ATTACHMENT C

WASTE ANALYSIS PLAN

TABLE OF CONTENTS

LIST OF TABLES 2
WASTE ANALYSIS PLAN....3
C.1 FACILITY DESCRIPTION....4
C.1.1 Facility Waste-Generating Processes and Activities....4
C.1.2 Stored Waste....4
C.1.2.1 Non-Mixed Hazardous Waste....4
C.1.2.2 Mixed Low-Level Waste....7
C.1.2.3 Mixed Transuranic Waste....9
C.1.3 Treated Wastes....13
C.1.3.1 Treated Mixed TRU Wastes....13
C.1.4 Description of Permitted Units....14
C.2 WASTE ANALYSIS PARAMETERS....14
C.2.1 Analytical Parameters and Methods....14
C.2.2 Criteria and Rationale for Characterization Methodology Selection....15
C.3 CHARACTERIZATION METHODS....16
C.3.1 Hazardous and Mixed Low-Level Waste Characterization....17
C.3.1.1. Acceptable Knowledge....17
C.3.1.2 Sampling and Analysis....19
C.3.1.3 Verification Frequencies....21
C.3.2 Mixed Transuranic Waste Characterization....21
C.3.2.1.1 Real-Time Radiography....22
C.3.2.1.2 Visual Examination....22
C.3.2.2 Characterization to Meet LDR Requirements....22
C.3.2.3 WIPP Characterization....23
C.3.2.4 Characterization Procedures Prior to Treatment of Mixed TRU Wastes....23
C.3.2.5 Sample Handling, Preservation, and Storage....24
C.4 OFF-SITE WASTE ACCEPTANCE PROCEDURES....24
C.5 SPECIAL PROCEDURAL REQUIREMENTS....24
C.5.1 Procedures for Ignitable, Reactive, and Incompatible Wastes to be Stored or Treated....25
C.5.2 Procedures to Ensure Compliance with LDR Requirements....25
C.5.3 Procedures to Ensure Compliance with Subpart BB Requirements....25
C.5.3.1 Requirements for Leak Detection and Monitoring....25
C.5.3.2 Determination of Hazardous Waste Concentration....26
C.5.4 Procedures to Ensure Compliance with Subpart CC Requirements....26
C.6 REFERENCES 28

LIST OF TABLES

TABLE NO.	TITLE
C-1	(reserved)
C-2	Descriptions of Hazardous Waste Stored at the Facility
C-3	Descriptions of Mixed Low-Level Waste Stored at the Facility
C-4	LANL MTRUW Stream Waste Matrix Codes Correlated with Facility Waste Identification Systems
C-5	Descriptions of Mixed Transuranic Waste Stored at the Facility
C-6	(reserved)
C-7	(reserved)
C-8	(reserved)
C-9	Parameters, Characterization Methods, and Rationale for Parameter Selection for Hazardous Waste
C-10	Parameters, Characterization Methods, and Rationale for Parameter Selection for Mixed Low-Level Waste
C-11	Parameters, Characterization Methods, and Rationale for Parameter Selection for Mixed Transuranic Waste
C-12	(reserved)
C-13	(reserved)
C-14	(reserved)
C-15	Recommended Sample Containers, Preservation Techniques, and Holding Times
C-16	Summary of Characterization Methods for Hazardous Waste
C-17	Summary of Characterization Methods for Mixed Low-Level Waste
C-18	Summary of Characterization Methods for Mixed Transuranic Waste
C-19	Description of Cementation Waste Streams at Technical Area 55

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), and the hazardous component of mixed transuranic waste (MTRUW) 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 the stabilization process. 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 40 CFR Part 264 Subpart CC requirements.

Section C.6 References.

C.1 FACILITY DESCRIPTION

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

C.1.1 Facility Waste-Generating Processes and Activities

Wastes are generated at the Facility primarily from research and development (R&D) activities, processing and recovery operations, decontamination and decommissioning (D&D) projects, and environmental restoration (ER) activities. Wastes generated from these types of processes and activities may also be received from off-site facilities (*see* Attachment L (*Listing of Off-Site Facilities*)). Tables C-2 through C-5 present descriptive information on non-mixed hazardous wastes, MLLW, and MTRUW potentially generated at the Facility. Wastes generated at off-site facilities that may be received at the Facility are described in Table C-8. These tables include brief waste descriptions, brief descriptions of the waste-generating process or activity, the characterization basis for waste designation, potential EPA Hazardous Waste Number(s), the hazardous constituent(s) listed in Appendix VIII of 40 CFR Part 261 and/or the characteristic(s) defined at 40 CFR Part 261, Subpart C that make the waste hazardous, and the regulatory limits, as appropriate.

C.1.2 Stored Waste

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

C.1.2.1 Non-Mixed Hazardous Waste

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

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

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

Spent Solvents

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

Contaminated Solid Wastes

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

Paint and Related Wastes

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

Photographic and Photocopier Wastes

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

Corrosive Liquid Wastes

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

Solid Metals and Metallic Compounds

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

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

These wastes are non-corrosive aqueous and non-aqueous solutions and sludges that are contaminated with non-mixed hazardous wastes or hazardous residues. Waste-generating

activities include vacuum pump maintenance, analytical spectrometry, equipment cleaning and maintenance, vehicle maintenance, synthesis reactions, metal-polishing operations, and chemical research.

Mercury Wastes

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

Used Batteries and Battery Fluids

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

Unused and Off-Specification Commercial Chemical Products

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

Gas Cylinder Waste

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

Soils and Sludges

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

Aqueous Liquids

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

Debris

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

C.1.2.2 Mixed Low-Level Waste

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

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

Soils with Heavy Metals

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

Environmental Restoration Soils

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

Inorganic Solid Oxidizers

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

Lead Waste

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

Noncombustible Debris

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

Combustible Debris

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

Organic-Contaminated Noncombustible Solids

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

Organic-Contaminated Combustible Solids

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

Water-Reactive Wastes

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

Mercury Wastes

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

Unused Solid Reagent Chemical Wastes

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

Spent Solvents and Contaminated Solvent Mixtures

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

Corrosive Liquid Wastes

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

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

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

Oil Wastes

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

Unused Liquid Reagent Chemical Wastes

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

Gas Cylinder Waste

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

C.1.2.3 Mixed Transuranic Waste

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

MTRUW is generated at the Facility primarily from R&D activities, processing and recovery operations, and D&D projects. Limited quantities of MTRUW from off-site facilities will be

accepted at LANL for additional characterization and management. (*see* Table C-8). MTRUW at the Facility includes four broad categories that can be described by a Summary Category Group, which is further subdivided into Waste Matrix Codes.

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

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

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

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

1. *WMC S3100 (Inorganic Homogeneous Solid Waste)*: includes mixed inorganic homogeneous waste (cemented inorganics, organics on vermiculite, non-cemented, salts, and cemented organics);
2. *WMC S410*0 *(Soil)*: consists of radioactive contaminated solid waste materials that are at least 50 percent by volume soil/gravel;
3. *WMC S5300 (Organic Debris Waste)*: consists of mixed combustible debris waste (plastic, cellulosics, and rubber); and
4. *WMC S5400 (Heterogeneous Debris Waste)*: includes mixed heterogeneous debris waste (varying amounts of combustible and noncombustible debris, with a small amount of homogeneous waste present).

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

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

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

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

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

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

<u>LA-TA-55-19: Mixed Combustible Debris Waste</u>

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

C.1.3 Treated Wastes

MTRUW is treated at a permitted unit at the Facility. MTRUW is treated by cementation to stabilize the waste for storage and to meet the Waste Isolation Pilot Plant (WIPP) waste acceptance criteria.

C.1.3.1 Treated Mixed TRU Wastes

MTRUW that require treatment is generated primarily from R&D and processing and recovery operations. Treatment of MTRUW at the Facility may consist of stabilization by cementation to

form a noncorrosive solid matrix. Additional specific information on the stabilization treatment process is provided in Section C.3.2.4 of this WAP.

C.1.4 Description of Permitted Units

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

C.2 WASTE ANALYSIS PARAMETERS

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

C.2.1 Analytical Parameters and Methods

The Permittees shall use the characterization methods for non-mixed hazardous wastes, MLLW, and MTRUW summarized in Tables C-9 through C-11 to quantify the waste characterization parameters in those tables. The Permittees shall comply with the sampling and analysis requirements of Permit Sections 2.4.1 through 2.4.9. The Permittees shall use the methods listed below, as necessary, for the wastes listed in Attachment Section C.1.

1. Acceptable Knowledge (AK);
2. Sampling and laboratory analysis to determine the presence and concentrations of:
    - RCRA-regulated metals
    - RCRA-regulated volatile organic compounds (VOC)
    - RCRA-regulated semivolatile organic compounds (SVOC)
3. Additional MTRUW characterization sampling methods;
    - Headspace gas sampling to determine the presence of VOCs in container headspace
    - Physical waste form characterization through real-time radiography (RTR) and/or visual examination
4. Flash point characterization;
5. pH characterization;
6. Reactivity characterization; and
7. Free liquid determination via the paint filter test.

C.2.2 Criteria and Rationale for Characterization Methodology Selection

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

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

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

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

C.3 CHARACTERIZATION METHODS

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

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

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

Before accepting waste for storage or treatment, the Permittees shall determine that waste characterization documentation satisfies the information requirements of Permit Section 2.4, including but not limited to the assignment of all applicable EPA Hazardous Waste Numbers and the LDR status of the waste. Once the waste characterization documentation is reviewed and approved, the Permittees may notify the generator and authorize the transfer of the waste to a permitted unit. Before the waste is transferred, the Permittees' waste management personnel shall review any transfer documentation to ensure that it accurately pertains to the waste being transferred and that it corresponds with the waste characterization documentation. If the transfer documentation does not correspond with the characterization documentation, the Permittees shall not transfer the waste. The Permittees shall maintain the waste characterization documentation and the transfer documentation shall be part of the Facility Operating Record. After approval of waste characterization of a waste stream by waste management personnel, the Permittees shall approve subsequent transfer of waste from that waste stream based upon the generator's statement that the waste stream is accurately represented by the previously approved waste characterization information.

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

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

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

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

C.3.1 Hazardous and Mixed Low-Level Waste Characterization

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

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

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

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

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

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

C.3.1.1. Acceptable Knowledge

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

Process knowledge (PK) includes information about the process used to generate the waste, material inputs to the process, and the time period during which the waste was generated. PK is described in 40 CFR § 264.13(a)(2) as data developed under 40 CFR Part 261 and existing published or documented data on a specific hazardous waste or hazardous waste generated from

similar processes. PK may include off-site facility waste characterization data pertaining to a specific waste and laboratory analysis data performed prior to the effective date of applicable RCRA regulations.

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

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

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

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

The Permittees shall document the basis for using AK on a waste profile form. The Permittees shall maintain AK information in accordance with Permit Section 2.12.2 in a format that allows waste management personnel and subject matter experts to either obtain copies or, in the case of classified or sensitive AK documentation that cannot be sent to TA-54 due to security requirements, review the documentation at the point of waste generation. The Permittees shall assign a traceable identifier (*i.e.*, process or AK document number or alphanumeric designation) in accordance with Permit Section 2.4.1 to the waste characterization documentation so that the Permittees can obtain the information for as long as required by RCRA regulation and this Permit.

C.3.1.1.1 Process Knowledge

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

1. laboratory notebooks that detail the research processes and raw materials used in an experiment;
2. process or experiment design documents;
3. safety analysis reports;

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

C.3.1.2 Sampling and Analysis

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

C.3.1.2.1 Solid Waste Analysis

The Permittees shall, if necessary for waste characterization purposes, sample and analyze homogeneous waste streams for the toxicity characteristic (TC) contaminants listed in 40 CFR § 261.24, which is incorporated herein by reference. The Permittees may conduct analysis for total concentration of TC contaminants on samples in a screening step, as described in Section 1.2 of SW-846 Method 1311, the toxicity characteristic leaching procedure (TCLP). If total concentrations are used in the waste characterization process, the Permittees shall compare analytical data to the TC regulatory levels expressed as total values. These total values will be considered the regulatory threshold limit (RTL) values for the determination of whether a particular waste exhibits a TC. The Permittees shall obtain RTL values by calculating the weight/weight concentration (in the solid) of a TC contaminant that would give the regulatory weight/volume concentration in the TCLP extract. If the total concentrations are less than the RTL value, then it may be assumed that the waste does not exhibit the toxicity characteristic and the TCLP does not need to be completed for the screened TC contaminants.

C.3.1.2.2 Liquid Waste Analysis

Liquid wastes generated at the Facility consist of aqueous solutions, slurries, and organic liquids. The Permittees shall sample and analyze these wastes, if necessary for waste characterization purposes, for total metal content, VOCs, and SVOCs. In accordance with SW-846 Method 1311 (TCLP), liquid wastes (*i.e.*, those wastes that contain less than 0.5 percent dry solids) do not require extraction. The liquid waste, after filtration, is defined as the TCLP extract. Liquid waste, therefore, is characterized by filtering the waste, measuring total contaminant concentrations in the resulting filtrate, and comparing these concentrations to the TC regulatory levels in 40 CFR § 261.24.

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

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

Where:

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

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

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

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

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

C.3.1.2.3 Sample Handling, Preservation, and Storage

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

C.3.1.2.4 Analytical Laboratory Selection and Analytical Methods

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

1. a documented and comprehensive QA/QC program;
2. technical analytical expertise;

3. a document control and records management plan; and
4. the capability to perform data reduction, validation, and reporting.

C.3.1.3 Verification Frequencies

The Permittees shall comply with the waste characterization verification procedures identified in Permit Section 2.4.7(3). The Permittees shall place a non-conformance report in the Facility Operating Record if the characterization for the waste stream is found to be inconsistent with the documentation. The Permittees shall decline to accept any waste from the waste stream in issue until the characterization deficiency is remedied.

C.3.2 Mixed Transuranic Waste Characterization

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

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

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

The Permittees shall utilize AK to determine the EPA Hazardous Waste Numbers applicable to the waste stream or container under consideration. The Permittees shall utilize AK to determine whether the container requires additional waste management procedures such as secondary containment for liquid waste or segregation of incompatible, ignitable, or reactive wastes. If AK is insufficient to determine needed information (*e.g.*, ignitability), the Permittees shall use headspace gas sampling to provide the needed information.

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

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

C.3.2.1.1 Real-Time Radiography

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

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

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

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

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

C.3.2.1.2 Visual Examination

The Permittees may use visual examination (VE) to verify the contents of MTRUW containers as a substitute to RTR or during packaging of the waste. VE is performed by physically examining the contents of a waste container to verify that the container is properly included in the appropriate waste stream, to verify the absence of free liquids, to confirm the physical form of containerized waste, and to document the materials present. The Permittees shall ensure that waste characterization determined through VE is recorded in the associated waste's AK documentation.

Standardized training for VE shall be developed. Visual examination operators shall be trained in the specific waste generating processes, typical packaging configurations, and waste material parameters expected to be found in each waste stream at the generator site. The training shall be site specific to include the various waste configurations generated at the site. Operators must requalify at least every two years.

C.3.2.2 Characterization to Meet LDR Requirements

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

C.3.2.3 WIPP Characterization

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

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

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

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

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

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

To ensure that proper procedures and considerations for sample collection and preservation, QA/QC, and occupational safety and health are followed, the Permittees shall comply with the Facility-specific protocol consistent with the most recent version of *SW-846*. For purposes of collecting a representative sample of MTRUW, the Permittees shall collect and handle the

sample in a manner that preserves its original physical form and composition and prevents contamination or changes in concentration of the parameters to be analyzed. Specific requirements as for sampling, parameters, and analytical methods are outlined in Tables C-11 and C-18. Reevaluation frequency is addressed in Attachment Section C.3.

C.3.2.4.2 Characterization Procedures for Waste Treated by Stabilization

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

C.3.2.5 Sample Handling, Preservation, and Storage

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

C.4 OFF-SITE WASTE ACCEPTANCE PROCEDURES

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

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

The Permittees shall physically examine waste shipments upon receipt for correct documentation, correctness and completeness of waste container identification and labeling, and conformance with permitted container types and waste compatibility for storage and segregation, as appropriate. If the Permittees find discrepancies between the wastes received and the manifest or during further characterization find such discrepancies, the Permittees shall notify the Department in accordance with Permit Section 2.4.4. If the Permittees cannot resolve the discrepancies, the waste shall be returned to the generator in accordance with Permit Section 2.4.4.

C.5 SPECIAL PROCEDURAL REQUIREMENTS

Waste management requirements specific to ignitable, reactive, and incompatible waste as well as requirements for compliance with LDR and 40 CFR Part 264 Subparts BB and CC are described below.

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

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

C.5.2 Procedures to Ensure Compliance with LDR Requirements

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

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

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

C.5.3 Procedures to Ensure Compliance with Subpart BB Requirements

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

C.5.3.1 Requirements for Leak Detection and Monitoring

The Permittees shall ensure that monitoring complies with Reference Method 21 at 40 CFR Part 60.

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

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

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

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

C.5.3.2 Determination of Hazardous Waste Concentration

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

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

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

C.5.4 Procedures to Ensure Compliance with Subpart CC Requirements

The Permittees' waste streams described in this document may be subject to 40 CFR Part 264, Subpart CC "Air Emission Standards for Tanks, Surface Impoundments, and Containers" based on applicability criteria specified in 40 CFR § 264.1080, incorporated herein by reference. For waste units that are not exempt from this Subpart under 40 CFR §264.1080(b), the Permittees shall address the applicable Subpart CC requirements. In addition, exemption from the standards specified in 40 CFR §§ 264.1084 through 264.1087, incorporated herein by reference, can be demonstrated if the average VOC concentration is less than 500 parts per million by weight (ppmw) at the point of waste origination, as described at 40 CFR § 264.1082(c)(1), incorporated

herein by reference. The Permittees shall make this determination in accordance with 40 CFR § 264.1083(a) and shall review and update it as necessary at least every twelve months.

If the Permittees claim a 40 CFR § 264.1082(c) exemption for any hazardous waste management units, the Permittees shall document the determination for each waste stream. Permittees may use AK or process knowledge to make the determination. However, if sampling and analysis is needed, the Permittees shall conduct it in accordance with the approved methods identified at 40 CFR §§ 265.1084(a)(3)(iii)(A) through 265.1084(a)(3)(iii)(I), and listed in Tables C-16, C-17, and C-18. The Permittees shall review the characterization documentation before acceptance of the waste at TA-54 as required in Permit Section 2.4.7.

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

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

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

C.6 REFERENCES

ASTM, 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.

DOE, 1999, "Radioactive Waste Management," *DOE Order 435.1*, U.S. Department of Energy, Washington, D.C.

DOE, 1995, "DOE Waste Treatability Groups Guidance," Revision 0.0, U.S. Department of Energy, Idaho Operations Office.

EPA, 1994a, "Waste Analysis at Facilities that Generate Treat, Store, and Dispose of Hazardous Wastes, A Guidance Manual," *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA, 1994b, "Use of Total Waste Analysis in Toxicity Characteristic Determinations," FAXBACK 13647, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

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.

NMED, 1995, "Federal Facility Compliance Order (Los Alamos National Laboratory)," New Mexico Environment Department, Santa Fe, New Mexico.

Table C-1

(This table is reserved)

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

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (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 Sampling and Analysis	D001	Ignitability	NA[c]	Antimony, Arsenic, Barium, Cadmium, Cyanides (Total), Chromium (Total), Lead, Mercury-all others, Selenium, Silver, Acetone, Acetonitrile, Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, 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[c]	
			D003	Reactivity	NA[c]	
			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	
			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[c]	
			F002	Spent halogenated solvents	NA[c]	
			F003	Spent non-halogenated solvents	NA[c]	
			F004	Spent non-halogenated solvents	NA[c]	
			F005	Spent non-halogenated solvents	NA[c]	
			U213	Tetrahydrofuran	NA[c]	

Table C-2 (continued)

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (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 Sampling and Analysis	D001	Ignitability	NA[c]	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
			D003	Reactivity	NA[c]	
			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[d]	Cresol,1,4-Dichlorobenzene
			D024	m-Cresol	200.0[d]	
			D025	p-Cresol	200.0[d]	
			D027	1,4-Dichlorobenzene	7.5	
			D028	1,2-Dichloroethane	0.5	1,1-Dichloroethylene,2,4-Dinitrotoluene, Ethyl Ether, Heptachlor (and its epoxide), Hexachlorobenzene
			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	Hexachlorobutadiene,
			D034	Hexachloroethane	3.0	Hexachloroethane, Methanol, Methyl ethyl ketone, Methylene Chloride, Nitrobenzene,
			D035	Methyl ethyl ketone	200.0	
			D036	Nitrobenzene	2.0	
			D037	Pentachlorophenol	100.0	Pentachlorophenol, Phenol, p,p'-DDT, Pyridine, Tetrachloroethylene, Trichloroethylene,
			D038	Pyridine	5.0[e]	
			D039	Tetrachloroethylene	0.7	
			D040	Trichloroethylene	0.5	
			D041	2,4,5-Trichlorophenol	400.0	2,4,5-Trichlorophenol,
			D042	2,4,6-Trichlorophenol	2.0	2,4,6-Trichlorophenol,
			D043	Vinyl chloride	0.2	Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit
			F001	Spent halogented solvents	NA[c]	
			F002	Spent halogenated solvents	NA[c]	
			F003	Spent non-halogenated solvents	NA[c]	
			F004	Spent non-halogenated solvents	NA[c]	
			F005	Spent non-halogenated solvents	NA[c]	
			K045	Spent non-halogenated solvents	NA[c]	
				Spent carbon	NA[c]	

Table C-2 (continued)

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Paint and Related Wastes	Painting and finishing operations, and general facility maintenance	Acceptable Knowledge 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[c] 100.0 1.0 5.0 5.0 0.2 5.0 2.0 NA[c] NA[c]	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 Sampling and Analysis	D001 D002 D006 D007 D008 D011	Ignitability Corrosivity Cadmium Chromium Lead Silver	NA[c] NA[c] 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 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[c] NA[c] NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 6.0 5.0 NA[c] NA[c] NA[c] NA[c]	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

Table C-2 (continued)

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Solid Metals and Metallic Compounds	Machining and cutting operations; synthesis reactions; solder from electronic manufacturing, repair, and brazing operations; and grinding operations	Acceptable Knowledge Sampling and Analysis	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	NA[c] NA[c] 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
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[c] 5.0 0.2 5.0 NA[c]	Barium, Chromium (Total), Lead, Mercury-all others, Silver Thallium, Zinc 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[g]	Ignitability Corrosivity Reactivity Toxicity characteristic wastes Discarded commercial chemical products and off-specification species	NA[c] NA[c] NA[c] -[b] NA[c]	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Nickel, Selenium, Silver, Acetonitrile, Benzene, Carbon tetrachloride Chlorobenzene, Chloroform, o-Cresol, m-Cresol, p- Cresol, 2, 4-D, 1,4 Dichlorobenzene, 1,1-Dichloroethylene, 1,2-Dichloroethane 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, 2,4,6-Trichlorophenol, 2,4,5-TP (Silvex), Vinyl chloride, and all applicable constituents identified above the UHC regulatory limit

Table C-2 (continued)

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (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 Sampling and Analysis	D001 D002 D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D021 D022 D023 D024 D025 D027 D028 D029 D030 D032 D033 D034 D035 D036 D037 D038 D039 D040 D041 D042 D043 F001 F002 F003 F004 F005	Ignitability Corrosivity Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform o-Cresol m-Cresol p-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 2,4,6-Trichlorophenol Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] NA[c] 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[d] 200.0[d] 200.0[d] 7.5 0.5 0.7 0.13[e] 0.13[e] 0.5 3.0 200.0 2.0 100.0 5.0 0.7 0.5 400.0 2.0 0.2 NA[c] NA[c] NA[c] NA[c] NA[c]	Acetone, Acetonitrile, Antimony, Arsenic, Barium, Benzene, Cadmium, Carbon tetrachloride, Chlorobenzene, Chloroform Chromium (Total), Chrysene, o-Cresol, m-Cresol p-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-Trichlorophenol 2,4,6-Trichlorophenol, Zinc Vinyl chloride and all applicable constituents above the UHC regulatory limit

Table C-2 (continued)

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
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	NA[c] NA[c] NA[c] -[b] NA[c]	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Selenium, Silver, Benzene, Carbon tetrachloride Chlorobenzene, Chloroform o-Cresol, m-Cresol, p-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
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[c] NA[c] 1.0 5.0 5.0 0.2 5.0 5.0[e]	Cadmium, Chromium, Lead, Mercury-all others, Pyridine, Silver and all applicable constituents above the UHC regulatory limit

Table C-2 (continued)

Waste Description[a]	Waste-Generating Process[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
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	Ignitability	NA[c]	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 identified above the UHC regulatory limit
			D003	Reactivity	NA[c]	
			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	
			D022	Chloroform	6.0	
			D030	2,4-Dinitrotoluene	0.13[c]	
			D032	Hexachlorobenzene	0.13[c]	
			D033	Hexachlorobutadiene	0.5	
			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	NA[c]	
			F002	Spent halogenated solvents	NA[c]	
			F003	Spent non-halogenated solvents	NA[c]	
			F005	Spent non-halogenated solvents	NA[c]	

[a] Denotes information from the Los Alamos National Laboratory waste characterization documentation database

[b] 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]

[c] Not applicable: Refers to the absence of regulatory limits for ignitable, corrosive, and reactive characteristic wastes and F-, P-, and U-listed wastes

[d] 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

[e] 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])

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

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Solid Wastes						
Soils with Heavy Metals	Decontamination and decommissioning (D&D) and Environmental Restoration (ER) activities	Acceptable Knowledge and Preliminary Analysis	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 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[c] NA[c] NA[c] NA[c]	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	D001 D003 D005	Ignitability Reactivity Barium	NA[c] NA[c] 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	D002 D003 D007 D008 D009	Corrosivity Reactivity Chromium Lead Mercury	NA[c] NA[c] 5.0 5.0 0.2	Chromium, Lead, Mercury-all others and all applicable constituents identified above the UHC regulatory limit
Noncombustible Debris	Maintenance, D&D, R&D, and ER activities	Acceptable Knowledge	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011 F002	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Spent halogenated solvents	NA[c] NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 NA[c]	Arsenic, Barium, Cadmium, Chromium (Total), Lead, Mercury-all others, Selenium, Silver, and all applicable constituents identified above the UHC regulatory limit

			F005	Spent non-halogenated solvents	NA[c]	

Table C-3 (continued)

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Solid Wastes						
Combustible Debris	Maintenance, R&D, D&D, and ER activities	Acceptable Knowledge	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[c] NA[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 NA[c] NA[c] NA[c] NA[c]	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	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[c] 5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 7.5 0.13[d] 0.13[d] 0.5 3.0 200.0 100.0 5.0[d] 400.0 2.0 NA[c] NA[c] NA[c] NA[c]	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[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Solid Wastes						
Organic-Contaminated Combustible Solids	Maintenance, D&D, and ER activities	Acceptable Knowledge	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[c] NA[c] 5.0 5.0 0.2 0.13[d] 200.0 NA[c] NA[c] NA[c] NA[c]	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	D001 D003 D005 F002	Ignitability Reactivity Barium Spent halogenated solvents	NA[c] NA[c] 100.0 NA[c]	Barium, and all applicable constituents identified above the UHC regulatory limit
Mercury Wastes	Cleanup operations	Acceptable Knowledge	D005 D007 D008 D009 F001	Barium Chromium Lead Mercury Spent halogenated solvents	100.0 5.0 5.0 0.2 NA[c]	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	D001 D002 D003 All P- and U-listed EPA Hazardous Waste Numbers[e]	Ignitability Corrosivity Reactivity Discarded commercial chemical products and off-specification species	NA[c] NA[c] NA[c] NA[c]	All applicable constituents above the UHC regulatory limit

Table C-3 (continued)

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Liquid Wastes						
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	D001 D002 D004 D005 D007 D008 D009 D010 D011 D018 D019 D021 D022 D027 D028 D030 D032 D033 D034 D036 D042 D043 F001 F002 F003 F005	Ignitability Corrosivity Arsenic Barium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform 1,4-Dichlorobenzene 1,2-Dichloroethane 2,4-Dinitrotoluene Hexachlorobenzene Hexachlorobutadiene Hexachloroethane Nitrobenzene 2,4,6-Trichlorophenol Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] 5.0 100.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 7.5 0.5 0.13[d] 0.13[d] 0.5 3.0 2.0 2.0 0.2 NA[c] NA[c] NA[c] NA[c]	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
Corrosive Liquid Wastes	Radiochemistry research, plutonium-processing operations, and analytical chemistry	Acceptable Knowledge	D001 D002 D004 D006 D007 D008 D009 D010 D011 D036 D043 F001 F002 F005	Ignitability Corrosivity Arsenic Cadmium Chromium Lead Mercury Selenium Silver Nitrobenzene Vinyl chloride Spent halogenated solvents Spent halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] 5.0 1.0 5.0 5.0 0.2 1.0 5.0 2.0 0.2 NA[c] NA[c] NA[c]	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

Table C-3 (continued)

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Liquid Wastes						
Oil Wastes	Equipment maintenance operations	Acceptable Knowledge	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 Pentrachlorophenol 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 7.5 0.5 0.13[d] 0.13[d] 0.5 3.0 2.0 100.0 5.0[d] 400.0 2.0 0.2 NA[c] NA[c] NA[c] NA[c]	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	D001 D002 D035 All P- and U-listed EPA Hazardous Waste Numbers[e]	Ignitability Corrosivity Methyl ethyl ketone Discarded commercial chemical products and off-specification species	NA[c] NA[c] 200.0 NA[c]	Methyl ethyl ketone and all applicable constituents identified above the UHC regulatory limit

Table C-3 (continued)

Waste Description[a]	Waste Generating Activity[a]	Basis for Hazardous Waste Designation[a]	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents
Liquid Wastes						
Aqueous and Nonaqueous Liquids Contaminated with Heavy Metals and/or Organics	ER activities, metal-polishing operations, and radiochemistry research	Acceptable Knowledge Sampling and Analysis	D001 D003 D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D021 D022 D023 D024 F002 F005	Ignitability Reactivity Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver Benzene Carbon tetrachloride Chlorobenzene Chloroform o-Cresol m-Cresol Spent halogenated solvents Spent non-halogenated solvents	NA[c] NA[c] 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[f] 200.0[f] NA[c] NA[c]	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
Gas Cylinder Waste						
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[e]	Ignitability Corrosivity Reactivity Toxicity characteristic wastes Discarded commercial chemical products and off-specification species	NA[c] NA[c] NA[c] -[b] NA[c]	All applicable constituents above the UHC regulatory limit

[a] Denotes information from the Los Alamos National Laboratory waste characterization documentation database.
[b] 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].
[c] Not applicable: Refers to the absence of regulatory limits for ignitable, corrosive, and reactive characteristic wastes and F-, P-, and U-listed wastes.
[d] 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]).
[e] 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.
[f] 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.

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[a]		IDC[b]		TRUCON Code[c]	
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				
	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[a]		IDC[b]		TRUCON Code[c]	
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[a]		IDC[b]		TRUCON Code[c]	
			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				

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

Table C-5
Descriptions of Mixed Transuranic Waste Stored at the Facility
(This table is for informational purposes only)

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

Table C-5 (continued)

Summary Category Group	Waste Matrix Code	Waste Description[a]	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents[c]
S3000 - Homogeneous	S3100	Homogeneous Inorganic, Vermiculite	Plutonium processing operations	Acceptable Knowledge	D002	Corrosive	NA[d]	
					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[e]	
					D032	Hexachlorobenzene	0.13[e]	
					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[e]	
					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[d]	
					F002	Spent halogenated solvents	NA[d]	
					F003	Spent non-halogenated solvents	NA[d]	
					F005	Spent non-halogenated solvents	NA[d]	

Table C-5 (continued)

Summary Category Group	Waste Matrix Code	Waste Description[a]	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents[c]
S4000 – Soil/ Gravel	S4100	Soil	D&D	Acceptable Knowledge	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[e]	D038
					D039	Tetrachloroethylene	0.7	D039
					D040	Trichloroethylene	0.5	D040
					F001	Spent halogenated solvents	NA[d]	F001
					F002	Spent halogenated solvents	NA[d]	F002
					F003	Spent non-halogenated solvents	NA[d]	F003
					F005	Spent non-halogenated solvents	NA[d]	F005

Table C-5 (continued)

Summary Category Group	Waste Matrix Code	Waste Description[a]	Waste-Generating Activity	Basis for Hazardous Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics	Regulatory Limits[b] (milligrams per liter)	Potential Underlying Hazardous Constituents[c]
S5000 - Debris	S5300	Combustible Debris	Plutonium processing operations	Acceptable Knowledge	D003	Reactive	NA[d]	
					D004	Arsenic	5.0	
					D005	Barium hydroxide	100.0	
					D006	Cadmium	1.0	
					D007	Chromium	5.0	
	S5400	Heterogeneous Debris	Plutonium processing operations; D&D	Acceptable Knowledge	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[e]	
					D039	Tetrachloroethylene	0.7	
					D040	Trichloroethylene	0.5	
					D043	Vinyl Chloride	0.2	
					F001	Spent halogenated solvents	NA[d]	
					F002	Spent halogenated solvents	NA[d]	
					F003	Spent non-halogenated solvents	NA[d]	
					F004	Spent non-halogenated solvents	NA[d]	
					F005	Spent non-halogenated solvents	NA[d]	
					U080	Methylene Chloride	NA[d]	

[a] 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.

[b] 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].

[c] 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.

[d] Not Applicable: Refers to the absence of regulatory limits for ignitable, corrosive, and reactive characteristic wastes and F-, P-, and U-listed wastes.

[e] 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

(This table is reserved)

TABLE C-7

(This table is reserved)

Table C-8

(This table is reserved)

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

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

[a] Information contained in this column is from the Los Alamos National Laboratory waste characterization documentation database

[b] Parameter selection is based on acceptable knowledge for each waste stream. Additional parameters may be selected for each waste stream as necessary

[c] 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]

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

Waste Description[a]	Parameter[b]	Characterization Method	Rationale
Soils with Heavy Metals	RCRA-regulated metals[c]	Acceptable Knowledge Sample and analyze randomly selected drums in waste stream	Determine toxicity characteristic
Environmental Restoration Soils	RCRA-regulated metals[c] VOCs	Acceptable Knowledge Sample and analyze randomly selected drums in waste stream	Determine presence of F-listed solvents Determine toxicity characteristic
Inorganic Solid Oxidizers	RCRA-regulated metals[c]	Acceptable Knowledge Sample and analyze randomly selected drums in waste stream	Determine toxicity characteristic Determine characteristic for ignitability and reactivity
Lead Waste	RCRA-regulated metals[c]	Acceptable Knowledge	Determine characteristic for reactivity Determine toxicity characteristic
Noncombustible Debris	RCRA-regulated metals[c]	Acceptable Knowledge	Determine toxicity characteristic Determine characteristic for ignitability and reactivity
Combustible Debris	RCRA-regulated metals[c] VOCs	Acceptable Knowledge	Determine toxicity characteristic Determine presence of F-listed solvents Determine characteristic for ignitability and reactivity
Organic-Contaminated Noncombustible Solids	RCRA-regulated metals[c] VOCs	Acceptable Knowledge	Determine toxicity characteristic Determine presence of F-listed solvents
Organic-Contaminated Combustible Solids	RCRA-regulated metals[c] VOCs	Acceptable Knowledge	Determine characteristic for ignitability and reactivity Determine toxicity characteristic Determine presence
Solid Wastes			
Mercury Wastes	RCRA-regulated metals[c] VOCs	Acceptable Knowledge Sample and analyze randomly selected drums in waste stream	Determine toxicity characteristic Determine presence of F-listed solvents
Unused Solid Reagent Chemical Wastes	RCRA-regulated metals[c]	Acceptable Knowledge	Determine characteristic for ignitability and corrosivity Determine the presence of P- and U-listed unused commercial chemical product

Table C-10 (continued)

Waste Description[a]	Parameter[b]	Characterization Method	Rationale
Solid Wastes			
Unused Solid Reagent Chemical Wastes	RCRA-regulated metals[c]	Acceptable Knowledge	Determine characteristic for ignitability and corrosivity Determine the presence of P- and U-listed unused commercial chemical product
Liquid Wastes			
Spent Solvents and Contaminated Solvent Mixtures	Flash point pH RCRA-regulated metals[c] VOCs Semivolatile organic compounds	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability, corrosivity, and toxicity Determine concentration of F-listed solvents
Corrosive Liquid Wastes	Flash point pH RCRA-regulated metals[c] SVOCs	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability, corrosivity, and toxicity Determine concentration of F-listed solvents
Aqueous and Nonaqueous Liquids Contaminated with Heavy Metals and/or Organics	Flash point RCRA-regulated metals[c] VOCs SVOCs	Acceptable Knowledge Sampling and Analysis	Determine characteristic for ignitability and toxicity Determine concentration of F-listed solvents
Oil Wastes	RCRA-regulated metals[c] VOCs SVOCs	Acceptable Knowledge Sampling and analysis	Determine characteristic for toxicity Determine concentration of F-listed solvents
Unused Liquid Reagent Chemical Wastes	Flash point pH	Acceptable Knowledge	Determine characteristic for ignitability and corrosivity Determine the presence of P- and U-listed unused commercial chemical product
Gaseous Wastes			
Gas Cylinder Waste	RCRA[c]-regulated metals VOCs SVOCs	Acceptable Knowledge	Determine characteristic for ignitability, corrosivity, and reactivity Determine presence of D-coded and P- and U-listed waste

[a] 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.

[b] Parameter selection is based on acceptable knowledge for each waste stream. Additional parameters may be selected for each waste stream as necessary

[c] 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]

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

Summary Category Group/ Description[a]	Waste Description	Parameters	Characterization Methods	Rationale
Storage				
S3000-Homogeneous Solids	Solidified aqueous waste (*e.g.*, concreted/cemented aqueous waste)	Free liquids in waste matrix Physical form of the waste	Visual examination Real-time radiography (RTR) Acceptable Knowledge	Verify physical waste form No free liquids allowed
	Solidified aqueous waste (*e.g.*, dewatered sludge and chemical treatment sludge) Solidified inorganic/organic process solids and liquids	Resource Conservation and Recovery Act (RCRA)-regulated metals	Sample and analyze statistically selected number of drums in waste stream Acceptable Knowledge	Determine toxicity characteristic Determine concentration of metals
	Homogeneous inorganic solids Glass/noncombustible waste Non-cemented inorganics Absorbed organics on vermiculite	Volatile organic compounds in container headspace gas	Gas chromatography / mass spectrometry (GC/MS) Fourier transform infrared spectrometry Gas chromatography / Flame ionization detector Acceptable Knowledge	Qualitative screening to confirm the presence of VOCs
S4000-Soils/Gravels	Contaminated soil	Free liquids in waste matrix Physical form of the waste	Visual examination RTR Acceptable Knowledge	Verify physical waste form No free liquids allowed
		RCRA-regulated metals	Sample and analyze statistically selected number of drums in waste stream Acceptable Knowledge	Determine toxicity characteristic Determine concentration of metals
		VOCs in container headspace gas	GC/MS Fourier transform infrared spectrometry Gas chromatography / Flame ionization detector	Qualitative screening to confirm the presence of VOCs
S5000-Debris Waste	Mixed metal scrap and incidental combustibles Combustible waste Graphite waste Metal waste Glass waste	Free liquids Physical form of the waste VOCs in container headspace gas VOCs and semivolatile organic compounds	Visual examination RTR Acceptable Knowledge	Verify physical waste form No free liquids allowed Determine compliance with land disposal restrictions (LDR) treatment standards, if applicable
	Leaded-rubber and metal waste High-efficiency particulate air filters Noncombustible waste Mixed combustible / noncombustible waste	RCRA-regulated metals	Gas chromatography / mass spectrometry Fourier transform infrared spectrometry Gas chromatography / Flame ionization detector Acceptable Knowledge	Qualitative screening to confirm the presence of VOC Determine compliance with LDR treatment standards, if applicable

Table C-11 (continued)

	Treatment			
L1000 Aqueous Liquids/Slurries	Evaporator bottoms solutions, aqueous waste, and laboratory solutions	RCRA-regulated metals and corrosivity	Acceptable Knowledge Sampling and Analysis	Determine toxicity characteristics Determine concentration of metals
S3000 Homogeneous Solids	Inorganic process solids and cemented inorganic process solids	RCRA-regulated metals	Acceptable Knowledge Sampling and Analysis	Determine concentration of metals

[a] 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.

Table C-12

(This table is reserved)

Table C-13

(This table is reserved)

Table C-14

(This table is reserved)

Table C-15
Recommended Sample Containers[a], Preservation Techniques, and Holding Times[b]

Analyte Class and Sample Type	Container	Preservative	Holding Time
Volatile Organics			
Concentrated Waste Samples:	Method 5035: 40-milliliter (mL) vials with stirring bar. Method 5021: See method. Methods 5031 & 5032: 125-mL WM[c]-G[d]. Use Teflon-lined lids for all procedures.	Cool to 4º degrees Celsius (ºC)[e]	14 days
Aqueous Samples:			
No Residual Chlorine Present	Methods 5030, 5031, & 5032: 2 x 40-mL vials with Teflon-lined septum caps.	Cool to 4ºC and adjust pH[f] to less than 2 with H_2SO_4, HCl, or solid $NaHSO_4$	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 4ºC and adjust pH to less than 2 with H_2SO_4, HCl, or solid $NaHSO_4$	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 4ºC	14 days
Soil/Sediments and Sludges:	Method 5035: 40-mL vials with stirring bar. Method 5021: See method. Methods 5031 & 5032: 125-mL WM[c]-G[d]. Use Teflon-lined lids for all procedures.	See the individual method	14 days

Table C-15 (continued)

Analyte Class and Sample Type	Container	Preservative	Holding Time
Semivolatile Organics/Organochlorine Pesticides and Herbicides			
Concentrated Waste Samples:	125 mL WM[c]-G[d] with Teflon-lined lid	None	Samples must be extracted within 14 days and analyzed within 40 days following extraction.
Soil/Sediments and Sludges:	250 mL WM[c]-G[d] with Teflon-lined lid	Cool to 4ºC	Samples must be extracted within 14 days and analyzed within 40 days following extraction.
Liquid Samples:			
No Residual Chlorine Present	1-gallon (gal.), 2 x 0.5 gal., or 4 x 1 liter (L) AG[g] container with Teflon-lined lid	Cool to 4ºC	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[g] with Teflon-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 4ºC.	Samples must be extracted within 7 days and extracts analyzed within 40 days following extraction
Metals			
Aqueous Samples:			
Metals (except hexavalent chromium and mercury)	1-L P[h] or G[d]	Add nitric acid to adjust pH to less than 2.	180 days
Hexavalent chromium	500-mL P[h] or G[d]	Cool to 4ºC	24 hours
Mercury	500-mL P[h] or G[d]	Add nitric acid to adjust pH to less than 2.	28 days
Soil/Sediments and Sludges:			
Metals (except hexavalent chromium and mercury)	500-mL WM[c]-P[h] or G[d]	Cool to 4ºC	180 days
Hexavalent chromium	500-mL WM[c]-P[h] or G[d]	Cool to 4ºC	Not established - analyze as soon as possible.
Mercury	500-mL WM[c]-P[h] or G[d]	Cool to 4ºC	28 days

[a] 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] Wide-mouth
[d] 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] Amber glass[h]; P = Polyethylene

Table C-16
Summary of Characterization Methods for Hazardous Waste

Parameter	Method Numbers	Test Methods	Rationale
Volatile organic compounds in waste matrix: Spent halogenated solvents Spent nonhalogenated solvents	ASTM Method D4547-91[a] U.S. EPA/540/4-91/001[b] *SW-846* (1311, 8260B, 8275A)[c] or equivalent methods[d] 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 chromotography/mass spectrometry (GC/MS) Semivolatile organic compound (SVOC) analysis by thermal extraction/gas chromatography/mass spectrometry (TE/GC/MS) Acceptable Knowledge	Determine total and/or TCLP and SVOC/VOC concentration in samples of solids or liquids
SVOCs in waste:	*SW-846* (1311 and 8270C)[c] or equivalent methods[d]	Total or TCLP SVOC analysis by GC/MS Acceptable Knowledge	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)[c] (1311, 6010B, 7080A, 7081)[c] (1311, 6010B, 7130, 7131A)[c] (1311, 6010B, 7190, 7191)[c] (1311, 6010B, 7420, 7421)[c] (1311, 6010B, 7470A, 7471A, 7472)[c] (1311, 6010B, 7740, 7741A, 7742)[c] (1311, 6010B, 7760A, 7761)[c] or equivalent methods[d]	Total and/or TCLP Inductively-coupled plasma atomic emission spectroscopy Atomic absorption Manual cold vapor atomic absorption Anodic stripping voltammetry Acceptable Knowledge	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[e] *SW-846* (9030B, 9031, 9034)[c] or equivalent methods[d]	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)[c] or equivalent methods[d]	Pensky-Martens closed cup Setaflash closed cup Ignitability of solids	Determine ignitablity
pH (Corrosivity)	*SW-846* (9040B, 9041A, 9045C)[c] or equivalent methods[d]	pH electrometric measurement pH paper Soil and waste pH	Determine corrosivity

[a] 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

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

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

[d] Equivalent methods subject to EPA approval may be substituted

[e] *SW-846*, Section 7.3.4.2 contains specialized methods to determine if a sulfide-containing waste exhibits the reactivity characteristic

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

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

Table C-17 (continued)

Parameter	Method Numbers	Test Method	Rationale
Liquid Wastes (cont.)			
RCRA-regulated metals in waste: Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	*SW-846* (1311, 6010B, 7060A, 7061A)[c] (1311, 6010B, 7080A, 7081)[c] (1311, 6010B, 7130, 7131A)[c] (1311, 6010B, 7190, 7191)[c] (1311, 6010B, 7420, 7421)[c] (1311, 6010B, 7470A, 7471A, 7472)[c] (1311, 6010B, 7740, 7741A, 7742)[c] (1311, 6010B, 7760A, 7761)[c] or equivalent methods[d]	Total and/or TCLP Inductively-coupled plasma atomic emission spectroscopy Atomic absorption Manual cold vapor atomic absorption Anodic stripping voltammetry Acceptable Knowledge	Determine total and/or TCLP concentration in samples of liquid
Ignitability (Flash Point)	*SW-846* (1010, 1020A, 1030)[c] or equivalent methods[d]	Pensky-Martens closed cup Setaflash closed cup Acceptable Knowledge	Determine ignitability
pH (Corrosivity)	*SW-846* (9040B, 9041A, 9045C)[c] or equivalent methods[d]	pH electrometric Measurement pH paper Soil and waste pH Acceptable Knowledge	Determine corrosivity

[a] 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

[b] U.S. Environmental Protection Agency (EPA), 1991, "Soil Sampling and Analysis for Volatile Organic Compounds," EPA 154014-91991, Office of Research and Development

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

[d] Equivalent methods, subject to EPA approval, may be substituted

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

Parameter	Method Numbers	Test Methods	Rationale
Storage			
Physical Waste Form (Free liquids in waste matrix)		Waste inspection procedures Real-time radiography Visual examination Acceptable Knowledge	Verify waste container contents
Volatile organic compounds in waste matrix: Spent halogenated solvents Spent nonhalogenated solvents	ASTM Method D4547-91[a] U.S. EPA/540/4-91/001[b] *SW-846* (1311, 8260B, 8275A)[c] or equivalent methods[d] 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	Determine the presence or absence of VOCs in samples
SVOCs in waste	*SW-846* (1311 and 8270C)[c] or equivalent methods[d]	Total and/or TCLP SVOC analysis by GC/MS Acceptable Knowledge	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)[c] (1311, 6010B, 7080A, 7081)[c] (1311, 6010B, 7130, 7131A)[c] (1311, 6010B, 7190, 7191)[c] (1311, 6010B, 7420, 7421)[c] (1311, 6010B, 7470A, 7471A, 7472)[c] (1311, 6010B, 7740, 7741A, 7742)[c] (1311, 6010B, 7760A, 7761) or equivalent methods[d]	Total and/or TCLP Inductively-coupled plasma atomic emission spectroscopy Atomic absorption Manual cold vapor atomic absorption Anodic stripping voltammetry Acceptable Knowledge	Determine total and/or TCLP concentration in samples
Ignitability	*SW-846* (1010, 1020A, 1030)[c] or equivalent methods[d]	Pensky-Martens closed cup Setaflash closed cup Ignitabililty of Solids Acceptable Knowledge	Determine ignitability
pH (Corrosivity)	*SW-846* (9040B, 9041A, 9045C) or equivalent methods[d]	pH electrometric measurement Acceptable Knowledge	Determine corrosivity

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

[a] 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

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

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

[d] Equivalent methods, subject to EPA approval, may be substituted

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[a] (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	D002 D004 D005 D006 D007 D008 D009 D010 D011	Nitric acid Arsenic Barium hydroxide Cadmium Chromium Lead Mercury Selenium Silver	NA 5.0 100.0 1.0 5.0 5.0 0.2 1.0 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	D004 D005 D006 D007 D008 D009 D010 D011	Arsenic Barium hydroxide Cadmium Chromium Lead Mercury Selenium Silver	5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0

[a] 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