> Determine the presence of P- and U-listed unused commercial chemical product

Waste Description <sup>a</sup>	Parameter <sup>b</sup>	Characterization Method	Rationale
<b>Gaseous Wastes</b>			
Gas Cylinder Waste	<input type="checkbox"/> RCRA <sup>c</sup> -regulated metals <input type="checkbox"/> VOCs <input type="checkbox"/> SVOCs	<input type="checkbox"/> Acceptable Knowledge <sup>d</sup>	<input type="checkbox"/> Determine characteristic for ignitability, corrosivity, and reactivity <input type="checkbox"/> Determine presence of D-coded and P- and U-listed waste

<sup>a</sup> Information contained in this column is extracted primarily from Los Alamos National Laboratory, 1995, "LANL's Federal Facility Compliance Order Site Treatment Plan Background Volume," Los Alamos National Laboratory, Los Alamos, New Mexico.

<sup>b</sup> Parameter selection is based on acceptable knowledge for each waste stream. Additional parameters may be selected for each waste stream as necessary.

<sup>c</sup> Resource Conservation and Recovery Act. Use of the term "RCRA-regulated metals" refers to hazardous waste as defined in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, 261.24 [6-14-00].

<sup>d</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

**Table C-11**  
**Parameters, Characterization Methods, and Rationale for Parameter Selection**  
**for Mixed Transuranic Waste**

Summary Category Group/Description <sup>a</sup>	Waste Description	Parameters	Characterization Methods	Rationale
<b>Storage</b>				
S3000-Homogeneous Solids	<input type="checkbox"/> Solidified aqueous waste (e.g., concreted/cemented aqueous waste)	<input type="checkbox"/> Free liquids in waste matrix <input type="checkbox"/> Physical form of the waste	<input type="checkbox"/> Visual examination <input type="checkbox"/> Real-time radiography (RTR) <input type="checkbox"/> Acceptable Knowledge <sup>b</sup>	<input type="checkbox"/> Verify physical waste form <input type="checkbox"/> No free liquids allowed
	<input type="checkbox"/> Solidified aqueous waste (e.g., dewatered sludge and chemical treatment sludge) <input type="checkbox"/> Solidified inorganic/organic process solids and liquids	<input type="checkbox"/> Resource Conservation and Recovery Act (RCRA)-regulated metals	<input type="checkbox"/> Sample and analyze statistically selected number of drums in waste stream <input type="checkbox"/> Acceptable Knowledge <sup>b</sup>	<input type="checkbox"/> Determine toxicity characteristic <input type="checkbox"/> Determine concentration of metals
	<input type="checkbox"/> Homogeneous inorganic solids <input type="checkbox"/> Glass/noncombustible waste <input type="checkbox"/> Uncemented inorganics <input type="checkbox"/> Absorbed organics on vermiculite	<input type="checkbox"/> Volatile organic compounds (VOC) in container headspace gas	<input type="checkbox"/> Gas chromatography / mass spectrometry (GC/MS) <input type="checkbox"/> Fourier transform infrared spectrometry <input type="checkbox"/> Gas chromatography / Flame ionization detector <input type="checkbox"/> Acceptable Knowledge <sup>b</sup>	Qualitative screening to confirm the presence of VOCs
S4000-Soils/Gravels	<input type="checkbox"/> Contaminated soil	<input type="checkbox"/> Free liquids in waste matrix <input type="checkbox"/> Physical form of the waste	<input type="checkbox"/> Visual examination <input type="checkbox"/> RTR <input type="checkbox"/> Acceptable Knowledge <sup>b</sup>	<input type="checkbox"/> Verify physical waste form <input type="checkbox"/> No free liquids allowed
		<input type="checkbox"/> RCRA-regulated metals	<input type="checkbox"/> Sample and analyze statistically selected number of drums in waste stream <input type="checkbox"/> Acceptable Knowledge <sup>b</sup>	<input type="checkbox"/> Determine toxicity characteristic <input type="checkbox"/> Determine concentration of metals
		<input type="checkbox"/> VOCs in container headspace gas	<input type="checkbox"/> GC/MS <input type="checkbox"/> Fourier transform infrared spectrometry <input type="checkbox"/> Gas chromatography / Flame ionization	Qualitative screening to confirm the presence of VOCs

Summary Category Group/Description <sup>a</sup>	Waste Description	Parameters	Characterization Methods	Rationale
			detector	
S5000-Debris Waste	<ul style="list-style-type: none"> <li><input type="checkbox"/> Mixed metal scrap and incidental combustibles</li> <li><input type="checkbox"/> Combustible waste</li> <li><input type="checkbox"/> Graphite waste</li> <li><input type="checkbox"/> Metal waste</li> <li><input type="checkbox"/> Glass waste</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Free liquids</li> <li><input type="checkbox"/> Physical form of the waste</li> <li><input type="checkbox"/> VOCs in container headspace gas</li> <li><input type="checkbox"/> VOCs and semivolatile organic compounds</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Visual examination</li> <li><input type="checkbox"/> RTR</li> <li><input type="checkbox"/> Acceptable Knowledge<sup>b</sup></li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Verify physical waste form</li> <li><input type="checkbox"/> No free liquids allowed</li> <li><input type="checkbox"/> Determine compliance with land disposal restrictions (LDR) treatment standards, if applicable</li> </ul>
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Leaded-rubber and metal waste</li> <li><input type="checkbox"/> High-efficiency particulate air filters</li> <li><input type="checkbox"/> Noncombustible waste</li> <li><input type="checkbox"/> Mixed combustible / noncombustible waste</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> RCRA-regulated metals</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Gas chromatography / mass spectrometry</li> <li><input type="checkbox"/> Fourier transform infrared spectrometry</li> <li><input type="checkbox"/> Gas chromatography / Flame ionization detector</li> <li><input type="checkbox"/> Acceptable Knowledge<sup>b</sup></li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Qualitative screening to confirm the presence of VOC</li> <li><input type="checkbox"/> Determine compliance with LDR treatment standards, if applicable</li> </ul>
<b>Treatment</b>				
L1000 <input type="checkbox"/> Aqueous Liquids/Slurries	Evaporator bottoms solutions, aqueous waste, and laboratory solutions	<ul style="list-style-type: none"> <li><input type="checkbox"/> RCRA-regulated metals and corrosivity</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Acceptable Knowledge<sup>b</sup></li> <li><input type="checkbox"/> Sampling and Analysis</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Determine toxicity characteristics</li> <li><input type="checkbox"/> Determine concentration of metals</li> </ul>
S3000-Homogeneous Solids	Inorganic process solids and cemented inorganic process solids	<ul style="list-style-type: none"> <li><input type="checkbox"/> RCRA-regulated metals</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Acceptable Knowledge<sup>b</sup></li> <li><input type="checkbox"/> Sampling and Analysis</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Determine concentration of metals</li> </ul>

<sup>a</sup> information in this column is based on information from the *Acceptable Knowledge Information Summary for Los Alamos National Laboratory Transuranic Waste Streams (AKIS)*, TWCP-AK-2.1-019, R.0, LA-UR-03-4870, Los Alamos National Laboratory, Los Alamos, New Mexico.

<sup>b</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

**Table C-12**  
**Parameters, Characterization Methods, and Rationale for Parameter Selection**  
**for High Explosives (HE) Waste and HE-Contaminated Waste**

<b>Waste Description</b>	<b>Parameter<sup>a</sup></b>	<b>Characterization Method</b>	<b>Rationale</b>
HE-Contaminated Water	<ul style="list-style-type: none"> <li>- Ignitability</li> <li>- Reactivity</li> <li>- Toxicity</li> <li>☐ Solvents from non-specific sources</li> <li>☐ 25% by volume HE</li> </ul>	<ul style="list-style-type: none"> <li>- Acceptable Knowledge<sup>b</sup></li> <li>- Field screening</li> <li>☐ Sampling and analysis</li> <li>☐ SW846 methodology</li> </ul>	<ul style="list-style-type: none"> <li>- Determine characteristic for ignitability and reactivity</li> <li>- Determine toxicity characteristic (metals and organics)</li> <li>- Determine the presence of F-listed solvents</li> </ul>
HE-Contaminated Oil/Solvent Waste	<ul style="list-style-type: none"> <li>- Corrosivity</li> <li>- Ignitability</li> <li>- Reactivity</li> <li>- Toxicity</li> <li>☐ Solvents from non-specific sources</li> <li>☐ 25% by volume HE</li> </ul>	<ul style="list-style-type: none"> <li>- Acceptable Knowledge<sup>b</sup></li> <li>☐ Sampling and analysis</li> <li>☐ SW846 methodology</li> </ul>	<ul style="list-style-type: none"> <li>- Determine characteristic for ignitability, corrosivity, and reactivity</li> <li>- Determine toxicity characteristic (organics)</li> <li>- Determine the presence of F-listed solvents</li> </ul>
Solid and Scrap HE (i.e., bulk HE)	<ul style="list-style-type: none"> <li>- Ignitability</li> <li>- Reactivity</li> <li>- Toxicity</li> </ul>	<ul style="list-style-type: none"> <li>- Acceptable Knowledge<sup>b</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Determine characteristic for ignitability and reactivity</li> <li>- Determine toxicity characteristic (barium and dinitrotoluene)</li> </ul>
HE-Contaminated Commercial Chemical Products	<ul style="list-style-type: none"> <li>- Ignitability</li> <li>- Reactivity</li> <li>- Spill residues from commercial products</li> </ul>	<ul style="list-style-type: none"> <li>- Acceptable Knowledge<sup>b</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Determine characteristic for ignitability and reactivity</li> <li>- Determine the presence of U-listed wastes</li> </ul>
Wet HE	<ul style="list-style-type: none"> <li>- Ignitability</li> <li>- Reactivity</li> <li>- Toxicity</li> <li>- Solvents from non-specific sources</li> <li>- Specific source wastes (K wastes)</li> </ul>	<ul style="list-style-type: none"> <li>- Acceptable Knowledge<sup>b</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Determine characteristic for ignitability and reactivity</li> <li>- Determine toxicity characteristic (organics and metals)</li> <li>- Determine the presence of F- and K-listed solvents</li> </ul>

Refer to footnotes at end of table.

**Table C-12 (continued)**

<b>Waste Description</b>	<b>Parameter<sup>a</sup></b>	<b>Characterization Method</b>	<b>Rationale</b>
HE-Contaminated Solid Waste (heterogeneous)	<ul style="list-style-type: none"> <li>- Ignitability</li> <li>- Corrosivity</li> <li>- Reactivity</li> <li>- Toxicity</li> <li>- Solvents from non-specific sources</li> </ul>	<ul style="list-style-type: none"> <li>- Acceptable Knowledge<sup>b</sup></li> <li>- Field screening</li> <li>☐ Sampling and analysis</li> <li>☐ Visual examination</li> </ul>	<ul style="list-style-type: none"> <li>- Determine characteristic for ignitability, corrosivity, and reactivity</li> <li>- Determine toxicity characteristic (organics and metals)</li> <li>- Determine the presence of F-listed solvents</li> </ul>
HE-Contaminated Solid Waste (homogeneous, i.e., sand)	<ul style="list-style-type: none"> <li>- Ignitability</li> <li>- Corrosivity</li> <li>- Reactivity (i.e., 10% by weight)</li> <li>- Toxicity</li> <li>- Solvents from non-specific sources</li> </ul>	<ul style="list-style-type: none"> <li>- Acceptable Knowledge<sup>b</sup></li> <li>- Field screening</li> <li>- Sampling and analysis</li> </ul>	<ul style="list-style-type: none"> <li>- Determine characteristic for ignitability, corrosivity, and reactivity</li> <li>- Determine toxicity characteristic (organics and metals)</li> <li>- Determine the presence of F-listed solvents</li> </ul>
HE-Contaminated Equipment	<ul style="list-style-type: none"> <li>- Reactivity</li> <li>- Toxicity</li> </ul>	<ul style="list-style-type: none"> <li>- Acceptable Knowledge<sup>b</sup></li> <li>- Field screening</li> <li>- Sampling and analysis</li> </ul>	<ul style="list-style-type: none"> <li>- Determine characteristic for reactivity</li> <li>- Determine toxicity characteristic (dinitrotoluene and metals)</li> </ul>
HE-Contaminated Liquid Acids, Bases, and/or Inorganic Salt Solutions	<ul style="list-style-type: none"> <li>- Corrosivity</li> <li>- Reactivity</li> <li>- Toxicity</li> <li>☐ Solvents from non-specific sources</li> <li>☐ 25% by volume HE</li> </ul>	<ul style="list-style-type: none"> <li>- Acceptable Knowledge<sup>b</sup></li> <li>- Field screening</li> <li>☐ Sampling and analysis</li> <li>☐ SW846 methodology</li> </ul>	<ul style="list-style-type: none"> <li>- Determine characteristic for corrosivity and reactivity</li> <li>- Determine toxicity characteristic (organics)</li> <li>- Determine the presence of F-listed solvents</li> </ul>

<sup>a</sup> Parameter selection is based on process knowledge for each waste stream. Additional parameters may be selected for each waste stream as necessary.

<sup>b</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

**Table C-13**  
**Summary of Characterization Methods for**  
**High Explosives (HE) Waste and HE-Contaminated Waste**

Parameters	Method Numbers	Test Method	Rationale
HE in the Waste	SW-846 (Appropriate analytical method from the Method 8300 series) <sup>a</sup>	High Performance Liquid Chromatography or Acceptable Knowledge <sup>b</sup>	Determine HE concentrations directly in homogeneous materials or by process information.
		DX-2 Spot Test, DeTech, or other screening methods	Determine if HE is present in the waste stream.
		Acceptable Knowledge <sup>b</sup>	If all surfaces of heterogeneous waste cannot be directly tested or visually examined (e.g., debris or equipment) and the waste object was potentially contaminated with HE during its use.

<sup>a</sup> U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.

<sup>b</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

**Table C-14**

**Summary of Characterization Methods for Ash Generated by Open Burning<sup>a</sup>**

Parameters	Method Numbers	Test Method	Rationale
Metals: Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	SW-846  (1311, 6010B, 7060A, 7061A) <sup>b</sup> (1311, 6010B, 7080A, 7081) <sup>b</sup> (1311, 6010B, 7130, 7131A) <sup>b</sup> (1311, 6010B, 7190, 7191) <sup>b</sup> (1311, 6010B, 7420, 7421 <sup>d</sup> ) <sup>b</sup> (1311, 6010B, 7470A, 7471A) <sup>b</sup> (1311, 6010B, 7740, 7741A, 7742) <sup>b</sup> (1311, 6010B, 7760A, 7761) <sup>b</sup> or equivalent methods <sup>c</sup>	Total and/or toxicity characteristic leaching procedure (TCLP)  Inductively-coupled plasma atomic emission spectroscopy  Atomic absorption  Manual cold vapor technique  Acceptable Knowledge <sup>d</sup>	Determine total and/or TCLP metals concentrations in samples of solid process residues
Volatile Organic Compounds	SW-846 (8260B)	Total  VOC analysis by gas chromatography/mass spectrometry (GC/MS)  Acceptable Knowledge <sup>d</sup>	Determine total VOC concentrations for comparison with Universal Treatment Standards (UTS)
Semivolatile Organic Compounds	SW-846 (8270C)	Total  SVOC analysis by GC/MS  Acceptable Knowledge <sup>d</sup>	Determine total SVOC concentrations for comparison with UTS

<sup>a</sup> Ash generated by open burning is characterized for all TCLP metals.  
<sup>b</sup> U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.  
<sup>c</sup> Equivalent methods, subject to EPA approval, may be substituted.  
<sup>d</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

**Table C-15**  
**Recommended Sample Containers<sup>a</sup>, Preservation Techniques, and Holding Times<sup>b</sup>**

Analyte Class and Sample Type	Container	Preservative	Holding Time
<b>Volatile Organics</b>			
<u>Concentrated Waste Samples:</u>	Method 5035: 40-milliliter (mL) vials with stirring bar. Method 5021: See method. Methods 5031 & 5032: 125-mL WM <sup>c</sup> -G <sup>d</sup> . Use Teflon-lined lids for all procedures.	Cool to 4° degrees Celsius (°C) <sup>e</sup>	14 days
<u>Aqueous Samples:</u>			
No Residual Chlorine Present	Methods 5030, 5031, & 5032: 2 x 40-mL vials with Teflon-lined septum caps.	Cool to 4°C and adjust pH <sup>f</sup> to less than 2 with H <sub>2</sub> SO <sub>4</sub> , HCl, or solid NaHSO <sub>4</sub>	14 days
Residual Chlorine Present	Methods 5030, 5031, & 5032: 2 x 40-mL vials with Teflon-lined septum caps.	Collect sample in a 125-mL container which has been pre-preserved with 4 drops of 10% sodium thiosulfate solution. Gently swirl to mix sample and transfer to a 40-mL volatile organic analysis (VOA) vial. Cool to 4°C and adjust pH to less than 2 with H <sub>2</sub> SO <sub>4</sub> , HCl, or solid NaHSO <sub>4</sub>	14 days
Acrolein and Acrylonitrile	Methods 5030, 5031, & 5032: 2 x 40-mL vials with Teflon-lined septum caps.	Adjust to pH of 4-5. Cool to 4°C	14 days
<u>Soil/Sediments and Sludges:</u>	Method 5035: 40-mL vials with stirring bar. Method 5021: See method. Methods 5031 & 5032: 125-mL WM <sup>c</sup> -G <sup>d</sup> . Use Teflon-lined lids for all procedures.	See the individual method	14 days

Refer to footnotes at end of table.

Table C-15 (continued)

Analyte Class and Sample Type	Container	Preservative	Holding Time
<b>Semivolatile Organics/Organochlorine Pesticides and Herbicides</b>			
<u>Concentrated Waste Samples:</u>	125 mL WM <sup>c</sup> -G <sup>d</sup> with Teflon-lined lid	None	Samples must be extracted within 14 days and analyzed within 40 days following extraction.
<u>Soil/Sediments and Sludges:</u>	250 mL WM <sup>c</sup> -G <sup>d</sup> with Teflon-lined lid	Cool to 4°C	Samples must be extracted within 14 days and analyzed within 40 days following extraction.
<u>Liquid Samples:</u>			
No Residual Chlorine Present	1-gallon (gal.), 2 x 0.5 gal., or 4 x 1 liter (L) AG <sup>g</sup> container with Teflon <sup>□</sup> -lined lid	Cool to 4°C	Samples must be extracted within 7 days and extracts analyzed within 40 days following extraction
Residual Chlorine Present	1-gal., 2 x 0.5 gal., or 4 x 1-L AG <sup>g</sup> with Teflon <sup>□</sup> -lined lid	Add 3-mL 10% sodium thiosulfate solution per gallon (or 0.008%). Addition of sodium thiosulfate solution to sample container may be performed in the laboratory prior to field use. Cool to 4°C.	Samples must be extracted within 7 days and extracts analyzed within 40 days following extraction
<b>Metals</b>			
<u>Aqueous Samples:</u>			
Metals (except hexavalent chromium and mercury)	1-L P <sup>h</sup> or G <sup>d</sup>	Add nitric acid to adjust pH to less than 2.	180 days
Hexavalent chromium	500-mL P <sup>h</sup> or G <sup>d</sup>	Cool to 4°C	24 hours
Mercury	500-mL P <sup>h</sup> or G <sup>d</sup>	Add nitric acid to adjust pH to less than 2.	28 days
<u>Soil/Sediments and Sludges:</u>			
Metals (except hexavalent chromium and mercury)	500-mL WM <sup>c</sup> -P <sup>h</sup> or G <sup>d</sup>	Cool to 4°C	180 days
Hexavalent chromium	500-mL WM <sup>c</sup> -P <sup>h</sup> or G <sup>d</sup>	Cool to 4°C	Not established - analyze as soon as possible.
Mercury	500-mL WM <sup>c</sup> -P <sup>h</sup> or G <sup>d</sup>	Cool to 4°C	28 days

<sup>a</sup> Smaller sample containers may be required due to health and safety concerns associated with potential radiation exposure, transportation requirements, and waste management considerations.

- b Information primarily from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*, U.S. Environmental Protection Agency, 1986 and all approved updates.
- c WM = Wide-mouth
- d G - Glass
- e Adjust to pH of less than 2 with sulfuric acid, hydrochloric acid, or solid sodium bisulfate.
- f A term used to describe the hydrogen-ion activity of a system.
- g AG = Amber glass
- h P = Polyethylene

**Table C-16**  
**Summary of Characterization Methods for Hazardous Waste**

Parameter	Method Numbers	Test Methods	Rationale
Volatile organic compounds (VOC) in waste matrix:  Spent halogenated solvents  Spent nonhalogenated solvents	ASTM Method D4547-91 <sup>a</sup> U.S. EPA/540/4-91/001 <sup>b</sup>  SW-846 (1311, 8260B, 8275A) <sup>c</sup> or equivalent methods <sup>d</sup>  Methods included in 20.4.1 NMAC §§ 265.1084(a)(2), (a)(3), and (a)(4)	Total and/or toxicity characteristic leaching procedure (TCLP)  VOC analysis by gas chromatography/mass spectrometry (GC/MS)  Semivolatile organic compound (SVOC) analysis by thermal extraction/gas chromatography/mass spectrometry (TE/GC/MS)  Acceptable Knowledge <sup>f</sup>	Determine total and/or TCLP and SVOC/VOC concentration in samples of solids or liquids
SVOCs in waste:	SW-846 (1311 and 8270C) <sup>c</sup> or equivalent methods <sup>d</sup>	Total or TCLP  SVOC analysis by GC/MS  Acceptable Knowledge <sup>f</sup>	Determine total and/or TCLP and SVOC concentration in samples of solids or liquids
Resource Conservation and Recovery Act-regulated metals in waste:  Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	SW-846  (1311, 6010B, 7060A, 7061A) <sup>c</sup> (1311, 6010B, 7080A, 7081) <sup>c</sup> (1311, 6010B, 7130, 7131A) <sup>c</sup> (1311, 6010B, 7190, 7191) <sup>c</sup> (1311, 6010B, 7420, 7421) <sup>c</sup> (1311, 6010B, 7470A, 7471A, 7472) <sup>c</sup> (1311, 6010B, 7740, 7741A, 7742) <sup>c</sup> (1311, 6010B, 7760A, 7761) <sup>c</sup> or equivalent methods <sup>d</sup>	Total and/or TCLP  Inductively-coupled plasma atomic emission spectroscopy  Atomic absorption  Manual cold vapor atomic absorption  Anodic stripping voltammetry  Acceptable Knowledge <sup>f</sup>	Determine total and/or TCLP concentration in samples of solids or liquids
Reactive Sulfide	SW-846, Test Method to Determine Hydrogen Sulfide Released from Wastes <sup>c</sup> SW-846 (9030B, 9031, 9034) <sup>c</sup> or equivalent methods <sup>d</sup>	Colorimetric, titrametric, or spectrophotometric measurement of hydrogen sulfide released from waste following reflux distillation under acidic conditions	Determine concentration of reactive sulfides
Ignitability (Flash Point)	SW-846 (1010, 1020A, 1030) <sup>c</sup> or equivalent methods <sup>d</sup>	Pensky-Martens closed cup  Setaflash closed cup  Ignitability of solids	Determine ignitability
pH (Corrosivity)	SW-846 (9040B, 9041A, 9045C) <sup>c</sup> or equivalent methods <sup>d</sup>	pH electrometric measurement  pH paper  Soil and waste pH	Determine corrosivity

- <sup>a</sup> American Society for Testing and Materials, 1991, "Standard Practice for Sampling Waste and Soils for Volatile Organic Compounds," ASTM D4547-91, *Annual Book of ASTM Standards*, Philadelphia, Pennsylvania, American Society for Testing and Materials.
- <sup>b</sup> U.S. Environmental Protection Agency (EPA), 1991, "Soil Sampling and Analysis for Volatile Organic Compounds," EPA 154014-91001, Office of Research and Development.
- <sup>c</sup> U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.
- <sup>d</sup> Equivalent methods subject to EPA approval may be substituted.
- <sup>e</sup> *SW-846*, Section 7.3.4.2 contains specialized methods to determine if a sulfide-containing waste exhibits the reactivity characteristic.
- <sup>f</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

**Table C-17**  
**Summary of Characterization Methods for Mixed Low-Level Waste**

Parameter	Method Numbers	Test Method	Rationale
<b>Solid Wastes</b>			
Volatile organic compounds (VOC) in waste matrix:	ASTM Method D4547-91 <sup>a</sup> U.S. EPA/540/4-91/001 <sup>b</sup>	Total and/or toxicity characteristic leaching procedure (TCLP)	Determine total and/or TCLP and VOC concentration in samples of solid process residues and soils
Spent halogenated solvents	SW-846 (1311, 8260B, 8275A) <sup>c</sup> or equivalent methods <sup>d</sup>	VOC analysis by gas chromatography/mass spectrometry (GC/MS)	
Spent nonhalogenated solvents	Methods included in 20.4.1 NMAC §§ 265.1084(a)(2), (a)(3), and (a)(4)	Semivolatile organic compounds (SVOC) analysis by thermal extraction/gas chromatography/mass spectrometry (TE/GC/MS)	
		Acceptable Knowledge <sup>e</sup>	
SVOCs in waste:	SW-846 (1311 and 8270C) <sup>c</sup> or equivalent methods <sup>d</sup>	Total and/or TCLP  SVOC analysis by GC/MS	Determine total and/or TCLP and SVOC concentration in samples of solid process residues and soils
		Acceptable Knowledge <sup>e</sup>	
Resource Conservation and Recovery Act (RCRA)-regulated metals in waste:	SW-846	Total and/or TCLP	Determine total and/or TCLP concentration in samples of solid process residues and soils
Arsenic	(1311, 6010B, 7060A, 7061A) <sup>c</sup>	Inductively-coupled plasma atomic emission spectroscopy	
Barium	(1311, 6010B, 7080A, 7081) <sup>c</sup>		
Cadmium	(1311, 6010B, 7130, 7131A) <sup>c</sup>		
Chromium	(1311, 6010B, 7190, 7191) <sup>c</sup>	Atomic absorption	
Lead	(1311, 6010B, 7420, 7421) <sup>c</sup>		
Mercury	(1311, 6010B, 7470A, 7471A, 7472) <sup>c</sup>	Manual cold vapor atomic absorption	
Selenium	(1311, 6010B, 7740, 7741A, 7742) <sup>c</sup>		
Silver	(1311, 6010B, 7760A, 7761) <sup>c</sup> or equivalent methods <sup>d</sup>	Acceptable Knowledge <sup>e</sup>	
<b>Liquid Wastes</b>			
VOCs in waste matrix:	ASTM Method D4547-91 <sup>a</sup> EPA/540/4-91/001 <sup>b</sup>	Total and/or TCLP	Determine total and/or TCLP and VOC concentration in samples of liquid
Spent halogenated solvents	SW-846 (1311 and 8260B) <sup>c</sup> or equivalent methods <sup>d</sup>	VOC analysis by GC/MS	
Spent nonhalogenated solvents		Acceptable Knowledge <sup>e</sup>	
SVOCs in waste:	SW-846 (1311 and 8270B) <sup>c</sup> or equivalent methods <sup>d</sup>	Total and/or TCLP  SVOC analysis by GC/MS	Determine total and/or TCLP and SVOC concentration in samples of liquid
		Acceptable Knowledge <sup>e</sup>	

Parameter	Method Numbers	Test Method	Rationale
RCRA-regulated metals in waste: Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	SW-846 (1311, 6010B, 7060A, 7061A) <sup>c</sup> (1311, 6010B, 7080A, 7081) <sup>c</sup> (1311, 6010B, 7130, 7131A) <sup>c</sup> (1311, 6010B, 7190, 7191) <sup>c</sup> (1311, 6010B, 7420, 7421) <sup>c</sup> (1311, 6010B, 7470A, 7471A, 7472) <sup>c</sup> (1311, 6010B, 7740, 7741A, 7742) <sup>c</sup> (1311, 6010B, 7760A, 7761) <sup>c</sup> or equivalent methods <sup>d</sup>	Total and/or TCLP Inductively-coupled plasma atomic emission spectroscopy Atomic absorption Manual cold vapor atomic absorption Anodic stripping voltammetry Acceptable Knowledge <sup>e</sup>	Determine total and/or TCLP concentration in samples of liquid

Refer footnotes at end of table.

Parameter	Method Numbers	Test Method	Rationale
<b>Liquid Wastes (Continued)</b>			
Ignitability (Flash Point)	SW-846 (1010, 1020A, 1030) <sup>c</sup> or equivalent methods <sup>d</sup>	Pensky-Martens closed cup  Setaflash closed cup  Acceptable Knowledge <sup>e</sup>	Determine ignitability
pH (Corrosivity)	SW-846 (9040B, 9041A, 9045C) <sup>c</sup> or equivalent methods <sup>d</sup>	pH electrometric Measurement  pH paper  Soil and waste pH  Acceptable Knowledge <sup>e</sup>	Determine corrosivity

<sup>a</sup> American Society for Testing and Materials, 1991, "Standard Practice for Sampling Waste and Soils for Volatile Organic Compounds," ASTM D4547-91, *Annual Book of ASTM Standards*, Philadelphia, Pennsylvania, American Society for Testing and Materials.

<sup>b</sup> U.S. Environmental Protection Agency (EPA), 1991, "Soil Sampling and Analysis for Volatile Organic Compounds," EPA 154014-911991, Office of Research and Development.

<sup>c</sup> U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.

<sup>d</sup> Equivalent methods, subject to EPA approval, may be substituted.

<sup>e</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

**Table C-18**  
**Summary of Characterization Methods for Mixed Transuranic Waste**

Parameter	Method Numbers	Test Methods	Rationale
<b>Storage</b>			
Physical Waste Form (Free liquids in waste matrix)		Waste inspection procedures Real-time radiography Visual examination Acceptable Knowledge <sup>e</sup>	Verify waste container contents
Volatile organic compounds (VOC) in waste matrix:  Spent halogenated solvents  Spent nonhalogenated solvents	ASTM Method D4547-91 <sup>a</sup> U.S. EPA/540/4-91/001 <sup>b</sup>  SW-846 (1311, 8260B, 8275A) <sup>c</sup> or equivalent methods <sup>d</sup>  Methods included in 20.4.1 NMAC §§ 265.1084(a)(2), (a)(3), and (a)(4)	Total and/or toxicity characteristic leaching procedure (TCLP)  VOCs in container headspace gas  VOC analysis by gas chromatography/mass spectrometry (GC/MS)  Semivolatile organic compound (SVOC) analysis by thermal extraction/gas chromatography/mass spectrometry (TE/GC/MS)  Acceptable Knowledge <sup>e</sup>	Determine the presence or absence of VOCs in samples
SVOCs in waste	SW-846 (1311 and 8270C) <sup>c</sup> or equivalent methods <sup>d</sup>	Total and/or TCLP SVOC analysis by GC/MS  Acceptable Knowledge <sup>e</sup>	Determine the presence or absence of SVOCs in samples
Resource Conservation and Recovery Act (RCRA)-regulated metals in waste:  Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	SW-846  (1311, 6010B, 7060A, 7061A) <sup>c</sup> (1311, 6010B, 7080A, 7081) <sup>c</sup> (1311, 6010B, 7130, 7131A) <sup>c</sup> (1311, 6010B, 7190, 7191) <sup>c</sup> (1311, 6010B, 7420, 7421) <sup>c</sup> (1311, 6010B, 7470A, 7471A, 7472) <sup>c</sup> (1311, 6010B, 7740, 7741A, 7742) <sup>c</sup> (1311, 6010B, 7760A, 7761) or equivalent methods <sup>d</sup>	Total and/or TCLP  Inductively-coupled plasma atomic emission spectroscopy  Atomic absorption  Manual cold vapor atomic absorption  Anodic stripping voltammetry  Acceptable Knowledge <sup>e</sup>	Determine total and/or TCLP concentration in samples
Ignitability	SW-846 (1010, 1020A, 1030) <sup>c</sup> or equivalent methods <sup>d</sup>	Pensky-Martens closed cup  Setaflash closed cup  Ignitability of Solids  Acceptable Knowledge <sup>e</sup>	Determine ignitability
pH (Corrosivity)	SW-846 (9040B, 9041A, 9045C) or equivalent methods <sup>d</sup>	pH electrometric measurement  Acceptable Knowledge <sup>e</sup>	Determine corrosivity

Parameter	Method Numbers	Test Methods	Rationale
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Refer to footnotes at end of table.

Parameter	Method Numbers	Test Methods	Rationale
<b>Treatment</b>			
RCRA-regulated metals in waste: Arsenic Barium Cadmium Chromium Lead Mercury Silver	SW-846  (1311, 6010B, 7060A, 7061A) <sup>c</sup> (1311, 6010B, 7080A, 7081) <sup>c</sup> (1311, 6010B, 7130, 7131A) <sup>c</sup> (1311, 6010B, 7190, 7191) <sup>c</sup> (1311, 6010B, 7420, 7421) <sup>c</sup> (1311, 6010B, 7470A, 7471A, 7472) <sup>c</sup> (1311, 6010B, 7760A, 7761) <sup>c</sup> or equivalent methods <sup>d</sup>	Total and/or TCLP  Inductively-coupled plasma atomic emission spectroscopy  Atomic absorption  Manual cold vapor atomic absorption  Acceptable Knowledge <sup>e</sup>	Determine total and/or TCLP metals concentration in samples
pH (Corrosivity)	SW-846 (9040B, 9041A, 9045C) or equivalent methods <sup>d</sup>	pH electrometric measurement  Acceptable Knowledge <sup>e</sup>	Determine corrosivity

<sup>a</sup> American Society for Testing and Materials, 1991, "Standard Practice for Sampling Waste and Soils for Volatile Organic Compounds," ASTM D4547-91, *Annual Book of ASTM Standards*, Philadelphia, Pennsylvania, American Society for Testing and Materials.

<sup>b</sup> U.S. Environmental Protection Agency (EPA), 1991, "Soil Sampling and Analysis for Volatile Organic Compounds," EPA 154014-91001, Office of Research and Development.

<sup>c</sup> U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.

<sup>d</sup> Equivalent methods, subject to EPA approval, may be substituted.

<sup>e</sup> Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

**Table C-19**  
**Description of Cementation Waste Streams at Technical Area 55**  
(This table is for informational purposes only)

Summary Category Group	Waste Description	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Constituents in the Waste	Regulatory Limits <sup>a</sup> (milligrams per liter)
L1000 – Aqueous Liquids/Slurries	Evaporator bottoms solutions, aqueous waste, and laboratory solutions	Process residue from evaporator bottoms and other discardable solutions.	Acceptable Knowledge <sup>b</sup>	D002 D004 D005 D006 D007 D008 D009 D011	Nitric acid Arsenic Barium hydroxide Cadmium Chromium Lead Mercury Silver	NA 5.0 100.0 1.0 5.0 5.0 0.2 5.0
S3000 – Homogenous Solids	Inorganic process solids and cemented inorganic process solids	Process residue from evaporator bottoms and other discardable solutions; process-leached solids, ash, filter cakes, salts, metal oxides, and fines generated as a result of plutonium-processing	Acceptable Knowledge <sup>b</sup>	D004 D006 D007 D008 D009	Arsenic Cadmium Chromium Lead Mercury	5.0 1.0 5.0 5.0 0.2

<sup>a</sup> A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” *EPA-SW-846*, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C., the extract from a representative sample of the waste contains any of the contaminants listed at a concentration equal to or greater than the respective value given in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, 261.24, revised June 14, 2000.

<sup>b</sup> Acceptable knowledge is broadly defined as process knowledge, supplemental waste analysis data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, “Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual,” *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.  
EPA = U.S. Environmental Protection Agency  
NA = Not applicable