Title 40 CFR Part 191
Compliance Certification
Application
for the
Waste Isolation Pilot Plant

Appendix WAP

United States Department of Energy
Waste Isolation Pilot Plant

Carlsbad Area Office
Carlsbad, New Mexico

Waste Analysis Plan

CHAPTER C

WASTE ANALYSIS PLAN

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Introduction

This waste analysis plan (WAP) has been prepared for disposal activities to be conducted at the Waste Isolation Pilot Plant (WIPP) facility to meet requirements set forth in Title 20 of the New Mexico Administrative Code, Chapter 4, Part I (20 NMAC 4.1), Subpart V, §264.13. Guidance in the most recent U.S. Environmental Protection Agency (EPA) manual on waste analysis has been incorporated into the preparation of this WAP (EPA, 1994). Accordingly, this chapter includes a facility description; information on the waste to be managed; a discussion of parameters, rationale, and test methods; details of planned waste sampling and analysis; a description of the waste shipment screening and verification process; and a description of the quality assurance (QA)/quality control (QC) program.

When using this WAP, the term "WIPP," when used in the context of requiring a duty or responsibility, means the U.S. Department of Energy (DOE) as the facility owner and operator and the Westinghouse Waste Isolation Division (WID) as the co-operator, as set forth in the WIPP Resource Conservation and Recovery Act (RCRA) Permit Application certification (Chapter M of this permit application). This WAP establishes waste characterization requirements for DOE waste generators at other sites. Waste characterization requirements are implemented in lower-tier documents, including the Transuranic Waste Characterization Quality Assurance Program Plan (QAPP)[1] and quality assurance project plans (QAPjP) for individual generator sites and analytical laboratories.

The mission of the WIPP Project, as established by the U.S. Congress in 1979 (Public Law 96-164), is to provide a research and development facility to demonstrate the safe disposal of transuranic (TRU) mixed waste generated as a result of United States defense activities. This permit application and this WAP are for the management of TRU mixed waste to be disposed of at the WIPP facility.

TRU mixed waste contains both TRU radioactive and hazardous components, as defined in 20 NMAC 4.1, Subpart VIII, §268.35(d), and in the Federal Facility Compliance Act, Public Law 102- 386, Title 1, §3021(d). It is designated and separately packaged as either contact-handled (CH) or remote-handled (RH), based on the radiological dose rate at the surface of the waste

[1]The Transuranic Waste Characterization Quality Assurance Program Plan, DOE/CAO 94-1010 (April, 1995), utilizes a performance-based approach to allow individual sites to have the flexibility to employ analytical and examination methods that meet the quality assurance objectives specified in this WAP. The DOE will conduct waste characterization activities at each generator site planning to ship waste to the WIPP facility to obtain the requisite data. TRU mixed waste characterization described in the QAPP includes: 1) radiography, 2) headspace gas sampling and analysis, 3) solidified waste sampling and analysis, and 4) visual examination.

container. Both CH TRU and RH TRU mixed wastes will be received and disposed of at the WIPP facility.

The hazardous components of the TRU mixed waste to be managed at the WIPP facility are designated in the WIPP facility's RCRA Part A permit application. This WAP describes the measures that will be taken to assure that the wastes received at the WIPP facility are within the scope of the RCRA Part A permit application as established by 20 NMAC 4.1, Subpart V, §264.13, and that they comply with unit-specific requirements of 20 NMAC 4.1, Subpart V, Miscellaneous Units.

Both CH TRU and RH TRU mixed waste at the WIPP facility will be managed using containers that meet or exceed the requirements of the U.S. Department of Transportation (DOT) for Type A containers. The use of the term "container" when referring to waste characterization activities refers to a drum, canister, or Standard Waste Box (SWB) unit. Section D-1a(1) provides details regarding the design and use of these waste containers.

The WIPP facility requires TRU waste characterization programs to adhere to the requirements specified in this WAP, and enumerated in the WIPP Waste Acceptance Criteria (WAC), and the Transuranic Waste Characterization QAPP (DOE, 1995a). All waste characterization activities discussed in Section C-4 will be carried out at generator sites in accordance with this WAP. WIPP management will audit site waste characterization programs and activities as described in Section C-5. This WAP describes the relationship of the waste characterization data and information to the regulatory requirements of 20 NMAC 4.1. The waste characterization program for wastes to be received at the WIPP facility for disposal has been designed to utilize sampling and analysis. In addition, acceptable knowledge of waste generation processes may be used for those wastes for which no practical characterization techniques exist (such as debris waste).

Some TRU mixed waste is retrievably stored at the DOE generator sites. Additional waste will be generated and packaged into containers at these sites in the future. TRU mixed waste will be retrieved from storage areas at a DOE site. Retrievably stored waste is defined as waste generated after 1970 and before implementation of the QAPP characterization requirements. Newly generated waste is defined as waste generated after implementation of QAPP characterization requirements. Stored TRU waste will be characterized on an ongoing basis, as the waste is retrieved. Newly generated TRU waste will be characterized as it is generated. Waste characterization requirements for stored and newly generated wastes differ due to the QAPP requirements, as discussed in Sections C-3a and C-3b.

Characterization requirements for individual containers of waste are specified on a waste stream basis. A waste stream is defined as waste material generated from a single process or from an activity that is similar in material, physical form, isotopic make-up, and hazardous constituents. Waste streams are grouped by Waste Matrix Code Groups related to the physical and chemical properties of the waste. Generator/storage sites must use the characterization techniques described in this WAP to assign appropriate Waste Matrix Code Groups for WIPP disposal. The

Waste Matrix Code Groups are solidified inorganics, solidified organics, salt waste, soils, lead/cadmium metal, inorganic nonmetal waste, combustible waste, graphite, filters, heterogeneous debris waste, and uncategorized metal.

Wastes are initially categorized into three broad Summary Category Groups that are related to the final physical form of the wastes. Waste characterization requirements for these groups are specified separately in Section C-2 of this WAP. These groups include Homogeneous Solids (Summary Category S3000), Soil/Gravel (Summary Category S4000), and Debris Wastes (Summary Category S5000).

The WIPP waste characterization program carried out by generators will be controlled under this WAP and implemented by the requirements of the QAPP and the WAC Certification Program (DOE, 1991). Waste characterization activities at the generator sites include the following, although not all these techniques will be used on each container, as discussed in Section C-2:

- Radiography, which is an x-ray technique to determine physical contents of containers
- Visual examination of opened containers as an alternative way to determine their physical contents or to verify Radiography results
- Headspace-gas sampling to determine volatile organic compound (VOC) content of gases in the void volume of the containers
- Sampling and analysis of waste forms that are homogeneous and can be representatively sampled to determine concentrations of hazardous waste constituents and toxicity characteristic contaminants of waste in containers
- Compilation of documented acceptable knowledge into an auditable record

The DOE's objective is to operate and maintain the WIPP facility free of both chemical and radiological contamination. Therefore, as allowed by 20 NMAC 4.1, Subpart V, §264.13, and consistent with joint EPA and U.S. Nuclear Regulatory Commission (NRC) guidance, all waste sampling and analyses will be conducted by the DOE generator sites in accordance with the requirements of this WAP. The WAP specifies required characterization activities that the generator must complete in order to be able to provide the information needed to send TRU waste to the WIPP facility for disposal. In accordance with this WAP, the generator sites will conduct the required waste characterization activities. Once the sufficient waste characterization is complete, the generator will complete a Waste Stream Profile Form documenting the results of their characterization activities (see Section C-1b). Generators will perform specific waste analyses according to the Transuranic Waste Characterization Sampling and Analysis Methods Manual (hereinafter referred to as the Methods Manual), which prescribes appropriate EPA-specified analytical methods modified as needed due to the presence of TRU waste

contaminants (DOE, 1995b). Since the DOE has determined that the waste analysis parameters (Section C-2a) are the same for CH and RH TRU mixed waste, RH TRU waste will be characterized using the same techniques as are used for CH TRU waste, with the exception of visual examination. Most RH TRU waste will be inspected using radiographic examination, but the DOE decided that visual examination will not be used to verify radiographic examination for RH TRU waste due to the added radiological exposure, cost, and waste generation associated with visual examination. The sampling and analytical methods that are used for CH waste characterization will not change except for that they will be performed remotely in shielded facilities for most RH waste characterization. The remote manipulations used for waste characterization (i.e., shaking and pouring) are common and will not require additional operator training. If at some point in time more effective waste characterization methods are developed for CH TRU or RH TRU waste, they will be submitted for inclusion in the Methods Manual per the DOE/Carlsbad Area Office (CAO) procedure discussed in Appendix C7. The data reports and the Waste Stream Profile Forms (see Section C-1b) resulting from waste characterization activities will be transmitted to the WIPP, reviewed for completeness, and screened for acceptance prior to loading any waste into the Transuranic Package Transporter (TRUPACT-II) or RH TRU mixed waste shielded road cask at the generator facility, as described in Section C-5. Only waste that has been characterized in accordance with this WAP and that meets the WAC, will be accepted for disposal at the WIPP facility.

C-1 Facility Description

C-1a Description of Processes and Activities at the WIPP

General descriptions of the WIPP facility waste handling processes are provided below. Detailed process descriptions are provided in Chapter D, Section D-10a(3), of this permit application.

CH TRU Mixed Waste Handling Process Overview

Waste from DOE TRU mixed waste generator/storage sites identified by the DOE as meeting the WAC will be disposed of at the WIPP facility. The ten major generator/storage sites anticipated to send the majority of waste for disposal at the WIPP are:

- Argonne National Laboratories (East)
- Idaho National Engineering Laboratory
- Los Alamos National Laboratory
- Lawrence Livermore National Laboratory
- Mound Facility
- Nevada Test Site
- Oak Ridge National Laboratory
- Richland (Hanford) Site
- Rocky Flats Environmental Technology Site
- Savannah River Site

Figure C-3 shows the geographic location of these sites. There are several small generator/storage sites that will either ship their waste to the WIPP facility for disposal or to one of the major generator/storage sites for waste characterization and certification to the WIPP requirements. Those sites will be identified to the New Mexico Environment Department (NMED) as they are certified and prior to initiating any shipments from these sites to the WIPP facility.

CH TRU mixed waste will arrive at the WIPP facility in a DOT Type B transportation package (i.e., a TRUPACT-II or other approved package). Each TRUPACT-II is capable of carrying up to two DOT Type A SWBs, two seven-packs of DOT Type 7A 55-gallon (gal) drums, or one DOT Type 7A Ten-drum Overpack (TDOP).

When the TRUPACT-IIs arrive at the WIPP facility, radiological surveys, security checks, and shipping documentation reviews will be performed. Upon completion of these checks, the hazardous waste manifest will be signed to release the driver. Should radiological surveys (i.e., surface dose rate, contamination) exceed acceptable levels, the TRUPACT-IIs and transport trailer will be placed outside the Waste Handling Building (WHB) in the parking area container storage unit or in the WHB itself. Factors such as weather conditions, time of receipt, and space availability will determine the actual location for placement of the TRUPACT-IIs and transport trailer. Once the location is established, the appropriate radiological boundaries (i.e., ropes, placards, etc.) will be erected around the affected TRUPACT-IIs and transport trailer. In the event that fixed and/or removable contamination is detected on the external surface of TRUPACT-IIs in excess of WIPP free release limits, Waste Operations, in conjunction with Operational Health Physics, would assess the situation and formulate a plan of recovery to decontaminate the shipping container(s).

The TRUPACT-IIs will be removed from the transport trailer and taken inside the WHB. Inside the WHB, the TRUPACT-IIs will be opened and the waste containers removed. As the containers are being removed, radiological surveys will be conducted. If contamination is detected on the waste containers, a determination will be made as to whether small area "spot" decontamination activities will be performed or to replace the waste containers, reseal the TRUPACT-II, and prepare a new hazardous waste manifest to ship the payload back to the generator/storage facility. Should small area decontamination be conducted, the resulting waste will be managed as "derived" waste. Derived waste management is discussed in detail in Section D-10a(3)(a).

When the containers are removed from the TRUPACT-II, additional checks will be conducted to verify that the waste containers are the same as those described on the hazardous waste manifest and the WIPP Waste Information System (WWIS) database (described in Section C-5a). When all identification checks have been completed, the generator's copy of the manifest will be returned to them (within 30 days of waste receipt). If there are any discrepancies, the generator will be contacted for resolution. Discrepancies that are not resolved within 15 days of waste receipt will be reported to the NMED as required by 20 NMAC 4.1, Subpart V, §264.72. If a resolution is not reached within 30 days of waste receipt, the waste will be returned to the site

which shipped the containers. A more detailed discussion on discrepancy resolution is provided in Section C-5b of this chapter.

The waste containers will be loaded onto a facility pallet, which will be transferred to a conveyance loading car. The conveyance loading car will move the loaded facility pallet into the waste hoist cage, which will be lowered to the underground waste receiving station through the Waste Shaft. At the underground waste receiving station, the pallet will be transferred to an underground waste transporter, which will move the loaded facility pallet to an underground hazardous waste management unit (HWMU). At the HWMU, the waste containers will be removed from the facility pallet and will be emplaced in a waste emplacement room. Bags of backfill material will be placed around and on top of the stacked waste containers. Section D-10a(3)(b) of this permit application provides a more complete description of the facility and the CH waste management activities.

RH TRU Mixed Waste Handling Process Overview

RH TRU mixed waste will arrive at the WIPP facility in a shielded road cask. Upon arrival, radiological surveys, security checks, and shipping documentation reviews will be performed. Upon completion of these checks, the hazardous waste manifest will be signed to release the driver. Should radiological surveys (i.e., surface dose rate, contamination) exceed acceptable levels, the road cask and transport trailer will be placed outside the WHB in the controlled area or in the WHB itself. Factors such as weather conditions, time of receipt, and space availability will determine the actual location for placement of the road cask and transport trailer. Once the location is established, the appropriate radiological boundaries (i.e., ropes, placards, etc.) will be erected around the road cask and transport trailer. In the event that fixed and/or removable contamination is detected on the external surface of the road cask in excess of WIPP free release limits, Waste Operations, in conjunction with Operational Health Physics, would assess the situation and formulate a plan of recovery to decontaminate the road cask.

The RH TRU mixed waste canister will be removed from the shielded road cask in the WHB hot-cell complex, where it will be checked against the identity on the hazardous waste manifest and the WWIS to verify that the canister is suitable for emplacement. The generator's copy of the manifest is then returned to the generator. If there are any discrepancies, the generator will be contacted for resolution. Discrepancies that are not resolved within 15 days of waste receipt will be reported to the NMED, as required by 20 NMAC 4.1, Subpart V, §264.72. If a resolution is not reached within 30 days of receipt of the waste, the canister will be returned to the site that shipped the canister.

The RH canister will be checked for external surface contamination in the hot-cell complex. If an unacceptable condition is identified, the canister will be overpacked. The overpacked canister will then reenter the normal waste management process line. The canister will then be placed into a facility cask for transport to an HWMU. The facility cask will be placed onto the facility

cask transfer car and will be loaded onto the waste hoist and lowered to the underground waste receiving station.

At the underground waste receiving station, the facility cask transfer car will move the facility cask, loaded with the RH TRU mixed waste canister, from the waste hoist cage, and a forklift will transport it to an HWMU. The emplacement machine will be positioned in front of a predrilled horizontal hole bored into the room wall, and the facility cask will be placed on the machine assembly. The emplacement machine will then insert the waste canister into the hole. A shield plug will be inserted into the hole to provide radiation protection.

The amount of RH TRU mixed waste disposed in each panel is limited, based on thermal and geomechanical considerations. A nominal spacing of 8 feet (ft) (2.4 meters [m]) between centers for RH TRU mixed waste canisters is planned. Section D-10a(3)(c) of this permit application provides a more complete description of the facility and the RH waste management activities.

C-1b Identification of TRU Mixed Waste Managed at the WIPP Facility

Waste Stream Identification

Waste destined for disposal at WIPP is characterized on a waste stream basis. A waste stream is defined as waste material generated from a single process or activity that is similar in material, physical form, isotopic make-up, and hazardous constituents. Waste may be generated as either process or process batch waste streams. A process is defined as a system or series of continuous or regularly occurring actions taking place in a predetermined manner over extended periods of time, resulting in waste that is substantially uniform. A process batch is defined as an amount of material subject to a particular unit chemical process, unit physical mixing process, or another short-term operation, resulting in waste that is substantially uniform. Sites delineate waste streams using acceptable knowledge. Acceptable knowledge is fully described in Section C-4b and Appendix C9.

There are various identifiers used for waste streams, all developed for specific purposes. Table C-1 is a cross correlation table that shows the interrelation between all of these identifiers.

The Summary Category Group (Matrix Parameter Summary Category) description is the broadest grouping. The Summary Category Groups are assigned to each waste stream identified by generators to facilitate RCRA waste characterization and reflect the physical form of the waste.

The Waste Matrix Codes (or Matrix Parameter Categories) were developed by the DOE, in response to the Federal Facilities Compliance Act, as a methodology to aid in classifying mixed waste streams within the DOE system. These codes represent different physical and chemical matrices. The Waste Matrix Code Group (or Final Waste Form) is a grouping of the Waste Matrix Codes that have similar physical and chemical properties.

A Waste Stream WIPP Identifier (ID) is assigned to each specific waste stream at a specific generator site. Similarities in the IDs do not necessarily correlate to similarities between waste streams. The Waste Stream Name is linked to the ID.

Waste stream descriptions may also be associated with TRUPACT-II content (TRUCON) codes. TRUCON content codes were originally developed as a type of shorthand representation of the chemical content and physical waste form of generator waste streams for use in the TRUPACT-II transportation safety analysis. Each waste stream was reviewed and a TRUCON code was assigned. Newly identified waste streams eligible for WIPP disposal will be assigned TRUCON codes, which will be approved by the NRC prior to shipment of the waste streams.

The Item Description Code is a site-specific numerical code applied to individual waste streams to identify their source. These codes represent the local identifiers, used by the generator sites to specify the waste stream type and/or generation area of TRU and TRU mixed waste, and are used at most DOE facilities that generate TRU and TRU mixed waste.

The Waste Type is a numerical designator ranging from one to four that indicates if the waste is a solidified inorganic, solid inorganic, solid organic, or solidified organic. This description is used in the shipment of the waste.

Waste Categories are included in Table C-1 for the purposes of linking this information to the compatibility study presented in Appendix C1.

Waste stream information has been provided by the generator/storage sites and is documented in the WIPP Transuranic Waste Baseline Inventory Report (WTWBIR) (see Table C-2). The information provided by the generator/storage sites in the WTWBIR is not the result of waste characterization. It is an estimate of waste stream constituents. Therefore, one WTWBIR waste stream may relate to numerous waste streams for the purpose of waste characterization. The WTWBIR information was compiled in order to estimate waste volumes and properties for long-term performance assessment. All waste characterization activities must still be conducted and each waste stream submitted to the WIPP facility on a Waste Stream Profile Form for approval. Waste stream descriptions will be finalized over the course of waste characterization at the sites. Changes that have been made to the WTWBIR in recent revisions to this document do not affect this permit application.

Currently, the majority of existing retrievably stored waste to be disposed at WIPP is in earthen-covered storage or other storage which is not readily accessible. Because of this, all of the waste within a waste stream may not be available for sampling and analysis at one time. In these instances, sites will divide waste streams into waste stream lots based on staging, transportation, or handling issues. Characterization activities are then undertaken on a waste stream lot basis. Sites initially delineate and describe waste streams using acceptable knowledge. As waste characterization activities proceed, waste stream descriptions may change based on the results of sampling and analysis. Results from waste characterization are used to confirm acceptable knowledge, including the assignment of EPA hazardous waste codes to waste streams, as appropriate.

The quantity of waste reported in the WIPP RCRA Part A application was determined using reported generator information on waste generating processes, and waste constituents and characteristics. If it was suspected, based on knowledge of a waste generating process, that a RCRA-regulated hazardous constituent may be contained in the waste, the waste was assumed to contain that constituent. The waste volume associated with each reported EPA code was assumed to equal the volume of the waste stream. Therefore, it appears that receipt of the total annual waste volumes reported in the Part A application over WIPP's projected 25 year waste-emplacement period would exceed the 6.2 million cubic feet (ft^3) (175,600 cubic meters (m^3)) allowable waste capacity specified in the Land Withdrawal Act of 1992. This is because many waste streams with multiple EPA codes were counted as multiple volumes. A biennial report, in accordance with 20 NMAC 4.1, Subpart V, §264.75, will provide information on actual volume and waste descriptions received for disposal during the time period covered by the report.

Waste Summary Categories Accepted at the WIPP Facility

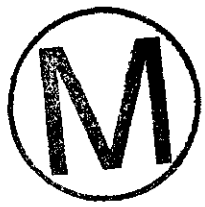
Once a waste stream has been delineated, sites assign a Waste Matrix Code to the waste stream based on the physical form of the waste. Waste streams are assigned to one of three broad Summary Category Groups; S3000-homogeneous solids, S4000-soils/gravel, and S5000-debris wastes. These Summary Category Groups are used to determine further characterization requirements.

S3000—Homogeneous Solids

Solid process residues are defined as solid materials, excluding soil, that do not meet the NMED criteria for classification as debris (20 NMAC 4.1, Subpart VIII, §268.2[g] and [h]). Included in the series of solid process residues are inorganic process residues, inorganic sludges, salt waste, and pyrochemical salt waste. Other waste streams are included in this Summary Category Group based on the specific waste stream types and final waste form. Each waste stream designated as a 3000 solid process residue is identified in Table C-2 with the EPA hazardous waste codes that are associated with that waste stream. This Summary Category Group is expected to contain toxic metals and spent solvents. This category includes wastes that are at least 50 percent by volume solid process residues.

S4000—Soils/Gravel

This Summary Category Group includes waste streams that are at least 50 percent by volume soil as identified in Table C-2 with the EPA hazardous waste codes that are associated with that waste stream. This Summary Category Group is expected to contain toxic metals. Soils are further categorized by the amount of debris included in the matrix.



S5000—Debris Wastes

This Summary Category Group includes waste that is at least 50 percent by volume materials that meet the NMAC criteria for classification as debris (20 NMAC 4.1, Subpart VIII, §268.2) as follows:

> Debris means solid material exceeding a 2.36 inch (in.) (60 millimeter) particle size that is intended for disposal and that is:
>
> 1. a manufactured object, or
> 2. plant or animal matter, or
> 3. natural geologic material.
>
> However, the following materials are not debris:
>
> 1. any material for which a specific treatment standard is provided in 20 NMAC 4.1, Subpart VIII, 268 Subpart D;
>
> 2. process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges, or air emission residues; and
>
> 3. intact containers of hazardous waste that are not ruptured and that retain at least 75 percent of their original volume.

However, for the purposes of this WAP, all heterogeneous materials, or waste materials whose physical form does not lend itself to sampling and analysis, are considered to be in the Summary Category Group regardless of the size of the waste materials. That is, this Summary Category Group includes heterogeneous waste materials that are less than 2.36 in.

A mixture of debris (that has not been treated to the standards provided by 20 NMAC 4.1, Subpart VIII, §268.45), and other material is subject to regulation as debris if the mixture is comprised primarily of debris, by volume, based on visual inspection (20 NMAC 4.1, Subpart VIII, §268.2[g]). Due to the presence of radioactive contaminants in the waste and the safety hazards involved in opening waste containers, the DOE has opted to use radiography as a form of nondestructive examination of the waste form in place of visual examination of the waste form. For these reasons, radiography will be used on 100 percent of stored waste containers and most RH TRU waste containers to determine the physical composition of debris mixtures. The percentage of debris materials in mixtures in newly generated CH TRU waste will be determined by visual examination during packaging.

"Hazardous debris" means debris that contains a hazardous waste listed in 20 NMAC 4.1, Subpart II, 261 Appendix VIII, or that exhibits a characteristic of hazardous waste identified in 20 NMAC 4.1, Subpart II, §261, Subpart C.

Included in the S5000 series are metal debris, lead containing metal debris, inorganic nonmetal debris, asbestos debris, combustible debris, graphite debris, heterogeneous debris, and composite filters, as well as other minor waste streams, as identified in Table C-2. This Summary Category Group is expected to contain toxic metals and spent solvents. The EPA hazardous waste codes associated with the debris waste streams are included in Table C-2.

Examples of waste that might be included in the S5000 series are asbestos-containing gloves, fire hoses, aprons, flooring tiles, pipe insulation, boiler jackets, and laboratory tabletops. Also included are combustible debris constructed of plastic, rubber, wood, paper, cloth, and graphite and biological materials. Examples of graphite waste that would be included in this series are crucibles, graphite components, and pure graphite.

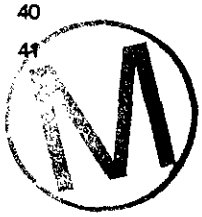
Chemical Properties of the Waste

This section of the WAP provides an overview of the chemical properties of the waste and the waste source. Hazardous constituents and target analytes for waste to be disposed of at the WIPP facility are shown in Table C-3.

The most common hazardous constituents in the TRU mixed waste to be managed in the WIPP facility consist of the following:

Metals

Some of the TRU mixed waste to be emplaced in the WIPP facility contains metals for which 20 NMAC 4.1, Subpart II, §261.24, toxicity characteristics were established (EPA hazardous waste codes D004 through D011). These materials are known to be present based on acceptable knowledge of waste-generating processes and various analytical results used to verify acceptable knowledge. Cadmium, chromium, lead, mercury, selenium, and silver are present in discarded tools and equipment, solidified sludges, cemented laboratory liquids, and waste from decontamination and decommissioning activities. A large percentage of the waste consists of lead-lined gloveboxes, leaded rubber gloves and aprons, lead bricks and piping, lead tape, and other lead items. Lead, because of its radiation-shielding applications, is the most prevalent toxicity-characteristic metal present.



Halogenated Volatile Organic Compounds

Some of the mixed waste to be emplaced in the WIPP facility contains spent halogenated organic solvents identified in 20 NMAC 4.1, Subpart II, §261.31 (EPA hazardous waste numbers F001 through F005). The presence of these compounds is confirmed by analytical results from headspace gas sampling of TRU mixed waste. Tetrachloroethylene; trichloroethylene; methylene chloride; carbon tetrachloride; 1,1,1-trichloroethane; and 1,1,2-trichloro-1,2,2-trifluoroethane (EPA hazardous waste codes F001 and F002) are the most prevalent halogenated organic compounds identified in TRU mixed waste that may be managed at the WIPP facility during the Disposal Phase. These compounds are commonly used to clean metal surfaces prior to plating, polishing, or fabrication; to dissolve other compounds; or as coolants. Because they are highly volatile, only very small amounts typically remain on equipment after cleaning or, in the case of treated wastewaters, in the sludges after clarification and flocculation.

Nonhalogenated Volatile Organic Compounds

Xylene, methanol, and n-butanol are the most prevalent nonhalogenated VOCs in TRU mixed waste that may be managed at the WIPP facility during the Disposal Phase. These compounds occur in TRU mixed waste materials in much smaller quantities than halogenated VOCs. Like the halogenated VOCs, they are used as degreasers and solvents and are similarly volatile. The same analytical methods that are used for halogenated VOCs are used to detect the presence of nonhalogenated VOCs.

Waste Not Accepted at the WIPP Facility

The DOE has established WIPP WAC to specify the chemical and physical forms of TRU mixed waste that will be accepted at the WIPP facility. These criteria include those required to ensure occupational safety and protection of human health and the environment.

The following waste is unacceptable for management at the WIPP facility:

- Ignitable, reactive, and corrosive waste, as defined under 20 NMAC 4.1, Subpart II, Characteristics of Hazardous Waste
- Liquid wastes, (all waste must meet the WAC criteria regarding liquid content)
- Compressed gases

- Incompatible waste, as defined under 20 NMAC 4.1, Subpart V, Appendix V (waste must be compatible with backfill, seal and panel closure materials, container, cask, and TRUPACT-II materials as well as with other waste)

- Headspace-gas VOC concentrations resulting in average annual emissions not protective of human health and the environment (Table C-5 lists target maximum average headspace concentrations)

- Wastes with EPA codes not listed on RCRA Part A permit application

- Waste with equal to or more than 50 parts per million (ppm) (50 milligrams per liter [L]) polychlorinated biphenyls (PCB)

The WIPP facility will not accept waste that exhibits the characteristics of ignitability, reactivity, or corrosivity. The DOE ensures through administrative and operational procedures at the generator sites that TRU mixed waste received at the WIPP facility does not exhibit these characteristics. These characteristics are generally associated with liquid wastes or specific waste forms that may react violently. This WAP and the WAC, therefore, prohibit liquid waste, explosives, compressed gases, oxidizers, and pyrophorics. The absence of these wastes is confirmed by radiography, visual examination, and headspace analysis.

The TRU mixed waste received at the WIPP facility will not be aqueous or liquid, will not contain WAC-prohibited materials, and will be capable of being handled at standard temperatures and pressures without reaction to oxygen or water (see Table C-4). The WAC specifies that liquid waste is not acceptable at the WIPP. The WIPP facility will not accept containers holding waste that would be considered a liquid waste as defined in 20 NMAC 4.1, Subpart I, §260.10. Every container holding waste with less than 2 L of liquid for a 55-gal drum or 8 L in a SWB must contain as little residual liquid as is reasonably achievable, and all internal containers (e.g., bottles and cans) must contain less than one in. (2.5 centimeters) of liquid at the bottom of the container.

Additionally, TRU mixed waste cannot contain explosives, compressed gases, oxidizers, or nonradionuclide pyrophoric materials. (Waste generators have submitted information on waste streams based on known waste generation processes that indicate certain waste streams may have the potential for reactivity, ignitability, or corrosivity.) These characteristics must be eliminated prior to waste acceptance for disposal at the WIPP.

Before accepting a container holding TRU mixed waste, WIPP personnel will examine the radiography data records to verify that the container holds no unvented compressed gas containers and no greater than one percent by volume of residual liquid. If discrepancies or inconsistencies are detected during the radiography data record review, WIPP personnel may review the radiography video tape to verify that the observed physical form of the waste is consistent with the waste stream description provided by the generator and to ensure that no

WAC-prohibited materials are present in the waste. Section C-5 includes a description of the waste verification process that the DOE intends to conduct prior to receiving a shipment at the WIPP.

The WIPP will manage TRU mixed waste in a manner that mitigates the buildup of explosive or flammable gases within the waste. Containers are vented through individual carbon composite particulate filters, allowing any gases that are generated by radiolytic and microbial processes within a waste container to escape; to prevent over pressurization. Gas generation is discussed in detail in Chapter I, Section I-1e(4).

The WIPP facility is designed to manage only compatible waste. Therefore, a compatibility analysis was performed to identify potential incompatibilities for all defense generated TRU mixed waste reported in the WTWBIR. Wastes were screened for incompatibilities based on their chemical content and physical waste form by comparing information presented in 20 NMAC 4.1, Subpart V, Appendix V, and the EPA document "*A Method for Determining the Compatibility of Hazardous Wastes*," (Hatayama et al., 1980). The compatibility analysis also took into account waste compatibility with various aspects of the repository such as shaft, seal, and panel closure materials, backfill, and fire suppressant materials. Appendix C1 provides additional details and results of this analysis.

To ensure the integrity of the WIPP facility, waste streams identified to contain incompatible materials or materials incompatible with waste containers cannot be shipped to WIPP unless they are treated to remove the incompatibility. Only those waste streams that are compatible or have been treated to remove incompatibilities will be shipped to WIPP.

As described in Chapter D, Section D-9b(4), the potential risks to human health and the environment are due to emissions of VOCs from the waste containers into the air pathway. The most stringent environmental performance standard of 20 NMAC 4.1, Subpart V, §264.601(c) is the acceptable excess risk levels for residential (chronic) exposure to carcinogens (10^{-6} for Class A and B carcinogens and 10^{-5} for Class C carcinogens). In addition, the risk assessment in Chapter D examined occupational exposures and compared them to Occupational Safety and Health Administration risk standards. WAC have been developed to limit the VOC concentrations in the headspace of waste containers to those which when averaged will ensure compliance with the performance standards. These limits are presented in Table C-5 as VOC headspace concentration limits. In reality, these are maximum <u>average</u> headspace concentrations. This means that some containers can exceed these values as long as averages in a disposal room do not. For a generator to ship waste that exceeds any of these values, a WAC exception must be requested at which time WIPP personnel will evaluate the impact on the average concentrations in the disposal room.

The DOE will only allow generators to ship those waste streams with EPA Hazardous Waste Codes listed on Part A of this application. Characterization of all waste streams will be performed as required by this WAP. If during the characterization process, new hazardous

waste codes are identified, those wastes cannot be accepted for disposal at the WIPP facility until a permit modification has been submitted and approved. Similar waste streams at other generator sites will be examined more closely to ensure that the newly identified code does not apply. If other waste streams also require a new hazardous waste code, shipment of these waste streams will also cease until a permit modification has been submitted and approved. Approval will be based on the physical and chemical properties of the waste.

Transformer oils containing PCBs have been identified in a limited number of waste streams included in the Waste Matrix Code corresponding to organic sludges. Because the WIPP facility is not seeking permission to manage PCB waste, these waste streams are required to be screened to assure PCB levels are below 50 ppm.

Control of Waste Acceptance

The waste acceptance program is defined in the WAC (DOE, 1991 or current revision). This document provides a list of criteria that must be met for waste to be shipped to the WIPP facility for management. The WAC requires the generator to prepare a waste certification program that lists the methods and techniques used to determine compliance with the WAC and the QA/QC criteria that are applied to the generator's waste certification program. One of the criteria that the generator is required to meet is compliance with the applicable portions of this WAP. The WAC certification programs result in controlled and consistent waste properties and final packaging.

A Waste Stream Profile Form will describe a CH TRU or RH TRU mixed-waste stream destined for shipment to and disposal at the WIPP facility. The Waste Stream Profile Form summarizes important information about a particular waste stream. Examples of information contained in a Waste Stream Profile Form are:

- The generator's site name
- Original generator of waste stream
- A description of the waste stream
- The date of WAC certification by the DOE/CAO and the certification document title and date
- The Waste Stream WIPP Identification Number
- The designated Summary Category Group
- A listing of acceptable knowledge documentation used to identify the waste stream

- The waste-characterization procedures used and the reference and date of the procedure
- The data packages supporting the characterization
- The EPA hazardous waste codes
- Waste Stream Profile Form Certification statement signed by the manager of the generator site

These data will be provided for each waste stream prior to its acceptance for disposal at the WIPP. The Waste Stream Profile Form data will be transmitted once for each waste stream from a facility.

For waste streams that are continually generated, a Waste Stream Profile Form may be submitted once the waste stream has been characterized per the QAPP based on the variability of the waste stream (as shown in Appendix C6). Characterization activities will continue in order to verify consistency with the initial characterization and Waste Stream Profile Form (Section C-3a). If there are discrepancies, the waste will be redefined to a separate waste stream, and a new Waste Stream Profile Form will be submitted.

The WIPP Waste Operations Manager will be responsible for the review of Waste Stream Profile Forms (see Section C-1c and Figure C-4) and data records to verify compliance with the restrictions on TRU mixed wastes for WIPP disposal. The Waste Stream Profile Form includes a section requiring the waste generator to provide the data and documentation of WAC certification for the TRU mixed waste stream described on the form. The WIPP Waste Operations Manager will also be responsible for the review of shipping records (see Section C-5b) to verify that each container has been prepared under a WAC-certified program and in accordance with this WAP. Waste characterization data must indicate the absence of unacceptable materials.

Generator site waste stream characterization will be subject to the Generator/Storage Site Waste Screening and Certification Audit Program (Appendix C11) for compliance with this WAP. Section C-5 further discusses WIPP facility waste screening activities.

C-1c Waste-Generating Processes

Waste-Generating Processes At DOE Generator Facilities

TRU mixed waste generated at DOE sites results from specific processes and activities that are well-defined and well-controlled, enabling the DOE to characterize waste streams on the basis of knowledge of the process and the raw materials used. Examples of the major types of operations that generate TRU mixed waste include:

- Production of Nuclear Products—Production of nuclear products includes reactor operation, radionuclide separation/finishing, and weapons fabrication and manufacturing. The majority of the TRU mixed waste was generated by weapons fabrication and radionuclide separation/finishing processes. More specifically, wastes consist of residues from chemical processes, air and liquid filtration, casting, machining, cleaning, product quality sampling, analytical activities, and maintenance and refurbishment of equipment and facilities.

- Plutonium Recovery—Plutonium recovery wastes are residues from the recovery of valuable plutonium-contaminated molds, metals, glass, plastics, rags, salts used in electrorefining, precipitates, firebrick, soot, and filters.

- Research and Development (R&D)—R&D projects include a variety of hot cell or glovebox activities that often simulate full-scale operations described above, producing similar TRU mixed wastes. Other types of R&D projects include metallurgical research, actinide separations, process demonstrations, and chemical and physical properties determinations.

- Decontamination and Decommissioning—Facilities and equipment that are no longer needed or usable are decontaminated and decommissioned, resulting in TRU mixed wastes consisting of scrap materials, cleaning agents, tools, piping, filters, Plexiglas™, gloveboxes, concrete rubble, asphalt, cinder blocks, and other building materials. This is expected to be the largest category by volume of TRU mixed waste to be generated in the future.

Waste-Generating Processes at the WIPP Facility

Nonradioactive hazardous waste generated at the WIPP facility is characterized, placed in containers, and temporarily stored, in accordance with 40 CFR §262.34, until it is transported off site for treatment and/or disposal at a permitted facility. This waste generation and accumulation activity, which is performed in compliance with 20 NMAC 4.1, Subpart III, is not subject to RCRA permitting requirements and, as such, is not addressed in this permit application.

Administrative practices that direct normal operations at the WIPP facility will be implemented to minimize the possibility of generating new TRU mixed waste. For this reason, any TRU mixed waste generated through normal waste handling operations will be derived from the waste received from the off-site generator. Throughout this application, site-generated waste that is derived from waste generated at an off-site facility is referred to as *derived waste*. Because derived wastes can contain only those RCRA-regulated materials present in the waste from which they were derived, no additional characterization of the derived waste is proposed for disposal purposes. In other words, the generator's characterization data and knowledge of the

processes at the WIPP facility will be used to identify and characterize containers of derived waste. The management of derived waste is addressed in Section D-10a(3)(a).

Hazardous constituents within the waste containers are known and have been determined to be acceptable for disposal at the WIPP facility. Therefore if a spill, breach, or other type of release of TRU mixed waste from a container occurs, the waste generated during cleanup would be managed as derived waste. Anticipated sources of derived waste during the Disposal Phase include:

- Swipes used to detect external radioactive contamination during receipt inspection and other radiological checks
- Any TRU mixed waste generated through nonroutine events, such as the cleanup of spills

C-1d Description of HWMUs

The underground HWMUs (defined as waste panels) are 2,150 ft (655 m) beneath the surface, in the WIPP underground and are designated as Panels 1 through 10. Each waste panel, designated as Panels 1 through 8, consists of seven parallel rooms and two access drifts. Each room is approximately 300 ft (91 m) long, 33 ft (10 m) wide, and 13 ft (4 m) high. Access drifts connect the rooms and have the same cross section. Panels 9 and 10 are the disposal area access drifts which may be used by the DOE for waste disposal in the future. The DOE intends to operate the WIPP facility in a manner that minimizes the number of underground HWMUs that are open at any one time, as discussed in Section B-1b.

The underground HWMUs provide room for 6.2 million ft^3 (175,600 m^3) of TRU mixed waste, of which no more than 250,000 ft^3 (7,080 m^3) may be for RH TRU mixed waste. The remainder will be for CH TRU mixed waste. RH TRU mixed waste canisters will be inserted into horizontal holes bored into the walls of the HWMUs. The CH TRU mixed waste packages will fill the remaining HWMU space exclusive of the panel closures.

The surface HWMUs are inside the WHB and the parking area south of the WHB. The WHB is the surface facility where waste handling activities will take place (Figure D-1). The WHB has a total area of approximately 84,000 square ft (ft^2) (7,803 square m (m^2) of which 33,175 ft^2 (3,083 m^2) are designated for the waste handling and storage of CH TRU mixed waste and 21,318 ft^2 (1,981 m^2) are designated for the waste handling and storage of RH TRU mixed waste, as shown in Figure D-1. These combined areas are being permitted as a container storage unit. The CH side of the WHB will store up to 2718.2 ft^3 (77.02 m^3) and the RH side up to 377 ft^3 (10.7 m^3), under normal conditions of operations. The concrete floors are sealed with an impermeable coating that has excellent resistance to the chemicals in TRU mixed waste and, consequently, provide secondary containment for TRU mixed waste.

The parking area HWMU (Figure D-2) south of the WHB will be used for storage of waste in sealed shipping containers awaiting unloading, having a surface area of 272,500 ft^2 (25,315 m^2). This area is also being permitted as a container storage unit for 1536 ft^3 (43.5 m^3) of CH and 126 ft^3 (3.6 m^3) of RH waste. The sealed shipping containers provide secondary containment in this HWMU. System descriptions for the WHB HWMU and TRU mixed waste handling systems and a description of the impermeable coating are provided in Sections D-10a(2)(b), D-10a(2)(c), and D-10a(3).

C-2 Waste Parameters

This section discusses the parameters of interest for waste characterization purposes, and the rationale for their selection.

C-2a Selecting Waste Analysis Parameters

The following analytes were selected as parameters of interest:

- Toxicity characteristic contaminants listed in 20 NMAC 4.1, Subpart II, §261.24, Table 1 (excluding pesticides)
- F-listed solvents (F001, F002, F003, F004, F005) found in 20 NMAC 4.1, Subpart I, §261.31, and known to be used at DOE sites
- Hazardous constituents included in 20 NMAC 4.1, Subpart II, §261 Appendix VIII, and reported to be present in waste generated by DOE TRU waste generator/storage sites

Table C-3 summarizes the parameters of interest and the rationale for including each parameter in this WAP. The next sections provide a description of the acceptable methods to evaluate these parameters for each waste Summary Category Group.

C-2b Criteria and Rationale for Parameter Selection

Parameters were selected for characterization based on data needed to address regulatory requirements for accepting TRU mixed waste at the WIPP miscellaneous-unit disposal facility.

Radiography will be used to examine containerized waste to ascertain its physical form. This technique can detect liquid wastes and containerized gases, which are prohibited for WIPP disposal. Prohibiting liquids and containerized gases prevents the shipment of corrosives, ignitable waste, or reactive waste. Radiography will also be able to confirm that the physical form of the waste matches its waste stream description (i.e. Homogeneous Solids, Soil/Gravel, or Debris Waste [including uncategorized metals]). If the physical form does not match the waste stream description, the waste will be designated as another waste stream and assigned

the preliminary hazardous waste codes that are inherent to the new waste stream assignment. If radiography indicates that the waste does not match the waste stream description, a non-conformance report will be completed and the inconsistency will be resolved per Section C8-13 of Appendix C8. The proper waste stream assignment will be determined, the correct hazardous waste codes will be assigned, and the resolution will be documented.

Headspace-gas samples are used to determine the types and concentrations of VOCs in the void volume of waste containers. Averages of measured headspace VOC concentrations in waste containers received at the WIPP site will be compared routinely with those used in this permit application's environmental pathway analysis demonstration to ensure that on an annual basis there are no associated adverse worker or public-health impacts. Average concentrations of VOCs in headspace gas have been used in this permit application's environmental pathway analysis to demonstrate that average annual concentrations of VOCs emitted from containers emplaced at the WIPP will be well below health-based limits (headspace gas analytical data used to determine average concentrations is provided in Appendix C-2).

For wastes that can be representatively sampled (Homogeneous Solids and Soil/Gravel Wastes), the total concentrations of PCBs, VOCs, semivolatile organic compounds (SVOC), and metals will be determined analytically. A representative sample is defined in 20 NMAC 4.1, §260.10 as "a sample of a universe or whole (e.g., waste pile, lagoon, groundwater) which can be expected to exhibit the average properties of the universe or whole."

Data on total concentration will be used to quantify the types and quantities of RCRA-regulated listed hazardous constituents, and to determine whether the waste exhibits a toxicity characteristic under 20 NMAC 4.1, Subpart II. Toxicity characteristic will be determined using total extraction analysis rather than the toxicity characteristic leaching procedure (TCLP), because total concentrations are more useful for repository compliance demonstrations[2] and result in more conservative estimates of toxicity characteristics. (Appendix C3 discusses comparability of the results of these two methods.)

Documented acceptable knowledge will be used to determine the types and quantities of listed and toxicity characteristic waste that cannot be directly sampled for total metals or total organics. Debris waste is heterogeneous, having waste forms that cannot be representatively sampled (e.g. personal protective equipment, leaded rubber gloves, manufactured goods, and natural geologic material). In these types of wastes, acceptable knowledge is used to make a hazardous waste determination. Radiography, visual examination, and headspace gas sampling will be

[2]According to 20 NMAC 4.1, Subpart IX, §270.14(b)(2), the information needed regarding the chemical and physical properties is "...all the information which must be known to treat, store, or dispose of the wastes properly in accordance with Part 264 [Subpart V]." For a mined geological repository such as the WIPP, totals analyses provides such information needed to model the solubility and transport of waste and waste constituents over the long-term For this reason the DOE has opted to require totals analyses of representative samples of homogeneous waste.

used to verify the acceptable knowledge used. (Appendix C9 details the use of acceptable knowledge).

Table C-6 summarizes the parameters, methods, and rationales for stored and newly generated CH TRU wastes according to their waste forms, and Table C-7 is a parallel table for RH TRU wastes.

C-3 Characterization Techniques and Frequency

Generator/storage sites will characterize waste on a waste stream basis using a variety of techniques. Characterization techniques include: acceptable knowledge, radiography, headspace-gas sampling and analysis, and homogeneous solids and soils/gravel sampling and analysis.

Acceptable knowledge refers to applying knowledge of the hazardous nature of the waste based on the materials or processes used to generate the waste. This may include accompanying records; administrative, procurement and quality controls associated with the processes generating the waste; past sampling and analytical data; material inputs to the waste-generating process; and the time during which the waste was generated (certain waste-generating processes are associated with specific historical time periods). Information required for characterizing waste using acceptable knowledge includes the physical form of the waste and documented changes to the process or material inputs. Appendix C9 outlines the minimum set of requirements which must be met by the generator sites in order to use acceptable knowledge. In addition, verification of acceptable knowledge through sampling and analysis and the generator-site audit program is described in the appendix.

Acceptable knowledge is used in three ways: 1) to delineate waste streams, 2) to make hazardous waste determinations for debris waste, and 3) to determine if homogeneous solids and soil/gravel are RCRA-listed wastes. Used for these purposes, acceptable knowledge balances the requirements for providing definitive chemical and physical characterization of waste streams when it is difficult to obtain a representative sample because of the physical waste form and/or composition of the waste (e.g., metal, glass, and combustibles). This use of acceptable knowledge is outlined in *Waste Analysis: EPA Guidance Manual for Facilities That Generate, Treat, Store and Dispose of Hazardous Waste,* (EPA, 1994), where EPA has specifically referred to the characterization of mixed waste as a situation where the use of acceptable knowledge is appropriate.

Generator sites will use acceptable knowledge to sort waste containers into waste streams for the purposes of grouping waste for further characterization. Since the waste is characterized on a waste stream basis, minimal variability of hazardous constituents between waste containers in a waste stream will provide a more representative characterization of the waste stream. The analyses performed will not differ based on the waste stream, only on the physical form of the waste (i.e., debris waste cannot be sampled for totals analyses). Both stored and newly

generated wastes will be separated in this fashion, though the types of acceptable knowledge used may differ. Section C-4b discusses the use of acceptable knowledge, sampling, and analysis in more detail. Acceptable knowledge is discussed more completely in Appendix C9.

Radiography is used to verify the physical form of retrievably stored CH TRU waste and most RH TRU waste. Based on this physical form (ie, Homogeneous Solids/Soils/Gravel or Debris) it is determined whether a representative sample can be collected and totals analyses performed on the waste. For newly generated waste, physical form will be verified during packaging. Radiography is also used in conjunction with acceptable knowledge to characterize debris wastes. Radiography and the associated information compiled from acceptable knowledge (e.g., age of the waste, generating process) will be used to determine the RCRA-regulated constituents present in the waste.

All waste containers are sampled and analyzed for VOCs in the headspace gas. A statistically selected portion of homogeneous solids and soil/gravel is sampled and analyzed for RCRA-regulated total VOCs, SVOCs, and metals. Sampling and analytical methods used for waste characterization are discussed in Section C-4a.

In the process of performing organic analyses, nontarget compounds may be identified. These compounds will be reported as tentatively identified compounds (TIC). The specific procedures for positive TIC identification are implemented by the QAPP. Positively identified TICs listed in 20 NMAC 4.1, Subpart V, 264, Appendix IX,[3] will be added to the target analyte list if they are detected in 25 percent of all samples from a given waste stream as implemented in the QAPP. The DOE will add these compounds to the list of hazardous constituents for the waste stream (and additional EPA hazardous waste codes, if appropriate), and a permit modification will be submitted adding these constituents, if necessary.

Waste characterization sampling and analysis activities will differ for retrievably stored waste and newly generated waste. The waste characterization data collection design for each type of waste is described in the following sections. Figures C-1 and C-2 summarize the waste characterization data collection design for newly generated and retrievably stored waste, respectively. Table C-8 provides a summary of hazardous waste characterization requirements for all TRU mixed waste by waste characterization parameters.

C-3a Newly Generated Waste

The RCRA-regulated constituents in newly generated wastes will be documented and verified at the time of generation to provide acceptable knowledge for the waste stream. Newly generated mixed waste characterization will begin with verification that processes generating the waste have operated within established written procedures. Waste containers will be classified

[3]Appendix IX of 264 was chosen because analytical methods have been established for all analytes listed.

into waste streams using acceptable knowledge. Verification that the physical form of the waste (Summary Category Group) corresponds to the physical form of the assigned waste stream is accomplished during packaging. This process consists of the operator confirming that the waste is assigned to a waste stream that has the correct Summary Category Group for the waste being packaged. If a confirmation cannot be made, corrective actions will be taken per Section C8-13 of Appendix C8. A second operator, who is equally trained to the requirements of the WAC and QAPP (See Appendix C4, Section C4-3b for training requirements), will provide additional verification by reviewing the contents of the waste container to ensure correct reporting. If the second operator cannot provide concurrence, corrective actions will be taken per Section C8-13 of Appendix C8. The subsequent waste characterization activities depend on the assigned Summary Category Group since waste within the homogeneous solids and soils/gravel summary category groups will be characterized using different techniques than the waste in the debris waste summary category group.

All newly generated waste containers will undergo headspace-gas analysis for VOC concentrations. If the DOE believes the frequency can be reduced in the future based on trends in analytical results, it may provide technical arguments for such a reduction and request a permit modification. The headspace-gas sampling method is provided in Appendix C4, Section C4-1.

Newly generated waste streams of homogeneous solids and soils/gravel wastes will be randomly sampled a minimum of once per year for total VOCs, SVOCs and metals. Sampling frequency of once per year is only allowed if a process has operated within established bounds without any significant process changes or fluctuations. Otherwise, the waste must be considered as process batches. Significant process changes and process fluctuations can be determined using statistical process control charting techniques; these techniques require historical data for determining limits for indicator species and subsequent periodic sampling to assess process behavior relative to historical limits. If the limits are exceeded, the waste stream must be recharacterized, and the characterization must be performed according to procedures required in the QAPP for retrievably stored waste. The process behind this control charting technique is described in Appendix C6, Section C6-5.

Also, as another control of waste generated from a particular process, the bounds for a waste generating process will be established by the specific written procedures for that process. Examples of parameter bounds that could affect a waste generated by a process are volumes of input material, change in the input material, and any other changes that would change the output of that process.

To ensure that the generator site procedures for waste generating processes contain the proper controls of the waste stream, generator site waste generating process procedures must contain sections containing the following information:

- Scope

- Purpose
- Responsible organizations for implementing the requirements of the procedure
- Administrative process controls
- Material inputs
- Waste Streams Generated
- Process controls and range of operation that affect final hazardous waste determinations
- Rate and quantity of hazardous waste generated
- List of applicable operating procedures relevant to the hazardous waste determination
- Nonconformance reporting
- Process knowledge verification sampling
- Reporting and records management

Events where procedurally established bounds are exceeded or any condition of normal operation not being met are events that could trigger an increased sampling frequency of a waste stream. As long as a process does not change within a year, the waste generated by that process will have the same characteristics, and therefore, one sample could verify the lack of variability of that waste stream. Compliance with process procedures and the maintenance of the parameters specified by those procedures will be verified by WIPP during the Generator/Storage Site Waste Screening and Acceptance Audit Program (Appendix C11).

The records generated by the process procedures will be examined for indications of process changes or limits being exceeded that would change the output of that process. If these changes are apparent, WIPP will verify that a follow-up sample of process waste was collected and analyzed. Records of that analysis will be available for examination by the auditors. If records of the analysis are not available, the waste stream will not be acceptable at the WIPP facility for disposal and the site may lose certification authority. If a generator site changes a process but determines that increased sampling is not required because the change will not affect waste generated by that process, the DOE/CAO must be notified in the form of a memorandum to the CAO Waste Characterization Manager. The DOE/CAO must concur with

the decision to not increase the sampling frequency before any additional waste from that process is shipped.

The toxicity characteristics of homogeneous solids and soils/gravel waste streams will be determined using total analysis of toxicity characteristic contaminants, rather than the TCLP. The sampling methods for homogeneous solids and soil/gravel wastes is provided in Appendix C4, Section C4-2.

Acceptable knowledge, examination during packaging, and headspace-gas sampling and analysis are used to characterize debris waste. When waste is being generated by processes that are driven by written procedures, the waste generated by that process can be characterized by acceptable knowledge. Other documentation besides written procedures provide useful information that can be used for acceptable knowledge. Examples of documentation used for waste characterization by acceptable knowledge practices are described in Appendix C9. RCRA-regulated metals present in debris wastes are associated with specific waste materials (i.e., lead in leaded rubber gloves, leaded glass, or lead shielding). Knowledge of the materials and operations that generated these waste streams is used to determine if they contain RCRA-regulated metals. Acceptable knowledge is further explained in Section C-4b and Appendix C9.

C-3b Retrievably Stored Waste

All retrievably stored waste containers will be examined using radiography to confirm the physical waste form (Summary Category Group), to verify the absence of prohibited items, and to determine the waste characterization techniques to be used based on the Summary Category Groups (i.e., S3000, S4000, S5000). Repackaged retrievably stored waste may be handled as newly generated waste to confirm the Summary Category Group. The applicability of Real-Time Radiography (RTR) as an example for this purpose is detailed in Appendix C5.

To confirm the results of radiography, a statistically selected number of the CH waste container population will be visually examined by opening containers to inspect waste contents to verify radiography results. Appendix C6, Section C6-1 contains the approach used to statistically select the number of drums to be visually examined.

All retrievably stored containers will undergo headspace gas analysis for VOC concentrations. The headspace gas sampling method is provided in Appendix C4, Section C4-1.

A statistically selected portion of homogeneous solids and soil/gravel wastes will be sampled and analyzed for total VOCs, SVOCs, and metals. The approach used to statistically select drums for homogeneous solids and soil/gravel wastes is different than the method used to select waste containers for visual examination. This method is also included in Appendix C6, Section C6-2. The sampling methods for these wastes are provided in Appendix C4, Section C4-2.

The toxicity characteristic of homogeneous solids and soil/gravel wastes will be determined using total analysis of toxicity characteristic parameters, rather than the TCLP. Appendix C3 discusses comparability of these analytical results to those of the TCLP method.

Representativeness of containers selected for visual examination and waste subjected to homogeneous solids and soil/gravel sampling and analysis will be validated via examination of documentation that shows that true random samples were collected. (Because representativeness is a quality characteristic that expresses the degree to which a sample or group of samples represent the population being studied, the random sampling of waste streams ensures representativeness.)

Acceptable knowledge, along with radiography and headspace-gas sampling and analysis, is used to characterize debris waste. RCRA-regulated metals present in debris wastes are associated with specific waste materials (i.e., lead in leaded rubber gloves, leaded glass, or lead shielding). Knowledge of the materials and operations that generated these waste streams is used to determine if they contain RCRA-regulated metals. Acceptable knowledge is further explained in Section C-4b and Appendix C9.

Specific waste analysis methods are documented in the Methods Manual. Alternative methods will also be approved by the DOE/CAO Manager and accepted by the NMED. The procedure for this method of submittal and approval is provided in Appendix C7. Appendix C8 discusses required analytical method quality assurance objectives (QAO) and analytical procedures. Site-specific sampling and analysis activities will be documented in the QAPjP prepared by the generator sites, and approved by the WIPP facility personnel.

C-4 Characterization Methods

The characterization techniques used by sites include acceptable knowledge, headspace-gas sampling and analysis, radiography, and solidified waste sampling and analysis. All characterization activities are performed in accordance with the QAPP and the Methods Manual. Table C-8 provides a summary of the characterization requirements for TRU mixed waste.

As part of characterization efforts, waste containers will be tested in testing batches. A testing batch is a suite of waste containers undergoing radiography using the same testing equipment. A testing batch can be up to 20 waste containers without regard to waste matrix. Samples will be collected in sampling batches. A sampling batch is a suite of samples of similar matrix (i.e., gas or solid) collected consecutively, using the same sampling equipment within a specific time period. A sampling batch can be up to 20 samples (excluding field QC samples), all of which must be collected within 14 days of the first sample in the batch. Samples will be analyzed in analytical batches. An analytical batch is a suite of samples of similar matrix (i.e., gas or solid) processed as a unit, using the same analytical method within a specific time period. An analytical batch can be up to 20 samples (excluding laboratory QC samples), all of which must be received by the laboratory within 14 days of the validated time of sample receipt of the first sample in the batch. For on-line integrated headspace-gas sampling/analytical systems, samples

will be collected and analyzed in on-line batches. An on-line batch is the number of headspace gas samples that are collected and analyzed within a 12-hour period using the same on-line integrated sampling/analysis system.

C-4a Sampling and Analytical Methods

Headspace Gas Sampling and Analysis

All TRU waste will be sampled and analyzed to determine the concentrations of VOCs (presented in Table C-9) in headspace gases. Sampling protocols, equipment, and QA/QC methods for headspace-gas sampling are provided in Appendix C4, Section C4-1. In accordance with EPA convention, identification of compounds detected by gas chromatography/mass spectrometry methods that are not on the list of target analytes must be reported. These compounds are reported as tentatively identified compounds in the waste data package and must be added to the target analyte list if detected in 25 percent of all samples from a given waste stream and if they appear in the 20 NMAC 4.1, Subpart II, 264, Appendix IX list as implemented in the QAPP. The headspace gas analysis method QAOs are specified in Appendix C8.

Homogeneous and Soil/Gravel Sampling and Analysis

The goal of sampling of homogeneous and soil/gravel wastes is to collect a sample that is representative of the waste stream. This is accomplished through core sampling, which is described in Appendix C4, Section C4-2. The waste containers for sampling and analysis are selected randomly from the population of containers for the waste stream. The random selection methodology is specified in Appendix C6.

Totals analyses for VOCs, SVOCs, and RCRA-regulated metals are used instead of the TCLP to determine waste parameters that may be important to the performance within the disposal system (Tables C-10 and C-11). If sample preparation and/or cleanup methods are required, the analyst must use the procedures specified in the Methods Manual. Alternate sample preparation or cleanup methods must be submitted for review and approval in accordance with the DOE/CAO procedure contained in Appendix C7. The generator may use the results from these analyses to determine if a waste exhibits a toxicity characteristic. The mean concentration of toxicity characteristic contaminants are calculated for each waste stream such that it can be reported with an upper 90 percent confidence limit (UCL_{90}). The UCL_{90} values for the mean measured contaminant concentrations in a waste stream will be compared to the specified regulatory levels in 20 NMAC 4.1, Subpart II, expressed as total values. to determine if the waste stream exhibits a toxicity characteristic. A comparison of total analyses and TCLP analyses is presented in Appendix C3, and a discussion of the UCL_{90} is included in Appendix C6, Section C6-3.

Laboratory Selection

The DOE will conduct analyses using laboratories that are qualified through participation in the Performance Demonstration Program (DOE, 1995c, d) and in accordance with the QAPP. These laboratories will use methods presented in SW-846, *"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"*, (EPA, 1986). In the event that the SW-846 method cannot meet program specific QAO due to the properties of TRU waste, an alternate method may be submitted to CAO for approval. Since the original method is not acceptable for use due to inability to meet QAOs, the alternative method would have to be more sensitive and stable. The methods submitted as alternatives would be more restrictive, as far as data acceptability, than SW-846 methods. Appendix C7 contains the DOE/CAO procedure for submittal and approval of alternative analytical methods. The DOE specified analytical protocols and procedures for waste characterization are published in the Methods Manual.[4] The Methods Manual acts as a unified source of information on the sampling and analytical techniques used to comply with the requirements of the QAPP. Many of the procedures found in the Methods Manual are based on analytical methods found in SW-846. In these instances, the analyst is referred directly to the SW-846 method for the requirements of the procedure. Only information unique to the waste characterization program (e.g., target analytes, QAOs, QC requirements) is included in the Methods Manual. The differences between SW-846 methods and the methods contained in the Methods Manual are presented in Appendix C12.

A performance-based approach to analytical method selection also allows individual sites the flexibility to adapt methods to meet the specified analytical method QAOs in Appendix C8. In addition, methods and supporting performance data demonstrating QAO compliance must be submitted to the CAO for review and approval in accordance with Appendix C7. Once approved, the methods will be incorporated into the Methods Manual.

Analytical methods used by the laboratories must: 1) satisfy all of the appropriate QAOs as implemented in the QAPP, and 2) be implemented through laboratory-documented standard operating procedures. These methods fulfill all of the WAP requirements. Alternative methods must demonstrate equivalency, showing that the performance characteristics of the method (e.g., detection limit, accuracy, and precision and completeness for the waste matrix in question) meet or exceed the WAP requirements and objectives. These analytical QAOs are discussed in detail in Appendix C8.

[4]*Analytical procedures that have been evaluated by the DOE and shown to produce acceptable results in* terms of data quality are implemented by the generator sites.

C-4b Acceptable Knowledge

RCRA regulations codified in 40 CFR Parts 260 through 265, 268, and 270, and New Mexico Hazardous Waste Management Regulations in 20 NMAC 4.1, Subparts I through Subpart VI, Subpart VIII, and Subpart IX, authorize the use of acceptable knowledge as a method which can be used in appropriate circumstances by waste generators, or treatment, storage, or disposal facilities to make hazardous waste determinations. Acceptable knowledge is defined in *Waste Analysis: EPA Guidance Manual for Facilities That Generate, Treat, Store and Dispose of Hazardous Waste* (EPA 1994) to include process knowledge, waste analysis data, and facility records of analysis performed before the effective date of RCRA regulations. Acceptable knowledge, as an alternative to sampling and analysis, can be used to meet all or part of the waste characterization requirements under RCRA (EPA 1994).

Acceptable knowledge is one of a number of techniques used to characterize TRU waste. It is used in conjunction with radiography, headspace gas sampling and analysis, and solidified waste sampling and analysis to meet the requirements of the WAP. Acceptable knowledge is used in TRU waste characterization activities in three ways:

- To delineate TRU waste streams
- To determine if TRU debris wastes exhibit a toxicity characteristic (40 CFR §261.24)
- To determine if TRU wastes are listed (40 CFR §261.31)

Acceptable knowledge is discussed in detail in Appendix C9, which outlines the minimum set of requirements which must be met by the generator sites in order to use acceptable knowledge. In addition, this appendix describes the verification of acceptable knowledge through sampling and analysis and the Generator/Storage Site Waste Screening and Acceptance Audit Program.

C-4c Radiography

Radiography is a nondestructive qualitative and quantitative technique that involves X-ray scanning of waste containers to identify and verify waste container contents. Since the system required for conducting radiography examination is fairly expensive, smaller generator sites reserve the right to conduct visual examination of waste containers in lieu of radiography. For sites that choose to use visual examination in lieu of radiography, the detection of liquid waste in non-transparent inner containers, detected from shaking the container, will be handled by assuming that any liquid that is detected is over WAC limits and the item will be rejected and/or repackaged to exclude the unacceptable characteristic. When radiography is used, or visual examination of transparent containers is performed, the same assumption will be used if the volume of liquid in inner containers is questionable. Radiography, or the equivalent, will be used on the existing/stored waste containers to verify the physical characteristics of the TRU mixed

waste correspond with its waste-stream identification/waste-stream Waste Matrix Code. This is used to determine that the sampling parameter and analysis requirements for that waste form are met. The results of radiography are verified through visual examination of a statistically selected subpopulation of CH TRU waste containers in each CH TRU waste stream. Radiographic examination protocols and QA/QC methods are provided in Appendix C4, Section C4-3.

The applicability of RTR is presented as an example of radiography in Appendix C5. However, the DOE is exploring other methods for the radiographic examination of TRU waste like digital radiography and computer tomography, which have the potential to increase the resolution of radiometric images and increase the discrimination of various waste items. These methods are being developed by DOE and private industry. Several prototype systems exist that are in the process of being validated as qualified radiographic examination methods. When these systems are completely operational and approved, per the procedure outlined in Appendix C7, they will be included in future revisions of the Methods Manual. The quality assurance, quality control and training requirements established for radiography will also apply to newly developed radiographic methods.

C-4d Quality Assurance Sampling and Analysis Requirements

The WIPP facility will assure adequate waste characterization by generator sites sending TRU mixed waste to the WIPP for disposal through appropriate data validation and usability and reporting controls. These steps will be taken at three program levels: 1) the data generation level, 2) the site project level, and 3) the WIPP facility level. These levels are shown in Figure C-5 and the validation process at each level is described in Appendix C8, Sections C8-10 and C8-11. These controls are implemented by the QAPP, by the site-prepared QAPjPs, and by site-specific SOPs. The sampling and analysis program data validation and compliance to data quality objectives (DQO) and QAOs make up the first level of control. The following general requirements must be met by the generator characterization programs:

- Raw data must be reported accurately in a pre-approved format, must be maintained in permanent files, and must be traceable.

- All data must receive a technical review by another qualified analyst, the technical supervisor, and the laboratory QA officer.

- All raw data must have the signatures of a technical supervisor and a QA officer before release.

Generator sites will be responsible for data validation and verification of waste characterization for each container and the data must be documented by release signatures from the Site Project Manager, Site Data Validation Officer, and the Site Data QA Officer. This is the second level of verification.

The DOE operates a QA/QC program to ensure and maintain the integrity of data, documents, and information associated with the management of TRU mixed waste. The following waste characterization activities are described within this subsection: QA/QC control procedures, DQOs, QAOs, data generation, data transmittal, data verification, and records management.

The WIPP will also institute QA/QC control over the waste characterization program through the Generator/Storage Site Waste Screening and Acceptance Audit Program. This audit program is discussed in Section C-5 of this chapter and Appendix C11.

QA/QC Control Practices

Waste characterization QA/QC ensures that the characterization data obtained at generator sites are suitable for regulatory compliance purposes. The WIPP facility implements stringent QA/QC over the generation, transmittal, and verification of data from waste characterization determinations. In addition, the WIPP facility extends QA/QC practices to the management of all records associated with waste shipment screening determinations.

Data Quality Objectives

As previously described, the waste characterization data obtained through this WAP implementation will be used to ensure that the WIPP facility meets regulatory requirements with regard to both regulatory compliance and to ensure that all wastes are properly managed during the Disposal Phase. The DQOs established for this plan are implemented by the QAPP. They are designed to address the specific waste characterization parameters that will be evaluated. To satisfy the RCRA regulatory compliance requirements, the following DQOs are established by this WAP and have been incorporated into the QAPP (DOE, 1995a):

- Headspace-Gas Sampling and Analysis
  - To quantify the concentrations of VOC constituents in the total waste inventory to ensure compliance with the environmental performance standards of 20 NMAC 4.1, Subpart V, §264.601(b).
- Total Analysis of Homogeneous solids and soil/gravel
  - To compare UCL_{90} values for the mean measured contaminant concentrations in a waste stream with specified toxicity characteristic levels in 20 NMAC 4.1.
  - To report the average concentration of hazardous constituents in a waste stream, as specified in 20 NMAC 2.1, Subpart II, 261, Appendix VIII, with a 90 percent confidence interval.

- Radiography

  - To verify the TRU waste streams by Waste Matrix Code for purposes of physical waste form identification and determination of sampling and analytical requirements.

- Visual Examination

  - To verify the TRU waste streams by Waste Matrix Code for purposes of physical waste form identification and determination of sampling and analytical requirements.

  - To provide a process check on a sample basis by verifying the information determined by radiography.

Reconciliation of these DQOs by the Generator/Storage Site Project Manager is addressed in Appendix C8, Section C8-11.

Quality Assurance Objectives

Each characterization method described in the QAPP has a corresponding set of QAOs that are intended to provide assurance that the data generated by that method is of known quality. The generator sites must demonstrate compliance with each QAO associated with the various characterization methods as described in the QAPP. Site Project Managers are further required to perform a reconciliation at the project level of the data sets submitted by the various organizations at the site with the DQOs established in this WAP and implemented in the QAPP. The Site Project Manager must determine that all of the DQOs have been met for the characterization of the waste stream prior to submitting a Waste Stream Profile Form to WIPP for approval (Appendix C8, Section C8-11). The following QAO elements must be considered for each technique as a minimum:

- Precision

  - Precision is a measure of the mutual agreement among multiple measurements.

- Accuracy

  - Accuracy is the degree of agreement between a measurement result and the true or known value.

- Completeness

  - Completeness is a measure of the amount of valid data obtained from a method compared to the total amount of data obtained that is expressed as a percentage.

- Comparability

  - Comparability is the degree to which one data set can be compared to another.

A more detailed discussion of the QAOs, including a mathematical representation, where appropriate, can be found in Appendix C8, which describes the QAOs associated with each method of analysis.

Sample Control

The sites will implement a sample handling and control program that will include the maintenance of field documentation records, proper labeling, and a chain of custody (COC) record. The site QAPjP will document this program and include COC forms to control the sample from the point of origin to the final analysis result reporting. WIPP will review and approve the QAPjP, including the determination that the sample control program is adequate. Details of this sample control program are provided in Appendix C4 and are summarized below to include:

- Field Documentation of samples including: point of origin, date of sample, container ID, sample type, analysis requested, and COC number.

- Proper Labeling and/or tagging including: proper sample numbering, sample ID, sample date, sampling conditions, and analysis requested.

- Chain-of-Custody control including: name of sample relinquisher, sample receiver, and the date and time of the sample transfer.

- Proper sample handling and preservation.

Data Generation

The DOE's waste characterization program implements the programmatic QA requirements in Chapter 1.0 of SW-846 (EPA, 1986), and the DOE/CAO verifies these requirements through QAPjP review and approval. The generator site QAPjPs are controlled by the QAPP. The QAPP identifies the specific requirements for all QAPjPs including: DQOs; QAOs; sampling procedures; sample custody procedures; calibration procedures and frequencies; analytical procedures; data reduction, validation, and reporting requirements; internal QC checks and frequencies;

performance and system audits and frequencies; preventive maintenance; procedures for assessing data quality; and procedures for corrective actions.

A pre-approved format will be used by each generator site for reporting waste characterization data. This form will be defined by the generator site QAPjP. The data reporting format will include all of the elements required by this WAP and implemented through the QAPP for data reports (Appendix C8, Section C8-12). The generator site must prepare data packages to meet the requirements of QAPjPs. All generator site QAPjPs are reviewed and approved by the DOE/CAO (See Appendix C10).

The DOE/CAO will perform audits of the generator site waste characterization programs to verify that site sampling, data collection, data validation, and reporting practices, as implemented by the site QAPjPs, will meet DQOs in this WAP (Generator/Storage Site Waste Screening and Acceptance Audit Program). The primary functions of these audits are to review data packages prepared by the generator sites that demonstrate adherence to the requirements of this WAP and assure adherence to the written, approved characterization program (as required by their QAPjPs). These audits ensure that implementation of the QAPjPs are consistent with the intent of the requirements of this WAP as implemented by the QAPP. Section C-5 and Appendix C11 provide additional information on the audits of the generator sites performed by the DOE/CAO.

The DOE/CAO further requires all analytical laboratories analyzing WIPP waste characterization samples for the generator sites to have established, documented QA/QC programs. The DOE/CAO annually evaluates these laboratories and their QA/QC programs as part of their participation in the laboratory performance program. The audits cover the requirements of the lab's QA/QC program as well as compliance with the method parameters specified in the Methods Manual, this WAP, and the QAPP. Continued compliance with these parameters will be verified by ongoing CAO audits. The laboratory's QA/QC program must include the following:

- Facility organization
- A list of equipment/instrumentation
- Operating Procedures
- Laboratory QA/QC Procedures
- Quality Assurance Review
- Laboratory Records Management

Data Transmittal

The DOE/CAO, through the QAPP and generator site QAPjPs, controls aspects of the waste-characterization data transmittal process. Data reports document the analytical results from the required characterization analyses and contain the characterization data plus documentation of required QA/QC activities associated with the sampling and analyses. The QAPP implements the WAP requirements for maintaining the integrity of the data in data reports by requiring data validation at both the data-generation level and the generator-site project level before the data are transmitted to the WIPP facility. Section C8-10 of Appendix C8 discusses the data validation process in more detail.

Data will be transmitted by hard copy from the data generation level to the generator site TRU mixed waste characterization project level. Transmitted data will include testing, sampling, and analytical data reports and data review checklists on forms approved under the generator sites QAPjP. Testing, sampling, and analytical data will be reported for each waste container. These data will also be input electronically into the WWIS. Data will be entered into the WWIS in the exact format required by the database (see Section C-5a for WWIS data requirements and Appendix C13 for the WWIS data dictionary). Summarized characterization information will be reported on a waste stream basis and transmitted by hard copy to the WIPP Waste Operations when requested. Hard copy data packages will include site name, program identification, waste container numbers, release signatures from the generator Site Project Manager and Site Project QA Officer, and a concise narrative summarizing the results of the site project-level review. Section C8-12 of Appendix C8 provides the format requirements for generator/storage site data reports; both hard copy and electronic. The report will briefly describe any problems or noteworthy observations (e.g., nonconformance reports, operational variances).

Once a waste stream is fully characterized, the site project manager will also submit to the WIPP facility a summary of the waste stream information and reconciliation with DQOs (Section C8-11 of Appendix C8). Based on this summary, the generator site project manager will complete a Waste Stream Profile Form (Figure C-4). This will be used as the basis for acceptance of waste characterization information on wastes to be disposed of at the WIPP.

Data Verification

The first level of data verification by the generator site will confirm that the waste characterization data are properly reported for the characterized waste containers that will be shipped to the WIPP. Data review, validation, and verification procedures used by the generator sites are required by the QAPP to assure that 100 percent of the data reported has received an independent technical review to assure that data generation and reduction were conducted in a technically correct manner, calculations have been verified correct, and all variances from accepted analytical methods (appropriate to the waste type being analyzed) have been documented and approved. Data packages will be reviewed for completeness to verify that they include field sampling records, raw analytical data, calculation records, COC documentation,

calibration records, QA sample results, and that sample holding times and preservation methods were met or exceptions documented. Completed data must be signed by the technical supervisor. At the second level of verification, the Site Project Manager, the Site Data Validation Officer, and the Site Data QA Officer will also ensure that a repeat of this review is performed for at least one randomly chosen container quarterly. Finally, a check for the data package elements required by the QAPP will be performed by the WIPP Waste Operations section as the third level of verification for data packages to assure that data packages are complete. Figure C-5 shows the components of each level of data verification. Data verification is discussed in more detail in Appendix C8, Section C8-10.

Records Management

Records related to waste characterization sampling and analysis activities at the generator sites will be maintained in the testing, sampling, or analytical facility files or site project files for those facilities located on sites. Contract waste analytical facilities will forward testing, sampling, and analytical QA documentation along with testing, sampling, and analytical batch data reports to the site project office for inclusion in site central files.

An appropriate records inventory and disposition schedule (RIDS) shall be prepared and approved by appropriate site personnel. All records relevant to an enforcement action, regardless of disposition, shall be maintained at the generator site until they are no longer needed for enforcement action, and then dispositioned per the approved RIDS. All waste characterization data and related QA/QC records in the site project files for waste to be shipped to the WIPP facility are designated according to NQA-1, Supplement 17S-1, as either Lifetime Records or Non-Permanent Records. Records that are designated as Lifetime Records shall be maintained for the life of the waste characterization program at a participating site plus six years, then offered to the DOE/CAO or transferred to the appropriate Federal Records Center (FRC). Waste characterization records designated as Non-Permanent Records shall be maintained for ten years from the date of (record) generation and then dispositioned according to their approved RIDS. If a site ceases to operate, all records shall be transferred before closeout. Table C-13 provides a listing of records designated as Lifetime Records and Non-Permanent Records.

All waste characterization data shall be maintained by DOE/CAO or WID for the active life of the WIPP facility plus two years. The active life of the WIPP facility is defined as the Disposal Phase and the Decommissioning Phase. After their active life, the records shall be retired to the FRC and maintained for 30 years. These records will then be offered to the National Archives. However, this disposition requirement does not preclude the inclusion of these records in the permanent marker system or other requirements for institutional control.

Raw data obtained by testing, sampling, and analyzing TRU waste in support of this WAP will be identifiable, legible, and provide documentary evidence of quality. The reporting requirements

are different for each technique used, but the forms for data reporting will be pre-approved forms, provided in site-specific documentation

C-5 Verification for TRU Mixed Waste

The third level of data verification, which is performed at the WIPP facility, involves screening and verification of waste stream data and waste shipments. Documentation on waste streams will be screened and verified to ensure that the waste is acceptable for disposal at the WIPP facility according to applicable RCRA requirements. Quality controls related to waste labeling, identification, transport, and screening will ensure that the waste packages arriving at the WIPP facility are the same as those transported from the generator sites and are correctly identified on the EPA Hazardous Waste Manifest.

WIPP waste screening is a two-phased process. Phase I will occur prior to transporting the waste to the WIPP facility. Phase II will occur after the waste shipment arrives but before it is emplaced. Figure C-6 presents the waste shipment screening process.

C-5a Phase I Waste Stream Screening and Verification

The first phase of the waste screening and verification process will occur before waste is shipped to the WIPP site. Before WIPP will begin the process of accepting waste from a generator site, an initial audit of that site will be conducted as part of the Generator/Storage Site Waste Screening and Acceptance Audit Program (Appendix C11). The RCRA portion of the generator site audit program will provide on-site verification of characterization procedures, data package preparation, and recordkeeping. The secondary verification step is the waste-characterization data package completeness/accuracy review and acceptance by the WIPP as part of the Waste Stream Profile Form approval process. At the WIPP facility, screening includes verification that all of the required elements of a data package are present (Appendix C8, Section C8-12) and that the waste characterization data meet acceptance criteria required for compliance with the WAP.

Once a generator site has prepared a QAPjP in accordance with the QAPP, it is submitted to the DOE/CAO for review and approval (See Appendix C10). The generator site will implement the specific parameters of the QAPjP once it is approved. The initial site RCRA audit will be performed at some point after this implementation has taken place and before a Waste Stream Profile Form has been submitted to the WIPP for approval. The checklists used in this audit will be based on each site's QAPjP. Additional audits, focusing on results of waste characterization, will be performed at least annually. The WIPP has the right to conduct unannounced audits and to examine any records that are related to the scope of the audit. More detail about this audit program is provided later in this section and in Appendix C11.

When the required waste stream characterization data have been collected by a generator and the initial site audit has been successfully completed, the generator Site Project Manager can

verify that waste stream characterization meets the WAP requirements as a part of the Level 2 data verification required by the QAPP (Appendix C8, Section C8-11). If the waste characterization does not meet the requirements of the WAP, the waste stream cannot be sent to the WIPP until those requirements are met. The generator will complete a Waste Stream Profile Form and submit it to Waste Operations, along with the accompanying waste characterization documentation for that waste stream. This provides notification that the generator considers that the waste stream (identified by the waste stream identification number) has been adequately characterized for disposal according to the WIPP facility approved QAPjP and QAPP DQOs.

The Waste Stream Profile Form is provided as Figure C-4. It includes information on the generator site name and EPA identification number, the technical contact for information on that waste stream, the WIPP ID, Summary Category Group, listing of acceptable knowledge documentation used, and waste characterization data package identification numbers associated with that waste stream. The form also requires the date of the WAC certification for that waste stream, procedures used for characterization, and EPA Hazardous Waste Code designations. Upon WIPP facility approval of the waste stream for disposal through the use of the Waste Stream Profile Form, the generator may begin shipping waste containers from that waste stream.

As part of the waste characterization data submittal, the generator site will also transmit the data on a container basis via the WWIS database. This data submittal can occur at any time as the data are being collected. The system will conduct internal limit checks as the data are entered, and the data will be available to WIPP personnel for review as supporting information for Waste Stream Profile Form review.

If discrepancies arise as a result of this review, the generator sites will be contacted by WIPP Waste Operations and required to provide the necessary additional information to resolve the discrepancy before that waste stream is approved for disposal at the WIPP facility. If the discrepancy is not resolved, the waste stream will not be approved.

WIPP WWIS Description

The WWIS is an electronic database that contains information and data related to the characterization, certification, and the shipment of waste destined for WIPP. The database design contains different modules for waste characterization data (as required by the QAPP and RCRA), waste certification data (as required by the WAC), and transportation data (as required by the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC). The database contains edit, limit, and other data check functions to ensure that data supplied meet the requirements and the limits of the QAPP, RCRA, the WAC, and the TRAMPAC. All TRU waste sites planning to ship waste to WIPP will supply the required data to the WWIS. The WWIS will verify that all of the supplied data meet the edit and limit checks prior to the shipment of any waste to WIPP. The WWIS database will notify the generator site if any of the supplied data fails to meet the requirements of the edit and limit checks via an appropriate error message. The generator site

will be required to correct the discrepancy with the waste or the waste data and re-transmit the corrected data prior to acceptance of the data by the WWIS. WIPP facility personnel will review data reported for each container of each shipment prior to providing notification to the shipping site that the shipment is acceptable. Table C-12 gives a partial listing of the data fields contained in the WWIS.

The WWIS will generate the following:

- Container Emplacement Report

  This report will be added to the operating record as an indication of the quantities of waste, date of emplacement, and location in the repository. This report will be generated on a shipment basis. Reports that are included as part of the operating record will be retained at the site, for the life of the facility.

- Shipment Summary Report

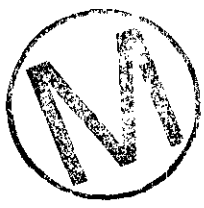
  This report will contain the container IDs of every container in the shipment, listed by TRUPACT-II number and by assembly number (for seven packs), for every assembly in the TRUPACT-II. This report is used by Waste Operations to verify containers in a shipment and will be generated on a shipment basis.

- Characterization Data Report

  This report will be generated on a waste stream basis and will be used by the WIPP in the Waste Stream Profile Form review and approval process. This report will contain the data listed in the Waste Characterization Data Module on Table C-12. This report will be generated and attached to the Waste Stream Profile Form for inclusion in the facility operating record and will be kept for the life of the facility.

- Reports of Change Log

  This will consist of a short report that lists the user ID and the fields changed. The report will also include a reason for the change. A longer report will list the information provided on the short report and include a before and after image of the record for each change, a before-record for each deletion, and the new information for added records. These reports provide an auditable trail for the data in the database.



Access to the WWIS will be controlled by a Data Administrator (DA) of the Waste Operations section who will control the WWIS users based on approval from management personnel. Integrity of the WWIS data will be maintained by strict access control to the database. The WWIS system is located in a limited access area within the WIPP site. Access to the computer room area where the WWIS system will reside is controlled through a cipher lock door system whose combination is only granted to authorized personnel. This computer room also houses the systems that provide the WIPP local and wide area networks, and is staffed by experienced computer operators on a 24 hour basis.

The WWIS will be included in the contingency planning performed by the Information Technology Resources (ITR) Section at the WIPP site. This section operates the computer room. This planning includes dual storage (other than the computer room) of software backup tapes that will permit rapid restart of the system.

The computer room is provided with power by a uninterruptible power supply system that can provide clean, harmonic filtered power for 30 minutes after the loss of the primary power supply. This will provide for an orderly shutdown of the database.

Nightly backups of the WWIS system will occur as part of the overall backup program for all of the systems. The database can be restarted, if for whatever reason, a catastrophic failure occurs using the previous day's backup copy. In addition to the nightly backup procedure, the database will be archived quarterly and annually. The archived copies will be included in the operating record and retained for the life of the facility.

The WWIS system hardware and application software is constructed using client-server architecture. The client software will provide the user interface and communication to the server. This limits user access only to those database functions approved by the WIPP, such as allowing the small quantity generator sites to populate a defined data structure established on the system for them by the WIPP. Onsite terminals are located within controlled access areas designated for use by authorized WWIS users. Offsite access will be by direct log in through multi-layer password/user ID methodology. The first layer of control will provide authorized access to the WIPP network, the second layer will provide authorized users access to the WWIS system, and the third layer defines the specific functions of the WWIS that each user has been assigned. Access to the various WWIS functions is controlled by the WWIS DA. All access attempts will be logged by the system. Waste Operations and ITR personnel will routinely review the logs for the purpose of identifying and investigating unauthorized access attempts.

The TRU waste generator sites will only have access to data that they have supplied, and only until the data have been formally accepted by the WIPP. After the data have been accepted, the data will be protected from indiscriminate change and can only be changed by a qualified DA.

The database has a Data Change Log that will require a reason for the change from the DA prior to accepting the change. The data change information, the user ID of the qualified DA making the change, and the date of the change will be recorded in the data change log automatically. The data change log cannot be revised by any user, including the DA. The data change log will be subject to internal and external audits and will provide an auditable trail for all changes made to previously approved data.

Examination of the Waste Stream Profile Form

Members of the Waste Operations section will be responsible for the verification of completeness and accuracy of the Waste Stream Profile Form. This verification will consist of a review of the Waste Stream Profile Form by the Environmental Compliance and Support section and the Quality Assurance department. These groups will review the Waste Stream Profile Form based on their area of responsibility. Of particular importance are the assignment of the waste-stream description, Waste Matrix Code Group, and Summary Category Groups, the results of waste analyses, the acceptable knowledge documentation, the methods used for characterization, the WAC certification, and appropriate designation of EPA hazardous waste code(s). If the waste stream profile form is considered to be inaccurate, efforts will be made to resolve discrepancies by contacting the generator site. If discrepancies in the waste stream are detected at the generator site, the QAPP requires the site to implement a non-conformance program to identify, document, and report discrepancies (Appendix C8, Section C8-13). The QAPP requires that site management at all levels shall foster a "no fault" attitude to encourage the earliest identification of discrepancies and/or deviations from protocols. The Waste Stream Profile Form must pass all verification checks at the WIPP facility in order for the waste stream to be approved for shipment to the WIPP facility.

The identified EPA hazardous waste codes for the wastes that appear on the Waste Stream Profile Form will be compared to those in the WIPP RCRA Part A to ensure that only wastes that contain constituents contained in the Part A are approved for shipment to the WIPP. The analytical data package summaries will be reviewed to verify that the waste has been classified correctly. The analytical method used will be compared to those listed in Tables C-9, C-10, and C-11 to assure that only approved analytical methods were used for analysis of the waste. Waste Operations will verify that WAC certification has been granted to the generator.

Environmental Compliance and Support will verify three different types of data related to WAC on every container holding TRU mixed waste before a shipment leaves the generator site for the WIPP facility. The three verifications will be performed on data from the following determinations: 1) an assignment of the waste stream's waste description (by waste matrix codes) and Waste Matrix Code Group; 2) a determination of ignitability, reactivity, and corrosivity; and 3) a determination of compatibility. The verification of waste stream description will be performed by reviewing the waste characterization data package for consistency in the waste stream description. The data package will also indicate if the waste has been checked for the characteristics of ignitability, corrosivity, and reactivity. The final verification of waste

compatibility will be performed using Appendix C1, the compatibility study. Since the Part A does not include hazardous waste codes that are not consistent with the WAC, a consistency check between the hazardous waste codes listed in the data package for the waste stream and the hazardous waste codes listed on the Part A will verify that the waste stream is not ignitable, corrosive, or reactive, and that it is compatible with the other waste to be disposed of at the WIPP facility.

Generator/Storage Site Waste Screening and Acceptance Audit Program

An important part of the WIPP's verification process is the Generator/Storage Site Waste Screening and Acceptance Audit Program implemented by representatives of the DOE/CAO and WID. The focus of this audit program is compliance with the QAPP, site QAPjPs, this WAP, and the RCRA. The RCRA compliance portion of the audits will be performed by the Environmental Compliance and Support section. This audit program addresses all waste sampling and analysis activities, from waste-stream classification assignment through final loading of the TRUPACT-II or shielded road cask, and ensures that SOPs are being followed and the QAPjPs are fully implemented. Audits will assure that containers and their associated documentation are adequately tracked throughout the waste handling process. Operator qualifications will be verified, and QA/QC procedures will be surveyed. Results of all generator site audits will be kept in the WIPP facility operating record until closure of the facility.

An initial audit will be performed at each generator site performing waste characterization activities prior to the formal acceptance of the Waste Stream Profile Forms and/or any waste characterization data supplied by the sites. Audits will be performed at least annually thereafter, including the possibility of unannounced audits (this means not a regularly scheduled audit). These audits will verify that the generator site has implemented a QA program for the characterization of waste. The accuracy of physical waste description and waste stream assignment provided by the generator site will be verified by review of the radiography results, and visual examination of data records and radiography videotapes (as necessary) during audits. More detail on this audit process is provided in Appendix C11.

C-5b Phase II Waste Shipment Screening and Verification

Phase II of the waste shipment screening and verification process includes examination of a waste shipment after the waste shipment has arrived. The second-phase determinations are: 1) a determination of the completeness and accuracy of the EPA Hazardous Waste Manifest; 2) a determination of waste shipment completeness; 3) a determination of land disposal restriction notice completeness; and 4) an identification and resolution of waste shipment irregularities. Only those waste containers that pass all Phase II waste-screening determinations will be emplaced at the WIPP. For each container shipped, the generator site must provide the following information:

Typical Hazardous Waste Manifest Information:

- Generator site name and EPA ID
- Generator site contact name and phone number
- Quantity of waste
- List of the hazardous waste codes in the shipment
- Listing of all container IDs
- Signature of authorized generator representative

Typical Land Disposal Restriction Notice Information:

- EPA Hazardous Waste Number(s)
- Applicable treatment standards for F001-F005 wastes (D001-D003 wastes prohibited by the WAC)
- Supporting analyses and/or references to previously supplied analytical data (Such as Characterization Reports and data submitted to the WWIS)

Specific Container information:

- Waste Stream Identification Number
- List of Hazardous Codes per Container
- Certification Data (Nuclide info, etc.)
- Shipping Data (Assembly numbers, ship date, shipping category, etc.)

This information must also be supplied electronically to the WWIS and may be provided to the WWIS as part of the Phase I Screening or may be supplied at the time of shipment.

Waste Operations personnel will verify that all this information is provided for each container received. The ID will be compared with a list of those approved for disposal at the WIPP.

Examination of the EPA Uniform Hazardous Waste Manifest and Associated Waste Tracking Information

Upon receipt of a waste shipment, Waste Operations will make a determination of EPA Uniform Hazardous Waste Manifest completeness and sign the manifest to allow the driver to depart. Waste Operations will make a determination of waste shipment completeness by checking the unique, bar-coded identification number found on each container holding TRU mixed waste after opening the TRUPACT-II or shielded road cask. The bar-coded identification number(s) will be noted and checked against the WWIS database. The RH waste canister has a unique identification number stamped into it which will be verified in the Hot Cell during transfer to the facility cask. The WWIS computer database will maintain waste container receipt and emplacement information provided by the WIPP site. It will include, among other items, the following information associated with each container of TRU mixed waste:

- Package (container) receipt date
- Overpack identification number (if appropriate)
- Package (container) emplacement date
- Package (container) emplacement location (panel/room)

The WWIS links the bar-coded identification numbers of all containers in a specific waste shipment to the waste assembly (for 7-packs) and to the shipment identification number, which is also written on the EPA Hazardous Waste Manifest. Generators electronically transmit the waste shipment information to the WWIS before the waste shipment is transported. Once a waste shipment arrives, WIPP facility personnel can verify the identity of each container using the data already in the WWIS.

If there are discrepancies on the manifest, the generator will be contacted for resolution. A manifest discrepancy is a difference between the quantity or type of hazardous waste designated on the manifest and the quantity or type of hazardous waste a facility actually receives. Manifest discrepancy resolution is accomplished by contacting the generator site technical contact (as listed on the manifest). If the discrepancy is identified prior to the containers being removed from the TRUPACT-II, the waste will be retained in the parking area. If the discrepancy is identified after the waste containers are removed from the TRUPACT-II, the waste will be retained in the WHB. Errors on the manifest can be corrected by the accepting facility with a verbal concurrence by the generator. Discrepancies not resolved within 15 days of receiving the waste will be reported to the NMED. Notifications to the NMED will consist of a letter describing the discrepancies, attempts to reconcile the discrepancies, and a copy of the manifest. If the waste containers reside in the TRUPACT-II and the manifest discrepancies have not been resolved within 30 days of waste receipt, the shipment will be returned to the generator/storage facility. If it becomes necessary to return waste containers to the generator site, a new EPA Uniform Hazardous Waste Manifest will be prepared.

Documentation of the returned containers will be covered by Waste Operations protocols and the WWIS. Changes will be made to the WWIS data to indicate the current status of the container(s), and a reason will be required to change the data. This reason, plus the record of the WWIS data change will be maintained in the change log of the WWIS and will provide an auditable record of the returned shipment.

The Waste Operations section will be responsible for resolution of discrepancies, notification of the NMED, as well as returning the original copy of the manifest to the generator. The manifest will be returned within 30 days of delivery of the waste.

Examination of the Land Disposal Restriction (LDR) Notice

Unless TRU mixed waste is otherwise exempted from the LDRs, the DOE intends to petition the EPA for a variance from the prohibition on land disposal of untreated TRU mixed waste at the WIPP facility. If successful, the WIPP facility may dispose of the restricted waste. With each waste shipment of LDR waste, the generator must provide the WIPP facility with a LDR determination and a notice that the waste is not prohibited from land disposal because the waste is covered by a no-migration determination (NMD). (This assumes that a Disposal-Phase NMD will be made by the EPA. Wastes will be in conformance with conditions of the NMD.) WIPP facility personnel will review this notice for accuracy and completeness. The generator will prepare this notice in accordance with the requirements of 20 NMAC 4.1, §268.7(a)(3).

Verification

Waste Operations will make a determination of waste shipment irregularities. The following items will be noted for each waste shipment arriving at the WIPP facility:

- The number and type of containers holding TRU mixed waste match the information in the WWIS
- Container defects

Waste Operations will verify that the containers (as identified by their container ID numbers) are the containers for which accepted data already exists in the WWIS. A check will be performed by Waste Operations comparing the data on the WWIS Shipment Summary Report for the shipment to the actual shipping papers (including the EPA Hazardous Waste Manifest). This check also verifies that the containers included in the shipment are those for which approved shipping data already exist in the WWIS Transportation Data Module (Table C-12). For SWBs and TDOPs, this check will include comparing the barcode on the container with the shipping papers and the data on the WWIS Shipment Summary Report. For 7-pack assemblies, one of the seven container barcodes will be read by the barcode reader and compared to the assembly information for this container on the WWIS Shipment Summary Report. This will automatically identify the remaining six containers in the assembly. This process enables Waste Operations

to identify all of the containers in the assembly with minimum exposure. If all of the container IDs and the information on the shipping papers agree with the WWIS Shipment Summary Report, the operator is assured that the containers have been approved for disposal at the WIPP facility.

Waste Shipment Screening QA/QC

Waste shipment screening QA/QC ensures that waste received is that which has been approved for shipment during the Phase I screening. This is accomplished by maintaining stringent QA/QC control of the waste shipment screening process. The screening process will be controlled by administrative processes which will generate records documenting waste receipt that will become part of the waste receipt record. The waste receipt record documents that container identifications correspond to shipping information and approved waste streams. The WIPP extends QA/QC practices to the management of all records associated with waste shipment screening determinations.

Records Management

As part of the WIPP facility's operating record, data and documents associated with waste characterization data are managed in accordance with standard records management practices. The storage of WIPP's copy of the manifest, LDR information, waste characterization data, waste stream profile forms, and other related records will be identified on the appropriate records inventory and disposition schedule for Waste Operations.

Waste characterization data and documents related to waste characterization that are part of the WIPP facility operating record are managed in accordance with the following guidelines:

General Requirements

- Records must be legible
- Corrections must be made with a single line through the incorrect information, and a date and initial of the person making the correction
- Records must be paginated indicating the total number of pages that make up the record
- Black ink is encouraged, unless a copy test has been conducted to ensure the other color ink will copy
- Use of highlighters on records is discouraged
- Records must be reviewed for completeness
- Records must be validated by the cognizant manager

Records Storage

- Active records must be stored when not in use

- Quality records must be kept in a one-hour (certified) fire-rated container or a copy of a record must be stored separately (sufficiently remote from the original) in order to prevent destruction of both copies as a result of a single event such as fire or natural disaster
- Unauthorized access to the records is controlled by locking the storage container or controlling personnel access to the storage area

The following records will be maintained for waste characterization purposes as part of the WIPP facility operating record:

- Completed WIPP Waste Stream Profile Forms and accompanying documentation
- Completed Waste Receipt Checklists
- WIPP WWIS Container Emplacement Report
- Audit reports and corrective action reports from Generator/Storage Site Waste Screening and Acceptance Audit Program audits

These records will be maintained for each TRU mixed waste container managed at the WIPP facility.

Records at the WIPP facility will be managed in accordance with the CAO Quality Assurance Program Description (QAPD) record management requirements. The QAPD provides for generation of QA records; QA guidelines; indexing of QA records; classification of QA records; receipt of QA records; storage, preservation, and disposition of QA records; and retrieval of QA records.

Waste Shipment Tracking QA/QC

The Transportation Tracking and Communications System is a unique waste shipment monitoring system that will provide 24-hour-per-day feedback to the WIPP facility via satellite on the location and status of each waste shipment during transport.

C-6 List of References

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U.S. Department of Energy, (DOE), 1991, "Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria," DOE/WIPP-069, Revision 4, Carlsbad, New Mexico,

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U.S. Environmental Protection Agency (EPA), April 1980. "A Method for Determining the Compatibility of Hazardous Wastes," EPA-600/2-80-076, California Department of Health Services and the U.S. Environmental Protection Agency, Office of Research and Development.

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TABLES

TABLE C-1
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Homogeneous Solids—S3000	Solidified Inorganics	1000	AL-W005	Solidified Aqueous Liquids/Slurries				
	Solidified Inorganics	3150	IN-W157	Solidified Process Residues	ID 213	004	4	Solidified Liquid
	Solidified Inorganics	3150	IN-W166	Solidified Process Residues	ID 114	114	1	Inorganic Process Solids and Soils
	Solidified Inorganics	3150	IN-W177	Solidified Process Residues		835		
	Solidified Inorganics	3150	IN-W179	Solidified Process Residues	MD 111A	836	1	
	Solidified Inorganics	3150	IN-W181	Solidified Process Residues	ID 211A	978	1	Inorganic Waste Water Treatment Sludge
	Solidified Inorganics	3150	IN-W188	Solidified Process Residues	ID 211A	976	1	Inorganic Waste Water Treatment Sludge
	Solidified Inorganics	3150	IN-W216	Solidified Process Residues	ID 211A	001	1	Inorganic Waste Water Treatment Sludge
	Solidified Inorganics	3150	IN-W220	Solidified Process Residues	ID 111	111	1	Inorganic Waste Water Treatment Sludge
	Solidified Inorganics	3113	IN-W221	Absorbed Aqueous Liquids	ID 113	113	4	Solidified Liquid
	Solidified Inorganics	3150	IN-W222	Solidified Process Residues	ID NYD	292		
	Solidified Inorganics	3121	IN-W228	Solidified Wastewater Treatment Sludges	ID 211A	002	1	Inorganic Waste Water Treatment Sludge
	Solidified Inorganics	3150	IN-W332	Solidified Process Residues		204		
	Solidified Inorganics	3113	IN-W347	Absorbed Aqueous Liquids		102		

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Homogeneous Solids—S3000	Solidified Inorganics	---	LA-W002	Solidified Aqueous Waste	LA 111A; 211A	002	1	Inorganic Waste Water Treatment Sludge
	Solidified Inorganics	---	LA-W003	Dewatered Sludge	LA 111B; 211B	003	1	Inorganic Waste Water Treatment Sludge
	Solidified Inorganics	---	LA-W006	Cemented Process Residues	LA 114A	006	1	Inorganic Process Solids and Soil
	Solidified Inorganics	---	LL-W019	Solidified Waste	LL 111	002	1	Inorganic Waste Water Treatment Sludge
	Solidified Inorganics	3150	MD-W002	Absorbed Aqueous Liquids				
	Solidified Inorganics	3120	OR-W042	Inactive Storage Tank Contents—MTRU Sludge				
	Solidified Inorganics	1220	PA-W014	Solidified TRU Waste Liquids				
	Solidified Inorganics	3129	PA-W015	TRU Solid				
	Solidified Inorganics	1190	PA-W015A	TRU and Technetium Waste				
	Solidified Inorganics	3150	RF-M001	Solidified Process/TRM	RF 114	806	1	Inorganic Process Solids and Soils
	Solidified Inorganics	3150	RF-W010	Solidified Aqueous Sludge/ TRM	RF 111	800 803 807	1	Inorganic Waste Water Treatment Sludge
	Solidified Inorganics	3121	RF-W038	Solidified Laboratory Waste/TRM	RF 113	802	4	Solidified Liquid

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Homogeneous Solids—S3000	Solidified Inorganics	3111	RF-W040	Incinerator Ash/TRM		419 420 421 425 426		
	Solidified Inorganics	3119	RF-W059	Sand, Slag, and Crucible/ TRM		387 392 390 393 395 394 396 399 391		
	Solidified Inorganics	1190	RF-W063	Miscellaneous TRM		070 503 400 508 401 527 500 541		
	Solidified Inorganics	6290	RF-W065	Calcium Metal/TRM		333		
	Solidified Inorganics	3129	RF-W068	Particulate Sludge/TRM		292 299 372 823		
	Solidified Inorganics	3119	RF-W076	Process Residues/TRM		289 372 292 422 299 423 340		
	Solidified Inorganics	---	RL-M005	TRU Mixed Homogeneous Solids with Mercury				
	Solidified Inorganics	---	RL-M032	TRU Mixed Inorganic Homogeneous Solids				

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Homogeneous Solids—S3000	Solidified Inorganics	3111	SR-W053	Ash				
	Solidified Inorganics	3129	IN-W146	Uncategorized Inorganic Sludges				
	Solidified Inorganics	3000	OR-W046	Solidified Liquid Low Level Waste Tanks - Sludge				
	Solidified Organics	3150	IN-W167	Solidified Process Residues	ID 112	112	4	Organic Liquid and Sludge
	Solidified Organics	3113	IN-W174	Absorbed Aqueous Liquids		834		
	Solidified Organics	3114	IN-W309	Organic Setups	ID 212	003	4	Organic Liquid and Sludge
	Solidified Organics	3222	RF-W013	Solidified Organics/TRM	RF 112	801	4	Organic Liquid and Sludge
	Solidified Organics	3212	RF-W069	Organic Resins/TRM	RF 126	430 431 809	3	Cation and Anion Exchange Resins
	Solidified Organics	---	RL-M017	TRU Mixed Organic Labpacks				
	Solidified Organics	---	RL-M018	TRU Mixed Organic Labpacks (State only)				
	Solidified Organics	---	RL-M024	TRU Mixed Organic Labpacks with polychlorinated biphenyls (PCB)				
	Solidified Organics	2000	SR-W006	Organic TRU				
	Salt Waste	3140	IN-W311	Salt Waste		409		
	Salt Waste	3140	IN-W312	Salt Waste	ID 124	124	2	Pyrochemical Salt
	Salt Waste	3140	IN-W314	Salt Waste		409		

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

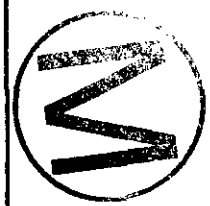
Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Homogeneous Solids—S3000	Salt Waste 	3141	RF-W058	Miscellaneous Pu Recovery By-products/TRM	RF 124	365 414 404 415 405 418 406 427 407 429 408 433 409 434 410 435 411 473 412 654 413	2	Pyrochemical Salt
	Salt Waste	---	IN-M001	Electrorefiner Stripped Salts—Barium (Ba) & Cadmium (Cd)				
Soils/Gravel—S4000	Soils	4200	IN-W263	Contaminated Soils/Debris	MD 111B	842	1	
	Soils	---	RL-M007	TRU Mixed Soils without Mercury				
Debris Waste—S5000	Combustible	5310	IN-W198	Plastic/Rubber Debris	ID 216C	337	3	Combustibles
	Combustible	5320	IN-W202	Wood Debris	ID 216A	970	3	Combustibles
	Combustible	5300	IN-W205	Combustible Debris	ID 216B	900	3	Combustibles
	Combustible	5311	IN-W250	Leaded Gloves/Aprons Debris	ID 123	123	3	Leaded Rubber
	Combustible	5311	IN-W252	Leaded Gloves/Aprons Debris	ID 123; 223A	339	3	Leaded Rubber
	Combustible	5311	IN-W254	Leaded Gloves/Aprons Debris	ID 223A	463	3	Leaded Rubber
	Combustible	5311	IN-W256	Leaded Gloves/Aprons Debris		802		

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Debris Waste—S5000	Combustible	5300	IN-W325	Unknown Solids		815		
	Combustible	5300	IN-W327	Combustible Debris		847		
	Combustible	5310	IN-W330	Plastic/Rubber Debris		801		
	Combustible	5300	IN-W336	Combustible Debris		202		
	Combustible	---	LA-W004	Combustible Waste	LA 116A	004	3	
	Combustible	---	LL-M001	Research and Development Glovebox Waste	LL 116	001	3	
	Combustible	---	RL-M009	TRU Mixed Organic Debris with Corrosives				
	Combustible	---	RL-M010	TRU Mixed Organic Debris with Mercury				
	Combustible	---	RL-M011	TRU Mixed Organic Debris without Mercury				
	Combustible	---	RL-M012	TRU Mixed Organic Debris/ Contaminated without Organics				
	Combustible	---	RL-M013	TRU Mixed Organic Debris/ Contaminated with Organics				
	Combustible	---	RL-M014	TRU Mixed Leaded Gloves/ Aprons with Mercury				
	Combustible	---	RL-M015	TRU Mixed Leaded Gloves/ Aprons Metals without Mercury				

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Debris Waste—S5000	Combustible	---	RL-M016	TRU Mixed Leaded Gloves/ Aprons Metals/Organics without Mercury				
	Combustible	---	RL-M022	TRU Mixed Leaded Gloves/ Aprons PCBs with Mercury				
	Combustible	---	RL-M023	TRU Mixed Resource Conservation and Recovery Act (RCRA) Organic Debris with PCBs				
	Filter	5410	IN-W214	Composite Filters		813		
	Filter	5410	RF-W066	Filters & Media/TRM	RF 119	328 376 331 490 335 491 342	3	Filters
	Filter	5410	RF-W067	Cemented Filters/TRM	RF 119	376 338	3	Filters
	Filter	5410	AW-M003	TRU Waste Used Pre-filters				
	Graphite	5000	IN-W272	Debris Waste	ID 115	312	2	Graphite
	Graphite	5000	IN-W275	Debris Waste		301		
	Graphite	5000	IN-W276	Debris Waste	ID 215A	300	2	Graphite
	Graphite	3119	RF-W060	Coarse Graphite/TRM	RF 115	303 312	2	Graphite
	Heterogeneous	5440	IN-W169	Predominantly Combustible Debris	ID 216C	330	3	Combustibles

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Debris Waste—S5000	Heterogeneous	5440	IN-W170	Predominantly Combustible Debris	AE 116A AE 116B	120		Combustibles
	Heterogeneous	5440	IN-W171	Predominantly Combustible Debris	AE 116A AE 116B	110		Combustibles
	Heterogeneous	5440	IN-W172	Predominantly Combustible Debris		010		
	Heterogeneous	5440	IN-W186	Predominantly Combustible Debris	ID 116	116	3	Combustibles
	Heterogeneous	5440	IN-W189	Predominantly Combustible Debris	ID 221A	464	3	Benelex® and Plexiglas®
	Heterogeneous	5440	IN-W197	Predominantly Combustible Debris	ID 216A	336	3	Combustibles
	Heterogeneous	5440	IN-W203	Predominantly Combustible Debris		826		
	Heterogeneous	5440	IN-W204	Predominately Combustible Debris	MD 116A	827	3	
	Heterogeneous	5440	IN-W225	Predominantly Combustible Debris	ID 221A	302	3	Benelex® and Plexiglas®
	Heterogeneous	5400	IN-W259	Heterogeneous Debris		104		
	Heterogeneous	5430	IN-W265	Predominately Inorganic Nonmetal Debris	ID 121	374	3	Benelex® and Plexiglas®
	Heterogeneous	5000	IN-W269A	Debris Waste		150		
	Heterogeneous	3190	IN-W271	Uncategorized Inorganic Process Residues		814		

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Debris Waste—S5000	Heterogeneous	5400	IN-W281	Heterogeneous Debris	MD 117A	824		
	Heterogeneous	5400	IN-W283	Heterogeneous Debris	ID 225A	241	3	Combustibles and Noncombustibles
	Heterogeneous	5400	IN-W285	Heterogeneous Debris		201		
	Heterogeneous	8200	IN-W289	Unknown Solids	AE 116A	121		
	Heterogeneous	5000	IN-W291	Debris Waste		100		
	Heterogeneous	8200	IN-W302	Unknown Solids		020		
	Heterogeneous	5400	IN-W329	Heterogeneous Debris		848		
	Heterogeneous	5000	IN-W334	Debris Waste		203		
	Heterogeneous	5000	IN-W345	Debris Waste		155		
	Heterogeneous	5000	IN-W351	Debris Waste		105		
	Heterogeneous	5490	NT-W001	Heterogeneous Debris, Uncategorized	NT 111; 116; 211; 225		1 & 3	
	Heterogeneous	5400	OR-W044	CH TRU Heterogeneous Debris	OR 125A; 125B		3	
	Heterogeneous	8000	OR-W045	CH TRU Uncategorized				
	Heterogeneous	5400	OR-W047	CH TRU Heterogeneous Debris				
	Heterogeneous	5330	RF-M002	Supercompacted Combustibles/TRM	RF 116C	2116	3	Combustibles

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Debris Waste—S5000	Heterogeneous	5900	RF-W008	Soil & Cleanup Debris/TRM	RF 121	374	3	Benelex® and Plexiglas®
	Heterogeneous	5330	RF-W012	Combustibles/TRM	RF 116	330 831 336 832 337 833	3	Combustibles
	Heterogeneous	3119	RF-W036	Firebrick, Pulverized or Fines/ TRM	RF 122	377 378	2	Firebrick and Ceramic Crucibles
	Heterogeneous	---	RL-M004	TRU Mixed Heterogeneous Debris (State only)				
	Heterogeneous	---	RL-M006	TRU Mixed Inorganic Homogeneous Solids without Mercury				
	Heterogeneous	---	RL-M031	TRU Mixed Heterogeneous Debris (State only)				
	Heterogeneous	8900	SA-W134	TRU Waste at Hot Cell Facility				
	Heterogeneous	5400	SR-W026	Heterogeneous Debris				
	Heterogeneous	5400	SR-W027	Heterogeneous Debris				
	Heterogeneous	5400	AW-W020	TRU-Cd-Hot Cell Waste				
	Heterogeneous	---	IN-M002	TRU-Cd-Hot Cell Waste				
	Heterogeneous	---	IN-W139	TRU Contaminated Lead Debris				
	Heterogeneous	---	IN-W269B	Debris Waste		150		
	Heterogeneous	5440	IN-W323	Predominantly Combustible Debris		153		

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Debris Waste—S5000	Heterogeneous	5000	KA-W016	TRU Debris				
	Heterogeneous	5400	OR-W040	RH TRU Heterogeneous Debris				
	Heterogeneous	5400	RL-M201	Projected RH-MTRU Waste				
	Inorganic Nonmetal	5230	IN-W161	Ceramic/Brick Debris	ID 122; 222B	371	2	Firebrick and Ceramic Crucibles
	Inorganic Nonmetal	5200	IN-W230	Inorganic Nonmetal Debris	ID 122	122	2	Firebrick and Ceramic Crucibles
	Inorganic Nonmetal	5220	IN-W240	Glass Debris	ID 118	118	2	Glass
	Inorganic Nonmetal	5220	IN-W243	Glass Debris	ID 218B	440	2	Glass
	Inorganic Nonmetal	8900	IN-W245	Uncategorized Unknown	ID 225B	441	3	Combustibles and Noncombustibles
	Inorganic Nonmetal	8900	IN-W247	Uncategorized Unknown	ID 218A	442	2	Glass
	Inorganic Nonmetal	8900	IN-W249	Uncategorized Unknown		810		
	Inorganic Nonmetal	5250	MD-M001	Asbestos Debris				
	Inorganic Nonmetal	3114	RF-W026	Used Absorbents/TRM	RF 122	375	2	Firebrick and Ceramic Crucibles
	Inorganic Nonmetal	3119	RF-W032	Ground Glass/TRM	RF 118	444	2	Glass
	Inorganic Nonmetal	5122	RF-W052	Glass/TRM	RF 118	440 442 441 856	2	Glass

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Debris Waste—S5000	Inorganic Nonmetal	5123	RF-W056	Magnesium (Mg) Oxide Crucibles/TRM	RF 118	370 368 655	2	Glass
	Inorganic Nonmetal	5129	RF-W057	Insulation/TRM	RF 122	438	2	Firebrick and Ceramic Crucibles
	Lead/Cadmium Metal Waste	5400	AW-M001	ALHC Upgrade Decon Debris				
	Lead/Cadmium Metal Waste	5311	AW-M002	Lead/Cadmium Metal Waste				
	Lead/Cadmium Metal Waste	---	ET-M001	Hot Laboratory & Pu Facility D&D				
	Lead/Cadmium Metal Waste	5311	RF-W029	Leaded Gloves/TRM	RF 123	339	3	Leaded Rubber
	Lead/Cadmium Metal Waste	5311	RF-W041	Leaded Gloves-Acid Contaminated/TRM		341		
	Lead/Cadmium Metal Waste	---	RL-M019	TRU Mixed Elemental Hazardous Metals with Mercury				
	Lead/Cadmium Metal Waste	---	RL-M020	TRU Mixed Elemental Hazardous Metals without Mercury				
	Lead/Cadmium Metal Waste	3190	AW-W016	Electrorefiner Stripped Cadmium				
	Lead/Cadmium Metal Waste	3150	AW-W022	Electrorefiner Insolubles with Cadmium				

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Debris Waste—S5000	Lead/Cadmium Metal Waste	---	IN-M004	Electrorefiner Stripped Cadmium				
	Lead/Cadmium Metal Waste	---	IN-M005	Electrorefiner Insolubles with Cadmium				
	Uncategorized Metal	3100	IN-W260A	Inorganic Process Residues		040		
	Uncategorized Metal	5100	IN-W280	Metal Debris		803	1	
	Uncategorized Metal	5100	IN-W287	Metal Debris		101		
	Uncategorized Metal	5100	IN-W294	Metal Debris	ID 217C	481	2	Metal
	Uncategorized Metal	5100	IN-W296	Metal Debris	ID 217C	480	2	Metal
	Uncategorized Metal	5100	IN-W298	Metal Debris	ID 117	320	2	Metal
	Uncategorized Metal	5100	IN-W300	Metal Debris	ID 117	117	2	Metal
	Uncategorized Metal	---	LA-W001	Mixed Metal Scrap and Incidental Combustibles	LA 125A	001	3	
	Uncategorized Metal	---	LA-W005	Noncombustible Scrap	LA 117A; 118A	005 006	2	
	Uncategorized Metal	---	LA-W009	Metal Waste from Gloveboxes and Equipment				
	Uncategorized Metal	---	LL-W018	Combined Metal Scrap and Incidental Combustibles	LL 125	003	3	
	Uncategorized Metal	5112	RF-W011	Metal/TRM	RF 117	480 481	2	Metal
	Uncategorized Metal	5190	RF-W037	Heavy Metal (non-SS)/TRU	RF 117	320	2	Metal

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

Summary Category Group	Waste Matrix Code Group	Waste Matrix Code	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	IDC	Type	Waste Category
Debris Waste—S5000	Uncategorized Metal	---	RL-M001	TRU Mixed Inorganic Debris with Mercury				
	Uncategorized Metal	---	RL-M002	TRU Mixed Inorganic Debris Metals without Mercury				
	Uncategorized Metal	---	RL-M003	TRU Mixed Inorganic Debris Metal with Corrosives				
	Uncategorized Metal	---	RL-M008	TRU Mixed Inorganic Debris Metals without Mercury				
	Uncategorized Metal	---	RL-M021	TRU Mixed Inorganic Debris PCBs with Mercury				
	Uncategorized Metal	6200	AW-W018	Sodium-TRU				
	Uncategorized Metal	6200	AW-W019	Sodium Potassium-(NaK)-TRU				
	Uncategorized Metal	5100	AW-W021	Metal Debris				
	Uncategorized Metal	---	IN-M003	Element Hardware FCF Waste				
	Uncategorized Metal	3100	IN-W260B	Inorganic Process Residues		040		
	Uncategorized Metal	5190	IN-W322	Sample Fuel		154		
	Uncategorized Metal	---	LA-WR01	Mixed Metal Scrap and Incidental Combustibles				
	Uncategorized Metal	---	LA-WR05	Noncombustible Scrap				

TABLE C-1 *(Continued)*
WASTE IDENTIFIERS CROSS-CORRELATION

[a] Waste stream unique identifications (ID) are taken from the U.S. Department of Energy (DOE), 1995, "Waste Isolation Pilot Plant Transuranic Waste Baseline Inventory Report," CAO-94-1005, Rev. 1, U.S. Department of Energy, Albuquerque, New Mexico.

[b] TRUCON = TRUPACT-II Content

TABLE C-2
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Inorganics	AL-W005	Solidified Aqueous Liquids/Slurries[c]		This waste stream will be generated during the remediation of a glovebox that has been used for plutonium (Pu) and other transuranic research. The glovebox continues to be used for transuranic research. Some of the contents of the glovebox will become mixed transuranic (MTRU) waste. It has not yet been determined what volume will be MTRU and what will be TRU. Isotopes that are known to be in the glovebox are: Pu-239, Pu-240, Pu-242, Np-237, Pa-233, U-235, U-236, and U-238. Concentrations of the TRU components range from 1 part per million (ppm) to 2,300 ppm in various concentrations of nitric acid. Uranium concentrations range from 0.1 ppb to 407,770 ppm. Note: This stream may contain Toxic Substance Control Act (TSCA) waste at unknown levels.	d D004 D005 D006 D007 D008 D010 D011
	Solidified Inorganics	IN-W157	Solidified Process Residues	ID 213	This waste comes from the Rocky Flats Plant (RFP). It contains alcohols and organic acids such as ethylene diamine tetra acetic acid (Versenes) set in portland and magnesia cements.	d D006 D008 F001 F002 F003
	Solidified Inorganics	IN-W166	Solidified Process Residues	ID 114	Solid inorganic process solution waste consists of cemented inorganic particulates of sludge-like (not chemically precipitated) wastes from Pu recovery operations.	D008 F001 F002 F003
	Solidified Inorganics	IN-W177	Solidified Process Residues		This waste comes from Mound Laboratory. It consists of caustic waste and neutralized waste liquids, adsorbed onto a clay called Florco®.	d

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Inorganics	IN-W179	Solidified Process Residues		This waste comes from Mound Laboratory. The waste consists of shower water, decontamination water, cooling water, and some acids and caustics that have been solidified in portland cement.	d D006 D007 D008 D009 D010 D011 F001 F003 P015
	Solidified Inorganics	IN-W181	Solidified Process Residues	ID 211A	This waste is from RFP. The waste consists of sludge from laundry operations that have been cemented in portland. The cement is described as a poor grade.	d D006 D007 D008 D009 F001 F002 F003 P015
	Solidified Inorganics	IN-W188	Solidified Process Residues	ID 211A	This waste is from RFP. The waste consists of sludge from floor drains in a Pu process facility that have been cemented in portland cement, described as poor grade.	d D006 D007 D008 D009 D022 D028 F001 F002 F003 P015

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Inorganics	IN-W216	Solidified Process Residues	ID 211A	The waste stream generated at RFP, consists of first- and second-stage sludges. Sludges were combined starting in 1979 to reduce the radiation levels of first stage sludge. Portland cement was added to absorb free liquids.	d D005 D006 D007 D008 D009 D011 D022 D028 F001 F002 F003 P015
	Solidified Inorganics	IN-W220	Solidified Process Residues	ID 111	This waste includes waste generated at Argonne National Laboratory-East (ANL-E) and solid wet sludge from RFP. The ANL-E waste is derived from research activities performed in a laboratory environment. The waste includes concrete and laboratory apparatus. The RFP solid wet sludge is cemented or dewatered sludge precipitated from aqueous waste treatment processes. Soils that are not contaminated with or by chemicals are also included.	d D004 D005 D006 D007 D008 D009 F001 F002 F003 P015
	Solidified Inorganics	IN-W221	Absorbed Aqueous Liquids	ID 113	Solid laboratory waste consists of cemented or absorbed neutralized aqueous laboratory waste.	d F003

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Inorganics	IN-W222	Solidified Process Residues	ID NYD	This waste stream, generated at RFP, consists of sludge from the incinerator off-gas system, recovery building filter plenums, pumps, etc. Portland cement is added to absorb free liquids. The sludge may contain a limited number of surgical gloves.	d D006 D008 F001 F002 F003
	Solidified Inorganics	IN-W228	Solidified Wastewater Treatment Sludges	ID 211A	This waste stream, generated at RFP, consists of wet sludge from treatment of all other plant radioactive and/or chemical contaminated wastes and further treatment of the first stage effluent. Some pre-1973 wastes may include nonsludge wastes such as electric motors, mercury and lithium batteries, bottles of liquid chemicals, and small amounts of mercury in pint bottles. Portland cement was added to absorb the residual liquids.	d D005 D006 D007 D008 D009 D011 D022 D028 F001 F002 F003 P015
	Solidified Inorganics	IN-W332	Solidified Process Residues		This waste comes from the Battelle Columbus Laboratories. It is a turco soap decontamination solution (used to decontaminate glove boxes from a Pu laboratory) that is solidified in a plaster-of-paris.	e

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Inorganics	IN-W347	Absorbed Aqueous Liquids		This waste comes from ANL-E. It consists of liquids adjusted to pH 10 using NaOH, which are then absorbed in vermiculite.	e
	Solidified Inorganics	LA-W002	Solidified Aqueous Waste,	LA 111A; 211A	Solidified aqueous waste, cemented sludge.	d
	Solidified Inorganics	LA-W003	Dewatered Sludge.	LA 111B; 211B	Dewatered sludge from Pu recovery operations.	D004
	Solidified Inorganics	LA-W006	Cemented Process Residues	LA 114A	Cemented process residues derived from decontamination activities.	D007
	Solidified Inorganics	LL-W019	Solidified Waste	LL 111	50 to 90% of this waste matrix consists of liquids solidified in 1- to 5-gallon (gal) plastic containers using portland cement or Aquaset® for the water-based liquids and Envirostone® or Petroset® for the oil-based liquids. The remainder consists of glovebox waste.	D040 F002
	Solidified Inorganics	MD-W002	Absorbed Aqueous Liquids[c]		TRU waste from PP-113, R-140, R-149. Note: This stream may contain TSCA waste at unknown levels.	e
	Solidified Inorganics	OR-W042	Inactive Storage Tank Contents—MTRU Sludge[c]		The waste stream is comprised of MTRU sludge that has settled and separated from wastewater that has been stored in large underground storage tanks. The waste is a product of past operations at Oak Ridge National Laboratories (ORNL) involving various nuclear research and radioisotope fabrication processes. Note: This stream may contain TSCA waste at unknown levels.	D006 D007 D008 D009
	Solidified Inorganics	PA-W014	Solidified TRU Waste Liquids		Aqueous Slurries—Basic. This stream is generated from the shutdown of the neptunium/technetium recovery system.	d

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Inorganics	PA-W015	TRU Solid		Other inorganic sludges generated from the shutdown of the neptunium/technetium recovery system	D007
	Solidified Inorganics	PA-W015A	TRU and Technetium Waste		Other wastewaters. This stream is generated from the shutdown of the neptunium/technetium recovery system.	e
	Solidified Inorganics	RF-M001	Solidified Process/TRM	RF 114	This waste stream represents the solidified final form of all particulate and sludge-type materials. Particulates and sludge-type materials are immobilized with portland cement. The cemented wastes are cast into 1-gal molds and allowed to cure prior to packaging. This is the final waste form for Firebrick, Pulverized or Fines/TRM, Incinerator Ash/TRM, Particulate Sludge/TRM, and Sand, Slag, and Crucible/TRM.	d D004 D005 D006 D007 D008 D009 D010 D011 D018 D019 D035 D040 F001 F002 F003 F005

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Inorganics	RF-W010	Solidified Aqueous Sludge/ TRM	RF 111	This waste stream consists of aqueous sludge from wastewater treatment mixed with 30% portland cement. The waste is generated as a result of process wastewater treatment in Building 374 and 774. Aqueous sludge is produced by vacuum filtration of precipitated solids from pretreated aqueous waste slurry. Untrapped solids are skimmed off the surface of the filter medium of the rotating drum as wet sludge. The precipitated solids are chiefly hydroxides with pH of 10 to 12. The final waste form is obtained by mixing the wet sludge with approximately 30% portland cement. RFP has several drums of aqueous sludge that were returned by Idaho National Engineering Laboratory (INEL). These old drums were packaged by alternating the layers of cement and wet sludge or by adding cement to the top and bottom of a drum containing wet sludge.	D006 D008 F001 F002 F005
	Solidified Inorganics	RF-W038	Solidified Laboratory Waste/TRM	RF 113	This waste stream is liquid waste solidified with portland cement. This waste consists of waste liquids from the analytical laboratories, research and development laboratories, and maintenance shops that are packaged and sent to Building 774 for immobilization with portland cement and absorbent cement. These are wastes which are incompatible with the process collection system and the liquid waste treatment plant. Acidic wastes are neutralized before immobilization. Immobilization is done in 55-gal drums. Approximately 21 gal of waste are added to each drum prior to storage.	D007

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Inorganics	RF-W040	Incinerator Ash/TRM		This waste stream was previously named "fluidized bed incinerator ash (TRU)-mixed." Ash is generated from operation of a fluidized bed incinerator in Building 776 or an incinerator in RFP Building 771. The incinerator was used to burn office trash, combustible waste generated in process areas, combustible oils from refrigeration units, diesel fuel, and crank case oils. The oil had been accumulated as a low-level mixed waste. Fluid bed incinerator ash was packaged in 55-gal drums lined with a rigid polyethylene liner and one bag liner. It is a portion of the waste stream entitled "fluidized bed incinerator ash/LLW mixed" in the inventory report. The ash normally assays as low-level waste (LLW) but this portion was found to be TRU.	D004 D005 D006 D007 D008 D009 D010 D011 F001 F002 F005
	Solidified Inorganics	RF-W059	Sand, Slag, and Crucible/ TRM		This waste includes unpulverized slag, unpulverized sand and crucible, unpulverized sand, slag and crucible, sand slag and crucible heel, sand from button breakout, pulverized sand slag and crucible, and pulverized slag and crucible. This waste is generated during the reduction of Pu tetrafluoride to Pu metal. Its composition includes magnesium oxide sand, crucible, calcium metal, and stainless steel (SS).	d D007
	Solidified Inorganics	RF-W063	Miscellaneous TRM		As result of the shutdown of Pu operations at RFP in November 1989, several hundred plastic bottles and several tanks of process liquids remained in storage in Buildings 371, 559, 771, and 779.	d D007
	Solidified Inorganics	RF-W065	Calcium Metal/TRM		This material is elemental calcium used in Pu reduction operations. Calcium metal pellets are mixed with Pu tetrafluoride during the reduction process as a pyrotechnic initiator.	d

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Inorganics	RF-W068	Particulate Sludge/TRM		This waste stream was previously named "Particulate-Sludge/TRU Mixed (2)." This waste was generated from Pu recovery operations in RFP Building 771. The waste consists of incineration sludge, miscellaneous sludge, sludge from size reduction area, grit, and cemented miscellaneous sludge. Spent ion exchange resin waste is not included in this data. The waste is packaged in 55-gal drums with multiple bag liners. This waste consists of a variety of organically contaminated sludges with particulate fines of heavy metals that are TRU contaminated.	d D006 D007 D008 F001 F002 F005
	Solidified Inorganics	RF-W076	Process Residues/TRM		This waste stream was previously named "Particulate-Sludge/TRU Mixed (2)." This waste was generated from Pu recovery operations in RFP Building 771. The waste consists of low-purity oxide heel, incineration sludge, miscellaneous sludge, sludge from size reduction area, grit, soot, and soot heel. The waste is packaged in 55-gal drums with multiple bag liners.	d D006 D007 D008 F001 F002 F005
	Solidified Inorganics	RL-M005	TRU Mixed Homogeneous Solids with Mercury[c]		This waste stream consists primarily of homogeneous solids. Some of the containers contain organic debris (plastic, cellulosics). Note: This stream may contain TSCA waste at unknown levels.	d D009
	Solidified Inorganics	RL-M032	TRU Mixed Inorganic Homogeneous Solids		This waste stream consists primarily of inorganic homogeneous solids (absorbents).	d D007 F003
	Solidified Inorganics	SR-W053	Ash		Ash from the RFP incinerator was sent to the Savannah River Site (SRS) for Pu recovery research purposes. It is stored in a satellite area in 235-F. The sample material was sent to SRS to investigate possible flow sheets for the recovery of Pu. The ash was classified as waste by the Colorado Court System, and the flow-sheet experiments were cancelled.	D004 D005 D006 D007 D008 D009 D010 D011 F001 F002 F005

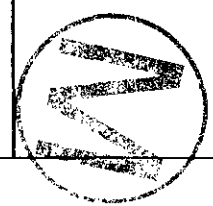


TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Organics	IN-W167	Solidified Process Residues	ID 112	TRU solid organic waste consisting of cemented or absorbed organic liquids from production or laboratory processes.	D022 F001 F003
	Solidified Organics	IN-W174	Absorbed Aqueous Liquids		This waste comes from Mound Laboratory. It consists of acid liquids, mainly nitric, absorbed onto a clay called Florco®.	d
	Solidified Organics	IN-W309	Organic Setups[c]	ID 212	This waste stream contains liquid organic wastes generated at RFP. About 47% of the organic waste stream is lathe coolant, which is 60% Texaco Regal oil and 40% carbon tetrachloride. About 10% of the organic waste stream is trichloroethane. The remainder is other organic wastes. These liquid wastes were mixed with calcium silicate to form a grease or paste-like material. Note: This stream may contain TSCA waste at unknown levels.	D005 D011 F001 F002 F004 P015
	Solidified Organics	RF-W013	Solidified Organics/TRM	RF 112	This waste stream includes waste TRU organic fluids that are transferred to RFP Building 774 for cementation from Buildings 707, 776, and 777. The liquids are mixed with gypsum cement within 55-gal drums. The drum is lined with one or two bag liners with a rigid polyethylene liner. This waste stream includes cemented solids and organic sludges/particulates.	F001 F002
	Solidified Organics	RF-W069	Organic Resins/TRM	RF 126	This waste stream was previously named "Particulate-Sludge/TRU Mixed (2)." This waste was generated from Pu recovery operations in Building 771. It consists of unleached resin and leached resin. The waste is packaged in 5-gal drums with multiple bag liners. Final waste form for this waste stream is cemented resin.	d D006 D007 D008 F001 F002 F005
	Solidified Organics	RL-M017	TRU Mixed Organic Labpacks		This waste stream consists primarily of organic labpacks. Some of the containers contain inorganic debris (metals), organic debris (plastic, cellulosics).	d F003
	Solidified Organics	RL-M018	TRU Mixed Organic Labpacks (State only)		This waste stream consists primarily of organic labpacks. Some of the containers contain organic debris (plastic, cellulosics).	e

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Organics	RL-M024	TRU Mixed Organic Labpacks with polychlorinated biphenyls (PCB)[e]		This waste stream consists primarily of organic labpacks. Some of the containers contain organic debris (plastic, rubber, cellulosics), and PCBs.	d
	Solidified Organics	SR-W006	Organic TRU		Laboratory waste from Pu extractions generated in the Savannah River Technology Center (SRTC) 773-A Facility. Homogeneous, liquid, flammable, xylene-based chelating agent. TTA - Thenoyl trifluoroacetone.	d
	Salt Waste	IN-W311	Salt Waste		This waste was generated at the RFP.	D028 F001
	Salt Waste	IN-W312	Salt Waste	ID 124	Pyrochemical salt consists of used chloride salts from pyrochemical processes such as electrorefining, molten salt extraction or direct oxide reduction.	d
	Salt Waste	IN-W314	Salt Waste		This waste, generated at the RFP, consists of chunks of salt and ceramic.	F001
	Salt Waste	RF-W058	Miscellaneous Pu Recovery By-products/TRM	RF 124	This waste is generated during Pu recovery operations such as direct oxide reduction molten salt extraction, electrorefining, and salt scrub. Its composition includes mixed salts, a probable presence of magnesium, sodium and potassium metals and chromium. This waste consists of reactive molten and electrorefining (ER) salt residues from Pu purification and direct oxide reduction.	d D007

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Soils/Gravel—S4000	Soils	IN-W263	Contaminated Soils/Debris		This waste, generated at Mound Laboratory, consists of soils, including small rocks and pebbles, generated from cleanup of a leak. All soil waste was dry when packaged. A few waste boxes also include picks, shovels, metal cans, rubber gloves, booties, respirators, plastic, and possibly an air hammer and chisel.	d D006 D007 D008 D009 D010 D011
	Soils	RL-M007	TRU Mixed Soils without Mercury		This waste stream consist primarily of soils. Some of the containers contain organic debris (rubber, cellulosics, plastic) and inorganic debris (metal).	D007 D010
Debris Waste - S5000	Combustible	IN-W198	Plastic/Rubber Debris	ID 216C	The waste stream is from the RFP and consists of various types of plastics such as polyethylene (PE), polyvinyl chloride (PVC), teflon (TFE), and nonleaded rubber items. The waste may be bags, vials, bottles, sheeting, and surgical gloves. Some other combustible wastes such as respirator facemasks and paper may be included. Some small amounts of noncombustible wastes may also be present.	D008 D022 D029 F001 F002 F003 F005
	Combustible	IN-W202	Wood Debris	ID 216A	This waste stream is from the RFP and primarily consists of wood in the form of lumber, plywood, filter frames, and possibly ladders. Some of the items such as plastic sheeting, Kimwipes®, and other combustibles are also present. Plastic sheeting may have some paint coatings. Limited noncombustibles such as nails and sheetrock may also be included.	D008 F001 F002 F003
	Combustible	IN-W205	Combustible Debris	ID 216B	This waste stream from the RFP primarily consists of line- and nonline-generated combustible materials such as plastics, paper, empty PE bottles, booties, paper, plastic sheeting, and surgical gloves. The waste may be dry or damp. Limited amounts of noncombustibles may also be present.	D008 F001 F002 F003
	Combustible	IN-W250	Leaded Gloves/Aprons Debris	ID 123	Discarded leaded glovebox gloves and leaded aprons.	D008

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Combustible	IN-W252	Leaded Gloves/Aprons Debris	ID 123; 223A	This waste comes from RFP. It consists of leaded rubber gloves and aprons. A limited amount of unleaded gloves, lead bricks, and lead sheeting may also be present.	D008 D022 D028 D029 F001 F002 F003 F005
	Combustible	IN-W254	Leaded Gloves/Aprons Debris	ID 223A	This waste comes from RFP. It consists of leaded rubber gloves and aprons. A limited amount of unleaded gloves, lead bricks, and lead sheeting may also be present.	D008 F001 F002
	Combustible	IN-W256	Leaded Gloves/Aprons Debris		This waste stream is generated at the Mound Laboratory. The waste consists of neoprene dry box (glovebox) gloves, neoprene, O-rings, and lead-lined gloves.	D008
	Combustible	IN-W325	Unknown Solids[e]		This waste stream was generated at Mound Laboratory and consists of classified parts.	e
	Combustible	IN-W327	Combustible Debris		This waste stream is from Mound Laboratory and consists of nonline generated combustible wastes such as plastic sheeting, paper, reagents, gloves (rubber and cloth), plastic bottles, wood, paper suits, and shoe covers. About 75% of the waste is compacted. The waste may be either dry or damp.	e
	Combustible	IN-W330	Plastic/Rubber Debris		This waste stream, generated at Mound Laboratory, consists of various types of plastics (PVC, PE, Tygon®, etc.) in the form of tubing, piping, sample vials, gaskets, manipulator boots, etc. Limited amounts of other combustible wastes may also be included. One drum contains liquid mercury. The wastes are primarily from decommissioning and decontamination (D&D) activities at the Pu processing and research buildings. Limited amounts of waste may be damp.	e

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Combustible	IN-W336	Combustible Debris		This waste stream, generated at Battelle Columbus Laboratories, contains such combustible items as wood, plastic suits, nylon reinforced plastic tent structures, shoe covers, rubber gloves, and air hose. The waste is from decontamination and deactivation of the Pu laboratory.	e
	Combustible	LA-W004	Combustible Waste	LA 116A	Combustible waste - paper, rags, plastic, rubber, etc.	D005
	Combustible	LL-M001	Research and Development Glovebox Waste	LL 116	The waste consists mostly of untreated dry solids such as tissues, paper, assorted plastics, glassware, ceramics, and metals. Portland cement or Aquaset® is used to solidify small amounts of water-based liquids; Envirostone® or Petroset® is used to solidify small amounts of solvents and oil-based liquids. The composition varies considerably, but it is predominantly organics (> 90% by weight).	d D006 D008 D009 D040
	Combustible	RL-M009	TRU Mixed Organic Debris with Corrosives		This waste stream consists primarily of organic debris. Some of the containers contain inorganic debris (metals) and soils.	d
	Combustible	RL-M010	TRU Mixed Organic Debris with Mercury		This waste stream consists primarily of organic debris. Some of the containers contain inorganic debris (metals, including mercury) and soils.	d D006 D009
	Combustible	RL-M011	TRU Mixed Organic Debris without Mercury		This waste stream consists primarily of organic debris. Some of the containers contain inorganic debris (metals) and soils.	d D007 D008
	Combustible	RL-M012	TRU Mixed Organic Debris/ Contaminated without Organics		This waste stream consists primarily of organic debris. Some of the containers contain inorganic debris (metals) and soils.	D019

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[c]	EPA Code
	Combustible	RL-M013	TRU Mixed Organic Debris/ Contaminated with Organics		This waste stream consists primarily of organic debris. Some of the containers with organics contain inorganic debris (metals) and soils.	D019 F001 F002 F003 F004 F005
Debris Waste - S5000	Combustible	RL-M014	TRU Mixed Leaded Gloves/ Aprons with Mercury		This waste stream consists primarily of leaded gloves/aprons. Some of the containers contain inorganic debris (metals, including mercury), organic debris (plastic, rubber, cellulosics), and soils.	d D005 D006 D007 D008 D009
	Combustible	RL-M015	TRU Mixed Leaded Gloves/ Aprons Metals without Mercury		This waste stream consists primarily of leaded gloves/aprons. Some of containers contain inorganic debris metals, without mercury), organic debris plastic, rubber, cellulosics), and soils.	d D005 D006 D007 D008
	Combustible	RL-M016	TRU Mixed Leaded Gloves/ Aprons Metals/Organics without Mercury		This waste stream consists primarily of leaded gloves/aprons. Some of the containers contain inorganic debris metals), organic debris (plastic, rubber, cellulosics), and soils.	D007 D008 D019
	Combustible	RL-M022	TRU Mixed Leaded Gloves/ Aprons PCBs with Mercury[e]		This waste stream consists primarily of leaded gloves/aprons. Some of the containers contain inorganic debris (metal), organic debris (plastic) and hazardous constituents including PCBs and mercury. Note: This waste stream may contain TSCA waste at unknown levels.	D006 D008 D009
	Combustible	RL-M023	TRU Mixed Resource Conservation and Recovery Act (RCRA) Organic Debris with PCBs[e]		This waste stream consists primarily of organic debris contaminated with PCBs. Note: This waste may contain TSCA waste at unknown levels.	d

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
	Filter	IN-W214	Composite Filters		This waste stream, generated at the Mound Laboratory, consists primarily of spun glass filters and fiberglass glovebox prefilters. The waste may include limited amounts of other noncombustibles.	d D009
Debris Waste - S5000	Filter	RF-W066	Filters & Media/TRM	RF 119	This waste stream was previously named "Filter Waste/TRU." Filter waste is generated from process operations throughout the RFP site. This waste consists of Ful-flo filters from the Building 771 incinerator, Ful-flo filters from nonincineration operations, absolute glovebox filters from nonacid contaminated operations, acid contaminated absolute glovebox filters, acid contaminated high-efficiency particulate air (HEPA) filters, nonacid contaminated HEPA filters, plenum prefilters, filter media, and processed filter media. Processed filter media is material which has been treated using portland cement to absorb moisture and neutralize acid contamination. Filter waste is packaged in 55-gal drums and metal standard waste boxes.	d D004 D006 D007 D008 D009 D010 D011 F001 F002 F005
	Filter	RF-W067	Cemented Filters/TRM	RF 119	This waste stream was previously named "Filter Waste/TRU." Filter waste is generated from process operations throughout the RFP site. Processed filter media is material that has been treated using portland cement to absorb moisture and neutralize acid contamination. Filter waste is packaged in 55-gal drums and metal standard waste boxes. Hazardous constituents originate in liquid and gaseous effluents from processing operations.	d D005 D006 D007 D008 D009 F001 F002 F003
	Graphite	IN-W272	Debris Waste	ID 115	Coarse graphite chunks.	F001 F002
	Graphite	IN-W275	Debris Waste		This waste stream, generated at the RFP, is similar to graphite molds. A graphite core is part of the shaped graphite mold to cast Pu metal. The graphite has broken into pieces, and some of the graphite has been scarfed or wire brushed to remove any above-discard deposits of Pu.	F001

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Graphite	IN-W276	Debris Waste	ID 215A	This waste stream, generated at the RFP, consists of graphite molds used in casting Pu metal. The waste may also include small amounts of surgical gloves. The graphite is in the form of broken mold pieces. Some of the graphite has been scarfed or wire-brushed to remove above-discard deposits of Pu.	D022 D028 F001 F002 F003 F005
	Graphite	RF-W060	Coarse Graphite/TRM	RF 115	This waste form includes scarfed graphite chunks and coarse graphite. This waste is a result of broken graphite molds from the classified weapons shape casting process.	D006
	Heterogeneous	IN-W169	Predominantly Combustible Debris	ID 216C	The waste stream is from RFP and primarily consists of line- and nonline-generated dry combustible materials such as paper, rags, plastics, surgical gloves, cloth overalls and booties, cardboard, wood, wood filters frames, and laundry lint. Some combustibles may be damp or moist. Limited amounts of noncombustibles such as glass, concrete, cement, lead glovebox gloves, batteries, and metal scrap may also be present.	D008 D022 D029 F001 F002 F003 F005
	Heterogeneous	IN-W170	Predominantly Combustible Debris		This waste is generated at ANL-E. The waste is derived from decontamination and disposal of facilities and ancillary systems (e.g., gloveboxes).	D004 D006 D008 F003
	Heterogeneous	IN-W171	Predominantly Combustible Debris		This waste is generated at ANL-E. The waste is derived from research activities performed in a research environment. The waste includes soft plastics, cardboard, rags, paper, and cloth from various processes. The waste is packaged in 55-gal drums or in standard waste boxes.	D004 D006 D008 F003

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Heterogeneous	IN-W172	Predominantly Combustible Debris		This waste stream, generated at Bettis Atomic Power Laboratory, consists primarily of rags, gloves, plastic, paper, carbo-wax, filters, oil-contaminated absorbent (diatomaceous earth), and rubber. The waste stream may also contain noncombustible items.	F001 F002
	Heterogeneous	IN-W186	Predominantly Combustible Debris	ID 116	Combustible waste consists of cellulosic, plastic or cloth waste from various processes.	D008 F001 F002
	Heterogeneous	IN-W189	Predominantly Combustible Debris	ID 221A	This waste, generated at RFP, contains mainly Benelex® which is a dense, laminated, lignocellulose hardboard made from wood chips and particles. Benelex® is generally 2 inches (in.) thick. Some of the Benelex® has lead shielding attached to it. Metal hinges and angle iron strongbacks are also present. Plexiglas™ is the other major constituent in the waste. The Plexiglas™ thickness ranges from 2 to 4 in. Both the Benelex® and the Plexiglas™ are combustible.	D008 F001
	Heterogeneous	IN-W197	Predominantly Combustible Debris	ID 216A	The waste stream is from the RFP and primarily consists of damp or wet line- and nonline-generated dry combustible materials such as paper, rags, plastics, surgical gloves, canvas, cardboard, wood, and rubber. Some combustibles may be damp or moist. Moisture content may range from damp to wet, and may include water, soaps, nitric acid, or caustic solutions. Limited amounts of noncombustibles such as glass, concrete, cement, leaded glovebox gloves, and metal scrap may also be present. These wastes are mostly from decontamination and cleanup work, and may be from any Pu area.	d D008 D022 F001 F002 F003 F005

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Heterogeneous	IN-W203	Predominantly Combustible Debris		This waste stream, generated at Mound Laboratory, includes two different types waste depending on when the waste was generated. Prior to 1980 waste consisted of glovebox floor sweepings and rust. After 1980, waste may consist of large combustible waste such as plastic tanks, Plexiglas™ shielding and windows, wood, and fiberglass conveyor glovebox sections. Limited amounts of small combustibles such as shoe covers and surgical gloves are also included.	D009
	Heterogeneous	IN-W204	Predominately Combustible Debris		This waste stream is smaller combustible items from Mound Laboratory that fit into drums.	D008 D009
	Heterogeneous	IN-W225	Predominantly Combustible Debris	ID 221A	The waste, generated at RFP, contains mainly Benelex® which is a dense, laminated, lignocellulose hardboard made from wood chips and particles. Benelex® is generally 2 in. thick. Some of the Benelex® has lead shielding attached to it. Metal hinges, and angle iron strongbacks are also present. Plexiglas™ is the other major constituent in the waste. The Plexiglas™ thickness ranges from 2 to 4 in. Both the Benelex® and the Plexiglas™ are combustible.	D008 F001
	Heterogeneous	IN-W259	Heterogeneous Debris		This waste stream, generated at ANL-E, contains alpha hot cell waste. Noncombustible and combustible waste are segregated. Combustible wastes include: paper, plastic and PVC containers, rubber O-rings and gloves, rags, and Q-tips. Noncombustible wastes include: laboratory equipment, tools, fixtures, glassware, pipe, tubing, fitting, fasteners, firebrick, ferrous and nonferrous metal scraps and parts, and small electric motors. Sodium in the waste is reacted with ethyl alcohol, mixed with pelletized clay, and dried. Nitrates and oxidizing agents are neutralized or reduced, mixed with pelletized clay.	D008

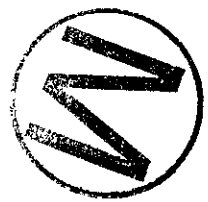


TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Heterogeneous	IN-W265	Predominately Inorganic Nonmetal Debris	ID 121	This waste contains blacktop, concrete, reinforced concrete, cinder blocks, bricks, dirt and sand. Limited amounts of waste may be damp. A limited amount may contain combustibles such as coveralls and gloves. The waste is generated from cleanup of spills and leaks, process changes, maintenance, and D&D operations. Portland cement is added to containers that contain wet or damp waste.	F001 F002 F003 F004
	Heterogeneous	IN-W269A	Debris Waste		This waste stream, generated at INEL, contains laboratory waste from ANL-W including fluxwire, fission counters, analytical samples dissolved and absorbed on Oil-Dri, glassware, vials, miscellaneous waste from gloveboxes, dissolved pellets absorbed on Oil-Dri, enriched and normal U308 pellets, aluminum foil and capsules, TREAT® waste capsules, chlorinated ion exchange resins, Pu sources. Laboratory waste includes Kimwipes®, trash, glassware, dissolved samples absorbed in Oil-Dri, analytical samples, gloves, etc.	e
	Heterogeneous	IN-W271	Uncategorized Inorganic Process Residues[e]		This waste stream was generated at Mound Laboratory. The records at Mound Laboratory and at INEL do not agree on the content. The waste most likely is graphite crucibles and electrodes, with some containers of mercury.	D009
	Heterogeneous	IN-W281	Heterogeneous Debris		This waste stream, generated at the Mound Laboratory, consists of large, noncombustible wastes such as tanks (SS and tantalum), piping, ducts, conduit, electric motors, pumps, metallurgical presses, lathes, dissolvers, evaporators, furnaces, ladders, vacuum sweepers, 24- x 24- x 12-in. HEPA filters, fume hoods, gloveboxes, Plexiglas™ glovebox windows, and floor tile. Limited amounts of combustible wastes (plastic tanks, fiberglass gloveboxes, plastic contamination control tents, etc.) are also included.	D005 D006 D007 D008 D009 D010 D011

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Heterogeneous	IN-W283	Heterogeneous Debris	ID 225A	This waste stream, generated at the RFP, consists of piping, flanges, valves, tools, equipment, PVC piping, glassware (flasks, broken ion exchange columns, etc.), glass filters, leaded glovebox gloves, paper, and plastics. Wastes from renovations of the americium recovery line were shipped only in 1972 and 1973. Some of the containers are lead-lined.	d D008 F002 F003
	Heterogeneous	IN-W285	Heterogeneous Debris		This waste stream, generated at Battelle Columbus Laboratories, contains noncombustible items such as tools, crucibles, piping, valves, pieces of equipment, lead bricks, Plexiglas™, and filters.	D008
	Heterogeneous	IN-W289	Unknown Solids[c]		This waste is generated at ANL-E and RFP. The waste is derived from decontamination and disposal of facilities and ancillary systems.	D004 D005 D006 D007 D008 D009 F001 F002 P015
	Heterogeneous	IN-W291	Debris Waste		This waste stream, generated at ANL-E, contains combustible and noncombustible items such as paper, rags, rubber gloves, plastic bottles, glassware, small tools, balances, and empty metal cans. The waste is usually separated into combustible and noncombustible streams.	d F003

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Heterogeneous	IN-W302	Unknown Solids[c]		This waste stream, generated at Bettis Atomic Power Laboratory, contains noncompressible and noncombustible items such as absolute filters, solidified chemical waste, contaminated metal equipment, furnace brick, and highly contaminated glovebox equipment. Metal scrap could include bars, sheet, fixtures, small equipment tools, etc. made of carbon steel, SS, Inconnel, aluminum, copper, brass and zirconium. Chemical wastes include spent chemical solutions and associated solids from the isotope and isotopic dilution analysis of nuclear fuel specimens. The residues were neutralized before being either mixed with absorbent material solidified.	d F001 F002
	Heterogeneous	IN-W329	Heterogeneous Debris		This waste stream, generated at Mound Laboratory, consists of nonline generated noncombustible wastes such as tools, pipe, equipment, metal, glass, concrete, plaster, bricks, and dirt. Limited amounts of combustible wastes such as paper, rags, etc. are also included.	e
	Heterogeneous	IN-W334	Debris Waste		This waste stream, generated at Battelle Columbus Laboratories, contains a mixture of combustible and noncombustible items in roughly equal proportions. Combustible items include paper and paper products. Noncombustibles are primarily metal and some glass.	e
	Heterogeneous	IN-W345	Debris Waste		This waste stream, generated at INEL, consists of a plastic glovebox, a hydraulic pump containing oil, vacuum pump, centrifuges, tools, and experimental fuel capsules. The presence of hazardous materials is not known, but some absorbed oil is likely.	e

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Heterogeneous	IN-W351	Debris Waste		This waste stream, generated at ANL-E, consists of glass bottles used to transport liquid wastes.	e
	Heterogeneous	NT-W001	Heterogeneous Debris, Uncategorized	NT 111; 116; 211;225	This waste stream consists of glovebox parts, laboratory trash, contaminated equipment, and solidified sludges. Real-time radiography has been performed on the waste to verify there are no free liquids present, with the exception of liquid in aerosol cans. Most of the waste is contact handled (CH) TRU waste; one and 3 drums are remote-handled (RH). The waste stream was generated at Lawrence Livermore National Laboratory, Livermore, CA (LLNL) and shipped to the Nevada Test Site (NTS) from 1974 until 1990. The waste was declared as potentially mixed TRU waste by the generator in April 1991.	d D006 D007 D008 D011 F001 F002 F003 P015
	Heterogeneous	OR-W044	CH TRU Heterogeneous Debris[c]	OR 125A; 125B	This waste stream consists of CH TRU waste which is classified as contaminated equipment, decontamination debris or dry solids. The physical form is solid. These wastes do not contain free or containerized liquids. Note: This stream may contain TSCA waste at unknown levels.	D006 D008 D009 D011
	Heterogeneous	OR-W045	CH TRU Uncategorized[c,e]		This waste stream consists of CH TRU waste which is not classified. The physical form is either solid, liquid, mixed (both solid and liquid), or unknown. Note: This stream may contain TSCA waste at unknown levels.	D006 D008 D009 D011
	Heterogeneous	OR-W047	CH TRU Heterogeneous Debris[c]		This waste stream consists of CH TRU waste which is classified as contamination equipment, decontaminated debris, or dry solids. The physical form is solid. Note: This stream may contain TSCA waste at unknown levels.	D006 D008 D009 D011
	Heterogeneous	RF-M002	Supercompacted Combustibles/TRM	RF-116C	This waste consists of cloth and paper products from cleanup of gloveboxes and spills, which has been supercompacted for volume reduction.	F001 F002 F005

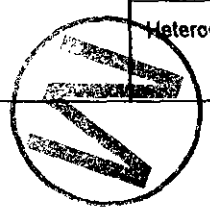


TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Heterogeneous	RF-W008	Soil & Cleanup Debris/TRM	RF 121	This waste stream is construction rubble generated during D&D activities. The waste consists of blacktop/concrete/dirt/sand. The waste is generated from construction/demolition within the Pu process buildings. The waste is usually packed in 55-gal drums with multiple bag liners, a fiberboard liner, and a rigid polyethylene liner. Also, the waste can be packaged in DOT 7A, Type A metal boxes which are lined with a fiberboard and PVC liner. Metals are considered to be potentially present in the rubble from demolition and cleanup activities. Solvents are potentially present from the materials used during decontamination.	D006 D007 D008 F001 F002 F005
	Heterogeneous	RF-W012	Combustibles/TRM	RF 116	The waste consists mainly of cloth and paper products from cleanup of gloveboxes and spills, involving hazardous solvents. The bulk of these wastes are packaged in 55-gal drums with one rigid polyethylene liner and several bag liners. In addition the waste may be repackaged into DOT 7A, Type A metal boxes which are lined with a fiberboard and PVC liner.	F001 F002 F005
	Heterogeneous	RF-W036	Firebrick, Pulverized or Fines/TRM	RF 122	This waste stream was previously named "Firebrick - Pulverized or Fines." This waste is generated from replacement of fire brick in the Pu recovery incinerator in RFP Building 771. The fire brick must be replaced periodically because of the Pu buildup. The fire brick is pulverized to facilitate Pu recovery. Material which assays below the economic discard limit is discarded as pulverized fire brick waste. The waste is packaged in 55-gal drums lined with a rigid polyethylene liner.	D004 D006 D007 D008 F001 F002 F005
	Heterogeneous	RL-M004	TRU Mixed Heterogeneous Debris (State only)		This waste stream consists primarily of heterogeneous debris (filters). Some of the containers contain organic debris (plastic).	e
	Heterogeneous	RL-M006	TRU Mixed Inorganic Homogeneous Solids without Mercury		This waste stream consists primarily of inorganic homogeneous solids. Some of the containers contain organic debris (rubber, cellulosics).	d D019 F003

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Heterogeneous	RL-M031	TRU Mixed Heterogeneous Debris (State only)		This waste stream consists primarily of heterogeneous debris. The waste is hazardous by state regulation.	e
	Heterogeneous	SA-W134	TRU Waste at Hot Cell Facility		Predominantly metal laboratory trash including saw blades, copper and brass fittings. Balance of waste is combustible laboratory trash including rubber gloves and Tygon® tubing. There are no liquids.	e
	Heterogeneous	SR-W026	Heterogeneous Debris		200 Areas (F and H Separations Facilities). This waste is primarily solids consisting of mainly bootles, laboratory coats, floor sweepings, rags, labware, and other job control wastes. This waste is generated primarily through separation activities in the course of Pu production, includes small amounts of TRU waste from on-site laboratories.	d D004 D006 D007 D008 D009 D011 D018 D019 D022 D023 D024 D025 D026 P015

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Heterogeneous	SR-W027	Heterogeneous Debris		200 Areas (F and H Separations Facilities). This waste is generated primarily through separation activities in the course of Pu production and includes small amounts of TRU waste from on-site laboratories. This waste stream is primarily solids consisting of booties, laboratory coats, floor sweepings, labware, rags, and other job control waste. 	d D004 D006 D007 D008 D009 D011 D018 D019 D022 D023 D024 D025 D026 F001 F002 F003 F005 P015
	Inorganic Nonmetal	IN-W161	Ceramic/Brick Debris	ID 122; 222B	This waste contains whole and broken pieces of construction bricks, cinderblocks, and firebrick. Waste generated in the 1971 to 1973 period includes firebrick from the Pu recovery incinerator and related refractory development and from four boilers; cinderblocks and other brick from routine maintenance and from following the RFP fire. Waste generated since 1973 is mostly firebrick from Pu recovery operations. The firebrick generated since 1973 is a high-alumina, high-strength brick manufactured by Plibrico (Plicast 40®). Some of the incinerator firebrick is scarfed to remove surface contamination and then leached with nitric acid to recover Pu.	F001 F002

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Inorganic Nonmetal	IN-W230	Inorganic Nonmetal Debris	ID 122	Insulation, firebrick, and concrete.	F001 F002
	Inorganic Nonmetal	IN-W240	Glass Debris	ID 118	Glass waste consists of discarded labware, windows, containers or raschig rings from various processes.	D008 D009 F001
	Inorganic Nonmetal	IN-W243	Glass Debris	ID 218B	This waste stream, generated at the RFP, consists of glass sample vials, bottles, lead-taped sample vials, ion exchange columns, dissolver pyrex laboratory glassware such as Pyrex™ flasks and beakers, glovebox windows (glass, Plexiglas™, leaded glass), and crushed and ground glass. The waste includes limited amounts of other noncombustibles such as metals, and limited amounts of combustible wastes. No sludges should be present although some glass vials may contain limited amounts of residual liquids.	D008 D029 F001 F002 F003 F005
	Inorganic Nonmetal	IN-W245	Uncategorized Unknown[e]	ID 225B	This waste stream, generated at the RFP, consists of boronated glass rings used to minimize neutron multiplication in liquid storage tanks. Unleached raschig rings was used from 1971–79 as a separate stream and then combined with leached raschig rings. The rings are about 1.75 in. high and 1.5 in. in diameter, with a 0.25 in. wall thickness. The rings are heat and chemical resistant borosilicate glass. Some of the rings, which had above-discard amounts of Pu, were leached with nitric acid to recover the Pu and then rinsed with water, and dried. Some of the rings may be contaminated with small amounts of oil.	d D008 F001

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[c]	EPA Code
Debris Waste - S5000	Inorganic Nonmetal	IN-W247	Uncategorized Unknown[e]	ID 218A	This waste stream, generated at the RFP, consists of boronated glass rings used to minimize neutron multiplication in liquid storage tanks. Unleached rashig rings was used from 1971–79 as a separate stream and then combined leached rashig rings. The rings are about 1.75 in. high and 1.5 in. in diameter, with a 0.25 in. wall thickness. The rings are heat and chemical resistant borosilicate glass. Some of the rings, which had above-discard amounts of Pu, were leached with nitric acid to recover the Pu and then rinsed with water, and dried. Some of the rings may be contaminated with small amounts of oil.	d D008 D028 D029 F001 F002 F003 F005
	Inorganic Nonmetal	IN-W249	Uncategorized Unknown[e]		This waste stream, generated at Mound Laboratory, consists mostly of whole and broken glassware and glass sample vials. The majority of the glass is Pyrex™. Limited amounts of other noncombustibles may be present.	D009
	Inorganic Nonmetal	MD-M001	Asbestos Debris[e]		(24) Asbestos filters, (1) glass filter. Note: This waste may contain TSCA waste at unknown levels.	e
	Inorganic Nonmetal	RF-W026	Used Absorbents/TRM	RF 122	This waste stream was previously named "Spent Absorbent/TRU (Oil Dry)". This waste stream was not specifically identified in the Storage and Inventory Report prepared by RFP in fulfillment of Federal Facility Compliance Act requirements. This waste is the TRU fraction of the waste titled "Oil Dry/LLW Mixed" in the Inventory Report. Normally it is low-level waste (LLW) but occasionally some assays as TRU. Absorbents, usually vermiculite materials, which are used in the absorption, or absorption of any liquids as needed. One of the most commonly used absorbents is Oil Dri®. Spent absorbents are assumed to be radiologically contaminated. The waste is packaged in 55-gal drums lined with two polyethylene bags.	F001

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Inorganic Nonmetal	RF-W032	Ground Glass/TRM	RF 118	This waste stream is crushed fluorescent lights with some leached glass. Glass waste consists of crushed fluorescent lamps that come from the fluorescent lights used throughout the Pu and uranium processing areas, as well as ground leaded glass. Small amounts of leached glass may be mixed with the crushed fluorescent lamp waste. This glass waste is packaged in 55-gal drums that are lined with one fiberboard liner and two polyethylene bags.	D008
	Inorganic Nonmetal	RF-W052	Glass/TRM	RF 118	This waste stream is glass from D&D, labs, etc. This waste stream is made up of glass from analytical laboratories, recovery processes, ceramics, and glovebox windows. This waste stream was previously named "glass." This waste form has been characterized by toxicity characteristic leaching procedure (TCLP) analytical data and process knowledge. Ground glass is characterized by process knowledged and limited analytical data.	D005 D008 F001 F002
	Inorganic Nonmetal	RF-W056	Magnesium (Mg) Oxide Crucibles/TRM	RF 118	This waste stream includes any type or size of ceramic crucibles or liners including LECO crucibles. This waste consists of magnesium oxide crucible, magnesium oxide crucible fragments with reactive salts of calcium, magnesium, sodium, and/or potassium adhering to the surface and containing Pu residue. This waste stream was generated during Pu recovery using pyrochemical and electro-chemical processing. Waste is placed in 4-liter poly bottles and double plastic bagged or placed in 1 gal or 1 quart paint cans, then placed into 55-gal drums.	d D006
	Inorganic Nonmetal	RF-W057	Insulation/TRM	RF 122	This waste stream is contaminated insulation. The insulation is generated from construction and demolition on site. This waste was characterized using process knowledge for manifesting purposes in 1987 and 1989 to determine if any reportable quantities per 49 CFR 172 were present. These are spent solvents from degreasing of Pu or other metals.	F001 F002

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Lead/Cadmium Metal Waste	AW-M001	ALHC Upgrade Decon Debris		Waste packaged for WIPP containing: radioactive cadmium debris from CH-ANL-242T, solidified to meet WIPP-WAC requirement for particulate immobilization, and bags of lead-lined gloves were placed in the solidified drums to fill the void space.	D006 D007 D008
	Lead/Cadmium Metal Waste	AW-M002	Lead/Cadmium Metal Waste		This waste is typically lead lined gloves replaced at the Experimental Fuel Laboratory glovebox.	D008
	Lead/Cadmium Metal Waste	ET-M001	Hot Laboratory & Pu Facility D&D		1 lead shielding brick plus additional hot material.	D008
	Lead/Cadmium Metal Waste	RF-W029	Leaded Gloves/TRM	RF 123	This waste stream consists of leaded rubber gloves that are used on gloveboxes to reduce radiation exposure to personnel. Gloves that are damaged or that do not meet safety inspection requirements are replaced with new gloves and discarded as waste. The gloves are packaged in 55-gal drums lined with a rigid polyethylene liner and one bag liner.	D008
	Lead/Cadmium Metal Waste	RF-W041	Leaded Gloves-Acid Contaminated/TRM		This waste stream consists of leaded rubber gloves used in the glovebox system for Pu recovery operations in RFP Buildings 771 and 371. These gloves are contaminated with nitric acid and other acids when replaced and discarded as waste. The gloves are packaged in 55-gal drums lined with a rigid polyethylene liner and a bag liner. Leaded gloves as waste are currently characterized by process knowledge and sample analysis using the Extraction Procedure (EP) Toxicity Test.	D008

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Lead/Cadmium Metal Waste	RL-M019	TRU Mixed Elemental Hazardous Metals with Mercury		This waste stream consists primarily of elemental hazardous metals. Some of the containers contain inorganic debris (metals, including mercury), organic debris (plastic, rubber, cellulosics), and soils.	d D005 D006 D007 D008 D009
	Lead/Cadmium Metal Waste	RL-M020	TRU Mixed Elemental Hazardous Metals without Mercury		This waste stream consists primarily of elemental hazardous metals. Some of the containers contain inorganic debris (metals without mercury), organic debris (plastic, rubber, cellulosics), and soils.	D007 D008
	Uncategorized Metal	IN-W260A	Inorganic Process Residues		This waste stream, generated at Bettis Atomic Power Laboratory, contains solid binary scrap as powder, pellets, or rods. The material is made of ceramic based UO_2 and ThO_2. Some kilorods or fuel rods constructed of fuel pellets within hollow zirconium tubes are also included.	e
	Uncategorized Metal	IN-W280	Metal Debris		This waste comes from Mound Laboratory. It consists of SS, carbon steel, and small amounts of aluminum-metal wastes in the form of valves, piping, wrenches, nuts, bolts, SS tubing, spatulas, pans, hotplates, ringstands, etc. Limited amounts of combustible and noncombustible waste also present from. Most of the waste is metal waste that is primarily from D&D operations. Some of the metals were leached with nitric acid, ultrasonically cleaned and dried to remove above-discard amounts of Pu.	D009
	Uncategorized Metal	IN-W287	Metal Debris		This waste stream, generated at ANL-E, contains glovebox sections and associated equipment from decontamination and decommissioning operations. The waste is predominantly noncombustible.	D008

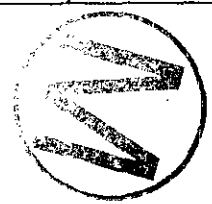


TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Uncategorized Metal	IN-W294	Metal Debris	ID 217C	This waste comes from RFP. It consists of the smaller pieces of the waste that have been washed with water to recover Pu.	D008 D022 F001 F002 F005
	Uncategorized Metal	IN-W296	Metal Debris	ID 217C	The waste comes from RFP. It consists of nonline- and line-generated wastes. The waste may be in the form of gloveboxes, glovebox windows, furnaces, lathes, drill presses, ducting, piping, angle iron, tanks, downdraft tables, part carriers, respirator filters, ultrasonic cleaners, control panels, electronic instrumentation, vacuum sweepers, pumps, motors, railing stairs, metal racks and trays, hotplates, empty metal produce and paint cans, carts, power tools (saws, drills, etc.), hand tools (wrenches, hammers, saws, chisels, gauges, etc.), chairs, desks, tables, typewriters, filing cabinets, crushed 55-gal drums, etc. The waste may also include limited amounts of combustible waste.	D008 D028 D029 F001 F002 F003 F005
	Uncategorized Metal	IN-W298	Metal Debris	ID 117	This waste comes from the RFP. It consists of used tantalum crucibles, funnels, funnel inserts, and pour rods.	D008 F001 F002
	Uncategorized Metal	IN-W300	Metal Debris	ID 117	Discarded metal.	D008 F001 F002 P015
	Uncategorized Metal	LA-W001	Mixed Metal Scrap and Incidental Combustibles	LA 125A	Mixed metal scrap and incidental combustibles.	d

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Uncategorized Metal	LA-W005	Noncombustible Scrap	LA 117A; 118A	Noncombustible scrap—small tools, cans, small equipment items, broken glass, etc.	D006
	Uncategorized Metal	LA-W009	Metal Waste from Gloveboxes and Equipment		Metal waste from gloveboxes and equipment	F001 F002 F005
	Uncategorized Metal	LL-W018	Combined Metal Scrap & Incidental Combustibles	LL 125	The waste consists mostly of metal scrap such as decommissioned gloveboxes, hoods, and other large equipment as well as laboratory trash. Typically, it will contain metal components, glassware, ceramics, plastics, paper, and wood. It will be mostly inorganic material but can vary widely.	D008
	Uncategorized Metal	RF-W011	Metal/TRM	RF 117	This waste includes items such as gloveboxes and machinery and empty containers. Items that are difficult to reduce to a size that would fit in a 55-gal drum are placed in DOT 7A, Type A metal boxes. These drums are lined with a rigid polyethylene liner, fiberboard liner and several bag liners. The boxes are lined with a fiberboard and PVC liner.	D008 F001 F002
	Uncategorized Metal	RF-W037	Heavy Metal (non-SS)/TRU	RF 117	Heavy (non-SS) metal waste is generated at various locations throughout the RFP. Heavy scrap metal is defined at RFP as metal elements above copper (Cu) on the periodic chart. Typically, these scrap metals consist of crucibles, funnels, rods and fixturing from several processes and production operations. Tantalum, tungsten, and platinum are examples of scrap metals at the RFP.	D008
	Uncategorized Metal	RL-M001	TRU Mixed Inorganic Debris with Mercury		This waste stream consists primarily of with mercury inorganic debris. Some of the containers contain organic debris (plastic and cellulosics).	D006 D009
	Uncategorized Metal	RL-M002	TRU Mixed Inorganic Debris Metals without Mercury		This waste stream consists primarily of inorganic metal debris. Some of the containers contain organic debris (plastic, rubber, cellulosics).	D008

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
CONTACT-HANDLED TRANSURANIC WASTE

CH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste—S5000	Uncategorized Metal	RL-M003	TRU Mixed Inorganic Debris Metal with Corrosives		This waste stream consists primarily of inorganic debris. Some of the containers contain organic debris (plastic, cellulosics, rubber).	d
	Uncategorized Metal	RL-M008	TRU Mixed Inorganic Debris Metals without Mercury		This waste stream consist primarily of inorganic debris metals. Some of the containers contain organic debris (plastic, rubber, cellulosics), and soils.	d D006 D007 D008
	Uncategorized Metal	RL-M021	TRU Mixed Inorganic Debris PCBs with Mercury[c]		This waste stream consists primarily of inorganic debris. Some of the containers contain organic debris (plastic, cellulosics). The hazardous constituents include PCBs and mercury. Note: This waste may contain TSCA waste at unknown levels.	D006 D008 D009

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
REMOTE-HANDLED TRANSURANIC WASTE

RH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Homogeneous Solids—S3000	Solidified Inorganics	IN-W146	Uncategorized Inorganic Sludges		Ten drums of TRU mixed waste sludge was generated from cleaning of four catch tanks. Concentrations of radionuclides and hazardous waste vary from drum to drum.	D006 D007 D008 D009 D011
	Solidified Inorganics	OR-W046	Solidified Liquid Low Level Waste Tanks - Sludge[c]		This waste stream is comprised of liquid low-level waste (LLLW) that has been concentrated by evaporation and subsequently stored in large underground storage tanks. The waste is generated as relative dilute low level waste in various nuclear research and radioisotope fabrication processes. These streams are collected centrally and the volumes reduced in an evaporation facility. After the waste has been stored, it separates into phases. The resulting solids (sludge phase) is fairly homogeneous chemically and radiochemically. Because the sludge is a product of solids concentration, it has been classified as a TRU waste. Note: This stream may contain TSCA waste at unknown levels.	D006 D007 D008 D009
	Salt Waste	IN-M001	Electrorefiner Stripped Salts—Barium (Ba) & Cadmium (Cd)		Chloride salts containing residual amounts of Cd and Ba.	e

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
REMOTE-HANDLED TRANSURANIC WASTE

RH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Filter	AW-M003	TRU Waste Used Pre-filters		The waste consists of metal or wood framed pre-filters. Prefilters are 2 x 2 x 0.5 feet (ft). HEPA filters are 2 x 2 x 1 ft. Both types of filters have screen mesh covering high-efficiency filtering media. The concentrations of radioisotopes and RCRA toxic metals vary in each filter. These filters were generated from the decontamination of the analytical hot cell in 1993.	e
	Heterogeneous	AW-W020	TRU-Cd-Hot Cell Waste		This waste stream consists of metallic cadmium, soils, and associated cleanup materials (paper towels and cloth rags). The waste is contaminated with activation and fission products as well as with Pu. This waste stream is generated for Fuel Cycle Facility demonstration support experiments.	D006
	Heterogeneous	IN-M002	TRU-Cd-Hot Cell Waste		Metallic cadmium, salts, and cleanup material such as paper towels and rags.	e
	Heterogeneous	IN-W139	TRU Contaminated Lead Debris		This waste is lead contaminated lead debris from various sources. This debris includes lead pieces, galvanized sheet metal, copper/bronzeware, silicon, impregnated fiberglass, paper, HEPA filters, duct, etc.	D008
	Heterogeneous	IN-W269B	Debris Waste		This waste stream, generated at Idaho National Engineering Laboratory, contains laboratory waste from ANL-W including fluxwire, fission counters, HEDL samples, analytical samples dissolved and absorbed on Oil-Dri, glassware, vials, miscellaneous waste from gloveboxes, dissolved pellets absorbed on Oil-Dri, enriched and normal U-308 pellets, aluminum foil and capsules, TREAT® waste capsules, chlorinated ion exchange resins, Pu sources. Laboratory waste includes Kimwipes®, trash, glassware, dissolved samples absorbed in Oil-Dri, analytical samples, gloves, etc.	e

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
REMOTE-HANDLED TRANSURANIC WASTE

RH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Heterogeneous	IN-W323	Predominantly Combustible Debris		This waste stream was generated at ANL-W and at INEL. Most of the waste is organic and combustible materials including paper, wood, PVC and plastic containers and items, rubber gaskets and gloves, leather, rags, towels, Q-tips, tubing, filter media, abrasive media and metal pieces. Small residuals of moderators and fuel are trapped on the filters. Drums of CH waste are stored at the TRU Storage Area (TSA). Drums of RH waste are stored at the Intermediate Level TRU Storage Facility (ILTSF).	D008
	Heterogeneous	OR-W040	RH TRU Heterogeneous Debris[c]		This waste stream consists of RH TRU waste which is classified as contaminated equipment, decontamination debris or dry solids. The physical form is solid. Note: This stream may contain TSCA waste at unknown levels.	D006 D008 D009 D011
Debris Waste - S5000	Heterogeneous	RL-M201	Projected RH-MTRU Waste		The waste includes failed and obsolete equipment or material, including tanks, pumps, agitators, ovens, heaters, hoods, jumpers, and accessories. Some waste will contain wood, plastics, paper, rubber, and soils.	e
	Lead/Cadmium Metal Waste	AW-W016	Electrorefiner Stripped Cadmium		This waste stream consists of cadmium dispersed in a copper alloy matrix. This waste stream will be generated from the electrorefiner station in the ANL-Fuel Cycle Facility.	D006
	Lead/Cadmium Metal Waste	AW-W022	Electro Refiner Insolubles with Cadmium		This waste stream consists of cadmium metal with other heavy metals and "mable" metals (that is, they are not reactive in the FCF electrorefining process). This waste stream will be generated from the electrorefiner station in the ANL-W Fuel Cycle Facility Integral Fast Reactor demonstration. This waste stream includes inorganic sludges/particulates.	D006
	Lead/Cadmium Metal Waste	IN-M004	Electrorefiner Stripped Cadmium		Encapsulated waste cadmium metal.	e

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
REMOTE-HANDLED TRANSURANIC WASTE

RH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Lead/Cadmium Metal Waste	IN-M005	Electrorefiner Insolubles with Cadmium		Cadmium and other heavy metals.	e
	Uncategorized Metal	AW-W018	Sodium - TRU		Sodium is used as a primary and secondary coolant for the EBR-II Reactor. Waste sodium metal is a hazardous constituent of the TRU waste stored at the ANL-W Radioactive Scrap and Waste Facility (RSWF). Waste at RSWF is RH. This waste is generated during maintenance and operational activities. The sodium typically coats waste metal equipment, experiments and components removed during reactor operations and maintenance activities.	d
	Uncategorized Metal	AW-W019	Sodium Potassium-(NaK) - TRU		Sodium potassium alloy is used as a coolant for some components of the EBR-II reactor. Waste NaK metal is stored at the ANL-W RSWF. The RH NaK waste at the RSWF is contained in SS capsules or tubing and placed inside carbon steel waste cans which are then placed in SS outer cans. The entire package is then stored in RSWF storage liners (carbon steel soil storage vaults). The NaK is generated during maintenance and operational activities. NaK waste is in canisters with TRU waste metal pieces and rods from reactor experiments.	d
	Uncategorized Metal	AW-W021	Metal Debris		This waste stream consists of metal, and of EER N fuel elements. This waste stream will be generated from the "Element Chopper" station in the ANL-W Fuel Cycle Facility demonstration.	D005 D006
Debris Waste - S5000	Uncategorized Metal	IN-M003	Element Hardware FCF Waste		Small pieces of SS from nuclear fuel.	e
	Uncategorized Metal	IN-W260B	Inorganic Process Residues		This waste stream, generated at Bettis Atomic Power Laboratory, contains solid binary scrap as powder, pellets, or rods. The material is made of ceramic based UO_2 and ThO_2. Some kilorods or fuel rods constructed of fuel pellets within hollow zirconium tubes are also included.	e

TABLE C-2 (CONTINUED)
TRU MIXED WASTE CHARACTERIZATION INFORMATION
REMOTE-HANDLED TRANSURANIC WASTE

RH TRU Waste Summary Category Group Description	Waste Matrix Code Group	Waste Stream Unique ID[a]	Waste Stream Name	TRUCON[b] Code	Waste Description (WTWBIR)[a]	EPA Code
Debris Waste - S5000	Uncategorized Metal	IN-W322	Sample Fuel		Waste consists of actinide neutron sources, a ladrum needle, small vials of fuel, and metal containers of experimental fuel capsules.	e
	Uncategorized Metal	LA-WR01	Mixed Metal Scrap and Incidental Combustibles		Mixed metal scrap and incidental combustibles.	e
	Uncategorized Metal	LA-WR05	Noncombustible Scrap		Noncombustible scrap—small tools, cans, equipment items, broken glass, etc.	e

[a]Waste stream unique identifications (ID) and waste descriptions are taken from the U.S. Department of Energy (DOE), 1995, "Waste Isolation Pilot Plant Transuranic Waste Baseline Inventory Report," CAO-94-1005, Rev. 1, U.S. Department of Energy, Albuquerque, New Mexico. The WTWBIR contains the most complete description information available at this time. Hazardous contents listed for individual waste streams are subject to verification through the WIPP Generator/Storage Site Waste Screening and Acceptance Audit Program (Appendix C8).
[b]TRUCON = TRUPACT-II Content
[c]Waste streams with unknown levels of TSCA waste, PCBs, or asbestos will have to meet WAP acceptability criteria.
[d]Although waste generators have previously indicated that some waste streams may have had the potential for reactivity, ignitability, or corrosivity (based on known waste generating processes), the final waste form accepted for disposal at the WIPP facility would not be permitted with these characteristics.
[e]EPA hazardous waste codes have not been reported by the generators at this time. These wastes will be subjected to the characterization requirements of this WAP prior to acceptance. These may or may not actually be TRU mixed wastes but are retained in the table for completeness.
[f]Classification of waste matrix code group is based on the waste stream being at least 50 percent of the indicated waste form (e.g., solidified inorganics). Therefore, a cement matrix containing trace quantities of F-listed solvents is classified as solidified inorganics.

NOTE: The use of trade names or brand names in this table does not constitute endorsement by the DOE or its contractors.

TABLE C-3
RATIONALE FOR SELECTION OF PARAMETERS OF INTEREST

Compound[a]	Synonyms	CAS[b] Number	Toxicity Characteristic Contaminant	Other Listed Constituent	Appendix VIII Constituent
Acetone	2-Propanone, dimethyl ketone	67-64-1		F003	
Antimony		7440-36-0			+
Arsenic		7440-38-2	D004		+
Barium		7440-39-3	D005		+
Benzene	Benzol	71-43-2	D018	F005	+
Beryllium		7440-41-7		P015	+
Bromoform	Tribromomethane, methyl tribromide	75-25-2			+
n-Butyl alcohol	Butanol, 1-butanol, n-butanol	71-36-3		F003	
Cadmium		7440-43-9	D006		+
Carbon disulfide	Carbon bisulfide	75-15-0		F005	+
Carbon tetrachloride	Tetrachloromethane	56-23-5	D019	F001	+
Chlorobenzene		108-90-7	D021	F002	+
Chloroform	Trichloromethane	67-66-3	D022		+
Chromium	Chrome	7440-47-3	D007		+
Cresols	Cresylic acid	1319-77-3	D026	F004	+
1,4-Dichlorobenzene	p-Dichlorobenzene	106-46-7	D027		+
1,2-Dichlorobenzene	o-Dichlorobenzene	95-50-1		F002	+
1,1-Dichloroethane	Ethylidene dichloride	75-34-3			+
1,2-Dichloroethane	Ethylene dichloride	107-06-2	D028		+
cis-1,2-Dichloroethylene	cis-1,2-Dichloroethene, sym-Dichloroethylene	156-60-5			+
1,1-Dichloroethylene	1,1-Dichloroethene, vinylidene chloride	75-35-4	D029		+
2,4 Dinitrophenol		51-28-5			+
2,4-Dinitrotoluene	1-methyl-2, 4-dinitrobenzene	121-14-2	D030		+
Ethyl benzene		100-41-4		F003	
Ethyl ether	Diethyl ether, ether	60-29-7		F003	
Formaldehyde[c]		50-00-0			+
Hexachlorobenzene		118-74-1	D032		+
Hexachloroethane		67-72-1	D034		+
Hydrazine[c]		302-01-2			+
Isobutanol	Isobutyl alcohol, 2-methyl-1-propanol	78-83-1		F005	+
Lead		7439-92-1	D008		+
Mercury		7439-97-6	D009		+
Methanol	Methyl alcohol	67-56-1		F003	
Methyl ethyl ketone	2-Butanone	78-93-3	D035	F005	+
Methyl isobutyl ketone	4-Methyl-2-pentanone, hexone	108-10-1		F003	
Methylene chloride	Dichloromethane	75-09-2		F001,F002	+
Nickel		7440-02-0			+
Nitrobenzene	Nitrobenzol	98-95-3	D036	F004	+
Pentachlorophenol	PCP	87-86-5	D037		•
Polychlorinated biphenyls (PCBs)		1336-36-3			+
Pyridine		110-86-1	D038	F005	+
Selenium		7782-49-2	D010		+
Silver		7440-22-4	D011		+

TABLE C-3 (CONTINUED)
RATIONALE FOR SELECTION OF PARAMETERS OF INTEREST

Compound[a]	Synonyms	CAS[b] Number	Toxicity Characteristic Contaminant	Other Listed Constituent	Appendix VIII Constituent
1,1,2,2-Tetrachloroethane		79-34-5			+
Tetrachloroethylene	Tetrachloroethene, perchloroethylene	127-18-4	D039	F001,F002	+
Thallium		7440-28-0			+
Toluene	Methyl benzene	108-88-3		F005	+
1,1,1-Trichloroethane	Methyl chloroform	71-55-6		F001,F002	+
1,1,2-Trichloroethane	Ethane trichloride	79-00-5		F002	+
Trichloroethylene	Trichloroethene	79-01-6	D040	F001,F002	+
Trichlorofluoromethane	Freon-11	75-69-4		F001,F002	+
1,1,2-Trichloro-1,2,2-trifluoroethane	Freon-113	76-13-1		F001,F002	
Vanadium		7440-62-2			
Vinyl chloride	Chloroethene	75-01-4	D043		+
m-Xylene	1,3-Dimethylbenzene	108-38-3		F003	
o-Xylene	1,2-Dimethylbenzene	95-47-6		F003	
p-Xylene	1,4-Dimethylbenzene	106-42-3		F003	
Zinc[e]		7440-66-6			

[a] U.S. Department of Energy (DOE), 1995a, "Transuranic Waste Characterization Quality Assurance Program Plan" (QAPP), CAO-94-1010, Rev. 0, Carlsbad Area Office, Carlsbad, New Mexico.

[b] CAS=Chemical Abstracts Number

[c] Reported only by Los Alamos National Laboratory.

[d] Reported only by Oak Ridge National Laboratory and Savannah River Site.

[e] Zinc was added during development of the QAPP.

TABLE C-4
RATIONALE FOR COMPLIANCE WITH PROHIBITED CHARACTERISTIC WASTES

Prohibited Characteristics	Rationale for Transuranic Mixed Waste Compliance
Ignitability	Ignitability
• Liquid waste.	• Waste is not a liquid. Verified by radiography.
• Contains pyrophorics or materials capable of spontaneous chemical changes.	• Final waste form precludes pyrophorics or spontaneous reactions.* Pyrophorics prohibited by waste acceptance criteria (WAC).
• Contains ignitable compressed gases as defined in 49 Code of Federal Regulations (CFR) §173.300.	• Containers capable of containing any compressed gases are prohibited by the WAC . Verified by radiography.
• Contains oxidizers as defined in Title 49 CFR §173.151.	• Acceptable knowledge and final waste form precludes oxidizers.
Corrosivity	Corrosivity
• Contains aqueous or nonaqueous liquid waste.	• Liquid waste (greater than one percent by volume) is prohibited by WAC.
Reactivity	Reactivity
• Unstable and will readily undergo violent change without detonating.	• Final waste form precludes reactivity*.
• When mixed with water, will react violently, form a potentially explosive mixture, or generate harmful toxic gases, vapors, or fumes.	• Acceptable knowledge and final waste form*.
• If subjected to a strong initiating force or if heated under confinement, will detonate or explode.	• Acceptable knowledge and final waste form*.
• Cyanide- or sulfide-bearing waste.	• Acceptable knowledge and final waste form*.
• Capable of detonation or explosive decomposition at standard temperature and pressure.	• Final waste form precludes detonation or explosive decomposition*.
• A forbidden explosive as defined in 49 CFR §173.51, a Class A explosive as defined in 49 CFR §173.53 or a Class B explosive as defined in 49 CFR §173.88.	• Explosives prohibited by WAC.

*Waste compatibility analysis in Appendix C1 shows that these reactions will not occur based on waste constituents and final waste form.

TABLE C-5
VOC HEADSPACE CONCENTRATION LIMITS

COMPOUND	VOC HEADSPACE CONCENTRATION LIMITS[a] (PPM)
Carbon Tetrachloride	7,510
Chlorobenzene	17,660
Chloroform	6,325
1,1-Dichloroethene	28,750
1,2-Dichloroethane	9,100
Methylene Chloride	100,000
1,1,2,2-Tetrachloroethane	7,924
Toluene	41,135
1,1,1-Trichloroethane	100,000

[a] There are no maximum headspace limits for other VOCs. These concentrations are based on calculations provided in Appendix D9.

TABLE C-6
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE FOR CH TRANSURANIC MIXED WASTE (STORED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S3000-Homogeneous Solids	• Solidified inorganics • Salt waste • Solidified organics	Physical waste form	100% radiography or visual examination	• Verify waste matrix • Demonstrate compliance with waste acceptance criteria (e.g., no free liquids, no incompatible wastes, no compressed gases)
S4000-Soil/Gravel	• Contaminated soil/debris			
		Headspace gases • Gas volatile organic compounds (VOC)	100% gas sampling and analysis (see Table C-9)	• Quantify concentration of flammable VOCs • Determine potential flammability of transuranic (TRU) waste headspace gases • Quantify concentrations of VOC constituents in headspace of containers • Support demonstration of no migration by headspace VOCs
		Hazardous constituents • Total metals • Total VOCs • Total semi-VOCs	Statistical sampling[a] (see Tables C-10 and C-11)	• Determine characteristic metals and organics • Determine total quantity of metals, VOCs, and semi-VOCs

TABLE C-6 (CONTINUED)
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE FOR CH TRANSURANIC MIXED WASTE (STORED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S5000–Debris Waste	• Uncategorized metal (metal waste other than lead/cadmium) • Lead/cadmium waste • Inorganic nonmetal waste • Combustible waste • Graphite waste • Heterogeneous waste • Composite filter waste	Physical waste form	100% Radiography Visual examination (statistical sample)[a]	• Verify waste matrix • Demonstrate compliance with waste acceptance (e.g., no free liquids, no incompatible wastes, no compressed gases)
		Headspace gases • Gas VOCs	100% gas sampling and analysis (see Table C-9)	• Quantify concentration of flammable VOCs • Determine potential flammability of TRU waste headspace gases • Quantify concentrations of VOC constituents in headspace of containers • Support demonstration of no migration by headspace VOCs • Verify acceptable knowledge
		Hazardous constituents • Total metals • Total VOCs • Total semi-VOCs	Acceptable knowledge	• Determine characteristic metals and organics • Determine total quantity of metals, VOCs, and semi-VOCs

TABLE C-6 (CONTINUED)
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE FOR CH TRANSURANIC MIXED WASTE (NEWLY GENERATED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S3000-Homogeneous Solids S4000-Soil/Gravel	• Solidified inorganics • Salt waste • Solidified organics • Contaminated soil/debris	Physical waste form	Documentation and verification[b]	• Verify waste matrix • Demonstrate compliance with waste acceptance criteria (e.g., no free liquids, no incompatible wastes, no compressed gases)
		Headspace gases • Gas VOCs (VOCs)	100% gas sampling and analysis (see Table C-9)	• Quantify concentration of flammable VOCs • Determine potential flammability of TRU waste headspace gases • Quantify concentrations of VOC constituents in headspace of containers • Support demonstration of no migration by headspace VOCs
		Hazardous constituents • Total metals • Total VOCs • Total semi-VOCs	Statistical sampling[a] (see Tables C-10 and C-11)	• Determine characteristic metals and organics • Determine total quantity of metals, VOCs, and semi-VOCs

TABLE C-6 (CONTINUED)
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE FOR CH TRANSURANIC MIXED WASTE (NEWLY GENERATED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S5000–Debris Waste	• Uncategorized metal (metal waste other than lead/cadmium) • Lead/cadmium waste • Inorganic nonmetal waste • Combustible waste • Graphite waste • Heterogeneous waste • Composite filter waste	Physical waste form	Documentation and verification[b]	• Verify waste matrix • Demonstrate compliance with waste acceptance (e.g., no free liquids, no incompatible wastes, no compressed gases)
		Headspace gases • Gas VOCs	100% gas sampling and analysis (see Table C-9)	• Quantify concentration of flammable VOCs • Determine potential flammability of TRU waste headspace gases • Quantify concentrations of VOC constituents in headspace of containers • Support demonstration of no migration by headspace VOCs • Verify acceptable knowledge
		Hazardous constituents • Total metals • Total VOCs • Total semi-VOCs	Acceptable knowledge	• Determine characteristic metals and organics • Determine total quantity of metals, VOCs, and semi-VOCs

TABLE C-6 (CONTINUED)
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE FOR CH TRANSURANIC MIXED WASTE (STORED WASTE)

[a] Number determined per Quality Assurance Program Plan (QAPP), Section 5.0.
[b] See discussion in Section 5.3.3 of the QAPP.

U.S. Department of Energy (DOE), 1995, "TRU Waste Characterization Quality Assurance Program Plan," CAO-94-1010, Rev 0, Carlsbad Area Office, Carlsbad, New Mexico.

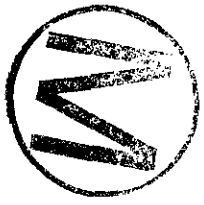


TABLE C-7
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE FOR RH TRANSURANIC MIXED WASTE (STORED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S3000-Homogeneous Solids S4000-Soil/Gravel	• Solidified inorganics • Salt waste • Solidified organics • Contaminated soil/debris	Physical waste form	Radiography for wastes <1 rem/hour Acceptable knowledge	• Verify waste matrix • Demonstrate compliance with waste acceptance criteria (e.g., no free liquids, no incompatible wastes, no compressed gases)
		Headspace gases • Gas VOCs	100% gas sampling and analysis (see Table C-9)	• Quantify concentration of flammable volatile organic compounds (VOCs) • Determine potential flammability of transuranic (TRU) waste headspace gases • Quantify concentrations of VOC constituents in headspace of containers • Support demonstration of no migration by headspace VOCs
		Hazardous constituents • Total metals • Total VOCs • Total semi-VOCs	Statistical sampling (see Tables C-10 and C-11)	• Determine characteristic metals and organics • Determine total quantity of metals, VOCs, and semi-VOCs

TABLE C-7 (CONTINUED)
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE FOR RH TRANSURANIC MIXED WASTE (STORED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S5000–Debris Waste	• Uncategorized metal (metal waste other than lead/cadmium) • Lead/cadmium waste • Inorganic nonmetal waste • Combustible waste • Graphite waste • Heterogeneous waste • Composite filter waste	Physical waste form	100% Radiography	• Verify waste matrix • Demonstrate compliance with waste acceptance (e.g., no free liquids, no incompatible wastes, no compressed gases)
		Headspace gases • Gas VOCs	100% gas sampling and analysis (see Table C-9)	• Quantify concentration of flammable VOCs • Determine potential flammability of TRU waste headspace gases • Quantify concentrations of VOC constituents in headspace of containers • Support demonstration of no migration by headspace VOCs • Verify acceptable knowledge
		Hazardous constituents • Total metals • Total VOCs • Total semi-VOCs	Acceptable knowledge	• Determine characteristic metals and organics • Determine total quantity of metals, VOCs, and semi-VOCs

TABLE C-7 (CONTINUED)
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE FOR RH TRANSURANIC MIXED WASTE (NEWLY GENERATED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S3000-Homogeneous Solids	• Solidified inorganics • Salt waste • Solidified organics	Physical waste form	Documentation and verification	• Verify waste matrix • Demonstrate compliance with waste acceptance criteria (e.g., no free liquids, no incompatible wastes, no compressed gases)
S4000-Soil/Gravel	• Contaminated soil/debris	Headspace gases • Gas volatile organic compounds (VOCs)	100% gas sampling and analysis (see Table C-9)	• Quantify concentration of flammable VOCs • Determine potential flammability of TRU waste headspace gases • Quantify concentrations of VOC constituents in headspace of containers • Support demonstration of no migration by headspace VOCs
		Hazardous constituents • Total metals • Total VOCs • Total semi-VOCs	Statistical sampling (see Tables C-10 and C-11)	• Determine characteristic metals and organics • Determine total quantity of metals, VOCs, and semi-VOCs

TABLE C-7 (CONTINUED)
SUMMARY OF PARAMETERS, CHARACTERIZATION METHODS, AND RATIONALE FOR RH TRANSURANIC MIXED WASTE (NEWLY GENERATED WASTE)

Waste Matrix Code Summary Categories	Waste Matrix Code Groups	Characterization Parameter	Method	Rationale
S5000–Debris Waste	• Uncategorized metal (metal waste other than lead/cadmium) • Lead/cadmium waste • Inorganic nonmetal waste • Combustible waste • Graphite waste • Heterogeneous waste • Composite filter waste	Physical waste form	Documentation and verification	• Verify waste matrix • Demonstrate compliance with waste acceptance (e.g., no free liquids, no incompatible wastes, no compressed gases)
		Headspace gases • Gas VOCs	100% gas sampling and analysis (see Table C-9)	• Quantify concentration of flammable VOCs • Determine potential flammability of TRU waste headspace gases • Quantify concentrations of VOC constituents in headspace of containers • Support demonstration of no migration by headspace VOCs • Verify acceptable knowledge
		Hazardous constituents • Total metals • Total VOCs • Total semi-VOCs	Acceptable knowledge	• Determine characteristic metals and organics • Determine total quantity of metals, VOCs, and semi-VOCs

TABLE C-8

SUMMARY OF HAZARDOUS WASTE CHARACTERIZATION REQUIREMENTS FOR TRANSURANIC MIXED WASTE[a]

Parameter	Techniques and Methods Manual Procedure
Physical Waste Form Matrix Parameter Categories Summary Category Names S3000 *Homogeneous Solid* S4000 Soil/Gravel S5000 Debris Wastes	**Waste Inspection Procedures** Radiography, Procedure 310.1 Visual Examination, Procedure 310.2 (QAPP Section 10.0)
Headspace Gases **Volatile Organic Compounds** Benzene Bromoform Carbon tetrachloride Chlorobenzene Chloroform 1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethylene (cis)-1,2-Dichloroethylene Ethyl benzene Ethyl ether Formaldehyde[b] Hydrazine[c] Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,1,1-Trichloroethane Trichloroethylene 1,1,2-Trichloro-1,2,2-trifluoroethane Xylenes Alcohols and Ketones Acetone Butanol Methanol Methyl ethyl ketone Methyl isobutyl ketone	**Gas Analysis** Gas Chromatography (GC)/Mass Spectroscopy (MS), Procedure 430.1 or 430.2 (QAPP Section 12.0) GC/MS GC/Flame Ionization Detector (FID), Procedure 440.1 (QAPP Section 12.0) Fourier Transform Infrared Spectroscopy (FTIRS), Procedure 430.7

TABLE C-8 (CONTINUED)
SUMMARY OF HAZARDOUS WASTE CHARACTERIZATION REQUIREMENTS FOR TRANSURANIC MIXED WASTE[a]

Parameter		Techniques and Methods Manual Procedure
Total Volatile Organic Compounds		**Total Volatile Organic Compound Analysis**
Acetone	Isobutanol	GC/MS, Procedure 430.3 or 430.4
Benzene	Methanol	GC/FID, Procedure 440.2
Bromoform	Methyl ethyl ketone	(QAPP Section 13.0)
Butanol	Methylene chloride	
Carbon disulfide	Pyridine[d]	Acceptable Knowledge for Matrix Parameter Summary
Carbon tetrachloride	1,1,2,2-Tetrachloroethane	Category S5000 (Debris Wastes)
Chlorobenzene	Tetrachloroethylene	
Chloroform	Toluene	
1,4-Dichlorobenzene[d]	1,1,2-Trichloro-1,2,2-trifluoroethane	
1,2-Dichlorobenzene[d]	Trichlorofluoromethane	
1,2-Dichloroethane	1,1,1-Trichloroethane	
1,1-Dichloroethylene	1,1,2-Trichloroethane	
Ethyl benzene	Trichloroethylene	
Ethyl ether	Vinyl chloride	
Formaldehyde[b]	Xylenes	
Hydrazine[c]		
Total Semivolatile Organic Compounds		**Total Semivolatile Organic Compound Analysis**
Cresols		GC/MS, Procedure 430.5 or 430.6
1,4-Dichlorobenzene[e]		GC/ECD for PCBs , Procedure 440.3
1,2-Dichlorobenzene[e]		(QAPP Section 14.0)
2,4-Dinitrophenol		
2,4-Dinitrotoluene		Acceptable Knowledge for Matrix Parameter Summary
Hexachlorobenzene		Category S5000 (Debris Wastes)
Hexachloroethane		
Nitrobenzene		
Polychlorinated biphenyls		
Pentachlorophenol		
Pyridine[e]		
Total Metals		**Total Metals Analysis**
Antimony	Mercury	Atomic MS, Procedure 630.1
Arsenic	Nickel	Atomic Emission Spectroscopy, Procedure 640.1
Barium	Selenium	Atomic Absorption Spectroscopy , Procedures 650.1
Beryllium	Silver	through 650.7
Cadmium	Thallium	(QAPP Section 15.0)
Chromium	Vanadium	
Lead	Zinc	Acceptable Knowledge for Matrix Parameter Summary
		Category S5000 (Debris Wastes)

[a] U.S. Department of Energy (DOE), 1995a, "TRU Waste Characterization Quality Assurance Program Plan" (QAPP), CAO-94-1010, Rev. 0, Carlsbad Area Office, Carlsbad, New Mexico.
[b] Required only for homogeneous solids and soil/gravel from Los Alamos National Laboratory.
[c] Required only for homogeneous solids and soil/gravel from Oak Ridge National Laboratory and Savannah River Site.
[d] Can also be analyzed as a semi-volatile organic compound.
[e] Can also be analyzed as a volatile organic compound.

TABLE C-9
HEADSPACE TARGET ANALYTE LIST AND METHODS

Parameter	Methods Manual Procedure	EPA Specified Analytical Method
Benzene Bromoform Carbon tetrachloride Chlorobenzene Chloroform 1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethylene (cis)-1,2-Dichloroethylene Ethyl benzene Ethyl ether Formaldehyde[b] Hydrazine[c] Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethylene Toluene 1,1,1-Trichloroethane Trichloroethylene 1,1,2-Trichloro-1,2,2-trifluoroethane Xylenes	430.1 430.2 430.7	EPA: Modified TO-14[a]; Modified 8240/8260 EPA - Approved Fourier Transform Infrared Spectroscopy
Acetone Butanol Methanol Methy ethyl ketone Methyl isobutyl ketone	430.1 430.2 430.7 440.1	EPA: Modified TO-14[a]; Modified 8240/8260 EPA - Approved Fourier Transform Infrared Spectroscopy No Equivalent EPA Method for Methods Manual Procedure 440.1

[a] U.S. Environmental Protection Agency (EPA), 1988, "Compendium Method TO-14, the Determination of Volatile Organic Compounds (VOC) in Ambient Air Using SUMMA® Passivated Canister Sampling and Gas Chromatographic Analysis," in Compendium of Methods for the Determination of Toxic Organic Compounds on Ambient Air. Research Triangle Park, North Carolina, Quality Assurance Division, Monitoring System Laboratory, U.S. EPA. The most current revision of the specified methods will be used.

[b] Required only for containers of homogeneous solids and soil/gravel waste from Los Alamos National Laboratory.

[c] Required only for containers of homogeneous solids and soil/gravel waste from Oak Ridge National Laboratory and the Savannah River Site.

TABLE C-10
REQUIRED TOTAL ORGANIC ANALYSES AND TEST METHODS ORGANIZED BY ORGANIC ANALYTICAL GROUPS

Organic Analytical Group	Required Organic Analyses	Methods Manual Procedure	EPA Specified Analytical Method[a]
Nonhalogenated Volatile Organic Compounds (VOCs)	Acetone Benzene n-Butanol Carbon disulfide Ethyl benzene Ethyl ether Formaldehyde Hydrazine[b] Isobutanol Methanol Methyl ethyl ketone Toluene Xylenes	430.3 430.4 440.2	8240B 8260A
Halogenated VOCs	Bromoform Carbon tetrachloride Chlorobenzene Chloroform 1,2-Dichloroethane 1,1-Dichloroethylene Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethylene 1,1,2-Trichloroethane 1,1,1-Trichloroethane Trichloroethylene Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Vinyl Chloride	430.3 430.4	8240B 8260A
Semivolatile Organic Compounds (SVOCs)	Cresols (o, m, p) 1,2-Dichlorobenzene[c] 1,4-Dichlorobenzene[c] 2,4-Dinitrophenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachloroethane Nitrobenzene Polychlorinated biphenyls (PCB)[d] Pentachlorophenol Pyridine[c]	430.5 430.6 440.3 (for PCBs only)	8250A 8270B 3620 8081 (for PCBs only) 3550

TABLE C-10 (CONTINUED)
REQUIRED ORGANIC ANALYSES AND TEST METHODS
ORGANIZED BY ORGANIC ANALYTICAL GROUPS

[a] U.S. Environmental Protection Agency (EPA), 1993, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, Third Edition Final Update I and Final Update II. Equivalent methods are demonstrated by meeting the quality assurance/quality control requirements specified in the QAPP and SW-846 protocols.

[b] Sites will have to develop an analytical method for hydrazine. This method will be submitted to the DOE CAO for approval.

[c] These compounds may also be analyzed as VOCs by SW-846 Methods 8240B and 8260A.

[d] Transformer oils containing PCBs have been identified in a limited number of waste streams included in the organic sludges waste matrix code. Therefore, only waste streams included in the solidified organics final waste form must be analyzed for PCBs.

TABLE C-11
SUMMARY OF SAMPLE PREPARATION AND ANALYTICAL METHODS FOR TOTAL METALS

Parameters	Methods Manual Procedure	EPA-Specified Analytical Methods[a]
Sample Preparation	610.1	3051, or equivalent, as appropriate for analytical method
Total Antimony	630.1, 640.1, 650.1, 650.2, 650.5	6010A, 6020, 7040, 7041, 7062
Total Arsenic	630.1, 640.1, 650.4, 650.5	6010A, 6020, 7060A, 7061A, 7062
Total Barium	630.1, 640.1, 650.1, 650.2	6010A, 6020, 7080A, 7081
Total Beryllium	630.1, 640.1, 650.1, 650.2	6010A, 6020, 7090, 7091
Total Cadmium	630.1, 640.1, 650.1, 650.2	6010A, 6020, 7130, 7131A
Total Chromium	630.1, 640.1, 650.1, 650.2	6010A, 6020, 7190, 7191
Total Lead	630.1, 640.1, 650.1, 650.2	6010A, 6020, 7420, 7421
Total Mercury	650.3	7471A
Total Nickel	630.1, 640.1, 650.1	6010A, 6020, 7520
Total Selenium	630.1, 650.2, 650.6, 650.7	6010A, 7740, 7741A, 7742
Total Silver	630.1, 640.1, 650.1, 650.2	6010A, 6020, 7760A, 7761
Total Thallium	630.1, 640.1, 650.1, 650.2	6010A, 6020, 7840, 7841
Total Vanadium	630.1, 650.1, 650.2	6010A, 7910, 7911
Total Zinc	630.1, 640.1, 650.1, 650.2	6010A, 6020, 7950, 7951

[a] U.S. Environmental Protection Agency (EPA), 1986 as amended by FR 46040, August 31, 1993. "Test Methods for Evaluating Solid Waste," Laboratory Manual Physical/Chemical Methods, SW-846, 3rd ed., U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C. Equivalent methods are demonstrated by meeting the quality assurance/quality control requirements specified in the Quality Assurance Program Plan (QAPP) and SW-846 protocols.

TABLE C-12
WIPP WASTE INFORMATION SYSTEM DATA FIELDS[a]

Characterization Module Data Fields [b]	
Container ID [c]	Total VOC Sample Date
Generator EPA ID	Total VOC Analysis Date
Generator Address	Total VOC Analyte Name [d]
Generator Name	Total VOC Analyte Concentration [d]
Generator Contact	Total Metal Sample Date
Hazardous Code	Total Metal Analysis Date
Headspace Gas Sample Date	Total Metal Analyte Name [d]
Headspace Gas Analysis Date	Total Metal Analyte Concentration [d]
Headspace Gas Analyte [d]	Semi-VOC Sample Date
Headspace Gas Concentration [d]	Semi-VOC Analysis Date
Headspace Gas Char. Method [d]	Semi-VOC Analyte Name [d]
Total VOC Char. Method [d]	Semi-VOC Concentration [d]
Total Metals Char. Method [d]	Transporter EPA ID
Total Semi-VOC-Char. Method [d]	Transporter Name
Item Description Code	Visual Exam Container [e]
Haz. Manifest Number	Waste Material Parameter [d]
NDE Complete [e]	Waste Material Weight [d]
PCB Concentration [f]	Waste Matrix Code
	Waste Matrix Code Group
	Waste Stream Profile Number

Certification Module Data Fields	
Container ID [c]	Fissile Gram Equiv.
Container type	Radioassay (RA) Date
Container Weight	RA Method
Contact Dose Rate	Radionuclide [d]
Container Certification date	Radionuclide Quan.[d]
Container Closure Date	Handling Code
Container Liner Type	Waste Weight
Decay Heat	Waste Fill %
Overpack Number (if any)	Surface Contamination
PE Curie Equiv.	Alpha Activity

Transportation Data Module	
Shipment Number	Layers of Packaging
TRUPACT Number	Ship Category
Assembly Number[c]	Ship Certification Date
Container IDs [c,d]	Ship Date
Filter Model	Receive Date
Filter Date	Vehicle Type
ICV Closure Date	

TABLE C-12 (CONTINUED)
WIPP WASTE INFORMATION SYSTEM DATA FIELDS

Disposal Module Data
Container ID [c]
Disposal Date
Disposal Location

[a] This is not a complete list of the WWIS data fields, but is a subset that contains the fields that are pertinent to RCRA.

[b] Some of the fields required for characterization are also required for certification and/or transportation.

[c] Container ID is the main relational field in the WWIS Database.

[d] This is a multiple occurring field for each analyte, nuclide, etc.

[e] These are logical fields requiring only a yes/no.

[f] Limits are applied to many fields. The limit for PCBs is 50 ppm.

[g] Required for 7-Packs of 55 gal drums to tie all of the drums in that assembly together. This facilitates the identification of waste containers in a shipment without need to breakup the assembly.

TABLE C-13
REQUIRED PROGRAM RECORDS MAINTAINED IN SITE PROJECT FILES

Lifetime Records

- Field sampling data forms
- Field and laboratory chain-of-custody forms
- Laboratory analytical data reports
- Analytical results of all QA/QC samples
- Reports and data transmittals sent to DOE/CAO
- Nonconformance and corrective action documentation
- Sampling Plans
- Audit plans, reports, responses, and final closure of corrective actions
- Quality assurance reports to management
- Data reduction, validation, and reporting records
- Gas canister tags
- Audio/video tapes

Non-Permanent Records

- Performance Demonstration Program analytical results
- Sampler certifications
- All pertinent incoming and outgoing correspondence, memoranda, and telephone records related to QA/QC
- Documentation of calculations and computer programs with associated verification
- Reference material relevant to the waste characterization program
- Training/qualification records
- Documentation of revisions or changes to the QAPP or QAPjPs
- Calibration records
- Electronic instrument data (e.g., GC/MS files)
- Procurement records
- QC standard certification statements

FIGURES

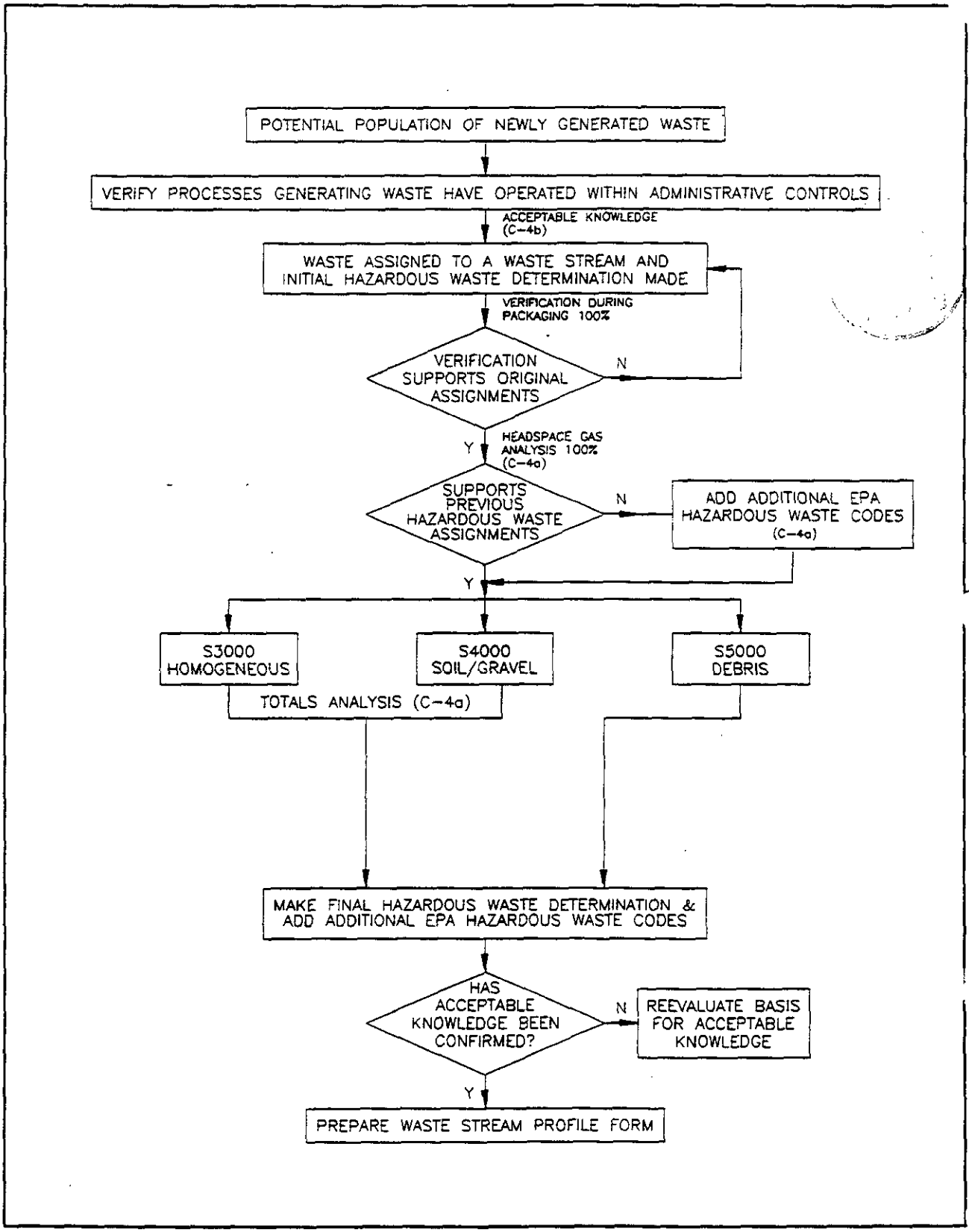


Figure C-1

Data Collection Design for Characterization of Newly Generated Waste

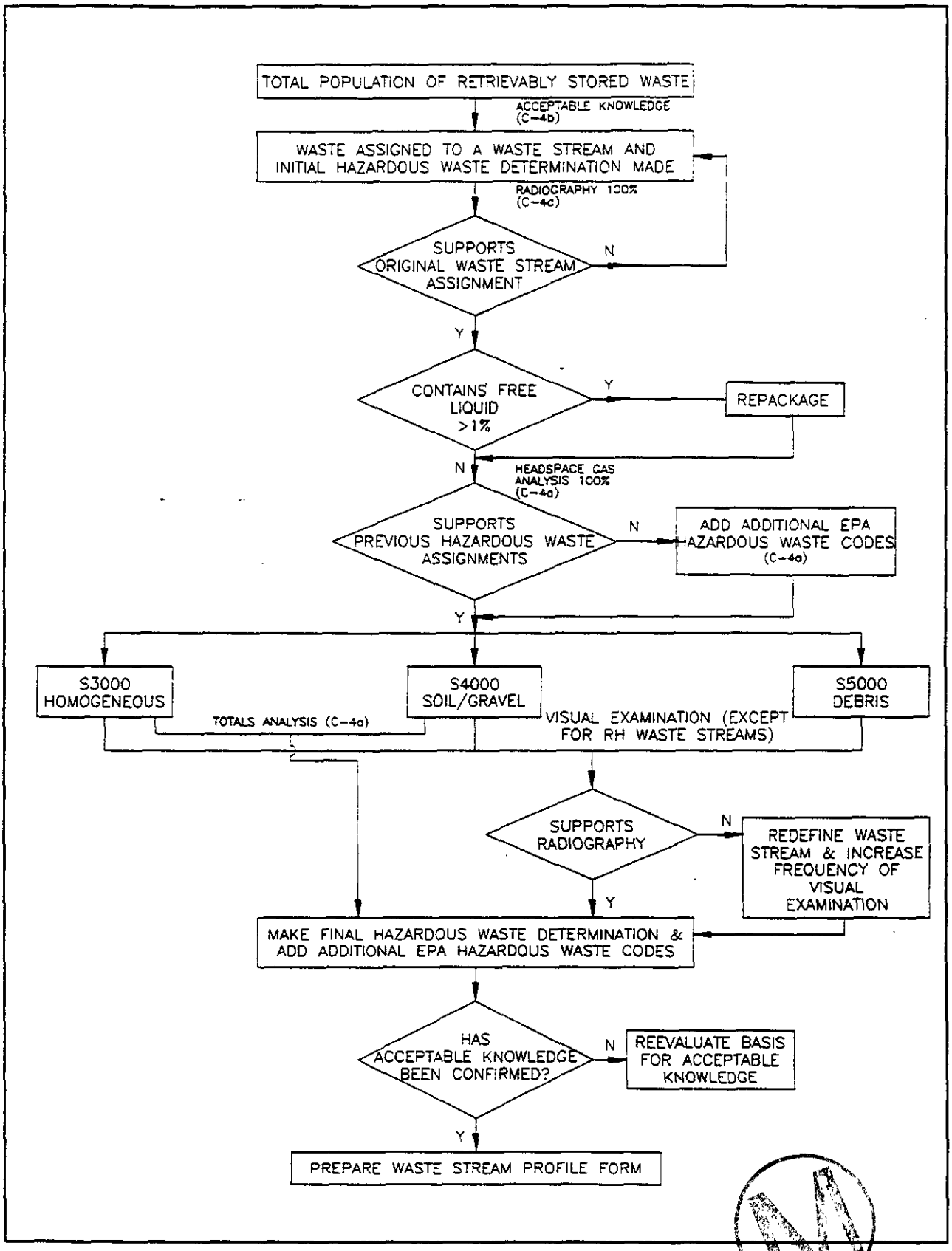


Figure C-2

Data Collection Design for Characterization of Retrievably Stored Waste

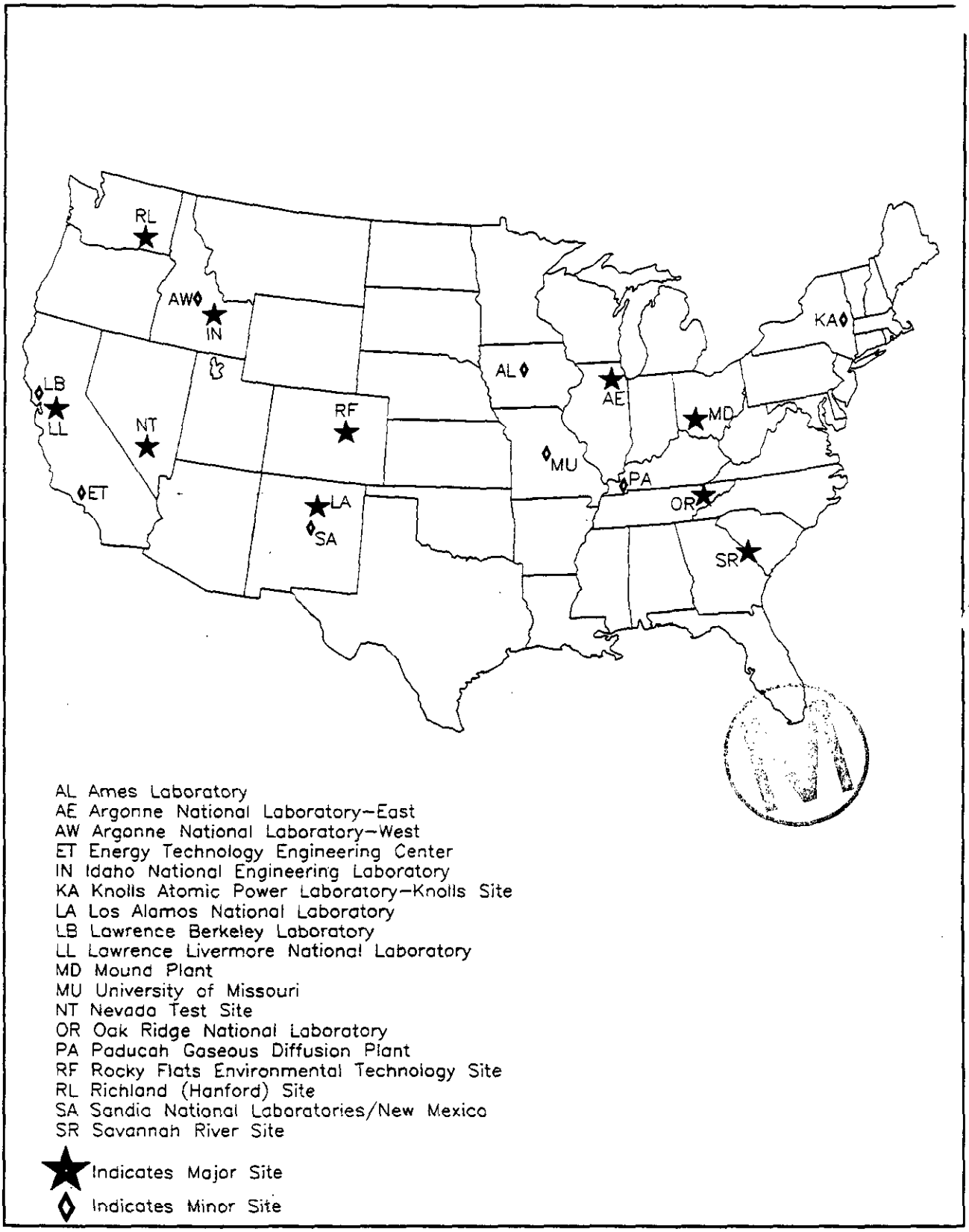


Figure C-3

U.S. Department of Energy Transuranic Mixed Waste Generator/Storage Sites

Form Number _____
Page ___ of ___

WIPP WASTE STREAM PROFILE FORM

Shipper/Generator Information:

Site Name _____ / EPA ID _____

Tech. Contact _____ / Phone _____

Orig. Generator _____ / EPA ID _____

Waste Stream Information:

Check one: ☐ CH ☐ RH

Waste Stream WIPP ID _____

Summary Category Group _____ /Waste Matrix Code Group _____

Waste Stream Name _____

Description _____

_____

_____

Date of WAC Certification _____

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

_____

Number of SWBs _____ Number of Drums _____ Number of Canisters _____

List all applicable EPA Hazardous Waste Codes _____

Acceptable Knowledge Information:

Required Program Information		Supporting Documentation Used (References and dates)
☐	Map of Site	_____
☐	Facility Mission Description	_____
☐	Description of Operations that Generate Waste	_____
☐	Waste Identification/Categorization Schemes	_____
☐	Types and quantities of waste generated	_____
☐	Correlation of waste streams generated from the same building and process, as appropriate	_____
☐	Waste certification procedures	_____

Required Waste Stream Information		
☐	Area(s) and building(s) from which the waste stream was generated	_____
☐	Waste stream volume and time period of generation	_____
☐	Process flow diagrams	_____

Figure C-4
WIPP Waste Stream Profile Form

Form Number_____
Page ____ of ____

☐ Waste Generating Process Description _____
☐ Material inputs of other information identifying chemical/radionuclide content and physical waste form _____

Supplemental Documentation

☐ Process design documents _____
☐ Standard operating procedures _____
☐ Safety Analysis Reports _____
☐ Waste Packaging Logs _____
☐ Test Plans/Research Project Reports _____
☐ Site Databases _____
☐ Information from Site Personnel _____
☐ Standard Industry Documents _____
☐ Previous Analytical Data _____
☐ Material Safety Data Sheets _____
☐ Sampling and Analysis Data from _____
Comparable/Surrogate Waste _____
☐ Laboratory Notebooks _____

Sampling and Analysis Information*: **Sampling and Analysis Procedures (reference and date)**

☐ Radiography _____
☐ Visual Examination _____
☐ Headspace Gas Analysis
VOCs _____
Other Gases (Specify) _____
☐ Homogeneous Solids/Soil/Gravel Sample Analysis
VOCs _____
Semi-VOCs _____
PCBs _____
Total Metals _____
Other (specify) _____
☐ Ignitable ☐ Corrosive ☐ Reactive ☐ Compatible
Waste Characterization Data Package Numbers: _____

* Attach signed waste characterization summary data package to support hazardous waste code assignment to form

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

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

Figure C-4
WIPP Waste Stream Profile Form (Continued)

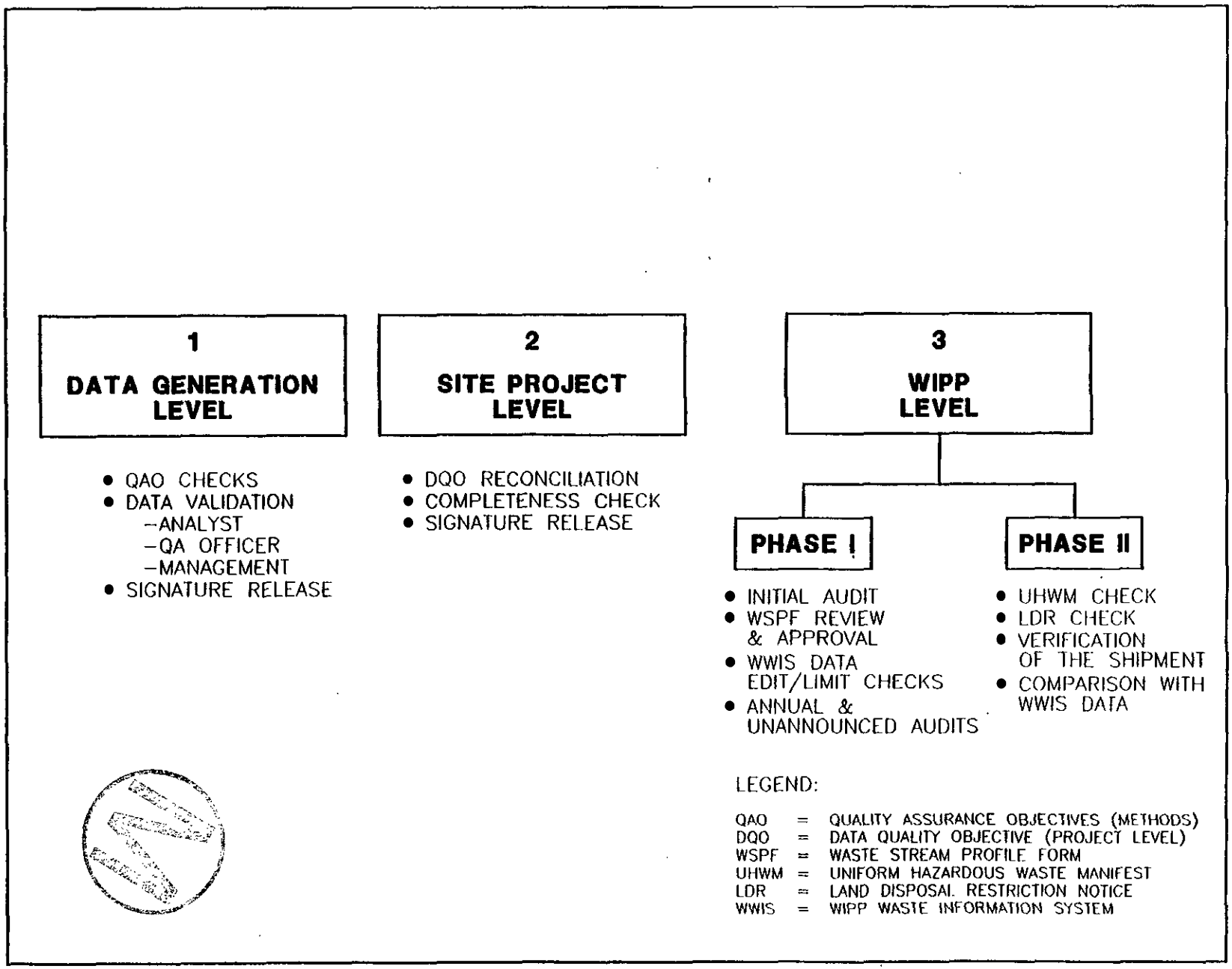


Figure C-5
Levels of Data Verification

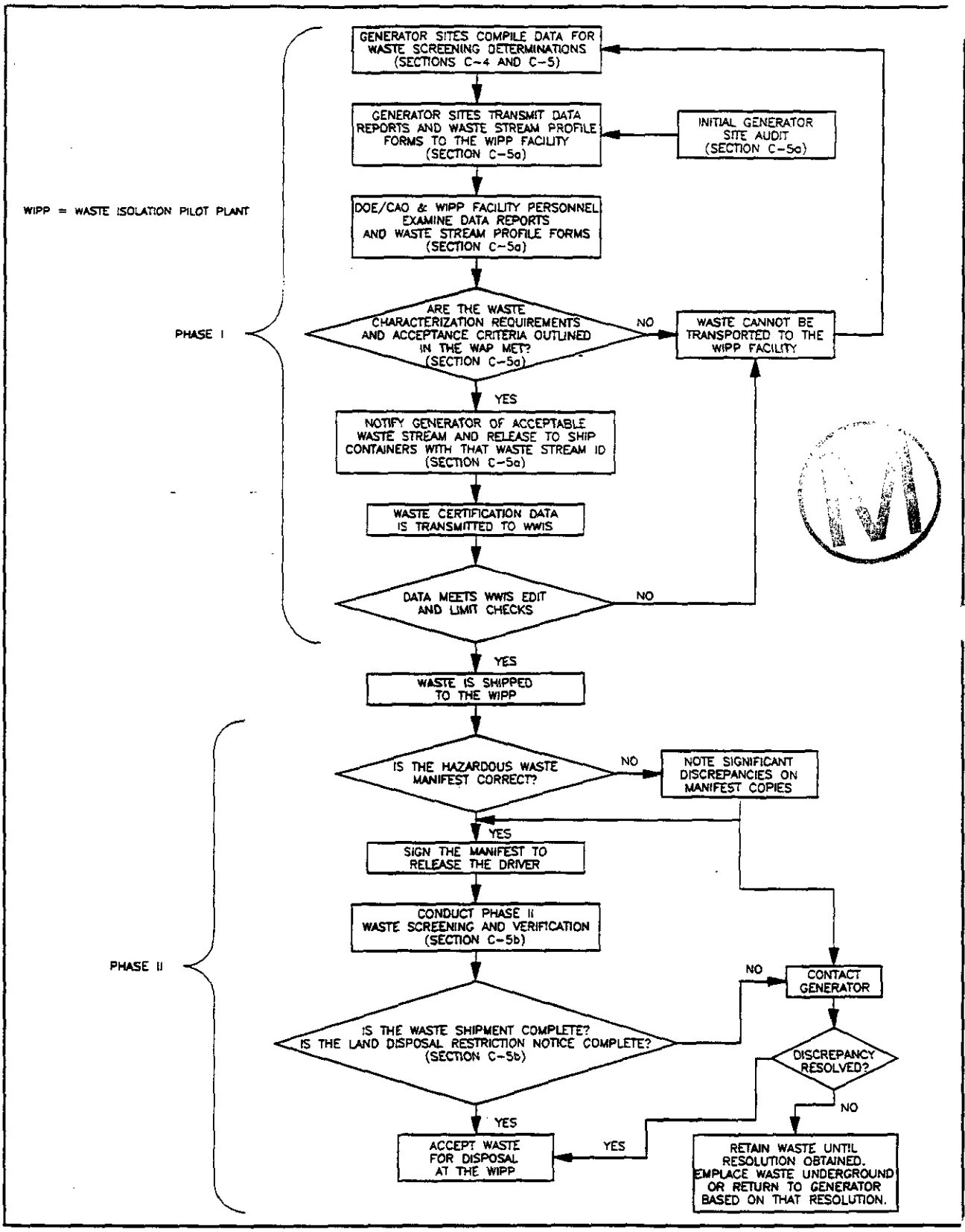


Figure C-6
TRU Waste Screening Flow Diagram