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HNF-1886
Revision 8

Central Waste Complex Waste Analysis Plan

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

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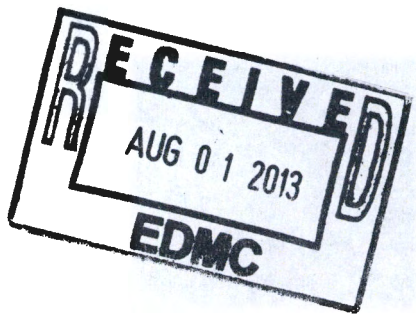

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CENTRAL WASTE COMPLEX WASTE ANALYSIS PLAN

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CENTRAL WASTE COMPLEX WASTE ANALYSIS PLAN

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Tables and Figures

ACRONYMS

ALARA	as low as reasonably achievable
AOAC	Association of Official Analytical Chemists
APHA	American Public Health Association
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Materials
CAP	corrective action plan
CCW	constituent concentrations in waste
CCWE	constituent concentrations in waste extract
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 objectives
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
HNF	Hanford Nuclear Facility (document identifier)
LDR	land disposal restriction
LLBG	Low-Level Burial Grounds Trenches 31 and 34
MSDS	material safety data sheet
NDE	nondestructive examination
NIOSH	National Institute for Occupational Safety and Health
PCB	polychlorinated biphenyl
PES	performance evaluation system
pH	negative logarithm of the hydrogen-ion concentration
QA	quality assurance
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
RCW	Revised Code of Washington
SAP	sampling and analysis plan
SWOC	Solid Waste Operations Complex
T Plant	T Plant Complex
TCLP	toxicity characteristic leaching procedure
TPA or Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSD	treatment, storage, and/or disposal
UHC	underlying hazardous constituents
WAC	Washington Administrative Code
WAP	waste analysis plan
WRAP	Waste Receiving and Processing Facility
WRP	Waste Retrieval Project

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	Meters	3.28084	feet
yards	0.9144	meters	Meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
Mass (weight)			**Mass (weight)**		
ounces (avoir)	28.34952	grams	Grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			**Volume**		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	Liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	Liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds (force) per square inch	6.894757	Kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE, Third Ed., 1990, Professional Publications, Inc., Belmont, California.

DEFINITIONS

Term	Definition
Analysis	Obtaining and reviewing information provided by the waste generator and/or provided by other means to confirm the information provided concerning a waste stream.
Compatible	As applied to suitability of containers, tanks or sampling equipment, *compatible* means the waste will not react with or otherwise damage the container, tank, or sampling equipment so that the ability of the equipment to contain the waste is not impaired. For determination of compatibility for storage, refer to definition of *incompatible waste.*
Inspection	Viewing of the contents of the container, container markings and labeling, number of containers, and/or the container itself as a means of confirming the identity of the waste
Knowledge	Sufficient information about a waste to reliably substitute for direct testing of the waste. To be sufficient and reliable, the *Knowledge* used must provide information necessary to manage the waste in accordance with the requirements of this chapter. [WAC 173-303-040] Note: *Knowledge* may be used by itself or in combination with testing to designate as waste pursuant to WAC 173-303-070(3)(c), or to obtain a detailed chemical, physical, and/or biological analysis of a waste as required in WAC 173-303-300(2).
Profile	A *detailed physical, chemical, and/or biological analysis of a dangerous waste* provided by the waste generator in order to allow the Solid Waste Operation Complex (SWOC) Treatment, Storage, and/or Disposal (TSD) Units (CWC, WRAP, T Plant, and LLBG Trenches 31 and 34) staff to perform waste evaluation. Previously used terms such as waste acceptance summary, and waste storage and disposal records, are examples of profiles for performing technical reviews for transfers between SWOC TSD units.
Solid Waste Operations Complex (SWOC)	A combination of treatment, storage, and disposal operating unit groups consisting of the CWC, Waste Receiving and Processing Facility (WRAP), T Plant, and Low Level Burial Grounds (LLBG) Trenches 31 & 34.
Testing	Performance of a procedure that yields a quantitative or qualitative evaluation of the type and/or quantity of materials present. Sometimes referred to as *laboratory analysis*, but for purposes of this document, the term *testing* is used to distinguish it from waste analysis (refer to definition of *analysis* above).
Verification	Determination that the waste in question is that waste described on the approved profile. Verification includes container receipt inspection, physical screening, and chemical screening of waste.
Waste Stream	Wastes that are physically or chemically similar to each other; wastes that are generated from the same types of processes; or wastes that are of the same type, but generated at different points in the process or at different process locations.

CENTRAL WASTE COMPLEX WASTE ANALYSIS PLAN

1 UNIT DESCRIPTION

The Central Waste Complex (CWC) is located in the 200 West Area of the Hanford Facility, Richland, Washington. The CWC provides storage and treatment of dangerous and/or mixed waste.

This Waste Analysis Plan (WAP) describes processes for obtaining information on the chemical, biological, and physical characteristics of the dangerous and/or mixed waste managed in CWC to meet the requirements of the Washington State Department of Ecology Dangerous Waste Regulations, Washington Administrative Code (WAC) 173-303-300, General Waste Analysis.

This WAP documents the waste acceptance process, sampling methodologies, analytical techniques and overall processes that CWC performs on dangerous and/or mixed waste that it accepts for storage within CWC. This WAP contains information regarding the acceptance, confirmation, and management of newly generated waste, waste transfers from other SWOC treatment, storage, and disposal (TSD) Units, CWC generated waste, and Waste Retrieval Project (WRP) waste.

Activities may be performed by the CWC operating organization or its delegated representative.

1.1 Description of Unit Processes and Activities

The CWC consists of a container management area where waste is stored and/or treated. Refer to the Part A Permit Application Form for identification of the CWC container management area.

The CWC container storage area capabilities are:

- Receiving.
- Storing and Treating.
- Opening containers.
- Sampling.
- Physical screening.
- Chemical screening.

The CWC generates, stores, treats, repackages, overpacks, and transfers/ ships dangerous and/or mixed waste. Containers requiring treatment can be treated at CWC, transferred to WRAP or to T Plant, or to an off-site treatment facility. Refer to Section 7.5 for a description of the treatment capabilities provided at CWC.

CWC waste processes include:

- Assessment and evaluation of all waste stream information. This process ensures conformance with the CWC waste acceptance requirements prior to acceptance of the waste by the CWC.
- Receipt and acceptance of dangerous and/or mixed waste.
- Completion and submittal of a waste stream data package.
- Generation of new dangerous and/or mixed waste during processing (CWC generated waste).
- Management of the accepted waste for storage and/or treatment.

Waste entering CWC will be packaged in containers of various types and sizes according to United States Department of Transportation (DOT) Regulations, or alternate on-site packaging requirements. Waste will be processed within CWC capabilities and may or may not meet the onsite Land Disposal Restriction (LDR) treatment standards pursuant to WAC 173-303-140. Dangerous waste meeting the LDR treatment standards can be stored in CWC until the waste will be transferred/ shipped for final disposal to the LLBG Trenches 31 & 34, other on-site disposal facilities, or an off-site disposal facility.

1.1.1 Waste Acceptance, Movement, Processing, and Management

The CWC waste tracking processes ensure that the waste received at CWC matches the shipping manifest or transfer documents, and that the waste will be tracked through CWC. The CWC maintains all the waste tracking information.

The CWC tracks the waste through the following processes, segregation; storage; transfers; and/or shipping for final disposal. The waste tracking process (Figure 4) provides a mechanism for tracking waste using a unique container identification number. The unique number is a barcode (or equivalent) that will be recorded in an electronic data tracking system. This mechanism encompasses waste acceptance, movement, processing, and management of waste. This electronic container tracking system identification number links the hard copy or electronic record to the container. These records will be maintained in accordance with Section 8, Recordkeeping. The container identification number records will contain information on the location, quantity, and physical and chemical characteristics of the waste.

The following Sections and Figures 1, 2, and 3 describe the process for waste acceptance and required documentation (container data and waste profile).

1.1.1.1 Narrative Process Descriptions

Wastes will be stored at CWC regardless of whether or not compliance with LDR treatment standards has been met. For waste that meets the applicable LDR requirements, the CWC operating organization will maintain all the information (Section 8) to demonstrate how these requirements have been met.

The Hanford Facility is required to test certain mixed wastes when treatment standards are expressed as concentrations to ensure that the waste or treatment residues are in compliance with applicable LDR requirements (Section 2.1.3.2 and 7.3). Such testing will be performed according to the frequency specified in this WAP, as stated in 40 CFR 268.7(b), incorporated in reference by WAC 173-303-140.

1.1.1.2 Waste Acceptance Process

Waste acceptance processes for CWC exist for newly generated waste (2.1), SWOC transfers (2.2), WRP waste (2.3), and CWC Generated waste (2.4). These processes typically include waste stream approval, waste shipment/transfer approval, and verification. Refer to the respective sections in 2 for how these processes apply to the different categories of waste.

1.1.1.2.1 Types of Knowledge

When collecting documentation on a waste stream or container the CWC operating organization must determine if information provided by the generator, other than that obtained from direct testing, meets the definition of *Knowledge* in WAC 173-303-040. Knowledge requirements will be met by sampling and analysis and/or historical data. Historical data consists of detailed information from existing waste analysis data or information on processes similar to those that generated the waste, including but not limited to the following:

- Mass balance from a controlled process that has a specified input for a specified output.
- Material safety data sheets (MSDSs) on unused chemical products.
- Test data from a surrogate sample.
- Analytical data on the waste or a waste from a similar process.
- Interview information.
- Logbooks.
- Procurement records.
- Analytical data with qualifiers.
- Processes and/or methods.
- Process flow charts.

- Inventory sheets.
- Vendor information.
- Mass balance from an uncontrolled process (e.g., spill cleanup).
- Mass balance from a controlled process with variable inputs and outputs (e.g., washing/cleaning methods).

All information meeting the definition of knowledge will be applied to designate waste, quantify constituents, and characterize the waste for its safe management to demonstrate compliance with CWC acceptance requirements.

1.1.1.2.2 Description of Performance Evaluation System Committee (PES)

The Performance Evaluation System Committee (PES) acts as an agent of CWC and determines the initial physical screening frequency of each Hanford on-site generator's waste stream. PES will provide a periodic status report for an individual generator's performance as identified in Section 2 for applicable waste received at CWC. In addition, PES will provide a mechanism for determining corrective actions, resolving waste acceptance issues, and physical screening frequency adjustments when a conformance issue is discovered.

1.1.1.2.3 Initial Physical Screening Frequency Determination

The initial physical screening frequency is determined based on the following process:

- Personnel responsible for waste receipt at CWC review the generator waste profile information to determine the relative potential for incorrect designation or inappropriate segregation based on all relevant information, including any previous experience with the generator. Based on this review, any concerns will be identified associated with the following criteria:
  - Documented waste management program
  - Waste stream characterization information
  - Potential for inappropriate segregation.
- Based on the identification of concerns during the review, an initial physical screening frequency will be established for the new generator's waste stream based on the following criteria:
  - Initial physical screening frequency of, at a minimum, 20 percent: No concerns identified (e.g., cleanup of contaminated soil where the soil has been well characterized and no other waste generation processes are occurring at that location)
  - Initial physical screening frequency of, at a minimum, 50 percent: Concern(s) identified in one criterion
  - Initial physical screening frequency of 100 percent: Concerns identified in two or more criteria.

1.1.1.2.4 Performance Evaluation

A performance evaluation will be used to trend a generator's waste acceptance performance and will be used to adjust the generator's overall physical screening frequency. This evaluation, identified as an integral part of the quality assurance (QA) program, objectively considers the conformance issues documented during the Pre-shipment Review and Verification functions. The PES will maintain processes that: (1) perform evaluations based on conformance issues identified, (2) evaluate unsatisfactory performance for corrective actions, and (3) adjust physical screening rates accordingly.

The performance evaluation will be conducted and subsequently accepted by PES, and the documentation shall be maintained in accordance with Section 8, Recordkeeping. Performance evaluation frequency will be based on the generator's historical performance and the waste stream involved.

1.1.1.2.5 Conformance Issue Resolution

Conformance issues may result in a waste container not meeting CWC waste acceptance requirements. A conformance issue is any discrepancy identified during the confirmation process with waste package documentation, a waste package, or a shipment. Discrepancies can be identified during pre-shipment reviews of waste streams during the verification process. When a possible conformance issue is identified, the following actions will be taken to resolve the discrepancy issue:

- The PES compiles all information concerning the possible conformance issue(s).
- The PES notifies and requests that the generator supply additional knowledge that may assist in the resolution of the concern(s). When the generator supplies information that resolves the concern(s) identified, no further action is required.
- Once PES identifies a conformance issue during verification, the CWC operating organization and the generator discuss the conformance issue and identify the appropriate corrective action to resolve the container issue. The corrective actions may include returning the container to the generator or transferring the container to another TSD unit/off-site TSD facility to resolve the conformance issue. When the conformance issue(s) results in a waste stream failure, the physical screening frequency for all waste streams that have the potential to exhibit a similar conformance issue from the generator will be adjusted to 100 percent until the issue(s) are adequately addressed.
- The CWC operating organization requests the generator to provide a corrective action plan (CAP) that clearly states the reason for the failure and describes the actions required to prevent recurrence. The generator may request a reduction in verification of unaffected waste streams. This request must be accompanied by a justification that identifies why these waste stream(s) will not exhibit the same conformance issue.
- The CWC operating organization reviews the CAP and waste stream justification for adequacy. When the CAP is considered inadequate by CWC operating organization, the generator's screening rate cannot be dropped down to the baseline frequency until an approved CAP is in place. When the waste stream justification is adequate, the CWC operating organization may provide an alternative frequency as denoted in Section 1.1.1.2.6.

1.1.1.2.6 Process for Reducing the Physical Screening Frequency

Physical screening rate frequencies and changes to those frequencies may be applied to a specific waste stream, to a specific contractor, or to a specific offsite generator based on the circumstances surrounding the conformance issue. After the CWC operating organization establishes or increases the initial physical screening frequency, the frequency may be reduced in accordance with the following process.

CWC operating organization reduces physical screening in three steps. Reduction for all steps will be based on the generator's ability to demonstrate that five containers from the waste stream in question pass verification. In addition, reduction to the baseline frequency requires that the CWC operating organization documents an acceptable evaluation of the corrective action plan. At no time will the physical screening frequency be reduced below 5 percent (minimum allowable) for waste generated onsite or below 10 percent for offsite generators.

Step 1) Reduce frequency by up to 66 percent after five containers from the waste stream in question pass verification.

Step 2) Reduce frequency established in Step 1 by up to 50 percent after five containers from the waste stream in question pass verification.

Step 3) Reduce frequency established in Step 2 to the baseline frequency after five containers from the waste stream in question pass verification. The CWC operating organization documents the acceptable evaluation of the corrective action plan.

The physical screening rate reduction will be established during periodic PES evaluations, and the documentation will be maintained according to Section 8, Recordkeeping. The percentage of the reduction will be based on the evaluation of the relative severity of the original conformance issue, the status of the corrective action plan, any interim actions taken by the generator, and the generator's historical performance for this waste stream before this reduction.

1.1.2 Operating Conditions

The CWC operating organization will conduct waste management operations in accordance with the design and engineering requirements of waste management structures and equipment, and with all equipment manufacture specifications and operating processes. Before treatment and storage of waste, CWC will have processes in place for safe management of the waste. These processes consider actual or potential risks posed by the waste treatment and/or storage equipment. CWC will conduct all waste storage and/or treatment according to these processes and comply with requirements for labeling, container management, and inspection. Management of ignitable, reactive, or incompatible waste within CWC will be accomplished in accordance with Section 7.2.

1.2 Identification and Classification of Waste

CWC waste management operations will be conducted in accordance with the requirements of the WAP. Before a waste is accepted into CWC, its properties will be evaluated to determine if the waste can be safely managed within CWC. The following waste types will not be authorized for storage within CWC:

- Bulk liquid waste in tankers.
- Bulk solids in trucks or roll-off boxes.
- Shock sensitive waste.
- Class 4 oxidizer waste (International Fire Code).
- Infectious waste.

CWC will manage the following waste types:

- Containerized liquids/free liquids.
- Pressurized gas cylinders and aerosol cans within containers.
- Munitions/explosives (to be evaluated on a case-by-case basis).
- Bulk sodium metal.
- Labpack liquids.
- Solids/debris.
- Sludges/soils.

These waste types could be classified as, mixed, and/or dangerous unless otherwise prohibited by this WAP, the waste could exhibit any or all of the following characteristics: ignitable, toxic, corrosive, or reactive. Refer to Section 7.2 for regarding ignitable waste, reactive waste, or compatibility reviews.

These waste types could be accepted within any of the waste categories which include: newly generated waste, waste transfers from other SWOC TSD Units, CWC generated waste, and WRP waste. This waste material consists of items such as, but not limited to, personal protective equipment, rags, and spent equipment contaminated with dangerous cleaning agents, lubricants, paints, or other dangerous materials that designate as dangerous wastes when discarded.

Biological waste could consist of animal remains that were used for experiments.

1.2.1 Dangerous Waste Numbers, Quantities, and Design Capacity

The CWC Part A identifies dangerous waste numbers, quantities, and design capacity.

Waste will be designated pursuant to WAC 173-303 using manufacturer's product information, MSDS, laboratory analysis, and reference material such as *Registry of Toxic Effects of Chemical Substances* (NIOSH). Waste designated for the DW numbers enumerated in the table below (See the CWC Part A Permit Application form) can be accepted for storage in CWC, subject to the additional requirements in this WAP.

Designation for waste types accepted and stored at CWC include:

Number	References
U and P numbers	WAC 173-303-9903-9904
F numbers (limited numbers refer to Part A)	WAC 173-303-9904
WPCB	WAC 173-303-9904
D001	WAC 173-303-090(5)
D002	WAC 173-303-090(6)
D003	WAC 173-303-090(7)
D004 through D043	WAC 173-303-090(8)
WT01 and WT02	WAC 173-303-100 and 104
WP01, WP02, and WP03	WAC 173-303-100 and 104
WSC2	WAC 173-303-090(6)/104

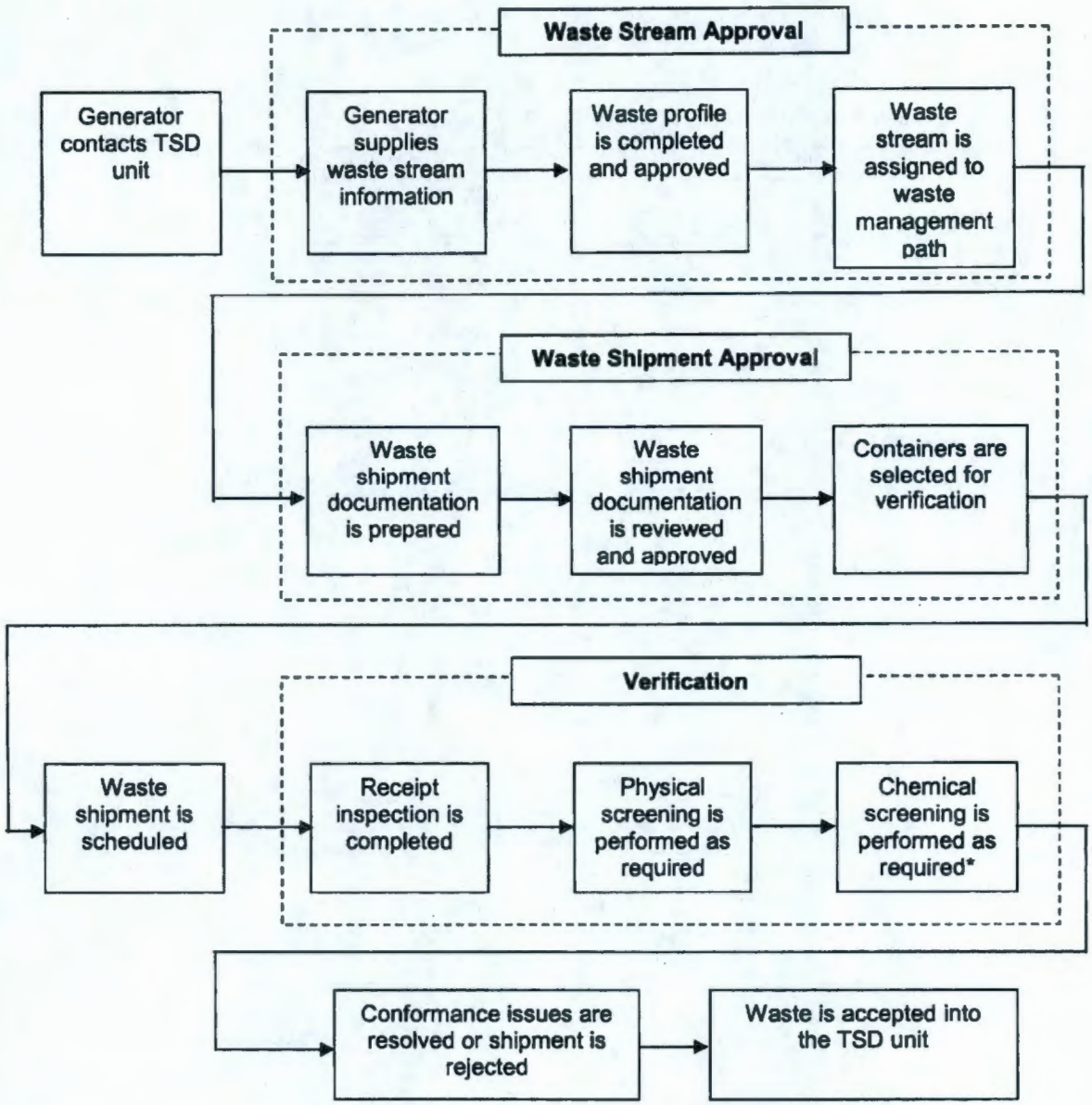

Figure 1 Waste Confirmation and Acceptance Process for Newly Generated Waste

* Trained CWC personnel may conduct verification at the Hanford onsite generating location prior to shipment.

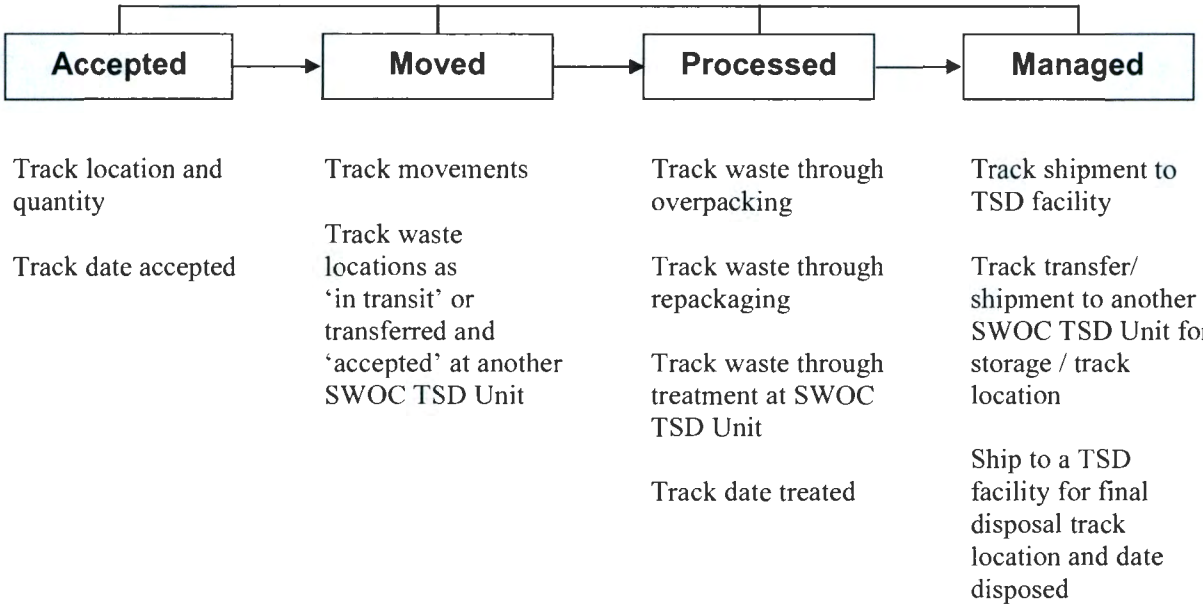

Figure 2 Waste Tracking

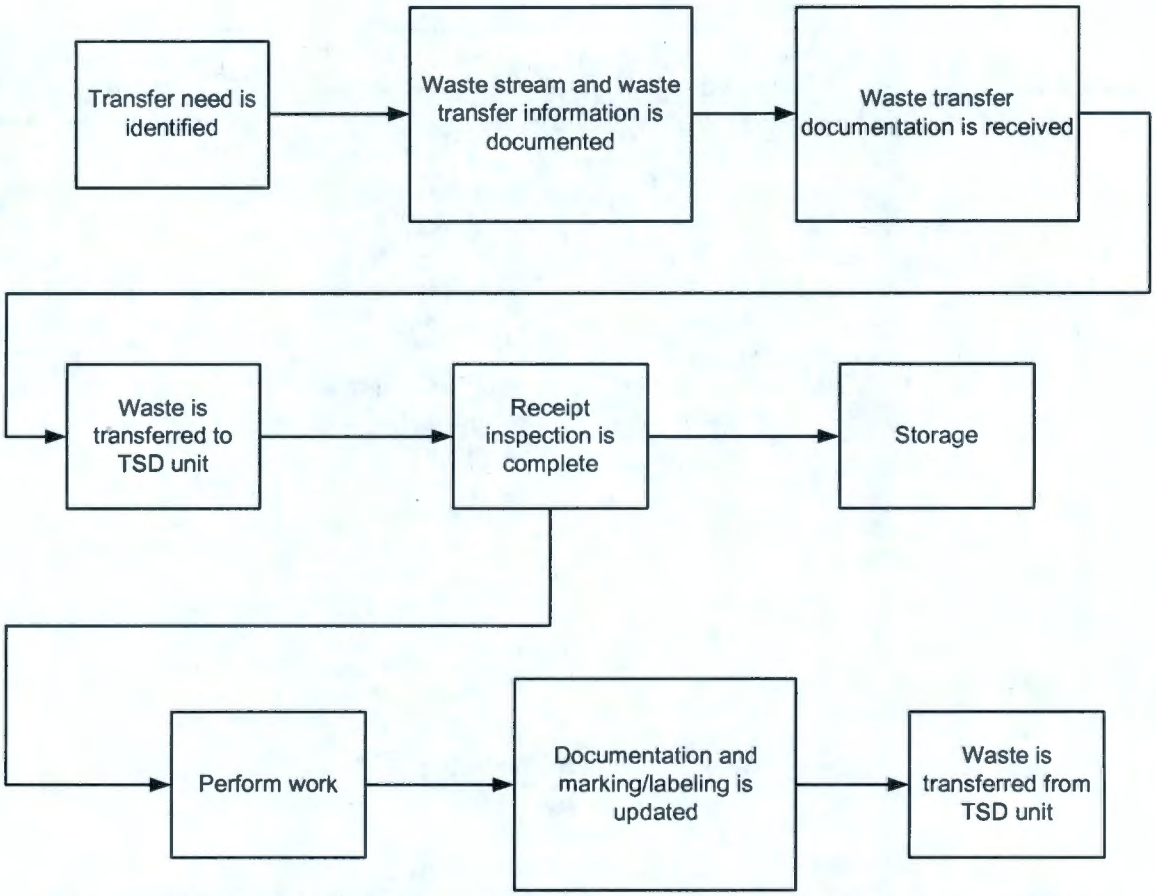

Figure 3 Waste Transfers Between Solid Waste Operations Complex TSD Units

2 CONFIRMATION PROCESS

The confirmation process used to meet WAC 173-303-300 requirements includes completing pre-shipment reviews and verification steps as described in this section and indicated on Figure 2. The four confirmation processes are identified as follows:

- Newly generated waste for non-CWC onsite generating locations and offsite generators (Section 2.1)
- Waste transfers of previously accepted waste between SWOC TSD Units (Section 2.2)
- Waste Retrieval Project (WRP) waste transfers (Section 2.3) and
- CWC generated waste (Section 2.4).

2.1 Newly Generated Waste

2.1.1 Pre-Shipment Review

Pre-shipment review takes place before waste will be scheduled for transfer or shipment to CWC. The review focuses on whether the waste stream is defined accurately, meets the CWC waste acceptance requirements, and the LDR treatment standards. Only waste determined acceptable for storage and/or treatment in CWC will be scheduled. This determination will be based on the information provided by the generator. The pre-shipment review consists of the waste stream approval and waste shipment approval process. The following sections discuss the pre-shipment review process. The information obtained from the generator during the pre-shipment review will, at a minimum, include all information necessary to safely store or treat the waste. The pre-shipment review will ensure that the waste has been characterized for purposes of evaluation against the CWC waste acceptance requirements.

2.1.1.1 Waste Stream Approval Process

The waste stream approval process will consist of reviewing waste stream information provided on a waste stream profile and/or other approved processes and analysis authorized by this WAP. At a minimum, the waste stream profile will require the following information:

- Generator information (e.g., name, address, point-of-contact, telephone number).
- Waste stream name.
- Waste generating process description.
- Chemical characterization information (e.g., characterization method(s), chemicals present, concentration ranges).
- Designation information.
- For mixed and/or dangerous waste, applicable LDR treatment standards and a determination whether the waste must be treated before land disposal including identification of constituents subject to treatment for F001-F005 and F039, and underlying hazardous constituents (UHCs) as applicable.
- Waste type information (e.g., physical state, absorbents used, inert materials, stabilizing agents used).
- Packaging information (e.g., container type, maximum weight, size).
- Attachments may consist of container drawings, process flow information, analytical data, etc.,

This information will be reviewed against the CWC waste acceptance requirements to ensure that the waste will be acceptable for receipt. When conformance issues are found during this review, additional information will be requested. The request may include a requirement for providing analytical data or additional data derived from sample analysis. If the waste cannot be received, the CWC operating

organization will pursue acceptance of the waste at an alternative TSD unit or request the generator to pursue acceptance at an offsite TSD facility or another approved facility.

On determination that the waste is acceptable for receipt at CWC, the CWC operating organization will assign a waste management path to the waste and will establish a waste verification frequency based on the PES requirements.

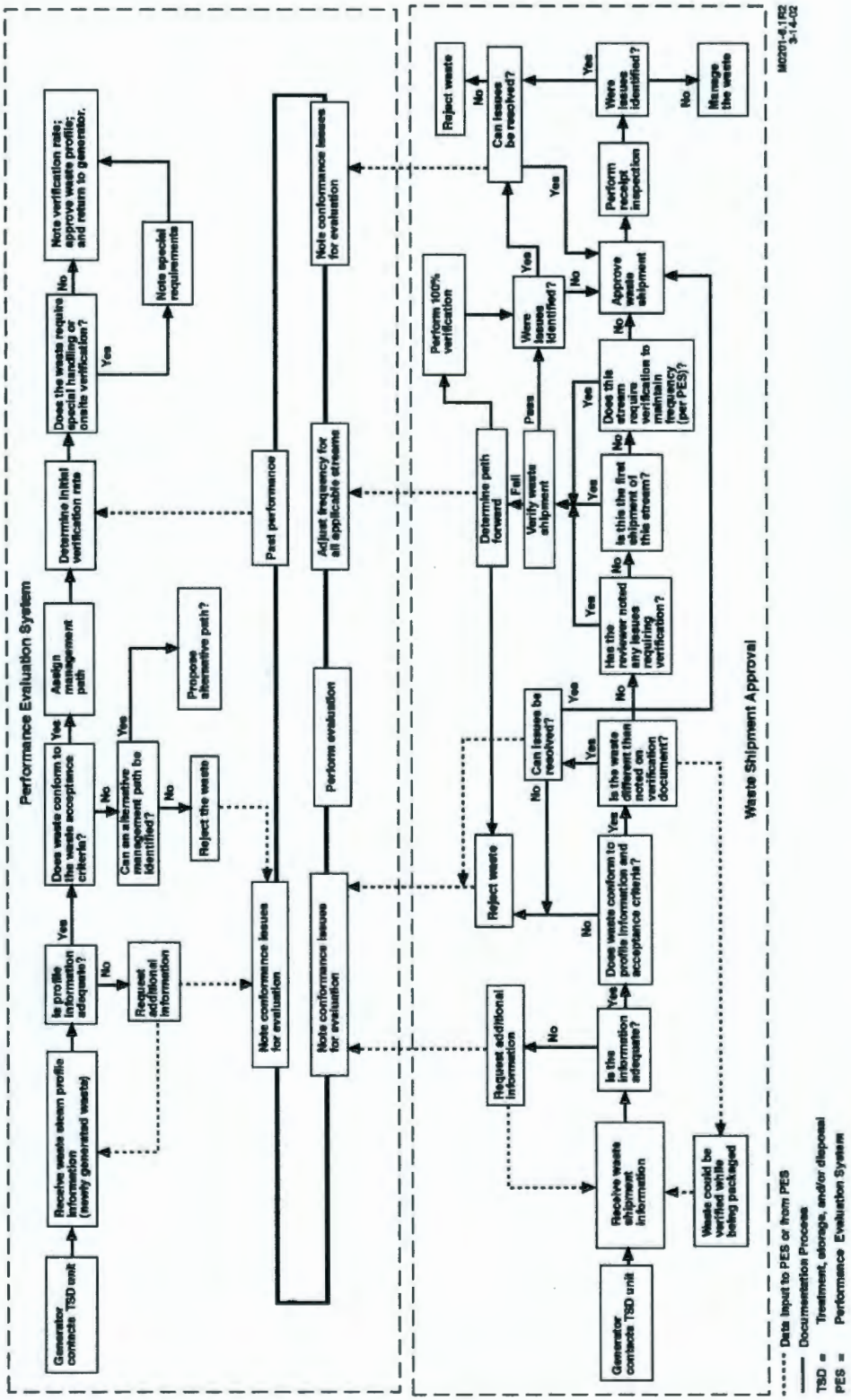

Figure 4 Waste Acceptance Process

2.1.1.2 Waste Shipment Approval Process

For each waste transfer or shipment that will be a candidate for storage and/or treatment, the generator provides the following information:

- Container identification number.
- Profile number (except for waste transfers of previously accepted waste).
- Waste description.
- Generator information (e.g., name, address, point-of-contact, telephone number).
- Container information (e.g., type, size, weight).
- Dangerous waste numbers.
- Designation as extremely hazardous waste or dangerous waste.
- Waste composition.
- Packaging materials and quantities.

The pertinent information will be entered into the Hanford Facility Operating Record, CWC unit-specific portion.

When potential conformance issues exist in the information provided, (e.g., waste characteristics do not match the waste profile information, conform to CWC waste acceptance requirements, or additional constituents are expected to be present that do not appear on the documentation), the CWC operating organization will contact the generator (if available) for resolution.

For each container, a technical review will be performed. Physical screening determination and chemical screening determination are defined in Section 2.1.2.3 and 2.1.2.4. Technical review will be as follows:

Technical review

The individual container data will be compared to the waste profile to ensure that the waste to be shipped to the CWC is as described by the waste profile. Based on the waste identification information provided, the waste designation will be reviewed to ensure compliance with waste designations per WAC 173-303-070 through -100, as well as evaluating whether the waste meets the CWC waste acceptance requirements.

When the transfer or shipment information is found to be acceptable, the CWC operating organization will determine when any of the waste containers will be physically and/or chemically screened. The CWC operating organization will document the determination of shipment or transfer of waste to meet the requirements of Section 8, Recordkeeping of this WAP.

2.1.1.3 Knowledge Requirements

The CWC operating organization will ensure that all information used to make waste management decisions will be based on the requirements found in the following sections. Information determined to be Knowledge must meet the definition of *Knowledge* cited in WAC 173-303-040. Information from sampling and analysis must meet the data quality requirements for the associated waste acceptance requirement or parameter.

2.1.1.3.1 General Knowledge Requirements

General Knowledge requires (1) waste Knowledge requirements, (2) LDR waste Knowledge requirements, and/or (3) waste Knowledge exceptions.

(1) **General Waste Knowledge Requirements for Designation and Waste Management**. At a minimum, the generator will supply enough information for the waste to be treated and/or stored at CWC. The minimum level of knowledge will consist of designation data where the constituents or Knowledge of the waste's generating source (in the case of wastes potentially

from listed sources) causing a dangerous waste number to be assigned are quantified, and that data addresses any CWC operational parameters necessary for proper management of the waste.

When historical data indicates that constituents are present which might cause the waste to be regulated, testing can be performed to ensure that the constituents do not appear in the waste above applicable regulatory levels. If the constituents are included in an input to a process and historical data supports that the constituents are not expected to be in the waste, then sampling will not be necessary. This requirement may be met through chemical screening. This testing will be required only for initial characterization of the waste stream.

When the available information does not qualify as Knowledge or is not sufficient to characterize a waste for management, the sampling and testing methods outlined in WAC 173-303-110 will be used to determine whether a waste designates as ignitable, corrosive, reactive, and/or toxic. In addition, sampling and testing methods will be used as applicable to determine whether the waste contains free liquids. If the testing is performed to complete characterization after acceptance of the waste by the CWC, then this WAP governs the sampling and testing requirements.

(2) **Waste Knowledge Requirements for LDR Compliance.** Waste will be stored at the CWC while awaiting analytical results for LDR requirements. The Hanford Facility Operating Record, CWC unit-specific portion will contain all information required to document that the appropriate treatment standards have been met or that the treatment required to meet the LDR treatment standards is identified, unless otherwise specified in this section of the WAP.

For wastes with a concentration-based LDR treatment standard, testing of a representative sample will be required to demonstrate compliance with a concentration-based treatment standard (refer to Section 4, Selecting Sampling Processes). Corroborative testing for the sample will be accomplished in the following manner.

- Generators use on-site laboratories or other laboratories to obtain data that will be used as a basis to certify that the waste meets concentration-based LDR treatment standards. For waste that must meet method based LDR treatment standards, information must be supplied on the treatment methods necessary to meet LDR requirements and comply with WAC 173-303-380(1)(j),-(k),-(n), and -(o).
- The CWC will use these analytical data to meet applicable requirements found in WAC 173-303-140(4).

(3) **Waste Knowledge Exceptions**. The generator will provide information necessary to further disposition the waste (e.g., repackage; designate; segregate; sample; and analyze) when general knowledge requirements are not met. However, the CWC organization will ensure that sufficient information is available regarding D001, D002, D003, and incompatibility, and that operation safeguards are in place to safely process waste. When sufficient information is not available to meet D001, D002, D003, and incompatibility knowledge requirements, the waste can be accepted and will enter the discrepant container management process described in Section 2.5 in order to obtain the necessary information according to requirements of this WAP.

2.1.1.3.2 Methodology to Ensure Compliance with Land Disposal Restrictions Requirements for Mixed and Dangerous Waste

Dangerous and/or mixed waste deficient in meeting LDR treatment standards, but meeting the waste acceptance requirements for CWC, may be stored and/or treated at CWC. The following are general requirements for offsite notifications or on site information and supporting documentation:

- The waste is subject to LDR treatment standards and the generator has treated the waste. The generator supplies the appropriate LDR certification information [40 CFR 268, incorporated by reference into WAC 173-303-140].

- The waste is subject to LDR treatment standards and the generator has determined that the waste meets the LDR for disposal. The generator develops the certification based on process knowledge and/or analytical data and supplies the appropriate LDR certification information necessary to demonstrate compliance with the LDR treatment standards of WAC 173-303-140. State-only LDRs do not require this type of certification.
- The waste is subject to LDR and requires further treatment to meet applicable treatment standard.
  - The generator supplies additional information concerning the waste and details any treatment necessary to meet applicable treatment standards.
  - If waste is treated to meet federal LDRs in CWC, the CWC operating organization prepares information necessary to meet WAC 173-303-380(1)(k) (Section 7.5.)

A representative sample of the waste must be submitted for testing to ensure that concentration-based LDR treatment standards are met. This sample may be taken by the CWC operating organization or the generator according to the requirements of this WAP and will be required to comply with the applicable treatment standards described in 40 CFR 268.40 and 268.48 for UHCs.

2.1.2 Verification

Verification is an assessment performed by the CWC operating organization to substantiate that the waste stream received at the CWC will be the same as represented by the analysis supplied by the generator for the pre-shipment review. Verification will be performed on waste received by the CWC operating organization. Verification includes container receipt inspection (Section 2.1.2.1). In addition, select containers may be subject to physical screening and chemical screening (Section 2.1.2.2). Waste will not be accepted into CWC for storage and/or treatment before the required elements of verification have been completed. Documentation reviewed as part of verification activities will include the shipping manifest or onsite shipment document, container inventory documentation, a container listing report, visual verification records, screening analyses, and the waste profile.

Qualified personnel conduct all waste verification activities: container receipt inspection, physical screening, and chemical screening. Qualified personnel will be trained as required by PRC-STD-TQ-40229, Central Waste Complex Dangerous Waste Training Plan.

All conformance issues identified during the verification process will be resolved in accordance with Section 1.1.1.2.5, Conformance Issue Resolution.

Containers previously used to hold waste that is not acute hazardous waste as defined by WAC 173-303-040 will be evaluated to determine if they are empty by using the following criteria: A container or inner liner is "empty" when all wastes in it have been taken out that can be removed using practices commonly employed to remove materials from that type of container or inner liner (e.g., pouring, pumping, aspirating, etc.) and, no more than one inch of waste remains at the bottom of the container or inner liner, or the volume of waste remaining in the container or inner liner is equal to three percent or less of the container's total capacity, or, if the container's total capacity is greater than one hundred ten gallons, the volume of waste remaining in the container or inner liner is no more than 0.3 percent of the container's total capacity.

The presence of free liquids which readily separate from the solid waste portion of dangerous waste may be determined by either the paint filter test or through NDE.

2.1.2.1 Container Receipt Inspection

Container receipt inspection will be a mandatory element of the verification process. One hundred percent of each shipment and transfer will be inspected at CWC for possible damage or leaks; complete labeling, and if present, that tamper-resistant seals are intact (Sections 2.1.2.3. and 2.1.2.4.). This will ensure that the shipment: (1) is received at CWC in good condition, (2) is the waste indicated on the transfer or shipping papers, (3) has not been opened after physical and/or chemical screening was performed, and (4) is complete.

When a conformance issue exists (Section 1.1.1.2.5) a case-by-case determination is performed and corrective action is taken. One of the following actions may be taken as appropriate, in response to a conformance issue:

- Implementation of the contingency plan according to HNF-IP-0263-CWC, Building Emergency Plan for Central Waste Complex.
- Resolution of conformance issues where additional information is needed to safely manage the waste.
- Continuation of verification for waste with conformance issues not meeting all of the above criteria.

2.1.2.2 Physical Screening and Chemical Screening Determination

A description of the activities for selecting containers for physical and chemical screening will be maintained by CWC. Means of selecting containers for physical and chemical screening will be applied based on the pre-shipment and/or waste stream review process. The container selection will be based on the contents listed in the associated shipment/waste stream documentation, historical documentation and operational experience.

Two criteria will be used in making the selection. The first criterion is based on whether pre-shipment review activities (document and characterization review) identify areas of potential concern. The second criterion is reviewing the current physical screening percentage (calculated according to Section 2.1.2.3.2.) of containers offered for receipt from said waste stream from said generator that have been offered over the past 12 months or the date of the last physical screening adjustment, whichever is most recent. The rate will be applied as compared to those that have been physically screened. This criterion ensures that the minimum physical screening rates required by this WAP will be met.

The number of containers selected for physical screening per waste stream will be determined by comparing the calculated percentage rate which is then adjusted according to the PES. This selected group of containers constitutes a sample set.

After the required percentage verification on the shipment has been completed, the container(s) will be scheduled for shipment.

2.1.2.3 Physical Screening Process

Physical screening is a verification element. This section describes the requirement pertaining to methods, frequency, and exceptions concerning the use of physical screening as a verification element. Physical screening could be performed before the waste is shipped to CWC. When physical screening is performed at a location not within the SWOC TSD Units, tamper-resistant seals will be applied to each container after examination. Upon receipt the CWC, tamper-resistant seals will be verified as intact to ensure that no changes have occurred to the waste content during shipment to CWC. Documentation of physical screening will be maintained in accordance with Section 8, Recordkeeping.

2.1.2.3.1 Physical Screening Methods

The following physical screening methods, comply with the requirement to verify a waste.

1. Visual inspection (opening the container or observe packaging).
2. NDE.

Refer to Section 2.1.2.6.1 for QC pertaining to physical screening. (Refer to Section 3.1. for the criteria and rationale for choosing a physical screening method.)

Waste packaging that is witnessed by the CWC operating organization or its representative at a non-SWOC TSD Unit location will be considered to have met the physical screening requirements denoted in this WAP, provided that the packaging meets the requirements of WAC 173-303 and that the witness is qualified and trained to determine that the waste meets CWC waste acceptance requirements. On closure

of the container, tamper-resistant seals must be applied to ensure the integrity of the contents. Processes will be maintained by CWC detailing the requirements for adding and/or removing tamper-resistant seals.

2.1.2.3.2 Physical Screening Frequency

The minimum physical screening frequency will be 5 percent for onsite generators, applied per waste stream per generator per year. For offsite generators, the minimum physical screening frequency is 10 percent per waste stream per generator per year. The CWC operating organization adjusts the physical screening frequency for generators based on objective performance criteria (refer to Section 1.1.1.2.6.).

If a container fails verification, the waste stream physical screening frequency will be raised to 100 percent for the next containers offered. Subsequent containers offered will be evaluated through the PES for verification rates, as described in Section 1.1.1.2.4.

2.1.2.3.3 Physical Screening Exceptions

The following are exceptions to the physical screening process outlined previously (Ecology 1997):

- Shielded, classified, and remote-handled mixed waste will not be required to be physically screened; however, the CWC operating organization performs a more rigorous documentation review and obtains the raw data used to characterize the waste (less than 1 percent of current waste receipts). For classified waste, it will be necessary to have an appropriate U.S. Department of Energy security clearance and a need to know the information as defined by the classifying organization or agency.
- Waste that physically cannot be screened at CWC or an associated screening unit must be physically screened at the generator location [e.g., large components, containers that cannot be opened, for as low as reasonably achievable (ALARA) purposes, or does not fit into a NDE unit]. Physical screening at the generator location will consist of observing the packaging of the waste. If no location can be found to perform the physical screening, no screening is required.
- Waste that is packaged by a trained CWC operating organization or its delegated representative(s) will be considered to have met the physical screening requirements as denoted within this WAP.
- Waste that has been packaged and physically screened at a SWOC TSD unit.

2.1.2.4 Chemical Screening Process

Chemical screening is a verification element. This section describes methods, frequency, and exceptions for chemical screening. Chemical screening may be performed before the waste is shipped to CWC. When screening is performed at a location not within the SWOC TSD Units, tamper-resistant seals will be applied to each container examined and, on receipt at CWC, verified as acceptable to ensure that no changes could have occurred to the waste content before receipt at CWC. Processes will be maintained by the CWC detailing the requirements for adding and/or removing tamper-resistant seals. Chemical screening documentation will be maintained in accordance with Section 8, Recordkeeping.

Unless otherwise noted, tests are qualitative, not quantitative. The objective of chemical screening will be to obtain reasonable assurance that the wastes are generally consistent with the description on the container shipping documentation. The following tests will be selected depending on the waste matrix and the applicability of the method.

- pH
- Peroxide
- Oxidizer
- Water reactivity
- Halogenated Organic Carbons - HOC (chlor-n-oil/water/soil)
- Headspace

- Sulfide
- Cyanide
- Paint filter.

Refer to Section 2.1.2.6.2, Chemical Screening Quality Control for QC information. Processes will be maintained by the CWC that defines the basis for selecting screening tests.

2.1.2.4.1 Chemical Screening Frequency

At a minimum, 10 percent [round up to the nearest whole number of container(s)] of the mixed or dangerous waste containers verified by physical screening (Section 2.1.2.3) must be screened chemically (Ecology 1997).

Small containers of waste (labpacks), not otherwise identified in the exceptions and packaged in accordance with WAC 173-303-161 will be screened chemically in accordance with the chemical screening frequency of the waste stream as determined by the PES team (Section 1.1.1.2.2.). Inner containers will be segregated by physical appearance. At least one container from each group (or three containers if all are similar) will be screened chemically.

2.1.2.4.2 Chemical Screening Exceptions

Chemical screening will not be required for the following:

- Small containers of waste in over-packed containers (labpacks) packaged in accordance with WAC 173 303-161 and not prohibited under LDR specified in WAC 173-303-140.
- Waste exempted from the physical screening requirements (Section 2.1.2.3.3.).
- Commercial chemical products in the original product container(s) (e.g., off-specification, outdated, or unused products).
- Chemical containing equipment removed from service, (e.g., ballasts, batteries).
- Waste containing asbestos.
- Waste, environmental media, and/or debris from the cleanup of spills or release of single substance or commercial product or otherwise known material (e.g., material for which an MSDS can be provided).
- Confirmed noninfectious waste (e.g., xylene, acetone, ethyl alcohol, isopropyl alcohol) generated from laboratory tissue preparation, slide staining, or fixing processes.
- Hazardous debris as defined in WAC 173-303-040.
- Other special cases could be exempted on a case-by-case basis with Ecology approval.

The aforementioned wastes will be exempted from chemical screening and will be documented in accordance with Section 8, Recordkeeping.

2.1.2.5 Sampling for Confirmation Screening

Sampling will be performed in accordance with WAC 173-303-110(2) to ensure that the samples are representative of the waste being sampled. A representative sample will be obtained for chemical screening. The chemical screening methods do not require any sample preservation methods because the screening tests will be performed at the time and location of sampling, or as soon as possible thereafter. During the interim period, the samples will be stored in a manner that maintains chain of custody and protects the sample composition.

2.1.2.6 Quality Assurance and Quality Control for Confirmation Process

The following QA and quality control (QC) elements will be used by the CWC operating organization to ensure that the confirmation activities generate the data essential to providing an indication that waste received will be as described in the pre-shipping documentation. Data quality objectives have been

established in accordance with Tri-Party Agreement (TPA) Action Plan, Section 6.5 and have documented and reflected in this WAP. In addition, all screening equipment requiring calibrations will be checked before use to ensure that calibration dates are current and equipment is functioning properly. This check will be documented in equipment log books.

2.1.2.6.1 Physical Screening Quality Control

This section describes the QC used by CWC operating organization to ensure that reliable data will be obtained when performing physical screening methods identified in Section 2.1.2.3.1, except visual inspection. Physical screening QC will be used only to ensure that quality data are obtained when performing NDE. QC objectives for visual inspection will be performed by properly trained personnel through training as specified in the PRC-STD-TQ-40229, Central Waste Complex Dangerous Waste Training Plan.

The following QC elements apply to NDE used for physical screening:

- A resolution test will be performed at the beginning of a shift. A shift ends when shutdown activities are performed. A shift can be up to 24-hours.
- A radiographer will be qualified per SNT-TC-IA, Level II certification of American Society of Nondestructive Testing training.
- Examination must cover 100 percent of the waste in the container.

2.1.2.6.2 Chemical Screening Quality Control

The following QC elements will be used when performing chemical screening.

- Appropriate sample containers and equipment will be used.
  - Containers and equipment of the appropriate size that are chemically compatible with the waste and testing reagents will be used.
- Reagent checks
  - Water that is reagent grade and from a documented source is used.
  - Chemicals and test kits are labeled so that these are traceable and documented in the Hanford Facility Operating Record, CWC unit-specific portion.
  - QC checks are performed on each lot of test kits and associated reagents according to the test kit instructions and documented in the Hanford Facility Operating Record, CWC unit-specific portion.
  - If the QA/QC checks for a specific test kit are not within the acceptable range based on the manufacturer's instructions, the test kit is removed from service. A new test kit is put into service after satisfactorily passing the required QC checks.

2.1.3 Waste Acceptance

Initial acceptance of waste occurs only after the confirmation processes described in Section 2.1.1 and 2.1.2 is complete. Conformance issues identified during the confirmation process will be documented and managed in accordance with Section 1.1.1.2.5 and include:

- Waste does not match approved profile documentation.
- Designation, physical, and/or chemical characterization discrepancy.
- Incorrect LDR paperwork.
- Manifest Discrepancies as described in WAC 173-303-370(5)(a) [for offsite shipments unless Permit Condition II.P.2 can be utilized for an alternate tracking system].
- Packaging discrepancy.

When conformance issues are not resolved prior to acceptance, the waste can be accepted when tracked for discrepancy resolution. The discrepancy resolution activities will be tracked to completion (refer to Section 2.5).

2.2 Waste Transfers between SWOC TSD Units

Transfers from other SWOC TSD Units to the CWC may be necessary to perform verification, obtain additional knowledge to support treatment/disposal, to make the waste amenable for long-term storage, or to perform treatment. For waste being transferred from other SWOC TSD Units to CWC, the following requirements apply. Waste transfers from LLBG Trenches 31 & 34 can occur due to verification activities prior to disposal or to LLBG Trenches 31 & 34 generated waste.

2.2.1 Waste Stream Approval Process

The waste stream must already have been approved using a profile as described in Section 2.1.1. Waste Knowledge exceptions apply as described in Section 2.1.1.3. The amount and type of data that exists for a given waste package can vary widely and depends on the documentation requirements in effect when the waste was previously accepted. Previously accepted waste is not re-profiled.

2.2.2 Waste Transfer Approval Process

A technical review of documentation associated with all containers in the shipment will be performed prior to transfer from other SWOC TSD Units to CWC and documented in accordance with Section 8, Recordkeeping. When necessary, the waste management path (waste specification record) previously assigned to the waste stream will be updated and re-labeling/remarking will be completed before the transfer. Waste will be tracked through processing at CWC in accordance with Section 1.1.1. As new information is obtained on the waste, the container will be managed to meet any new requirements. Updates to container data prior to transfer and subsequent processing activities will be maintained in accordance with Section 8, Recordkeeping.

2.2.3 Verification

For container receipt inspection, all of the containers of each transfer will be visually inspected for damage and to ensure that the waste containers are those indicated on the documentation. This activity will be the means for identifying any document conformance issues or damaged containers before receipt/acceptance into CWC. Conformance issues identified during receipt will be managed as described in Section 1.1.1.2.5.

Transfers from other SWOC TSD Units to CWC are subject to physical screening, the PES, and chemical screening only if the waste package has not been previously subjected to the process. If a waste package has been verified, further verification upon transfer within SWOC is not required.

2.3 Waste Retrieval Project (WRP) Waste Transfers

Beyond what is normally contained in a WAP, the following sections contain process information provided for clarification purposes only. The Waste Retrieval Project (WRP) waste was placed in the 218-W-4B, 218-W-4C, 218-W-3A, and 218-E-12B burial grounds after May 6, 1970 up until the time transuranic (TRU) waste was stored in aboveground storage buildings. At the time it was placed in the burial grounds, the waste met the definition of TRU waste. WRP waste will be removed from the burial grounds (retrieved) and managed in accordance with the Tri-Party Agreement (TPA) M-091 series of milestones. WRP waste is presumed to be TRU mixed (TRUM) waste prior to commencing retrieval. WRP TRUM waste can be reclassified to mixed low level waste (MLLW) during the course of retrieval or subsequent storage.

CWC, WRAP, T Plant manage WRP waste. WRP TRUM waste will reevaluated for acceptance for shipment to an off-site disposal facility pursuant to the Land Withdrawal Act. WRP MLLW will be evaluated for storage and/or treatment for eventual disposal at an on-site disposal facility. Offsite

permitted facilities can be used to supplement the processing/treatment of WRP TRUM waste and MLLW.

2.3.1 Waste Information Pre-Shipment Review

Waste knowledge must be sufficient to designate the waste in accordance with WAC-173-303-070 through -100 and to properly manage the waste. This includes sufficient information to properly segregate the waste, and to demonstrate that the waste meets acceptance criteria for subsequent on-site TSD units or offsite TSD facilities.

Waste information is summarized in acceptable knowledge (AK) packages as allowed by WAC 173-303-070(3)(c)(ii) consisting of information from burial records, waste stream descriptions including buildings and processes, and the packaging requirements applicable during the time the waste was placed into the burial grounds. The AK review includes the operational history from the waste generating areas and the processes that generated the waste.

The AK data compiled provides the basis for the waste designation. The waste designation assures the waste can be safely managed, segregated for storage, and/or transferred to an on-site TSD unit or offsite TSD facility. The AK package is documented in the operating record for CWC.

Collecting sufficient information for WRP waste presents several unique challenges. The WRP waste was generated at locations on and off the Hanford Facility. The WRP waste consists primarily of debris with small amounts of non-debris solid waste including containerized liquids with sufficient sorbent to solidify the liquids. Packaging requirements to ensure only disposal of sorbed liquids in small amounts were in place in 1970 when WRP waste was placed into the burial grounds (December 1970, ARH-1842). For containers that may have contained liquids, sufficient absorbents were added so that liquid is retained in the absorbent and will not flow if the container is breached. A variety of materials have been used to meet this requirement including: vermiculite, diatomaceous earth, concrete, and sawdust. This information (free-flowing liquids are prevented via absorbent) is applied to the container unless new information is obtained on the container.

Container sizes of WRP waste range from 55 gallon drums to very large boxes of various sizes. Since the waste was placed in the burial grounds up to approximately 40 years ago, the containers have degraded and many of the identification markings have become unreadable, or in some cases, no markings at all were applied to the container. When the package identification number is still legible on the container, an attempt is made to identify the contents of the container from the information contained on the burial record and AK package. When the container cannot be identified, the container is termed "unidentifiable." For unidentifiable waste containers that consist of multiple sources of generating locations and processes, the AK package applies a conservative waste designation to each container.

During processing of the WRP waste, additional information is generated and is then added to the waste record. Additional information is reviewed to determine if the storage category (hazard class) should be updated, or if the container should be stored in secondary containment. Compatibility reviews are performed in accordance with Section 7.2 on the AK packages.

2.3.2 Waste Container Evaluation

Prior to placement in the burial grounds, a variety of containers were utilized to package WRP waste including, but not limited to: 55 gallon drums, 110 gallon containers, fiberglass reinforced plywood boxes, cleated plywood boxes, concrete boxes, and steel boxes. Prior to removal of WRP waste from the burial ground trench, burial records and subsurface scanning techniques are used to obtain data on the location of the containers. Several techniques have been used and are being used for the retrieval of these containers. Typically, the first step within the trench involves the removal of overburden and remaining soil to expose the container. Operational controls to prevent exposure to the waste are utilized throughout this process.

When the container is exposed, a visual check is performed to identify leaks, dents, bulges and degradation. Health and safety surveys and monitoring of the container and the surrounding area are performed. The container will be removed when a determination is made that this process will not result in the spread of contamination. If the condition of the container is damaged or corroded it will be mitigated. Mitigation techniques depend on the type of container, but may include: overpacking, shoring of the box, and packaging WRP waste into a new container. Protective coverings are applied to the large containers to protect the containers from ultra violet rays and weather. When the process of removing the WRP waste from the trench has been completed, the waste is packaged in a container that can be safely transported and stored in CWC or other receiving facility.

2.3.3 Pre-Transfer Review

Transfer of the WRP waste out of the burial grounds is necessary to perform subsequent processing, treatment, and/or characterization. When a transfer to CWC, WRAP, or T Plant occurs, a pre-transfer review takes place before transfer from a burial ground is scheduled and a determination is made on the ability to transfer. The pre-transfer review determination is based on the characterization of the waste (described in Section 2.3.1) and information collected during the management of the WRP waste in the burial ground(s). WRP waste transfers between TSD units also occur (CWC, WRAP, T Plant) and are governed by this section.

2.3.4 Verification

For container receipt inspection, all of the containers of each transfer will be visually inspected for damage and to ensure that the waste containers are those indicated on the documentation. This activity will be the means for identifying any document conformance issues or damaged containers before receipt/acceptance into CWC. Conformance issues identified during receipt will be managed as described in Section 1.1.1.2.6.

Transfers of WRP waste are not subject to physical screening the PES, and chemical screening processes (Ecology 2004b, 2004c).

2.3.5 Discrepant Containment Management

During the retrieval and management of the waste, conditions can change or new information is obtained on WRP waste. The container will be evaluated under the discrepant container management program according to Section 2.5.

2.4 CWC Generated Waste

The CWC generates dangerous and/or mixed waste while processing. This waste material consists of items including, but not limited to: personal protective equipment, rags, and spent equipment contaminated with dangerous cleaning agents, lubricants, paints, run-off , or other dangerous materials that designate as dangerous waste when discarded. Operational Knowledge is used to characterize these waste materials for the purposes of waste designation. Waste generated by CWC is considered accepted at CWC when the waste is generated. All Knowledge and confirmation of Knowledge concerning CWC generated waste will be documented in accordance with Section 8, Recordkeeping.

2.4.1 Waste Stream Approval Process

Documenting operational Knowledge constitutes the waste stream approval process.

2.4.2 Waste Transfer Approval Process

No transfer occurs while the waste resides in CWC. If the waste is transferred to another SWOC unit, the requirements for a SWOC transfer in Section 2.3 apply.

2.4.3 Verification

Any container is exempt from verification requirements when the container resides in CWC. Verification requirements include the container receipt inspection, physical screening, the PES, and chemical screening.

2.5 Discrepant Container Management

During the waste acceptance process or during subsequent management of waste at CWC, an issue can arise where a container will be identified with a discrepant item(s) and will be called a "discrepant container" until the issue is resolved. The following list of issues will be tracked under the discrepant container management program:

- Indications of bulging,
- Containers with unknown contents,
- Containers holding waste prohibited under Section 1.2,
- Knowledge is needed to properly manage the waste according to the waste knowledge exception requirements in Section 2.1.1.3.1(3).
- Conformance issue is not resolved prior to acceptance in Section 2.1.3,
- Containers no longer in good condition and not in compliance with 40 CFR 265.171,
- Inconsistent inventory between container contents and the record, and
- Unexpected liquids are found.

The following processes and criteria will be initiated for a discrepant container:

- An evaluation will be performed on available historical data. In addition, interviews could be performed with generator points-of-contact, NDE personnel, etc.
- Nonempty Containers as defined in WAC 173-303-160(2), in which liquids are discovered, will be placed in secondary containment that meets the requirements of WAC 173-303-630(7)(a). Containers with discovered liquids and with sufficient added absorbent to completely absorb the liquids and meet the other requirements of WAC 173-303-630(7)(c), may be managed in container storage units without secondary containment. For combination packages[1], if the liquids are only present within inner containers and no free liquids are present in the outer container, the external container will serve as secondary containment, provided that the combination package can be managed in a manner that meets the requirements of WAC 173-303-630(7)(a) and the compatibility requirements in WAC 173-303-395(1).
- When additional information about the waste becomes available to warrant a compatibility evaluation, an evaluation will be performed to ensure the compatibility with the other materials in the container and with the outer container in accordance with WAC 173-303-395(1)(b). This evaluation will be documented in the Hanford Facility Operating Record, CWC unit-specific portion in accordance with WAC 173-303-395(1)(c). Liquids not determined to be compatible with the waste contents or the container will be segregated.
- If adequate information is unavailable to determine the liquids constitute an imminent hazard, the container will be segregated as incompatible waste.
- For waste where the generator can be contacted, the generator will be requested to provide additional information. The container will be dispositioned by either returning it to the generator (provided it can be transported safely and compliantly) by resolving the discrepancy on the

[1] A combination package is any configuration where dangerous and/or mixed wastes are confined within (inner) containers, which are in turn stored within secondary, external (outer) containers. Examples include labpacks, certain overpacks, portable spill pallets, or any container configuration that has an outer container with one or more inner containers.

container at a CWC, WRAP, or T Plant, or shipping the container off-site to a permitted TSD facility.

- Based upon the evaluation of information (hazards identified) the container will be managed in a safe configuration.
- The container will be tracked for discrepancy resolution.

2.6 Sampling and Analysis Plans

A sampling and analysis plan (SAP) can be developed outside the WAP to support the characterization of waste for various projects. A SAP provides sufficient detail to ensure that sampling personnel and the analytical laboratory correctly implement the DQOs and quality assurance project plan requirements pursuant to TPA action plan, Section 6.5. SAPs can utilize existing knowledge, historical information, and/or additional analytical data in combination with sampling requirements as identified in the SAP to sufficiently characterize a waste stream for acceptance into CWC.

3 SELECTING WASTE ANALYSIS PARAMETERS

Physical and chemical screening parameters for verification will be chosen from those in Sections 3.1 and 3.2. Parameters for waste designation and meeting LDR requirements will be addressed in Section 3.3. Each physical and chemical screening result must be in agreement with the shipping documentation. Conformance issues identified during the confirmation process will be documented and managed in accordance with Section 1.1.1.2.5. Parameters, methods, and rationale for physical and chemical screening parameters appear in Table 1 below.

Table 1 Parameters and Rationale for Physical and Chemical Screening

Parameter	Method[a]	Rationale for Selection
Physical Screening		
Visual inspection	Field method – observe phases, presence of solids in waste	Evaluate consistency between waste and shipping documentation and determine the presence of free liquids.
Nondestructive evaluation	Field method	Evaluate consistency between waste and shipping documentation and determine the presence of free liquids.
Chemical Screening		
Ignitability and/or headspace for volatile organic compound screening	Organic vapor monitor, colorimetric gas sampling tubes, or a lower explosive level meter	Confirm consistency between waste and shipping documentation; determine from test results whether the preventive measures identified in WAC 173-303-395(1)(b) must be applied to manage the waste in compliance.
Peroxide	Field peroxide test paper	Confirm consistency between waste and shipping documentation; determine from test results in WAC 173-303-395(1)(b) must be applied to the manage the waste in compliance.
Liquids	SW-846, Method 9095, Paint Filter Liquids Test	Confirm consistency between waste and shipping documentation; evaluate whether the requirements of WAC 173-303-395(1)(b) must be applied to the management of the waste container.
pH	Field pH screen (pH paper method)	Confirm consistency between waste and shipping documentation; evaluate whether the requirements of ensure WAC 173-303-395(1)(b) must be applied to the management of the waste container.
Oxidizer	Field potassium iodide test paper	Confirm consistency between waste and shipping documentation; ensure evaluate whether the requirements of WAC 173-303-395(1)(b) must be applied to the management of the waste container.
Water reactivity	Field water mix screen	Confirm consistency between waste and shipping documentation; ensure evaluate whether the requirements of WAC 173-303-395(1)(b) must be applied to the management of the waste container.

Table 1 Parameters and Rationale for Physical and Chemical Screening

Parameter	Method[a]	Rationale for Selection
Cyanides	Field cyanide screen	Confirm consistency between waste and shipping documentation; ensure evaluate whether the requirements of WAC 173-303-395(1)(b) must be applied to the management of the waste container.
Sulfides	Field sulfide screen	Confirm consistency between waste and shipping documentation; ensure evaluate whether the requirements of WAC 173-303-395(1)(b) must be applied to the management of the waste container.
Halogenated Organic Carbons	Screening test method for PCBs in transformer oil (SW-846, Method 9079)	Confirm consistency between waste and shipping documentation; evaluate whether the requirements of WAC 173-303-395(1)(b) must be applied to the management of the waste container.

[a] Processes based on manufacturer's recommended methodology for test kit or testing equipment, unless otherwise noted. When regulations require a specific method, the method will be followed.

3.1 Physical Screening Parameters

The following methods are approved for use in performing physical screening.

(1) Visual inspection (preferred method for physical screening):

Rationale: This method meets the requirement to ensure consistency between waste containers and the accompanying waste stream documentation.

Method: The container is opened and the contents are removed as needed for visual examination or the packaging by the generator will be observed. Homogenous loose solids are probed to determine the presence of material not documented on the waste stream documentation, or for improperly absorbed liquids. Visual observations are compared with the applicable profile information and the container specific information in the waste stream documentation.

Failure criteria: A container fails inspection for any of the following reasons; (a) undocumented, improperly packaged, or inadequately absorbed liquids; (b) discovery of prohibited articles or materials listed in Section 1.2; (c) discovery of material not consistent with the applicable waste stream documentation; and (d) variability greater than 25 percent by volume in listed constituents (e.g., paper, plastic, cloth, and metal).

(2) NDE:

Rationale: This method meets the requirement to ensure consistency between waste containers and the accompanying waste stream documentation. This method also is subject to the QA requirements listed in Section 2.1.2.6. Containers that are not easily amenable to visual inspection because of physical or radiological content, or unit availability can be examined safely and economically.

Method: The container is scanned with a NDE system. Data are observed on a video monitor and captured and recorded. Personnel experienced with the interpretation of NDE imagery record their observations. These observations are compared to the contents listed on the waste stream documentation.

Failure criteria: A container fails the inspection for any of the following reasons; (a) undocumented, improperly packaged, or inadequately absorbed liquids; (b) discovery of prohibited articles listed in Section 1.2; (c) image data not consistent with the applicable waste stream

documentation; and (d) variability greater than 25 percent by volume in listed constituents (e.g., paper, plastic, cloth, and metal).

3.2 Chemical Screening Parameters

The following methods are approved for use in performing chemical screening tests. Chemical screening is used to verify that incoming waste is consistent with waste stream documentation. Failure of a chemical screening test is defined as a chemical screening result that is inconsistent with the associated waste stream documentation.

(1) Ignitability and/or headspace volatile organic compound screening:

Rationale: To determine the potential ignitability and the presence or absence of volatile organic compounds in waste and to alert personnel to potential hazards. These methods are used when containers are opened for inspection. These methods can be applied to any matrix.

Methods: A sample of the headspace gases in a container is analyzed by one or more of the following types of portable instrumentation: organic vapor monitor, colorimetric gas sampling tubes, or a lower explosive level meter.

Failure criteria: High organic vapor readings in matrices not documented or detected as having volatile organic content constitutes failure.

(2) Peroxide screening:

Rationale: To determine the presence of organic peroxides in solvent liquid wastes, to alert personnel to potential hazards, to ensure safe segregation and storage of incompatible wastes, and to confirm consistency with the waste stream documentation. The test is sensitive to low parts per million ranges.

Method: A peroxide test strip is dampened with a pipet sample of liquid waste. Solids are tested by first wetting the test strip with water and contacting a small sample of the waste. A blue color change indicates a positive reaction. The color change can be compared with a chart on the packaging to determine an approximate organic peroxide concentration.

Failure criteria: Peroxide concentrations greater than 20 parts per million in liquid waste constituents that are known organic peroxide formers not documented as having been stabilized constitutes failure. Results that are not consistent with documented constituents fail verification.

(3) Paint filter liquids test:

Rationale: To verify the presence or absence of free liquid in solid or semisolid material.

Method: To a standard paint filter, 100 cubic 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. The required method for the paint filter liquids test is method 9095 in the U.S. Environmental Protection Agency (EPA), SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (the most recently promulgated version) (EPA 1986).

Failure criteria: Failure of the test in waste matrices not documented as having free liquids constitutes failure of the container. Small quantities of condensate trapped in inner plastic liner folds are acceptable.

(4) pH screen:

Rationale: To identify the pH and corrosive nature of an aqueous or solid waste, to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation.

Method: Field verification of pH measurement is performed using pH test paper.

Failure criteria: If the pH of a matrix exceeds regulatory limits (less than or equal to 2.0 or greater than or equal to 12.5) in waste not documented as being regulated for this property, or the measured pH is inconsistent with the waste container documentation, the container fails verification.

(5) Oxidizer screen:

Rationale: To determine if a waste exhibits oxidizing properties, to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation. This test can be applied to waste liquids, solids, and semisolids.

Method: 1 or 2 drops of 3N HCl acid is added to the Oxidizer test paper (potassium iodide, starch). The test paper is touched to a pea size sample of the waste to be tested. A black, blue/black, or purple color change determines a positive oxidizer test.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(6) Water reactivity screen:

Rationale: To determine if the waste has the potential to vigorously react with water to form gases or other reaction products. This information is used to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation.

Method: 2 or 3 drops of distilled water is added to an oxidizer test paper strip. The test paper is touched to a pea size sample of the waste to be tested. The observance of effervescence, a violent reaction, flaming or boiling indicates a positive test.

Failure criteria: A positive or negative indication in a waste that is not consistent with documented constituents fails verification.

(7) Cyanide screen:

Rationale: To indicate if waste could release hydrogen cyanide on acidification near pH 2. This information is used to ensure safe segregation and storage of incompatible waste and to confirm consistency with the waste stream documentation.

Method: A pea size sample of the waste to be tested is dissolved in a small quantity of water. A mixture of ferrous ammonium sulfate and ferrous ammonium citrate is added to the stoppered test tube. The sample is then shaken and 3N HCl is added to the solution. A dark Prussian blue color change indicates the presence of the acid.

Failure criteria: A positive or negative indication in a waste that is inconsistent with documented constituents fails verification.

(8) Sulfide screen:

Rationale: To indicate if the waste could release hydrogen sulfide on acidification near pH 2. This information is used to ensure safe segregation and storage of incompatible wastes and to confirm consistency with the waste stream documentation.

Method: 5 drops of 3N HCl acid is added to a pea size sample of the waste to be tested. Lead acetate test paper is touched to the sample. A brown or black color change of paper indicates a positive test.

Failure criteria: A positive or negative indication in a waste that is inconsistent with documented constituents fails verification.

(9) Halogenated Organic Carbons screen:

Rationale: To indicate whether PCBs or other chlorinated solvents are present in the waste. This information is used to confirm consistency with the waste stream documentation and to determine if additional information/data are needed to properly store and treat the waste.

Methods: Field organic chlorine tests appropriate to the matrix, such as those offered by the Dexsil Corporation (e.g., Chlor-N-Oil, Chlor-N-Soil), are used. These screening tests are available with several detection limits that enable the verification to be performed in the concentration range applicable to the proposed management path of the waste.

Failure criteria: A positive or negative indication of chlorinated organic compounds in a waste that is inconsistent with documented constituents as having chlorinated organic compounds content constitutes failure.

3.3 Analysis Parameters and Methods

Parameters needed to meet designation, characterization, and LDR requirements and associated analytical methods for dangerous and/or mixed waste stored and/or treated at CWC are identified in Table 2.

The most recent promulgated revision of SW-846 will be used for the EPA methods.

In determining the characteristic of ignitability, either the Pensky-Martens (EPA Method 1010) or the Setaflash (EPA Method 1020), must be used when testing. The characteristic of corrosivity also requires specific EPA test methods. When testing the pH of a given waste stream, EPA Method 9040 or EPA Method 9045 must be used in accordance with WAC 173-303-090(6).

Compliance with LDR for dangerous and/or mixed waste that have a treatment standard expressed as constituent concentrations in waste (CCW) [40 CFR 268.40, incorporated by reference into WAC 173-303-140] may be shown using the appropriate method in Table 2. When the waste treatment standard is expressed as constituent concentrations in waste extracts (CCWE) [40 CFR 268.40, incorporated by reference into WAC 173-303-140], then the Toxicity Characteristic Leaching Procedure (TCLP) EPA Method 1311, which is referenced in 40 CFR 268.41(a), must be performed. Following the extraction procedure (EPA Method 1311), the appropriate EPA determinative method in Table 2 will be used. Both cyanide test parameters (total and amenable) for non-waste waters will be analyzed using EPA Method 9012, 9014, 9213, or SM 4500-CN. Underlying Hazardous Constituents (UHCs) will be evaluated, as required by 40 CFR 268.48.

Table 2 Analytical Parameters, Methods, and Rationale for Testing

Parameter	Analytical Method	Matrix Type	Rationale for Analysis
Flashpoint	1010, 1020	Liquid	To determine regulatory status as D001 waste, to provide proper waste designation and to identify applicable LDR treatment standards.
pH liquid	9040, SM 4500H^+B[b]	Liquid, sludge	To determine regulatory status as D002 waste, to provide proper waste designation and to identify applicable LDR treatment standards.
pH solid	9045	Solid	To determine regulatory status as WSC2 waste, to provide proper waste designation and to identify applicable LDR treatment standards.
Free liquids	9095	Liquid, sludge, solid	Identify applicable LDR requirements.
Cyanide	9012, 9014, 9213, SM 4500 CN[b]	Liquid, sludge, solid	To determine regulatory status as D003 waste, to provide proper waste designation and to identify applicable LDR treatment standards.
Sulfide	9030	Liquid, sludge, solid	To determine regulatory status as D003 waste, to provide proper waste designation and to identify applicable LDR treatment standards.

Table 2 Analytical Parameters, Methods, and Rationale for Testing

PCBs	8082	Liquid, sludge, solid	To determine regulatory status as WPCB waste, to provide proper waste designation and to identify applicable LDR treatment standards.
Total organic carbon	9060	Liquid, sludge, solid	To provide proper waste designation and applicability to state-only requirements, identify applicable LDR treatment standards.
Persistent constituents: HOC	9076	Oil	To determine regulatory status as WP01/WP02 waste, to provide proper waste designation and applicability to state-only requirements.
Persistent constituents: PAH	8270	Liquid, sludge, solid	To determine regulatory status as WP03 waste, to provide proper waste designation and applicability to state-only requirements.
Total organic halides[e]	9020,9021,9022	Liquid, sludge, solid	To determine regulatory status as WP01/WP02 waste, to provide proper waste designation and applicability to state-only requirements.
Total suspended solids	SM 2540D[b]	Liquid, sludge	To provide applicability of LDR requirements and status as a wastewater.
Volatile organic compounds[d]	8260	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Semi volatile organic compounds[d]	8270	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Chlorinated herbicides	8151	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Arsenic[d]	6010, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Barium[d]	6010, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Cadmium[d]	6010, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Chromium[d]	6010, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Lead[d]	6010, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Mercury[d]	7470, 7471, 7473, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Silver[d]	6010, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation,

Table 2 Analytical Parameters, Methods, and Rationale for Testing

			regulatory status, and applicability of LDR requirements.
Selenium[d]	6010, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Antimony[d]	6010, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Beryllium[d]	6010, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Nickel[d]	6010, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.
Thallium[d]	6010, 200.8[c]	Liquid, sludge, solid	To determine proper waste designation, regulatory status, and applicability of LDR requirements.

[a] Any of the listed methods can be used. Procedures based on EPA SW-846, unless otherwise noted.
[b] Standard Methods for the Examination of Water and Wastewater, 21st Edition, American Public Health Association, 2005, or most recent version when available.
[c] EPA/600/R-94/111 (EPA, May 1994), Supplement I, "Methods for the Determination of Metals in Environmental Samples"
[d] When appropriate, Toxicity Characteristic Leaching Procedure will be used.
[e] Estimated.
LDR = land disposal restriction.
PCB = polychlorinated biphenyls.

4 SELECTING SAMPLING PROCESSES

Specific sampling procedures and techniques depend on both the nature of the material and the type of packaging. Waste samples will be handled and preserved as necessary to protect the sample. For treatment, preservation techniques, and holding times, CWC personnel or authorized delegate will utilize the procedures and techniques recommended in SW-846. This section describes the sampling methodology used to obtain representative samples. DQOs have been established in accordance with TPA Action Plan Section 6.5.

4.1 Sampling Strategies

Table 3 contains waste forms and sample equipment used to sample the referenced waste. Sampling of these waste forms will be performed in accordance with Table 3.

4.2 Sampling Methods

Sampling methods are those described in WAC 173-303-110(2) and incorporated by reference into this WAP.

The basic sampling sequence includes the following:

- Obtain a unique sample number and complete the sample tag before sampling.
- Obtain a pre-cleaned sampler and sample bottles.
- Attach sample label to sample bottles.
- For sampling liquid waste, use a sampler or pipet to sample for two phase liquids. Homogeneous liquids in small containers will be poured into a sample bottle.
- For sampling solid waste, use a scoop, trier, or hand auger to obtain a sample of the waste. For large containers of waste, composite several augers or scoops to ensure samples are representative.
- Fill sample containers in the following sequence: volatile organics, pH (corrosivity), ignitability, semivolatile organics, metals,
- For solid waste, wipe the exterior surfaces of the sample bottles with a dry rag.
- Attach sample labels to outer plastic bags.
- Place samples in an appropriate receptacle for transfer to the laboratory.
- Complete the chain-of-custody records and comply with chain-of-custody procedures.
- Seal and mark the receptacle in accordance with WAC 173-303-071(3)(1).
- Transfer receptacle to the analytical laboratory, as appropriate to meet sample holding times.
- Properly clean and decontaminate non-disposable sampling equipment or package for return to central sampling equipment decontamination area according to onsite requirements.

4.3 Selecting Sampling Equipment

Sampling equipment selection is detailed in Table 3. Sampling equipment needed to sample waste will be maintained and decontaminated as necessary to ensure representative samples according to SW-846.

Table 3 CWC Sampling Equipment

Waste form	SW-846, Test Methods for Evaluating Solid Waste: Physical/Chemical Test Methods, Section 9., References	
	Waste type	Equipment*
Liquids	Free-flowing liquids and slurries	COLIWASA, glass thief, pipet; dip, tank, bomb, and bailer samplers; and tube-type samplers
Solidified liquids	Sludges	Trier, scoops and shovels; tube-type samplers and augers; for small containers, a spoon may be used in place of a scoop
Sludges	Sludges	Trier, scoops and shovels; tube-type samplers and augers; for small containers, a spoon may be used in place of a scoop
Soils	Sand or packed powders and granules	Auger, scoops and shovels; tube-type samplers and augers; for small containers, a spoon may be used in place of a scoop
Absorbents	Large-grained solids	Large trier, scoops and shovels
Wet absorbents	Moist powders or granules	Trier, scoops and shovels
Process solids and salts	Moist powders or granules	Trier, scoops and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, scoops and shovels
	Large-grained solids	Large trier, scoops and shovels
Ion exchange resins	Moist powders or granules	Trier, scoops and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, scoops and shovels
COLIWASA = composite liquid waste sampler. * other ASTM-approved equipment could be used to collect samples.		

4.4 Sample Preservation

Because samples are normally transported from the field to an analytical laboratory, some preservation is sometimes necessary to maintain the integrity of the samples. Samples shall be preserved in a manner consistent with regulatory requirements.

4.5 Establishing Quality Assurance and Quality Control for Sampling

This WAP incorporates the requirements of TPA Action Plan Section 6.5, for QA/QC. Sample collectors prepare a permanent log of sampling activities in accordance with SW-846. Records will be maintained in accordance with Section 8, Recordkeeping. Log entries include: date of collection, time of collection, location, batch number, sample number, tank number (if applicable), copy of the chain-of-custody form, sampling methodology, container description, waste matrix (liquid), description of generating process (e.g., decontamination activities), number and volume of samples, field observations, field measurements (e.g., pH, percent lower explosive limit), laboratory destination and laboratory number, and signature.

These log entries will be made by trained personnel while the sampling is performed. The logs or copies of logs will be maintained in accordance with Section 8, Recordkeeping.

Chain-of-custody records accompany samples at all times. The CWC operating organization will maintain and follow written hard copy or electronic chain-of-custody processes to ensure accountability of waste sample handling and to guarantee sample integrity. All samples will be labeled with a unique identifier.

The following QA/QC elements will be used by CWC to ensure sampling activities for designation purposes result in acceptable laboratory data:

- Representative sampling methods as defined by WAC 173-303-110(2); and/or SW-846.
- Approved sample containers and sampling equipment per SW-846.
- Samples numbered.
- Traceable labeling system.
- Field QA/QC samples (per applicable SAP).
- Documentation of equipment calibration per equipment manufacturer specifications.
- Chain-of-custody records and corresponding chain-of-custody processes.

5 LABORATORY SELECTION AND QUALITY ASSURANCE/QUALITY CONTROL

The selection of any laboratory will be based on the ability of the laboratory to demonstrate compliance to this section with experience and capability in the following major categories:

- Comprehensive written QA/QC program.
- Technical analytical expertise.
- Effective information management systems.

The QA and QC requirements outlined in this section will be applicable to laboratory activities governed by this WAP.

5.1 Evaluation of Laboratories

All laboratories providing analytical support to the CWC operating organization will be required to have a current, laboratory approved QA plan. The laboratory QA plan will be submitted to Ecology in accordance with TPA Action Plan Section 6.5, for review as a secondary document before commencement of analytical work. The QA plan will, at a minimum, address the following elements:

- Sample custody and management practices (also refer to Section 4.)
- Sample preservation protocols.
- Sample preparation and analytical method requirements.
- Instrument maintenance and calibration requirements.
- Internal QC measures, e.g., method blanks, spikes, duplicates.
- Corrective action processes.

Each laboratory will be audited periodically by an independent organization to evaluate the effective implementation of the laboratory's QA/QC program. QA personnel and technical experts evaluate the laboratory through onsite observations and/or reviews of the following documentation: copies of the QA/QC documents; records of surveillances/inspections; audits; non-conformances, and corrective actions. The CWC will ensure independent organizations; QA personnel and technical experts are qualified to perform these evaluations.

5.2 Quality Assurance/Quality Control Objectives

The overriding goal of the analytical program will be to support the accurate designation of waste and/or demonstrate compliance to LDR standards. The laboratory QA/QC programs will be designed to meet the following objectives:

- Minimize errors. Errors may be introduced during preparative, analytical, and/or reporting phases of work. QC program elements include analyses of samples in accordance with established methods.
- Provide information. The designation of waste relies on a combination of Knowledge, historical data, and additional analytical data. Laboratory QA/QC programs ensure accurate, precise, reliable and reproducible data.

Key QA program elements will be designed to provide objective evidence that waste analysis methods meet the performance specifications of CWC. QA activities and implementation responsibilities are as follows:

- Activity based laboratory inspections. Inspections will be performed to verify that specific guidelines, specifications, and procedures for the activities are completed successfully.
- Laboratory analyses. Analyses performed by onsite or offsite laboratories on samples of waste using written and approved methods.

- Development of inspection checklists. Checklists are required for laboratory inspections and will be designed to ensure that the inspected activity is consistently addressed. Checklists will be completed during the inspection to document results.
- Instrument calibration and calibration verification. These activities will be performed by the laboratory and are required for ensuring data of known accuracy and precision. Calibration data will be maintained and stored to ensure traceability to reported results.
- Laboratory QA/QC inspection results and instrumental calibrations will be documented in accordance with Section 8, Recordkeeping.

5.3 Laboratory Quality Assurance/Quality Control

All analytical work will be defined and controlled by a statement of work, work order, or other work authorizing document. These authorization documents will include QA/QC performance requirements. Samples will be handled according to controlled laboratory procedures. The accuracy, precision, and limitations of the analytical data will be evaluated through QC performance.

As needed, the CWC operating organization will conduct analyses to determine completeness of information and whether waste meets the acceptance criteria for treatment, storage, or disposal at one of the Hanford Facility TSD Units or those of a chosen offsite TSD facility. Testing and analytical methods will depend on the type of analyses sought. For parameters or methods not otherwise specified in Section 3, the most current revisions of the following are acceptable sources of testing methods.

- Analytical methods cited in WAC 173-303;
- The most recently promulgated version of *Test Method for Evaluating Solid Waste: Physical/ Chemical Methods*, SW-846, U.S. Environmental Protection Agency, EPA, Office of Solid Waste;
- Other current U.S. EPA methods, as applicable to the matrix under evaluation;
- *Standard Methods for the Examination of Water and Wastewater, American Public Health Association* (APHA), American Water Works Association, Water Environment Federation;
- *Annual Book of ASTM Standards, American Society for Testing and Materials*;
- *AOAC Official Methods of Analysis*, AOAC (Association of Official Analytical Chemists), International.
- SW-846 methods modified to meet ALARA concerns may be performed subject to Ecology approval.

5.4 Data Assessment

Data used for decision making need to be scientifically sound, of known quality, and thoroughly documented in the Hanford Facility Operating Record, CWC unit-specific portion. The CWC is responsible for the quality of the data and project usability. Data are assessed to determine compliance with quality standards as follows.

Precision – Precision represents a measure of the degree of reproducibility of measurements under prescribed similar conditions. Sample precision is calculated on the basis of duplicate analyses. Acceptance criteria shall be established for each analyte and each analyte method and shall be agreed on by the laboratory and the client.

Accuracy – Accuracy represents the degree to which a measurement agrees with an accepted reference or true value. Sample accuracy is expressed as the percent recovery of a spiked sample. Acceptance criteria shall be established for each analyte and each analyte method and shall be agreed on by the laboratory and the client.

Representativeness – Representativeness is the degree to which data accurately and precisely represents a characteristic of a population, a parameter variation at a sampling point, a process condition, or an environmental condition. Representativeness of a population or an environmental condition depends

heavily on sampling and is addressed in other documents. The issue of representativeness is addressed for the following points:

- Based on the generating process, the waste stream, and its volume, that an adequate number of sampling locations are selected
- The representativeness of selected media has been defined accurately
- The sampling and analytical methodologies as defined in Tables 1, 2, and 3
- The environmental conditions at the time of sampling are documented in accordance with Section 8, Recordkeeping.

Completeness – Completeness is a measure of the amount of usable and/or valid data obtained from a measurement system compared to the total amount of data requested. Completeness can be used to evaluate the amount of data produced that meets the client's requirements (e.g., accuracy, precision). In some cases, data may not meet all the requirements but may still be used for qualitative information as an indicator of the presence or absence of a parameter.

Comparability – Comparability is the confidence with which one data set can be compared to another. For each analyte, comparable precision and accuracy depend on the method and sample matrix. To be comparable, similar precision, accuracy, and detection limits shall be achieved on samples with similar matrices using similar methods. Factors such as analytical method selected, detection limits or uncertainty, precision, accuracy, and matrix effects should be considered in the decision making process when data is to be compared between multiple laboratories.

6 SELECTING WASTE RE-EVALUATION FREQUENCIES

The waste profile and supporting data and documentation will be re-evaluated at least annually, or whenever the generator has informed CWC of a change in the waste generation process, or if waste received at CWC or the description on the shipping documentation does not match the waste profile. If the generator has informed CWC of a change in the waste generation process, the waste re-enters the waste stream approval process described in Section 2.1.1.1. The CWC operating organization will evaluate waste receipt verification data against the waste profile to identify any waste streams for which a change in the waste generation process is suspect. When a waste stream is suspect, that waste stream will re-enter the approval process described in Section 2.1.1.1.

When a waste profile is re-evaluated, the CWC operating organization may request the generator to do one or more of the following:

- Verify accuracy of the current waste profile;
- Supply a new waste profile;
- Submit a sample for laboratory analytical chemical analysis to confirm that the waste is still within the profile parameters.
- Document the nature of any generating process changes with respect to dangerous waste listing definitions.

7 SPECIAL WASTE ANALYSIS PROCEDURAL REQUIREMENTS

This section discusses special process requirements for receiving dangerous and/or mixed waste at CWC.

7.1 Processes for Receiving Onsite and Offsite Waste

The processes for receiving waste are described in Section 2. In general, mixed waste received from onsite generators is managed the same as waste received from offsite generators. Differences include, but are not limited to the following: (1) physical/chemical screening frequencies for verification [minimum percentages of 5 percent for waste from onsite generators and 10 percent for waste from offsite generators (note that chemical screening frequency depends on the physical screening frequency)], (2) shipping documentation (Uniform Hazardous Waste Manifests are used for waste from offsite generators and shipping documents are used for waste from onsite generators), and (3) LDR documentation requirements for mixed or dangerous waste (notification for waste from offsite generators and equivalent information from onsite generators).

7.2 Processes for Ignitable, Reactive, and Incompatible Waste

CWC accepts ignitable, reactive, or incompatible waste (refer to Section 1.2). Pre-shipment review and/or chemical screening requirements in Section 2 will be used to identify whether the waste is ignitable, reactive, or incompatible. The CWC waste acceptance requirements identifies certain management requirements for ignitable, reactive, and incompatible waste, ensuring the waste will be stored in a safe manner.

Appropriate precautions will be taken when ignitable, reactive, or incompatible waste is stored within CWC. Storage and treatment of ignitable, reactive, or incompatible waste within CWC will be accomplished in accordance with WAC 173-303-395(1)(b) and documented in accordance with WAC 173-303-395(1)(c). The annual inspection for ignitable and reactive waste is addressed in the Job Control System and performed by a Fire Protection Engineer.

A compatibility review will be performed on wastes being considered for acceptance into CWC: (1) during the waste acceptance process based upon waste chemical characteristics, and/or (2) when additional information becomes available on waste form or waste constituents. The compatibility review for the WRP Waste will be performed on the information contained in the Acceptable Knowledge documentation for the waste stream. If additional information becomes available during the waste processing steps, the compatibility of the waste container/stream will be re-evaluated.

The compatibility review process covers compatibility between chemicals within a waste matrix, compatibility between multiple containers within a lab pack, and compatibility between a waste container and the waste it contains. The storage category (hazard class) will be updated as necessary following the compatibility review. The storage category will be used to ensure incompatible wastes are not stored together. The chemical compatibility matrix used is consistent with approach documented in *A Method for Determining the Compatibility of Hazardous Waste* (Hatayama *et al*, 1980) (http://www.uos.harvard.edu/ehs/environmental/EPAChemicalCompatibilityChart.pdf).

The compatibility review process considers the available characterization data and waste designation. The conditions against which compatibility will be measured include the following:

- Storage lasting for 20 years.
- Lack of a temperature controlled environment.
- Amount of material.
- Stability of components and reactivity.
- Consequence of inner containers breaking.
- Compatibility of waste with absorbent.
- Container material.

7.3 Provisions for Compliance with Federal and State Land Disposal Restriction Requirements

LDR requirements restrict the land disposal of certain types of waste subject to the *Hazardous Waste Management Act of 1976*. Waste managed on the Hanford Facility falls within the purview of these LDRs per 40 CFR 268, incorporated by reference by WAC 173-303-140. Wastes that are otherwise prohibited from land disposal may be land disposed if the treatment standards established by WAC 173-303-140 are satisfied.

Generators determine what LDR treatment standards apply to the mixed and/or dangerous wastes, and make an evaluation of whether or not these treatment requirements have been satisfied. For wastes subject to concentration-based treatment standards, compliance with LDR treatment standards will be evaluated through analysis of a representative grab sample of the waste. For those LDR constituents subject to treatment for the listed and characteristic waste numbers that apply to the waste, including any UHC identified by 40 CFR 268.2(i), if the Knowledge of the generator is not sufficient to make complete constituent determinations. If the waste does not meet the applicable treatment standards, the generator provides waste information with each shipment stating so, in accordance with WAC 173-303-380(1)(j),-(k),-(l),-(m),-(n), or -(o). If the waste meets the LDR standards, the generator must send a certification that the waste meets the treatment standards.

7.4 Sampling and Analytical Methods

It is recognized that ALARA concerns may warrant modifications to the methods to ensure appropriate protection of personnel health and safety without impact to the method or sample integrity. Waste analyzed using SW-846 methods modified to address ALARA protection concerns will be considered acceptable provided the applicable data quality objectives specified in the modified SW-846 methods will be met.

Samples of waste will be transferred from CWC to an onsite laboratory or shipped offsite to a laboratory for analysis. Samples are collected in accordance with SW-846 and as described in Section 4. Sample storage will be provided for waste containers while awaiting laboratory analysis results.

7.5 Waste Treatment

Waste must be treated to meet LDR as specified in WAC 173-303-140, except as provided if Permittees are in compliance with the requirements and schedules of TPA Action Plan Appendix D, Milestone M-91 series, incorporated by reference herein, with respect to mixed transuranic waste that has been designated by the Secretary of Energy for disposal at the Waste Isolation Pilot Plant (WIPP) pursuant to the *WIPP Land Withdrawal Act*, Pub. L. 102-579, as amended. Provided such compliance is maintained, such Secretary-designated mixed transuranic waste may be certified and shipped to WIPP in lieu of LDR treatment if, as of the time of shipment, such waste is exempt from LDR treatment standards when disposed of at WIPP.

Mixed waste is treated to the applicable standards required by the disposal facility or other applicable requirements. The CWC can perform limited treatment on waste before shipment to an on-site TSD unit or offsite TSD facility that could perform full treatment of the specific waste to meet LDR treatment requirements. Waste requiring treatment other than what the CWC can provide is repackaged, labeled, and transferred to a TSD unit for storage pending identification or development of an appropriate treatment method. Prior to treatment of waste, the CWC will have in place processes to ensure safe waste treatment as defined in Section 1.1.1.2 of this WAP. When characteristics of the waste are changed as a result of treatment or other processing, documentation will be entered into the unit-specific operating record.

When evaluating the treatability of certain characteristic waste, consideration must be given to any additional UHCs that exist above universal treatment standards in 40 CFR 268.48. When the concentration-based standards are used, the constituent concentrations for the waste must fall below those specified in 40 CFR 268.40 and/or 268.48 for UHCs and in WAC 173-303-140 for land disposal without

treatment. If the concentrations exceed these limits, the waste must be treated before disposal. The alternative treatment standards for hazardous debris as specified in 40 CFR 268.45 or for contaminated soil as specified in 40 CFR 268.49, as established in a site-specific treatability variance pursuant to 40 CFR 268.44 (h), or for labpacks in 40 CFR 268.42(c) all incorporated by reference by WAC 173-303-140 could also be used.

Treatment at CWC can consist of, absorption of free liquids, absorption to accomplish deactivation, and neutralization of corrosive materials. Sorting and repackaging of waste would occur at the time the other treatments are performed, or these activities could occur without performing treatment.

- Absorption of free liquids is used to remove the characteristics of the waste due to its ignitability (D001), corrosivity (D002), and/or reactivity (D003). Absorption techniques include adding sorbent to waste in a container, mixing the waste in the parent container with sorbent, placing sorbent in a new container and adding waste to the sorbent, or responding to a spill. Absorbent material that could be used includes polyacrylates, polypropylene, superabsorbent polymer, cellulose, or other absorbent materials that meets applicable receiving facility requirements.
- Absorption to accomplish deactivation is used to remove the characteristics of the waste due to its ignitability (D001), corrosivity (D002), and/or reactivity (D003). Absorption techniques include adding sorbent to waste in a container, mixing the waste in the parent container with sorbent, placing sorbent in a new container and adding waste to the sorbent, or responding to a spill. Absorbent material that could be used includes polyacrylates, polypropylene, superabsorbent polymer, cellulose, or other absorbent materials that meets applicable receiving facility requirements.
- Neutralization of corrosive materials is the primary method of treatment for corrosive waste that has a pH less than or equal to 2 and/or greater than or equal to 12.5. Examples of bases that could be used to neutralize acids are sodium hydroxide, calcium hydroxide, or calcium carbonate. Examples of acids that could be used to neutralize bases are hydrochloric acid and sulfuric acid. Treatment of solid-acid (WSC2) low pH waste could also use the techniques of adding a liquid, then neutralizing the liquid, and reabsorbing the treated waste.

State-only extremely hazardous waste (WT01, WP01, and WP03) LDR requirements for mixed waste, is evaluated in accordance with Revised Code of Washington (RCW) 70.105.050(2).

Waste managed at the CWC is treated to meet either concentration-based treatment standards or technology based standards. The alternative treatment standards for hazardous debris as specified in 40 CFR 268.45 or for contaminated soil as specified in 40 CFR 268.49 may also be used. When dealing with multiple dangerous waste numbers, both standards could apply, requiring a treatment train for ultimate compliance to LDR. In most cases, stabilization treatment is at the end of the treatment train which would require treatment at another onsite TSD unit or an offsite TSD facility.

Grab samples are collected on each batch of concentration based treated waste to ensure that the treatment process was successful. For specified technologies, the CWC will document in accordance to Section 8, Recordkeeping, information to demonstrate the treatment process was well designed and well operated.

7.6 Land Disposal Restriction Certification of Treatment

When LDR treatment has been completed and analytical results expressed as constituent concentration have been verified as compliant with the LDR treatment standards, certification of the LDR treatment will be prepared by the CWC operating organization. The certification statement will be prepared by the CWC operating organization in accordance with 40 CFR 268.7(b, d, and e). A copy of the certification will be placed in the Hanford Facility Operating Record, CWC unit-specific portion.

When a prohibited waste does not meet the applicable treatment standards set forth in 40 CFR 268.40 incorporated by reference by WAC 173-303-140, this information will be placed in the Hanford Facility

Operating Record, CWC unit-specific portion, in accordance with WAC 173-303-380(1)(j), (k), (n), and (o) facility recordkeeping.

8 RECORDKEEPING

Recordkeeping requirements applicable to the Hanford Facility Operating Record, CWC unit-specific portion are described as follows:

a. Confirmation records described in Section 2.
b. Waste information documentation described in Section 2.
c. Waste sampling records and associated documentation described in Sections 3 and 4.
d. Laboratory records and associated documentation described in Section 5.
e. Documentation regarding waste re-evaluation frequencies described in Section 6.
f. Special waste analysis requirement documentation described in Section 7.

9 REFERENCES

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