1 of 2

Waste Analysis Plan for Confirmation or Completion of Tank Farms Backlog Waste Designation

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GLOSSARY

1		
2		
3		
4	ASTM	American Society for Testing and Materials
5		
6	BWIS	Backlog Waste Information System
7		
8	COC/SAR	Chain of Custody/Sample Analysis Request
9	CWC	Central Waste Complex
10		
11	DOE-RL	U.S. Department of Energy, Richland Operations Office
12	DOP	diethyl phthalate
13	DOT	U.S. Department of Transportation
14	DQO	data quality objectives
15	DW	dangerous waste
16		
17	EC	equivalent concentration
18	Ecology	Washington State Department of Ecology
19	EHW	extremely hazardous waste
20	EPA	U.S. Environmental Protection Agency
21		
22	HASM	Hanford Analytical Services Management
23	HEPA	high-efficiency particulate air
24	HH	halogenated hydrocarbons
25	HOC	halogenated organic compounds
26	HPT	health physics technician
27		
28	IARC	International Agency for Research on Cancer
29	IH	industrial hygienist
30		
31	LLW	low-level waste
32		
33	MSDS	material safety data sheets
34		
35	N/A	not applicable
36	NDE	nondestructive examination
37	NIOSH	National Institute for Occupational Safety and Health
38		
39	ORM-E	other regulated material
40		
41	PAH	polycyclic aromatic hydrocarbons
42	PCB	polychlorinated biphenyls
43	PIN	package identification number
44	PNL	Pacific Northwest Laboratory
45		
46	QA/QC	quality assurance/quality control
47		
48	RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
49	RTECS	Registry of Toxic Effects of Chemical Substances
50	RTR	real-time radiography
51	RWP	radiation work permit
52		

GLOSSARY (cont)

1		
2		
3		
4	SAE	Society of Automotive Engineers
5	SDAR	storage disposal approval record
6	SVOA	semivolatile organic analysis
7	SWAS	Solid Waste Acceptance Services
8	S&ML	sample and mobile laboratory
9	SWD	solid waste disposal
10	SWITS	Solid Waste Information and Tracking System
11		
12	TC	toxicity characteristic
13	TCLP	toxicity characteristics leaching procedure
14	TOX	total organic halogen
15	TSCA	<i>Toxic Substances Control Act of 1976</i>
16	TSD	treatment, storage, and/or disposal
17		
18	UO	unusual occurrence
19		
20	VOA	volatile organic analysis
21		
22	WAC	Washington Administrative Code
23	Westinghouse	
24	Hanford (WHC)	Westinghouse Hanford Company
25	WSDR	waste storage/disposal request
26		
27	<	less than
28	>	greater than
29	≤	less than or equal to
30	%	percent
31	wt%	weight percent
32	ppm	parts per million
33	pH	negative concentration logarithm of the
34		hydrogen-ion concentration

1.0 INTRODUCTION

On January 23, 1992, waste management problems in the Tank Farms were acknowledged through an Unusual Occurrence (UO) Report # RL-WHC-TANKFARM-1992-0007 (DOE-RL 1992).

On March 10, 1993, the Washington State Department of Ecology (Ecology) issued Order 93NM-201 (Order) to the U.S. Department of Energy, Richland Operations Office (DOE-RL) and the Westinghouse Hanford Company (Westinghouse Hanford) asserting that "DOE-RL and Westinghouse Hanford have failed to designate approximately 2,000 containers of solid waste in violation of WAC 173-303-170(1)(a) and the procedures of WAC 173-303-070" (Ecology 1993).

On June 30, 1993, a Settlement Agreement and Order Thereon (Settlement Agreement) among Ecology, DOE-RL, and Westinghouse Hanford was approved by the Pollution Control Hearings Board (PCHB). Item 3 of the Settlement Agreement requires that DOE-RL and Westinghouse Hanford submit a waste analysis plan (WAP) for the waste subject to the Order by September 1, 1993 (PCHB 1993). This revision of the WAP is being written in accordance with Item H of Stipulation to Revise Settlement Agreement and Order Thereon (Stipulation) dated September 15, 1993 (PCHB 1993). The parties will submit the approved WAP as proof of settlement to the PCHB on November 1, 1993 or will raise the remaining issues as appropriate.

1.1 SCOPE

This WAP satisfies the requirements of Item 3 of the Order as amended per the Settlement Agreement. Item 3 states: "Within forty (40) calendar days of receipt of this Order, DOE-RL and WHC provide Ecology with a waste analysis plan for review and approval detailing the established criteria and procedures for waste inspection, segregation, sampling, designation, and repackaging of all containers reported in item #1. The report shall include sampling plan criteria for different contaminated media, i.e., soils, compactable waste, high-efficiency particular air (HEPA) filters, etc., and a schedule for completing the work within the time allowed under this Order."

Item 3 was amended per the Settlement Agreement as follows: "In addition to the waste inspection plans for the "unknowns" previously provided and currently being supplemented, DOE-RL and WHC shall provide a draft waste analysis plan for the containers reported in Item 1 of the Order to Ecology by July 12, 1993. A final, DOE-RL approved waste analysis plan shall be submitted to Ecology by September 1, 1993, for Ecology's written approval by September 15, 1993."

The scope of the waste subject to this WAP was agreed upon by the Management Team¹ on October 7, 1993 as:

- Waste identified under the Order and Tank Farm waste identified by DOE-RL/Westinghouse Hanford in the 90-day response dated June 10, 1993, less any exceptions noted below.
- The scope of this WAP covers only that waste generated under Tank Farms management.
- All Tank Farms "Unknown" containers processed through T-Plant are not covered under this WAP.

For purposes of this WAP only, the scope of the waste covered under the WAP will be referred to as backlog waste².

1.2 PURPOSE

This WAP describes the procedures that will be undertaken to confirm or to complete designation of the solid waste identified in the Order.

The backlog waste has a two step acceptance process. The first step is called interim acceptance. It requires a minimum level of information needed for short term staging. But before waste can be formally accepted for treatment, storage, or disposal (second step), it must be properly certified, documented, and packaged in accordance with the *Hanford Site Solid Waste Acceptance Criteria* (WHC 1991). This WAP addresses the second step of the process.

Ecology alleged failure to designate solid waste containers in violation of WAC 173-303-170(1)(a) and the procedures of WAC 173-303-070 in Order 93NM-201. Pursuant to Item 3 of this Order as it is modified by the Settlement Agreement and Order Thereon (PCHB No. 93-64), DOE-RL and Westinghouse Hanford were required to provide a WAP for all containers in the agreed upon scope of the waste program. This WAP is intended to fulfill this requirement and provide a means for confirming or completing the solid waste designation of all containers within its scope. For the purposes of this WAP, to confirm designation means to be able to demonstrate with sufficient documented information that the waste is characterized to the extent necessary for compliant storage.

¹ The Management Team is also referred to as the Policy Review Team. This team consisted of two staff members each from Ecology, DOE-RL, and Westinghouse Hanford. This team was established to resolve issues deemed by the Working Level Team to have ramifications outside of the scope of this WAP or where resolution of issues could not be reached by the Working Level Team. The Working Level Team consisted of two line staff members each from both Ecology and Westinghouse Hanford. Their task was to develop an acceptable and implementable WAP in accordance with Item H of Stipulation to Revise Settlement Agreement and Order Thereon (PCHB 93-64).

² A clear definition of the backlog waste program was not agreed upon by either the Working Level Group or the Management Team.

1 To fulfill the requirements of Item 3, the following areas are addressed:

- 2
- 3 • Description of the waste types included under the Order
- 4
- 5 • Minimum documentation required by the generator in order to formally
- 6 accept the waste for storage at the Central Waste Complex (CWC)
- 7
- 8 • Method for sorting the wastes into waste types
- 9
- 10 • Procedures for confirming or completing the Tank Farms' designation of
- 11 a waste container.
- 12
- 13

14 1.3 DATA QUALITY OBJECTIVES

15
16 The data quality objectives (DQO) planning process recommended by the
17 U.S. Environmental Protection Agency (EPA) (EPA 1987) has been used as
18 guidance for developing this WAP.

19
20 The question established during the DQO process is: "How does one demonstrate
21 that the waste (in the containers) has been properly designated in accordance
22 with the Order and Settlement Agreement?"

23
24 The data obtained to answer this question are specifically intended to ensure
25 the following:

- 26
- 27 • The Tank Farms' designation has been confirmed or completed
- 28
- 29 • The designated waste class of the waste is correct (i.e., dangerous
- 30 waste or extremely hazardous waste)
- 31
- 32 • The waste is designated in accordance with WAC 173-303-070
- 33
- 34 • Sufficient characterization information is obtained so the waste can
- 35 be properly managed during storage.
- 36

37 The DQOs developed for the process are specifically addressed as criteria
38 throughout this document.

39 40 41 1.4 DEVIATIONS FROM AGREED UPON PROCESS

42
43 It may be necessary to deviate from the agreed upon procedures outlined in
44 this WAP.

45 46 47 1.4.1 Container Specific Deviations

48
49 All deviations that are not required to be approved by Ecology in accordance
50 with the WAC will be container specific and will not be applicable to the
51 overall process. Prior to the deviation, a justification memo will be
52 written. This memo must identify the container(s) covered under the deviation

1 and must clearly state the reason for the deviation. The justification will
2 be sent via facsimile to the Ecology Lead for the Order and the Ecology Lead
3 for the Implementation of the WAP. If, after two (2) working days, Ecology
4 has not responded, it will be deemed as acceptance of the deviation for the
5 container(s) specified.

8 1.4.2 Deviations from the Washington Administrative Code

10 All deviations from the requirements of the WAC (such as deviations from
11 WAC 170-303-110) will be submitted to Ecology for their review and approval.

14 1.4.3 Addendums To The Waste Analysis Plan

16 All changes to the process described in this WAP will be approved by DOE-RL
17 and Ecology. The DOE-RL/Westinghouse Hanford may implement any proposed
18 change once Ecology is notified of the proposed change. However, if the
19 change is eventually disapproved, DOE-RL/Westinghouse Hanford will be
20 responsible for fulfilling any requirements that were not met because of
21 implementation of the change.

23 The process to be followed is as follows:

- 25 • DOE-RL/Westinghouse Hanford will submit the proposed change to the
26 Ecology Lead for the Order and the Ecology Lead for the Implementation
27 of the WAP by means of a letter. The proposed changes will be in the
28 form of an addendum to this WAP where the specific changes and reasons
29 for the changes are identified.
- 31 • Ecology will respond to the proposed change in a letter. The letter
32 will state if the change is approved or disapproved and, if
33 disapproved, the reason(s) for the disapproval. This response will be
34 given no later than ten (10) working days after receipt of the
35 request.
- 37 • DOE-RL/Westinghouse Hanford may resubmit a modified proposed addendum
38 in which case Ecology has 10 working days to respond. Alternately,
39 DOE-RL/Westinghouse Hanford may choose to elevate the proposed
40 addendum to a management level team. The management team would
41 consist of members from DOE-RL, Westinghouse Hanford, and Ecology.
42 The members of the management team will not be identified until such
43 time that it becomes necessary to establish the team. The DOE-RL and
44 Westinghouse Hanford will be responsible for naming the appropriate
45 people from their respective organizations to the team.
- 47 • If the proposed addendum is appealed to the management team, the
48 management team will have five (5) working days to approve or
49 disapprove the request.

2.0 WASTE MANAGEMENT ORGANIZATIONAL RESPONSIBILITIES

Waste management organizational responsibilities are discussed in the following sections.

2.1 TANK FARMS

Tank Farms will be responsible for processing the backlog waste included in the Order in accordance with this WAP.

Tank Farms, as a generating unit, will maintain responsibility for the waste included under the Order until the waste is formally accepted by the CWC. This responsibility includes waste designation, laboratory analysis, formal acceptance certifications, compaction/void filling (if required), repackaging, appropriate documentation, container management (including labeling), and other regulatory requirements applied to onsite generating units.

Tank Farms will be responsible for ensuring that the waste included under the Order has accurate documentation required for designation. This documentation includes, but is not limited to, sampling results; inventory sheets; documented process knowledge; and certification plans, studies, and tank characterization analyses.

Tank Farms also will be responsible for the following.

- Determining the final sorting of the containers into waste streams for confirmation or completion of waste designation.
- Requesting storage/disposal approval records (SDARs) that would allow for the waste to be formally accepted by the CWC. These requests will be made in accordance with *Hanford Site Solid Waste Acceptance Criteria* (WHC 1991) and will be for open SDARs for waste streams or for specific SDARs for individual containers.
- Signing a certification statement for each waste container (WHC 1991).
- Reporting, through the occurrence reporting system, all significant discrepancies found during confirmation or completion of the waste designation.

NOTE: Significant discrepancies in waste designation are defined as discrepancies that, if uncorrected, would cause mismanagement of the container(s) at a storage unit. (Conservative designation of the waste is not considered a significant discrepancy.) Significant discrepancies include the following.

- The waste is determined to have a characteristic that was not previously listed.

1 - The discrepancy, if uncorrected, would result in the storing of
2 incompatible wastes together.

3
4 - Waste was accepted that is prohibited as defined in Section 3.1.
5

6 7 **2.2 SOLID WASTE DISPOSAL ORGANIZATION**

8
9 The Solid Waste Disposal (SWD) organization will provide the following:
10

- 11 • Technical assistance on characterization issues
- 12
- 13 • Perform technical assistance for all field analysis for confirmation
- 14 or completion of designation, as required by this WAP
- 15
- 16 • Issue SDARs for the waste
- 17
- 18 • Ensure that all containers, once approved for final acceptance at CWC,
- 19 are stored in accordance with WAC 173-303 interim status TSD
- 20 requirements
- 21
- 22 • Inspect all waste containers included under the Order to confirm
- 23 container integrity (A list of those containers needing
- 24 repackaging/overpacking will be provided to Tank Farms.)
- 25
- 26 • Retrieve the containers in a sequence requested by Tank Farms for
- 27 shipping the backlog containers for processing
- 28
- 29 • Receive and store and/or dispose of containers approved in accordance
- 30 with acceptance criteria (WHC 1991) and this WAP. Only those
- 31 containers previously identified as LLW can be disposed of under this
- 32 WAP
- 33
- 34 • Perform physical confirmation such as nondestructive examination (NDE)
- 35 via X-ray and nondestructive assay of the containers, as necessary, as
- 36 described by this WAP
- 37
- 38 • Coordinate all changes necessary for the solid waste information
- 39 tracking system (SWITS) to track all containers throughout the process
- 40
- 41 • Track the waste containers through SWITS (this will include data input
- 42 and report output as necessary)
- 43
- 44 • Perform surveillances, as required, if Tank Farms are not an approved
- 45 generating unit in accordance with the acceptance criteria (WHC 1991).
- 46

47 48 **2.3 HANFORD ANALYTICAL SERVICES MANAGEMENT ORGANIZATION**

49
50 The Hanford Analytical Services Management (HASM) organization will coordinate
51 sampling efforts between the laboratory and the CWC or the T Plant Complex
52 sampling unit.

1
2 **2.4 SAMPLE AND MOBILE LABORATORY**
3

4 The Sample and Mobile Laboratory (S&ML) will provide the following:
5

- 6 • Collecting samples for laboratory analysis in support of backlog waste
7 confirmation or completion of designation
8
9 • Initiating and maintaining chain of custody on collected samples
10
11 • Shipping collected samples to offsite laboratories
12
13 • Documenting sampling activities in a controlled field logbook.
14
15

16 **2.5 REPACKAGING ORGANIZATION RESPONSIBILITIES**
17

18 The Repackaging Organization will make appropriate preparations for the
19 following:
20

- 21 • Accepting waste for confirmation
22 • Accepting waste that fails confirmation
23 • Performing completion of designation as necessary
24 • Performing repackaging as necessary.
25

26 The Repackaging Organization will be responsible for obtaining permits (as
27 applicable), writing procedures, and ensuring all necessary supplies are
28 available.
29
30

31 **2.6 TRANSPORTATION AND PACKAGING ORGANIZATION**
32

33 The Transportation and Packaging organization will provide support for
34 shipment of samples and containers.

1
2
3
4
5

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3.0 WASTE MANAGEMENT CRITERIA AND TRAINING

Waste management criteria and personnel training are discussed in the following sections.

3.1 WASTE MANAGEMENT CRITERIA

Before final acceptance by the CWC, waste will be designated in accordance with WAC 173-303-070. The requirements of the *Central Waste Complex Final Safety Analysis Report* (WHC 1992) must be followed at all times. The CWC will not accept unidentified or uncharacterized waste not identified in the Hanford Central Waste Complex Part A Permit Application (DOE/RL-88-21). In addition, the CWC will not accept the following prohibited items:

- Etiologic agents (49 CFR 173.386)
- Chemically incompatible materials in any waste container (40 CFR 265.313)
- Explosives (10 CFR 61.56)
- Pyrophorics (10 CFR 61.56)
- Gas cylinders not permanently vented.

Containers must be in good condition with no visible cracks, holes, dents, bulges, corrosion, or other damage that affects the integrity of the container (WHC 1991).

The radioactive limits for the CWC cannot be exceeded without documentation from the SWD organization allowing a deviation from the limits as follows.

- The maximum surface-radiation dose rate will not exceed 100 millirems per hour at any point. If the dose rate exceeds the limit, the package will be shielded down to the acceptable limit.
- Removable contamination on the exterior surfaces of all waste packages will not exceed the following limits:
 - 220 disintegration per minute per 100 square centimeters for alpha contamination
 - 1,000 disintegration per minute per 100 square centimeters for beta-gamma contamination.
- The total fissile content of any container will not exceed 15 grams.

3.2 WASTE MANAGEMENT TRAINING

All training will be performed to meet the requirements of WAC 173-303-330. Each TSD unit involved in the processing of backlog waste is responsible for their own personnel training. The TSD units have specific training plans that contain the detailed training needed at that TSD unit. The training might exceed the training required under this WAP. Other organizations who do not have a training plan and are performing work under this WAP are responsible for meeting the minimum training requirements outlined in this section.

Although formal training is not required on the specific processes described in this WAP, workshops will be given to present this WAP along with the methodology, and to discuss in detail the various processes embodied by this WAP.

All employees involved with the backlog program will be placed into one of the following four categories based on their job titles, positions, and responsibilities:

- Category 1 - All Employees
- Category 2 - General Worker
- Category 3 - General Manager
- Category 4 - General Shipper.

Training courses for each category are described in the following sections. Specific training course numbers and course descriptions are available on request.

3.3 CATEGORY 1 TRAINING - ALL EMPLOYEES

Required training courses are as follows:

1. "Hazardous Communication and Waste Orientation"
2. "Asbestos General Employee Training"
3. "Facility Specific Orientation" (for the facility or facilities where the employee will perform their job duties).

3.4 CATEGORY 2 TRAINING - GENERAL WORKER

3.4.1 Personnel Who Work With Dangerous Wastes

Personnel who handle or transport wastes including repackaging and movement of containers are included in this category.

Required training courses are as follows:

1. "Category 1 Training Requirements"
2. "Generator Hazards Safety Training" (every 2 years)

3. "Facility Specific Training" using the Facility Emergency and Hazard Information Checklist (annually)
4. "Job Specific Training" (as determined by the facility management)
5. "Hazardous Waste Operations Training," either 24-hour or 40-hour initial training (8-hour retraining annually).

3.4.2 General Workers Who Work Within a TSD Unit

Personnel who provide written direction on handling dangerous waste in the form of work plans, work packages, and operating procedures are included in this category.

Required training courses are as follows:

1. "Category 1 Training Requirements"
2. "Generator Hazards Safety Training" (every 2 years)
3. "Facility Specific Training" using the Facility Emergency and Hazard Information Checklist (annually)
4. "Job Specific Training" (as determined by the facility management)
5. "Hazardous Waste Operations Training," either 24-hour or 40-hour initial training (8-hour retraining annually).

3.5 CATEGORY 3 TRAINING - GENERAL MANAGER

3.5.1 Decision-making Authorities in Emergencies Involving Dangerous Waste

Required training courses are as follows:

1. "Category 1 Training Requirements"
2. "Generator Hazards Safety Training" (every 2 years)
3. "Building Emergency Director Training" or "Building Warden Training" (annually)
4. "Review of Building Emergency Plan" (annually).

3.5.2 First-line Management in Dangerous Waste Management Facilities

1. "Generator Hazards Safety Training" (every 2 years)
2. "Hazard Evaluation Workshop".

3.6 CATEGORY 4 TRAINING - GENERAL SHIPPERS

Required training courses for dangerous and mixed waste shippers are as follows:

1. "Category 1 Training Requirements"
2. "Generator Hazards Safety Training" (every 2 years)
3. "Hazardous Waste Shipment Certification Training" (annually)

4. "Facility Specific Training" using the Facility Emergency and Hazard Information Checklist
5. "Hazardous Waste Operations Training," either 24-hour or 40-hour initial training (8-hour retraining annually)
6. "Waste Designation Support" (annually).

3.7 ADDITIONAL TRAINING REQUIREMENTS

The following sections discuss training requirements that are in addition to any training discussed previously.

3.7.1 Personnel Responsible for Designating Waste and Determining the Waste Meets Minimum Requirements for Storage

The required training course for these personnel is as follows.

1. "Waste Designation Certification Training" (annually).

3.7.2 Personnel Responsible for Making Decisions on Flagging Containers for Further Analysis and Making the Decision that a Container or Waste Stream has Sufficient Information for Characterization for Storage

The required training course for these personnel is as follows.

1. "Waste Designation Support" (annually).

3.7.3 Personnel Who Perform Waste Sampling or Who Clean and Certify Sampling Equipment

Required training courses for these personnel include the following:

1. "Generator Hazards Safety Training" (every 2 years)
2. "Hazardous Waste Operations Training," either 24-hour or 40-hour initial training (8-hour retraining annually)
3. "Facility Waste Sampling and Analysis"
4. "Job Specific Training".

4.0 WASTE STREAM DESCRIPTION

Although Tank Farms primary mission is the receipt and long-term storage of highly radioactive liquid wastes in large underground tanks, some containerized solid waste is generated. The generation of containerized wastes is limited to activities such as surveillance, monitoring, maintenance of electrical and mechanical equipment, and the removal of radiologically contaminated soil. In order to maintain exposures as low as reasonably achievable (ALARA), very little work in Tank Farms involves direct contact with the tank wastes. The generation of mixed waste primarily results from other activities occurring in the Tank Farms.

4.1 DESCRIPTION OF WASTE GENERATING PROCESSES

To adequately describe the waste generating processes for containerized waste in Tank Farms a description of the waste generating activities and the subsequent waste descriptions are found in the following sections. A matrix illustrating the waste that results from each activity is found in Table 4.1. Each waste material is described in Table 4.2.

4.1.1 Waste Generating Activities

There are 11 primary waste generating activities that take place in Tank Farms:

- gasket replacements
- gauge/manual liquid level tape repairs
- sampling
- tank pumping
- in-tank photography
- vent and balance
- surveillance
- maintenance and repairs
- contamination control
- spills
- construction.

The following describes these waste generating activities.

Gasket replacement entails the dismantling of tank riser covers, the removal and replacement of asbestos gaskets, and the reinstallation of the riser covers.

Tank Farms generates waste using two liquid level indication devices in the various tanks: a Food Instrument Corporation™ (FIC) gauge and a manual tape. Repairs on these devices generates waste meeting a variety of descriptions.

Sampling in the Tank Farms involves several different activities. The sampling activities that generate the most waste are tank core and bore hole drilling.

1 As part of Tank Farms' primary mission of managing highly radioactive liquid
2 waste, a certain amount of pumping of the liquid waste is required. Single-
3 Shell Tank stabilization, waste receiving, removing liquids from tanks that
4 are suspected of leaking, and some tank-to-tank transfers involve tank
5 pumping. Some amount of waste that directly contacts the tank waste is
6 generated from these activities as well as a volume of non-contact waste.

7
8 In-tank photography generates waste that results primarily from the placement
9 and removal of the photographic equipment from inside of a tank.

10
11 Vent and balance activities involve only the calibration and testing of
12 ventilation, exhaust, and filtration equipment.

13
14 Surveillances represent the most frequent activity that occurs in the Tank
15 Farms. As a result, it is expected that the largest volume of backlog waste
16 resulted from this activity. A surveillance involves the donning of personal
17 protective equipment, entering a Tank Farm Complex, performing a surveillance,
18 leaving the Complex, and removing the personal protective equipment.
19 Personnel conducting surveillances read instruments, perform visual
20 inspections, and perform oversight activities, but do not normally come into
21 direct contact with the tank wastes.

22
23 The category of maintenance and repairs involves a wide range of waste
24 generating activities that occur in Tank Farms. These activities include
25 preventive maintenance of equipment, housekeeping, replacement of failed
26 equipment, and repair of broken equipment. This category excludes in-tank
27 equipment. The repair, maintenance, and disposal of in-tank equipment
28 generates wastes that are handled in the WAP as special case waste.

29
30 The control of radioactive contamination is an important and required activity
31 conducted in Tank Farms. Radioactive contamination has been inadvertently
32 deposited on the soils within the Tank Farms during years of routine
33 operations. Much of this contamination is fixed and does not spread. Some of
34 the contamination is not fixed, or non-fixed contamination is uncovered during
35 activities such as excavation. As a result it is imperative that Tank Farms
36 reduce the potential for spreading contamination by containerizing the soil
37 that contains the radioactive contamination.

38
39 Tank Farms does not intentionally spill either dangerous or nondangerous
40 materials. Spills, however, might occur despite the most stringent
41 precautions. The most common spill that could occur in the Tank Farms results
42 from the use of diesel fuel. Various equipment in the Tank Farms is powered
43 with diesel fuel. This equipment sometimes develops leaks that result in
44 spills or the diesel fuel is spilled during refueling. On rare occasions,
45 tank waste also is spilled to the soil.

46
47 Construction activities in the Tank Farms vary greatly in scope. The wastes
48 that result from construction activities are difficult to categorize in terms
49 of description, volume, or characteristics. Most construction is small scale,
50 such as the pouring of new concrete, but some like the 242-A Evaporator
51 upgrades are major construction efforts. Most of the waste volume results

1 from demolition actions that produce rubble and debris. The more prevalent
2 wastes include rags, hand tools, plastic, paint, metal parts, and lumber.

4.1.2 Waste Description

7 Table 4.2 provides a brief description of the waste materials that are
8 typically generated during Tank Farms activities. Table 4.2 also provides
9 additional clarification to the waste generating matrix found in Table 4.1.

4.2 WASTE MANAGEMENT PRACTICES

14 The vast majority of the wastes that are to be addressed by this WAP are
15 currently being stored at the CWC and are designated as dangerous waste (DW)
16 with only the waste codes F001, F002, F003, and F005 identified on the Backlog
17 Waste Information Sheet (BWIS) and on the containers. Both federal and state
18 regulations state that a mixture of a solid waste with any listed waste also
19 will be designated as a listed waste. Tank Farms' management has historically
20 not segregated waste streams. Consequently, Tank Farms were unable to
21 substantiate the waste designations and were not allowed to ship the waste as
22 low-level waste.

24 By employing the Backlog Waste Program, Tank Farms used their existing
25 characterization information (Tank Farms lacked the information to demonstrate
26 that the wastes were properly segregated and had not been in direct contact
27 with the tank waste), and applied the waste codes F001, F002, F003, and F005.
28 The Backlog Waste Information Sheet (BWIS) was used as the tool for
29 documenting the existing characterization information as determined by Tank
30 Farms.

32 In early 1993, new process knowledge based on the use of decontamination
33 chemicals at T Plant became available. The knowledge resulted in the
34 application of the F004 waste code to tank waste. As a result, all waste
35 covered under this WAP and either currently designated as F001, F002, F003,
36 and F005 or suspected of having contacted tank waste, also will be designated
37 with the F004 waste code. Both the container labels and the container
38 documentation will be updated accordingly.

4.3 WASTE IDENTIFICATION

43 All of the Tank Farms' backlog waste can be grouped into one of the following
44 waste types:

- 46 • Debris
- 47 • Soil
- 48 • Containerized Liquids
- 49 • Non-Containerized Liquids
- 50 • LLW
- 51 • Special Case.

1 More than one activity can generate the same type of waste. Conversely, more
2 than one waste type can be generated during the same activity. Waste streams
3 can be defined for the backlog waste based on the process knowledge and
4 characterization information of the waste and the location where the waste was
5 generated. The waste types can be divided into the following waste stream
6 classes:

- 8 • Contamination control soil
- 9 • Diesel contaminated soil
- 10 • Other contaminated soil
- 11 • Low-level waste debris (dangerous and nondangerous)
- 12 • F-listed debris
- 13 • Other radioactive mixed waste debris
- 14 • Containerized liquids
- 15 • Uncontainerized liquids
- 16 • Special case waste.

17
18 Debris will be defined according to 40 CFR 268 as solid material exceeding
19 60-millimeter particle size that is intended for disposal and that is a
20 manufactured product, plant or animal matter, or natural geologic material.
21 A mixture of debris and other materials is considered debris if the mixture is
22 primarily debris, by volume, based on visual inspection. Intact containers of
23 dangerous waste that are not ruptured and that retain 75% of their original
24 volume are not considered debris. These intact, inner containers, such as an
25 aerosol can containing lubricant, will be handled as containerized liquids.

26
27 Contamination control soil was generated solely from contamination control
28 activities. The contamination is assumed to be the result of either direct or
29 indirect contact with tank wastes.

30
31 Diesel contaminated soil is the result of a diesel spill cleanup. The soil
32 might or might not be radioactively contaminated.

33
34 Other contaminated soil could have been generated from any spill or other
35 activity other than incidental contact with the tank wastes or diesel fuel.
36 Three of these incidents have already been documented: a lead-acid battery
37 spill, 241-SY-101 air lance rinsate spill, and 241-T-106 borehole drill
38 cuttings.

39
40 Low-level waste debris is debris that has no measurable levels of radioactive
41 contamination above background, nor any visible contamination of any kind.
42 The use of the term 'LLW' is not intended to connote the actual designation of
43 the waste stream class.

44
45 Debris that is considered F-listed contains measurable levels of radioactivity
46 above background or has been designated as F-listed on the corresponding BWIS.
47 No other visible contamination other than that which would be attributed to
48 contact with the tank waste can be present. A determination as to the
49 applicability of the other waste codes that have been assigned to tank waste
50 will be made via representative sampling of debris waste streams as described
51 in Section 6.1. The F-listed debris also is suspected of containing lead as
52 described in Section 4.3.2.

1 typically assigned the D008 waste code. Recently, DOE-RL and
2 Westinghouse Hanford determined that all electronic components
3 containing lead solder exceed the Toxicity Characteristics Leaching
4 Procedure (TCLP) level for lead of 5 ppm. Consequently, the
5 designation for waste streams with lead solder containing items might
6 have to change.
7

8 The waste designation and the assignment of all applicable waste codes will be
9 conducted according to Appendix A.

1 Other mixed waste debris might be designated as F-listed on the BWIS but also
2 exhibits visible contamination other than would be attributed to contact with
3 the tank waste. This debris also is suspected of containing lead as described
4 in Section 4.3.2.

5
6 Containerized liquids include all containers found in the backlog waste drums
7 that are not empty as defined in WAC 173-303-160(2)(a) and (b). Empty
8 containers will be considered debris.

9
10 Uncontainerized liquids include all free liquids in the backlog waste drums
11 that are not contained in an internal container. It is expected that the
12 primary uncontainerized liquid will be water, which is the result of
13 condensation or that was used to wet asbestos. Small drops and unpooled
14 condensation are addressed in accordance with Section 6.4.

15
16 Special Case waste is any waste that is not described by any of the previous
17 descriptions. All special case waste will be handled on a case-by-case basis.

18 19 20 4.3.1 Tank Farms Complexes

21
22 The Tank Farms Complexes and the buildings and/or structures included within
23 each complex are listed in Table 4.3. The waste stream classes of soil and
24 debris will be divided into waste streams by these complexes. The existing
25 container documentation or additional documentation gained during this process
26 will indicate the generating location. The information in Table 4.3 will
27 allow that container to be assigned to a Tank Farms Complex to assist in
28 establishing the waste stream.

29 30 31 4.3.2 Potential Waste Designation

32
33 Table 4.4 summarizes the waste generating activities that contributed to each
34 of the previously identified waste streams. The potential waste codes that
35 would apply to these waste streams and the rationale for this designation also
36 are reflected in Table 4.4.

37
38 Potential waste codes refers to waste codes that may apply if certain types of
39 dangerous wastes are contained within a waste stream, or the concentration of
40 a dangerous waste constituent is high enough for the waste stream to exhibit a
41 dangerous waste characteristic. If additional waste codes are identified as a
42 result of the process described in this WAP, Table 4.4 will be updated
43 accordingly.

44
45 The following are several examples of waste codes:

- 46
47 • The containerized liquid waste stream may contain aerosol cans with
48 enough remaining flammable product to cause the waste stream to be
49 designated as D001,
50
- 51 • The F-listed debris waste stream may contain electronic circuit boards
52 from maintenance and repair activities. This waste stream is not

Table 4.1. Tank Farms Waste Generating Activities and Waste Materials.

Waste Materials**	Waste Generating Activities*										
	Gasket Replacements	FIC/Manual Tape Repairs	Sampling	Tank Pumping	In-Tank Photography	Vent & Balance	Surveillance	Maintenance & Repairs	Contamination Control	Spills	Construction
Soil (diesel spills)								X		X	X
Soil (cont. control)									X	X	X
Soil (Other cont.)										X	
Rags		X		X		X		X			X
Vacuum Pump								X			
CAM Parts								X			
Electric Motors		X						X			
Belts								X			
Tools	X	X	X	X	X	X		X		X	X
Plastic Sheeting	X	X	X	X	X	X		X	X	X	X
PPE	X	X	X	X	X	X	X	X	X	X	X
Misc. Step-off Pad Waste	X	X	X	X	X	X	X	X	X	X	X
Nuts & Bolts	X	X			X			X			X
Wire		X						X			X
Lumber			X	X	X			X			X
Tape Housing & Misc. Equip.		X									
Drill Rod			X								
Drill Bits			X								
In-tank Equipment		X		X				X			X
Liquid Level Tapes		X									
Lead Shielding		X	X								X
Exhauster Housing & Parts								X			
HEPA Filters						X					
Items w/lead solder		X						X			
Oils								X			
Hydraulic Fluid								X			
Paints								X			X
Misc. Aerosol Cans								X			X
Asbestos Gaskets & Water	X										
Asbestos (other) & Water											X

* A description of the Waste Generating Activities is described in Section 4.1.1.

** A more detailed description of the Waste Materials is found in Table 4.2

CAM = continuous air monitor.

PPE = personal protective equipment.

Table 4.2. Waste Material Descriptions.

Waste Materials	Description
Soil (diesel spills)	Soil contaminated with diesel fuel packaged typically in a plastic bag.
Soil (rad. cont.)	Soil with some measurable level of radioactivity above background.
Soil (other cont.)	Soil contaminated from several sources: lead acid battery spills, SY-101 Airplane rinsing, T-106 drill cuttings, and other miscellaneous spills.
Rags	Rags contaminated with tank wastes, oils, paint, or other miscellaneous chemicals.
Vacuum Pump	Spent equipment
CAM Parts	Spent equipment
Electric Motors	Spent equipment
Belts	Rubber based "fan belts".
Tools	Hand tools and power tools.
Plastic Sheeting	Plastic from greenhouses, contamination control and waste packaging.
PPE	SWPs (whites), gloves, boots, masks, and mask filters
Misc. Step-off Pad Waste	Tape, plastic, and rags
Nuts & Bolts	Spent equipment
Wire	Spent equipment
Lumber	Treated and untreated wood
Tape Housing & Misc. Equip.	Spent equipment that may or may not have contacted tank waste.
Drill Rod	Spent equipment that contacted tank waste.
Drill Bits	Spent equipment that contacted tank waste.
In-tank Equipment	Spent equipment that contacted tank waste.
Liquid Level Tapes Lead Shielding	Spent equipment that contacted tank waste.
Exhauster Housing & Parts	Spent equipment that may or may not have contacted tank waste.
HEPA Filters	Filter media and housing.
Items w/ lead solder	Circuit boards, light bulbs, and other electrical equipment containing significant amounts of lead solder.
Oils	Compressor oil, hydraulic fluid, motor oil
Other liquids	Cleaning products
Paints	Empty paint containers, dangerous waste paints and residue, non-dangerous paints and residue.
Misc. Aerosol Cans	Cleaning products, paint cans, lubricants, and solvents
Asbestos Gaskets & Water	Asbestos packaged with water as a wetting agent.
Asbestos (other) & Water	Asbestos packaged with water as a wetting agent.

CAM = continuous air monitor.
 PPE = personal protective equipment.
 SWP = special work permit.

Table 4.3. Tank Farms Complexes. (sheet 1 of 3)

PUREX A-Farm Complex

241-A Tank Farm
6 SSTs (241-A-101 to 106)
241-A-271 Control Room
241-A-401 Condenser Building
241-A-701 Compressor Building
241-A-702 Ventilation Building
241-A-4,000 CFM Backup Exhauster
241-AX Tank Farm
4 SSTs (241-AX-101 to 104)
241-AX-801 Water Service Building
241-AX-2707 Changeroom
241-AY Tank Farm
2 DSTs (241-AY-101 & 102)
241-AY-801 Instrument Building
241-AZ Tank Farm
2 DSTs (241-AZ-101 & 102)
241-AZ-801 Instrument Building
Miscellaneous subgrade ancillary equipment (i.e., diversion boxes, valve pits, catch tanks, and vaults).

AP/AW Tank Farm Complex

241-AW Tank Farm and support buildings
6 DSTs (241-AW-101 to 106)
241-AW-271 Control Building
241-AW-273 Compressor Building
241-AW Water Service Building
241-AN Tank Farm and support buildings
7 DSTs (241-AN-101 to 107)
241-AN-271 Control Building
241-AN Water Service Building
241-AN-273 Compressor Building
241-AP Tank Farm and support buildings
8 DSTs (241-AP-101 to 108)
241-AP-271 Control Building
241-AP Water Service Building
241-AP-701 Compressor Building
204-AR Railcar Unloading Facility
244-AR Vault.
244-AR-701 Generator Building
244-AR-715 Closed-Loop Cooling System Building
291-AR Filter Building and Stack
292-AR Vessel Vent Stack
207-A Retention Basins
244-A Lift Station
Miscellaneous subgrade ancillary equipment (i.e., diversion boxes, valve pits, catch tanks, and vaults).

Table 4.3. Tank Farms Complexes. (sheet 2 of 3)

242-A Evaporator

242-A Evaporator
242-A-81 Water Service Building
242-A-702 Evaporator Ventilation Building

B-Farm Complex

241-B Tank Farm
16 SSTs (241-B-101 to 112 & 241-B-201 to 204)
241-B-701 Compressor Building
241-BX Tank Farm
12 SSTs (241-BX-101 to 112)
244-BX Double-Contained Receiver Tank
2724-BX Check-Out Station
241-BY Tank Farm
12 SSTs (241-BY-101 to 112)
241-BY-254 ITS 2 Building
241-BY-301 ITS 1 Building
241-BY-302 Compressor Building
2724-BY Check-Out Station
MO-114 Changeroom (BY Farm)
Miscellaneous subgrade ancillary equipment (i.e., diversion boxes, valve pits, catch tanks, and vaults).

C-Farm Complex

241-C Tank Farm
16 SSTs (241-C-101 to 112 & 241-C-201 to 204)
241-CR-271 Control Room
2724-C Check-Out Station
2724-CA Check-Out Station
244-CR Vault
Miscellaneous subgrade ancillary equipment (i.e., diversion boxes, valve pits, catch tanks, and vaults).

T-Farm Complex

241-T Tank Farm
16 SSTs (241-T-101 to 112 & 241-T-201 to 204)
Miscellaneous subgrade ancillary equipment (i.e., diversion boxes, valve pits, catch tanks, and vaults).

Table 4.3. Tank Farms Complexes. (sheet 3 of 3)

TX/TY-Farm Complex

241-TX Tank Farm
18 SSTs (241-TX-101 to 118)
241-TY Tank Farm
6 SSTs (241-TY-101 to 106)
242-T Evaporator
244-TX Double-Contained Receiver Tank
Miscellaneous subgrade ancillary equipment (i.e., diversion boxes, valve pits, catch tanks, and vaults).

U-Farm Complex

241-U Tank Farm
16 SSTs (241-U-101 to 112 & 241-U-201 to 204))
244-U Double-Contained Receiver Tank
Miscellaneous subgrade ancillary equipment (i.e., diversion boxes, valve pits, catch tanks, and vaults).

S-Farm Complex

241-S Tank Farm
12 SSTs (241-S-101 to 112)
241-SX Tank Farm
15 SSTs (241-SX-101 to 115)
241-SY Tank Farm
3 DSTs (242-SY-101 to 103)
242-S Evaporator-Crystallizer
244-S Double-Contained Receiver Tank
Miscellaneous subgrade ancillary equipment (i.e., diversion boxes, valve pits, catch tanks, and vaults).

Buildings/Structures not Part of any Complex

Grout Treatment Facility
Liquid Effluent Retention Facility (LERF)
151 ER Diversion Box
152 ER Diversion Box
153 ER Diversion Box
154 UX Diversion Box

CFM = cubic feet per minute.
DST = double-shell tank.
ITS = in-tank solidification.
SST = single-shell tank.

Table 4.4. Tank Farms Dangerous Waste Identification.

ACTIVITY	WASTE STREAM ^{CLASS*}	POTENTIAL WASTE CODES	RATIONALE	DW/EHW
Gasket Replacements	LLW - Debris	N/A	Contact with tank wastes did not occur.	
FIC/Manual Tape Repairs	LLW - Debris	N/A	Contact with tank wastes did not occur.	
	Derived from RMW - Debris	F001, F002, F003, F004, F005, D008	Incidental contact with listed wastes and quantities of lead solder.	DW
Sampling	LLW - Debris	N/A	Contact with tank wastes did not occur.	
	Derived from RMW - Debris	F001, F002, F003, F004, F005	Incidental contact with listed wastes.	DW
Tank Pumping	LLW - Debris	N/A	Contact with tank wastes did not occur.	
	Derived from RMW - Debris	F001, F002, F003, F004, F005	Incidental contact with listed wastes.	DW
In-Tank Photography	LLW - Debris	N/A	Contact with tank wastes did not occur.	
	Derived from RMW - Debris	F001, F002, F003, F004, F005	Incidental contact with listed wastes.	DW
Vent & Balance	LLW - Debris	N/A	Contact with tank wastes did not occur.	
Surveillance	LLW - Debris	N/A	Contact with tank wastes did not occur.	
Maintenance & Repairs	LLW - Debris	N/A	Contact with tank wastes did not occur.	
	Derived from RMW - Debris	F001, F002, F003, F004, F005, D008	Incidental contact with listed wastes and quantities of lead solder.	DW
	Other RMW - Debris	W001, D006, D007, D008, D009	PCB and heavy metal residues in used oils.	DW
	Containerized liquids	Determined according to Sec. 6.4		DW
Contamination Control	Rad. contaminated soil	F001, F002, F003, F004, F005	Incidental contact with listed wastes.	DW
Spills	Diesel contaminated soil	F001, F002, F003, F004, F005, D018, WC02	Incidental contact with listed wastes and the concentration of benzene in diesel fuel.	DW
	Other contaminated Soil	F001, F002, F003, F004, F005, D002, D0??	Direct contact with listed wastes from the tanks.	DW
Construction	Rad. contaminated soil	F001, F002, F003, F004, F005	Incidental contact with listed wastes.	DW
	LLW - Debris	N/A	Contact with tank wastes did not occur.	
	Derived from RMW - Debris	F001, F002, F003, F004, F005, D008	Incidental contact with listed wastes and quantities of lead solder.	DW
	Containerized liquids	Determined according to Sec. 6.4		DW
	Uncontainerized liquids	N/A		DW

* The Waste Stream Classes described in this Table for soil and debris will be divided into specific waste streams according to the Tank Farm Complex where the waste was generated. See Section 4.3.1.

** ?? means a contaminant may be present which would cause the waste to be regulated for one of the TCLP contaminants.

5.0 PROCESS FOR CONFIRMATION OR COMPLETION OF DESIGNATION

This section describes the general approach that will be used for confirmation or completion of the backlog waste designation. The purpose of the process is to demonstrate that the defined waste streams meet the criteria of a waste stream and to obtain characterization information for confirmation or completion of designation sufficient for proper management of the waste during storage. The process is designed to prevent false negative results in the designation of a container.

The steps in the process are shown in Figure 5-1. The basic steps to be followed are as follows:

- Sorting
- Documentation Assessment
- Physical Analysis
- Field Analysis
- Laboratory Analysis.

Each container will be evaluated and the confirmation and completion of designation performed on an individual basis. However, each container does not have to go through all of the steps. Information obtained from analyses on containers within a waste stream could be applied to other containers within the same waste stream.

Section 6.0 of this WAP outlines the basic protocol to be followed for each waste stream. All containers will be processed through the sorting and documentation assessment. The number of containers in each waste stream to be processed through the remaining steps, along with the specific physical, field, and/or laboratory analysis to be performed are described in Section 6.0.

At any point in the process, when Tank Farms determines that sufficient information is available for proper storage of a container or waste stream, Solid Waste Acceptance Services (SWAS) can be requested to issue a SDAR for the container or waste stream. The process to be used for this request is outlined in Section 5.3.

5.1 SPECIAL HANDLING OF CONTAINERS

At any step in the process, information can be obtained for a container that would cause the evaluator to question the validity of the available documentation. The container documentation will be flagged so that additional steps can be taken to ensure that sufficient characterization information is obtained so that the designation is completed or confirmed.

Examples of when flagging of a container is required include the following.

- The documentation assessment uncovers questionable documentation on a container.

- 1 • Physical or chemical analysis raises questions concerning the
2 documentation on a container.
- 3
- 4 • An object or material is found in a waste container that is not
5 substantiated by the documentation assessment.
- 6
- 7 • An indication of a mixture of waste streams is found that has not been
8 previously identified.
- 9

10 Whenever a container is flagged as a result of the documentation assessment,
11 physical analysis, or chemical analysis, the evaluator must determine if the
12 other containers in the waste stream potentially could be impacted. The
13 evaluator must determine the appropriate course of action based on the waste
14 stream documentation. Possible courses of action include subjecting other
15 containers in the waste stream to further analyses, applying the results
16 obtained from the flagged container to other containers in the waste stream,
17 or redefining a waste stream and subsequently resorting some waste containers.

18

19 Whenever a container has a waste code(s) added as a result of analysis, the
20 same waste code(s) could be added to the remaining containers in the same
21 waste stream in lieu of performing additional analysis on those containers.
22 However, it must be demonstrated that all of the containers still belong in
23 the same waste stream.

24

25 At any step in the process, a significant discrepancy in waste designation
26 could be revealed. A significant discrepancy in waste designation is defined
27 as a discrepancy that, if uncorrected, would cause mismanagement of the
28 container or the waste stream storage unit. (Conservative designation of the
29 waste is not considered a significant discrepancy.) Significant discrepancies
30 include the following.

- 31
- 32 • The waste is determined to have a characteristic that was not
33 previously listed.
- 34
- 35 • The discrepancy, if uncorrected, would result in the storing of
36 incompatible wastes together.
- 37
- 38 • Waste was accepted that is prohibited as defined in Section 3.1.
- 39

40

41 5.2 DOCUMENTING FLAGGED CONTAINERS

42

43 When flagging of a container results in the need for additional actions to be
44 taken on the container or other containers in the waste stream, the actions
45 taken must be documented in the operating record. A statement of the actions
46 taken and the reason(s) for the action will be kept in the container file.
47 The statement will be signed and dated by the evaluator.

5.3 DETERMINATION OF ADEQUATE KNOWLEDGE FOR STORAGE

On completion of any step after the documentation assessment, Tank Farms could request SWAS to issue a SDAR for any waste container or waste stream that is believed to have adequate documentation to demonstrate that the waste has been designated according to WAC 173-303-070 and that the waste meets the acceptance criteria requirements (WHC 1991).

The SDAR specifies the waste type, the hazardous constituents in the waste (if any), and the designation of the waste according to WAC 173-303-070 (if the waste is designatable). The SDAR will be applicable to either a specific container or a complete waste type. In the first case, the SDAR is called a 'specific' SDAR. The package identification number(s) (PIN) for the container(s) are specified on the specific SDAR. In the second case, the SDAR is called an 'open' SDAR. It can be used for any container that meets the criteria on the SDAR.

The following steps will be followed to make and evaluate a request.

- Step 1. A waste storage/disposal request (WSDR) will be completed for the container(s). Tank Farms waste characterization data will be referenced or placed in each container field file belonging to the waste stream.
- Step 2. The WSDR and Tank Farms field file(s), as well as supporting documentation referenced in the field file, will be transmitted to SWAS for evaluation.
- Step 3. SWAS will answer the question, "*Does adequate knowledge exist for designation according to this WAP?*", by comparing the documentation to WAC 173-303-070 and waste acceptance requirements (WHC 1991). The designation criteria for meeting WAC 173-303-070 are provided in Appendix A. Table 5.1 contains the analytical testing used in the designation process.

If the answer to the question is 'YES', SWAS will issue a notice of adequate documentation to Tank Farms (and other organizations as applicable). The appropriate SDAR to be used for the container or waste stream and the specific container PINs allowed will be specified. If an SDAR is not currently written for the waste, an SDAR will be written.

If the answer to the question is 'NO', the waste has not been characterized sufficiently for storage, and a notice of rejection will be issued. The notice of rejection must be accompanied with a list of the criteria that has not been met and the required actions needed to meet the criteria.

- Step 4. On receiving the notice of adequate documentation, Tank Farms will prepare the waste for shipment as specified in the SDAR. Preparations could include packaging and labeling. If the container is already located at the CWC, shipment will not be necessary. In the

1 case of a rejection, the required activities to meet the acceptance
2 criteria will be performed and the request will be resubmitted.
3
4

5 5.4 PRELIMINARY WASTE SORTING

6
7 Tank Farms will perform a preliminary paperwork sort of the containers based
8 on the backlog waste documentation. The waste container files will be sorted
9 into waste types.

10
11 Preliminary sorting will be performed using information provided in SWITS and
12 the BWIS. During preliminary sorting, containers will be placed in one of the
13 following five waste types based on the description of each waste type in
14 Section 4.3:

- 15
- 16 • Debris
- 17 • Soil
- 18 • Containerized Liquids
- 19 • Non-Containerized Liquids
- 20 • LLW
- 21 • Special Case
- 22

23 Containers with a mixture of waste types will be flagged to ensure that
24 confirmation or completion of designation is performed on all waste types in
25 the container.
26

27 5.5 DOCUMENTATION ASSESSMENT

28
29 The documentation assessment will review all process and characterization
30 knowledge available on the backlog waste at the CWC.
31

32
33 To consistently and objectively assess all waste containers, a 'container
34 waste documentation checklist' will be used (Appendix B). This checklist will
35 assist Tank Farms in determining the following:
36

- 37 • The segregation of containers into waste streams
- 38
- 39 • If there is sufficient knowledge about the container for designation
40 at this stage of the process
- 41
- 42 • Containers within a waste stream that require flagging for special
43 management.
44

45 5.5.1 Waste Stream Segregation

46
47 During the documentation assessment, the information on the BWIS files
48 (including the waste type) will be verified and the waste types will be
49 divided into waste streams.
50
51

1 Segregation will occur using information contained in field files and various
2 characterization documents (e.g., tank characterization analysis or process
3 history documents). The waste stream criteria and Tank Farms Complexes used
4 for the segregation are defined in Section 4.3. Segregation will take place
5 based on the following criteria:

- 6
- 7 • **Debris** will be divided into waste streams based on the Tank Farm
8 Complex.
- 9
- 10 • **Soil** will be divided into waste streams based on the waste generating
11 activity (diesel spill, contamination control, or special case). All
12 soil that has been designated as F-Listed during the backlog process
13 will be divided by Tank Farm Complex.
- 14
- 15 • **Containerized Liquids** will be divided into the following streams:
16
 - 17 - Aerosols
 - 18 - Paints
 - 19 - Acids
 - 20 - Dangerous liquids
 - 21 - Oils
- 22
- 23 • **LLW** will be considered one waste stream.
- 24
- 25 • **Special Case** will be divided into streams based on the type of
26 activity that generated the waste and the location where the waste was
27 generated.
- 28

29 (Note that it is possible that a waste stream will consist of a single
30 container.)

31
32 Further division of the previously defined waste streams might occur for
33 logistical purposes (e.g., debris boxes could be segregated from debris drums
34 because of different management protocol). Other waste streams could be
35 identified as the confirmation or completion of the backlog waste designation
36 process progresses. New waste streams will be identified according to
37 physical and chemical characteristics.

38
39 Each waste stream will be identified by a 10-digit sorting number that will
40 clearly identify the waste stream(s) in the container. After all containers
41 have been assigned a sorting number, the sorting number will be entered into
42 SWITS.

43 44 45 **5.5.2 Characterization Information Criteria**

46
47 During the documentation assessment, all available documentation will be
48 reviewed to determine if a waste stream is characterized sufficiently to allow
49 for storage of the container(s) at the CWC. If a determination is made that
50 sufficient documentation for storage exists, a SDAR can be requested in
51 accordance with the steps outlined in Section 5.3.

1 Sources of information used during the documentation assessment include the
2 individual field (container) files and all other supporting documentation.
3 The field file contains the specific information on a file such as container
4 inventory sheets, MSDSs, and sampling and analysis results. Supporting
5 documentation is all of the information available for a waste stream including
6 log books and procedures. The following sources represent typical sources of
7 characterization information.

8
9 **5.5.2.1 Interviews.** Interviews could be used to determine if chemicals known
10 to be present were used, if procedures were used as written or if deviations
11 were allowed, or to verify the events in a logbook.

12
13 **5.5.2.2 Logbooks.** Logbooks could contain the documentation of activities of
14 an individual or could be kept to document the activities of a specific
15 project. Logbooks could be reviewed to identify waste streams and gain
16 information supporting waste designation.

17
18 **5.5.2.3 Procurement Records.** Procurement records could indicate a specific
19 application of products at a given site and/or a given job. Use of
20 procurement records is acceptable only for waste streams that were generated
21 directly from the use of a product (e.g., solvents, absorbents, etc.).

22
23 **5.5.2.4 Analytical Results.** Analytical results could provide concentration
24 of constituents present in samples. The usefulness of analytical results
25 depends on the representativeness of a sample to the media it was sampled
26 from, its correlation to a specific stream, and the constituents that were
27 analyzed. If only one or two process control constituents were analyzed, the
28 target analytes could be used to support other documentation. If the
29 concentrations of the analyzed constituents match logbook or operating
30 records, then credibility could be given to other logbook/operating record
31 entries for containers within a waste stream.

32
33 **5.5.2.5 Qualified Analytical Data.** Qualified analytical data could be used
34 for characterization. Reasons for qualifying data include having missing or
35 incomplete chain of custody or sampling plans or exceeding holding times.
36 Data must be identified with a specific container or waste stream. Without
37 validated data, sampling and analysis might be required to be repeated.

38
39 **5.5.2.6 Radiation Work Packages.** Radiation work packages could contain
40 information regarding waste generating activities at the Tank Farms.

41
42 **5.5.2.7 Procedures and/or Methods.** Procedures and/or methods could give
43 specifics as to how an activity was or will be performed. This could allow
44 for either a determination of the amount of waste generated or
45 characterization of the waste. Documented evidence must exist indicating that
46 the procedures and/or methods were followed. Documented evidence should be
47 initialed and dated.

48
49 **5.5.2.8 Process Flow Charts.** Process flow charts could show chemical input
50 and output of various streams. Process flow charts can be studied along with
51 the reactions that occur during processing to determine constituents as well
52 as constituent concentrations. Process flow charts must show a specific

1 application at a specific site and/or for a given job to be acceptable as
2 process knowledge.

3
4 **5.5.2.9 Inventory Sheets.** Inventory sheets listing the container contents
5 could be produced as a container of waste is generated. These sheets could be
6 signed and dated as a certification of the contents.

7
8 **5.5.2.10 Vendor Information.** Vendor information (i.e., MSDSs) could provide
9 chemical data that could be used to characterize dangerous waste. The MSDSs
10 must be identified with a specific application at a specific site and/or for a
11 given job to be acceptable as process knowledge. If the MSDS does not give
12 enough information to make this determination, the manufacturer of the product
13 could be contacted and should be able to provide additional information on
14 chemical constituents and concentrations.

15 16 17 **5.5.3 Identification of Containers Requiring Special Handling**

18
19 Those containers that do not have enough information to complete the
20 documentation assessment or for which questions exist as to the validity of
21 the characterization information will be flagged to ensure that further
22 actions are taken to evaluate the container. These actions should be
23 documented in accordance with Section 5.2.

24
25 All boxes must be flagged for visual inspection because real-time radiography
26 (RTR) for these boxes might not be possible.

27 28 29 **5.6 PHYSICAL CONFIRMATION OR COMPLETION OF DESIGNATION**

30
31 The intent of physical analysis is to ensure the following.

- 32
33 • The waste is described accurately in the waste management
34 documentation to ensure that the container has been assigned to the
35 correct waste stream.
- 36
37 • The container does not contain any prohibited articles as described in
38 Section 3.1 or any other items that are indicative of a different
39 waste stream.
- 40
41 • All containers with containerized and noncontainerized liquids are
42 identified.

43
44 If, after physical analysis, Tank Farms believes enough information exists to
45 request a SDAR for the waste stream, SWAS can be consulted in accordance with
46 Section 5.3.

1 **5.6.1 Physical Screening**

2
3 Physical screening provides a mechanism for determining those containers that
4 need to be opened for visual inspection. Screening methods used consist of
5 physical measurements and nondestructive examination by RTR.

6
7 **5.6.1.1 Physical Measurements.** The CWC will validate the weight and dose
8 rate noted in the backlog waste documentation.

9
10 A difference in measured weight greater than 10 percent of the documented
11 weight will cause the container to be flagged for visual inspection. Weights
12 can be expected to vary because initial measurements were obtained in the
13 field.

14
15 The measured dose rate will be compared to the documented dose rate to find
16 dose rate anomalies. A graduated approach will be used to determine if visual
17 inspection needs to be done on the container. For containers with documented
18 dose rates less than or equal to 5 mrem/hr, if the measured dose rate varies
19 by more than 100% of the documented dose rate, the container will be flagged
20 for visual inspection. For containers with documented dose rates greater than
21 5 mrem/hr, if the measured dose rate varies by more than 5 mrem/hr of the
22 documented dose rate, the container will be flagged for visual inspection.

23
24 **5.6.1.2 Nondestructive Examination.** Using RTR equipment, the waste container
25 will be viewed and the observed contents will be compared to available
26 documentation. The NDE technician will record NDE results on a NDE checklist
27 (Appendix C, *Backlog Waste Real-Time Radiography Guidance*). The NDE also will
28 be used to obtain information that does not impact confirmation or completion
29 of designation, but is applicable to long-term management of the waste (i.e.,
30 determination of the presence of a liner, percentage of void space, etc.).
31 The checklist will be maintained in the container field file.

32
33 The RTR of the waste in a container will result in the following actions.

- 34
35 • No inconsistencies are found that conflict with the documentation for
36 the waste stream. No further action is required for physical analysis
37 of the container.
38
39 • Inconsistencies are identified between the RTR and the inventory
40 sheets for the container but the waste codes for the container do not
41 change and the other containers in the waste stream are not affected.
42 The change will be made on the inventory sheet and on the low-level
43 waste storage/disposal record. Visual inspection of the container is
44 not required.
45
46 • Inconsistencies are identified that could affect the waste codes for
47 the container or for the waste stream. Further characterization
48 information could be gathered to substantiate the designation of the
49 waste. If the information is not sufficient to make this
50 determination, the container must be opened for visual inspection.
51

- Inconsistencies are found that show an undocumented mixture of waste streams within the container. The inconsistency will be noted and a determination will be made as to the applicability to other containers in the waste stream.
- Undocumented free liquids are found in the container (also referred to as uncontaminated liquids). Characterization of the liquids will be performed based on the waste stream criteria in Section 6.0.
- The RTR could reveal containerized liquids. When containerized liquids are identified during RTR, the container will be flagged for resorting to remove and characterize the liquid. On removal of the containerized liquid, the container will continue through the process.

Other anomalies not identified here or in the specific protocol in Section 6 will be determined at the time of RTR by the evaluator. The reason for the action(s) taken will be documented in accordance with Section 5.2.

5.6.2 Visual Inspection of Container Contents

The criteria for performing visual inspections are explained. The actions to be taken when a container can not be opened also are described.

5.6.2.1 Visual Inspection Criteria. The container will be opened for a visual inspection of the waste and the contents will be compared to the documentation provided.

During the visual inspection for all waste streams except soils, the entire content of the container will be emptied and inspected. Visual inspection of soils will consist of a cursory inspection with an attempt to identify inconsistencies that might be under the surface by mixing or digging the soil.

Visual inspection of the waste in a container will result in the following actions.

- No inconsistencies are found that conflict with the documentation for the waste stream. No further action is required.
- Additional characterization information gathered after visual inspection of the waste could result in sufficient information to determine whether additional waste codes need to be added to the container.
- Visual inspection could identify waste that needs chemical analysis. The container will be flagged and the appropriate chemical analysis will be performed.

5.6.2.2 Limitations on Visual Inspection. In keeping with the ALARA precept (DOE Order 5400.5), containers will not be opened for visual inspection if, by so doing, it could expose personnel to unacceptable risks of exposure to radionuclides and/or dangerous substances.

1 As a rule of thumb, containers with external dose rates greater than
2 10 mrem/hr will not be opened. Deviations from this rule can be made by the
3 health physics technician (HPT) as allowed by the radiation work permit (RWP)
4 for the job. The decision to deviate will be based on the waste type and the
5 available information for the container. The deviation must be documented in
6 the container field file and signed and dated by the HPT.

8 The industrial hygienist (IH) will make the decision that a container will not
9 be opened because of a chemical hazard. The decision must be documented in
10 the field file and signed and dated by the IH making the decision.

12 If a container cannot be opened for ALARA reasons, a worst-case designation
13 will be performed based on the documentation available for the container as
14 well as the waste stream. If this determination cannot be made, Ecology will
15 be notified and an action plan for managing the container will be developed.
16 This deviation will be made in accordance with Section 1.4.

19 5.6.3 Quality Control of Physical Analysis

21 Containers flagged for visual examination will be used to determine the
22 effectiveness of the physical screening process. At least 10% of the
23 containers from the screening process must be verified through the visual
24 examination process. If at least 10% of the containers are not flagged for
25 visual inspections, additional containers will be chosen at random to make up
26 the 10%. (The only exception to this process is for soil containers, which
27 will not undergo RTR. The quality control criteria for these soil containers
28 is found in Section 6.2.1.)

30 During visual inspection, the container contents will be noted and compared to
31 the inventory in the field file and the results of the screening process. If
32 waste is found during the visual examination process that (1) was not
33 identified by the physical screening and (2) would have caused the waste
34 container or the waste stream to be erroneously designated, Tank Farms must
35 determine an alternative process for identifying these inconsistencies and
36 notify Ecology. The process of obtaining an addendum to this WAP described in
37 Section 1.4 will be followed.

40 5.7 CHEMICAL CONFIRMATION OR COMPLETION OF DESIGNATION

42 The intent of chemical confirmation or completion of designation is to ensure
43 the following:

- 45 • The waste stream is adequately characterized for current management of
46 the container for storage at the CWC.
- 48 • The waste stream does not contain any prohibited contaminants or
49 exhibit attributes that are prohibited for storage at the CWC.

- Provide additional characterization information for confirmation or completion of designation and possible updating of Tank Farms' waste stream designation.

Chemical analysis will be accomplished using field testing equipment, nonobtrusive testing such as x-ray fluorescence, headspace gas analysis, or laboratory chemical analysis. Chemical analysis consists of field screening and segregation, field analysis, and laboratory analytical analysis.

Containers will be selected randomly from a waste stream. Containers that are already opened for other reasons could be used as the containers on which chemical analysis will be performed. However, at least 25% of the samples must be obtained from containers that were not flagged previously. The amount of containers selected from any single waste stream will be based on the criteria in Section 5.7.1.

5.7.1 Selection of Sample Set

The contents of the waste streams must be tested per Section 6.0 for the presence of dangerous constituents to confirm or complete the backlog waste designation. The backlog containers have been divided into several groups that represent different waste streams for which statistical inferences are desired.

The DOE-RL/Westinghouse Hanford will test whether 95% or more of the containers in a waste stream grouping do not contain significant discrepancies. This relates to a Type I decision error of 5% or less (this is the probability of falsely concluding that less than 95% of the containers contain significant discrepancies). Type II error rate of 20% or more will be used to test if the true proportion of containers that contain significant discrepancies is 70% or less. (A Type II error is the probability of falsely concluding that less than 95% of the containers do not have significant discrepancies.)

In statistical terminology, the DOE-RL/Westinghouse Hanford will test the null hypothesis that 95% or more of the containers do not contain significant discrepancies against the alternative hypothesis that less than 95% of the containers do not contain significant discrepancies. The Type I error will be 5% or less with the power of the test being 80% or greater if the true proportion is 70% or less.

Mathematically this is stated as:

DOE-RL/Westinghouse Hanford will test the proportion of containers, p , such that under the null hypothesis, $H_0: p \geq .95$

and under the alternative hypothesis, $H_A: p < .95$.

The test is designed so that the Type I error, α , will be .05 or less and the Type II error, β , will be .20 or less at $p = .8$ under the alternative hypothesis.

This testing situation was resolved by designing a hypogeometric model that tracks the number of containers in a sample of observations that are tested and declared to be free of significant discrepancies. Let X be the number of drums in a sample of size n that are declared to be free of significant discrepancies. Then a test of the form

if $X \geq k$ fail to reject H_0
and if $X < k$ accept H_A

is most powerful for testing H_0 versus H_A under the hypogeometric model. k is the critical number of containers. It is the number of containers in a sample set that must not have any significant discrepancies in order to accept the null hypothesis.

Based on the developed test, the appropriate sample size, n , is given as well as the critical value k for each waste stream group by range as follows:³

- For waste streams ≥ 400 ; ($n = 13$, $k = 11$) or ($n = 35$, $k = 28$).
- For waste streams < 400 and ≥ 50 ; ($n = 13$, $k = 11$) or ($n = 16$, $k = 13$).
- For waste streams < 50 ; ($n = 4$, $k = 0$) or ($n = 4$, $k = 1$ and $n = 4$, $k = 0$). (If the sampling shows no significant discrepancies, then we fail to reject H_0 . If 1 container is found to have a significant discrepancy, then an additional four samples must be taken.)

In the first two cases, either sample size can be selected. However, should the waste stream not meet the specifications of the test, no statistical inferences can be made and the waste stream will be addressed on a container by container basis. If the specifications of the test are not met, the container will be flagged and the guidance found in Section 5.1 will be followed. All containers in the waste stream will be addressed to determine if a sorting error occurred. If a sorting error did not occur, either all other containers in the waste stream will be given the conservative designation based on the previous sample results or each container will be sampled.

If chemical analysis indicates that a waste stream requires additional waste code designation(s), the applicability of applying the waste code designation(s) to other containers within the stream will be addressed. This activity would not qualify as a significant discrepancy. If no correlation can be determined among the chemical analysis results, waste codes, and generating activity, the containers either will be sampled to determine the applicability of additional waste codes or all containers within a stream will be conservatively designated.

³ Due to the discrete distributions, the Type I and Type II numbers may not be exact, but will be calculated to be reasonably close.

5.7.2 Screening and Segregation

All containers selected for chemical confirmation or completion of designation will be screened and the contents will be segregated into groups using radioactive characteristics, visual inspection for obvious contamination, pH, and low-range (1-20 ppm) benzene analyzer tubes (used to easily detect the possibility of high concentrations of diesel contamination). The screening and segregation step provides a quick determination of the types of contaminants potentially present in the waste and allows the field personnel to make sampling decisions using the criteria set forth in Section 6.0.

5.7.3 Characterization Information Determination

After the waste in a container has been segregated using field screening techniques, Tank Farms must determine if enough characterization information exists to adequately designate the specific waste groups. The SWAS must be consulted if Tank Farms has decided not to sample a specific group of waste to ensure no further information is needed before placing the waste back into the container. Field testing could be used to confirm knowledge, but field testing methods cannot be the sole basis for determining that a waste is not designated dangerous waste.

A waste container might not require 'full' sampling for characterization. In most cases, sampling will be performed based on the predetermined fingerprint parameters for each waste type (Section 6.0). For example, on inspection of the contents of a container, a sludge weight is observed. Based on the Tank Farms initial characterization of the material and the fact that sludge weights could only be generated from one source on the Hanford Facility, the process is complete.

5.7.4 Laboratory and Field Analytical Criteria

Currently, HAZCAT⁴ kits and other EPA-approved field testing methods and equipment are used to confirm the identity of wastes. Field analysis may be used for the following:

- Confirming whether a waste is ignitable, corrosive, or reactive.
- Confirming the presence of organic or inorganic constituents.

Field analyses are not adequate to demonstrate that a waste does not have one of the above characteristics or constituents.

If additional capabilities for field analysis are acquired, an addendum to this WAP will be submitted in accordance with the requirements of Section 1.4. The submittal must include specific criteria and application of the technology to backlog waste.

⁴HAZCAT is a tradename of Haztech Systems, Inc.

1 Laboratory testing criteria are specified in Section 7.0

2
3 The acceptable error tolerance for analytical analysis is ± 20 percent of the
4 spike. If a laboratory analysis falls into this area, the sample QA/QC will
5 be assessed to determine the acceptability of the analytical result. A
6 decision of regulatory status will be based on this assessment and the
7 relative difference between the analytical results and the regulatory limit.
8
9

10 5.7.5 Limitations on Chemical Sampling

11
12 In keeping with ALARA, containers will not be opened for sampling if, by so
13 doing, opening the container could expose personnel to unacceptable risks of
14 exposure to radionuclides and/or dangerous substances.
15

16 As a rule of thumb, containers with external dose rates greater than
17 10 mrem/hr will not be opened. Deviations from this rule can be made by the
18 HPT as allowed by the RWP for the job. The decision to deviate will be based
19 on the waste type and the available information for the container. The
20 deviation must be documented in the container field file and signed and dated
21 by the HPT.
22

23 The IH will make the decision that a container will not be opened because of a
24 chemical hazard. The decision must be documented in the field file and signed
25 and dated by the IH making the decision.
26

27 If a container is chosen for random sampling and it cannot be sampled for
28 ALARA reasons, another container will be chosen in its place.
29

30 If a container cannot be opened for ALARA reasons, a worst-case designation
31 will be performed based on the documentation available for the container as
32 well as the waste stream. If this determination cannot be made, Ecology will
33 be notified and an action plan will be developed for managing the container.
34 This deviation will be made in accordance with Section 1.4.
35
36

37 5.7.6 Quality Control of Chemical Analysis

38
39 Field analysis results are confirmed by performing SW-846 protocol laboratory
40 testing (EPA 1986) on 10 percent of the waste samples. Quality control on
41 laboratory analytical sampling will be performed in accordance with
42 Section 7.0 of this WAP.
43

Figure 5-1. Confirmation or Completion of Designation Process.

Table 5.1. Analytical Testing for Completion of Designation.

Designation criteria	Analysis and information required
Discarded chemical products	Process knowledge
Dangerous waste sources	SVOA, VOA, and process knowledge
Toxicity	SVOA, VOA, ICP metals, anions, process knowledge
Carcinogenic	SVOA, VOA, ICP metals, anions, process knowledge
Persistence	TOX
Ignitability	Flashpoint Field flammability testing Field oxidizer testing
Corrosivity	pH
Reactivity	Analytical cyanide/sulfide field reactivity testing
TCLP	ICP metals, SVOA, VOA
PCB	PCB; process knowledge

NOTE: TCLP will not necessarily be used as a basis for designation. A TCLP analysis could be taken on a percentage of the samples with the primary use of the results being for future treatment and disposal of the waste [i.e., to meet the Land Disposal Restriction Requirements (40 CFR 268 and WAC 173-303)].

SVOA = semivolatile organic analysis.

VOA = volatile organic analysis.

ICP = inductively coupled plasma.

TOX = total organic halogens.

PCB = polychlorinated biphenyls.

TCLP = toxicity characteristics leaching procedure.

6.0 WASTE TYPE SPECIFIC PROTOCOL

This section describes the specific physical/chemical protocol that will be followed for confirmation or completion of designation of each waste type.

Sampling of each waste type will be performed using the sampling procedure referenced in Section 7.0. Analytical methods will be performed in accordance with Section 7.0, Table 7.1, except in those cases in which a modified method must be used due to the radioactivity associated with the sample. Each waste type and associated streams are defined in Section 4.0.

6.1 DEBRIS

Debris will be processed through the physical/chemical analysis protocol by waste stream. Figure 6-1 shows the basic process in a flow diagram.

6.1.1 Physical Analysis Protocol

OBJECTIVE: The following is a list of objectives:

- Identify containers with a previously unidentified mixture of waste streams
- Identify containers with free liquids for proper management of the containers
- Identify containers with containerized liquids for removal and characterization of the internal container
- Identify containers with lead to document the lead in the field file and to add the D008 waste code
- Identify containers with undocumented waste for proper management of the container.

PROTOCOL: Two options are possible for these containers: 100% of the debris containers either will go through RTR (Option 1) or a combination of RTR(drummed wastes) and visual examination (boxes) (Option 2). The rationale for analyzing 100% is that debris containers have the highest probability of containing waste stream mixtures that would affect the current designation and possible management of the container.

DRUMMED AND BOXED WASTE (OPTION 1): Physical screening of containerized wastes will consist of RTR. During the RTR process, Tank Farms will flag containers under the following conditions and perform the required actions.

- Containers that contain lead or lead substances for addition of the D008 waste code (lead used as shielding is considered to be part of the container and will not be assigned the D008 code. The lead will be documented as being used as shielding.)
- Containers that contain free liquids for further characterization and management in accordance with Section 6.4.
- Containers containing containerized liquids for removal of the liquid container and management of the liquid in accordance with Section 6.4.
- Containers that contain debris inconsistent with that which is noted in the field file will not be opened unless they exhibit attributes that are indicative of a waste stream mixture. Additional characterization could be required.
- Containers that contain small quantities of soil for the possible addition of waste codes as applicable based on the characterization of soil from that complex in accordance with Section 6.2. A low-range (1-20 ppm) benzene analyzer tube will be used to determine the applicability of the diesel fuel soil streams designation for the container.

On identifying a container that meets any of the above criteria, Tank Farms will administratively 'flag' the container for further activities. For flagged containers that might contain mixtures of waste streams, Tank Farms will consult characterization information to determine the appropriate waste codes (if any). If insufficient documentation exists to accurately determine (1) whether a container contains a mixture or (2) the identity of the streams, the container must undergo visual inspection.

Visual examination of the container will be performed to determine if the container truly has a mixture of waste streams. During visual examination, Tank Farms will inspect the waste to determine if any indications of additional waste streams exist that would require additional waste codes to be placed on the container (such as HEPAs or batteries).

Also during the visual inspection, Tank Farms will note any discrepancies between the waste description that is noted from the RTR and that identified during the inspection. Any container that (1) is noted as possibly containing other contaminants and (2) does not have characterization information for the contaminants will be flagged for chemical analysis. Analysis will be performed in accordance with the chemical analysis protocol for that waste type.

BOXED WASTE (OPTION 2): Because of the possible limitations in RTR equipment, boxes might not be screened by RTR before visual inspection. In this case, all boxes will be visually examined. During visual

inspection, Tank Farms will sort through the boxes and flag containers under the following conditions and perform the required actions.

- Containers that contain lead or lead substances for addition of the D008 waste code (Lead used as shielding is considered to be part of the container and will not be assigned the D008 code. The lead will be documented as being used as shielding.)
- Containers that contain free liquids for further characterization and management in accordance with Section 6.4.
- Containers containing containerized liquids for removal of the liquids and management of the liquid in accordance with Section 6.4.
- Containers that contain debris inconsistent with that which is noted in the field file will not be opened unless they exhibit attributes that are indicative of a waste stream mixture. Additional characterization might be required.
- Containers that contain small quantities of soil for the possible addition of waste codes as applicable based on the characterization of soil from that complex in accordance with Section 6.2. A low-range (1-20 ppm) benzene analyzer tube will be used to determine the applicability of the diesel fuel stream designation for the container.

On identifying a container that meets any of the above criteria, Tank Farms will administratively 'flag' the container for further activities. For flagged containers that might contain mixtures of waste streams, Tank Farms will consult characterization information to determine the appropriate waste codes (if any). If insufficient documentation exists to accurately determine (1) whether a container contains a mixture or (2) the identity of the streams, the container must undergo chemical analysis.

6.1.2 Chemical Analysis Protocol

OBJECTIVE: The following is a list of objectives:

- Identify containers with a previously unidentified mixture of waste streams.
- Provide characterization information for the confirmation or completion of designation for the containers.

PROTOCOL: The sample set of containers to be chemically sampled will be determined in accordance with Section 5.7.1.

A container that is flagged for chemical analysis will be emptied and segregated into the following groups using a geiger mueller counter and visual examination:

- (1) No detectable radioactivity above background and no observable chemical contamination
- (2) Detectable radioactivity, but no observable chemical contamination and having a field pH ≥ 5 and < 9
- (3) Detectable radioactivity, but no observable chemical contamination and having a field pH ≥ 9 or < 5
- (4) Debris with observable oil contamination
- (5) Debris with observable paint contamination
- (6) Debris contaminated with other solids or liquids other than specified above.

Each group will be sampled for the analytes listed in Table 6.1.

6.1.3 Management Protocol

Once all analyses have been completed for a waste stream, each container will be managed based on the results. Possible waste streams and designations include the following:

- (1) No detectable radioactivity above background and no observable chemical contamination - For the purposes of this WAP, this waste will be managed as F-Listed due to the mixture rule and designated in accordance with Section 4.3.2 and Table 4.4.
- (2) Detectable radioactivity, but no observable chemical contamination and having a field pH ≥ 5 and < 9 - For the purposes of this WAP, this waste will be managed as F-Listed due to the mixture rule and designated in accordance with Section 4.3.2 and Table 4.4.
- (3) Detectable radioactivity, but no observable chemical contamination and having a field pH ≥ 9 or < 5 - For the purposes of this WAP, this waste will be managed as containing F-Listed waste; additional waste codes will be added in accordance with this characterization effort if applicable. If characterization efforts indicate additional waste codes are necessary per WAC 173-303-070, Section 4.3.2 and Table 4.4 will be updated.
- (4) Debris with observable oil contamination - In addition to the applicability of the F-Listed designation previously discussed, additional waste codes will be added and Section 4.3.2 and Table 4.4 will be updated based on characterization information obtained during this effort.
- (5) Debris with observable paint contamination - In addition to the applicability of the F-Listed designation previously discussed,

1 additional waste codes will be added and Section 4.3.2 and Table 4.4
2 will be updated based on characterization information obtained
3 during this effort.
4

- 5 (6) Debris Contaminated with Other Solids or Liquids - In addition to
6 the applicability of the F-Listed designation previously discussed,
7 additional waste codes will be added and Section 4.3.2 and Table 4.4
8 will be updated based on characterization information obtained
9 during this effort.
10

11 The HEPA filters and combination mask filters will be designated using
12 previously obtained characterization information unless these filters are
13 known to contain additional contaminants.
14

15 For any container that has a mixture of waste streams, the designation will be
16 based on the designation of all waste streams. Samples will not necessarily
17 be taken from each waste stream in the container. Analysis results from the
18 same waste stream might be used for other containers in the waste stream.
19
20

21 6.2 SOILS 22

23 The waste type soil will be processed through the physical/chemical analysis
24 protocols by waste stream. Figure 6-2 shows the basic process in a flow
25 diagram.
26

27 6.2.1 Physical Analysis Protocol 28

29 OBJECTIVE: The following is a list of objectives:
30

- 31 • Identify containers with a previously unidentified mixture of waste
32 streams.
33
- 34 • Identify containers with free liquids for proper management of the
35 containers.
36
- 37 • Identify containers with containerized liquids for removal and
38 characterization of the internal container.
39
- 40 • Identify containers with lead to document the lead in the field file
41 and to add the D008 waste code.
42
- 43 • Identify containers with undocumented waste for proper management of
44 the container.
45
46

47 PROTOCOL: Soil containers will be processed through one of the two options
48 described in this section. The first option describes an RTR
49 process similar to the process described in the debris section.
50 The second option describes a process using physical
51 characteristics and visual inspection to fulfill the objectives.
52 The rationale for having two options is that RTR equipment might

1 not be available that can adequately penetrate the entire waste
2 container. The probability of soil containers with mixtures is
3 very low based on the procedures used for contamination control
4 and spill cleanup.
5

6 OPTION 1 (RTR): Physical screening of drummed wastes will consist of
7 50% of the containers being processed through RTR. During the RTR
8 process, Tank Farms will flag containers under the following conditions
9 and perform the required actions.
10

- 11 • Containers that contain lead or lead substances for addition of the
12 D008 waste code (Lead used as shielding is considered to be part of
13 the container and will not be assigned the D008 code. The lead will
14 be documented as being used as shielding.)
15
- 16 • Containers that contain free liquids for further characterization
17 and management in accordance with Section 6.4.
18
- 19 • Containers containing containerized liquids for removal of the
20 liquids and management of the liquid in accordance with Section 6.4.
21
- 22 • Containers that contain waste inconsistent with that which is noted
23 in the field file will not be opened unless the containers exhibit
24 attributes that are indicative of a waste stream mixture.
25 Additional characterization might be required.
26

27 On identifying a container that meets any of the above criteria, Tank
28 Farms will administratively 'flag' the container for further
29 activities. For flagged containers that might contain mixtures of
30 waste streams, Tank Farms will consult characterization information to
31 determine the appropriate waste codes (if any). If insufficient
32 documentation exists to accurately determine (1) whether a container
33 contains a mixture or (2) the identity of the streams, the container
34 must undergo visual inspection.
35

36 Visual examination of the container will be performed to determine if
37 the container truly has a mixture of waste streams. During visual
38 examination, Tank Farms will inspect the waste to determine if any
39 indications of additional waste streams exist that would require
40 additional waste codes to be placed on the container (such as HEPAs or
41 batteries).
42

43 Also during the visual inspection, Tank Farms will note any
44 discrepancies between the waste description that is noted from the RTR
45 and that identified during the inspection. Any container that (1) is
46 noted as possibly containing other contaminants and (2) does not have
47 characterization information for the contaminants will be flagged for
48 chemical analysis. Analysis will be performed in accordance with the
49 chemical analysis protocol for that waste type.
50

51 OPTION 2 (Physical Measurements): Because of the possible limitations
52 in RTR equipment, soil containers might not be able to be adequately

1 screened using RTR. In this case, 100% of the soil containers will be
2 screened using physical characteristics. Each container's dose rate
3 and weight will be measured and compared to information that appears in
4 the field file. Tank Farms will identify the following conditions:

- 5
- 6 • Containers that do not meet the dose rate comparison criteria
- 7 specified in Section 5.6.1.1.
- 8
- 9 • Containers that do not meet the weight comparison criteria specified
- 10 in Section 5.6.1.1.
- 11

12 On identifying a container that meets any of the above criteria, Tank
13 Farms will administratively 'flag' the container for further
14 activities. For flagged containers that might contain mixtures of
15 waste streams, Tank Farms will consult characterization information to
16 determine the appropriate waste codes (if any). If insufficient
17 documentation exists to accurately determine (1) whether a container
18 contains a mixture or (2) the identity of the streams, the container
19 must undergo chemical analysis.

20 Ten percent of the soil containers must be opened and visually verified
21 as a quality control check of the physical characteristics. The
22 containers chosen for visual verification will be containers other than
23 those that have been flagged based on weight and dose rate
24 measurements. During visual inspection, Tank Farms will identify the
25 following conditions:

- 26
- 27
- 28 • Containers that contain lead or lead substances for addition of the
- 29 D008 waste code (Lead used as shielding is considered to be part of
- 30 the container and will not be assigned the D008 code. The lead will
- 31 be documented as being used as shielding.)
- 32
- 33 • Containers that contain free liquids for further characterization
- 34 and management in accordance with Section 6.4.
- 35
- 36 • Containers containing containerized liquids for removal of the
- 37 liquids and management of the liquid in accordance with Section 6.4.
- 38
- 39 • Containers that contain waste inconsistent with that which is noted
- 40 in the field file will not be opened unless the containers exhibit
- 41 attributes indicative of a waste stream mixture. Additional
- 42 characterization might be required.
- 43

44 If more than 10% of the containers chosen for quality control are
45 identified as having significant discrepancies, another 10% of the soil
46 containers from the same waste stream will be inspected visually. This
47 process will be repeated until the number of containers (chosen for
48 quality control that are identified through visual inspection as having
49 significant discrepancies) is less than 10% of the total containers that
50 have been checked for that waste stream or all containers have been
51 visually inspected. After a minimum of 20% of the containers has been
52 opened, instead of continuing to open containers, a conservative

1 designation could be applied to all remaining containers in the waste
2 stream.

3 4 5 **6.2.2 Chemical Analysis Protocol**

6
7 OBJECTIVE: The following is a list of objectives:

- 8
9
 - 10 • Identify containers with a previously unidentified mixture of waste
11 streams
 - 12 • Provide characterization information for the confirmation or completion
13 of designation for the containers.

14
15 PROTOCOL: The sample set of containers to be chemically sampled will be
16 determined in accordance with Section 5.7.1.

17
18 Those containers that are flagged for chemical sampling will be
19 visually examined and a determination as to possible contaminants
20 (other than from the mixture rule) will be made based on the following
21 groups:

- 22
23 (1) No observable chemical contamination and having a field
24 pH ≥ 5 and < 9
25
26 (2) No observable chemical contamination and having a field
27 pH ≥ 9 or < 5
28
29 (3) Soil with observable oil contamination
30
31 (4) Soil with observable paint contamination
32
33 (5) Soil contaminated with other possible solids or liquids not
34 specified above.

35
36 Each group will be sampled for the analytes listed in Table 6.2.
37 Although the analytical requirements will not be different between
38 F-Listed soil and soil containing diesel fuel spills, Tank Farms must
39 document any indications of soils that might contain diesel fuel spills
40 and apply any additional waste codes.

41 42 43 **6.2.3 Management Protocol**

44
45 Once all analyses has been completed for a waste stream, each container will
46 be managed based on the results. Possible waste streams and designations
47 include:

- 48
49 (1) No observable chemical contamination and having a field
50 pH ≥ 5 and < 9 - For the purposes of this WAP, this waste will be
51 managed as F-Listed due to the contained in rule and designated in
52 accordance with Section 4.3.2 and Table 4.4.

- (2) No observable chemical contamination and having a field pH ≥ 9 or < 5
- For the purposes of this WAP, this waste will be managed as containing F-Listed waste. Additional waste codes will be added in accordance with this characterization effort if applicable. If characterization efforts indicate additional waste codes, Section 4.3.2 and Table 4.4 will be updated.
- (3) Soil with observable oil contamination - In addition to the applicability of the F-Listed designation already discussed, additional waste codes will be added and Section 4.3.2 and Table 4.4 will be updated based on characterization information obtained during this effort.
- (4) Soil with observable paint contamination - In addition to the applicability of the F-Listed designation already discussed, additional waste codes will be added and Section 4.3.2 and Table 4.4 will be updated based on characterization information obtained during this effort.
- (5) Soil contaminated with other possible solids or liquids (this will be addressed in the field). - In addition to the applicability of the F-Listed designation previously discussed, additional waste codes will be added and Section 4.3.2 and Table 4.4 will be updated based on characterization information obtained during this effort.

For any container that has a mixture of waste streams, the designation will be based on the designation of all waste streams. Samples will not necessarily be taken from each waste stream in the container. Analysis results from the same waste stream could be used for other containers in the waste stream.

6.3 Low-Level Waste

The waste type LLW will be processed through the physical/chemical analysis protocols by waste stream. Figure 6-3 shows the basic process in a flow diagram.

6.3.1 Physical Analysis Protocol

OBJECTIVE: The following is a list of objectives:

- Identify containers with a previously unidentified mixture of waste streams.
- Identify containers with free liquids for proper management of the containers.
- Identify containers with containerized liquids for removal and characterization of the internal container.

- Identify containers with lead to document the lead in the field file and to add the D008 waste code.
- Identify containers with undocumented waste for proper management of the container.

PROTOCOL: 100% of the LLW containers will either go through RTR (drummed wastes) or visual examination (boxes). The rationale for performing this activity is that LLW containers have the highest probability of containing waste stream mixtures that could affect the current designation and possible management of the container.

DRUMMED AND BOXED (OPTION 1) WASTE: Physical screening of containerized wastes will consist of RTR. During the RTR process, Tank Farms will flag containers under the following conditions and perform the required actions.

- Containers that contain lead or lead substances for addition of the D008 waste code (Lead used as shielding is considered to be part of the container and will not be assigned the D008 code. The lead will be documented as being used as shielding.)
- Containers that contain free liquids for further characterization and management in accordance with Section 6.4.
- Containers with containerized liquids for removal of the liquids and management of the liquid in accordance with Section 6.4.
- Containers that contain debris inconsistent with that which is noted in the field file will not be opened unless the containers exhibit attributes that are indicative of a waste stream mixture. Additional characterization might be required.
- Containers that contain small quantities of soil for the possible addition of waste codes as applicable based on the characterization of soil from that complex in accordance with Section 6.2. A low-range (1-20 ppm) benzene analyzer tube will be used to determine the applicability of the diesel fuel soil stream designation for the container.

On identifying a container that meets any of the above criteria, Tank Farms will administratively 'flag' the containers for further activities. For flagged containers that might contain mixtures of waste streams, Tank Farms will consult characterization information to determine the appropriate waste codes (if any). If insufficient documentation exists to accurately determine (1) whether a container contains a mixture or (2) the identity of the streams, the container must undergo visual inspection.

Visual examination of the container will be performed to determine if the container truly has a mixture of waste streams. During visual

1 examination, Tank Farms will inspect the waste to determine if any
2 indications of additional waste streams exist that would require
3 additional waste codes to be placed on the container (such as HEPAs or
4 batteries).

5
6 Also during the visual inspection, Tank Farms will note any
7 discrepancies between the waste description that is noted from the RTR
8 and that identified during the inspection. Any container that (1) is
9 noted as possibly containing other contaminants and (2) does not have
10 characterization information for the contaminants will be flagged for
11 chemical analysis. Analysis will be performed in accordance with the
12 chemical analysis protocol for that waste type.

13
14 BOXED WASTE (OPTION 2): Because of the possible limitations in RTR
15 equipment, boxes might not be screened by RTR before visual inspection.
16 In this case, all boxes will be visually examined. During visual
17 inspection Tank Farms will sort through the boxes and flag containers
18 under the following conditions and perform the required actions.

- 19
20 • Containers that contain lead or lead substances for addition of the
21 D008 waste code (Lead used as shielding is considered to be part of
22 the container and will not be assigned the D008 code. The lead will
23 be documented as being used as shielding.)
- 24
25 • Containers that contain free liquids for further characterization
26 and management in accordance with Section 6.4.
- 27
28 • Containers containing containerized liquids for removal of the
29 liquids and management of the liquid in accordance with Section 6.4.
- 30
31 • Containers that contain debris inconsistent with that which is noted
32 in the field file will not be opened unless the containers exhibit
33 attributes that are indicative of a waste stream mixture.
34 Additional characterization might be required.
- 35
36 • Containers that contain small quantities of soil for the possible
37 addition of waste codes as applicable based on the characterization
38 of soil from that complex in accordance with Section 6.2. A low-
39 range (1-20 ppm) benzene analyzer tube will be used to determine the
40 applicability of the diesel fuel soil stream designation for the
41 container.

42
43 On identifying a container that meets any of the above criteria, Tank
44 Farms will administratively 'flag' the container for further
45 activities. For flagged containers that might contain mixtures of
46 waste streams, Tank Farms will consult characterization information to
47 determine the appropriate waste codes (if any). If insufficient
48 documentation exists to accurately determine (1) whether a container
49 contains a mixture or (2) the identity of the streams, the container
50 must undergo chemical analysis.

6.3.2 Chemical Analysis Protocol

OBJECTIVE: The following is a list of objectives:

- Identify containers with a previously unidentified mixture of waste streams.
- Provide characterization information for the confirmation or completion of designation for the containers.

PROTOCOL: The sample set of containers to be chemically sampled will be determined in accordance with Section 5.7.1.

A container that is flagged for chemical analysis will be emptied and segregated into the following groups using a geiger mueller counter and visual examination:

- (1) No detectable radioactivity above background and no observable chemical contamination
- (2) Detectable radioactivity, but no observable chemical contamination and having a field pH ≥ 5 and < 9
- (3) Detectable radioactivity, but no observable chemical contamination and having a field pH ≥ 9 or < 5
- (4) Debris with observable oil contamination
- (5) Debris with observable paint contamination
- (6) Debris contaminated with other solids or liquids other than specified above.

Each group will be sampled for the analytes listed in Table 6.3.

6.3.3 Management Protocol

Once all analyses has been completed for a waste stream, each container will be managed based on the results. Possible waste streams and designations include:

- (1) No detectable radioactivity above background and no observable chemical contamination - For the purposes of this WAP, this waste will be managed as F-Listed due to the mixture rule and designated in accordance with Section 4.3.2 and Table 4.4.
- (2) Detectable radioactivity, but no observable chemical contamination and having a field pH ≥ 5 and < 9 - For the purposes of this WAP, this waste will be managed as F-Listed due to the mixture rule and designated in accordance with Section 4.3.2 and Table 4.4.

- (3) Detectable radioactivity, but no observable chemical contamination and having a field pH ≥ 9 or < 5 - For the purposes of this WAP, this waste will be managed as containing F-Listed waste, additional waste codes will be added in accordance with this characterization effort if applicable. If characterization efforts indicate additional waste codes, Section 4.3.2 and Table 4.4 will be updated.
- (4) Debris with observable oil contamination - In addition to the applicability of the F-Listed designation previously discussed, additional waste codes will be added and Section 4.3.2 and Table 4.4 will be updated based on characterization information obtained during this effort.
- (5) Debris with observable paint contamination - In addition to the applicability of the F-Listed designation previously discussed, additional waste codes will be added and Section 4.3.2 and Table 4.4 will be updated based on characterization information obtained during this effort.
- (6) Debris Contaminated with Other Solids or Liquids - In addition to the applicability of the F-Listed designation previously discussed, additional waste codes will be added and Section 4.3.2 and Table 4.4 will be updated based on characterization information obtained during this effort.

The HEPA filters and combination mask filters will be designated using previously obtained characterization information unless these filters are known to contain additional contaminants.

For any container that has a mixture of waste streams, the designation will be based on the designation of all waste streams. Samples will not necessarily be taken from each waste stream in the container. Analysis results from the same waste stream could be used for other containers in the waste stream.

6.4 LIQUIDS

The waste type liquids will be characterized in accordance with the protocol described in this section. Figure 6-4 shows the basic process in a flow diagram.

6.4.1 Uncontainerized Free Liquids

The waste type Uncontainerized Free Liquids will be processed in accordance with this section. Uncontainerized free liquids might result from the physical screening processes of LLW, soil, and debris. Uncontainerized free liquids are not expected or allowed in any of the backlog waste except asbestos-containing wastes because of packaging protocols. Containers identified as containing uncontainerized liquids will be managed on a case-by-case basis.

1 OBJECTIVE: The following is a list of objectives.
2

- 3 • Identify containers with uncontainerized free liquids that also contain
4 asbestos. Verify that the liquid is water.
5
- 6 • Characterize the liquid from containers with uncontainerized free
7 liquids that do not contain asbestos.
8
- 9 • If possible, determine the type of liquid found in the container using
10 field analysis to minimize laboratory analysis.
11

12 PROTOCOL: Uncontainerized liquids will be handled in the following manner:
13

14 The first 20 asbestos containers (regardless of waste streams) identified
15 as containing uncontainerized free liquids based on physical protocols
16 and information found in the field files will be opened. The
17 uncontainerized free liquids will be confirmed as water by performing all
18 applicable field testing required by the HAZCAT manual. If field
19 sampling of all 20 containers reveals no inconsistencies (i.e., all free
20 liquids are water), no further containers that have documented
21 information on the presence of asbestos and the RTR identification of
22 uncontainerized free liquids will be opened for further characterization
23 of the free liquids. All containers that fall into this category will be
24 managed under the appropriate section with the exception that the waste
25 will be overpacked and sufficient absorbent added to absorb twice the
26 amount of free liquids will be placed in the annulus.
27

28 Containers that have been identified through RTR to have free liquids and
29 do not have associated documentation that indicates the presence of
30 asbestos in the container must be visually inspected. During visual
31 inspection, Tank Farms will determine if the free liquids are a result of
32 asbestos packaging or due to other factors. Containers identified as
33 containing asbestos will be managed as described in the previous
34 paragraph.
35

36 Containers, which are identified as containing uncontainerized free
37 liquids but also do not contain asbestos, will be characterized on a
38 case-by-case basis in accordance with Table 6.4. Tank Farms will attempt
39 to determine the type of liquid based on physical and field sampling to
40 minimize laboratory analytical analysis.
41

42 43 6.4.2 Containerized Liquids 44

45 The waste type Containerized Liquids will be processed in accordance with this
46 section. Containerized liquids might be detected from the physical screening
47 processes of LLW, soil, and debris. Containers identified as containing
48 containerized liquids will be managed on a case-by-case basis.
49

1 OBJECTIVE: The following is a list of objectives.
2

- 3 • Identify containers with containerized free liquids.
4
- 5 • Gather all applicable information (labeling, process knowledge, MSDS)
6 during and after visual inspection of the container.
7
- 8 • Confirm the applicability of the information collected by performing
9 confirmatory sampling if there is no other mechanism to ensure the
10 container does not contain something other than that labeled.
11
- 12 • Perform chemical confirmation or completion of designation in
13 accordance with Section 5.7.1.
14

15 PROTOCOL: All containers identified as containing containerized liquids will
16 be opened, the containerized liquids will be removed, and the
17 original container will be processed through the protocol for the
18 waste type.
19

20 The removed container of free liquid will be managed on a case-by-case
21 basis. Tank Farms will gather all applicable information (labeling,
22 process knowledge, MSDS) during and after visual inspection of the
23 container. Information obtained will be confirmed through field
24 analysis, if there is no other mechanism to ensure the container does
25 not contain something other than that documented. Perform chemical
26 confirmation or completion of designation in accordance with
27 Section 5.7.1 and Table 6.4.
28
29

30 6.4.3 Management Protocol 31

32 All liquids will be managed on a case-by-case basis in accordance with
33 WAC 173-303 and the current revision of waste acceptance criteria as
34 characterization data requires (WHC 1991).
35
36

37 6.5 SPECIAL CASE 38

39 The waste type Special Case will be managed on a case-by-case basis and
40 characterized in accordance with WAC 173-303 and waste acceptance criteria
41 (WHC 1991).

1
2
3
4
5

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Figure 6-1. Physical and Chemical Analysis Process for Drums and Boxes (Option 1) Containing Debris. (sheet 1 of 2)

Figure 6-1. Physical and Chemical Analysis Process for Boxes (Option 2) Containing Debris. (sheet 2 of 2)

Figure 6-2. Physical and Chemical Analysis Process for Soils Option 1.
(sheet 1 of 2)

Figure 6-2. Physical and Chemical Analysis Process for Soils Option 2.
(sheet 2 of 2)

Figure 6-3. Physical and Chemical Analysis Process for Drums and Boxes (Option 1) of Low-Level Waste. (sheet 1 of 2)

Figure 6-3. Physical and Chemical Analysis Process for Boxes (Option 2) of Low-Level Waste. (sheet 2 of 2)

Figure 6-4. Physical and Chemical Analysis Process for Liquids.

Table 6.1. Analytical Methods for Debris.

CRITERIA	POSSIBLE CONTAMINANTS	ANALYTICAL METHODS (WAC 173-303-110)
(1) No detectable radioactivity above background and no observable chemical contamination	F-Listed solvents; 1,1,1-trichloroethane (F001), methylene chloride (F002), acetone and methyl isobutyl ketone (F003), cresols and cresylic acid (F004), methyl ethyl ketone (F005)	No testing is required because concentrations would not require a change in designation (F-Listed waste based on the mixture rule).
(2) Detectable radioactivity, but no observable chemical contamination and having a field pH ≥ 5 and < 9	-Listed solvents; 1,1,1-trichloroethane (F001), methylene chloride (F002), acetone and methyl isobutyl ketone (F003), cresols and cresylic acid (F004), methyl ethyl ketone (F005)	No testing is required because concentrations would not require a change in designation (F-Listed waste based on the mixture rule).
(3) Radioactively Contaminated debris and having a field pH ≥ 9 or < 5	F-Listed solvents; 1,1,1-trichloroethane (F001), methylene chloride (F002), acetone and methyl isobutyl ketone (F003), cresols and cresylic acid (F004), methyl ethyl ketone (F005) Possible sulfide, cyanide contamination Possible heavy metal contamination	SVOA (Method 8270), VOA (Method 8240) Cyanide (Method 9010 or 9012)/Sulfide (Method 9030) Reactivity Testing ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420)
(4) Debris with observable oil contamination	Possible heavy metal contamination Possible halogenated hydrocarbon contamination Possible PCB contamination	ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420) TOX (Method 9020M) PCB (Method 8080)
(5) Debris with observable paint contamination	Possible solvent contamination Possible heavy metal contamination; Lead, Chromium, Mercury	SVOA (Method 8270), VOA (Method 8240) ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420), Mercury (Method 7471)
(6) Debris Contaminated with Other Solids or Liquids, not otherwise specified.	Possible solvent contamination Possible sulfide, cyanide contamination Possible heavy metal contamination Possible halogenated hydrocarbon contamination Possible PCB contamination Possible acid contamination	SVOA (Method 8270), VOA (Method 8240) Cyanide (Method 9010 or 9012)/Sulfide (Method 9030) Reactivity Testing ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420) TOX (Method 9020M) PCB (Method 8080) Anions (including nitrates and nitrites), (Methods EPA-600 300.0, 353.1, 353.2, and 353.3) Washington State pH

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Table 6.2. Analytical Methods for Soil.

CRITERIA	POSSIBLE CONTAMINANTS	ANALYTICAL METHODS (WAC 173-303-110)
(1) No detectable radioactivity above background and no observable chemical contamination and a pH ≥ 5 and < 9	F-Listed solvents; 1,1,1-trichloroethane (F001), methylene chloride (F002), acetone and methyl isobutyl ketone (F003), cresols and cresylic acid (F004), methyl ethyl ketone (F005)	No testing is required due to the fact that concentrations would not be require a change in designation (F-Listed waste based on the contained in rule).
(2) No observable or measured chemical contamination and having a field pH ≥ 9 or < 5	F-Listed solvents; 1,1,1-trichloroethane (F001), methylene chloride (F002), acetone and methyl isobutyl ketone (F003), cresols and cresylic acid (F004), methyl ethyl ketone (F005) Possible sulfide, cyanide contamination Possible heavy metal contamination	SVOA (Method 8270), VOA (Method 8240) Cyanide (Method 9010 or 9012)/Sulfide (Method 9030) Reactivity Testing ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420)
(3) Soil with observable oil contamination	Possible heavy metal contamination Possible halogenated hydrocarbon contamination Possible PCB contamination	ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420) TOX (Method 9020M) PCB (Method 8080)
(4) Soil with observable paint contamination	Possible solvent contamination Possible heavy metal contamination; Lead, Chromium, Mercury	SVOA (Method 8270), VOA (Method 8240) ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420), Mercury (Method 7471)
(5) Soil contaminated with other possible solids or liquids	Possible solvent contamination Possible sulfide, cyanide contamination Possible heavy metal contamination Possible halogenated hydrocarbon contamination Possible PCB contamination Possible acid contamination, based on field pH	SVOA (Method 8270), VOA (Method 8240) Cyanide (Method 9010 or 9012)/Sulfide (Method 9030) Reactivity Testing ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420) TOX (Method 9020M) PCB (Method 8080) Anions (including nitrates and nitrites), (Methods EPA-600 300.0, 353.1, 353.2, and 353.3) Washington State pH

T6-2

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10/27/93

Table 6.3. Analytical Methods for Low-Level Waste.

CRITERIA	POSSIBLE CONTAMINANTS	ANALYTICAL METHODS (WAC 173-303-110)
(1) No detectable radioactivity above background and no observable chemical contamination	Refer to Section 6.3.3	Not applicable.
(2) Detectable radioactivity, but no observable chemical contamination and having a field pH ≥ 5 and < 9	Refer to Section 6.3.3	Not applicable.
(3) Radioactively Contaminated Debris and having a field pH ≥ 9 or < 5	F-Listed solvents; 1,1,1-trichloroethane (F001), methylene chloride (F002), acetone & methyl isobutyl ketone (F003), cresols and cresylic acid (F004), methyl ethyl ketone (F005) Possible sulfide, cyanide contamination Possible heavy metal contamination	SVOA (Method 8270), VOA (Method 8240) Cyanide (Method 9010 or 9012)/Sulfide (Method 9030) Reactivity Testing ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420)
(4) Debris with observable oil contamination	Possible heavy metal contamination Possible halogenated hydrocarbon contamination Possible PCB contamination	ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420) TOX (Method 9020M) PCB (Method 8080)
(5) Debris with observable paint contamination	Possible solvent contamination Possible heavy metal contamination; Lead, Chromium, Mercury	SVOA (Method 8270), VOA (Method 8240) ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420), Mercury (Method 7471)
(6) Debris Contaminated with Other Solids or Liquids, not otherwise specified.	Possible solvent contamination Possible sulfide, cyanide contamination Possible heavy metal contamination Possible halogenated hydrocarbon contamination Possible PCB contamination Possible acid contamination	SVOA (Method 8270), VOA (Method 8240) Cyanide (Method 9010 or 9012)/Sulfide (Method 9030) Reactivity Testing ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420) TOX (Method 9020M) PCB (Method 8080) Anions (including nitrates and nitrites), (Methods EPA-600 300.0, 353.1, 353.2, and 353.3) Washington State pH

T6-3

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Table 6.4. Analytical Methods for Liquids.

CRITERIA	POSSIBLE CONTAMINANTS	ANALYTICAL METHODS (WAC 173-303-110)
Oil	Possible heavy metal contamination Possible halogenated hydrocarbon contamination Possible PCB contamination Possibly ignitable	ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420) TOX (Method 9020M) PCB (Method 8080) Flashpoint (Method 1010)
Paint (Oil Based)	Possible solvent contamination Possible heavy metal contamination; Lead, Chromium, Mercury Possibly ignitable	SVOA (Method 8270), VOA (Method 8240) ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420), Mercury (Method 7471) Flashpoint (Method 1010)
Paint (Water Based)	Possible heavy metal contamination; Lead, Chromium, Mercury	ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420), Mercury (Method 7471)
Other Aqueous Liquids	Possible sulfide, cyanide contamination Possible heavy metal contamination Possibly corrosive	Cyanide (Method 9010 or 9012)/Sulfide (Method 9030) Reactivity Testing ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420) Anions (including nitrates and nitrites), (Methods EPA-600 300.0, 353.1, 353.2, and 353.3) pH (Method 9045)
Other Organic Liquids	Possible solvent contamination Possible sulfide, cyanide contamination Possible heavy metal contamination Possible halogenated hydrocarbon contamination Possible PCB contamination	SVOA (Method 8270), VOA (Method 8240) Cyanide (Method 9010 or 9012)/Sulfide (Method 9030) Reactivity Testing ICP Metals (Method 6010), Arsenic (Method 7060), Lead (Method 7420) TOX (Method 9020M) PCB (Method 8080)

7.0 LABORATORY ANALYSIS METHODS

This section will be followed whenever laboratory analysis is required as specified in this WAP.

7.1 DANGEROUS CONSTITUENT SAMPLING

Sampling of waste streams will be based on a simple random selection method as outlined in SW-846 (EPA 1986). The random selection will be based on a random number generating method. The selection of the sample set for each waste stream is described in Section 5.7.1. Each container in the sample set will be sampled with a bias towards the most contaminated portion of the waste in the container. Specific sampling criteria for each waste type is described in Section 6.0.

Table 7-1 lists the sample and analysis protocol for solids, semi-solids, and liquids. Field analysis and process knowledge will be used to determine the specific analytes to be tested for in a waste. The criteria for each waste type is described in Section 6.0. Note that no analytes are specified for sampling 'hards' (cement, metals, wood, asphalt). A representative sample cannot be taken from this material for chemical testing. Only in cases where there is a 'crust' on the surface of the material that can be scraped off will sampling take place.

7.2 CRITERIA FOR WASTE TYPE SAMPLING

Sampling might not include detailed laboratory analysis. Sampling could be specified after visual screening, simple field testing, or analysis for waste type fingerprint parameters as appropriate. The applicability for each waste type is described in Section 6.0.

7.3 WASTE SAMPLING TECHNIQUES

This section describes how various waste types are to be sampled, establishes standard procedures for sampling various kinds of waste covered under the Order, and documents how these procedures vary from sampling procedures referenced in Ecology guidance documents, including SW-846, Volume II, Chapter 9.0, "Sampling". Standardized criteria for determining the locations and number of duplicate samples to be collected in various sampling situations are established. These sampling guidelines will be incorporated into work plans.

7.3.1 Sample Handling

Waste sample handling will be conducted by S&ML personnel who have successfully completed training in environmental protocol sampling (Section 3.0). In general, sample handling will follow recommended practices

1 found in SW-846. Deviations from these practices are described in this
2 section.

3
4 **7.3.1.1 Chain of Custody.** All waste samples will have the following chain of
5 custody.

6
7 **7.3.1.1.1 Sample Labeling.** All waste samples will be labeled before
8 analysis. Where possible, the sample container will be labeled with the
9 following information:

- 10
11 • Sample number or other unique identification
- 12
13 • Requested analysis
- 14
15 • Name or initials of the sampler
- 16
17 • Preservation methods
- 18
19 • Date and time the sample was collected
- 20
21 • Available information on radionuclides and radiation level if
22 applicable
- 23
24 • Location where the sample was collected.

25
26 In instances where labeling the sample container is not practical, the sample
27 packaging and/or overpack will be clearly labeled with this information.

28
29 **7.3.1.1.2 Sample Evidence Tape.** Sample evidence tape will be used to
30 ensure sample integrity if practical. If sample evidence tape is required,
31 the tape will be affixed to the sample container where possible, and will
32 include the same information as the waste label (Section 7.3.1.1.1). In
33 instances where sample evidence tape cannot be applied to the sample
34 container, the tape will be applied to the sample overpack. Such instances
35 might occur when application of a sample evidence tape to the container in the
36 field could result in radiological doses that are not consistent with ALARA.
37 Sample evidence tape should be affixed in a manner that will reveal tampering.

38
39 **7.3.1.1.3 Sample Logbooks.** The S&ML organization will maintain a
40 controlled field logbook. As a minimum, the following entries will be made
41 for each sample:

- 42
43 • Names of personnel involved in the field activity
- 44
45 • Titles and responsibilities of personnel involved in the field activity
46 (if applicable)
- 47
48 • Signature of person making an entry (the printed name of the person is
49 to occur at least once per logbook by their signature)
- 50
51 • Type and purpose of field activity
- 52

- 1 • Date of field activity
- 2
- 3 • Site map, sketch, or other definitive site description
- 4
- 5 • Field observations
- 6
- 7 • Brief description of the job
- 8
- 9 • Sampling methods used
- 10
- 11 • Instrument calibration information
- 12
- 13 • Equipment identification numbers (if applicable)
- 14
- 15 • Condition of equipment
- 16
- 17 • Field decontamination of equipment and personnel
- 18
- 19 • Decontamination of equipment before arrival onsite
- 20
- 21 • Field problems, solutions, corrective actions
- 22
- 23 • Attachments (e.g., photographs)
- 24
- 25 • Audits or surveillances conducted during the sampling event
- 26
- 27 • Sample identification table with identification numbers, date, time,
- 28 preservative, and analysis
- 29
- 30 • Field measurement data
- 31
- 32 • Lot numbers of the sample collection containers used
- 33
- 34 • The condition of each sampled container (e.g., leaking, bulged,
- 35 corrosion, etc.)
- 36
- 37 • Status of the inside liner (e.g., horsetailed, taped, open, if a liner
- 38 is present or not, etc.)
- 39
- 40 • PIN of the container sampled
- 41
- 42 • Any declared waste components and concentrations.
- 43

44 **7.3.1.1.4 Chain-of-Custody Record/Sample Analysis Request.** A COC/SAR
45 will be completed for each sample shipment and will accompany the shipment to
46 a laboratory. Guidance on documenting and maintaining chain of custody is
47 described in Appendix D. A sample COC/SAR also is included. The COC/SAR will
48 include, at a minimum, the following information for each sample:

- 49
- 50 • Sample number or other unique identifier (matching that in the sample
- 51 logbook)
- 52

- Date and time of sample collection
- Description of sampling location
- Number of sample containers associated with each sample
- Analyses requested
- Inclusive times and dates of sample possession, and signatures for each person handling the sample shipment.

Where possible, the COC/SAR will be packaged with the samples in the shipping container (e.g., sealed in a plastic bag). In instances where it is not practical to package the COC/SAR with the sample, the COC/SAR will accompany the sample during transport.

The following steps will ensure the integrity of the samples.

Step 1: The S&ML sampling technician will initiate and maintain custody.

- The S&ML sampling technician will maintain custody of sample(s) from collection until appropriate transfer of custody.
- The S&ML sampling technician will record the following in the field logbook:
 - Sample identification numbers
 - Witness name.

Step 2: To document transfer of samples, the person relinquishing custody and the next person accepting custody will sign, date, and record the time of transfer on the COC form. The COC form initiator and the first person to sign the "Relinquished by" block on the COC form will be the same person.

Step 3: The original COC form will accompany the sample(s), and a copy of the COC form will be given to the S&ML sampling technician for information.

Step 4: A copy of the COC/SAR, shipping documentation, and radiation documentation will be forwarded to HASM for tracking purposes by the close of business the working day following sample shipment.

Step 5: The laboratory sample custodian will inspect transferred samples to ensure the following:

- Seals are intact
- Labels are affixed and legible
- A SAR accompanies each sample or discrete set of samples
- The physical condition of samples is acceptable
- Samples being transferred are those on the COC form.

Once the inspection is completed, the laboratory sample custodian will sign the COC documentation.

7.3.1.2 Sample Containers. Where possible, sample containers indicated on Table 7-1 will be used for sample collection and transport. All sample containers will have the proper Teflon*-lined lid as described in Table 7.1. In some instances, sample containers required by SW-846 cannot be used. In these instances, samples will be shipped to the laboratory as soon as practical, and transferred to an approved container.

Sample containers will be vendor certified, precleaned, with Teflon-lined closures, and bar coded from the manufacturer with lot number and identification number. The number and sizes of the required containers will depend on the analysis requested and the specific laboratory requirements. The HASM will provide a list of the container volumes required by the specific analytical laboratory before sampling.

7.3.1.3 Reagents. Reagents used during sampling will include the following:

- ASTM Type II water
- Pre-certified silica sand.
- HNO_3
- S_2O_4
- $\text{ZnAc} + \text{NaOH}$

All chemical reagents will be analytical grade or better.

7.3.1.4 Equipment. The following is a typical list of equipment that could be used in the collection of samples (additional items could be required, depending on the individual sampling task):

- Sample containers
- Sample labels, pre-printed and blank
- Sampling scoops and trowels
- Sampling bowls
- Composite liquid waste sampler (COLIWASA)
- Thief sampler (open tube sampler)
- Grain sampler
- Sampling trier
- Hand-auger
- Dip sampler
- Surgeons gloves
- Safety glasses
- Scissors
- Ice chest
- Peristaltic pump
- Evidence tape
- Bung wrench
- Absorbent pads

* Teflon is a trademark of E. I. du Pont de Nemours and Company.

- Ratchet wrench/open-end wrench
- Field notebooks.

7.3.2 Sample Collection

Standard sampling protocol used for confirmation and characterization of waste covered under the Order is summarized in the following sections. Most of these methods are based on or are correlated to suggested sampling methods in SW-846 or ASTM Methods referenced in WAC 173-303.

7.3.3 Sample Disposition

Waste generated during sampling and samples returned from the laboratory will be disposed of with the same or a compatible waste stream. Wastes generated from field analysis will be disposed of with a compatible waste stream. Chemical constituents of concern will be noted on the contents inventory of the container where the waste is placed.

7.3.4 Container Sampling Procedures

The container sampling procedures will be as follows:

- Verify the PIN on the container to be sampled
- Photograph the container to be sampled and date and label the photograph. (If possible, the side of the container that the PIN number is on should be photographed.)

NOTE: If any hazards are discovered that could jeopardize personnel safety, discontinue sampling of the container(s) and notify the backlog engineer and/or the S&ML cognizant scientist. Any anomalies will be noted in the field logbook.

- Inspect the outside of the container for any previously unidentified leaks, bulging, or other hazards
- Observe the environment for any possible contamination problems (dust, odors, liquid, breezes, etc.):
 - Document existence of possible contamination problems
 - Evaluate potential effects on the samples.
- Open the container. For a container ring, use either a bung wrench or open-end wrench, depending on the type of container
- Sample collection will be performed in accordance with *Drum Sampling Procedure* (WHC 1993b).

NOTE: In the following, the sample label must include the following information:

Identification of lead sampler and initials
Sample identification number
Date and time sample collected
Sample event location
Analysis to be performed.

- Complete the sample label and affix to the sample container
- Place evidence tape on the sample bottle in such a way that if the container is opened, the evidence tape will be broken
- Replace the lid/bung on the container
- Tighten the lid/bung
- Record sampling data and conditions
- Clean the exterior of the sample containers
- Evidence tape the bung or lid of the container. Make sure that the evidence tape includes the date and the name of the technician who performed the sampling
- If the sample comes from a radiation zone, request that a radiation survey be performed
- Bag each sample in double plastic bags and bubble wrap
- Place bagged samples in an ice chest
- Seal the ice chest closed
- Decontaminate the sampling equipment at the sampling site. If unable to decontaminate, discard the equipment as waste at the sampling site.

7.4 QUALITY ASSURANCE AND QUALITY CONTROL PROTOCOL

In general, QA and QC will follow recommended practices found in SW-846. Deviations from these practices are described in this section. Spikes, duplicates, and blanks will be run per batch of samples, with 20 samples as a maximum per batch or one for each waste stream sampled, whichever is less, as described in the latest revision of SW-846.

The need for QA/QC samples will be determined on a case-by-case basis by the backlog waste engineer/scientist, the S&ML cognizant scientist, and a HASM representative.

7.4.1 Blank Samples

Blank samples will be transported with the collected samples to a laboratory for analysis. The samples will be used to determine the following:

- Cleanliness of sampling equipment
- Contamination or cross-contamination that might occur during sample handling and transportation
- Document the precision of sampling and analytical techniques.

Depending on the sample matrix (soil or water), pre-certified silica sand or reverse osmosis/deionized ASTM Type II water will be used for equipment and trip blanks.

7.4.2 Equipment Blanks

Equipment blanks will be collected using the exact sampling equipment that is to be used in subsequent sample collection and will imitate the sampling event. Equipment blanks will be representative of all equipment used in sample collection. Equipment blanks will be analyzed for the same constituents as an actual sample collected during the sampling event.

7.4.3 Trip Blanks

Trip blanks will be collected in a controlled environment. A container from the same lot number that will be used in the sampling event will be used to contain the trip blank. Trip blank(s) will be collected only if VOA is to be performed on an actual sample. As a recommendation, one trip blank will be prepared for every ice chest that contains a VOA sample and all VOA samples per shipment will be sent in one ice chest to minimize the number of trip blanks.

7.4.4 Duplicate Samples

A duplicate sample will be two samples that are collected from the same container or composite material. The basis of collecting a duplicate sample will be to evaluate the replicability of sampling and analysis. A duplicate sample will be analyzed for the same constituents as the sample it duplicates.

7.5 ANALYTICAL TECHNIQUE REQUIREMENTS

The standard methods to be used to analyze waste parameters associated with the waste covered under the Order are described in the following sections. In general, these methods are based on SW-846 and will be consistent with SW-846 requirements. These requirements include, but are not limited to, (where appropriate) duplicates, matrix spikes, matrix spike duplicates, laboratory

1 blanks, and surrogate spikes. However, mixed waste analysis protocol varies
2 slightly from those described in SW-846; a general summary of those areas of
3 variance are provided in Section 7.3. Online instrumentation (e.g.,
4 continuous air monitors, radiation monitors, etc.) will be discussed in the
5 work plans.

6 7 8 **7.5.1 Liquid Matrix Analytical Methods**

9
10 The methods used for liquid mixed waste samples will be based on SW-846
11 methods. In some instances, three different methods are provided for mixed
12 waste samples. The actual laboratory and analytical method used for a given
13 waste sample depend on sample characteristics and the specific laboratory
14 where the analysis is performed.

15 16 17 **7.5.2 Solid Waste Matrix Analytical Methods**

18
19 Analysis of mixed waste solid samples will be based on SW-846. As described
20 in Section 7.3.1, up to three different methods will be provided for some
21 mixed waste constituents.

22 23 24 **7.5.3 Deviations from SW-846 Protocol**

25
26 This section provides a general discussion of the currently documented
27 deviations from SW-846 protocol that will occur during the analysis of mixed
28 waste samples. Many of the deviations from SW-846 protocol arise from the
29 radioactive nature of the samples handled. In addition to the specific
30 deviations mentioned, recommended sample holding times are probably going to
31 be exceeded for the waste samples that must be handled in laboratory hot
32 cells. Preparation of these samples is complicated by the remote nature of
33 the hot cell operations. Additionally, redundant laboratory instruments
34 currently are not available for many hot cell operations. Maintenance and
35 repair activities also are complicated by the remote hot cell environment.
36 Instrument failures also have caused holding times to be exceeded.

37
38 The samples will be sent to Thermal Analytical, Incorporated, (TMA), unless
39 the total radioactivity (total alpha, total beta, and total gamma) of the
40 sample is ≥ 100 nanocuries per gram. If the radioactivity is above this
41 limit, the samples will be sent onsite to either Pacific Northwest Laboratory
42 (PNL) or the 222-S Laboratory Complex. In general, when samples cannot be
43 sent to offsite laboratories because of radioactive content, PNL and the
44 222-S Laboratory Complex will deviate from SW-846 protocol. Analytical
45 methods used by PNL are described in "Analytical Chemistry Laboratory (ACL)
46 Procedure Compendium", PNL-MA-599 (PNL 1993). Procedures used by the
47 222-S Laboratory Complex are: ICP metals including arsenic, lead, and
48 selenium - LA-505-151; mercury - LA-325-104; cyanide - LA-695-102; nitrite,
49 nitrate, fluorine, chlorine, sulfate, and phosphate - LA-533-105; and pH -
50 LA-212-102. Sample preparation procedures include -LA-504-101; -LA-505-158,
51 AND -LA-505-159 (WHC 1993a).
52

1 **7.5.3.1 Inorganic Analysis.** Analytical procedures used to characterize
2 inorganic species deviate from SW-846 protocols in the general areas of sample
3 preparation, sample size, and analytical techniques. These deviations are
4 discussed in the following sections.

5
6 **7.5.3.1.1 Sample Size and Preparation.** In general, smaller sub-sample
7 sizes (0.25 grams to 0.5 grams versus 1 to 2 grams) are to be used when
8 sampling mixed waste samples to reduce radiation exposure to laboratory
9 personnel. Many sample preparation steps will be performed in disposable
10 Teflon beakers.

11
12 All samples that are sent to TMA will have the minimum volume requirement as
13 described in SW-846, unless the amount of waste is less than the amount
14 required for the sample. If the volume is less than required, it will be
15 noted in the logbook and the volume will be noted on the chain-of-custody
16 form.

17
18 **7.5.3.1.2 Analytical Techniques.** Fluoride, nitrate, sulfate, and
19 phosphate analyses will be performed using an ion chromatographic method.
20 This method is based on EPA methods for waste water analyses (EPA 1982).

21
22 **7.5.3.2 Volatile and Semivolatile Organics.** Because of radiological controls
23 and exposure constraints, it will not be possible to refrigerate mixed waste
24 samples during laboratory storage. This complicates the ability to comply
25 with required storage temperature constraints.

26
27 **7.5.3.3 Toxicity Characteristics Leaching Procedure.** Onsite laboratories can
28 perform the TCLP [Method 1311 (WAC 173-303)] on a very limited basis. As the
29 ability to ship and process samples is limited by radiological constraints,
30 total analyses are going to be used in place of TCLP extractions. Solid
31 samples containing a total concentration of a toxic characteristic (TC)
32 regulated compound, which is less than 20 times the regulatory limit on the
33 Toxicity Characteristics List (WAC 173-303-090(8)(c)), are not considered TC
34 wastes.

Table 7.1 Sample and Analysis Protocol. (sheet 1 of 2)

ANALYTE PROCEDURE	SAMPLING METHOD	SAMPLING CONTAINER ¹	HOLDING TIMES	SAMPLE PRESERVATION METHOD	SAMPLE PREPARATION METHOD	ASSOCIATED QA/QC PROCEDURES
SOLIDS						
METALS ICP:6010 As:7060 Pb:7420 Se:7740	REFER TO SECTION 7.3.4	P	6 Months	4° ± 2° C	3050	REF CH.1 SW-846
Hg:7471			28 Days			
VOA 8240		Gs	14 Days		N/A	
SVOA 8270		aG	14 Days		3500	
TOX 9020M Ref EPA Docuement No. 600/4/84-008 App. d		aGs	28 Days		N/A	
REACTIVITY 9030 (SULFIDE)		P P	7 Days		N/A	
REACTIVITY 9010 or 9012 (CYANIDE)			28 Days			
ANIONS 300.0 353.1, .2, .3		G P	28 Days		EPA 2.3	
pH WA State Method ²		N/A	N/A		N/A	
PCB 8080		aG	7 Days		3580	

¹ Sample container: P (plastic), aGs (amber glass septa lid), g (glass), aG (amber glass). Container volumes will be as specified by the laboratory. For offsite laboratories, sampling container volumes will be no smaller than those specified in SW-846.

² Laboratories do not perform Washington State pH.

Table 7.1 Sampling and Analysis Protocol. (sheet 2 of 2)

ANALYTE PROCEDURE	SAMPLING METHOD	SAMPLING CONTAINER	HOLDING TIMES	SAMPLE PRESERVATION METHOD	SAMPLE PREPARATION METHOD ³	ASSOCIATED QA/QC PROCEDURES
SEMI-SOLIDS AND LIQUIDS						
METALS ICP:6010 As:7060 Pb:7420 Se:7740	REFER TO ?	P	6 Months	HNO ₃ to pH < 2 Cool to 4° ± 2° C	3050 3010 ⁴	REF CH.1 SW-846
Hg:7471			28 Days			
VOA 8240		Gs	14 Days	H ₂ SO ₄ pH < 2 4° ± 2° C	N/A	
SVOA 8270		aG	14 days	4° ± 2° C	3500	
TOX 9020M Ref EPA Document No. 600/4/84-008 App. d		aGs	28 Days	4° ± 2° C	N/A	
REACTIVITY 9030 (SULFIDE)		P P	7 Days	ZnAc+NaOH pH > 9 4° ± 2° C	N/A	
REACTIVITY 9010 or 9012 (CYANIDE)			28 Days	NaOH pH > 12 4° ± 2° C		
ANIONS 300.0 353.1, .2, .3		G P	28 Days	4° ± 2° C	EPA 2.3	
PCB 8080		aG	7 Days	4° ± 2° C	3580	
pH 9045		N/A	ASAP	None	N/A	
FLASHPOINT 1010		G	14 Days	None	N/A	

³ All chemicals used for preservation will be for aqueous phase only.

⁴ Method 3010 will be used for aqueous samples only.

8.0 RECORDKEEPING

1
2
3
4 All container files and documentation generated during the confirmation or
5 completion of designation process defined in this WAP will be maintained by
6 Generator and Acceptance Services at M0279, in the 200 West Area. Once the
7 process is completed, the container files will be turned over to the custody
8 of Tank Farms. If staging of the files at a different location is necessary,
9 Ecology will be informed in writing of the new location.

10
11 Records generated during the implementation of the WAP will be maintained
12 until closure of the Hanford Facility pursuant to WAC 173-303-380 or as
13 required during any postclosure period.

1
2
3
4
5

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9.0 REFERENCES

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3
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6
7 *Toxic Substances Control Act of 1976*, 90 Stat. 2003, 15 USC 2601 et seq.

8
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12
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14 *Waste Treatment, Storage, and Disposal Facilities*.

15
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17
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19
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21
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23
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APPENDIX A

BACKLOG WASTE DESIGNATION GUIDANCE

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APPENDIX A

BACKLOG WASTE DESIGNATION GUIDANCE

This appendix provides basic instructions on how to designate dangerous waste per WAC 173-303-070. This appendix does not contain all of the information necessary to perform designations. To be qualified, a designator must attend and pass a hazardous waste designation course.

1.0 DESCRIPTION

This appendix covers the steps necessary to determine confirmation or completion of designation.

2.0 DEFINITION

All acronyms and appendix-specific terms are defined in the Glossary at the end of this appendix.

3.0 REQUIREMENTS

In accordance with this WAP, this guidance must be followed when designating backlog waste.

Personnel responsible for waste designation will be trained in Waste Designation, Course No. 035012.

4.0 PROCEDURE

The following sections provide instructions on how to determine confirmation or completion of designation on backlog waste.

4.1 CHEMICAL COMPOSITION

It will be the responsibility of Tank Farms to provide SWAS with chemical characterization information. This characterization can be as simple as

1 including the MSDS(s) for the chemical(s) that make up the waste matrix or as
2 complicated as performing laboratory analysis on the waste matrix.

3
4 The MSDS does not always give adequate information on the chemical composition
5 of the waste. In these cases, the manufacturer of the product should be
6 contacted for more information. The designator should make a reasonable
7 attempt to get a full chemical characterization from the manufacturer or at
8 least obtain the assurance that the product contains no halogenated
9 hydrocarbons and polycyclic aromatic hydrocarbons, carcinogens, or
10 constituents listed on Table A1.

11 12 13 **4.2 DISCARDED CHEMICAL PRODUCTS**

14
15 A Discarded Chemical Product is an unused chemical product that is listed in
16 the Discarded Chemical Product List (WAC 173-303-9903) and must be a
17 commercial product or a manufacturing chemical intermediate. The Discarded
18 Chemical Product List is separated into two sections: Moderately Dangerous
19 and Acutely Dangerous Chemical Products. Both sections must be consulted when
20 determining whether or not the chemical is a Discarded Chemical Product.

21
22 Each of the listed chemicals has a dangerous waste number in accordance with
23 WAC 173-303-070. These numbers are located on the Discarded Chemical Products
24 List. Designate 'Acutely Hazardous Waste' as AHW. Designate 'Acutely
25 Dangerous Chemical Products' as EHW. Designate 'Moderately Dangerous Chemical
26 Products' as DW.

27
28 NOTE: Refer to Glossary. The terms 'Acutely Dangerous' and
29 'Acutely Hazardous' do not share the same definition.

30
31 Discarded Chemical Products include the following.

- 32
33 • Original 'unused' products as received from the manufacturer that
34 contain a listed product as the sole active ingredient. (Trace
35 additives, inert constituents, and water are not considered active
36 ingredients.)
- 37
38 • Any of these products that are of off-specification composition.
- 39
40 • Any container or inner liner that has been used to hold any of these
41 products or off-specification products. If the chemical is an AHW,
42 the container or inner liner will receive a waste number from the
43 list. If the container has been triple-rinsed with an appropriate
44 cleaner or solvent per WAC 173-303-160(2), this designation does not
45 apply.
- 46
47 • Any residue, contaminated soil, water, or other debris resulting from
48 the cleanup of a spill of any off-specification product or listed
49 product will receive a waste number from the list.

50
51 The designator must consider all mentioned criteria and assign the applicable
52 waste codes to the waste.

4.3 DANGEROUS WASTE SOURCES

Dangerous Waste Sources are designated based on the list provided in WAC 173-303-9904. These 'Non-Specific Sources' and 'Specific Sources' describe waste with certain chemical components and/or waste from specific operations.

Dangerous Waste Sources include:

- Wastes listed in the WAC 173-303-9904 tables
- Any mixture of a 'Dangerous Waste Source' with another waste
- Only wastes that are designated as 'Used' by Tank Farms.

If a waste contains one or more of the chemical components in a given source entry, or is produced by a listed process¹, the waste will be designated a Dangerous Waste Source. Dangerous waste numbers provided in WAC 173-303-9904 will be assigned. In general, Dangerous Waste Sources are designated DW. In some cases, however, footnotes on the tables in WAC 173-303-9904 describe special circumstances where these wastes are designated EHW.

The designator must examine the waste components and determine if the waste meets the above criteria.

4.4 INFECTIOUS DANGEROUS WASTES

There are no infectious dangerous waste regulations at this time (WAC 173-303-083).

4.5 DANGEROUS WASTE MIXTURES

To designate Dangerous Waste Mixtures, the designator will determine if the waste is toxic, persistent, and/or carcinogenic as defined by WAC 173-303-084. This designation applies to pure chemicals as well as to waste mixtures. Note that additional codes are not required if a designation has been made under Discarded Chemical Products Lists (WAC 173-303-9903) as stated in WAC 173-303-070(6).

NOTE: The designator must designate the waste for any further special knowledge that is known concerning the waste and provide CWC with the appropriate information to allow for the proper storage of the waste (i.e., flammable, corrosive, reactive). The designator also must ensure that the waste has been appropriately designated DW or EHW.

¹A "listed source" is one that appears in the WAC 173-303-9904 tables.

4.5.1 Toxicity

To designate for Toxicity, the designator will assign 'Toxic Categories' to the constituents and will calculate the 'Equivalent Concentration' (EC) per WAC 173-303-084(5). The designator will compare the EC to the ranges given.

The designator will determine Toxic Categories of X, A, B, C, or D (listed in their order of severity) directly from the 'Registry of Toxic Effects of Chemical Substances' (RTECS), published by the National Institute for Occupational Safety and Health referenced in WAC 173-303-084. To determine the Toxic Category from data, the designator will check each constituent against the Toxic Category Table.

Four toxicity criteria are given in WAC 173-303-084: oral (Rat) LD₅₀ (mg/kg), aquatic (Fish) LC₅₀ or TLM₉₆ (Fish) (ppm), inhalation (Rat) LC₅₀ (mg/L), and dermal (Rabbit) LD₅₀ (mg/kg). The designator should be aware that these four criteria are not the only published toxicity parameters. However, these are the only criteria that Ecology uses for book designation of toxicity.

If data are available from more than one source, use only RTECS to determine the Toxicity Category. If toxicity data are not found in the RTECS, do not assign a Toxic Category to that constituent. If the MSDS gives the toxicity for the product, which is a mixture of several chemicals, use the toxicity noted on the MSDS.

Once the designator establishes toxic categories for all constituents, the designator will calculate the EC using the formula in WAC 173-303-084(5)(b).

For example, a waste of 10% Category A material, 5% Category B material, 15% Category D material, and 70% waste (non-toxic) will have the following EC:

$$EC = 10\%/10 + 5\%/100 + 15\%/10,000 = 1.0515$$

The designator will assign the DW or EHW classifications based only on the EC, as follows:

- If a waste is DW, assign the waste code WT02
- If a waste is EHW assign the waste code WT01
- If the EC% is below .001%, the waste is not regulated for toxicity.

<u>Equivalent Concentration</u>	<u>Designation</u>
< 0.001	Not regulated
0.001 to 0.01	DW
> 0.01	EHW

4.5.2 Persistence

If the waste contains halogenated hydrocarbons, or polycyclic aromatic hydrocarbons, the designator will evaluate for persistence per WAC 173-303-084(6).

1 Halogenated hydrocarbons are organic compounds composed of carbon, hydrogen,
2 and any one or more of the halogens: fluorine, chlorine, astatine, bromine,
3 or iodine. Halogenated hydrocarbons may also contain other elements. Other
4 criteria also apply per WAC 173-303-084(6).

5
6 The designator will evaluate the designation of halogenated hydrocarbons by
7 adding the weight percents of all halogenated hydrocarbons in the waste
8 mixture. The sum will be the 'Total Halogenated Hydrocarbons Concentration'.
9

10 The designator will assign the waste category using the following:

<u>Wt% halogenated hydrocarbons</u>	<u>Designation</u>
< 0.01	Not Regulated
0.01 to 1.0	DW
> 1.0	EHW

16
17 The designator will assign EHW halogenated hydrocarbons waste mixtures the
18 dangerous waste number WP01.

19
20 The designator will assign DW halogenated hydrocarbons waste mixtures the
21 dangerous waste number WP02.

22
23 Polycyclic aromatic hydrocarbons are hydrocarbon molecules composed of two or
24 more fused benzene ring structures. Conjugated ('daisy-chain') ring
25 structures are not regulated structures. Only molecules containing four,
26 five, and six fused rings are regulated (WAC 173 303-084).
27

28 To evaluate polycyclic aromatic hydrocarbons, the designator will add the
29 weight percents of all of the four-, five-, and six-ring polycyclic aromatic
30 hydrocarbons in the waste mixture. The sum is the 'Total Polycyclic Aromatic
31 Hydrocarbons Concentration' [WAC 173-303-084(4)(b)].
32

33 If the waste has a polycyclic aromatic hydrocarbons concentration greater than
34 1.0 wt%, the designator will designate the waste as EHW and use the waste
35 code WP03. For example, a mixture of 5 wt% pyrene and 95% acetone is EHW,
36 WP03. Wastes with less than 1% polycyclic aromatic hydrocarbons are not
37 regulated for polycyclic aromatic hydrocarbons.
38

39 40 4.5.3 Carcinogens

41
42 The third element of the Dangerous Waste Mixtures evaluation will involve
43 checking the waste for carcinogens [WAC 173-303-084(7)].
44

45 The designator will check each constituent of the waste mixture to determine
46 whether the waste is a human or animal, sufficient or limited carcinogen.
47 This information is published by the International Agency for Research on
48 Cancer and is available in the RTECS.
49

1 The designator will designate waste mixtures as carcinogens as follows.

- 2
- 3 • When the concentration of any one International Agency for Research on
- 4 Cancer sufficient carcinogen (human or animal) exceeds 1.0 wt% of the
- 5 waste mixture, the mixture will be designated as EHW and assign the
- 6 dangerous waste code WC01.
- 7
- 8 • When the concentration of any one International Agency for Research on
- 9 Cancer sufficient carcinogen (human or animal) is >.01 wt% of the
- 10 waste mixture, but <1.0 wt%, the mixture will be designated as DW and
- 11 assigned the dangerous waste code WC02.
- 12
- 13 • When the total concentration summed for all International Agency for
- 14 Research on Cancer sufficient and limited carcinogens (human or
- 15 animal) exceeds 1.0 wt% of the waste mixture, the mixture will be
- 16 designated as DW and assigned the dangerous waste code WC02.
- 17

18 The International Agency for Research on Cancer carcinogenic wastes, labeled
19 carcinogenic solely because of tests involving implantation into test animals,
20 are not regulated as carcinogens. This information can be found in the
21 International Agency for Research on Cancer Monographs on the Evaluation of
22 the Carcinogenic Risk of Chemicals to Humans [WAC 173-303-084(7)(c)]. Some
23 respiratory carcinogens, such as asbestos, are exempt from the dangerous waste
24 regulations as long as these are managed in compliance with the requirements
25 of 10 CFR 61.

26 27 28 **4.6 DANGEROUS WASTE CHARACTERISTICS**

29
30 If the waste has not been designated previously as DW or EHW, analysis may be
31 required to determine characteristics. The approved sampling methods are
32 given in WAC 173-303-110. Instructions for checking wastes for the dangerous
33 waste characteristics are provided in the following sections.

34 35 36 **4.6.1 Ignitability**

37
38 A waste is ignitable [WAC 173-303-090(5)] if the waste has any of the
39 following properties:

- 40
- 41 • Liquid (other than an aqueous solution containing less than 24%
- 42 alcohol by volume) with a flash point less than 60 °C according to
- 43 published or experimental closed cup test data.
- 44
- 45 • Solid or sludge, under standard conditions of temperature and
- 46 pressure, capable of causing fire through friction, absorption of
- 47 moisture or spontaneous chemical changes, and when ignited, burns so
- 48 vigorously and persistently that it creates a hazard.
- 49

50 NOTE: WAC 173-303-110 specifies the 'Chemical Testing Methods for
51 Complying with the Dangerous Waste Regulations' as the appropriate

1 procedure for ignitability determinations. This document states
2 that the test for ignitable solids is a 'prose test'.
3

- 4 • Ignitable compressed gas as defined in 49 CFR 173.300.
- 5
- 6 • Oxidizer as defined in 49 CFR 173.151. Oxidizers include nitrates and
7 nitrites in solid form or in solutions of 40% or greater.
8

9
10 The designator will designate wastes determined to be ignitable as DW and will
11 assign the dangerous waste code D001. Aerosol cans, which have a MSDS that
12 states that the aerosol product is not flammable, will not be designated as a
13 D001. A MSDS that states that the product is flammable or combustible will be
14 regulated as a D001 with a flash point <100 °F for flammable or flash point of
15 100 °F - 140 °F for combustible.
16

17 18 4.6.2 Corrosivity

19
20 A waste is corrosive [WAC 173-303-090(6)] if the waste has any of the
21 following properties.
22

- 23 • Aqueous with a pH less than or equal to 2 (≤ 2), or a pH greater than
24 or equal to 12.5 (≥ 12.5) according to accepted Ecology test methods.
25
- 26 • Liquid that corrodes Society of Automotive Engineers (SAE) 1020 steel
27 faster than 0.250 inch per year at a temperature of 130 °F. Rate is
28 determined by an Ecology-approved method.
29
- 30 • Solid or Semi-Solid that has an aqueous phase pH of ≤ 2 , or a pH ≥ 12.5
31 when it is made into a 50 wt% mixture with water. Ecology will
32 provide approved test methods.
33

34 The designator will designate wastes determined to be Corrosive as DW and will
35 assign the dangerous waste code D002.
36

37 38 4.6.3 Reactivity

39
40 A waste is Reactive [WAC 173-303-090(7)] if the waste has any of the following
41 properties:
42

- 43 • Is normally unstable and readily undergoes violent change without
44 detonating
45
- 46 • Reacts violently with water or forms potentially explosive mixtures
47 with water
48
- 49 • When mixed with water, generates toxic gasses, vapors or fumes in
50 quantities that present a danger to human health or the environment
51

- It is a cyanide (-CN) or sulfide (-S) bearing waste that, when exposed to pH conditions between 2 and 12.5, can generate toxic gasses, vapors or fumes in amounts sufficient to present a danger to human health or the environment. Numbers provided in SW-846 for evaluating reactivity are 250 milligrams hydrogen cyanide per kilogram of waste and 500 milligrams hydrogen sulfide per kilogram of waste
- Is capable of detonation or explosive reaction if subjected to a strong initiating source or heated under confinement
- Is readily capable of detonation or explosive decomposition, or reaction at standard temperature and pressure.
- It is a U.S. Department of Transportation Forbidden Explosive, a Class A or Class B Explosive as defined in 49 CFR 173.51, .53 and .88. Examples are as follows:

Nitroglycerin, liquid: Forbidden Explosive
(not desensitized)

Black powder (gunpowder): Class A Explosive

Exhibition display fireworks: Class B Explosive

The designator will designate the waste as DW and assign the dangerous waste code D003.

4.6.4 Toxicity Characteristic

The TC relates to the concentration of 40 specific chemicals [WAC 173-303-090(8)] that could leach from a solid or liquid waste matrix. These chemicals include heavy metals (lead, chromium, etc.), and certain pesticides and herbicides. Wastes may be DW or EHW depending on the concentration of these chemicals in the leachate.

The TCLP is used to test the solubility and mobility of hazardous components in a buffered aqueous solution. In a 'worst-case' calculation, a solid waste could be assumed to dissolve completely in the buffered extractant, which is always 20 times the mass of the waste sample. For liquids, concentration limits are imposed directly on the waste. Table A1 specifies limiting concentrations that could cause the extract to be designated TC.

The designator will designate the waste and will assign the dangerous waste codes (Table A1). Select dangerous waste numbers from the table, select the waste class (EHW or DW).

4.7 POLYCHLORINATED BIPHENYLS

The designator will designate PCBs as follows.

- Not regulated
 - Waste contains less than 50 parts per million PCBs
 - Waste did not originate from a transformer, capacitor, or source of greater than 50 parts per million PCBs
 - Waste is not mixed with a dangerous waste.
- Regulated in Washington State only (W001)
 - Waste contains PCBs in a concentration of 2 to 50 parts per million

NOTE: The lower regulatory limit for PCBs may be 2 parts per million when using ASTM Method D4059-86. Reference WAC-173-303-071(3)(k)(ii) for more information.

 - Waste originated from a transformer or capacitor containing less than 50 parts per million PCBs.
- Regulated under *Toxic Substances Control Act (TSCA) of 1976* (PCB2)
 - Waste contains greater than 50 parts per million PCBs.
 - PCB waste must be managed at its source concentration. For example, a transformer containing oil with 1,000 parts per million PCBs is drained and flushed with a solvent. Even though the actual PCB concentration in the solvent is 200 parts per million, it must be designated and disposed of as waste containing 1,000 parts per million.
 - Waste is not mixed with a dangerous waste.

4.8 SUMMARY OF WASTE DESIGNATION PROCEDURE

After the waste designation has been completed, the designator will determine the Waste Class of the waste by reviewing all categories (WAC 173-303). If any of the categories have been designated an AHW, the waste is classed as an AHW. If any of the categories have been designated EHW, the waste is classed EHW. Otherwise, the waste is classed as a DW or not regulated.

4.9 SPECIAL CASE WASTES

Some wastes require special management. The following directions will aid in disposing of these wastes. Not all special cases are covered in this section. Whenever there are questions concerning management of an unusual waste, the designator will consult SWAS. The following special case wastes are not discussed in this appendix.

Animal carcasses	Batteries (other than lead)
Brass, bronze	Construction debris
Copper wire	Lead used as shielding
Fluorescent light tubes	Mercury
Neutralization	Office waste
Stainless steel	Welding rods
Paints	

The following sections discuss sampling the most common special case wastes.

4.9.1 Alkali Metals

Solid and semi-solid wastes that contain alkali metals will be designated as D001, D002, and D003 (WAC 173-303-090). Under no circumstances should alkali metals be mixed with water.

4.9.2 Aerosol Cans

Empty aerosol cans normally not regulated could be discarded to trash. Any empty aerosol can that held an AHW as the sole ingredient is regulated as if the container were full unless the container was triple-rinsed. Trace ingredients, water, and inert materials will be considered as ingredients.

Aerosol cans that have lost propellant but still contain material (shake the can) will be designated as if the product is there, but the designator will subtract the propellant and adjust the concentrations of remaining constituents. Aerosol cans that are punctured before disposal will be treated in the same manner.

4.9.3 Fluorescent Light Ballasts

This section applies to fluorescent light ballasts (or small capacitors) taken out-of-service. Items for collection are ballasts containing PCBs. All unmarked ballasts must be assumed to contain PCBs.

NOTE: PCB ballasts are regulated by TSCA 30-day storage requirements. The disposal of PCB-free ballasts will be determined by WAC 173-303 regulations.

4.9.4 Nonregulated Empty Containers

For designation, empty containers fall into two categories: Ecology regulated and nonregulated. Certain empty containers that previously held dangerous waste are not regulated by Ecology. These containers contained wastes that are not acutely hazardous, and that are not pesticide containers bearing a danger or warning label. 'Acutely Hazardous' wastes are defined in WAC 173-303-040 and in the Glossary. The following describes the designation of empty containers.

1 **4.9.4.1 Ecology Regulated Containers.** Ecology-regulated empty containers are
2 those that contained an 'acutely hazardous' substance when full, and/or
3 pesticide containers that bear a danger or warning label. The containers must
4 have been designated and waste codes assigned, must have an EPA Hazardous
5 Waste sticker, have a unique number when manifested, and be shipped exactly as
6 if the containers were full.

7
8 **4.9.4.2 Nonregulated Empty Containers.** An empty container will not be
9 regulated as follows:

- 10
11 • It contained a U.S. Department of Transportation-regulated material
12 and has been rinsed and cleaned. These containers must be marked
13 'Non-regulated, MT, cleaned'. All hazard or warning labels must be
14 removed or obliterated.
- 15
16 • It contained an AHW and has been triple-rinsed per WAC 173-303-160.
17 These containers must not have an EPA Hazardous Waste sticker and must
18 be marked 'Non-regulated, MT, triple rinsed'. Hazard and warning
19 labels must be removed or obliterated.
- 20
21 • It contained materials that were not regulated by U.S. Department of
22 Transportation or Ecology when full. These containers must be labeled
23 'Non-regulated, MT.'
- 24
25 • Containers of 5 gallons or less, are empty (MT), did not contain an
26 AHW, are not regulated, and can be disposed of in a landfill.

30 5.0 GLOSSARY

31
32
33 **Acutely dangerous waste**--Any dangerous waste specifically identified on
34 the WAC 173-303-9903 Discarded Chemical Products List as EHW by the
35 Ecology.

36
37 **Acutely hazardous waste (AHW)**--Some items identified on the Discarded
38 Chemical Products List and some pesticide containers and pesticide waste.
39 Acutely Hazardous Wastes are those with dangerous waste numbers beginning
40 with a 'P' or those that show an 'X' or an 'A' in the Reason for
41 Designation column. Also pesticide containers that bear a 'Danger' or
42 'Warning' label.

43
44 **Combustible liquid**--Term used in 49 CFR 173.115 for liquids with closed
45 cup flash points at or above 100 °F and below 200 °F. In WAC 173-303,
46 this term includes material with a flash point ≥ 100 °F and below 140 °F.

47
48 **Container**--Any portable device in which a material is stored,
49 transported, treated, disposed of, or otherwise handled.

1 **Dangerous waste**--The words 'dangerous waste' refer to the full universe
2 of regulated solid wastes designated as either dangerous or extremely
3 hazardous in WAC 173-303-070 through WAC 173-303-103. (Refer to 'DW' and
4 'EHW'.')

5
6 **DW (dangerous waste)**--The abbreviation 'DW' refers to that part of the
7 solid waste universe that is dangerous waste only, and not EHW.

8
9 **EHW (extremely hazardous waste)**--The abbreviation 'EHW' refers to those
10 dangerous wastes that are extremely hazardous.

11
12 **Empty (MT)**--Containers that contain no more than 1% of its capacity if
13 the container can hold under 110 gallons or no more than 0.3% of its
14 capacity if the container can hold more than 110 gallons. A compressed
15 gas container (aerosol can) is 'empty' when the pressure inside the
16 container equals, or nearly equals, atmospheric pressure.

17
18 **Equivalent concentration (EC)**--Equivalent concentration is a value
19 determined by dividing the concentration of a constituent by its toxicity
20 value. This value is used to determine the relative toxicity of a waste
21 matrix.

22
23 **Flammable liquid**--Term used in 49 CFR 173.115 for liquids having closed
24 cup flash points below 100 °F.

25
26 **Generator**--Any person, by site, whose act or process produces dangerous
27 waste or whose act first causes a dangerous waste to become subject to
28 regulation. For the purposes of this waste analysis plan, the generator
29 is DOE-RL.

30
31 **Halogenated hydrocarbon (HH)**--An organic chemical compound composed of
32 carbon, hydrogen, and any one or more of the halogens: fluorine,
33 chlorine, bromine, or iodine. Halogenated hydrocarbons also might
34 contain other elements. Other criteria are defined in
35 WAC 173-303-084(6). The compound also might be referred to as
36 halogenated organic compounds (HOC).

37
38 **Halogenated organic compound (HOC)**--Refer to halogenated hydrocarbon.

39
40 **Hazardous substance**--A chemical substance that is listed in the hazardous
41 materials table in 49 CFR 172.101 and exceeds its reportable quantity
42 when packaged in a single container (refer to Reportable Quantity).

43
44 **Ignitable**--Term used in WAC 173-303-090 for a waste that can cause a fire
45 through friction, absorption of moisture, or spontaneous chemical
46 reaction, etc. This term generally applies to oxidizers as defined in
47 49 CFR 173.151. It also applies to liquids with flash points below
48 140 °F.

1 **Incompatible waste**--A dangerous waste that is unsuitable for placement in
2 a particular device or structure because the waste might corrode or decay
3 the containment materials, or is unsuitable for mixing with another waste
4 or material because the mixture might produce heat or pressure, fire or
5 explosion, violent reaction, toxic dusts, fumes, mists or gases, or
6 flammable fumes or gasses.
7

8 **Listed product**--A chemical product that meets the definition of a
9 Discarded Chemical Product and appears in the Discarded Chemical Product
10 List (WAC 173-303-9903).
11

12 **Listed source**--A waste source that has resulted from a process listed in
13 the Dangerous Waste Source List (WAC 173-303-9904).
14

15 **Material safety data sheet (MSDS)**--A document that conveys product safety
16 information from the manufacturer to the user.
17

18 **Persistence**--The quality of a material that retains more than half of its
19 initial activity after 1 year (365 days) in either a dark anaerobic or
20 dark aerobic environment of ambient conditions.
21

22 **Polycyclic aromatic hydrocarbon (PAH)**--Hydrocarbon molecules composed of
23 two or more fused benzene ring structures.
24

25 **Registry of Toxic Effects of Chemical Substances (RTECS)**--This document
26 is published by the National Institute for Occupational Safety and Health
27 and provides the toxicity and International Agency for Research on Cancer
28 data used during the designation process.
29

30 **Reportable quantity (RQ)**--This is the quantity of material or waste that
31 if released into the environment must be reported immediately to the
32 National Response Center. Reportable quantities are listed in the
33 hazardous materials table in 49 CFR 172.101 and in 40 CFR 302.4 (refer to
34 Hazardous substance).
35

36 **Solid waste**--Any solid, semi-solid, liquid or contained gaseous material,
37 garbage, refuse, sludge or discarded commodity resulting from industrial,
38 commercial, mining, agricultural, or community operations or activities
39 that is not a primary product of such operations or activities.
40

41 Some solid wastes, which are dangerous wastes, are identified in
42 WAC 173-303-016. The reuse, use for energy recovery, reclamation, and
43 speculative accumulation, as well as disposal of some of these wastes,
44 are regulated by Ecology as described in WAC 173-303-016.
45

46 **Waste generator**--Any person, by site, whose act or process produces
47 dangerous waste and whose act first causes a dangerous waste to become
48 subject to regulation (WAC 173-303-040). For purposes of RCRA and
49 WAC 173-303, the Hanford Site is considered to be a single generator
50 comprised of a number of generating units.
51

1 **Washington Administrative Code (WAC)**--Specifically, WAC 173-303 contains
2 all the solid waste regulations for the state of Washington.

Table A1. Toxicity Characteristic List for Liquids and Soluble Solids.
(sheet 1 of 2)

Waste code	Constituent	CAS no.	Liquid waste concentration (mg/l)		Solid waste concentration (wt%)	
			DW	EHW	DW	EHW
D004	Arsenic	7440-38-2	5 - 500	> 500	0.01 - 1	> 1
D005	Barium	7440-39-3	100 - 10,000	> 10,000	0.2 - 20	> 20
D006	Cadmium	7440-43-9	1 - 100	> 100	0.002 - 0.2	> 0.2
D007	Chromium	7440-47-3	5 - 500	> 500	0.01 - 1	> 1
D008	Lead	7439-92-1	5 - 500	> 500	0.01 - 1	> 1
D009	Mercury	7439-97-6	0.2 - 20	> 20	0.0004 - 0.04	> 0.04
D010	Selenium	7782-49-2	1 - 100	> 100	0.002 - 0.2	> 0.2
D011	Silver	7440-22-4	5 - 500	> 500	0.01 - 1	> 1
D012	Endrin	72-20-8	0.02 - 2	> 2	0.00004 - 0.004	> 0.004
D013	Lindane	58-89-9	0.4 - 40	> 40	0.0008 - 0.08	> 0.08
D014	Methoxychlor	72-43-5	10 - 1,000	> 1,000	0.02 - 2	> 2
D015	Toxaphene	8001-35-2	0.5 - 50	> 50	0.001 - 1	> 1
D016	2,4-D	94-75-7	10 - 1,000	> 1,000	0.02 - 2	> 2
D017	2,4,5-TP Silvex	93-72-1	1 - 100	> 100	0.002 - 0.2	> 0.2
D018	Benzene	71-43-2	0.5 - 50	> 50	0.001 - 0.1	> 0.1
D019	Carbon Tetrachloride	56-23-5	0.5 - 50	> 50	0.001 - 0.1	> 0.1
D020	Chlordane	57-74-9	0.03 - 3	> 3	0.00006 - 0.006	> 0.006
D021	Chlorobenzene	108-90-7	100 - 10,000	> 10,000	0.2 - 20	> 20
D022	Chloroform	67-66-3	6.0 - 600	> 600	0.012 - 1.2	> 1.2
D023	o-Cresol*	95-48-7	200 - 20,000	> 20,000	0.4 - 40	> 40
D024	m-Cresol*	108-39-4	200 - 20,000	> 20,000	0.4 - 40	> 40
D025	p-Cresol*	106-44-5	200 - 20,000	> 20,000	0.4 - 40	> 40
D026	Cresol	-----	200 - 20,000	> 20,000	0.4 - 40	> 40
D027	1,4-Dichlorobenzene	106-46-7	7.5 - 750	> 750	0.015 - 1.5	> 1.5
D028	1,2-Dichlorobenzene	107-06-2	0.5 - 50	> 50	0.001 - 0.1	> 0.1

* If o-, m-, and p-cresol concentrations cannot be differentiated, the total cresol (D026) is used.

Table A1. Toxicity Characteristic List for Liquids and Soluble Solids.
(sheet 2 of 2)

Waste code	Constituent	CAS no.	Liquid waste concentration (mg/l)		Solid waste concentration (wt%)	
			DW	EHW	DW	EHW
D029	1,1-Dichloroethylene	75-35-4	0.7 - 70	> 70	0.0014 - 0.14	> 0.14
D030	2,4-Dinitrotoluene	121-14-2	0.13 - 13	> 13	0.00026 - 0.026	> 0.026
D031	Heptachlor (& its OH)	76-44-8	0.008 - 0.8	> 0.8	0.000016 - 0.0016	> 0.0016
D032	Hexachlorobenzene	118-74-1	0.13 - 13	> 13	0.00026 - 0.026	> 0.026
D033	Hexachlorobutadiene	87-68-3	0.5 - 50	> 50	0.001 - 0.1	> 0.1
D034	Hexachloroethane	67-72-1	3 - 300	> 300	0.006 - 0.6	> 0.6
D035	Methyl ethyl ketone	78-93-3	200 - 20,000	> 20,000	0.4 - 40	> 40
D036	Nitrobenzene	98-95-3	2 - 200	> 200	0.004 - 0.4	> 0.4
D037	Pentachlorophenol	87-86-5	100 - 10,000	> 10,000	0.2 - 20	> 20
D038	Pyridine	110-86-1	50 - 500	> 500	0.01 - 1	> 1
D039	Tetrachloroethylene	127-18-4	0.7 - 70	> 70	0.0014 - 0.14	> 0.14
D040	Trichloroethylene	79-01-6	0.5 - 50	> 50	0.001 - 0.1	> 0.1
D041	2,4,5-Trichlorophenol	95-95-4	400 - 40,000	> 40,000	0.8 - 80	> 80
D042	2,4,6-Trichlorophenol	88-06-2	2 - 200	> 200	0.004 - 0.4	> 0.4
D043	Vinyl Chloride	75-01-4	0.2 - 20	> 20	0.0004 - 0.04	> 0.04

Conversion:

1 ppm = 0.0001%

10 ppm = 0.001%

100 ppm = 0.01%

1,000 ppm = 0.1%

10,000 ppm = 1.0%

100,000 ppm = 10.0%

CAS no. = Chemical Abstract Service number.

mg/l = milligrams per liter.

wt% = weight percent.

DW = dangerous waste.

EHW = extremely hazardous waste.

ppm = parts per million.

APPENDIX B

DOCUMENTATION ASSESSMENT

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APPENDIX B

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FIGURES

B1.	Waste Documentation Checklist	APP B F-1
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APPENDIX B

DOCUMENTATION ASSESSMENT

This appendix describes the procedure used for completing the documentation assessment.

1.0 PURPOSE

Each container file covered under the scope of this plan will be evaluated to assist Tank Farms in determining:

- The segregation of containers into waste streams
- If there is sufficient knowledge concerning the container for designation at this stage of the process
- Containers within a waste stream that require flagging for special management.

2.0 REQUIREMENTS

This appendix must be followed when completing the documentation assessment of the backlog waste in accordance with this WAP.

3.0 DOCUMENTATION ASSESSMENT

Each container of waste covered under the scope of this WAP will be evaluated in accordance with the 'Container Waste Documentation Checklist' (Figure B1). The BWISs for each container will be reviewed and compared to information gathered from the Tank Farms container files. The checklist will be completed at the time of the review. The checklist will be maintained as part of the operating record for the container.

All questions on the checklist must be answered. Specific comments should be noted in the 'COMMENTS' section as appropriate so that information can be obtained from the checklist as needed in further steps of the confirmation or completion of designation process.

3.1 TRACKING INFORMATION

The signature of the evaluator and the date of the evaluation will be completed. Both the Backlog PIN and the Generating Unit PIN will be given.

1
2 **3.2 VERIFICATION OF BACKLOG WASTE INFORMATION SHEET INFORMATION**
3

4 The purpose of this section of the checklist is to verify that the waste type
5 and inventory listed on the BWIS is accurate. All inconsistencies should be
6 noted for correction in SWITS.
7

8
9 **3.3 WASTE STREAM SEGREGATION**
10

11 The purpose of this section of the checklist is to gather information to
12 segregate the waste into waste streams and to flag any container that has a
13 mixture of waste types to ensure that the container is designated
14 appropriately. All waste types should be clearly noted whenever a container
15 is found that contains a mixture of waste types.
16

17
18 **3.4 CHARACTERIZATION INFORMATION**
19

20 The purpose of this section is to determine the type of documentation
21 available for a container and to determine if the documentation is sufficient
22 to designate the waste for storage.
23

24 All references to characterization information must be clearly described so
25 that the information can be easily retrieved.
26

27 The determination of whether sufficient information exists for designation for
28 storage is made by the evaluator. For any container with a mixture of waste
29 streams, sufficient information must be available on all waste streams. If
30 the evaluator believes enough information exists, an SDAR can be requested
31 from SWAS in accordance with Section 5.3 of the WAP.
32

33
34 **3.5 FLAGGING FOR SPECIAL HANDLING**
35

36 The purpose of this section is to flag containers that might need special
37 handling during the remaining analysis for confirmation or completion of
38 designation.
39

40 Containers that require physical analysis and cannot undergo NDE must be
41 opened for visual inspection. Examples include boxes (unless RTR capability
42 for boxes is obtained) and drums with lead shielding.
43

44 Any item on the inventory that raises a question about the designation should
45 undergo further analysis. Examples could include HEPA filters or cases where
46 the inventory is in question because of lack of detail. These containers
47 should be flagged; the exact reason for the flag must be noted on the
48 checklist.
49
50

CONTAINER WASTE DOCUMENTATION CHECKLIST		
BACKLOG PIN: _____ BL- _____ -00-MAP EVALUATOR SIGNATURE/DATE: _____ GENERATING UNIT PIN: _____ PRINTED NAME: _____		
VERIFICATION OF BWIS	(Y) OR (N)	COMMENTS
1. Is the waste type correct? (If no, give correct waste type.)		
2. Does the file documentation (i.e. inventory sheet) agree with the BWIS?		
WASTE STREAM SEGREGATION	(Y) OR (N)	
3. List the waste type for the container.	n/a	
4. List the Tank Farm Complex.	n/a	
5. Is the waste a single waste type? (If no, list all types in the mixture.)		
CHARACTERIZATION INFORMATION	(Y) OR (N)	
6. Does an inventory sheet exist?		
7. Is the inventory sheet certified with a signature and date?		
8. Is specific information related to the waste generating process contained/referenced in the file?		
9. Are analytical results available for the container?		
10. Are specific dangerous constituents and percents listed or MSDSs provided in the field file?		
11. Is documented process knowledge available from other containers from the same waste stream?		
12. Are analytical results available from other containers from the same activity?		
13. Is other characterization information available for the waste stream?		
DOES ADEQUATE DOCUMENTATION FOR DESIGNATION FOR STORAGE EXIST?		
FLAGGING FOR SPECIAL HANDLING	(Y) OR (N)	
14. Can the container have NDE performed on it? (If no, state reason.)		
15. Does the documentation in the container indicate any waste which needs further analysis?		
16. Is any of the documentation questionable such that the container needs further analysis?		

Figure B1. Waste Documentation Checklist.

APPENDIX C

BACKLOG WASTE REAL-TIME RADIOGRAPHY GUIDANCE

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APPENDIX C

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This appendix provides a NDE Checklist to be used in RTR of the backlog waste.

NDE CHECKLIST

Page 1 of 2

Backlog PIN: BL- -00-MAP

Generating Unit PIN:

Date:

Container Weight:

RTR Log Number:

Batch ID #:

WASTE CONTENTS EVALUATION

QUESTION	YES	NO	COMMENTS
1. Is a liner present in the container? ☐ horsetailed			
2. Are any free liquids observed? ☐ containerized Liquid amount: ☐ 1% or more of container			
3. Are any powdered materials observed? ☐ kitty liter/amount -			
4. Are any dense objects observed? ☐ batteries ☐ lead			
5. Are any compressed gases or pressurized-type containers observed?			
6. Are any sharp, pointed objects observed? ☐ padded			
7. Are any HEPAs potentially present in the waste? ☐ mask cartridges ☐ woodframed			
8. Is there general agreement between the observed container contents and the inventory sheet?			

EVALUATION (TO BE COMPLETED AFTER RTR OF THE CONTAINER)

DOES THE CONTAINER NEED OVERPACKING BEFORE BEING RETURNED TO CWC? ☐ YES ☐ NO

ANY WASTE THAT IS DETERMINED TO CONTAIN AEROSOL CONTAINERS THAT CONTAIN LIQUIDS WILL BE MANAGED AS FLAMMABLE LIQUIDS UNTIL SUCH TIME THAT FURTHER CONFIRMATION/COMPLETION OF DESIGNATION CAN BE PERFORMED. THE FOLLOWING LABELS/MARKINGS SHOULD BE APPLIED TO THE CONTAINER: "Flash point < 100 °F" Marking, DOT Flammable Liquid, "This End Up" Marking, "Liquid Organic Waste" Marking. A D001 WASTE CODE WILL BE ADDED TO THE EPA HAZARDOUS WASTE LABEL.

NEW STORAGE LOCATION CWC/Flammable Staging

DOES THE CONTAINER NEED FURTHER ANALYSIS? ☐ YES ☐ NO
(If yes, label the container with a white sticker marked "TO T-PLANT".)

TANK FARM REPRESENTATIVE
(Signature/Date) _____

DESCRIPTION OF DISCREPANCIES: _____

NDE CHECKLIST

Page 2 of 2

Backlog PIN: BL- -00-MAP

Generating Unit PIN:

ADDITIONAL COMMENTS (INCLUDE ANY ADDITIONAL ITEMS THAT COULD BE IDENTIFIED, ETC...):

Liner starts _____ inches from the top.

APPENDIX D

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST GUIDANCE

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APPENDIX D

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FIGURE

D1.	Typical Chain-of-Custody Form	APP D F1
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APPENDIX D

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST GUIDANCE

This procedure guidance (guidance) summarizes the general requirements for documenting and maintaining chain of custody for backlog waste environmental samples from point of origin to receipt at the analytical laboratory.

1.0 SCOPE

This guidance applies to backlog waste environmental samples collected in accordance with contracting documents. This guidance is applicable from time of sample acquisition until custody of the sample is transferred to a laboratory.

2.0 DEFINITIONS

Chain of Custody. Chain-of-custody documentation is required as evidence of sample integrity for transfer of samples from time of sample acquisition to receipt by the laboratory.

Custody. The physical responsibility for sample integrity, handling, and/or transportation custody responsibilities are effectively met if samples are in the individual's physical possession or direct observation after possession is taken, secured by the individual so that no tampering can occur, or secured or locked by the individual in an area in which access is restricted to authorized personnel only.

Custody Seals and Evidence Tape. Security tape or other similar material affixed such that any tampering with samples during transfer will be apparent.

Witness. A sampling team member who participates in the actual sampling, or who is an observer to the sampling, and is responsible for initial custody of samples.

3.0 RESPONSIBILITIES

The field team leader/cognizant engineer, witness, transporter, laboratory sample custodian, and HASM will all be involved in the chain-of-custody

1 process. Descriptions of these positions and their responsibilities are
2 provided in the following sections.

3 4 5 **3.1 FIELD TEAM LEADER/COGNIZANT ENGINEER**

6
7 The field team leader/cognizant engineer is responsible for chain-of-custody
8 documentation to ensure sample transfer documentation is complete.

9 10 11 **3.2 WITNESS**

12
13 The witness is responsible for maintaining custody of samples from sample
14 collection until proper transfer of custody.

15 16 17 **3.3 TRANSPORTER**

18
19 The transporter is responsible for transporting samples and corresponding
20 chain-of-custody documentation to the next custodian. If the transporter is a
21 private carrier, bonding will be required.

22 23 24 **3.4 LABORATORY SAMPLE CUSTODIAN**

25
26 The laboratory sample custodian is responsible for accepting custody of
27 samples, and inspecting transferred samples to ensure that seals are intact
28 and labels are affixed and sample condition is acceptable.

29 30 31 **3.5 HANFORD ANALYTICAL SERVICES MANAGEMENT**

32
33 The HASM is responsible for ensuring that a copy of the completed chain-of-
34 custody documentation is received with the laboratory sample data package and
35 for transmitting the laboratory sample data package, including original chain-
36 of-custody documentation, to the environmental data management organization.

37 38 39 40 **4.0 GENERAL REQUIREMENTS**

41
42
43 Chain of custody must be documented on the established chain-of-custody form
44 or on chain-of-custody forms that are laboratory specific. The chain of
45 custody/sample analysis request form is shown in Figure D1.

5.0 DESCRIPTION OF PROCEDURE

Samples are to be prepared, packaged, and transported to the laboratory in accordance with developed sample packaging and shipping descriptions.

5.1 CUSTODY INITIATION

The witness will take custody of samples in accordance with the definition of "custody" (Section 3.0 of this guidance) as soon as samples are collected. This custody is maintained until the appropriate time of transfer of custody.

5.2 CHAIN-OF-CUSTODY FORM INITIATION

The field team leader or the witness as determined by the field team leader initiates the chain-of-custody form. The chain-of-custody forms will be completed in accordance with established procedures.

5.3 TRANSFER OF CUSTODY

To document transfer of samples, the person relinquishing custody and the next person accepting custody signs, dates, and records time of transfer on the chain-of-custody form. The original chain-of-custody form will accompany samples, and a copy will be given to the field team leader for information. A copy of the chain-of-custody form is forwarded to the HASM organization for sample tracking purposes.

5.4 RECEIPT AT DESTINATION

The laboratory sample custodian inspects transferred samples to ensure that seals are intact, labels are affixed and legible, a sample analysis request accompanies each sample or discrete set of samples, the physical condition of samples is acceptable, and samples being transferred are those identified on the chain-of-custody form. Any problems encountered as a result of the inspection of samples must be handled in accordance with the statement of work with the laboratory. A laboratory sample custodian must sign, date, and record time of transfer of custody of samples on the chain-of-custody form. The laboratory sample custodian retains the original chain-of-custody form until project documentation is dispositioned. Laboratory custody descriptions are implemented on completion of transfer of custody.

5.5 SAMPLE DISPOSAL

Sample disposal is handled by the HASM and the "Final Disposition" block on the chain-of-custody form will be completed on sample disposal.

1 **5.6 RECORDS**

2
3 The HASM organization ensures that a copy of the completed chain-of-custody
4 form accompanies the sample data package received from the laboratory. The
5 HASM organization receives the completed, original chain-of-custody form(s)
6 (as part of the sample data package) from the laboratory after project
7 completion, and forwards the forms to environmental data management for
8 processing into the environmental information management system and subsequent
9 transmittal to information resource management for permanent retention.
10 Chain-of-custody form(s) documenting receipt are transmitted to information
11 resource management for permanent retention by the field file custodian in
12 accordance with descriptions established by information resources management.

Figure D1. Typical Chain-of-Custody Form.

Westinghouse Hanford Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST												Page _____ of _____			
Collector		Company Contact						Telephone No.						Date Turnaround ☐ Priority ☐ Normal			
Project Designation		Sampling Location						SAF No.									
Ice Chest No.		Field Logbook No.						Method of Shipment									
Shipped To		Offsite Property No.						Bill of Lading/Air Bill No.									
Possible Sample Hazards/Remarks		Preservative															
		Type of Container															
		No. of Container(s)															
Special Handling and/or Storage		Volume															
SAMPLE ANALYSIS																	
Sample No.	Matrix*	Date Sampled	Time Sampled														
CHAIN OF POSSESSION		Sign/Print Names						SPECIAL INSTRUCTIONS						Matrix*			
Relinquished By		Date/Time		Received By		Date/Time								S = Soil			
Relinquished By		Date/Time		Received By		Date/Time								SE = Sediment			
Relinquished By		Date/Time		Received By		Date/Time								SO = Solid			
Relinquished By		Date/Time		Received By		Date/Time								SL = Sludge			
Relinquished By		Date/Time		Received By		Date/Time								W = Water			
Relinquished By		Date/Time		Received By		Date/Time								O = Oil			
Relinquished By		Date/Time		Received By		Date/Time								A = Air			
Relinquished By		Date/Time		Received By		Date/Time								DS = Drum Solids			
Relinquished By		Date/Time		Received By		Date/Time								DL = Drum Liquids			
Relinquished By		Date/Time		Received By		Date/Time								T = Tissue			
Relinquished By		Date/Time		Received By		Date/Time								WI = Wipe			
Relinquished By		Date/Time		Received By		Date/Time								L = Liquid			
Relinquished By		Date/Time		Received By		Date/Time								V = Vegetation			
Relinquished By		Date/Time		Received By		Date/Time								X = Other			
LABORATORY SECTION		Received By						Title						Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method						Disposed By						Date/Time			

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