

PERMIT ATTACHMENT C WASTE ANALYSIS PLAN

C.1 INTRODUCTION

This waste analysis plan (WAP) contains requirements and procedures for the characterization of the chemical and physical nature of hazardous and mixed wastes generated, stored or treated at the Permitted Units. These include the Hazardous Waste Handling Unit, the Thermal Treatment Unit, the Radioactive and Mixed Waste Management Unit, the Auxiliary Hot Cell Unit, and the Manzano Storage Bunkers, and the Corrective Action Management Unit (CAMU), which are described in Permit Attachment A (*Facility Description*).

C.2 WASTE TYPES GENERATED AT THE FACILITY

Table C-1 summarizes general information on hazardous and mixed waste types generated at the Facility. The following sections contain general descriptions of the waste types, the major associated waste-generating processes and/or activities, and the general waste forms associated with each type. For the purposes of this WAP, a waste type is a general category used to describe one or more wastes that share key features (e.g., type of waste-generating process, waste form, basis for general characterization).

Hazardous and mixed waste types may be of uniform composition (i.e., homogeneous) or of dissimilar and diverse composition (i.e., heterogeneous). Table C-1 includes brief waste type descriptions, the associated waste-generating process or activity, and the characterization basis for hazardous and mixed waste designation. Table C-1 also addresses the variability of each waste type by listing the potential EPA Hazardous Waste Numbers and potential hazardous and mixed waste constituents and/or characteristics associated with each waste type. Each type of waste may include one or more wastes.

TABLE C-1
Types of Wastes Generated at the Facility

Waste Type Description	Principal Waste Generating Activities	Basis for Hazardous or Mixed Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics in the Waste
Laboratory Chemical Waste	Weapon systems and components design, development, fabrication, and testing and material research	Acceptable Knowledge and Sampling and Analysis, as appropriate	D001 D002 D003 D004-D043 All P- and U- EPA Hazardous Waste Numbers	Ignitability Corrosivity Reactivity Toxicity Discarded commercial chemical products and off-specification species
Contaminated Used Oil	Weapon systems and components design, development, fabrication, and testing, material research, pulsed-power research, reactor safety research, and off-site generated waste	Acceptable Knowledge and Sampling and Analysis, as appropriate, Fingerprint Analysis ^a	D001 D002 D003 D004-D043 F001-F005	Ignitability Corrosivity Reactivity Toxicity Spent solvents
Process Wastes	Weapon systems and components design, development, fabrication, and testing, material research, ER Project activities, and off-site generated waste	Acceptable Knowledge and Sampling and Analysis, as appropriate, Fingerprint Analysis	D001 D002 D003 D004-D043 F001-F005	Ignitability Corrosivity Reactivity Toxicity Spent solvents
Explosive Waste	Weapon systems and components design, development, fabrication, and testing	Acceptable Knowledge and Sampling and Analysis, as appropriate	D001 D002 D003 D004-D011 F001-F005	Ignitability Corrosivity Reactivity Toxicity Spent solvents
Batteries	Weapon systems and components design, development, and testing	Acceptable Knowledge and Sampling and Analysis, as	D001 D002	Ignitability Corrosivity

TABLE C-1 Types of Wastes Generated at the Facility				
Waste Type Description	Principal Waste Generating Activities	Basis for Hazardous or Mixed Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics in the Waste
		appropriate	D003 D005 D006 D007 D008 D009 D011	Reactivity Barium Cadmium Chromium Lead Mercury Silver
Elemental Lead	Pulsed-power research, reactor safety research, ER ^b Project and D&D ^c activities, and off-site generated waste	Acceptable Knowledge and Sampling and Analysis, as appropriate Fingerprint Analysis	D008	Lead
Unknown Liquids and Solids	Legacy wastes from historical weapons system design, development and testing, materials research, ER Project, and D&D activities	Acceptable Knowledge and Sampling and Analysis, as appropriate.	D001 D002 D003 D004-D043	Ignitability Corrosivity Reactivity Toxicity
Contaminated Soil	ER Project and D&D activities	Acceptable Knowledge and Sampling and Analysis, as appropriate Fingerprint Analysis	D001 D003 D004-D043 F001-F005 F039	Ignitability Reactivity Toxicity Spent solvents Leachate
Debris	Weapon systems and components design, development, and testing, material research, pulsed-power research, reactor safety research, support activities, ER Project and D&D activities	Acceptable Knowledge and Sampling and Analysis, as needed Fingerprint Analysis	D001 D003 D004-D043 F001-F005 F039	Ignitability Reactivity Toxicity Spent solvents Leachate

TABLE C-1 Types of Wastes Generated at the Facility				
Waste Type Description	Principal Waste Generating Activities	Basis for Hazardous or Mixed Waste Designation	Potential EPA Hazardous Waste Numbers	Potential Hazardous Waste Constituents and/or Characteristics in the Waste
Leachate and Decontamination, Purge, and Treatment Waters	ER Project, post-closure care, and D&D activities	Acceptable Knowledge and Sampling and Analysis, as appropriate	D002 D004-D043 F001-F005 F039	Corrosivity Toxicity Spent solvents CAMU Leachate
Treated Waste and Treatment Residues	Support activities (radiation protection and waste management)	Acceptable Knowledge and Sampling and Analysis, as needed	D001 D002 D003 D004-D043 F001-F005	Ignitability Corrosivity Reactivity Toxicity Spent -solvents
Containment System Liquids	Support activities (waste management)	Acceptable Knowledge and Sampling and Analysis, as needed	D001 D002 D003 D004-D043 F001-F005	Ignitability Corrosivity Reactivity Toxicity Spent solvents

- a "Fingerprint analysis" refers to checks and field methods designed to quickly identify chemical properties (e.g., pH, density, chlorine content, etc). Laboratory analysis may be required to fully and properly characterize a waste.
- b ER = Environmental Restoration
- c D&D =Decontamination and Decommissioning

C.2.1 Laboratory Chemical Waste

Laboratory chemical waste includes unused and used commercial chemical products or manufacturing chemical intermediates (in solid, liquid, or contained gas forms) declared to be waste, such as reagents, metal powders, oxidizers, reactive metals, elemental mercury, elemental sodium, spent or discarded solvents and other materials. Material Safety Data Sheets (MSDSs) or other product documentation may be available for these wastes. The Permittees initial generators generally produce this type of waste during various research, development and testing operations. Some of these laboratory chemical wastes also exhibit the hazardous waste characteristics of ignitability, corrosivity, reactivity, and/or toxicity.

C.2.2 Contaminated Used Oil

Used oils from vacuum pumps and other machinery may be contaminated with listed hazardous and mixed wastes or may exhibit hazardous waste characteristics of ignitability or toxicity. Specific constituents depend on the processes that generated the contaminated used oil.

C.2.3 Process Wastes

Process wastes, which can be liquid or solid chemicals, solutions, mixtures, waste waters, or manufactured items, are generated as a result of various activities, including experiments and routine operational processes. Typical process hazardous and mixed wastes include, but are not limited to, acidic solutions, alkaline solutions, oxidizers, and wastewaters. These wastes exhibit hazardous waste characteristics (e.g., ignitability, corrosivity, reactivity, toxicity) or are listed waste from nonspecific sources (e.g., spent solvents).

C.2.4 Explosive (Reactive) Waste

An explosive material is defined as a chemical compound or mixture containing any oxidizing and combustible substances, or other ingredients in such proportions, quantities, or packing that ignition by fire, friction, concussion, percussion or detonation of any part thereof causes decomposition with the production of a considerable quantity of heat and gas. Explosive wastes and explosive-contaminated wastes exhibit the hazardous waste characteristic of reactivity if they are capable of detonation or explosive reaction when subjected to a strong initiating source or if heated under confinement. Examples of explosive (reactive) wastes include components and test units that contain an explosive or explosive fragments, powders, and residues. Some of these wastes also exhibit hazardous waste characteristics of ignitability and/or toxicity and may contain spent solvents.

Explosive wastes and explosive-contaminated wastes are generated at the Facility primarily from research and development, fabrication, testing, and Environmental Restoration (ER) Project activities. Explosive waste generally consists of discrete pieces of a solid explosive substance, whereas explosive-contaminated waste typically consists of solid or liquid wastes that have been contaminated with an explosive substance. A specific type of explosive waste is managed at the TTU and is described in greater detail below in Section C.3.4.1.

C.2.5 Batteries

Batteries, in solid or liquid form, or both, are used in numerous Facility activities, and waste batteries may exhibit the hazardous waste characteristics of reactivity, corrosivity, or toxicity (due to the presence of metals such as cadmium, mercury, and lead). Information about the battery content, hazards, and EPA Hazardous Waste Numbers is determined using manufacturer's data. For example, thermal batteries (specialized single-use batteries) contain metals and may exhibit the hazardous waste characteristics of reactivity and toxicity. Lithium batteries exhibit the characteristic of reactivity, while mercury batteries, silver batteries, and nickel-cadmium batteries exhibit the characteristic of toxicity.

C.2.6 Elemental Lead

Elemental lead items that cannot be reused (e.g., for radiation shielding or containment) or are in a form that is unsuitable for recycling may be declared waste. These wastes exhibit the hazardous waste characteristic of toxicity.

C.2.7 Unknown Liquids and Solids

Unknown liquids and solids consist largely of legacy wastes from historical weapons systems design, development and testing, material research, ER Project, and Decontamination and Decommissioning (D&D) activities. Typical unknown hazardous and mixed wastes include, but are not limited to, unlabeled laboratory chemicals, residues in equipment and containers, and solid items that are smaller than debris (as defined in 40 CFR § 268.2). These wastes exhibit the hazardous waste characteristics of ignitability, corrosivity, reactivity, and/or toxicity.

C.2.8 Contaminated Soil

This waste type includes soil from ER Project activities, or other cleanup and excavation operations. Soil may be contaminated with or contain listed waste(s) or exhibit one or more hazardous waste characteristics (i.e., reactivity, ignitability, and/or toxicity).

C.2.9 Debris

This waste type includes waste generated during cleaning operations, D&D operations, ER Project activities, emergency response, waste management, and protection of personnel. These wastes are solid, usually heterogeneous, compactable and non-compactable materials that meet the regulatory definition of hazardous debris. Compactable materials include, but are not limited to, items such as personal protective equipment, rags, wipes, swipes, paper, and filters. Non-compactable materials include, but are not limited to equipment, components, electronic hardware, experimental remnants, cables, tools, machining parts, building materials, and glassware. Debris may be contaminated with or contain listed waste(s) or exhibit one or more hazardous waste characteristics (i.e., reactivity, corrosivity, ignitability, and/or toxicity).

C.2.10 Leachate and Decontamination, Purge, and Treatment Waters

This waste type includes CAMU leachate, and decontamination, purge, and treatment water (i.e., wastewater) from ER Project, D&D activities, and waste management. Decontamination, purge, or treatment waters may be listed wastes (e.g., CAMU leachate); be contaminated with or contain listed waste(s); or may exhibit a hazardous waste characteristic (i.e., corrosivity and/or toxicity).

C.2.11 Treated Waste and Treatment Residues

Treated waste and treatment residues, which form secondary waste types (i.e., solids, liquids, or contained gases), are generated by treatment operations at Permitted Units. The wastes may be stored on-site at a Permitted Unit and in accordance with this Permit pending determination of success in meeting treatment goals, subsequent treatment, and/or transportation to appropriate off-site Treatment, Storage, and Disposal Facilities (TSDFs).

C.2.12 Containment System Liquids

This waste type includes liquids that accumulate in containment system structures (e.g., spill pallets, trenches, catch tank). Containment system liquids may be contaminated with or contain listed hazardous and mixed waste(s) or exhibit one or more hazardous waste characteristics (i.e., reactivity, corrosivity, ignitability, or toxicity).

C.3 WASTE CHARACTERIZATION PROCEDURES

The approach to waste characterization is based on process knowledge and sampling and analysis data, as appropriate. The following sections describe the characterization procedures that shall apply to hazardous and mixed wastes managed at the Permitted Units.

C.3.1 Waste Characterization Process

The Permittees shall, in accordance with this WAP and the requirements of this Permit, determine what characterization is required. Waste information is submitted using a disposal request (DR) or equivalent form. Waste Characterization shall include identifying physical form, accurately assigning EPA Hazardous Waste Numbers, determining treatment requirements for wastes to be treated at the Permitted Units, and obtaining all information needed for safely handling, storing, and transporting, or otherwise managing the waste.

Waste characterization information includes: the quantity, physical form of the waste (e.g., solid, liquid, gas, wastewater), origin (e.g., research and testing, ER Project, unused commercial chemical product, activity that generated the waste), waste characteristics (e.g., ignitability, corrosivity), hazardous constituents (including reactive or explosive constituents) that are contained in the waste, concentrations and proportions of constituents as needed, and other information as needed or applicable (e.g., materials in contact with the waste such as paper or plastic, and the presence of free liquids in containers).

The Permittees shall review the disposal request forms and associated documentation (e.g., waste process documentation, technical information about the waste, and analytical results) for adequacy, completeness, data reliability, and acceptability.

The Permittees shall consider each waste individually. Each waste is one of the general types listed in Table C-1 and described in Section C.2 of this Permit Attachment. The Permittees shall use waste type identification in part to determine whether and what kind of additional information is needed to adequately and properly characterize waste. Types of additional information are discussed in Section C.2 of this Permit Attachment. If analytical data are needed to supplement the available information, they shall be obtained through sampling and analysis. A general summary of the characterization methods and parameters and the rationale for characterization are found in Table C-2 of this Permit Attachment.

If the Permittees determine that documentation is incomplete or inadequate for waste characterization, or find or suspect changes in the waste-generating process, they shall obtain the necessary information to properly complete waste characterization.

Using the waste characterization information, the Permittees shall make a hazardous waste determination in accordance with 40 CFR Part 262.11. Before accepting the waste at the appropriate Permitted Unit, the Permittees shall visually check to verify that the waste container(s) matches the information on the disposal request form. If the Permittees detect discrepancies between the shipping documentation and the waste at pickup, the Permittees shall amend the documentation with the correct information. Upon receipt of the waste at a Permitted Unit, the characterization documentation shall become part of the Operating Record. Data from additional waste characterization activities also shall be made part of the Operating Record.

C.3.2 Characterization of Unknown Wastes

Occasionally, wastes of an unknown nature are encountered. For example, unknown wastes may be generated as a result of a container label becoming detached or illegible. Most unknown wastes are contained in small containers (less than 1 gallon or 1 pound) and are related to research or testing projects. These wastes shall be managed on a case-by-case basis. The waste will be tentatively characterized by knowledge of the operations and activities that were performed in the specific area in which the waste was generated. An on-site visual investigation of an unknown waste is another method utilized to help tentatively characterize the waste. The visual investigation includes the assessment of the unknown waste for various properties, such as:

1. Physical state,
2. Color,
3. Age,
4. Storage and container conditions,
5. Changes in substance,
6. Phase separations,
7. Quantity of waste,
8. Any labeling, and

9. Type of operations in the nearby area.

The waste and its proper management shall be identified through this investigation, as appropriate. If identification is made, a disposal request shall be prepared and the waste shall be characterized as described above in Section C.3.1 of this Permit Attachment. If the unknown waste cannot be identified, a HazCat™ or comparable test shall be performed to determine the hazard class. Once the hazard class is determined and the waste is known to be safe to transport, the information shall be recorded on the disposal request form. Additional waste characterization shall be conducted to whatever extent is necessary to ensure full, accurate, and proper characterization of the waste as described in Section C.3.1.

C.3.3 Characterization of Blended Wastes

Waste may be blended on a limited basis. Liquid hazardous or mixed wastes and non-hazardous wastes may be blended together in a single container. These blending activities shall be limited to compatible wastes, such as oils or process wastes. The Permittees may also combine compatible liquids drained from aerosol cans (e.g., commercial chemical products or characteristic liquids) into a single container.

The Permittees will document the following information for containers with blended wastes:

1. The approximate amounts of each waste type in the mixture;
2. List of hazardous waste characteristics, and underlying hazardous constituents (UHCs) as defined in 40 CFR 268.2(i) in each waste in the mixture; and
3. Whether the wastes in the mixture include listed hazardous wastes such as spent solvents.

The Permittees shall consider the above information when they characterize the waste using the process described in Section C.5 and shall assign the applicable EPA Hazardous Waste Numbers and determine proper management of the waste, including treatment and disposal. The Permittees shall not blend wastes in violation of 40 CFR § 268.3.

TABLE C-2
General Characterization Methods, Parameters, and Rationale

Waste Type Description	Characterization Method	Parameter	Rationale
Laboratory Chemical Waste	Acceptable Knowledge and Sampling and Analysis, as appropriate	Source of waste Available information about waste composition Physical characteristics Presence of liquids Flash point (for liquids), DOT hazard class (for solids) Stability, DOT hazard class pH (for liquids) Hazardous waste metals Hazardous waste VOCs Hazardous waste SVOCs	Determine whether waste meets listing criteria Determine waste form Determine presence of free liquids Determine ignitability, reactivity, and corrosivity characteristics Determine waste compatibility information Determine toxicity characteristic
Contaminated Used Oil	Acceptable Knowledge and Sampling and Analysis, as appropriate	Source of waste Available information about waste composition Physical characteristics Flash point Hazardous waste metals Hazardous waste VOCs Hazardous waste SVOCs	Determine whether waste meets listing criteria Determine waste form Determine presence of free liquids Determine ignitability characteristic Determine waste compatibility information Determine toxicity characteristic

TABLE C-2
General Characterization Methods, Parameters, and Rationale

Waste Type Description	Characterization Method	Parameter	Rationale
Process Wastes	Acceptable Knowledge and Sampling and Analysis, as appropriate	Source of waste Available information about waste composition Physical characteristics Presence of liquids Flash point (for liquids), DOT hazard class (for solids) Stability, DOT hazard class pH (for liquids) Hazardous waste metals Hazardous waste VOCs Hazardous waste SVOCs	Determine whether waste meets listing criteria Determine waste form Determine presence of free liquids Determine ignitability, corrosivity, and reactivity characteristics Determine waste compatibility information Determine toxicity characteristic
Explosive Waste	Acceptable Knowledge and Sampling and Analysis, as appropriate	Source of waste Available information about waste composition Physical characteristics Presence of liquids Flash point (for liquids), DOT hazard class (for solids) Stability, DOT hazard class Hazardous waste metals Hazardous waste VOCs Hazardous waste SVOCs	Determine whether waste meets listing criteria Determine waste form Determine presence of free liquids Determine ignitability and reactivity characteristics Determine waste compatibility information Determine toxicity characteristic
Batteries	Acceptable Knowledge and Sampling and Analysis, as appropriate	Source of waste Available information about waste composition Physical characteristics Presence of liquids Flash point (for liquids), DOT hazard class (for	Determine waste form Determine presence of free liquids Determine ignitability, corrosivity, and reactivity characteristics Determine waste compatibility information

TABLE C-2
General Characterization Methods, Parameters, and Rationale

Waste Type Description	Characterization Method	Parameter	Rationale
		solids) pH (for liquids) Stability, DOT hazard class Hazardous waste metals	Determine toxicity characteristic
Elemental Lead	Acceptable Knowledge and Sampling and Analysis, as appropriate	Source of waste Available information about waste composition Physical characteristics Hazardous waste metals	Determine waste form Determine toxicity characteristic
Unknown Liquids and Solids	Physical Examination, Acceptable Knowledge, and Sampling and Analysis, as appropriate	Source of waste Available information about waste composition Physical characteristics Presence of liquids Flash point (for liquids), DOT hazard class (for solids) Stability, DOT hazard class pH (for liquids) Hazardous waste metals Hazardous waste VOCs Hazardous waste SVOCs	Determine waste form Determine presence of free liquids Determine ignitability, reactivity, and corrosivity characteristics Determine waste compatibility information Determine toxicity characteristic
Contaminated Soil	Acceptable Knowledge and Sampling and Analysis, as appropriate	Source of waste Available information about waste composition Physical characteristics Presence of liquids DOT hazard class (for solids) Stability, DOT hazard class Hazardous waste metals	Determine whether waste meets listing criteria Determine waste form Determine presence of free liquids Determine ignitability, and reactivity characteristics Determine waste compatibility information Determine toxicity characteristic

TABLE C-2
General Characterization Methods, Parameters, and Rationale

Waste Type Description	Characterization Method	Parameter	Rationale
		Hazardous waste VOCs Hazardous waste SVOCs	
Debris	Acceptable Knowledge and Sampling and Analysis, as appropriate	Source of waste Available information about waste composition Physical characteristics Presence of liquids DOT hazard class (for solids) Stability, DOT hazard class Hazardous waste metals Hazardous waste VOCs Hazardous waste SVOCs	Determine whether waste meets listing criteria Determine waste form Determine presence of free liquids Determine ignitability, and reactivity characteristics Determine waste compatibility information Determine toxicity characteristic
Leachate and Decontamination Purge, and Treatment Waters	Acceptable Knowledge and Sampling and Analysis, as appropriate	Source of waste Available information about waste composition Physical characteristics Flash point pH Stability, DOT hazard class Hazardous waste metals Hazardous waste VOCs Hazardous waste SVOCs	Determine whether waste meets listing criteria Determine waste form Determine ignitability, reactivity, and corrosivity characteristics Determine waste compatibility information Determine toxicity characteristic or constituent concentrations
Treated Waste and Treatment Residues	Acceptable Knowledge and Sampling and analysis, as appropriate	See Table C-3	See Table C-3
Containment System Liquids	Acceptable Knowledge and Sampling and Analysis, as appropriate	Source of waste Available information about waste composition Physical characteristics	Determine whether waste meets listing criteria Determine waste form Determine ignitability and corrosivity characteristics

TABLE C-2
General Characterization Methods, Parameters, and Rationale

Waste Type Description	Characterization Method	Parameter	Rationale
		Flash point pH Hazardous waste metals Hazardous waste VOCs Hazardous waste SVOCs	Determine waste compatibility information Determine toxicity characteristic

Note: The first three items in the parameter column for each waste type are mandatory and constitute the minimum acceptable knowledge. The remaining parameters are optional and will be selected for each waste type as necessary, if the results of the first three parameters indicate additional information is needed.

C.3.4 Characterization of Wastes Treated at the Permitted Units

Wastes treated at Permitted Units shall be characterized according to the process described in Sections C.3.4.1 through C.3.4.5 of this Permit Attachment. Treated wastes shall be characterized to determine one or more of the following, as appropriate, for each waste:

1. Applicable treatment standards, including standards for both characteristic and listed hazardous wastes in accordance with 40 CFR Part 268, Subpart D;
2. Appropriate treatment methods to meet the standards;
3. Underlying hazardous constituents (UHCs) and their appropriate treatment standards, if applicable;
4. Compliance with applicable treatment standards;
5. Suitability for treatment by one or more methods available on-site to meet treatment standards; and
6. Suitability for treatment by one or more methods available on-site to make the waste safer and more amenable to further management on-site or off-site.

These characterization criteria are summarized in Table C-3.

C.3.4.1 Characterization of Waste to be treated at the Thermal Treatment Unit

Reactive hazardous waste to be treated at the TTU shall be characterized through the use of process knowledge:

1. Explosive (e.g., SASN) and ignitable (e.g., acetone) components of the waste are known as a result of knowledge of process and a well-defined and documented procedure for formulating SASN. Variability occurs in the relative amounts of non-explosive liquid and solid items. Some variability occurs in the relative amounts of explosives (SASN and PETN),
2. The waste constituents shall be documented in the Operating Record for any given formulation of SASN. Prior to formulating the explosive slurry, the Permittees shall screen the formulation instructions to identify any changes. If the formulation has changed, the Permittees shall evaluate the constituents to determine if the wastes generated by producing the formulation are acceptable for treatment at the TTU. Properties evaluated shall include the weight of explosives in the waste, and the non-explosive constituents in the waste.

C.3.4.2 Characterization of Wastes to be treated at the RMWMU and AHCU

Wastes to be treated at the RMWMU and AHCU shall be characterized based on acceptable knowledge and supplemented by sampling and analysis, as appropriate, before treatment takes place. For wastes that will be treated to meet treatment standards in 40 CFR 268 Subpart D that include UHCs, characterization shall include any UHCs that are reasonably expected to be present.

C.3.4.3 Characterization of Treated Wastes and Treatment Residues

Treated wastes and treatment residues shall be characterized through knowledge of process and supplemented by sampling and analysis data, as appropriate, using the process described in Section C.3.1 of this Permit Attachment. Treated wastes and treatment residues shall be characterized to determine each of the following, as applicable, for each waste:

1. Whether the treatment effectively met the treatment-specific goals;
2. Whether the treated waste or residue meets the applicable treatment standards (including requirements and standards for UHCs if applicable) associated with the treatment performed;
3. If the treated waste or residue will not undergo further treatment prior to disposal, whether the treated waste or residue meets all applicable treatment standards (including requirements and standards for UHCs if applicable);
4. The presence of hazardous waste constituents and characteristics that could have been introduced during treatment;
5. Whether the treated waste or residue requires further management as a hazardous or mixed waste; and
6. The suitability for further treatment by one or more methods available on-site to make the waste safer and more amenable to further management on- or off-site.

These characterization criteria are summarized in Table C-3. All treated waste and treatment residues shall be characterized by the process described in Section C.3.1 of this Permit Attachment. Characterization of treated wastes and treatment residues shall include consideration of both listed and characteristic wastes that were present in the untreated wastes. The Permittees shall also follow the appropriate regulatory requirements for characterizing wastes that are listed solely because they exhibit one or more of the characteristics of ignitability, reactivity, or corrosivity.

Wastes that are treated using technologies specified in 40 CFR §§ 268.40-45 are not necessarily subjected to sampling and analysis. Such treatment technologies include physical treatment, and macroencapsulation. Other treated wastes shall be subject to sampling and analysis to characterize the waste and determine the effectiveness of the treatment, as appropriate.

C.3.4.4 Characterization of Treated Waste Residues at the TTU

Treatment residues from the thermal treatment of SASN mixed with other hazardous and solid waste include products of combustion. The principal constituents are ash (carbon) produced from burned solid items (e.g., paper, filters) inert non-combustible solid items (e.g., metal clips and pieces that were part of the solid waste) and gases (i.e., nitrogen, water vapor, carbon dioxide, carbon monoxide, diatomic oxygen, and traces of nitrous oxides) produced by decomposition of these wastes. Elemental silver is present in the ash when SASN is treated.

The treatment residue at the TTU shall be assessed by visually observing it for the presence of any untreated waste.

Treatment residue is hazardous waste (D011) based on process knowledge. Alternatively, the Permittees may use sampling and analysis to determine the silver content of the treatment residue. The Permittees shall characterize the treatment residue as appropriate for further treatment and disposal at a permitted off-site TSDF.

C.3.4.5 Characterization of Treated Wastes and Treatment Residues Generated at the RMWMU and the AHCU

Effectiveness of treatment is determined in one or more ways that are specific to the type of treatment and the waste undergoing treatment. Evaluation of the treatment effectiveness is described in detail in Permit Part 4. Treated wastes and treatment residues generated from the treatment of hazardous and mixed wastes at the RMWMU and AHCU shall be characterized using one or more of the following methods:

1. The Permittees may use process knowledge, as appropriate, to determine whether treated waste or treatment residues exhibit characteristics of reactivity or ignitability, and the flash point test, as appropriate, for determination of ignitability.
2. Treated corrosive aqueous liquid wastes and their liquid treatment residues, if any, shall be characterized for corrosivity by measuring pH.
3. Treated reactive wastes and their treatment residues, if any, shall be characterized for the presence of sulfides and cyanides if their presence caused the waste to be reactive.
4. Treated reactive batteries and other reactive/explosive items and their treatment residues, if any, shall be characterized for reactivity through process knowledge, as appropriate. Such wastes may also exhibit the characteristic of toxicity.
5. Elemental mercury treated by amalgamation at the RMWMU may be characterized by process knowledge.
6. Treated aqueous liquids that have been solidified (including liquids that have previously been neutralized) shall be checked for the presence of free liquids.
7. Treated oils and organic liquids exhibiting the characteristics of toxicity shall be characterized through process knowledge and sampling and analysis, as appropriate.
8. Treated soils and particulates exhibiting one or more characteristics of ignitability, reactivity, and toxicity may contain UHCs. Treated wastes that were toxic shall be characterized for toxicity by sampling and analysis, as appropriate.
9. Wastes treated by physical treatment include components containing listed wastes or exhibiting hazardous characteristics. After items are separated from larger items they shall be characterized as described in Section C.3.4 of this Permit Attachment.
10. Pressurized containers treated by physical treatment shall be characterized following treatment. If the containers are empty as defined in 40 CFR § 261.7, the containers are not hazardous waste. The collected liquids shall be characterized.

Treated wastes and treatment residues that will not undergo further treatment at the RMWMU and the AHCU shall be characterized as appropriate to determine compliance with applicable treatment standards for UHCs (*See* 40 CFR § 268.2(i) and 268.40(e)).

C.4 VERIFICATION AND RE-EVALUATION FREQUENCIES

The Permittees' waste verification process shall be designed to provide assurance that wastes are adequately characterized. Personnel involved in verification activities shall be trained and qualified for the activities they perform.

The Permittees shall review whether hazardous wastes are being stored in compliance with 40 CFR Part 264, Subpart CC at least once every 12 months. Such reviews shall be documented in the Operating Record.

C.4.1 Verification of Wastes

Wastes shall be selected for further evaluation as part of the verification program using one or more of the following criteria:

1. Random selection;
2. Adequacy of waste characterization information;
3. Recommendations from personnel;
4. Incomplete or inconsistent documentation; and
5. Other waste-specific criteria.

During each calendar year, the Permittees shall verify the characterization for ten percent (10%) by volume.

C.4.2 Re-evaluation of Waste Streams

If there is any information that indicates a change in the process that generates a waste that may affect the waste, the waste shall be re-characterized no later than the next time the waste is generated from the changed process.

C.5 USE OF ACCEPTABLE KNOWLEDGE

According to the EPA guidance, acceptable knowledge is defined to include process knowledge, supplemental waste analysis data, and facility records of analysis (EPA, 1994, "Waste Analysis at Facilities That Generate, Treat, Store, And Dispose of Hazardous Wastes"). Process knowledge is described as data developed under 40 CFR Part 264 and existing published or documented data on a specific hazardous waste or a waste generated from similar processes. Supplemental waste analysis data include concentration(s) of hazardous waste constituents and/or results of tests for hazardous waste characteristics to determine whether or how wastes are regulated under RCRA Subtitle C.

Examples that are presented in the 1994 EPA guidance as to when the application of acceptable knowledge may be appropriate include:

1. Wastes containing hazardous waste constituents from specific processes that are well documented such as F and K listed wastes; and

2. Wastes consisting of discarded commercial chemical products, reagents, or chemicals containing known physical and chemical constituents (such as, spent solvents and P and U listed wastes).
3. Health and safety risks to personnel would not justify sampling and analysis (e.g., radioactive mixed waste).
4. Physical nature of the waste does not lend itself to taking a laboratory sample.

Documentation of acceptable knowledge shall be maintained in the Operating Record. [See 40 CFR §§ 264.13(a)(2) and (b)(5), and 264.73(b)(3)].

C.5.1 Process Knowledge

Process knowledge, a subset of acceptable knowledge, consists of one or more of the following:

1. Detailed information on a waste obtained from published or documented waste analysis data;
2. Studies conducted on hazardous or mixed waste generated by processes similar to that which generated the waste; and
3. Knowledge of the materials and operations that generated the waste and that demonstrates the potential for hazardous waste constituents in the waste.

Documentation of process knowledge for each waste shall be maintained in the Operating Record. The documentation shall be traceable to a given waste. There are many sources of documentation that can be used to substantiate process knowledge for a specific waste. Examples include but are not limited to the following:

1. Material safety data sheets (MSDSs), product labels, vendor information and manufacturer's literature and other product package information;
2. Information from operating procedures and research projects, which can include a list of the raw materials or reagents, a description of the process/experiment that uses the materials, and a description of the wastes generated and how the wastes are handled;
3. Site databases (e.g., chemical inventory database for Superfund Amendments and Reauthorization Act Title III requirements);
4. Industry reports and analytical data on a similar process when there is a clear connection between the Facility's process/experiment and the industry's similar process/experiment;
5. Previous analytical data relevant to the waste;
6. Documented visual inspections to confirm or identify the physical characteristics and packaging of a waste; and
7. ER Project site and waste characterization data.

TABLE C-3			
Additional Parameters, Characterization Methods, and Rationale for Treated Wastes			
Waste Type Description	Characterization Method	Parameter^a	Rationale
Explosive waste to be treated by open burning	Knowledge of Process	All characterization information previously obtained Knowledge of treatment process	Verify that waste has same characteristics and constituents as previous wastes treated at TTU Determine treatment standards Identify UHCs reasonably expected to be present in characteristic waste
Residues from treatment of reactive hazardous wastes through open burning	Acceptable Knowledge and by Sampling and Analysis, as appropriate	All characterization information previously obtained for untreated waste Physical characteristics Knowledge of treatment process Presence of liquids Flash point (for liquids), DOT hazard class (for solids) Stability, DOT hazard class Hazardous waste metals UHCs	Determine whether treated waste meets listing criteria Determine waste form Determine presence of free liquids Determine waste compatibility information Determine toxicity characteristics Determine whether waste meets treatment standards, including standards for UHCs
Waste to be treated through chemical deactivation	Acceptable Knowledge and Sampling and Analysis, as appropriate	All characterization information previously obtained Knowledge of treatment process Cyanides and sulfides UHCs	Verify that waste is suitable for treatment by planned process Determine treatment standards Identify UHCs expected to be present in characteristic waste

TABLE C-3
Additional Parameters, Characterization Methods, and Rationale for Treated Wastes

Waste Type Description	Characterization Method	Parameter ^a	Rationale
Wastes that have been treated through chemical deactivation	Acceptable Knowledge and Sampling and Analysis, as appropriate	All characterization information previously obtained for untreated waste Physical characteristics Knowledge of treatment process Presence of liquids Flash point (for liquids), DOT hazard class (for solids) pH (for liquids) Stability, DOT hazard class Cyanides and sulfides UHCs	Determine whether waste meets listing criteria Determine waste form Determine presence of free liquids Determine ignitability, corrosivity, and reactivity characteristics Determine waste compatibility information Determine whether waste meets treatment standards, including standards for UHCs
Waste to be treated through thermal deactivation	Acceptable Knowledge and Sampling and Analysis, as appropriate	All characterization information previously obtained Knowledge of treatment process UHCs	Verify that waste is suitable for treatment by planned process Determine treatment standards Identify UHCs expected to be present in characteristic waste
Wastes that have been treated through thermal deactivation	Acceptable Knowledge and Sampling and Analysis, as appropriate	All characterization information previously obtained for untreated waste Physical characteristics Knowledge of treatment process DOT hazard class Stability, DOT hazard class UHCs	Determine waste form Determine ignitability and reactivity characteristics Determine waste compatibility information Determine whether waste meets treatment standards, including standards for UHCs
Waste to be treated through amalgamation	Acceptable Knowledge and Sampling and Analysis, as appropriate	All characterization information previously obtained Knowledge of treatment process	Verify that waste is suitable for treatment by planned process Determine treatment standards

TABLE C-3 Additional Parameters, Characterization Methods, and Rationale for Treated Wastes			
Waste Type Description	Characterization Method	Parameter^a	Rationale
Wastes that have been treated through amalgamation	Knowledge of Process	All characterization information previously obtained for untreated waste Physical characteristics Knowledge of treatment process	Determine waste form Determine whether waste meets treatment standards
Waste to be treated through stabilization/solidification	Acceptable Knowledge and Sampling and Analysis, as appropriate	All characterization information previously obtained Knowledge of treatment process UHCs	Verify that waste is suitable for treatment by planned process Determine treatment standards Identify UHCs expected to be present in characteristic waste
Wastes that have been treated through stabilization/solidification	Acceptable Knowledge and Sampling and Analysis, as appropriate	All characterization information previously obtained for untreated waste Physical characteristics Knowledge of treatment process Presence of liquids Flash point (for liquids), DOT hazard class (for solids) Stability, DOT hazard class UHCs	Determine whether waste meets listing criteria Determine waste form Determine presence of free liquids Determine ignitability and reactivity characteristics Determine waste compatibility information Determine whether waste meets treatment standards, including standards for UHCs
Waste to be treated through macroencapsulation	Acceptable Knowledge and Sampling and Analysis, as appropriate	All characterization information previously obtained Knowledge of treatment process	Verify that waste is suitable for treatment by planned process Determine treatment standards
Waste that have been treated through macroencapsulation	Knowledge of Process	All characterization information previously obtained for untreated waste Physical characteristics Knowledge of treatment process	Determine waste form Determine whether waste meets treatment standards

TABLE C-3			
Additional Parameters, Characterization Methods, and Rationale for Treated Wastes			
Waste Type Description	Characterization Method	Parameter^a	Rationale
Waste to be treated through physical treatment	Acceptable Knowledge and Sampling and Analysis, as appropriate	All characterization information previously obtained Knowledge of treatment process UHCs	Verify that waste is suitable for treatment by planned process Determine treatment standards Identify UHCs expected to be present in characteristic waste
Wastes that have been treated through physical treatment	Acceptable Knowledge and Sampling and Analysis, as appropriate	All characterization information previously obtained for untreated waste Physical characteristics Knowledge of treatment process Presence of liquids Flash point (for liquids), DOT hazard class (for solids) Stability, DOT hazard class pH (for liquids) Hazardous waste VOCs Hazardous waste SVOCs Hazardous waste metals UHCs	Determine whether waste meets listing criteria Determine waste form, including size Determine presence of free liquids Determine ignitability, corrosivity, and reactivity characteristics Determine waste compatibility information Determine toxicity characteristic Determine whether waste meets treatment standards, including standards for UHCs

^a Parameters listed are in addition to those shown in Table C-2. Parameters shown in *italics* are mandatory; the others are selected based on obtaining additional information necessary for treatment or for characterizing the treated waste.

C.6 WASTE SAMPLING AND ANALYSIS

Sampling and analysis shall be performed to provide supplemental information when acceptable knowledge does not provide sufficient information to adequately and properly characterize a hazardous or mixed waste as needed for the activities conducted under this Permit. Characterization methods, analytical parameters, and rationale are summarized in Tables C-2 and C-3.

Pursuant to 40 CFR 264.13(b)(1 and 2), Table C-4 identifies analytical testing requirements and test methods for parameters of interest, including UHCs that are reasonably expected to be present in the waste at the point of generation, as defined in 40 CFR 268.2(i).

C.6.1 Quality Assurance/Quality Control

The Permittees shall implement sampling quality assurance/quality control (QA)/QC procedures to assure that analytical results are adequate for their intended purpose(s). The QA/QC program shall be designed by adhering to the EPA sampling protocol and analytical procedures specified in this section; documenting sampling activities and sample custody; using controlled and standard equipment and materials; and collecting, analyzing, and evaluating field and laboratory QA/QC samples, to meet the requirements of EPA Office of Solid Waste publication SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (EPA, 1986) and all approved updates,(SW-846), Chapter 1.0.

C.6.2 Waste Sampling

The objective of waste sampling shall be to obtain a sample representative of a waste and shall consider the waste-generating and -handling processes. Some wastes separate into distinct layers, and representative samples must include aliquots or portions from each layer. In some cases, it shall be necessary to use a statistical or random sampling scheme for the collection of representative samples.

A number of criteria shall be considered by the Permittees in determining the number, location, and frequency of samples that should be collected. If the waste is uniform and from a single process location, one grab sample collected periodically may be sufficient. If a waste is a mixture of materials, more samples shall be required, and composite sampling may be appropriate. Sampling shall be repeated if the waste-generating process changes in a substantial way, or if inspection of the waste reveals the waste has changed such that the previous determination is no longer applicable.

The Permittees shall comply with SW-846, other approved EPA or American Society for Testing and Materials (ASTM) methods. The Permittees shall obtain prior approval by the Department to use other methods.

Samples of waste shall be collected and handled in a manner that preserves their original physical form and composition.

When sampling is required for waste characterization, the following strategies shall be used unless an alternative sampling strategy that meets the requirements of SW-846 is determined to be more appropriate for a specific waste:

1. Sampling shall be conducted in a manner that minimizes the generation of waste;
2. The Permittees shall consider personnel safety in determining how and whether to collect samples. If sampling of a waste would pose an unacceptable risk to human health, a non-waste item similar in chemical and physical properties to the waste may be sampled as a surrogate;
3. For heterogeneous solid items, such as contaminated debris, samples shall be obtained from areas that are most likely to be contaminated;
4. For solid items whose surfaces are suspected to be contaminated with hazardous or mixed wastes, the sampling method employed shall be appropriate for detecting surface contamination and may include, but is not limited to, surface wipe samples, crushing, grinding, and shredding, depending on the physical form of the waste and the suspected contaminants; and
5. Samples shall include portions or aliquots from each phase of a waste if more than one phase is present.

The Permittees may propose an alternative sampling strategy by submitting a sampling and analysis plan (SAP) to the Department for approval. If the Department does not notify the Permittees of the SAP's approval, conditional approval, or denial within 45 days of receipt of the SAP, the Permittees may implement the SAP provided that all applicable requirements of 40 CFR Parts 264 and 268 and this Permit are met; releases of waste are prevented; and the health and safety of workers and the public are protected from harm related to implementation of the plan.

C.6.3 Sample Handling, Preservation, and Storage

Use of appropriate sample container types and preservation are necessary to prevent some hazardous constituents from chemically, physically, or biologically altering other substances prior to analysis. Typical preservation techniques shall include the addition of appropriate chemicals, refrigeration, and adhering to holding time limitations between sampling and analysis. The Permittees shall use current EPA-approved preservation and container types, such as those presented in Table C-5 of this Permit Attachment, or in SW-846.

Field duplicate samples shall be collected at a rate of ten percent, and shall be analyzed for the same parameters as the associated waste samples. If disposable sampling equipment is not used, an equipment rinsate blank shall also be prepared and analyzed at a rate of ten percent, with at least one for each sampling event. If VOCs are included in the analyses, a trip blank shall be prepared and analyzed for volatile organic compounds (VOCs), and shall accompany VOC samples.

After a sample is collected, a label providing the following information at a minimum shall be immediately affixed to the sample container:

1. Sample number;

2. Date and time of collection;
3. Sampling location or container number(s) for composite samples;
4. Type of sample media (e.g., liquid, solid); and
5. Name of sample collector.

Sample numbers shall be unique to each sample. The sample number shall also be recorded on a sample collection log, which shall include the following information for each sample:

1. Sample number;
2. Sample and analysis request number;
3. Date and time of sample collection;
4. Sampling location or container number(s) for composite samples;
5. Type of sample media (e.g., solid, liquid);
6. Purpose of sample collection;
7. Number and volume of samples;
8. Sample type (e.g., grab, composite);
9. Results of field observations or measurements;
10. Name of sample collector; and
11. Signature of sample collector.

To assure that the sample is traceable from the time of collection to the time of analysis, an analysis request/chain-of-custody (AR/COC) form or equivalent shall be completed and maintained by the Permittees for each sample. The form shall include the following information at a minimum:

1. Sample number;
2. Date and time of sample collection;
3. Sampling location or container number(s) for composite samples;
4. Type of sample media (e.g., solid, liquid);
5. Required analytical testing;
6. Sample description (e.g., grab, composite);
7. Name of sample collector;
8. Signature of sample collector;
9. Signatures of persons involved in the chain of custody; and
10. Dates of possession.

Table C-5 lists requirements for sample containers, preservation techniques, and holding times for the active Units listed in Table J-1.1 of Permit Attachment J (*Hazardous and Mixed Waste Management Units*).

Sampling shall be performed with an appropriate device.

C.6.4 Analytical Laboratory Selection and Analytical Methods

The Permittees shall perform the chemical and physical analyses specified in SW-846 as necessary to adequately characterize waste. Laboratories conducting the analyses must have:

1. A documented comprehensive QA/QC program,
2. Technical analytical expertise,
3. A document control/records management plan, and
4. The capability to perform data reduction, validation, and reporting.

The selection of analytical testing methods for waste shall be based on the following considerations:

1. The physical form of the waste,
2. Chemical composition, and
3. Required detection limits (e.g., regulatory thresholds).

TABLE C-4 Summary of Analytical Methods		
Parameter	Method Numbers ^b	Rationale
Volatile Organic Compounds Spent halogenated and non-halogenated solvents	American Society for Testing and Materials (ASTM) Method D4547-91 ^c or equivalent method EPA/540/4-91/001 ^d or equivalent methods ^e EPA Methods SW-846 (1311, 8260, 8261) ^f or equivalent methods ^e Methods included in 20 NMAC 4.1.600/40 CFR §§ 265.1084(a)(2), (a)(3), and (a)(4)	Determine total and/or TCLP concentration in samples of solids or liquids, to characterize wastes, evaluate air emissions, or determine whether treated wastes meet treatment standards ^a
Semivolatile Organic Compounds	EPA Methods SW-846 (1311 and 8270) ^f or equivalent methods ^e	Determine total and/or TCLP concentration in samples of solids or liquids to characterize wastes or determine whether treated wastes meet treatment standards ^a
Metals Arsenic Antimony Barium Beryllium Cadmium Chromium Lead Mercury Nickel Selenium Silver Thallium	EPA Methods SW-846 ^f : (1311, 6010, 6020, 7000, 7010) ^e (1311, 7470, 7471) ^e (1311, 6010, 6020, 7000, 7010) ^e (1311, 6010, 6020, 7000, 7010, 7741, 7742) ^e (1311, 6010, 6020, 7000, 7010) ^e (1311, 6010, 6020, 7000, 7010) ^e or equivalent methods ^e	Determine total and/or TCLP concentration in samples of solids or liquids, or determine whether treated wastes meet treatment standards ^a
Reactive Sulfide	EPA Methods SW-846, Test Method to Determine Hydrogen	Determine concentration of

TABLE C-4
Summary of Analytical Methods

Parameter	Method Numbers ^b	Rationale
	Sulfide Released from Wastes ^g or equivalent methods ^c EPA Methods SW-846 (9030, 9031, 9034) ^f or equivalent methods ^c	reactive sulfides
Cyanide (total and amenable)	(1311, 9010, 9012) ^e	Determine concentration of cyanides
Paint Filter Liquids Test	EPA Methods SW-846 (9095) ^f or equivalent methods ^c	Determine presence of free liquids
Flash Point	EPA Methods SW-846 (1010, 1020, 1030) ^f or equivalent methods ^c	Determine ignitability
pH	EPA Methods SW-846 (9040, 9041, 9045) ^f or equivalent methods ^c	Determine corrosivity
Explosives in waste	EPA Methods SW-846 (Appropriate analytical method from the Method 8300 series - e.g., 8330) ^f	Determine reactivity
Dioxin/Furan Congeners	EPA Methods SW-846 (8280, 8290) ^f or equivalent methods ^c	Determine total and/or TCLP concentration in samples of solids or liquids to characterize wastes or determine whether treated wastes meet treatment standards ^a
Polychlorinated Biphenyls	EPA Methods SW-846 (8082, 8275) ^f or equivalent methods ^c	Determine total and/or TCLP concentration in samples of solids or liquids to characterize wastes or determine whether treated wastes meet treatment standards ^a
Pesticides	EPA Methods SW-846 (8140, 8141, 8081, 8085) ^f or equivalent methods ^c	Determine total and/or TCLP concentration in samples of solids or liquids to characterize wastes or determine whether treated wastes meet treatment standards ^a
Herbicides	EPA Methods SW-846 (8150, 8151) ^f or equivalent methods ^c	Determine total and/or TCLP concentration in samples of solids or liquids to characterize wastes or determine whether treated wastes meet treatment standards ^a

^a For treated wastes, analyses are limited to determining whether treated wastes meet the treatment standards in 40 CFR § 268.40 or the universal treatment standards for the underlying hazardous constituents that can reasonably be expected to be present at the point of generation of the hazardous waste, as provided in 40 CFR § 268.48

^b The Permittees shall use the most current methods for analysis. Method numbers shown in this table are subject to change through future updates and may differ from those shown here.

^c 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. (ASTM, 1991)

^d U.S. Environmental Protection Agency (EPA), 1991, "Soil Sampling and Analysis for Volatile Organic Compounds," EPA 1/540/4-91/001, Office of Research and Development. (EPA, 1991)

^e Equivalent methods not listed in one of the references in this Permit Attachment may be substituted to accommodate waste-specific properties if approved in advance by the Department.

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

^g SW-846, Section 7.3.4.2 contains specialized methods to determine if a sulfide-containing waste exhibits the reactivity characteristic.

TABLE C-5			
Sample Containers^a, Preservation Techniques, and Holding Times^b			
Analyte Class and Sample Type	Container	Preservative	Holding Time
Volatile Organic Compounds			
Concentrated Waste Samples	Method 5035 ^b : See method. Method 5021: See method. Methods 5031 & 5032: See methods. Use polytetrafluoroethylene (PTFE)-lined lids for all procedures.	Cool to 4° degrees Celsius (°C) and adjust pH ^c to less than 2 with H ₂ SO ₄ , HCl, or solid NaHSO ₄	14 days
Soil/Sediments and Sludges	Method 5035: See method. Method 5021: See method. Methods 5031 & 5032: See methods.	See the individual method	14 days
Liquid Samples: No Residual Chlorine Present	Methods 5030, 5031, & 5032: 2 x 40- milliliter (mL) vials with PTFE-lined septum caps.	Cool to 4°C and adjust pH to less than 2 with H ₂ SO ₄ , HCl, or solid NaHSO ₄	14 days
Liquid Samples: Residual Chlorine Present	Methods 5030, 5031, & 5032: 2 x 40-mL vials with PTFE-lined septum caps.	Collect sample in a 125-mL container, which has been pre-preserved with 4 drops of 10% sodium thiosulfate solution. Gently swirl to mix sample and transfer to a 40-mL volatile organic analysis (VOA) vial. Cool to 4°C and adjust pH to less than 2 with H ₂ SO ₄ , HCl, or solid NaHSO ₄	14 days
Liquid Samples: Acrolein and Acrylonitrile	Methods 5030, 5031, & 5032: 2 x 40-mL vials with PTFE-lined septum caps.	Adjust to pH of 4-5. Cool to 4°C	14 days
Semivolatile Organic Compounds/Organochlorine Pesticides and Herbicides			
Concentrated Waste Samples	125 mL WM ^c -G ^d with PTFE-lined lid	None	14 days
Soil/Sediments and Sludges	250 mL WM ^c -G ^d with PTFE-lined lid	Cool to 4°C	14 days
Liquid Samples, No Residual Chlorine Present	4 x 1 liter (L) AG ^f with PTFE-lined lid, or other size, as appropriate, to allow use of entire sample for analysis.	Cool to 4°C	14 days
Liquid Samples, Residual Chlorine Present	4 x 1-L AG ^f with PTFE-lined lid, or other size, as appropriate, to allow use of entire sample for analysis.	Add 3-mL 10% sodium thiosulfate solution per gallon (or 0.008%). Cool to 4°C.	14 days
Polychlorinated Biphenyls, Polychlorinated Dibenzo-p-dioxins, and Polychlorinated Dibenzofurans			
Concentrated waste samples	125-mL WM ^c -G ^d	None	14 days
Soil/Sediments and Sludges	250 mL WM ^c -G ^d with PTFE-lined lid	Cool to 4°C	14 days
Liquid Samples, No Residual Chlorine Present	4 x 1 liter (L) AG ^f with PTFE-lined lid, or other size, as appropriate, to allow use of entire sample for analysis	Cool to 4°C	14 days

TABLE C-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container	Preservative	Holding Time
Liquid Samples, Residual Chlorine Present	4 x 1-L AG ^f with PTFE-lined lid, or other size, as appropriate, to allow use of entire sample for analysis.	Add 3-mL 10% sodium thiosulfate solution per gallon (or 0.008%). Cool to 4°C.	14 days
Metals and Inorganic Compounds			
<u>Soil/Sediments and Sludges: Metals (except hexavalent chromium and mercury)</u>	500-mL WM ^c -P ^g or G ^d	Cool to 4°C	180 days
<u>Soil/Sediments and Sludges: Hexavalent chromium</u>	500-mL WM ^c -P ^g or G ^d	Cool to 4°C	Not established - analyze as soon as possible.
<u>Soil/Sediments and Sludges: Mercury</u>	500-mL WM ^c -P ^g or G ^d	Cool to 4°C	28 days
<u>Liquid Samples: Metals (except hexavalent chromium and mercury)</u>	1-L P ^g or G ^d	<u>Add nitric acid to adjust pH to less than 2.</u>	<u>180 days</u>
<u>Liquid Samples: Hexavalent chromium</u>	<u>500-mL P^g or G^d</u>	<u>Cool to 4°C</u>	<u>24 hours</u>
<u>Liquid Samples: Mercury</u>	<u>500-mL P^g or G^d</u>	<u>Add nitric acid to adjust pH to less than 2.</u>	<u>28 days</u>
<u>Cyanide</u>	500-mL WM ^c -P ^g or G ^d	Cool to 4°C. See method for preservation if oxidizing agents or interferences are present.	14 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. Permittees shall comply with EPA requirements for container types, preservatives, and holding times as specified under the current version of SW-846 or other applicable regulations.

^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. The Permittees shall use the most current containers and preservation methods. Containers and preservatives shown in this table are subject to change through future updates and may differ from those shown here.

^c WM = Wide-mouth

^d G = Glass

^e A term used to describe the hydrogen-ion activity of a system.

^f AG = Amber glass

^g P = Polyethylene

C.7 ORGANIC AIR EMISSION REQUIREMENTS

The Permittees manage wastes that are subject to organic air emissions requirements of 40 CFR Part 264, Subpart CC. For wastes that are not eligible for exemption, the Permittees shall address the applicable requirements for control of air pollutant emissions as follows:

1. In lieu of determining the concentration of VOCs in a waste at the point of generation, the Permittees may declare that a container holding the waste is subject to the requirements of 40 CFR Part 264, Subpart CC.
2. To determine the VOC concentration, the Permittees shall follow the waste determination procedures specified in 40 CFR 264.1083(a). If sampling and analysis is necessary, it shall be performed in accordance with the methods specified in this Permit Attachment.
3. Whenever changes to the source generating the waste are reasonably likely to or may potentially cause the average VOC concentration of the hazardous waste to increase to a level that is equal to or greater than the applicable VOC concentration limits specified in 40 C.F.R. § 264.1082, a new waste evaluation shall be performed by the Permittees, as specified in 40 C.F.R. § 264.1083(a)(1)(ii).
4. The Permittees shall review the characterization documentation for VOCs as part of the characterization process discussed in Section C.3 of this Permit Attachment.
5. Hazardous wastes containing VOCs that are newly generated through treatment and treatment residues shall be characterized for VOC content if the waste being treated contains VOCs, and/or the treatment process involves VOCs.
6. Characterization of routinely generated hazardous and mixed wastes that are subject to 40 C.F.R. Part 264, Subpart CC shall be reviewed and updated at least once every 12 months to determine whether Subpart CC requirements continue to apply.

C.8 PROCEDURES FOR ACCEPTANCE OF WASTE FROM OFF-SITE SOURCES

Hazardous and mixed wastes from off-site sources listed in Section 2.2.3 of Permit Part 2 may be accepted at the Facility.

The Permittees shall meet the requirements of 40 CFR §§, 264.13(a)(3)(ii), 264.13(a)(4), 264.13(b)(5), and 264.13(c).

Prior to accepting waste from an off-site source, the Permittees shall obtain a request and waste characterization data from the off-site source. The Permittees shall review the request and characterization data for completeness and consistency with the characterization process in Section C.3.1. The Permittees shall require large-quantity and small-quantity off-site sources to provide land disposal restriction (LDR) notification that addresses LDR requirements applicable to the wastes in the proposed shipment. The Permittees shall provide written notice to the source as required by 40 CFR 264.12(b).

The Permittees shall visually inspect each shipment to ensure that the number and type of container(s) and container labels match the manifest or other shipping papers. Discrepancies shall be addressed in compliance with 40 CFR 264.72 and Permit Section 1.9.9.8.

Documentation regarding wastes received from off-site sources shall be maintained in the Operating Record.

C.9 RECORDS

The Permittees shall enter characterization information into the Operating Record. Each package (the smallest discrete waste item) shall be assigned a unique identification and tracking number no later than its arrival at a Permitted Unit. Characterization information associated with the package shall be either in paper or electronic format. The Permittees shall document information related to activities that affect a waste package (e.g., repackaging, additional characterization, treatment).

C.10 REFERENCES

- ASTM, 1991 American Society for Testing and Materials, "Standard Practice for Sampling Waste and Soils for Volatile Organic Compounds," 1991
- ASTM, 1991 *Annual Book of ASTM Standards*, Philadelphia, Pennsylvania, American Society for Testing and Materials, 1991.
- EPA, 1986 U.S. Environmental Protection Agency, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*, 1986 and all approved updates.
- EPA, 1991 "Soil Sampling and Analysis for Volatile Organic Compounds," *EPA 1/540/4-91/001*, Office of Research and Development, 1991
- EPA, 1994 "Waste Analysis at Facilities That Generate, Treat, Store, And Dispose of Hazardous Wastes, A Guidance Manual," *OSWER 9938.4-03*, 1994.