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	Page(s)	Rev.	Date	Page(s)	Rev.	Date
Appendix 3A	APP 3A-i	0	12/95	APP 3A-i	0	12/95
Waste Analysis Plan for T Plant Complex WHC-SD-EN-WAP-005				ALL	0	04/96



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APPENDIX 3A

WASTE ANALYSIS PLAN FOR  
T PLANT COMPLEX

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## GLOSSARY

## ACRONYMS AND ABBREVIATIONS

1		
2		
3		
4	<b>ACRONYMS AND ABBREVIATIONS</b>	
5		
6	CFR	Code of Federal Regulations
7	COLIWASA	composite liquid waste sampler
8		
9	DQO	data quality objectives
10	DST	double-shell tank
11		
12	EHW	extremely hazardous waste
13	EPA	U.S. Environmental Protection Agency
14		
15	LDR	land disposal restrictions
16		
17	MSDS	material safety data sheet
18		
19	QA	quality assurance
20	QC	quality control
21		
22	RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
23		
24	TSD	treatment, storage and/or disposal
25		
26	WAC	Washington Administrative Code

**METRIC CONVERSION CHART**

Into metric units

Out of metric units

If you know	Multiply by	To get	If you know	Multiply by	To get
<b>Length</b>			<b>Length</b>		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
<b>Area</b>			<b>Area</b>		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
<b>Mass (weight)</b>			<b>Mass (weight)</b>		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
<b>Volume</b>			<b>Volume</b>		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76	cubic meters	cubic meters	1.308	cubic yards
<b>Temperature</b>			<b>Temperature</b>		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
<b>Force</b>			<b>Force</b>		
pounds per square inch	6.895	kilopascals	kilopascals	0.15	pounds per square inch

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

## 1.0 FACILITY DESCRIPTION

The T Plant Complex is located in the 200 West Area of the Hanford Facility, Richland, Washington. The T Plant Complex consists of two main structures, the 221-T Building and 2706-T Building (includes 2706-TA), and various support structures and storage units within the T Plant Complex (Figure 1-1). The 221-T and 2706-T Buildings are used for the storage (tank, container, and equipment) and treatment (tank, container, and equipment) of dangerous and/or mixed waste before transfer to an onsite treatment, storage, and/or disposal (TSD) unit or offsite TSD facility (hereinafter referred to as another TSD unit). The 221-T Building, 2706-T Building, various support structures, and storage units are used for storage, staging of containerized waste, decontamination activities, sampling, assay (radiological screening), characterization, verification, repackaging, and treatment of dangerous and/or mixed waste received from TSD units and offsite generators.

The specific objectives of the waste analysis plan are as follows:

- Ensure safe management of waste during treatment and storage
- Ensure that waste generated during operational activities is properly designated in accordance with regulatory requirements
- Provide chemical and physical analysis of representative samples of the waste stored for characterization and/or verification before the waste is transferred to another TSD unit
- Ensure compliance with land disposal restriction (LDR) requirements for treated waste
- Provide basis for work plans that describes waste analysis for development of new treatment technologies.

Because dangerous waste does not include the source, special nuclear, and by-product material components of mixed waste, radionuclides are not within the scope of this document. Information on radionuclides is provided only for general knowledge where appropriate.

### 1.1 CONTAINER TREATMENT AND/OR STORAGE

Dangerous and/or mixed waste is transferred to T Plant Complex for storage until assay, verification, sampling, analysis, characterization, repackaging, and/or treatment has been completed. Treatment and storage of dry and liquid dangerous and/or mixed waste in containers occurs in the 221-T Building deck and in various locations. The 214-T Building also is used for treatment, storage, and overpacking of dangerous and/or mixed waste containers.

Waste transferred to T Plant Complex can be staged in one of the storage areas designated for greater-than-90-day storage. Waste is staged in these

1 storage areas until assay, verification, sampling, analysis, characterization,  
2 repackaging, and/or treatment is accomplished and the waste is transferred to  
3 another TSD unit.

## 6 1.2 TANK STORAGE AND TREATMENT

8 Equipment received at T Plant Complex can be of two types: (1) equipment  
9 to be decontaminated for reuse and returned to service and (2) equipment  
10 received as waste, to be decontaminated to make the equipment amenable for  
11 disposal as solid, dangerous, mixed, or radioactive waste. Equipment is  
12 decontaminated in the 2706-T and 221-T Buildings using steam, high pressure  
13 water, chemicals, and other physical surface abrasion methods. Some of the  
14 equipment meant for reuse cannot be returned to service because of  
15 unsuccessful radiological decontamination, inability to repair the equipment,  
16 or other reasons. If the equipment has been successfully decontaminated but  
17 is no longer in usable condition, the equipment can be dispositioned for  
18 material recycling (e.g., for metals recovery) or for disposal as solid waste.  
19 Equipment that is not completely decontaminated is sent to another TSD unit  
20 for treatment, storage, and/or disposal, depending on the nature of the waste.

22 Liquid mixed waste generated during decontamination activities in the  
23 221-T Building is collected in a series of stainless steel tanks. These tanks  
24 are designated 6-1, 5-6, 5-7, 5-9, 11-R, and 15-1. Liquid mixed waste is  
25 stored and can be pH or nitrite adjusted in tank 15-1. The waste is pumped  
26 into a railcar and transferred to another TSD unit for treatment and/or  
27 storage.

29 Liquid mixed waste generated during decontamination activities in the  
30 2706-T Building is collected in the railroad pit in the building and pumped  
31 through a double-lined stainless steel underground pipeline to the  
32 211-T collection sump located southeast of the 2706-T Building. The liquid  
33 waste is transferred from the 221-T collection sump to the 221-T Building  
34 liquid mixed waste handling system by underground pipeline.

36 Sludge from the decontamination activities accumulate in the bottoms of  
37 the stainless steel tanks in the 221-T Building, 2706-T Building railroad pit,  
38 and the 211-T collection sump. This sludge is stored in the tanks until the  
39 waste is required to be transferred to another TSD unit. When the sludge is  
40 ready for transfer, the waste is characterized, treated, and/or packaged in  
41 waste containers for transfer to another TSD unit.

## 44 1.3 CONTAINMENT BUILDINGS

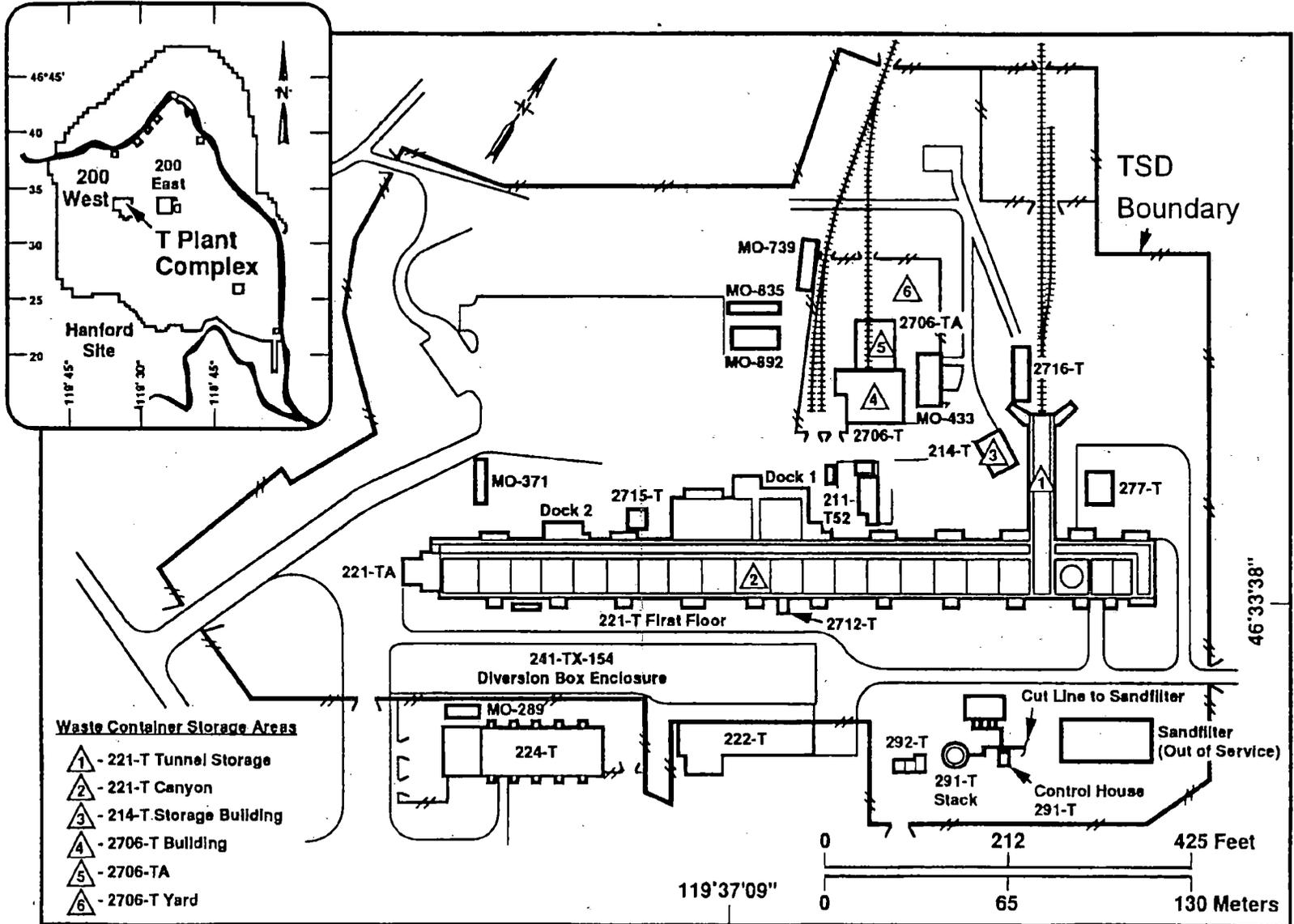
46 The 221-T and 2706-T Buildings serve as containment buildings for waste  
47 management activities at T Plant Complex. Waste or equipment can be stored in  
48 these areas until treatment and/or processing is accomplished. Waste  
49 processing includes activities such as assay, verification, sampling and  
50 analysis, characterization, waste repackaging, and/or treatment. The  
51 221-T Building canyon deck and railroad tunnel and 2706-T Building are used  
52 for these activities.

1 Treatment could include decontamination of contaminated equipment,  
2 material decontamination, and processing of waste containers. Equipment  
3 awaiting treatment could be stored at the 221-T Building deck and cells. The  
4 amount and type of equipment in the cells varies with treatment support  
5 requirements. The 2706-T Building is used to decontaminate railroad cars,  
6 buses, trucks, automobiles, heavy equipment, process equipment, and other  
7 materials. Waste equipment and containers are stored in the building while  
8 awaiting processing.

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3  
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Figure I-1. T Plant Complex (configuration as of December 1995).



H9504027.1

## 2.0 WASTE ACCEPTANCE PROGRAM

The T Plant Complex accepts a wide range of waste types for treatment and/or storage. This section provides the waste acceptance process for the proper management of waste.

### 2.1 WASTE ACCEPTED AT T PLANT COMPLEX

Dangerous and/or mixed waste contaminated equipment is accepted at T Plant Complex where the equipment is decontaminated and either reused or subsequently transferred for disposal. The T Plant Complex also accepts equipment for decontamination and stores liquid and solid residues generated by decontamination activities in tank systems. The liquid and solid residues could contain contaminants in the following categories:

- Corrosive
- Reactive
- Ignitable
- Toxicity characteristic
- F-listed
- State-only (WAC 173-303).

Dangerous and/or mixed waste is accepted from other TSD units for storage while awaiting assay, sampling, verification, analysis, characterization, repackaging, and/or treatment.

The 221-T and 2706-T Buildings provide dangerous and/or mixed waste decontamination, reclamation, and decommissioning services for process equipment. The characteristics of each waste stream that could be stored in the T Plant Complex can be divided into the following waste categories:

- Corrosive
- Reactive
- Ignitable
- Toxicity characteristic
- F-listed
- Discarded chemical products
- State-only (WAC 173-303).

The following section provides waste acceptance criteria.

### 2.2 WASTE ACCEPTANCE AND TRANSFER PROCEDURES

Offsite generators and/or onsite generating units must provide basic information on waste characteristics to T Plant Complex before waste acceptance is considered. The T Plant Complex reviews the information provided and makes a determination on whether the information is adequate and whether to accept the waste. After completion of acceptance documentation, the waste can be transferred.

### 2.2.1 Offsite Generator and/or Onsite Generating Unit Responsibilities

The offsite generator submits their initial request to the U.S. Department of Energy, Richland Operations Office (DOE-RL). The onsite generating unit requests approval from T Plant Complex to transfer waste by submitting a waste handling and treatment request form. The T Plant Complex reviews the information provided in the waste handling and treatment request form and accompanying data including waste characterization information and package description. The T Plant Complex compares the data to the waste acceptance criteria to determine whether the waste is described adequately and whether the waste can be accepted. The T Plant Complex also determines whether process knowledge provided in lieu of analytical data is adequate. The T Plant Complex determines whether or not to accept the waste based on the information on the waste handling and treatment request form.

The following information must be provided to T Plant Complex before acceptance of the waste:

- Description of the waste generation process
- For routine transfers of a certain waste stream, descriptions of waste generation processes when modifications are made
- Description of the waste including physical description, available chemical analyses, expected dangerous constituents, and waste numbers
- For routine transfers of a certain waste stream, descriptions of chemical usage changes, which could cause changes in the waste characteristics
- Description of the waste packaging (including waste contents, filler or components other than waste, container/liner, expected size, volume, weight, and quantity)
- LDR notification information.

### 2.2.2 T Plant Complex Tracking and/or Manifest

Before unloading the waste, waste tracking papers and waste packages are inspected to ensure the following conditions are met.

- All necessary waste tracking forms for the waste are present and completed correctly.
- All documents are signed and dated.
- All waste packages are accounted for and correctly indicated on the waste tracking forms.
- Waste containers are in sound condition (i.e., free of holes, punctures, major dents) and structural integrity is not compromised.

- 1 • Waste containers are labeled and marked as indicated on the waste  
2 tracking forms (i.e., package identification numbers, weights, waste  
3 numbers, etc. on the waste tracking forms are the same as those on the  
4 containers).
- 5
- 6 • Containers do not contain waste that is incompatible with other  
7 containers or waste in the area where the waste is staged.
- 8

9 Section 2.2.3 describes the actions taken should T Plant Complex receive  
10 a waste package that is determined to be unacceptable.

11  
12 After waste receipt, the waste containers are unloaded and staged in an  
13 appropriate designated area. Containers are staged with not less than a  
14 76-centimeter space between each double row of containers to facilitate  
15 inspections.

16  
17 Waste containers transferred to and from the staging area require  
18 completion of a waste container transfer form. Copies of the signed waste  
19 container transfer form are maintained at T Plant Complex.

### 22 2.2.3 Process for Unacceptable Waste

23  
24 If during the pre-acceptance inspection a waste package is determined to  
25 be unacceptable, the offsite generator and/or onsite generating unit is  
26 notified. The T Plant Complex requests that written instructions be provided  
27 to allow personnel to correct the conditions. In those cases where the waste  
28 is acceptable, but documentation is incorrect, the offsite generator and/or  
29 onsite generating unit is notified to correct the documentation. Waste may be  
30 rejected and returned if an agreement on correcting the conditions is not  
31 reached. Instances of noncompliance with the waste acceptance criteria and  
32 documentation requirements are recorded and tracked by T Plant Complex  
33 compliance personnel.

34  
35 If a noncompliant waste package is not returnable because of its  
36 condition or packaging, and agreement on disposition cannot be reached between  
37 involved parties, the waste package will be isolated at T Plant Complex  
38 pending resolution. The issue will be referred to DOE-RL, Washington State  
39 Department of Ecology (Ecology), and other appropriate regulatory agencies as  
40 necessary for resolution.

41  
42 For offsite generators, the DOE-RL provides notification to Ecology of  
43 any unreconciled manifest discrepancies that are not resolved within 15 days.  
44 Discrepancies for onsite generating units are handled internally.

### 47 2.3 WASTE CHARACTERIZATION

48  
49 Offsite generators and/or onsite generating units provide the physical,  
50 chemical, and radioactive characteristics of dangerous and/or mixed waste  
51 received for each process conducted at T Plant Complex, except for waste types  
52 described in Section 3.0. Offsite generators and/or onsite generating units

1 can use chemical analyses or process knowledge to determine waste  
2 characteristics.

3  
4 If process knowledge is used in the characterization process, a complete  
5 description of the process generating the waste [e.g., original product  
6 material safety data sheets (MSDS)] and published characterization methodology  
7 on the specific waste stream and/or characterization methodology on similar  
8 waste streams must be provided. Field analysis can be used to confirm process  
9 knowledge.

10  
11 If adequate process knowledge exists to ensure a particular constituent  
12 is not present in the waste, there is no requirement to analyze for that  
13 constituent. However, the waste certification summary must establish that  
14 there is no reason to suspect the constituent is in the waste. This can be  
15 accomplished by including a detailed process description and/or published data  
16 of the process.

### 17 18 19 2.3.1 Sampling Procedures

20  
21 Because of physical variations in the waste received at T Plant Complex,  
22 sampling methodologies differ for different waste streams and also differ  
23 because of offsite generator and/or onsite generating unit needs. Sampling  
24 methods, equipment, containers, and parameters will adhere to guidance  
25 provided in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*  
26 (*SW-846*) (EPA 1986), or other EPA-approved methods.

27  
28 The offsite generator and/or onsite generating unit determines the  
29 appropriate sampling method, conducts all field and sampling QA/QC, arranges  
30 for and coordinates with appropriate analytical laboratories, and documents  
31 the sampling and analysis activities. The offsite generator and/or onsite  
32 generating unit must certify that the waste analysis information is complete  
33 and accurate.

34  
35 The offsite generator and/or onsite generating unit also document the  
36 sampling activities, chain of custody, and arranges sample transfer. Sampling  
37 information, custody records, and analytical results are maintained by the  
38 offsite generator and/or onsite generating unit.

39  
40 Sampling methods are designed to ensure that each sample is accounted for  
41 at all times. The primary objectives of sample control are as follows.

- 42  
43 • Each sample received for analysis is uniquely identified with a sample  
44 identification number.  
45  
46 • Correct samples are analyzed and are traceable to the applicable data  
47 records.  
48  
49 • Sample collectors prepare a permanent log of sampling activities.  
50  
51 • Important and necessary sample constituents are preserved.  
52

- 1 • Offsite generators and/or onsite generating units ensure that all  
2 samples are labeled with identifying information.
- 3
- 4 • Samples are protected from loss, damage, or tampering.
- 5
- 6 • Any alteration of samples during collection or transfer  
7 (e.g., filtration, preservation, breakage) is documented.
- 8
- 9 • A record of sample custody and integrity is established that will  
10 withstand legal scrutiny.
- 11
- 12 • A chain-of-custody record accompanies samples at all times.
- 13

14 All sample collection, preparation, packaging, transportation, and  
15 analysis conforms to the requirements of SW-846 or other EPA-approved methods,  
16 unless radiological concerns require alternative methods because of safety  
17 issues.

### 18 19 20 **2.3.2 Analytical Methods**

21  
22 Attachment 1 lists typical analytical methods the offsite generators  
23 and/or onsite generating units could use in characterizing waste. To the  
24 extent possible, test methods are those specified in SW-846. Where alternate  
25 methods are used, e.g., for highly radioactive samples, methods are described  
26 in the quality assurance plan of the laboratory performing the analysis.

27  
28 The offsite generator and/or onsite generating unit could characterize  
29 the waste based on chemical data, MSDS, or other process-related information  
30 in lieu of analysis. However, T Plant Complex personnel will require waste  
31 sampling and analysis in conformance with this waste analysis plan, if the  
32 data provided in lieu of analysis are determined to be inadequate.

### 33 34 35 **2.3.3 Frequency of Waste Characterization**

36  
37 All recurrent waste streams received by T Plant Complex are  
38 recharacterized by the generating unit at least annually. As in the original  
39 characterization process, recharacterization can involve evaluation of process  
40 knowledge or sampling and analysis. A number of waste streams accepted by  
41 T Plant Complex could be generated on an irregular or one-time basis. Each

1 such new waste stream is characterized before acceptance, or by using the  
 2 procedures in Section 3.0 for suspect<sup>1</sup> and difficult waste<sup>2</sup>.

3  
 4 More frequent characterization of waste types would be conducted under  
 5 the following circumstances.

- 6
- 7 • A new waste stream is generated.
- 8
- 9 • The waste generating process changes significantly.
- 10
- 11 • The waste characteristics are highly variable from transfer to
- 12 transfer.
- 13
- 14 • The waste is physically or chemically unstable.
- 15
- 16 • The waste characterization is suspect (e.g., when waste numbers for
- 17 the same waste stream are reported inconsistently, or when the offsite
- 18 generator and/or onsite generating unit routinely provides waste
- 19 numbers inconsistent with information on the transfer papers,
- 20 analytical data, MSDS, or other information).
- 21
- 22

23 **2.4 WASTE ANALYSIS REQUIREMENTS PERTAINING TO LAND DISPOSAL RESTRICTIONS**

24  
 25 The *Hazardous and Solid Waste Amendments of 1984* prohibit land disposal  
 26 of certain types of waste. The T Plant Complex treats and stores LDR waste.  
 27 The T Plant Complex also provides interim storage for dangerous and/or mixed  
 28 waste destined for further treatment, storage, and/or disposal. Information  
 29 presented in this section describes how offsite generators and/or onsite  
 30 generating units characterize, document, and certify waste subject to LDR  
 31 requirements.

32  
 33  
 34 **2.4.1 Waste Characterization**

35  
 36 For all waste being accepted at T Plant Complex, the offsite generators  
 37 and/or onsite generating units are required to document waste characteristics,  
 38 the level of toxicity characteristics, and the presence of listed waste. This  
 39 information allows the offsite generators and/or onsite generating units to  
 40 accurately make all LDR determinations and to complete all required  
 41 notifications and certifications.

---

44 <sup>1</sup> Suspect waste is defined as waste that is 'suspected' to be  
 45 contaminated with regulated constituents.

46 <sup>2</sup> Difficult waste is defined as mixed waste that cannot receive a  
 47 complete chemical and/or radiological analysis in the 90-day time allowed by  
 48 regulation. The acceptance criteria limits the storage time for difficult  
 49 waste to an additional 90 days after acceptance into the difficult waste  
 50 management program.

#### 1 2.4.2 Sampling and Analytical Procedures

2  
3 The LDR waste streams must be analyzed for all constituents listed in  
4 40 CFR 268.48 that reasonably would be expected to be in the waste streams.  
5 The typical analytical methods are EPA-approved and are presented in  
6 Attachment 1.  
7  
8

#### 9 2.4.3 Frequency of Analysis

10  
11 All recurrent LDR waste streams are characterized at least annually.  
12 Waste characterization could be required more frequently under the following  
13 circumstances.  
14

- 15 • A new waste stream is generated.
- 16
- 17 • The waste generating process changes significantly.
- 18
- 19 • The waste characteristics are highly variable from transfer to  
20 transfer.
- 21
- 22 • The waste is physically or chemically unstable.
- 23
- 24 • The waste characterization is suspect (e.g., when waste numbers for  
25 the same waste stream are reported inconsistently, or when the offsite  
26 generator and/or onsite generating unit routinely provides waste  
27 numbers inconsistent with information on the transfer papers,  
28 analytical data, MSDS, or other information).  
29  
30

#### 31 2.4.4 Notifications and Certifications

32  
33 For LDR waste that is treated and/or stored, the offsite generator and/or  
34 onsite generating unit are required to provide the following LDR information:  
35

- 36 • Dangerous waste numbers
- 37
- 38 • Available waste analysis
- 39
- 40 • The corresponding treatment standards set forth in 40 CFR 268,  
41 Subpart C, and all applicable prohibitions
- 42
- 43 • Information contained in the notifications and certifications required  
44 under 40 CFR 268.7.  
45

46 If the waste transferred is restricted, but meets the applicable  
47 treatment standard(s), the offsite generator and/or onsite generating unit  
48 must submit the same notification information listed previously, and a  
49 certification stating that the waste meets all applicable treatment standards.  
50 If the waste does not meet the applicable treatment standards, a notification  
51 stating this fact is provided with the information listed previously.  
52

1 A waste tracking system is in place to document the transfer of waste,  
2 including waste subject to LDRs. Records related to treatment and disposal of  
3 waste subject to LDRs are maintained by the generating unit in the operating  
4 record as required by 40 CFR 264.73(b)(10) and (12).

## 7 2.5 CONTAINER WASTE ACCEPTANCE CRITERIA

8  
9 The T Plant Complex could receive waste containers that are improperly  
10 packaged to sample or repackage the contents based on agreement with offsite  
11 generators and/or onsite generating units. However, the ultimate  
12 responsibility for waste characterization resides with the offsite generators  
13 and/or onsite generating units. Any waste that violates the waste acceptance  
14 criteria will be returned to the generator and/or will be isolated until the  
15 waste acceptance conflict is resolved.

16  
17 Dangerous and/or mixed waste must be packaged in compatible and approved  
18 containers. Cardboard, fiberboard, paper, cloth, burlap, rubber, or glass for  
19 outer packaging is prohibited unless such packaging is specified for a certain  
20 waste. Improperly packaged waste might be received at T Plant Complex to be  
21 repackaged. However, waste with a dangerous waste number other than the  
22 numbers identified in the Part A, Form 3, permit application (DOE/RL-88-21) is  
23 not accepted for treatment and/or storage.

24  
25 Leaking, punctured, or dented containers, or containers with visible  
26 compromises in integrity are not the responsibility of T Plant Complex and  
27 might not be accepted. If the containers are accepted, the containers are  
28 separated and overpacked immediately. Accepting future waste from the offsite  
29 generator and/or onsite generating unit that transferred the damaged container  
30 might not occur until the issue is resolved.

31  
32 The T Plant Complex will not accept waste unless the following conditions  
33 are met or there is a previous agreement with the offsite generator and/or  
34 onsite generating unit to repackage the waste.

- 35  
36 • Incompatible waste must not be packaged within the same container.  
37 Containers of incompatible materials must not be placed on the same  
38 pallet for movement within a storage area.
- 39  
40 • Corrosive liquids must be packaged in metal containers with  
41 compatible liners or approved polyethylene containers.
- 42  
43 • Cyanide- and sulfide-bearing waste solutions must have a pH of greater  
44 than 9.
- 45  
46 • Internal packaging, absorbents, etc., generally must be noncombustible  
47 unless approved lab packs or materials are used.
- 48  
49 • A minimum 10% ullage (84 millimeters or 21 liters for a 208-liter  
50 container) must be left when filling containers with liquid.
- 51

- 1       • Bung plugs or caps must be properly gasketed and tightened  
2       securely to prevent leakage.  
3  
4

## 5   2.6 WASTE ACCEPTANCE CRITERIA FOR WASTE REQUIRING CHARACTERIZATION

6  
7       The T Plant Complex accepts dangerous, mixed, suspect, and/or difficult  
8 waste requiring verification and/or characterization. Containers of suspect  
9 waste and difficult waste must be accompanied by appropriate waste tracking  
10 forms.  
11

12       Any waste that is received for verification or characterization is  
13 isolated in a storage area and appropriately labeled until verification or  
14 characterization can be performed. The appropriate T Plant Complex personnel  
15 have the responsibility and authority to evaluate waste following verification  
16 for compliance with the waste acceptance criteria and to determine any  
17 required corrective action. Waste analysis methods used for characterization  
18 of suspect waste are provided in Section 3.0.  
19  
20

## 21 2.7 WASTE VERIFICATION

22  
23       It might be necessary to verify that the contents of a waste package  
24 match associated documentation. Waste verification could include opening a  
25 waste package, looking at the contents, or removing the contents and  
26 inspecting the contents. Field screening instrumentation could be used when a  
27 container is opened to identify hazards to personnel. Field screening also  
28 might confirm the presence of a certain waste that is expected to be present.  
29 The waste is compared to documentation to ensure the waste that is visually  
30 identified is described. Discarded chemical products with "P" and "U" waste  
31 numbers that are containerized in overpack containers are verified using MSDS  
32 information. Waste verification activities are documented in a waste  
33 verification logbook and are maintained as part of the T Plant Complex  
34 operating record.  
35

36       It might be necessary to sample waste to determine the following.

- 37  
38       • Documentation associated with the waste package is accurate and  
39       complete.  
40  
41       • Waste meets the waste acceptance criteria.  
42  
43       • Waste is packaged correctly.  
44  
45       • The waste is what is expected to be.  
46  
47       • Waste adequately is characterized to allow necessary processing or  
48       disposal.  
49

50       The verification sampling and analysis performed on waste could be  
51 limited or thorough depending on existing information, the needs of the  
52 offsite generator and/or onsite generating unit, and the type of waste

1 processing that is needed. In general, knowledge of levels of dangerous waste  
2 constituents present in waste is required. If process knowledge indicates  
3 there is no possibility that certain constituents are present in the waste, it  
4 is not necessary to sample and analyze for all dangerous waste constituents.  
5 However, if the waste is suspect, sampling and analysis would be required,  
6 using SW-846 methods. As with the waste handling activities that are  
7 performed, a major consideration in selecting analytical methods and  
8 parameters is the needs of the responsible offsite generator and/or onsite  
9 generating unit. The containers are sampled using the analytical methods  
10 listed in Attachment 1.

11  
12 The results of waste verification and sampling and analysis will be used  
13 to determine whether waste should be repackaged. If requested, T Plant  
14 Complex personnel will repackage the waste.

15  
16 Fingerprint<sup>1</sup> analysis for selected parameters might be appropriate for a  
17 sample if there is extensive process knowledge or if there is comprehensive  
18 analytical data for a container of waste. The EPA allows fingerprint analysis  
19 to provide an indication of whether the waste has been identified accurately  
20 on the waste tracking forms, LDR notification/certification, pre-acceptance  
21 contract, or other documentation. The containers are sampled using the  
22 analytical methods listed in Attachment 2.

23  
24 For waste packages accepted at T Plant Complex, at least 5 percent or an  
25 alternative rate based on process knowledge and/or analytical data must be  
26 verified.

27  
28 Verification is performed using a combination of nondestructive  
29 examination, physical examination, and/or chemical screening. Exceptions to  
30 chemical sampling include the following 'special materials':

- 31  
32 • Waste packages precluded from opening because of as low as reasonably  
33 achievable (ALARA)  
34  
35 • Empty product containers  
36  
37 • Single substance spill material  
38  
39 • Off-specification, contaminated, and/or outdated commercial products  
40 in the original product container  
41  
42 • Contaminated debris and asbestos (does not include liquids or soils)  
43  
44 • Other special-case situations handled on a case-by-case basis.  
45

---

46 <sup>1</sup> 'Fingerprint' parameters are those parameters that will confirm process  
47 knowledge, i.e., a container is labeled 'corrosive', and states that the waste  
48 contains sodium hydroxide; therefore, the waste will be tested for sodium and  
49 pH to confirm that process knowledge is correct.

1 Special materials have been exempted from chemical screening because  
2 these materials potentially are hazardous materials (e.g., remote handled,  
3 asbestos); are well defined and nonvariable (e.g., single substance spill  
4 material or off-specification products); or are unusually difficult to sample  
5 and analyze (e.g., empty product containers, contaminated debris, or  
6 demolition materials). For these exceptions, the onsite generating unit or  
7 offsite generator supplies sufficient chemical and physical characteristics  
8 for proper disposal of the waste.

1  
2  
3  
4  
5

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### 3.0 WASTE ANALYSIS FOR SUSPECT WASTE, DIFFICULT WASTE, AND SPILLS

This section describes waste analysis for suspect waste, difficult waste, and spills.

#### 3.1 WASTE ANALYSIS FOR SUSPECT WASTE

Work plans are written for accepting, evaluating, and managing containers of suspect waste or difficult waste. Difficult waste also could be accepted for storage while awaiting verification or characterization at T Plant Complex.

Because of the variable nature of waste characterization and processing activities at T Plant Complex, not all waste management scenarios are incorporated. A specific work plan is developed and implemented for each waste type.

##### 3.1.1 Waste Management Processes

Containers of suspect waste and difficult waste accepted at T Plant Complex require waste tracking forms. The suspect and difficult waste will be isolated until completely characterized.

Containers received at storage areas are verified to ensure that the paperwork and container match. Transfer labels and placards are compared with the waste tracking forms. Each container is inspected for damage and external contamination in the staging area. Contaminated containers are wrapped in plastic or overpacked and moved to a cleaning area. Containers are surveyed for potential surface radiological contamination. The following sequence establishes generic waste handling precautions; work plans for specific waste will identify additional precautions to be taken.

- The health physics technician ensures appropriate levels of protective clothing are donned by the personnel before performing the work.
- If the containers are metal drums or metal boxes, the lid is removed with a nonsparking tool, and the container is evaluated for hazardous or flammable vapors.
- The health physics technician samples the inside of the lid for radiological contamination and determines the conditions for proceeding.
- If crystalline material is noted on any object within a container, the object is considered shock-sensitive. All container handling ceases until the material is determined by the hazardous materials team not to be shock-sensitive.

- 1 • When repackaging is necessary, waste within a container is segregated  
2 and packaged according to the required treatment.
- 3
- 4 • All mixed waste containers are packaged, inventoried, and identified.
- 5
- 6 • If unknown liquids or suspect solids are encountered, a sample of the  
7 waste could be taken.
- 8

9 If discrepancies or deficiencies are found, these will be resolved before  
10 the waste manifest/waste tracking form is signed by the T Plant Complex. If  
11 discrepancies cannot be resolved, the T Plant Complex either rejects the  
12 entire waste shipment/transfer or rejects only those containers associated  
13 with the discrepancies (refer to Section 2.2.3).

### 14 15 16 3.1.2 Waste Analysis Processes for Suspect Waste

17  
18 Waste preferentially is designated using process knowledge or other  
19 information (e.g., MSDS) provided on the waste tracking form. Typically,  
20 suspect waste cannot be designated adequately using process knowledge;  
21 therefore a representative sample is taken (Section 4.0).

22  
23 Characteristics that cannot be determined by process knowledge will be  
24 sampled and analyzed per applicable criteria (Attachment 1). Attachment 1  
25 provides the analyses to be performed, the rationale for the performance of  
26 each analysis, and the analytical method to be used. Sample analysis results  
27 are used to identify constituents that would prohibit disposal in a landfill.

28  
29 Field analyses will be performed to determine characteristics necessary  
30 to manage the waste. Other sampling will be performed to complete  
31 characterizations.

### 32 33 34 3.2 WASTE ANALYSIS FOR SPILLS

35  
36 If a leak or spill is discovered within T Plant Complex that cannot be  
37 tracked to a specific container (and associated waste characterization  
38 information), the contingency plan will be implemented. The residues of such  
39 a release would be sampled and analyzed in accordance with the requirements in  
40 the process described in Section 3.1.2 to determine the characteristics of the  
41 waste residue as defined by waste designation procedures in WAC 173-303.

#### 4.0 CHARACTERIZATION OF WASTE GENERATED AND TREATED AT T PLANT COMPLEX

The T Plant Complex operations generate the following waste types:

- Decontaminated equipment that cannot be returned to service
- Liquid, sludge, and solid waste from decontamination activities
- Maintenance waste
- Treatment waste.

Some contaminated equipment at T Plant Complex might not be returned to service if the equipment is unable to be repaired, decontamination efforts are unsuccessful, or the equipment is unsuited for service in some other way. In these cases, the effectiveness of the decontamination process will dictate whether the unusable equipment will be discarded as dangerous, mixed, radiological, or solid waste, or recycled for metal recovery. The majority of the equipment to be decontaminated at T Plant Complex will be returned to service after successful decontamination.

Waste generated from decontamination operations performed on useable or unusable equipment includes solid and liquid material. Water, steam, sand, and various chemicals are examples of liquids and solids media that might be used to remove contamination from equipment. Contamination removed from equipment with liquid might be in a liquid or sludge form. Dirt, grease, and various chemical and radiological materials are examples of solid contaminants that could be removed from equipment.

Various waste types are generated by routine maintenance activities at T Plant Complex as follows:

- Materials that contact regulated chemical products
- Unused or old chemical products that will not be used
- Various materials that could be regulated because of chemical content.

The T Plant Complex treats waste in containers to stabilize or neutralize the waste and treats waste equipment to meet debris rule criteria. Addition of absorbent material, grouting/encapsulation, stabilization, and pH neutralization are examples of treatments. The characteristics of the containerized waste might be changed after treatment.

#### 4.1 WASTE TYPES

The following sections describe the types of materials that will be decontaminated or treated and sampled.

##### 4.1.1 Decontaminated Equipment

The majority of equipment contaminated with dangerous or mixed waste that is accepted at T Plant Complex for decontamination will be returned to service. This equipment is not considered waste after decontamination is

1 successfully completed, and it is not addressed further by this waste analysis  
2 plan. Some of the equipment that is contaminated with dangerous or mixed  
3 waste will not be returned to service because the contamination has not been  
4 sufficiently removed, the equipment cannot be repaired, or it is in some other  
5 way unsuited for service. At this time the equipment will be declared waste  
6 and managed appropriately.

#### 9 4.1.2 Decontamination Waste

10 Waste resulting from decontamination activities can be divided into three  
11 waste streams: (1) liquid mixed waste stored in tanks, (2) sludge that  
12 accumulates in tanks and is stored in the tanks, and (3) solid waste resulting  
13 from the nonaqueous decontamination processes (e.g., sand blasting, solid  
14 carbon dioxide blasting). The discussions in the subsequent sections apply to  
15 all three streams unless specifically stated otherwise.

16  
17  
18 Liquid mixed waste from decontamination activities in the 2706-T Building  
19 is accumulated in the railroad pit. From the railroad pit, the liquid mixed  
20 waste is pumped to the 211-T collection sump located southeast of the  
21 2706-T Building. The liquid mixed waste is transferred from the  
22 211-T collection sump to the 221-T Building mixed waste handling system by  
23 underground pipeline (refer to Section 1.2).

24  
25 Liquid mixed waste from decontamination activities in the 2706-T and  
26 221-T Buildings accumulates in a series of stainless steel tanks including  
27 tanks 6-1, 5-6, 5-7, 5-9, 11-R, and 15-1. From tank 15-1, the waste is  
28 characterized and pumped to a railroad tank car and transferred to another  
29 TSD unit.

30  
31 The decontamination waste collected in T Plant Complex tanks has two  
32 phases; liquid and settled sludge. These waste streams typically are mixed  
33 waste, but could include dangerous or radioactive waste. The liquid waste  
34 stream is predominantly water that could contain various contaminants. The  
35 sludge is a heavy viscous emulsion generally composed of water slurries  
36 containing sandblast sands, dirt, oils, and soaps. Decontamination efforts  
37 could include use of relatively dilute acidic and caustic solutions, steam,  
38 water, detergents, hydrocarbons, and abrasives. Equipment that is accepted  
39 for decontamination could contain chemical constituents such as oils, greases,  
40 and other hydrocarbons. Painted equipment could have heavy metal-bearing  
41 flakes of paint; plastics could add phthalates; and wood material could add  
42 other solvent-based paints and preservatives to the collection tanks. When  
43 sludge accumulation requires removal, the solids that accumulate in the  
44 bottoms of these tanks are characterized, placed in containers, and  
45 transferred to another TSD unit.

46  
47 The third waste stream from decontamination activities is a solid  
48 material that might be dangerous, mixed, or radioactive waste. This waste  
49 stream is a result of the residuals from nonaqueous decontamination processes  
50 such as sandblasting or carbon dioxide blasting, use of rags, and use of  
51 absorbent pads. The waste is collected, characterized, and stored in  
52 containers and transferred to another TSD unit.

1 The three waste streams are characterized based on process knowledge and  
2 on sampling and analysis. Sampling and analysis are conducted as described in  
3 Section 5.2.1 through 5.2.5.

#### 4 5 6 4.1.3 Maintenance Waste

7  
8 Various waste streams are generated during the performance of maintenance  
9 activities. This waste includes cloth, paper, rubber, concrete, glass, and  
10 contaminated equipment that might have come into contact with dangerous or  
11 mixed waste. Also included in this category are waste solvents in aerosol  
12 cans, high-efficiency particulate air filters, lead-containing paint waste,  
13 and routine maintenance waste. If process knowledge is insufficient to  
14 properly characterize the maintenance waste, sampling and analysis is  
15 performed before the waste is transferred to another TSD unit. The T Plant  
16 Complex ensures that characterization of the maintenance waste is sufficient  
17 to demonstrate compliance with the waste acceptance criteria of the TSD unit  
18 to which the waste will be transferred.

#### 19 20 21 4.1.4 Treatment Waste

22  
23 Treatment waste is produced when waste is treated at T Plant Complex.  
24 Contaminated equipment could be treated by applying an immobilization  
25 technology to the equipment and associated contamination. Immobilization  
26 technologies could include macro-encapsulation, micro-encapsulation, and  
27 sealing. Size reduction of equipment might be necessary to perform treatment  
28 on equipment. Certification statements will be completed when appropriate  
29 treatment methods are used for equipment and the Alternative Treatment  
30 Standards for Hazardous Debris (40 CFR 268.45) are met. Containerized waste  
31 could be treated in containers or removed from the containers before treatment  
32 and returned to the containers. In addition to the waste that is being  
33 treated, various waste streams are generated during the performance of  
34 treatment activities. This waste could include cloth, paper, rubber,  
35 concrete, and glass.

36  
37 The debris treatment standards (40 CFR 268.45) most likely to be  
38 implemented at T Plant Complex include the physical extraction methods of  
39 abrasive blasting and high pressure steam and water sprays, and the chemical  
40 extraction methods of water washing and spraying. These extraction  
41 technologies have a performance standard of a 'clean debris surface' for  
42 metal, glass, plastic, and rubber.

43  
44 "A clean debris surface means the surface, when viewed without  
45 magnification, shall be free of all visible contaminated soil and  
46 hazardous waste except that residual staining from soil and waste  
47 consisting of light shadows, slight streaks, or minor  
48 discolorations, and soil and waste in cracks, crevices, and pits may  
49 be present provided that such staining and waste and soil in cracks,  
50 crevices, and pits shall be limited to no more than 5 percent of  
51 each square inch of surface area" (40 CFR 268.45).

## 4.2 SAMPLING AND ANALYSIS OF THE DIFFERENT WASTE TYPES

The following sections describe the sampling procedures and the analyses that will be performed.

### 4.2.1 Characterization Parameters and Rationale

The parameters that are used to characterize the dangerous and/or mixed waste streams are selected to meet the objectives of designating the waste, providing for safe handling of the waste, meeting acceptance criteria at the receiving TSD unit, and meeting LDR requirements. Waste generated at T Plant Complex is characterized using process knowledge to the extent possible. Attachment 1 identifies the parameters, methods, and rationale that are used to complete characterization of the dangerous and/or mixed waste streams if process knowledge is insufficient.

Maintenance waste generally is completely characterized using process knowledge. Because maintenance waste is derived from known materials, process knowledge should be sufficient to characterize the waste. Sampling and analysis is used only if process knowledge is not adequate to characterize the waste, or the process producing the waste is not rigidly controlled. Maintenance waste is characterized sufficiently to meet regulatory requirements and to meet the acceptance criteria of the receiving TSD unit.

Solid equipment or debris treatment (decontamination) waste is best characterized using a combination of process knowledge and sampling and analysis. The solid equipment or debris treatment waste is expected to contain the contaminants that were present on the equipment or debris. However, the concentrations of contaminants will be unknown and there could be uncertainties in the range of contaminants. Therefore, sampling and analysis might be used to complete characterization of the solid treatment waste. Sampling and analysis also will be performed on treated waste, when necessary, to show compliance with treatment standards.

Liquid and sludge tanks waste will be characterized by sampling and analysis in cases where use of process knowledge is impracticable.

### 4.2.2 Characterization of Treated Waste

Containerized waste that has been treated at T Plant might be sampled to verify that treatment was successful. The sampling and associated analysis for treated containerized waste might only address prohibited or restricted constituent concentrations or waste characteristics for which the waste was treated. A more thorough analysis of treated containerized waste is unnecessary because waste received at T Plant Complex should have been characterized by the offsite waste generator and/or onsite generating unit.

Equipment or debris could be treated or decontaminated sufficiently to be reused. Equipment or debris that is useable and has been treated sufficiently to be reused might undergo field screening or limited sampling and analysis.

1 Limited characterization of useable material might be needed to ensure that  
2 contaminant levels do not pose a health or safety risk and the equipment can  
3 be used for its intended purpose. However, material that is to be reused does  
4 not require thorough characterization.

5  
6 Contaminated equipment or debris that is not functional or cannot be  
7 sufficiently treated for reuse will be declared waste that requires  
8 characterization and/or treatment. This equipment will be characterized  
9 primarily using process knowledge because of the difficulty of collecting  
10 representative samples. The waste could be treated before being transferred  
11 to another TSD unit. Equipment or debris that has been treated successfully  
12 using methods specified in regulatory requirements generally will not be  
13 sampled.

14  
15 Sampling treated containerized waste or contaminated equipment is not  
16 necessary if technology based standards or alternative treatment standards are  
17 applied to the waste. Alternative treatment standards might apply to  
18 contaminated equipment that meets the definition of debris in 40 CFR 268 and  
19 has been treated using EPA specified methods. Technology based standards  
20 might apply to non-debris or containerized waste that has been treated using  
21 EPA specified methods. Documentation including a certification is prepared to  
22 show that technology based standards or alternative treatment standards apply  
23 to a treated waste and the waste treatment meets regulatory requirements.

#### 24 25 26 4.2.3 Sampling Procedures

27  
28 Sampling information, chain-of-custody records, and analytical results  
29 are submitted as part of the data package supporting waste characterization.  
30 Sampling methods are designed to ensure that each sample is accounted for at  
31 all times. The primary objectives of the sample control methods are as  
32 follows:

- 33
- 34 • Each sample received for analysis is uniquely identified.
- 35
- 36 • The correct samples are analyzed and are traceable to the
- 37 applicable data records.
- 38
- 39 • Important and necessary sample constituents are preserved.
- 40
- 41 • Samples are protected from loss, damage, or tampering.
- 42
- 43 • Any alteration of samples during collection or transfer
- 44 (e.g., filtration, preservation, breakage) is documented.
- 45
- 46 • A record of sample custody and integrity is established that will
- 47 satisfy legal scrutiny.
- 48

49 The appropriate T Plant Complex personnel is responsible for arranging  
50 all sampling and laboratory support for sample analysis. Samples are  
51 processed at one of several laboratories qualified to perform analysis of  
52 waste samples. When the purpose of sample analysis is to designate waste,

1 sampling and analytical methods used are in accordance with EPA SW-846 methods  
2 (EPA 1986) or other methods approved by Ecology.

3  
4 The basic sampling sequence is as follows:

- 5
- 6 • Obtain sample number from the laboratory and complete the sample tag  
7 before sampling
- 8
- 9 • Obtain a precleaned sampler and sample bottles
- 10
- 11 • Attach sample label to sample bottles
- 12
- 13 • For sampling liquid waste, lower a sampler to obtain a representative  
14 sample of the waste liquid to be obtained. If the waste does not  
15 appear to be homogeneous, sample each stratified layer
- 16
- 17 • For sampling tank sludge, drag a sampling device along the bottom of  
18 the tank to collect sludge. Lift the sample device and decant excess  
19 water before filling sample bottles
- 20
- 21 • For sampling solid waste, use a scoop, trier, or hand auger to obtain  
22 a sample of the waste. For large containers of waste, composite  
23 several augers or scoops to ensure samples are representative
- 24
- 25 • Fill sample containers in the following sequence: volatile organics,  
26 semivolatile organics, metals, ignitability, pH (corrosivity)
- 27
- 28 • For liquid and sludge waste, rinse exterior surfaces of sample bottles  
29 with water and wipe with a dry rag
- 30
- 31 • For solid waste, wipe the exterior surfaces of the sample bottles with  
32 a dry rag
- 33
- 34 • Double bag sample bottles in plastic bags and seal each bag with tape
- 35
- 36 • Attach sample labels to outer plastic bags
- 37
- 38 • Place samples in a durable ice-filled cooler or comparable receptacle  
39 for transfer to the laboratory
- 40
- 41 • Complete the chain-of-custody forms
- 42
- 43 • Review all documentation and enclose the forms in a leaktight,  
44 polyethylene bag taped to the underside of the cooler lid
- 45
- 46 • Seal and mark the coolers or comparable receptacles in accordance with  
47 onsite requirements
- 48
- 49 • Transfer coolers to the analytical laboratory within 24 hours of  
50 collection
- 51

- 1 • Properly clean and decontaminate sampling hardware or package for  
2 return to central sampling equipment decontamination area according to  
3 onsite requirements.  
4

5 The sampling team should ensure that all samples are labeled with the  
6 following information:  
7

- 8 • A unique identifier  
9 • Date, time, and location of collection  
10 • Sample collector's name  
11 • Preservatives used  
12 • Analyses requested.  
13

14 Sample collectors prepare a permanent log of sampling activities.  
15 The log entries include as appropriate: date of collection, time of  
16 collection, location, batch number, sample number, tank number, copy of the  
17 chain-of-custody form, sampling methodology, container description, waste  
18 matrix (liquid), description of generating process (e.g., decontamination  
19 activities), number and volume of samples, field observations, field  
20 measurements (e.g., pH, percent lower explosive limit), laboratory destination  
21 and laboratory number; and signature of collector. These logs entries are  
22 made by the appropriate T Plant Complex personnel while the sampling is  
23 performed. The logs or copies of them are maintained by the appropriate  
24 T Plant Complex personnel after completion of sampling activities.  
25

26 A chain-of-custody record accompanies samples at all times. The record  
27 contains the sample number, date and time of collection, sample type, sample  
28 location, methods of transfer, and signatures of the collector and all  
29 subsequent custodians.  
30

31 All equipment used to sample waste material is disposable or designed for  
32 easy decontamination. Contaminated disposable equipment is managed as  
33 dangerous waste as appropriate. Cleanable equipment is decontaminated  
34 thoroughly before reuse or return to central sampling equipment  
35 decontamination area.  
36

37 During all sampling activities, strict compliance with industrial hygiene  
38 and safety standards is mandatory. Personnel are required to wear eye, skin,  
39 and respiratory protection as dictated by the health physics technician or by  
40 requirements. If samplers accidentally contact waste material,  
41 decontamination is immediately performed.  
42

43 Transportation of samples is in accordance with all applicable  
44 requirements. Dangerous and/or mixed waste samples are packaged properly,  
45 marked, and labeled. Waste tracking forms are prepared.  
46  
47

#### 48 4.2.4 Analytical Methods 49

50 Attachment 1 lists the analytical methods used to determine the  
51 characteristics of the waste generated during decontamination, maintenance,  
52

1 and other treatment activities. To the extent possible, analytical test  
2 methods will be those specified by the EPA (1986).

3  
4 As previously discussed, waste can be characterized based on chemical  
5 data, materials profiles, or other process-related information in addition to  
6 analysis.

#### 9 4.2.5 Frequency of Sampling and Analysis

10  
11 Liquid mixed waste from treatment and/or decontamination activities is  
12 sampled from tank 15-1 before waste transfer to the DST System (DOE/RL-90-38).  
13 If after a minimum of four sampling events, the results of the analyses  
14 indicate variation of less than 25 percent in the sample population (as  
15 measured by the coefficient of variation), the sampling frequency can be  
16 reduced to not less than once a year.

17  
18 Sludge in tanks is sampled, at a minimum, before each sludge removal  
19 event.

20  
21 The solid dangerous and/or mixed waste from decontamination, maintenance,  
22 and other treatment is sampled as necessary to ensure accurate designation  
23 before transfer of the waste.

24  
25 Sampling and analysis will be required under the following circumstances.

- 26 • Process knowledge is inadequate.
- 27 • A new waste stream is accepted for decontamination.
- 28 • The waste generating process for a given waste stream changes.
- 29 • The waste characteristics are highly variable from transfer to  
30 transfer for a specific offsite generator and/or onsite  
31 generating unit.
- 32 • The waste physically or chemically is unstable.

33  
34 Waste generated at T Plant Complex is characterized before transfer to  
35 another TSD unit.

#### 43 4.3 NOTIFICATION REQUIREMENTS PERTAINING TO LAND DISPOSAL 44 RESTRICTIONS FOR DEBRIS

45  
46 If the waste generated by T Plant Complex is subject to LDR and meets the  
47 applicable treatment standards, a notification and a certification stating  
48 that the waste meets all applicable treatment standards will be submitted to  
49 the receiving unit. If the waste does not meet applicable treatment  
50 standards, a notification stating this fact, the dangerous waste number(s),  
51 the constituent composition of the waste for constituents that do not meet the  
52 standards, and the treatment standards applicable to each constituent are

1 provided. Sections 5.3.1 and 5.3.2 describe the notification requirements  
2 that will be met for debris and for other waste streams.

#### 3 4 5 4.3.1 Notification Requirements for Debris

6  
7 A one-time notification will be provided to the EPA and Ecology for  
8 debris that is treated by an extraction or destruction technology identified  
9 in 40 CFR 268.45. The notification will include the following information:

- 10 • The name and location of the TSD unit receiving the treated debris
- 11 • A description of the dangerous debris as originally generated,  
12 including applicable waste numbers
- 13 • The technology used to treat the debris
- 14 • Records, including a certification, sufficient to document that  
15 decontamination was appropriately conducted and the  
16 technology-specific performance standards were achieved.

17  
18 If a treatment technology in 40 CFR 268.45 is used, regulatory  
19 pre-notification and approval of the treatment method is not required. In  
20 addition, if the technology-specific performance standards are achieved,  
21 sampling to confirm treatment typically is not required (EPA 1994).

22 Notifications will be updated when any of the following changes are made.

- 23 • The debris is transferred to a different TSD unit.
- 24 • A different type of debris is treated.
- 25 • A different treatment technology is used.

26  
27 Records of treatment/decontamination operations, certifications, and  
28 notifications will be maintained on the Hanford Facility. In addition,  
29 records of data on the success of treatment and associated key decontamination  
30 and/or treatment operating parameters are maintained. Before disposal of  
31 waste debris, a certification that the waste meets all applicable treatment  
32 standards will be prepared and maintained on file at the T Plant Complex.  
33 Notifications that are provided to the EPA and Ecology for treated debris also  
34 are maintained on file.

#### 35 36 37 4.3.2 Notification Requirements for Waste Streams

38  
39 Characterization information for the waste streams other than debris is  
40 provided to other TSD units that receive the waste. Analytical  
41 characterization data, necessary process knowledge, and LDR information will  
42 accompany the waste. The following LDR related information is provided to the  
43 receiving unit:

- 44 • Waste numbers
- 45 • The corresponding treatment standard

- 1 • The waste tracking identification number associated with the waste
- 2 • Available waste analysis and process knowledge.
- 3
- 4

## 5.0 QUALITY ASSURANCE AND QUALITY CONTROL

The following discussion presents the objectives of the QA and QC program that support the sampling and analysis of T Plant Complex waste.

### 5.1 QUALITY ASSURANCE AND QUALITY CONTROL OBJECTIVES

The primary purpose of waste testing is to ensure that the waste is properly characterized in compliance with WAC 173-303-300. Waste testing also is performed to ensure the safe management of waste being treated, stored, and/or transferred to another TSD unit. Testing ensures proper designation of waste accepted for storage or verification, and adequate characterization of waste generated during operational activities. To accomplish these goals, the QA/QC program must ensure that chemical and physical analysis of representative samples of the waste that is treated or stored is of adequate quality.

The objectives of the QA/QC program are two-fold. The first objective is to control and characterize any errors associated with the data. The QA activities, such as the inspection of transfer papers before waste acceptance and use of standard methods for collecting samples, are intended to limit the introduction of error. The QC activities, such as the collection of duplicate samples and the inclusion of blanks in sample sets, are intended to provide the information required to characterize errors in the data. Other QC activities ensure that the specified methods are followed and that the QA information needed for characterizing error is obtained.

The second QA/QC objective is to illustrate that waste testing has been performed according to specifications in this waste analysis plan. These QA/QC activities will include the following.

- **Field inspections**--performed by the appropriate T Plant Complex personnel and a member of the T Plant Complex compliance group, depending on the activity. The inspections are visual examinations but could include radiologic measurements of containers and equipment. The purpose of these inspections is to verify that sampling is being performed properly (i.e., according to the specific guideline, specification, or method for the activity) and is successfully completed.
- **Field testing**--performed by trained sampling personnel with oversight by the appropriate T Plant Complex personnel according to specified methods. The purpose of field testing is to ensure that the waste received is labeled properly and designated. Field testing might include tests such as pH sampling, polychlorinated biphenyl and chlorinated compound screening, water reactivity, or oxidizing/reducing agent screening.
- **Laboratory analyses**--performed by onsite and offsite laboratories on samples of waste. The purpose of the laboratory analyses is

1 to demonstrate acceptable precision, accuracy, and  
 2 representativeness of the data.  
 3

- 4 • **Instrument calibration**--maintain records of calibration of all  
 5 instruments used to perform surveying, field testing, and  
 6 laboratory analyses to demonstrate that instruments are within  
 7 appropriate operating ranges to ensure data quality.  
 8

9  
 10 **5.2 SAMPLING, COLLECTION, AND ANALYTICAL OBJECTIVES**  
 11

12 The sampling objectives and data collection and analytical objectives are  
 13 described in this section.  
 14

15  
 16 **5.2.1 Sampling Objectives**  
 17

18 Data quality objectives (DQOs) for the waste sampling and data analyses  
 19 are as follows:  
 20

- 21 • Characterize the waste for purposes of designation and safe management  
 22
- 23 • Verify whether waste accepted for treatment or storage meets the  
 24 waste characterization provided by the offsite generator and/or  
 25 onsite generating unit  
 26
- 27 • Determine if waste accepted for storage or treatment meets the  
 28 requirements of T Plant Complex waste acceptance criteria  
 29
- 30 • Ensure waste samples are representative of the contents of the  
 31 containers and tanks at the time the samples were taken  
 32
- 33 • Determine if waste accepted for characterization is regulated by  
 34 WAC 173-303  
 35
- 36 • Determine if the waste to be transferred to another TSD unit meets the  
 37 requirements of the unit's waste acceptance criteria  
 38
- 39 • Determine if treatment objectives have been achieved.  
 40

41  
 42 **5.2.2 Data Collection and Analytical Objectives**  
 43

44 The acquired data need to be scientifically sound, of known quality, and  
 45 thoroughly documented. The DQOs for the data collection and analysis are  
 46 consistent with the DQOs specified in the *Hanford Analytical Services Quality*  
 47 *Assurance Plan* (DOE/RL-94-55).  
 48

49 The data for chemical analyses accepted from onsite and offsite  
 50 laboratories must meet the quality level described in the *Hanford Analytical*  
 51 *Services Quality Assurance Plan* (DOE/RL-94-55).  
 52

1 **5.3 FIELD QUALITY ASSURANCE AND QUALITY CONTROL**

2  
3 Field QA/QC checks will be established by both qualitative documentation  
4 of sampling events and by submitting QA/QC samples to the analytical  
5 laboratory. Documentation of field sampling activities will include the  
6 following:

- 7  
8 • Chain-of-custody use  
9 • Sample holding times  
10 • Sample preservation  
11 • Sampling equipment decontamination procedures  
12 • Field log documentation.  
13

14 Field QC procedures involve taking additional samples and sending them to  
15 the analytical laboratory. Quantitative QC samples that are taken at each  
16 sampling event include trip blanks, equipment blanks, and field duplicates  
17 (DOE/RL-94-55). Each of these field QC samples is collected at approximately  
18 5 percent of the total number of field samples taken for each matrix.  
19  
20

21 **5.4 LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL**

22  
23 The quality of analytical data to be maintained by the analytical  
24 laboratories is defined by compliance with the *Hanford Analytical Services*  
25 *Quality Assurance Plan* (DOE/RL-94-55).  
26

27 Before commencement of the analytical work, the laboratory will submit  
28 its QA plan for approval (DOE/RL-94-55). At a minimum, an acceptable plan  
29 must address the following:  
30

- 31 • Sample custody and management practices  
32 • Analytical methods  
33 • Sample preparation and analytical procedures  
34 • Instrument maintenance and calibration procedures  
35 • Internal QA/QC measures including the use of method blanks  
36 • Sample preservatives  
37 • Other requirements if specified.

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## 6.0 RECORDKEEPING

This section describes recordkeeping, including waste analysis plan records, land disposal restriction records, and waste analysis plan maintenance and revision.

### 6.1 WASTE ANALYSIS PLAN RECORDS

This waste analysis plan is maintained by T Plant Complex. All documents referenced in the waste analysis plan except for the laboratory documents, which are maintained by the laboratories, also are maintained with the waste analysis plan as part of the T Plant Complex operating record.

The records associated with the waste analysis plan are maintained as part of the operating record. These records are as follows:

- Description and quantity of each dangerous or mixed waste managed and the method(s) and date(s) of treatment are maintained in accordance with WAC 173-303-380 and 40 CFR 264, Appendix I. Offsite generators and/or onsite generating units maintain their sampling and analysis records, and T Plant Complex personnel can request copies of this information. Analytical data submitted with waste transfers are maintained with the waste descriptions and transfer papers.
- Waste manifests and onsite waste tracking records, describing the types and quantities of waste, are maintained as part of the permanent record at T Plant Complex.
- Location of each dangerous or mixed waste stored within T Plant Complex and the quantity at each location are documented and maintained. Transfers are documented on onsite waste tracking records and provided to other TSD units receiving the waste.
- Waste analyses and designation records for T Plant Complex-generated waste are maintained, as appropriate, for the following:
  - Waste generated at T Plant Complex from the decontamination activities at T Plant Complex
  - Waste characterized (identified and/or verified) at T Plant Complex as a service for other organizations
  - Waste generated from maintenance activities at T Plant Complex
  - Waste resulting from a spill or leak.
- Records and results of waste analyses and trial tests required to manage the dangerous or mixed waste properly (including any supplied analytical and test data)

- 1 • The LDR information contained in the notices (except the manifest  
2 number), and certifications and demonstrations, if applicable,  
3 required under 40 CFR 268.7.  
4

5 As required, results of these analyses are provided to other TSD units  
6 subsequently receiving the waste for further treatment, storage, and/or  
7 disposal.  
8  
9

## 10 6.2 LAND DISPOSAL RESTRICTION RECORDS

11 Records related to treatment of waste subject to LDR requirements are  
12 maintained by the Hanford Facility as required by 40 CFR 264.73(b)(10) and  
13 (12). Records include but are not necessarily limited to the following:  
14

- 15
- 16 • The applicable notice and certification required by 40 CFR 268.7(a) or  
17 40 CFR 268.7(b)
  - 18 • Records of waste placed in land disposal units under an extension to  
19 the effective date of any LDR granted pursuant to 40 CFR 268.5
  - 20 • Records of waste placed in land disposal units under a petition  
21 granted pursuant to 40 CFR 268.6.  
22  
23  
24

25 An onsite waste tracking system is in place to document the transfer of  
26 waste subject to LDRs.  
27  
28

## 29 6.3 WASTE ANALYSIS PLAN MAINTENANCE AND REVISION

30 The waste analysis plan is maintained as a controlled document under the  
31 existing guidelines. Documents are maintained for a minimum period of 5 years  
32 per WAC 173-303.  
33

34 The waste analysis plan will be revised under the following  
35 circumstances:  
36

- 37
- 38 • Test methods are changed
  - 39 • Waste streams or process operations are modified, thus requiring a  
40 change in the parameters to be tested
  - 41 • Regulations are changed that affect the plan.  
42  
43  
44

45 Revisions to the plan will be made under the direction of T Plant Complex  
46 personnel.

## 7.0 REFERENCES

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ATTACHMENT 1

ANALYTICAL PARAMETERS, METHODS, AND RATIONALE FOR WASTE

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## Analytical Parameters, Methods, and Rationale for Waste. (sheet 1 of 6)

Parameter	Analytical method <sup>a</sup>	Rationale for selection of waste acceptance parameters	Rationale for analysis	
			Unknown waste	Waste generated at T Plant Complex
General chemistry				
Flashpoint	1010/1020	To provide documentation for safe storage conditions	To determine regulatory status as D001 waste	To provide proper waste designation and applicability of LDR requirements
pH	9040	To indicate the degree of corrosivity for safe handling; to provide for proper waste designation; and to identify waste that might compromise container integrity	To determine regulatory status as D002 waste	To provide proper waste designation, applicability of LDR requirements, state-only requirements, and to meet DST System waste acceptance criteria
Hydroxide	9040	To provide documentation for safe storage conditions; and to comply with DST System waste acceptance criteria.	Not applicable	To provide proper waste designation, applicability of LDR requirements, and to meet DST System waste acceptance criteria
Water reactivity	Field method	To determine whether the waste has a potential to violently react with water to form gases or generate heat; to provide documentation for safe storage conditions for waste designation; and to comply with DST System waste acceptance criteria.	Waste designation; safe storage and management	To provide proper waste designation and management

Analytical Parameters, Methods, and Rationale for Waste. (sheet 2 of 6)

Parameter	Analytical method <sup>a</sup>	Rationale for selection of waste acceptance parameters	Rationale for analysis	
			Unknown waste	Waste generated at T Plant Complex
Fluoride	EPA 413-C	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To meet LDR requirements	To meet LDR requirements
Cyanide	9010	For safe storage; for proper waste designation; applicability of LDR; and characterization of appropriate treatment	Not applicable	To meet LDR requirements
Sulfide	9030	For safe storage; for proper waste designation; applicability of LDR; and characterization of appropriate treatment	Not applicable	To meet LDR requirements
Chloride	9250	Not applicable	Not applicable	To comply with DST System waste acceptance criteria <sup>b</sup>
Nitrite	EPA 300.0	To comply with DST System waste acceptance criteria	Not applicable	To comply with DST System waste acceptance criteria <sup>b</sup>
Nitrate	EPA 300.0	To comply with DST System waste acceptance criteria	Not applicable	To comply with DST System waste acceptance criteria <sup>b</sup>
Reactivity	Laboratory specific	To comply with DST System waste acceptance criteria	Not applicable	To comply with DST System waste acceptance criteria <sup>b</sup>

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## Analytical Parameters, Methods, and Rationale for Waste. (sheet 3 of 6)

Parameter	Analytical method <sup>a</sup>	Rationale for selection of waste acceptance parameters	Rationale for analysis	
			Unknown waste	Waste generated at T Plant Complex
Organic analyses				
PCBs	8080	To determine proper waste designation for management of waste in accordance with the <i>Toxic Substance Control Act of 1976</i> and WAC 173-303.	To meet LDR requirements	To determine proper waste designation; to meet LDR requirements
Total organic carbon	9060	To comply with DST System waste acceptance criteria; applicability of LDR	To determine and applicability of LDR requirements	To comply with DST System waste acceptance criteria <sup>b</sup> ; applicability to LDR
Volatile organic compounds	1311/8260	To determine proper waste designation, applicability of LDRs, and characterization of appropriate treatment.	To determine regulatory status to meet LDR requirements	To provide proper waste designation and applicability of LDR requirements
Semivolatile organic compounds	1311/8270	To determine proper waste designation, applicability of LDRs, and characterization of appropriate treatment.	To determine regulatory status to meet LDR requirements	To provide proper waste designation and applicability of LDR requirements
Chlorinated herbicides	8150	Not applicable	Not applicable	To provide proper waste designation and applicability to state-only requirements.

## Analytical Parameters, Methods, and Rationale for Waste. (sheet 4 of 6)

Parameter	Analytical method <sup>a</sup>	Rationale for selection of waste acceptance parameters	Rationale for analysis	
			Unknown waste	Waste generated at T Plant Complex
Inorganic analyses				
Arsenic	1311/6010	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine regulatory status as toxicity characteristic waste	To provide proper waste designation and applicability of LDR requirements
Barium	1311/6010	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine regulatory status as toxicity characteristic waste	To provide proper waste designation and applicability of LDR requirements
Cadmium	1311/6010	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine regulatory status as toxicity characteristic waste	To provide proper waste designation and applicability of LDR requirements
Chromium	1311/6010	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine regulatory status as toxicity characteristic waste	To provide proper waste designation and applicability of LDR requirements
Lead	1311/6010	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine regulatory status as toxicity characteristic waste	To provide proper waste designation and applicability of LDR requirements

Analytical Parameters, Methods, and Rationale for Waste. (sheet 5 of 6)

Parameter	Analytical method <sup>a</sup>	Rationale for selection of waste acceptance parameters	Rationale for analysis	
			Unknown waste	Waste generated at T Plant Complex
Mercury	1311/7470	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine regulatory status as toxicity characteristic waste	To provide proper waste designation and applicability of LDR requirements
Silver	1311/6010	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine regulatory status as toxicity characteristic waste	To provide proper waste designation and applicability of LDR requirements
Selenium	1311/6010	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine regulatory status as toxicity characteristic waste	To provide proper waste designation and applicability of LDR requirements
Nickel	6010	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To meet LDR requirements	To meet LDR requirements
Vanadium	6010	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To meet LDR requirements	To meet LDR requirements

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## Analytical Parameters, Methods, and Rationale for Waste. (sheet 6 of 6)

Parameter	Analytical method <sup>a</sup>	Rationale for selection of waste acceptance parameters	Rationale for analysis	
			Unknown waste	Waste generated at T Plant Complex
Zinc	6010	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To meet LDR requirements	To meet LDR requirements
Total plutonium	Laboratory specific	To comply with DST System waste acceptance criteria	Not applicable	To comply with DST System waste acceptance criteria <sup>b</sup>
State toxicity criterion	WAC 173-303-100(5)	Not applicable	Not applicable	To provide proper waste designation and applicability to state-only requirements.
State persistence criterion	WAC 173-303-100(6)	Not applicable	Not applicable	To provide proper waste designation and applicability to state-only requirements.

<sup>a</sup> EPA 1986, unless otherwise noted.

<sup>b</sup> DOE/RL-90-39.

DST = double-shell tank.

LDR = land disposal restriction.

PCB = polychlorinated biphenyls.

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ATTACHMENT 2

FIELD AND LABORATORY ANALYTICAL METHODS  
FOR VERIFICATION FINGERPRINT SAMPLING

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1 Field and Laboratory Analytical Methods  
2 for Verification Fingerprint Sampling.  
3

Parameters	Analytical method/instrumentation
<b>Field analyses</b>	
Corrosivity	pH paper (within $\pm 2.5$ units) or pH meter $\pm 1$ unit
Water reactivity	Physical changes upon water addition
Oxidizing agent	Color change upon potassium iodide (KI) addition
Reducing agent	Color change upon starch/water/iodide addition
Chlorinated compounds	Presence or absence indicated by chlorine test kit
<b>Laboratory analyses</b>	
<u>Listed waste/ Waste Constituents</u>  P or U listed waste  F001-F003, F005  F004	EPA-approved analytical test methods <sup>1</sup>  Process knowledge  SW-846 Method 8240; extraction will vary depending on whether waste is aqueous, sludge, or solid  SW-846 Method 8270; extraction will vary depending on whether waste is aqueous, sludge, or solid
<u>Toxicity characteristics waste</u>  D004-D008, D010-D011  D009  D012 - D043	EPA-approved analytical test methods <sup>2</sup>  SW-846 Method 1311 (TCLP)/6010  SW-846 Method 1311 (TCLP)/7470  SW-846 Method 1311 (TCLP)/8240, 8270, and 8080
Corrosivity	SW-846 Method 9040 <sup>1</sup>
Ignitability	SW-846 Method 1010 or 1020 <sup>1</sup>
Reactivity:  Sulfides  Total and amenable cyanides	EPA-approved analytical test methods <sup>1</sup>  SW-846 Method 9030  SW-846 Method 9010

38  
39 <sup>1</sup> EPA 1986.