2. To: (Receiving Organization) Distribution

3. From: (Originating Organization) Generator and Waste Acceptance Services

4. Related EDT No.:

5. Proj./Proj./Dept./Div.: Central Waste Complex Waste Analysis Plan

6. Design Authority/ Design Agent/Cog. Engr.: R. M. Irwin (Design Authority) N. L. Weston (Design Agent)

8. Originator Remarks: For Release


15. DATA TRANSMITTED

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<th>(C) Sheet No.</th>
<th>(D) Rev. No.</th>
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18. Signature of EDT Originator: 9-1/96

19. Authorized Representative Date for Receiving Organization: 9-1/96

20. Design Authority/ Cognizant Manager:

21. DOE APPROVAL (if required)

   - Ctrl. No.
   - Approved
   - Approved w/comments
   - Disapproved w/comments

BD-7400-172-2 (05/96) GEF097
Waste Analysis Plan for the Central Waste Complex

Nancy L. Weston
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

Abstract: This waste analysis plan (WAP) has been prepared for the Central Waste Complex which is located in the 200 West Area of the Hanford Facility, Richland, Washington. This WAP documents the methods used to characterize, and obtain and analyze representative samples of waste managed at this unit.
**UNREVIEWED SAFETY QUESTION CHANGES SCREENING FORM**

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</tr>
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<td><strong>B. Make PROPOSED CHANGES that represent conditions that have not been analyzed in the safety basis?</strong></td>
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<td><strong>C. Describe tests or experiments which differ from those described in the safety basis?</strong></td>
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<tr>
<td><strong>D. Is a change in the TSR's involved?</strong></td>
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**BASIS** (supporting information is required for each question, attach additional pages as necessary):

A. Section 5.2.5 of the authorization basis, WHC-SD-WM-SAR-049, states that "Assurance that the container contents are in compliance with Hanford Site Solid Waste Acceptance criteria are provided through other programs, such as waste package certification plans". The section also states that waste packages are inspected for correlation to applicable records. The proposed WAP complies with these descriptions as described in the safety basis.

B. As discussed in A, Section 5.2.5 represents the conditions that have been analyzed in the authorization basis and the proposed WAP is in agreement with these conditions.

C. The sampling methods described in the WAP are in greater detail but in agreement with the description in the authorization basis for identification and correction of noncompliant conditions.

D. The proposed WAP does not involve any changes to the CWC TSRs because there are no TSRs associated with the verification and sampling program.

[ ] Agree

[ ] Disagree (Requires explanation, attach additional pages as necessary)

**USQE No. 1**
R.M. Irwin

**USQE No. 2**
E.V. dos Ramos

Signature: [Signature]
Date: 9/13/96
## CONTENTS

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FIGURES (cont)

1-12. Typical Radioactive and/or Mixed Waste Storage Building
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1-13. Radioactive and/or Mixed Storage Building (2403-WD) -
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4-1. Central Waste Complex Data Quality Objectives for Waste
Analysis Program .................................................. T4-1
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GLOSSARY

ACRONYMS

ALARA  as low as reasonably achievable
ASTM  American Society for Testing and Materials
COLIWASA  composite liquid waste sampler
CFR  Code of Federal Regulations
CWC  Central Waste Complex
DOE-RL  U.S. Department of Energy, Richland Operations Office
DQO  data quality objective
Ecology  Washington State Department of Ecology
EPA  U.S. Environmental Protection Agency
FR  Federal Register
HOC  halogenated organic compound
IH  industrial hygienist
LDR  land disposal restriction
mrem  millirem (roentgen equivalent man)
MSDS  material safety data sheet
OVA  organic vapor analyzer
PCB  polychlorinated biphenyl
pH  negative logarithm of the hydrogen-ion concentration
QA/QC  quality assurance and quality control
RCRA  Resource Conservation and Recovery Act of 1976
TCLP  toxicity characteristics leaching procedure
TOX  total organic halides
VOC  volatile organic compound
WAC  Washington Administrative Code
°C  degrees Celsius
°F  degrees Fahrenheit
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### METRIC CONVERSION CHART

The following conversion chart is provided to the reader as a tool to aid in conversion.

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1.0 FACILITY DESCRIPTION

The purpose of this waste analysis plan (WAP) is to document the waste acceptance process, sampling methodologies, analytical techniques, and overall processes that are undertaken for waste accepted for storage at the Central Waste Complex (CWC), located in the 200 West Area (Figure 1-1) of the Hanford Facility, Richland, Washington. The CWC provides storage and limited treatment (e.g., absorption, etc.) capabilities for mixed and/or radioactive waste that is generated on or off the Hanford Facility. Because dangerous waste does not include source, special nuclear, and by-product material components of mixed waste, radionuclides are not within the scope of this documentation. The information on radionuclides is provided only for general knowledge.

1.1 CENTRAL WASTE COMPLEX DESCRIPTION

The CWC (Figure 1-2) currently consists of the following:

- Low-Flash-Point and Alkali Metal Mixed Waste Storage Modules
- Mixed and/or Radioactive Waste Storage Buildings
- Mixed and/or Radioactive Waste Storage Pads
- Enhanced Radioactive and Mixed Waste Storage Buildings
- Waste Receiving and Staging Area.

These buildings, storage modules, and storage pads provide space for waste containers. Storage structures with physical features that provide for segregated storage areas are operated to maintain appropriate separation between arrays of incompatible waste as required by Washington Administrative Code (WAC) 173-303-395. Descriptions of CWC structures are provided in the following sections.

1.1.1 Low-Flash-Point and Alkali Metal Mixed Waste Storage Modules

The Low-Flash-Point and Alkali Metal Mixed Waste Storage Modules (Figures 1-4, 1-5, 1-6, and 1-7) are designed to meet all the storage requirements for ignitable, reactive, and corrosive types of mixed waste. Most of the Low-Flash-Point and Alkali Metal Mixed Waste Storage Modules currently store low-level radioactively contaminated flammable and alkali metal waste. Only compatible waste occupies any one storage module at any one time. Two of the Low-Flash-Point Mixed Waste Storage Modules were modified for transuranic flammable waste. The remaining Low-Flash-Point and Alkali Metal Mixed Waste Storage Modules, and any future Low-Flash-Point and Alkali Metal Mixed Waste Storage Modules, also could be modified for a specific use depending on storage needs.

The Low-Flash-Point and Alkali Metal Mixed Waste Storage Modules are pre-engineered structures. The size and weight of the storage modules vary among manufacturers. As a result, there is no set 'standard' module. The floor support system is designed for loads up to 0.12 kilogram per square

960919.1111 1-1
centimeter, and the front, back, and side walls of all the modules are
constructed of 10-gauge steel and are coated inside with chemical-resistant
epoxy paint or have a corrosion-resistant covering. All roofs are constructed
of 12-gauge steel. Three of the Low-Flash-Point Mixed Waste Storage
Modules have fire-retardant plywood floors and ceilings within the metal skin.
Some modules have fiberglass grating on the floors. The remaining Low-Flash-
Point and Alkali Metal Mixed Waste Storage Modules are constructed of metal.

All modules have a vented catch sump under the storage floor to provide
spill containment, as well as precluding spills from affecting other
containers by keeping the storage deck clean. For the two Low-Flash-Point
Mixed Waste Storage Modules handling transuranic flammable waste, draft
ventilation and electrical service are provided. The other Low-Flash-Point
and Alkali Metal Mixed Waste Storage Modules similarly can be supplied if
necessary. Water supply presently is not provided but could be made available
if necessary. Water will not be provided to the Alkali Metal Mixed Waste
Storage Modules. This is due to the violent explosive reaction that is
created when alkali metal is mixed with water.

1.1.2 2401-W and 2402-W Series Storage Buildings for Mixed and/or Radioactive
Waste and Toxic Substance Control Act Waste

The 2401-W and 2402-W Series Mixed Waste Storage Building are
pre-engineered steel structures with two rollup truck doors and two personnel
doors (Figures 1-3, and 1-9). The foundation is integrated into a perimeter
concrete curb 15.2 centimeters abovegrade. The floor accommodates a
908-kilogram forklift and an approximate 1,000 container equivalent load,
depending on waste management criteria. The floor loading is limited to
0.22 kilogram per square centimeter. Ramps are in place across the curb to
aid during loading and unloading operations. Compatible combinations of mixed
and/or radioactive waste can be placed in any one of the buildings according
to the building loading schedules.

Electrical power is supplied to the 2402-W Series Storage Building by
underground cables. Power is supplied for wall exhausters and to provide
power for all lighting, fire sprinkler equipment, and convenience receptacles.

Only sanitary water is used in the 2402-W Series Storage Buildings. The
2402-W Series Storage Buildings are maintained at atmospheric pressure;
heating and cooling are not required for operations. The ventilation system
for the 2402-W Series Storage Building consists of two wall exhausters, which
provide approximately four air changes per hour.

Utilities and services for the 2401-W Storage Building include sanitary
water required to serve the fire suppression system; and an electrical service
panel for fire suppression, heaters, lighting, and the electronic fire alarm
system.
1.1.3 2403-W Series Storage Buildings for Mixed and/or Radioactive Waste and State-Only Polychlorinated Biphenyls Waste

The 2403-WA through 2403-WC Storage Buildings for mixed and/or radioactive waste and state-only polychlorinated biphenyls (PCB) waste are steel-supported, sheet-metal-covered structures (Figures 1-11 and 1-12). The 2403-WA through 2403-WC Storage Buildings each accommodate approximately 11,600 208-liter containers of mixed and/or radioactive waste.

The structures are functional warehouses within which containers, boxes, and other approved packages of mixed and/or radioactive and state-only PCB waste can be stored. Floor areas are divided into quadrants by concrete curbs and are sealed with an impervious epoxy resin floor surfacing system that is compatible with the stored waste.

Electrical power is supplied by an aerial 13.3-kilovolt power line for all lighting, fire sprinkler equipment, and convenience receptacles.

Only sanitary water is used in the 2403-W Series Storage Buildings. The 2403-W Series Storage Buildings are maintained at atmospheric pressure; heating and cooling are not required for operations.

1.1.4 2403-WD Radioactive and/or Mixed Waste and State-Only Polychlorinated Biphenyls Waste Storage Building

The 2403-WD Radioactive and/or Mixed Waste and State-only Polychlorinated Biphenyls Storage Building (2403-WD Storage Building) is a steel-supported, sheet-metal-covered structure (Figures 1-13, and 1-14) that accommodates approximately 19,300 208-liter containers of mixed and/or radioactive waste.

Floor areas are divided into quadrants by concrete curbs and are sealed with an impervious epoxy resin floor surfacing system that is compatible with the stored waste. A 3.7-meter aisle is provided through the center of the 2403-WD Storage Building to accommodate loading and unloading operations.

Power and telephone lines are extended from the aerial lines through underground concrete-encased conduits to the 2403-WD Storage Building.

Power is provided for all lighting, fire sprinkler equipment, and convenience receptacles.

Only sanitary water is used in the 2403-WD Storage Building. The 2403-WD Storage Building is maintained at atmospheric pressure; heating and cooling are not required for operations. Four wall exhausters provide approximately four air changes per hour.

Compatible combinations of mixed and/or radioactive waste can be placed in any one containment quadrant according to the 2403-WD Storage Building loading schedules.
1.1.5 Waste Receiving and Staging Area

The Waste Receiving and Staging Area is an asphalt pad used for container handling and staging of mixed and/or radioactive waste destined for the various storage buildings.

1.1.6 Radioactive and/or Mixed Waste Storage Pad

The Radioactive and/or Mixed Waste Storage Pad has an access ramp, and a rainwater collection and removal system (Figure 1-10).

1.1.7 Enhanced Radioactive and Mixed Waste Storage

Enhanced Radioactive and Mixed Waste Storage, when constructed, will provide for additional storage and material handling. All buildings will use pre-engineered metal building systems and will be protected by an automatic fire protection system. This WAP will be updated to reflect additions to the CWC when the Enhanced Radioactive and Mixed Waste Storage project is completed.

1.2 DESCRIPTION OF THE CENTRAL WASTE COMPLEX PROCESS AND ACTIVITIES

The CWC is classified as a container storage and treatment unit and will be permitted per WAC 173-303. The CWC currently accepts radioactive waste and mixed waste according to the characteristics of the waste. All mixed waste is stored in Resource Conservation and Recovery Act (RCRA) of 1976–compliant storage structures. Waste accepted must be containerized. The CWC receives mixed waste from onsite generating units as well as offsite generators.

Hanford Facility waste generating activities are conducted under a common U.S. Environmental Protection Agency (EPA)/State identification number (WA7890008967); all waste management activities carried out under the assigned identification number are considered to be 'onsite' as defined in WAC 173-303.
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Figure 1-1. 200 West Area Central Waste Complex.
Figure 1-2. Central Waste Complex.
Figure I-4. Typical Waste Storage Module - Front View.
Typical Large-Waste Storage Module (WSM)
Top View

- Polyurethane Liners
- 150-watt Lights*
- 150-CFM Exhaust Fans*
- 12,000-BTU Heaters*
- Fiberglass Grating Floor
- 60 x 80 in. Doors
- 2 hr Fire-Rated
- 250-watt Light
- 1 x 1 ft Filtered Intake Louvers with 2-hr Fire-Rated Dampers

Conversion Factors:
- 2.54 centimeters per inch
- 0.305 meters per foot
- 0.45 kilometers per pound
- 105.4 joules per British thermal unit

CFM = Cubic Feet per Minute
BTU = British Thermal Unit

* Not operable at this time
Typical Small Waste Storage Module
Top View

- Polyurethane Liners
- 150-CFM Exhaust Fans*
- 150-watt Lights*
- 12,000-BTU Heaters*
- 1 x 1 ft Filtered Intake Louvers With 2-hour Fire Rated Dampers
- Fiberglass Grating Floor
- 250-watt Light
- 60 x 80 in. Doors 2-hour Fire Rated

Metric Conversion:
- 2.54 centimeters per inch
- 0.305 meters per foot
- 0.45 kilograms per pound
- 105.4 joules per British thermal unit

CFM = cubic feet per minute
BTU = British thermal unit

* Not operable at this time
Typical Waste Storage Module (Large and Small)
Side View

Figure 1-7. Typical Waste Storage Module – Side View.

25/50 Pound Dry Chemical
Fire Suppression System

Electric Power Panels

Exterior Light

Fire Suppression System and Alarm

Metric Conversion: 2.54 centimeters per inch
0.305 meter per foot
0.45 kilogram per pound
Typical Waste Storage Module
Side View

Exterior Light

Fire Extinguisher

10 ft

9 ft 8 in.

Exterior Light

10 ft

9 ft 8 in.

2.54 centimeters per inch
0.305 meter per foot
0.45 kilogram per pound
Figure 1-9. Typical Radioactive and/or Mixed Waste Storage Buildings (2402-W and 2402-WB through 2402-WL) - Plan and Elevations.
Figure 1-10. Mixed Waste Storage Pad - Civil Plan.
Figure 1-11. Typical Radioactive and/or Mixed Waste Storage Building (2403-WA, WB, and WC) - Elevations.
Figure 1-12. Typical Radioactive and/or Mixed Waste Storage Building (2403-WA, 2403-WB, and 2403-WC) - Plan.
Radioactive and/or Mixed Waste Storage Building (2403-WD)

Figure 1-13. Radioactive and/or Mixed Waste Storage Building
(2403-MD) - Elevations.
Radioactive and/or Mixed Waste Storage Building (2403-WD)
2.0 WASTE ACCEPTANCE PROGRAM

This section covers the waste acceptance process for the proper management of waste in the CWC.

2.1 WASTE CERTIFICATION PROGRAM

The onsite generating unit or offsite generator (for the purposes of this WAP, permitted treatment and storage facilities are classified as either onsite generating units or offsite generators) must have a program to certify characterization of their waste. The onsite generating unit or offsite generator must document their waste certification program on a stream-by-stream basis in the form of waste certification summaries. Each waste certification summary must include a description of methods used for characterizing the applicable waste stream(s). Characterization efforts must be included in a waste certification summary is provided in the following sections.

2.1.1 Waste Certification Information

The basic information required for each waste stream includes the following:

- General information on waste generating process
- Physical characteristics of the waste
- Chemical characteristics of the waste
- Radiological characteristics of the waste
- Packaging
- Supporting documentation (e.g., laboratory analysis, etc.)
- Land disposal restriction (LDR) certification (if applicable).

2.1.2 Waste Characterization

Waste must be characterized sufficiently to ensure that the waste meets the acceptance criteria for storage. It is the responsibility of onsite generating units and offsite generators to completely and correctly identify and quantify the dangerous constituents of their waste. Characterization can occur using either process knowledge or detailed laboratory analysis or a combination of both. Adequate process knowledge and/or analysis must be available to accurately identify all existing dangerous waste numbers in accordance with WAC 173-303-070, as well as determine the LDR status of the waste. The following are specific characterization techniques, depending on the waste generating process:
Characterization of consistently-generated waste streams

If the waste is being generated through a continuing process, such that the composition of the waste is not expected to vary appreciably over time, waste characterization requirements can be met through administrative and engineering controls on the process. Initially, the waste stream must be characterized through a campaign of sampling and analysis. However, if it can be shown that certain parameters are expected to remain within known limits or where representative sampling is not possible because of the physical form of the waste, gross measurements (e.g., pH, radioactivity screening) and related process knowledge could be substituted for specific chemical sampling and analysis. For each waste stream, the following information should be provided in the waste certification summary:

- Specific parameters expected to remain constant (metal content, radionuclide content, etc.)
- Method of ensuring the waste stream characterization remains reliable between sampling campaigns, including an estimate of its reliability as an indicator of correct characterization. Depending on the process involved, gross measurements, process indicators, or other techniques might be appropriate
- Frequency of recharacterization - if sampling and analysis are required, these must be performed annually, at a minimum, and more frequently if the waste generating process is subject to changes.

Characterization of Batch Waste Streams

If the waste is being generated through a short-term or infrequent operation, such that the composition of the waste is expected to vary appreciably over time, the waste could be characterized as a batch process. For such operations, the waste certification summary should describe the method for determining batch sizes and the mechanism for grouping waste into batches.

Batches can be defined by the specific waste generating operation with several similar operations grouped together (e.g., the applicable waste collected from several different chemistry laboratories), by the type of waste being generated (e.g., waste oils regardless of the point of origin), by point of origin (e.g., all applicable waste - either soil, liquid, or sludge, but not combinations of the three - from a given structure, regardless of the generating process), or by some other method appropriate to the specific onsite generating unit or offsite generator. For this type of waste stream, the following information should be included in the waste certification summary:

- Method of grouping waste into batches (e.g., by waste type, by point of origin)
- Size of batches characterized in this manner (e.g., the amount of waste collected in 1 week, the number of containers)
- Waste characterization technique (e.g., sampling and analysis or process knowledge).

2.1.3 Process Knowledge

If process knowledge is used in the characterization process, a complete description of the process generating the waste [e.g., original product material safety data sheets (MSDS)] and published characterization methodology on the specific waste stream and/or characterization methodology on similar waste streams must be provided. Field analysis can be used to confirm process knowledge.

If adequate process knowledge exists to ensure a particular constituent is not present in the waste, there is no requirement to analyze for that constituent. However, the waste certification summary must establish that there is no reason to suspect the constituent is in the waste. This can be accomplished by including a detailed process description and/or published data of the process.

2.1.4 Sampling and Analysis

In cases where process knowledge is unavailable or incomplete, the onsite generating units and/or offsite generators characterize the waste by sampling and analyzing the waste stream. Knowledge of the history and origin of the waste can be used to decide the analytical testing needed to determine the dangerous constituents of the waste (e.g., if no reason exists to suspect certain chemical compounds like pesticides, there is no reason to test for such parameters).

The onsite generating units and/or offsite generators determine the appropriate sampling method, conduct all field and sampling quality assurance and quality control (QA/QC), arrange for and coordinate with appropriate analytical laboratories, and document the sampling and analysis activities. The onsite generating units and/or offsite generators must certify that the waste analysis information is complete and accurate. For field activities, requirements will follow SW-846 (EPA 1986). Analytical Laboratories will follow requirements stated in the Hanford Analytical Services Quality Assurance Plan (DOE/RL-94-55).

2.1.5 Analytical Methodologies

Specific analytical methodologies that should be used for each parameter will adhere to the guidance provided in Test Methods For Evaluating Solid Waste, Physical/Chemical Methods, SW-846, (latest edition) (EPA 1986), other pertinent references accepted by Ecology, the EPA, and/or the DOE-RL and other equivalent methods approved by Ecology, the EPA, and/or the DOE-RL.
2.2 PRE-SHIPMENT REVIEW

Pre-shipment review takes place before waste can be scheduled for transfer or shipment to the CWC. The review focuses on whether the waste stream is accurately defined and the LDR status determined correctly. Only waste determined to be acceptable for storage is scheduled. This determination is based on the information provided by the onsite generating unit or offsite generator. The following section discusses the pre-shipment review process.

2.2.1 Pre-Shipment Review Process

For each waste transfer or shipment that is a candidate for storage, the onsite generating unit or offsite generator provides (1) all pertinent chemical, radiological, and physical data requested on the shipping paper; (2) other supporting documentation such as MSDS, analytical data, etc.; (3) a description of the waste contents on the container inventory record; and (4) LDR notification/certification information or equivalent documentation (e.g., national capacity variance, contained-in determination variance, etc.), as applicable. The pertinent information is entered into the Solid Waste Information Tracking System (SWITS).

Based on waste identification information provided, the waste designation is reviewed to ensure consistency with waste designations per WAC 173-303-070, as well as for technical accuracy to ensure the waste meets the waste acceptance criteria. If the transfer or shipment information is found to be acceptable, a final operations review is completed and the transfer or shipment is scheduled.

Where potential nonconformances exist in the information provided, waste characteristics do not match the waste certification summary, or additional constituents are expected to be present that do not appear on the documentation, the onsite generating unit or offsite generator is contacted by the CWC operating organization or an approved designated organization for resolution.

2.2.2 Methodology to Ensure Compliance with Land Disposal Restrictions Requirements

Mixed waste accepted for storage at the CWC must either meet or identify the treatment necessary as identified in 40 CFR 268 and WAC 173-303-140 to be considered for storage at the CWC. The CWC can provide limited treatment capabilities (e.g., absorption, neutralization, etc.), thus enabling some treatment of mixed waste to meet LDR criteria. However, the primary mission of the CWC is storage. More complex treatment of mixed waste to meet LDR requirements will be conducted at treatment units designed for this activity. All onsite generating units and offsite generators are subject to LDR or any LDR-related variances and are required to submit all the notifications and
certifications described in 40 CFR 268.7. The following are general requirements for notifications and supporting documentation.

- The waste is subject to LDR and the onsite generating unit and offsite generator or a permitted treatment unit has treated the waste.
  - The onsite generating unit or offsite generator or a permitted treatment unit supplies the appropriate LDR certification information and the analytical data that demonstrate compliance with the LDR treatment standards of 40 CFR 268 and WAC 173-303-140.

- The waste is subject to LDR and the onsite generating unit or offsite generator has determined that the waste naturally meets the LDR treatment standard for disposal.
  - The onsite generating unit or offsite generator supplies the appropriate LDR certification information and analytical data necessary to demonstrate compliance with the LDR treatment standards of 40 CFR 268 and WAC 173-303-140.
  - If the onsite generating unit or offsite generator develops the certification based on process knowledge, analytical data also might be necessary to demonstrate compliance with the appropriate LDR treatment standard.

- The waste is subject to an exemption from a prohibition on landfill disposal.
  - The onsite generating unit and offsite generator submits a notice stating the waste is not prohibited from land disposal as required by 40 CFR 268.7(a)(3).

A representative sample of the waste could be required to be submitted for analysis to ensure that LDR requirements are met. This sample could be submitted directly to a laboratory for analysis.

2.3 WASTE VERIFICATION

Waste verification consists of testing key physical and chemical properties. Waste verification parameters are selected based on the following criteria:

- The need to identify restricted waste
- Parameters important to the proper management of waste at the CWC
- Parameters that can be used to corroborate that waste received matches the identity of waste specified on accompanying transfer or shipping papers
The need to protect employees, the public, and the environment

- Verify waste received is LDR compliant as applicable.

Incoming waste verification is accomplished by reviewing applicable documentation and waste tracking forms or manifests against the waste. Selection of waste for verification is based on the following criteria.

- For radioactive (non-mixed) waste containers stored in the CWC, an adequate verification rate based on process knowledge, must be used.

- For radioactive mixed waste containers stored in the CWC, at least 5 percent or an alternative rate based on process knowledge and/or analytical data must be used.

Verification is performed using a combination of nondestructive examination, physical examination, and/or chemical screening (see Appendix A). Verification is performed by the SW organization or a designated organization during the waste acceptance process at the CWC.

The following 'special materials' might be excluded from verification by chemical sampling:

- Waste containers are not opened because of as low as reasonably achievable (ALARA) concerns
- Empty product containers
- Single substance spill material
- Off-specification, contaminated, and/or outdated commercial products in the original product container
- Contaminated debris and asbestos (does not include liquids or soils)
- Other special-case situations handled on a case-by-case basis.

The methods for ensuring representative sampling are presented in Section 3.0. As practical, the sampling techniques used for specific types of waste correspond to those referenced in SW-846 and WAC 173-303. The analytical methods chosen for the verification parameters are described in Appendix A.

Special materials have been exempted from chemical screening because these materials potentially are hazardous materials (e.g., remote handled, asbestos); are well defined and nonvariable (e.g., single substance spill material or off-specification products); or are unusually difficult to sample and analyze (e.g., empty product containers, contaminated debris, or demolition materials). For these exceptions, the onsite generating unit or offsite generator supplies sufficient chemical and physical characteristics for proper storage of the waste.
The following material cannot be verified by nondestructive examination:

- Container is shielded
- Container has classified waste
- Container is remote-handled waste
- Container cannot be nondestructively examined due to safety, equipment, or design limitations.

The following material cannot be verified by visual examination:

- Container would be damaged during opening
- Container has a surface dose rate of 20 millirem per hour or greater (unshielded)
- Container alpha curie loading is greater than 10 nanocuries per gram
- Container has classified waste
- Container is remote-handled waste
- Container cannot be visually examined due to safety, equipment, or design limitations.

2.4 CORRECTIVE ACTIONS

Corrective action is necessary when significant discrepancies or nonconformances are identified. All applicable acceptance criteria must be met. Nonconformances must be resolved or addressed before accepting the waste for storage at the CWC. Depending on the severity of the nonconformance, the action for noncompliance could range from conditional acceptance to rejection of the entire waste transfer or shipment. The following sections describe nonconformances and the resolution process.

2.4.1 Manifest Discrepancies

Manifest and/or onsite waste tracking form discrepancies are significant discrepancies of quantity or type between the dangerous waste identified by documentation and the dangerous waste that the SW organization actually receives. Significant discrepancies are obvious physical or chemical differences in dangerous constituents that can be discovered through physical or chemical screening, which would cause the waste to be mismanaged.
2.4.2 Nonconformances

The following are examples of nonconformances that require corrective action:

- Items in a waste container not accounted for on documentation or items not in the container but documented
- Free liquids, not including condensate
- Extensively damaged, leaking, or open containers
- Waste with appearance discrepancies
- Prohibited items including ignitable, reactive, corrosive, or incompatible waste.

2.4.3 Resolution of Nonconformances and Manifest Discrepancies

The following activities are conducted when nonconformances and waste tracking form and/or manifest discrepancies are encountered.

- Incorrect or incomplete entries on the waste tracking forms, Uniform Hazardous Waste Manifest, or other shipping papers can be corrected or completed with concurrence of the onsite generating unit or offsite generator, and the CWC operating organization. Corrections are made by drawing a single line through the incorrect entry. Corrected entries are initialed and dated by the individual making the correction.
- The waste packages can be held in an appropriate staging area and the onsite generating unit or offsite generator requested to provide written instructions for correcting the condition before the waste is accepted.
- Waste packages can be returned as unacceptable.
- The onsite generating unit or offsite generator could be requested to correct the condition on the Hanford Facility before the waste is accepted.
- If a noncompliant mixed waste package is received from an offsite generator, and the waste package is nonreturnable because of condition, packaging, etc., and if an agreement on disposition cannot be reached among the involved parties, the issue will be referred to the DOE-RL, Ecology, and other appropriate regulatory agencies for resolution.
- An evaluation will be performed to determine the need to sample previously accepted waste from the noncomplying onsite generating unit.
or offsite generator to determine if any of the waste has the potential for similar nonconformances.

For offsite generators, the DOE-RL provides notification to Ecology of unreconciled manifest discrepancies that are not resolved within 15 days. Discrepancies for onsite generating units are handled internally with no notification.

2.4.4 Periodic Evaluation of Nonconformances

All nonconformances from an onsite generating unit or offsite generator are reviewed periodically to determine if waste generation and management practices are satisfactory. Depending on the review, verification percentages could be adjusted for a given waste stream or other action, such as recharacterization of the waste stream, might be required.

2.5 ACCEPTING THE WASTE

When the waste has been evaluated, the incoming waste acceptance process has been completed, and nonconformances have been resolved or addressed, the following process is followed for receipt of waste.

- The shipment is compared to the shipping paperwork to verify that the paperwork and shipment match
- The containers are verified to ensure they are in acceptable condition for receipt (e.g., no bulging, corrosion, loose lids, punctures, etc.)
- The manifest is examined and approved
- The manifest is signed and dated
- The waste can proceed as directed to the disposal areas of the LLBG.

Copies of the following records for each waste stored in the CWC, as applicable, are maintained by the CWC operating organization or another designated organization:

- All records providing a description of the waste
- Documentation identifying the dangerous characteristics of the waste
- Laboratory reports with chemical and physical analysis of samples
- Manifests or onsite waste tracking forms.

The onsite generating units and offsite generators maintain copies of onsite waste tracking forms, manifests, and associated documentation identifying the waste characteristics and assigned waste designations.
2.6 MANIFEST SYSTEM

The Hanford Facility has one EPA/State identification number as required by WAC 173-303-060, and all TSD units on the Hanford Facility are part of a single dangerous waste facility. Therefore, onsite transfers of dangerous or mixed waste are not subject to the manifesting requirements specified in WAC 173-303-370 and -180. However, all onsite waste transfers are conducted in a manner to ensure protection of human health and the environment. Onsite waste tracking systems voluntarily are used for transporting waste.

For application in this document, the term 'offsite waste' is defined as mixed waste shipped to the CWC from:

- Any generator or generating unit that is located in an area that is not part of the contiguous Hanford Facility and/or
- Any generator or generating unit from which the shipment of waste is transported over a public access roadway.

Offsite waste shipments are not exempt from the requirements of WAC 173-303-370 and -180.

After scheduling the shipment, the following occurs.

- An offsite generator completes a Uniform Hazardous Waste Manifest for each shipment. An onsite generating unit completes an onsite waste tracking form.
- The transporter receives the waste, and dates and signs the Uniform Hazardous Waste Manifest or onsite waste tracking form. The onsite generating unit or offsite generator dates, signs, and retains a copy of the manifest or the onsite waste tracking form.
- The waste is transported to the CWC using onsite transportation personnel, or private carrier as applicable. Transporters of offsite mixed waste must have an EPA/State identification number.

Offsite waste arriving at the Hanford Facility is inspected by receiving personnel. The waste containers are inspected for damage and proper labeling when feasible, and review the transportation documentation for completeness and accuracy. If discrepancies are identified, the shipment is not allowed on the Hanford Facility until the discrepancies are resolved. If the shipment passes inspection, the shipment proceeds to the CWC or a verification facility.

Following receipt of the waste, the CWC operating organization ensures the following.

- Manifest discrepancies, if any, are noted on the Uniform Hazardous Waste Manifest or the onsite waste tracking form.
• The transporter is given a signed copy of the Uniform Hazardous Waste Manifest or the onsite waste tracking form.

• For offsite waste shipments, a CWC operating organization transmits the original Uniform Hazardous Waste Manifest to the offsite generator within 30 days of waste receipt. For onsite waste transfers, the CWC operating organization transmits a copy of the waste tracking form to the onsite generating unit.

The Uniform Hazardous Waste Manifests and onsite waste tracking forms are maintained in the CWC operating record.

If a waste arrives at the CWC in a condition (e.g., bulging, etc.) that could present a hazard to public health or the environment, the building emergency plan for the CWC could be implemented.

2.7 TRACKING SYSTEM

The CWC operating organization maintains a record of waste received, and rejected and returned, including generator's name(s), waste tracking numbers, and the reason the waste was rejected.

On approval for storage, the waste is assigned a unique number used for tracking waste movement and final disposition. This number is written on the manifest or waste tracking form and is placed on a label for each container.

2.8 ADDITIONAL REQUIREMENTS FOR WASTE GENERATED OFFSITE

There are no additional requirements for waste generated offsite.

2.9 METHODOLOGY FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTE

The CWC handles ignitable, reactive, and incompatible waste. Incompatible waste are packaged in separate containers and containers are separated from one another. All waste handling is performed according to applicable regulations and in a manner that minimizes the threat to human health or the environment. The following specific precautions are taken.

• No smoking is allowed in the CWC storage buildings/modules.

• No open flames, sparking devices, cutting or welding, hot surfaces, or static or friction sparks are allowed in CWC while ignitable or reactive waste is present, unless an appropriate authorization has been received from the responsible internal safety organizations. This authorization details the work restrictions necessary to ensure that ignitable or reactive waste is not exposed to conditions that could cause detonation or ignition.
• Compatibility testing is conducted using the methods listed in this WAP before mixing any two types of waste.

• Incompatible waste is segregated into separate containers and stored apart from each other.
3.0 SAMPLING METHODOLOGY

Specific sampling processes depend on both the nature of the material and the type of packaging (Table 3-1). This section describes the sampling methodology.

3.1 SAMPLING METHODS

As practical, the sampling techniques used for specific types of waste correspond to those references in SW-846 and WAC 173-303 (Table 3-1).

3.2 SAMPLING STRATEGIES

The ALARA principle and other worker safety concerns impose a practical limit on the extent of verification evaluation that can be performed on a waste load. The current upper limit set on the surface dose rate for opening containers is 20 millirem per hour. Deviations from this limit can be allowed by a radiation work permit.

In addition to the 20 millirem per hour restriction, the extent of verification evaluation could be limited by an industrial hygienist, who could make a decision that a container not be opened because of the potential for chemical exposure. In both cases, the decision not to open a container is documented in the CWC operating record and signed and dated by the industrial hygienist or an authorized representative of radiological control as appropriate. If a waste package is deemed to be hazardous to worker health, additional containers will be examined for sampling suitability.

Samples from individual containers or at the point of generation can be composited providing the samples are: (1) from a single onsite generating unit or offsite generator, (2) related to one waste specification record, or (3) similar in appearance and composed of compatible material. If the sample material shows significant variation in moisture content, texture, or color, this material should not be composited to avoid masking potentially regulated constituents.

Sampling of small containers will vary with the nature of the material, as well as the type of container. However, the appropriate SW-846 method or protocol will be followed with each sampling campaign. Solid material that cannot be penetrated to an appropriate depth with standard sampling equipment will be sampled to the best extent possible with available equipment. Otherwise a representative sample will be taken by drawing a full vertical sample of the waste container.
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<table>
<thead>
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<tbody>
<tr>
<td>Liquids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moist powders or granules</td>
<td>COLIWASA, SW-846, Chapter 9</td>
<td>Extremely viscous liquid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Containerized liquids</td>
</tr>
<tr>
<td>Solidified liquids</td>
<td>Sludges</td>
<td>Trier, SW-846, Chapter 9</td>
</tr>
<tr>
<td></td>
<td>Sludges</td>
<td>Trier, SW-846, Chapter 9</td>
</tr>
<tr>
<td>Soils</td>
<td>Sand or packed powders and granules</td>
<td>Auger, SW-846, Chapter 9</td>
</tr>
<tr>
<td>Absorbents</td>
<td>Large-grained solids</td>
<td>Large trier, SW-846, Chapter 9</td>
</tr>
<tr>
<td>Wet absorbents</td>
<td>Moist powders or granules</td>
<td>Trier, SW-846, Chapter 9</td>
</tr>
<tr>
<td>Process solids and salts</td>
<td>Moist powders or granules</td>
<td>Trier, SW-846, Chapter 9</td>
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<td></td>
<td>Dry powders or granules</td>
<td>Thief, SW-846, Chapter 9</td>
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<td></td>
<td>Sand or packed powders and granules</td>
<td>Auger, SW-846, Chapter 9</td>
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<td>Large-grained solids</td>
<td>Large trier, SW-846, Chapter 9</td>
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<tr>
<td>Ion exchange resins</td>
<td>Moist powders or granules</td>
<td>Trier, SW-846, Chapter 9</td>
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<td>Dry powders or granules</td>
<td>Thief, SW-846, Chapter 9</td>
</tr>
<tr>
<td></td>
<td>Sand or packed powders and granules</td>
<td>Auger, SW-846, Chapter 9</td>
</tr>
</tbody>
</table>

COLIWASA = composite liquid waste sampler.
NA = not applicable.
4.0 QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM

The following sections discuss the overall objectives of the waste analysis program, as well as the specific data quality objectives (DQOs) (Table 4-1). Specific field and laboratory QA/QC requirements to meet these objectives also are addressed.

4.1 OBJECTIVES OF THE WASTE ANALYSIS PROGRAM

The primary objective of the waste analysis program is to ensure that the waste stored at the CWC is characterized adequately for proper storage. The waste analysis program is designed to meet this objective, and the general waste analysis requirements of WAC 173-303-300 and the disposal restrictions of WAC 173-303-140(4) and 40 CFR 268 if applicable.

4.2 DATA QUALITY OBJECTIVES

The data used to support the CWC waste analysis program needs to be scientifically sound, of known quality, and thoroughly documented. In DQOs for the waste characterization and verification program, the standard parameters (precision, accuracy, compatibility, completeness, and representativeness) were considered (DOE/RL-94-55).

The field data for verification testing will meet EPA quality level I and II criteria. The laboratory data for chemical analyses will meet EPA quality level III criteria. Data from radiological analyses will meet EPA quality level V criteria (DOE/RL-94-55).

4.3 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

Field blanks and replicates are required for samples analyzed in the field as part of verification testing as well as for samples submitted for laboratory analysis. The number of field QA samples is 10 percent of the total number of field samples taken. The 10 percent criterion commonly is accepted as a minimum number of QA/QC samples. The types and frequency of collection for field QA samples will follow onsite criteria (DOE/RL-94-55).

4.4 LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

The laboratory QA/QC requirements outlined in the following apply to laboratory analyses requested by the CWC operating organization for residuals characterization or for recharacterization as part of a corrective action. Most laboratory analyses for waste characterization are conducted by the onsite generating units or offsite generators, who are required to document their waste certification programs (refer to Section 2.0).
The daily quality of analytical data generated in the contracted analytical laboratories is controlled by the implementation of an analytical laboratory QA plan.

Before commencement of the contract for analytical work, the laboratory submits its QA plan to the waste analysis project manager and the QA officer for approval. At a minimum, the plan documents the following:

- Sample custody and management practices
- Sample preparation and analytical procedures
- Instrument maintenance and calibration procedures
- Internal QA/QC measures, including the use of method blanks
- Sample preservatives used
- Analyses requested.
Table 4-1. Central Waste Complex Data Quality Objectives for Waste Analysis Program.

<table>
<thead>
<tr>
<th>Waste characterization</th>
<th>Waste analysis activity</th>
<th>Data quality/analytical level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtain and document the information necessary to properly designate waste</td>
<td>• Specify parameters to be evaluated for waste characterization</td>
<td>Level III for chemical analysis; Level V for radionuclide analysis</td>
</tr>
<tr>
<td>Confirm that the data collected for waste characterization are of sufficient quality to support waste management decisions</td>
<td>• Require waste certification summaries for each waste stream</td>
<td>Level III for chemical analysis; Level V for radionuclide analysis</td>
</tr>
<tr>
<td>Confirm that waste characterization information is up to date</td>
<td>• Specify information required to document process knowledge</td>
<td>NA</td>
</tr>
<tr>
<td>Identify and reject waste that does not meet CWC's acceptance criteria</td>
<td>• Require waste certification process</td>
<td>Level III for chemical analysis</td>
</tr>
<tr>
<td>Tests for compliance with numerical treatment standards of 40 CFR 268</td>
<td>• Specify sampling and analytical methods to be used</td>
<td>NA</td>
</tr>
<tr>
<td>Waste verification</td>
<td>• Specify QA requirements</td>
<td>Level III for chemical analysis</td>
</tr>
<tr>
<td>Confirm that the waste received matches the accompanying documentation and is what was expected by CWC</td>
<td>• Implement for all new or nonroutine waste streams</td>
<td>Level I/Level II</td>
</tr>
<tr>
<td>Confirm that no restricted waste forms are present</td>
<td>• Check completeness of shipping papers and screen all waste containers for surface dose and weight measurements to identify obvious discrepancies between the waste received, and the accompanying documentation</td>
<td>Level I/Level II</td>
</tr>
<tr>
<td>Confirm that the data collected during the verification evaluation are of sufficient quality to support waste management decisions</td>
<td>• Perform real-time radiography or visual inspection and fingerprint analysis on a percentage of the containers received to confirm that the waste matches the waste tracking forms</td>
<td>Level I/Level II</td>
</tr>
</tbody>
</table>

LDR = land disposal restriction.
NA = not applicable.
5.0 SPECIAL REQUIREMENTS FOR LAND DISPOSAL RESTRICTION WASTE

The CWC operating organization ensures that all mixed waste restricted from land disposal meets or describes the appropriate treatment standards of WAC 173-303-140(4) and 40 CFR 268, Subpart D, before acceptance for storage. The CWC operating organization will not transfer for disposal any mixed waste restricted under 40 CFR 268, Subpart C, that does not meet the treatment standards of 40 CFR 268, Subpart D, unless:

- Such waste is subject to a national variance
- Contained-in petition is granted
- Equivalent treatment under 40 CFR 268.42(b) is granted
- A petition under 40 CFR 268.6 is granted
- An extension under 40 CFR 268.5 is given
- A treatment standard variance under 40 CFR 268.44 is granted.

Listed waste numbers FO20, FO21, FO22, F023, F026, and F027 (dioxin-containing waste) are prohibited from land disposal; the CWC operating organization does not accept waste containing these waste numbers. Lab packs are accepted for storage until treatment becomes available.

Waste containing halogenated organic compounds (HOCs) in total concentration greater than or equal to 1,000 milligrams per kilogram are prohibited from land disposal and are accepted for storage at the CWC until treated. Specific methods for analyzing the HOCs [otherwise referred to as total organic halides (TOX)] are described in Appendix B.

The CWC operating organization is responsible for obtaining detailed physical and chemical analysis in accordance with Section 3.0. This applies to waste that is both treated and that naturally meets the treatment standards specified in 40 CFR 268. At a minimum, corroborative testing will be conducted annually on a designated sample (e.g., the pre-acceptance sample). Waste characterization might be required more frequently under the following circumstances.

- A new waste stream is generated.
- A process generating the waste changes.
- The waste characteristics are highly variable from load to load.
- The CWC operating organization has reason to suspect a change in the waste based on inconsistencies in manifesting, packaging, or labeling of the waste.

Each waste is analyzed for those LDR constituents contained in the listed and characteristic numbers identified by the onsite generating unit or offsite generator that cause the waste to be dangerous. Onsite generating units or offsite generators might test waste or use process knowledge to determine LDR status. Treatment standards to which the waste is subject use 40 CFR 268, Appendix I, SW-846, or EPA-600 methods. However, when it can be shown that a
treatment standard has been met through an analysis other than for the established analysis methods, the requirement for the analysis of the treatment standard may be waived by the CWC operating organization.
6.0 RECORDKEEPING

This WAP is maintained by the CWC operating organization or by other approved organizations. Laboratory documents are maintained at the laboratories. Records associated with this WAP and waste verification program are maintained by the CWC operating organization.

A copy of the waste storage record for each waste stream accepted at the CWC also is maintained. Onsite generating units and offsite generators maintain their sampling and analysis records, and the CWC operating organization could request copies of this information. All records and results of waste analysis are maintained in the CWC operating record.

This WAP will be revised under the following circumstances.

- Whenever test methods are changed.
- Whenever changes occur in the waste acceptance criteria or the waste categories accepted for storage that might require a change in the parameters to be tested.
- Whenever referenced personnel, organizations, or procedures are changed.
- Whenever regulation changes occur that affect the WAP.

The DOE-RL may implement any proposed change once Ecology is notified. However, if the change eventually is disapproved, the DOE-RL will be responsible for fulfilling any requirements that were not met because of implementation of the change.

This WAP is maintained as a controlled document under the existing guidelines for document control within the CWC operating organization. Documents are maintained in the CWC operating record and are forwarded to the onsite document control organization for permanent storage.
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7.0 REFERENCES


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APPENDICES

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B  TOTAL ORGANIC HALIDES SCREENING FOR INCOMING WASTE ACCEPTANCE

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ANALYTICAL PROCEDURES AND RATIONALE
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APPENDIX A

ANALYTICAL PROCEDURES AND RATIONALE

These analytical procedures are designed to identify or screen specific waste components. Because the characterization provides information concerning the distribution and nature of waste constituents within the waste material, and the CWC operating organization is merely identifying that previously submitted information is correct rather than completely characterizing the waste, a less comprehensive sampling and analytical approach is appropriate.

The analytical screening parameters that could be used for waste received at the CWC, associated rationale, and methods for these analyses are as follows.

- **Physical description** is used to determine the general characteristics of the waste. This facilitates subjective comparison of the sampled waste with previous waste descriptions or samples. Also, a physical description is used to verify the observational presence or absence of free liquids.

  Methods--samples are inspected and the physical appearance of the waste is recorded. Real-time radiography and/or visual examination is used.

- **Radioactivity screen** is used to quantify radionuclides for verification of transuranic radionuclide content, non-transuranic radionuclide content, and the waste classification (i.e., low-level waste or transuranic)

  Methods--a sample of the waste is passed by a geiger counter, survey meter, or a waste container is assayed using passive-active neutron or segmented gamma scanning techniques.

- **Headspace volatile organic compound analysis** is performed to determine the presence or absence of solvents or other volatile organic compounds in waste. This is one of the few methods available to evaluate the presence of volatile organic compounds that could be associated with heterogeneous materials.

  Methods--a sample of the headspace gases in a container is analyzed by one or more of the following: Fourier transform infrared spectroscopy, gas chromatography/mass spectroscopy, HNU, organic vapor analyzer, and colorimetric tubes.

- **Paint filter liquids test** is used to verify the presence or absence of free liquid in solid or semisolid material to be landfilled.
Method—to a standard paint filter, 100 centimeters or 100 grams of waste are added and allowed to settle for 5 minutes. Any liquid passing through the filter signifies failure of the test (SW-846, Method 9095).

- **pH screen** is used to identify the pH and corrosive nature of an aqueous or solid waste, aid in establishing compatibility strategies, and to indicate the proper storage location in CWC.

Methods—full range pH is used for the initial screening. If the initial screen indicates a pH below 2 or above 12.5, a pH meter is used. The pH meter is used directly on liquid samples and on the free liquid portion of liquid/solid samples. For solid materials, the pH of the solution from a 1:1 slurry of water to waste is used (or ASTM, Method D4980).

- **Flammability potential screen** is used to determine the fire-producing potential of the waste. This test can be applied to waste liquids, solids, and semisolids.

Methods—liquids are tested using the HAZCAT combustibility, char and/or oxidizer tests; solids and semisolids are tested using the HAZCAT char and/or oxidizer tests.

- **Water reactivity screen** is used to determine if the waste has the potential to react vigorously with water to form gases or other reaction products.

Method—approximately 5 grams of solid or 5 milliliters of liquid waste are mixed with about 5 milliliters of water. For liquid waste, water is added to the waste. The solution is observed for evidence or fuming, bubbling, or spattering. These reactions are considered to be positive evidence that the waste is water reactive.

- **Cyanide screen** indicates whether the waste produces hydrogen cyanide upon acidification below pH 2.

Method—to a test tube or beaker containing approximately 5 milliliters of sample, an equal amount of freshly prepared ferrous ammonium citrate is added. Then, 3 normal hydrochloric acid is used to reduce the pH of the solution to about 2.0. A deep blue color indicates the presence of cyanide. The test can detect free cyanide and complex cyanides in concentrations above 200 parts per million.

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1 HAZCAT is a registered trademark of Haztech Systems Incorporated, San Francisco, California.
• **Sulfide screen** is used to indicate if the waste produces hydrogen sulfide upon acidification below pH 2.

Methods--approximately 5 milliliters of sample is added to beaker or test tube and enough 3 normal hydrochloric acid is added to bring the pH down to 2.0. A sulfide test strip is placed in the solution. If the paper turns brown or silvery black, the presence of sulfides in the sample is indicated. If there is no color change, the total sulfides are reported as nondetectable.

• **Metals and elements screen** is used to determine the presence of regulated quantities of heavy metals in the waste and confirm the presence or absence of other inorganic elements. This method is used as a confirmation of other test results.

Method--waste samples are tested using an x-ray fluorescence spectrometer and/or the toxicity characteristics leaching procedure extraction method (SW-846 Method 1311). For the x-ray fluorescence spectrometry method, spectral data are obtained by putting a small sample of waste in special sample cups or by holding the detector up to the waste to be analyzed. The resulting spectra are analyzed for the presence of elements and heavy metals.

• **Volatile and semivolatile compounds screen** is used to evaluate the presence or absence of volatile and/or semivolatile organic compounds in the waste, and to verify the treatment standards associated with organic chemical content.

Method--waste is tested using fourier transform infrared spectroscopy, fourier transform raman spectroscopy, and/or gas chromatography/mass spectroscopy. Depending on the waste matrix, an experienced spectroscopist uses the testing method best suited for the waste and interprets the results.

• **PCB screen** is used to indicate whether PCBs are present in oil-bearing waste and to determine if the waste needs to be managed in accordance with the regulations prescribed in the *Toxic Substance Control Act of 1976*.

Method--the tests to be conducted include the HAZCAT beilstein test, and/or the appropriate organic chlorine test.
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APPENDIX B

TOTAL ORGANIC HALIDES SCREENING FOR INCOMING WASTE ACCEPTANCE
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TOTAL ORGANIC HALIDES SCREENING FOR INCOMING WASTE ACCEPTANCE

This appendix addresses the guidelines and processes by which the CWC operating organization determines the applicability and demonstrates compliance with the LDR regulations for waste with HOCs. The appropriate screening methods will be used for TOX.

Pre-Shipment Characterization for Halogenated Organic Compounds or Total Organic Halides

A determination as to the applicability of the HOCs is made during the pre-shipment acceptance testing. This determination is based on the results of TOX analysis or based on results of the individual compounds listed in Appendix III of 40 CFR 268. This determination is made by the onsite generating unit or offsite generator as part of the information submitted to the CWC operating organization.

Waste Verification for Total Organic Halides

The CWC operating organization samples and analyzes at least 20 percent of all incoming waste streams that have pre-shipment TOX readings above 500 milligrams per kilogram to ensure the incoming waste arrives with TOX levels below 1,000 milligrams per kilogram.

If the incoming waste contains less than 1,000 milligrams per kilogram of TOX, the material is considered for land disposal if all other waste acceptance criteria are met. If the TOX test indicates greater than 1,000 milligrams per kilogram of TOX is present, the waste is subjected to further analysis to determine if the HOC concentration exceeds 1,000 milligrams per kilogram as described in the next section.

Land Disposal Prohibition for Shipments with Excessive Levels of Total Organic Halides

The CWC operating organization will not transfer for disposal any mixed waste where waste analysis results exceeds 1,000 milligrams per kilogram of TOX unless the comprehensive analysis criteria are performed to demonstrate that the HOC level in such waste does not exceed 1,000 milligrams per kilogram. Laboratory analysis, in accordance with EPA approved methods, is performed to determine the concentration of each constituent listed in Appendix III of 40 CFR 268. If the laboratory results indicate that the total concentration of the listed HOCs does not exceed 1,000 milligrams per kilogram (solids) or 1,000 milligrams per liter (liquids), the CWC operating organization will transport this waste stream for land disposal after recording these data in the operating record.
Annual Total Organic Halides Analysis and Recharacterization of Waste for High Total Organic Halides

Annually, the CWC operating organization analyzes a sample of each non-high TOX waste stream for recharacterization of the high TOX classification. The TOX analysis is performed on a sample taken from an incoming shipment. Should the waste exceed 500 milligrams per kilogram of TOX, the waste is recharacterized as a high TOX waste and thereafter is analyzed for TOX at the high TOX frequency. High TOX waste remains high TOX waste thereafter. The annual high TOX recharacterization is not required for high TOX waste because waste already is sampled at the high TOX frequency.

Additional Recordkeeping Requirements for High Total Organic Halides Analysis Results

The CWC operating organization maintains the following additional records pertaining to TOX analysis in the operating record:

- A list of high TOX waste streams that are accepted at the CWC
- The results of the annual characterization analysis for high TOX/non-high TOX waste
- The results of the incoming shipment analyses for TOX for both high TOX and non-high TOX waste.

Total Organic Halides Screening Protocol Sample Preparation and Analysis

Method 9020 or 9022 determines TOX as chloride in aqueous waste solutions. Using this method for analysis, the CWC operating organization prepares and analyzes an extract for all waste that is nonaqueous in nature. The CWC operating organization uses Method 3540 (soxhlet) or Method 3550 (sonification), which are extraction procedures described in SW-846 to prepare this extract. The extract is referred to as 'solid waste extracts'.

If significant stratification occurs in the waste, each layer might be composited in proportion to the estimated volume. These samples are mixed sufficiently to allow a representative sample of the waste to be analyzed.
APPENDIX C

FINGERPRINT PARAMETER SELECTION
APPENDIX C

FINGERPRINT PARAMETER SELECTION

The following parameters have been selected for fingerprint analysis of waste materials being received at CWC.

- Flammability or head space VOC/SVOC - Flammability tests will be conducted when safety conditions exist that eliminate the spread of radioactive material to the worker or environment via open flame testing. Head space analysis, volatile organic compounds, or semivolatile organic compound analysis will be tested in place of open flame tests as needed using appropriate analytical equipment. Oxidizing materials that could contribute to the propagation of a fire also will be analyzed.

- Paint filter liquid screening - When needed, this analysis will be used to determine if free liquids potentially are present in a waste shipment.

- pH--pH screening is conducted to identify waste that might mobilize toxic materials and corrode storage containers.

- Organic Halogen--This screening is conducted to identify the presence of persistent or land ban materials; a precursor for PCB screening if the test is positive.

- PCBs--PCB waste is regulated specifically by federal and state regulations. These regulations must be met for storage of PCB waste at the CWC.

- $H_2O$ reactivity--This test is conducted to determine if a waste material has the potential to react vigorously with water or form toxic gases.

- Sulfide--This test is conducted to determine if a waste material might produce hydrogen sulfide, a toxic gas formed below pH 2.

- Cyanide--This test is conducted to determine if a waste material might produce hydrogen cyanide below pH 2.

- Metals--When needed, x-ray fluorescence or toxicity characteristic leaching procedure methods will be conducted.