1 of 1

<div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">ET</div> <div style="margin-left: 10px;"> STA 4 MAR 24 1995 </div>	ENGINEERING DATA TRANSMITTAL	Page 1 of <u>1</u> 1. EDT 609626
---	-------------------------------------	--

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) WRAP 1 Startup	4. Related EDT No.: n/a
5. Proj./Prog./Dept./Div.: W-026	6. Cog. Engr.: B.A. Mayancsik	7. Purchase Order No.: n/a
8. Originator Remarks: N/A		9. Equip./Component No.: n/a
11. Receiver Remarks:		10. System/Bldg./Facility: n/a
		12. Major Assm. Dwg. No.: n/a
		13. Permit/Permit Application No.: n/a
		14. Required Response Date: n/a

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-W026-PLN-006		0	WRAP Module 1 Sampling and Analysis Plan	EQ	2		

16. KEY					
Approval Designator (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)		1. Approval 2. Release 3. Information	4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment	4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)										(G)	(H)
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
1	1	Cog.Eng. B.A. Mayancsik	<i>B.A. Mayancsik</i>	3-20-95	T3-01	D.E. McKenney		3-20-95	N3-13	3	
1	1	Cog. Mgr. R.J. Bottorus	<i>R.J. Bottorus</i>	3/20/95	T3-01	G.C. Triner	<i>G.C. Triner</i>	3/20/95	T3-04	1	1
1	1	QA. D.D. Volkman	<i>D.D. Volkman</i>	3/22/95	H4-16	R.D. Pierce	<i>R.D. Pierce</i>	3/21/95	T3-04	1	1
		Safety.				M.L. Sheriff			T3-01	3	
1	1	Env. E.M. Greager	<i>E.M. Greager</i>	3/22/95	H6-20	Central Files	<i>(2)</i>		L8-04	3	
3		C.M. Seidel			H4-19	Solid Waste Processing Center			T3-01	3	
1	1	M.B. Walsh	<i>M.B. Walsh</i>	3-22-95	H6-20	OSTI (2 copies)			L8-07	3	
3		D.C. Derosa			X3-75						
1	1	J.D. Elliott	<i>J.D. Elliott</i>		T4-06						

18. <i>B.A. Mayancsik</i> Signature of EDT Originator Date 3-20-95	19. <i>R.J. Bottorus</i> Authorized Representative Date 3/23/95 for Receiving Organization	20. <i>R.J. Bottorus</i> Cognizant Manager Date 3/23/95
21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments		

BD-7400-172-2 (04/94) GEF097

RECEIVED
 APR 18 1995
 OSTI

INSTRUCTIONS FOR COMPLETION OF THE ENGINEERING DATA TRANSMITTAL

(USE BLACK INK OR TYPE)

BLOCK	TITLE	
(1)*	EDT	● Pre-assigned EDT number.
(2)	To: (Receiving Organization)	● Enter the individual's name, title of the organization, or entity (e.g., Distribution) that the EDT is being transmitted to.
(3)	From: (Originating Organization)	● Enter the title of the organization originating and transmitting the EDT.
(4)	Related EDT No.	● Enter EDT numbers which relate to the data being transmitted.
(5)*	Proj./Prog./Dept./Div.	● Enter the Project/Program/Department/Division title or Project/Program acronym or Project Number, Work Order Number or Organization Code.
(6)*	Cognizant Engineer	● Enter the name of the individual identified as being responsible for coordinating disposition of the EDT.
(7)	Purchase Order No.	● Enter related Purchase Order (P.O.) Number, if available.
(8)*	Originator Remarks	● Enter special or additional comments concerning transmittal, or "Key" retrieval words may be entered.
(9)	Equipment/Component No.	● Enter equipment/component number of affected item, if appropriate.
(10)	System/Bldg./Facility	● Enter applicable system, building or facility number, if appropriate.
(11)	Receiver Remarks	● Enter special or additional comments concerning transmittal.
(12)	Major Asm. Dwg. No.	● Enter applicable drawing number of major assembly, if appropriate.
(13)	Permit/Permit Application No.	● Enter applicable permit or permit application number, if appropriate.
(14)	Required Response Date	● Enter the date a response is required from individuals identified in Block 17 (Signature/Distribution).
(15)*	Data Transmitted	
(A)*	Item Number	● Enter sequential number, beginning with 1, of the information listed on EDT.
(B)*	Document/Drawing No.	● Enter the unique identification number assigned to the document or drawing being transmitted.
(C)*	Sheet No.	● Enter the sheet number of the information being transmitted. If no sheet number, leave blank.
(D)*	Rev. No.	● Enter the revision number of the information being transmitted. If no revision number, leave blank.
(E)	Title or Description of Data Transmitted	● Enter the title of the document or drawing or a brief description of the subject if no title is identified.
(F)*	Approval Designator	● Enter the appropriate Approval Designator (Block 15). Also, indicate the appropriate approvals for each item listed, i.e., SQ, ESQ, etc.
(G)	Reason for Transmittal	● Enter the appropriate code to identify the purpose of the data transmittal (see Block 16).
(H)	Originator Disposition	● Enter the appropriate disposition code (see Block 16).
(I)	Receiver Disposition	● Enter the appropriate disposition code (see Block 16).
(16)	Key	● Number codes used in completion of Blocks 15 (G), (H), and (I), and 17 (G), (H) (Signature/Distribution).
(17)	Signature/Distribution	
(G)	Reason	● Enter the code of the reason for transmittal (Block 16).
(H)	Disposition	● Enter the code for the disposition (Block 16).
(J)	Name	● Enter the signature of the individual completing the Disposition 17 (H) and the Transmittal.
(K)*	Signature	● Obtain appropriate signature(s).
(L)*	Date	● Enter date signature is obtained.
(M)*	MSIN	● Enter MSIN. Note: If Distribution Sheet is used, show entire distribution (including that indicated on Page 1 of the EDT) on the Distribution Sheet.
(18)	Signature of EDT Originator	● Enter the signature and date of the individual originating the EDT (entered prior to transmittal to Receiving Organization). If the EDT originator is the cognizant engineer, sign both Blocks 17 and 18.
(19)	Authorized Representative for Receiving Organization	● Enter the signature and date of the individual identified by the Receiving Organization as authorized to approve disposition of the EDT and acceptance of the data transmitted, as applicable.
(20)*	Cognizant Manager	● Enter the signature and date of the cognizant manager. (This signature is authorization for release.)
(21)*	DOE Approval	● Enter DOE approval (if required) by signature or control number that tracks the approval to a signature, and indicate DOE action.

*Asterisk denote the required minimum items check by Configuration Documentation prior to release; these are the minimum release requirements.

RELEASE AUTHORIZATION

Document Number: WHC-SD-W026-PLN-006, REV.0

Document Title: WRAP Module 1 Sampling and Analysis Plan

Release Date: March 24, 1995

**This document was reviewed following the
procedures described in WHC-CM-3-4 and is:**

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara M. Broz

March 24, 1995

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

This report has been reproduced from the best available copy. Available in paper copy and microfiche. Printed in the United States of America. Available to the U.S. Department of Energy and its contractors from:

U.S. Department of Energy
Office of Scientific and Technical Information (OSTI)
P.O. Box 62
Oak Ridge, TN 37831
Telephone: (615) 576-8401

Available to the public from: U.S. Department of Commerce
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Telephone: (703) 487-4650

SUPPORTING DOCUMENT		1. Total Pages 56
2. Title WRAP Module 1 Sampling and Analysis Plan	3. Number WHC-SD-W026-PLN-006	4. Rev No. 0
5. Key Words WRAP 1, sampling, analysis, field screening, waste, plan	6. Author Name: B.A. Mayancsik <i>B.A. Mayancsik</i> Signature Organization/Charge Code 87370/A4GA1	
7. Abstract <p>This document provides the methodology to sample, screen, and analysis waste generated, processed, or other the responsibility of the Waste Receiving and Processing Module 1 facility. This includes Low-Level Waste, Transuranic Waste, Mixed Waste, and Dangerous Waste.</p>		
<div style="text-align: center;">DISCLAIMER</div> <p>This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.</p>		
		8. RELEASE STAMP <div style="border: 1px solid black; padding: 5px; text-align: center;"> OFFICIAL RELEASE 13 BY WFO DATE MAR 24 1995 <i>STA 4</i> </div>

WRAP MODULE 1
SAMPLING AND ANALYSIS PLAN

B.A. Mayancsik

Special Acknowledgement

to

G.C. Triner

D.C. Derosa

WHC-SD-W026-PLN-006 Rev 0

TABLE OF CONTENTS

1.0	INTRODUCTION	7
1.1	PURPOSE	7
1.2	SCOPE	7
2.0	OBJECTIVES AND CRITERIA	9
2.1	OBJECTIVES	9
2.2	REGULATIONS	9
2.3	DATA QUALITY OBJECTIVES	10
3.0	RESPONSIBILITIES	11
4.0	SAMPLING LOCATIONS, WASTE FORMS, AND ANALYTES	14
4.1	SAMPLING LOCATIONS	14
4.2	WASTE FORMS AND ANALYTES	15
5.0	SAMPLE METHODS AND EQUIPMENT	17
5.1	SAMPLING EQUIPMENT	17
6.0	SAMPLE ANALYSIS	19
6.1	FIELD SCREENING ANALYSIS	19
6.2	LABORATORY ANALYSIS FOR CHEMICALS	21
6.3	LABORATORY ANALYSIS FOR RADIONUCLIDES	23
7.0	QUALITY ASSURANCE AND QUALITY CONTROL	28
7.1	FIELD DATA COLLECTION	28
7.2	FIELD SCREENING	29
7.3	QA/QC SAMPLES	29
7.3.1	Trip Blank	29
7.3.2	Equipment Blanks	29
7.3.3	Duplicate Samples	30
7.4	QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA	30
7.4.1	Precision	30
7.4.2	Accuracy	31
7.4.3	Representativeness	31
7.4.4	Completeness	31
7.4.5	Required Method Detection Limits	32
7.4.6	Holding Times	34
7.4.7	Comparability	34
8.0	REPORTING	35
8.1	FIELD SCREENING	35
8.2	LABORATORY DATA	35
9.0	HEALTH AND SAFETY CONSIDERATIONS	35
10.0	REFERENCES	36
	APPENDIX A ANALYTE LIST	39

LIST OF TABLES

Table 1-1	WRAP MODULE 1 SAMPLING PHILOSOPHY	8
Table 5-1	SAMPLING METHODOLOGIES	18
Table 6-1	TEST METHODS FOR FIELD SCREENING	19
Table 6-2	WASTE CHARACTERISTICS PER WAC-173-303	22
Table 6-3	WASTE CHARACTERIZATION CHEMICAL ANALYSIS	23
Table 6-4	FISSILE TRU RADIONUCLIDES	25
Table 6-5	RADIONUCLIDE CONCENTRATION LIMITS FOR LLW	26
Table 6-6	WASTE CHARACTERIZATION RADIONUCLIDE ANALYSES	27
Table 7-1	SUGGESTED WASTE CHARACTERIZATION ANALYSIS PQLs	33

ACRONYMNS

ALARA As Low as Reasonably Achievable
 CFR *Code of Federal Regulations*
 DOE U.S. Department of Energy
 DQO Data Quality Objectives
 GEA gamma energy assay
 IH Industrial Hygienist
 JHA Job Hazard Analysis
 LLW Low-Level Waste
 MQL Method Quantitation Limit
 MSDS Material Safety Data Sheets
 MW Mixed Waste
 PAN passive/active neutron
 PCB Polychlorinated Biphenyl
 PPE Personal Protective Equipment
 PQL Practical Quantitation Limit
 QA/QC Quality Assurance/Quality Control
 RCRA Resource Conservation and Recovery Act
 RO/DI Reverse Osmosis/De-Ionized
 RSD Relative Standard Deviation
 SAP Sampling and Analysis Plan
 SVOA Semi-volatile Organic Compound
 TCLP Toxicity Characteristic Leaching Procedure
 TRU transuranic
 TOC Total Organic Carbon
 USEPA U.S. Environmental Protection Agency
 VOC Volatile Organic Compound
 WAC *Washington Administrative Code*
 WDOE Washington State Department of Ecology
 WIPP Waste Isolation Pilot Plant
 WRAP Waste Receiving and Processing

WHC-SD-W026-PLN-006 Rev 0

1.0 INTRODUCTION

This sampling and analysis plan (SAP) defines the approach that is used to sample, screen, and analyze waste processed through or generated in the Waste Receiving and Processing (WRAP) Module 1 facility. This includes waste retrieved from Hanford Site storage units and waste generated within WRAP Module 1 during facility operations. The waste types that could be sampled under this plan are low-level waste (LLW), transuranic (TRU) waste, mixed waste (MW) and nonradioactive dangerous waste.

1.1 PURPOSE

The purpose of this document is to define the plan for sampling, screening, and analyzing waste for the purpose of obtaining information and data to adequately verify process knowledge and/or to characterize waste. Characterization parameters are defined based on applicable requirements for the handling, storage, transportation, and disposal of these waste. This plan identifies sampling, screening, and analysis methods that provide information on the waste to support those activities.

1.2 SCOPE

The scope of this plan includes sampling, field screening, and analyzing waste retrieved from Hanford Site storage units and waste generated during facility operations. Because of the importance to characterize the radionuclide properties of the waste, this plan includes sampling and analysis for the purpose of identifying radionuclide content. Results are used to provide information on the waste using methods that are considered practical for characterization and treatment purposes.

The characterization philosophy for retrieved waste is to employ field screening techniques to verify process knowledge to the maximum extent practicable followed with biased and/or composite sampling. The process knowledge is obtained from the various generators who have waste in retrievable storage or is obtained from knowledge collected on similar waste processed through WRAP Module 1. Sampling and analysis is used when sufficient process knowledge is not available on the waste or is used to verify process knowledge. It is expected that more laboratory analysis will be performed on the waste initially during the retrieval process. It is expected that as the retrieval process progresses, laboratory analysis will decrease.

Characterization of facility generated waste is completed using information found in Material Safety Data Sheets (MSDSs) and field screening techniques to verify process knowledge as appropriate.

A summary of the sampling philosophy that is expected to occur in WRAP Module 1 on the various waste streams is summarized in Table 1-1.

Table 1-1 WRAP MODULE 1 SAMPLING PHILOSOPHY

Stream	Field screening*	Lab analysis to confirm process knowledge (as required)	Lab analysis to characterize waste
Retrieved waste	X	X	X
Facility generated waste	X	X	
Treatment/Storage/Disposal verification	X	X	X
*If there is sufficient process knowledge and the waste is verified using screening techniques, then lab analysis is not necessary except as an overcheck for quality control purposes.			

Details on verification of newly generated waste are provided in the Solid Waste Disposal Division waste verification plan and will not be discussed in this SAP.

There are circumstances where U.S. Environmental Protection Agency/Ecology protocol sampling and analysis are not feasible or necessary for characterization of hazardous constituents (40 CFR 262). Under these circumstances, techniques that rely primarily on documented knowledge of raw materials, processes, and material balances can be employed to characterize wastes. Such techniques may be employed when one or more of the following conditions are met:

- o The waste stream is difficult to sample because of physical form. This condition primarily applies to the presence of pieces of metal (i.e., lead shielding) that contain dangerous constituents in their composition rather than as a residue that could be removed for testing.
- o Sampling and analysis of the waste stream could result in unacceptable risks of radiation exposure [i.e., the activities could not be conducted consistent with the "as low as reasonably achievable" (ALARA) precept].
- o The waste is too variable to be characterized by one set of samples (e.g., drums containing contaminated protective clothing, rags, and absorbent), provided sufficient process knowledge is available.
- o Process knowledge is available, documentable, and sufficient to provide a complete characterization of the waste stream.

Characterizing some of the waste within WRAP Module 1 involves handling samples that contain radioactivity at levels that exceed 100 nCi/g and surface dose rate limits up to 200 mrem/hr. Capabilities to sample and analysis waste that falls within these categories are limited. The matrices of the waste that are expected to be found in the retrieved waste stream also provide unique challenges for characterization. The matrices range from small containers containing liquids and solids to drums containing paper, plastic, rubber, cloth, absorbent material, other debris type material, lead, and mercury.

An attempt was made in this SAP to include those methods that require minimal modification to accommodate the various radioactivities and/or matrices and to analyze only those matrices that can be realistically sampled. Through the course of identifying proper sampling and analysis, consideration will be given to utilizing other sampling and/or analysis methods where standard methods are not used or available. An example of this can be shown from the case of laboratory analysis of the higher radiation dose rates associated with some of the TRU waste.

2.0 OBJECTIVES AND CRITERIA

This section discusses the objectives and criteria for the sampling and analysis program within WRAP Module 1 and lists the regulations for the criteria used in its development.

2.1 OBJECTIVES

The objectives of this SAP are to provide sufficient and accurate data on the retrieved or facility generated waste to meet Hanford Site, Resource Conservation and Recovery Act (RCRA), and Ecology characterization requirements and, in the case of TRU waste, Waste Isolation Pilot Plant (WIPP) waste acceptance criteria. This data is used to ensure proper handling, storage, treatment, transportation, and disposal of these waste.

2.2 REGULATIONS

Guidelines for characterizing waste are found in the following documents:

- o *Hanford Site Solid Waste Acceptance Criteria*, WHC-EP-0063-4 (WHC 1993)
- o *Waste Acceptance Criteria for the Waste Isolation Pilot Plant*, WIPP-DOE-069 (DOE 1991a).

These sources require waste generators to have specific knowledge of the waste to ensure proper handling, transportation, treatment, storage, and disposal.

The information presented in these documents is based on requirements identified in the following:

- o "Dangerous Waste Regulations," *Washington Administrative Code* (WAC) 173-303 (WAC 173-303 1993)
- o U.S. Department of Energy (DOE) Order 5820.2A, *Radioactive Waste Management* (DOE 1989)
- o *Quality Assurance Program Plan for the Waste Isolation Pilot Plant Experimental-Waste Characterization Program*, DOE/EM/48063-1 (DOE 1991b)
- o "Land Disposal Restrictions" 40 *Code of Federal Regulations* (CFR) Part 268 (40 CFR 268 1994).

Additional guidance on sampling and analysis is provided in:

- o *Testing Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846 (USEPA 1990).

2.3 DATA QUALITY OBJECTIVES

The determination of Data Quality Objectives (DQOs) involves a three-stage process. These three stages are discussed below.

Stage 1 - Identify Decision Types

Stage 1 of the DQO process defines the types of decisions that will be made from the results of the proposed activities, in this case sampling, screening, or analysis. Defining the decisions occurs through identifying data users, evaluating available data for the activities, developing a conceptual approach, and specifying objectives for the project. The information is compiled and analyzed to develop a conceptual approach to the problem. The conceptual approach facilitates identification of decisions that must be made and deficiencies in the existing information.

Stage 2 - Identify Data Uses/Needs

Stage 2 stipulates criteria for determining data adequacy. This stage involves specifying the data necessary to meet the objectives set in Stage 1. Stage 2 includes selection of the sampling approaches and the analytical options for the project, including evaluation of multiple-option approaches to effect more timely or cost-effective data collection and evaluation.

Stage 3 - Design Data Collection Program

Stage 3 results in the specification of the methods by which data of acceptable quality and quantity will be obtained to make decisions. This information is provided in documents such as the SAP.

Stage 1 "Decision Types" and Stage 2 "Data Uses/Needs" have been discussed in Sections 1.0 and 2.0. Considerations of cost effectiveness were addressed through choice of methodologies that would provide maximum information and consideration of multiple characterization requirements. Stage 3 considerations regarding the methodology to be used to obtain this data are addressed in Sections 2.0 and 4.0 through 6.0. Quality control requirements for precision, accuracy, and completeness are addressed in Section 7.0, Quality Assurance and Quality Control.

3.0 RESPONSIBILITIES

This section lists the responsibilities for sampling and analysis of waste in WRAP Module 1.

Facility Manager or designee shall:

- o Provide management oversight for sampling and field screening.
- o Ensure sampling, screening, and analysis is appropriate to federal, state, and DOE regulations.
- o Ensure sampling and field screening personnel are trained in the sampling and field screening methods.
- o Schedule sampling and field screening events.
- o Prepare, with Solid Waste Safety and Industrial Hygiene input and approval, a job-specific Job Hazard Analysis (JHA) for each sampling and/or field screening activity.
- o Ensure that all worker protection measures and practices specified on the job-specific JHA are followed.
- o Ensure that all personal protective equipment (PPE) specified on the approved job-specific JHA are available in quantities sufficient for each activity.
- o Ensure that pre-job meetings are held prior to each sampling and/or field screening activity and that each meeting includes a discussion of the job-specific JHA items, PPE, and worker protection practices and measures specified on the JHA.

- o Schedule Radiological Controls and other organizations, such as Generator Waste Acceptance Services, as required to support sampling and field screening activities.
- o Schedule Solid Waste Industrial Hygienist (IH) and/or IH Technicians to perform any worker exposure monitoring specified on the JHA.
- o Specify to sampling personnel all blank, trip, duplicate, matrix spike, and other quality control sample protocols.
- o Ensure protocol sample collection and preservation meet the quality assurance criteria of SW-846 (USEPA 1990) as appropriate.
- o Ensure sample bottles are new, commercially available, certified precleaned glass or plastic bottles as appropriate.
- o Ensure adequate quality control samples are collected as defined by SW-846 (USEPA 1990), Chapter 1 as appropriate.
- o Provide a sample analysis request form with each sample batch (this can be electronically generated using information in the Data Management System).
- o Review data and sampling and field screening activities.
- o Maintain and control data.
- o Provide personnel training, administrative controls, and oversight to ensure the quality control of sampling and field screening efforts is maintained or upgraded.
- o Perform surveillance of sample chain of custody and data.
- o Ensure all sampling and analysis meet quality control requirements.
- o Ensure quality records are retained which include sampling and screening logs, notebooks, electronic data, process records, analytical results, calculations, chain of custody forms, and shipping papers.
- o Investigate any unexpected analytical results.

Field screening personnel shall:

- o Be trained to perform field screening techniques.
- o Participate in all pre-job safety meetings prior to performing sampling and/or field screening activities.

- o Comply with all worker protection practices and measures and personal protective equipment requirements specified on the JHA.
- o Cooperate with the Solid Waste Industrial Hygienist (IH) and/or IH Technicians performing worker exposure monitoring specified on the JHA.
- o Review the appropriate radiation work permit for required radiological controls.
- o Assist in identifying the appropriate screening techniques and perform the methods.
- o Record all screening data in the field logbook and/or the WRAP Module 1 Data Management System.
- o Assist in the interpretation of screening results.
- o Assist in identifying additional laboratory methods based on screening results.
- o Ensure quality control during the performance of each screening method.

Sampling personnel shall:

- o Be trained in facility specific RCRA and other sampling methods.
- o Maintain and ensure chain of custody on each sample per WRAP Module 1 operating procedures.
- o Maintain accurate and complete sampling logs and/or data in the Data Management System which includes sample number, time, date, location, temperature, etc.
- o Review the appropriate radiation work permit for required radiological controls.
- o Ensure samples are properly packaged and transferred for preservation and analysis.

Analytical Services or their designee shall:

- o Arrange for approved offsite facilities to perform the required analysis.
- o Assist the Facility Manager or designee in identifying all blank, trip, duplicate, matrix spike, and other quality control sample protocols as required.

- o Maintain a copy of the shipping papers and chain of custody form within 24 hours after sample shipment.
- o Track the chain of custody form as required.
- o Verify that the chain of custody is completed and returned by the contracting laboratory's custodian with the resulting data package.
- o Perform "Level B" validation in accordance with Section 2.0, "Data Validation for RCRA Analysis", of WHC-CM-5-3, *Sample Management and Administration* (WHC 1990b).
- o Forward a copy of the data to the Facility Manager or designee as requested.

Facility Radiological Controls shall:

- o Survey the sample containers for shipment or storage.
- o Ensure all operations comply with radiological controls established for the facility.

4.0 SAMPLING LOCATIONS, WASTE FORMS, AND ANALYTES

This section identifies the various sampling locations within WRAP Module 1, waste forms expected in the different streams, and analytes that may be found within the waste.

4.1 SAMPLING LOCATIONS

A summary of the locations where sampling can occur within WRAP Module 1 is as follows:

- o Restricted waste management gloveboxes
- o Main process gloveboxes
- o Decontamination shower collection container
- o Truck wash collection sump
- o Facility generated waste collection locations set-up for maintenance, repair, and cleanup.

As other locations/streams are identified, this document shall be used as a guide for sampling and analysis activities.

The majority of the sampling activities within WRAP Module 1 occurs in the restricted waste management gloveboxes located in the process area with minimal sampling performed within the main process gloveboxes. The purposes of sampling in these gloveboxes are as follows:

- o Verification of newly generated waste
- o Verification of retrieved waste
- o Identification for appropriate treatment standards
- o Verification that treated wastes meet the appropriate treatment standards
- o Characterization of retrieved waste.

Sampling in the other locations occurs mainly for verification of process knowledge. Other streams may be identified as operations progress. Sampling and analysis of these streams will be assessed against the criteria listed in this document, instructions generated, and sampled/analyzed as appropriate. Details on verification of newly generated waste are provided in the Solid Waste Disposal Division waste verification plan.

4.2 WASTE FORMS AND ANALYTES

The majority of samples are collected from the retrieved waste stream. The retrieved waste may consist of a mixture of any of the following: paper products, plastic products, rubber, cloth, tape, failed process equipment (comprised of stainless steel, carbon steel, various gasket materials, etc.), leaded glass, lead blankets, lamps, piping, wiring, glass and metal portions of gloveboxes, pumps, motors, standard laboratory equipment (beakers, sample vials, flasks, etc.), high-efficiency particulate air (HEPA) filters, organic and inorganic liquids (free liquids, absorbed, cemented, etc.), and others. These drums will likely contain multiple waste forms. Combustible versus noncombustible segregation was required for the 1972 to 1978 period; however, this represents the only segregation requirement imposed on the waste generators. Approximately two-thirds of the TRU waste in drums is expected to be combustible material (paper, plastic, rubber, etc.) with the remaining one-third as noncombustible (metal, glass, etc.). Details on the seven main generators of waste in storage are provided in the following documents:

- o *Characterization of Past and Present Solid Waste Streams from the Plutonium Finishing Plant, WHC-EP-0621 (Duncan et al. 1993)*
- o *Radioactive Waste Shipments to Hanford Retrievable Storage from Babcock and Wilcox, Leechburg, Pennsylvania, WHC-EP-0719 (Duncan 1994a)*

- o *Radioactive Waste Shipments to Hanford Retrievable Storage from Westinghouse Advanced Reactors and Nuclear Fuels Divisions, Cheswick, Pennsylvania, WHC-EP-0718 (Duncan 1994b)*
- o *Characterization of Past and Present Solid Waste Streams from the Plutonium-Uranium Extraction Plant, WHC-EP-0646 (Pottmeyer et al. 1993a)*
- o *Characterization of Past and Present Solid Waste Streams from 231-Z, WHC-EP-0659 (Pottmeyer et al. 1993b)*
- o *Characterization of Past and Present Solid Waste Streams from the 325 Radiochemistry Building, WHC-EP-0696 (Pottmeyer et al. 1993c)*
- o *Radioactive Waste Shipments to Hanford Retrievable Storage from the General Electric Vallecitos Nuclear Center, Pleasanton, California, WHC-EP-0672 (Pottmeyer et al. 1993d).*

A summary of the retrieved waste streams for each of these generators is provided in *WRAP Module 1 Sampling Strategy and Waste Characterization Alternatives Study*, WHC-SD-W026-ES-013 (Bergeson et al. 1994). The waste streams for facility generated waste include silt, sand, solid, particulate, and liquid.

A review of historical data on the generators was completed. The chemicals that could possibly be found in the retrieved waste stream were listed and designated to determine potential regulated constituents. These constituents are listed in Appendix A, Analyte List (Bergeson et al. 1994). This list is to only be used as a guide to identify field screening and laboratory analysis methods. Note that wastes will not be designated as listed unless there is sufficient process knowledge to make that determination.

The general categories for chemical constituents of concern for the facility generated waste includes heavy metals, organic, and possibly regulated decontamination solutions.

Total organic carbons and total suspended solids must be identified in aqueous solutions to determine if the waste is a wastewater or a nonwastewater. This information is used to determine the appropriate concentration-based treatment standard as defined in 40 CFR 268. Wastewaters are wastes that contain less than 1% by weight total organic carbon (TOC) and less than 1% by weight total suspended solids with the following applicable exception: F001, F002, F003, F004, F005, wastewaters are solvent-water mixtures that contain less than 1% by weight TOC or less than 1% by weight total F001, F002, F003, F004, F005 solvent constituents. Most of the waste is expected to fall under the category of nonwastewater. If there is any doubt about the treatment category for aqueous solutions, then additional testing will be performed.

Sampling for chemical/radiochemical analysis may be performed on the following waste forms:

- o sludge
- o solidified liquid
- o soil
- o process solid and salt
- o ion exchange resin
- o liquid
- o HEPA filter media
- o absorbent.

These also represent the waste forms expected in WRAP Module 1. Samples are obtained utilizing the methods identified in Section 5.0.

5.0 SAMPLE METHODS AND EQUIPMENT

This section discusses the various methods and equipment that can be used for sample collection.

5.1 SAMPLING EQUIPMENT

The inconsistent and heterogenous nature of the waste imposes several restrictions on the ability to obtain representative sampling data from the retrieved waste stream. Consequently, chemical and radiochemical sampling and analysis have been proposed for those waste items from which a representative sample can be obtained. WAC 173-303-110 describes the following as waste types that can be representatively sampled:

- o crushed or powdered material
- o extremely viscous liquid
- o fly ash-like material
- o soil-like material
- o soil or rock-like material
- o containerized liquid wastes.

Likewise, Chapter 9 of the EPA SW-846 document (USEPA 1990) presents the following as waste types that can be representatively sampled:

- o sludge
- o moist powder or granules
- o dry powder or granules
- o sand or packed powder and granules
- o large grained solids.

For each of the above listed waste forms a sampling method has been developed and is provided in the respective sources. Section 4.2 of this document

identifies waste forms that should have homogenous properties (or are easily capable of being made homogenous), and can be classified into the above categories. Sampling and analysis for waste forms that do not fall into these categories will be handled on a case-by-case basis as they are identified.

Samples are obtained using the sampling methods prescribed in WAC-173-303 and/or SW-846 (USEPA 1990) Chapter 9 or equivalent. Table 5-1 provides a correlation between waste types identified in the procedural guidance in SW-846 (USEPA 1990) Chapter 9 and those waste types that are expected to be present in the drums. Where a correlation exists, it is recommended that the sampling method referenced in the table be used. Waste types that are not listed in Table 5-1, but have properties that allow representative sampling of the item, should be correlated to the category that best describes its characteristics. Modifications to these methods may occur to allow sampling of small quantities of waste that may be found inside the drums (i.e., using a pipet instead of a coliwasa).

Table 5-1 SAMPLING METHODOLOGIES

Waste Form	Waste Forms - SW-846 (USEPA 1990)	Sampling Equipment/Method
Liquids	Free-flowing liquids and slurries	Coliwasa; SW-846, Chapter 9
Sludges	Sludges	Trier; SW-846, Chapter 9
Solidified liquids		
Wet absorbents	Moist powders or granules	Trier; SW-846, Chapter 9
Process solids and salts		
Ion exchange resins		
Process solids and salts	Dry powders or granules	Thief; SW-846, Chapter 9
Ion exchange resins		
Soils	Sand or packed powders and granules	Auger; SW-846, Chapter 9
Ion exchange resins		
Process solids and salts		
Absorbents	Large-grained solids	Large Trier; SW-846, Chapter 9
Process solids and salts		

In addition to these methods, samples may be collected using snip and wipe techniques. Discrete snip samples can be collected on soft material and wipe samples can be collected on hard items. These methods will be used mainly for the purpose of determining radioactivity but can be used to screen or analyze for hazardous constituents. Because these techniques are not considered to be standard, their use will be limited and will be determined on a case-by-case basis.

6.0 SAMPLE ANALYSIS

This section provides information about the various analyses that can be performed on samples collected in WRAP Module 1 which includes field screening, chemical laboratory analysis, and radionuclide analysis.

6.1 FIELD SCREENING ANALYSIS

The objectives for this analysis activity are to confirm that either the retrieved waste or the facility generated waste matches its process knowledge and/or to provide adequate information to support waste management decisions (i.e., waste segregation and waste treatment). The quality of the data package for this activity is analytical Level I/Level II.

The tests chosen are tabulated in Table 6-1, along with the associated waste characteristic or property that is being tested, and applicable waste matrices. The methods chosen for testing are taken from the operational manual of a HazCat®¹ (Turkington 1993) kit or other test method best suited for the waste matrix. Other methods than those listed in Table 6-1 may be deemed necessary and will be performed as needed.

Table 6-1 TEST METHODS FOR FIELD SCREENING

Screening	Property	Waste Form	Suggested Method(s)
Flammability	Liquid with a flash point less than 60°C according to published or experimental closed cup test data	Liquid	HazCat Combustibility Test Closed Cup Flashpoint
	Ignitable compressed gas as defined in 49 CFR 173.300	Gas	Visual Observation
	Oxidizer as defined in 49 CFR 173.127	---	None
	An additional definition from SW-846 (USEPA 1990): "For the purpose of this, an oxidizer is any material that yields oxygen readily to stimulate the combustion of organic matter (e.g., chlorate, permanganate, inorganic peroxide, or a nitrate)"	Liquids/Solids	HazCat Oxidizer Test
pH	Aqueous with a pH less than or equal to 2 (≤ 2), or a pH greater than or equal to 12.5 (≥ 12.5)	Liquid	pH paper pH meter HazCat Inorganic/Organic Acid Test

¹ HAZCAT® is a registered trademark of Haztech Systems Incorporated, San Francisco, California.

Screening	Property	Waste Form	Suggested Method(s)
	Solid or Semi-Solid that has an aqueous phase pH of ≤ 2 , or a pH ≥ 12.5 when it is made into a 50 wt% mixture with water	Solid - solution from a 1:1 slurry of water to waste	pH paper pH meter HazCat Inorganic/Organic Acid Test
Organics	Organic liquids and solids	Liquids/Solids	HazCat Organic Test
	Chlorine and organic solvents	Liquids/Solids	HazCat Copperwire Test
	Organic solvents	Liquids/Solids	HazCat Iodine Crystal Test
	Halogenated Hydrocarbons 0-50 PPM	Liquids/Oil/Solids	Chlor-N-Oil Test
	Halogenated Hydrocarbons > 550	Liquids/Oil/Solids	Chlor-N-Oil Test HazCat Chlorine Hotwire
Polychlorinated Biphenyls (PCBs)	PCB Specific Testing	Liquids/Oil/Solids	Ensys PCB RISC Test ²
Water Reactivity	Is normally unstable and readily undergoes violent change without detonating	Liquids/Solids	Visual Observation
	Reacts violently with water or forms potentially explosive mixtures with water	Liquid/Solids	HazCat Water Reactivity HazCat Water Solubility Test
	When mixed with water, generates toxic gases, vapors or fumes in quantities that present a danger to human health or the environment	Liquid/Solids	HazCat Water Solubility Test
	Is capable of detonation or explosive reaction if subjected to a strong initiating source or heated under confinement	Liquid/Solids	HazCat Ignition Test (Hairpin Test)
	Is readily capable of detonation or explosive decomposition, or reaction at standard temperature and pressure	Liquid/Solids	Visual Observation
	It is a U.S. Department of Transportation Forbidden Explosive, a Class A or Class B Explosive as defined in 40 CFR 173.51, .53, and .88	Liquid/Solids	Visual Observation
Sulfide	It is a sulfide (-S) bearing waste that, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors, or fumes in amounts sufficient to present a danger to human health or the environment. Number provided in SW-846 (USEPA 1990) for evaluating reactivity is 500 milligrams hydrogen sulfide per kilogram of waste	Liquid/Solids	Approximately 10 ml of sample is added to a beaker or test tube and enough 1:1 hydrochloric acid is added slowly to bring the pH down to 2.0. pH paper is placed in the solution as the contents are agitated. If the paper turns brown or silvery black, the presence of sulfides in the sample is indicated. If there is no color change, the total sulfides are reported as non-detectable.

²The ENSYS PCB RISC is a registered trademark of ENSYS incorporated, complete citation.

Screening	Property	Waste Form	Suggested Method(s)
Cyanide	It is a cyanide (-CN) bearing waste that, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors, or fumes in amounts sufficient to present a danger to human health or the environment. Number provided in SW-846 (USEPA 1990) for evaluating reactivity is 250 milligrams hydrogen cyanide per kilogram of waste	Liquid/Solids	To a test tube or beaker containing approximately 10 ml of sample, enough caustic is added to bring the pH to 12-13; then 3 to 5 ml of 10 percent ferrous sulfate solution is added and stirred. Three to 5 ml of 5 percent ferric chloride is then added and enough concentrated sulfuric acid is slowly added to bring the pH down to 1 or less. A bright blue color indicates the presence of cyanide. The test can detect free cyanide and complexed cyanides in concentrations below 200 ppm.
Metals and Element	Metals and Elements Screening is used to determine the presence of regulated quantities of heavy metals in the waste and confirm the presence or absence of other inorganic elements.	Liquids/Solids	X-Ray Fluorescence (XRF) Spectrometer TCLP extraction (SW-846 Method 1311 [USEPA 1990]) HazCat Metals Test(s) Water Solubility
Headspace Volatile Organic Compounds	Gross screen to detect the presence or absence of solvents or other volatile organic compounds in wastes. One of the few methods available to evaluate the presence of volatile organic compounds in non-samplable (heterogeneous) matrices.	Liquids/Solids	Fourier Transform Infrared Spectroscopy organic vapor analyzer
Volatile and Semi-Volatile Compounds	Volatile and semi-volatile compounds Screening is used to evaluate the presence or absence of volatile and/or semi-volatile organic compounds and verify the treatment standards associated with organic chemical content.	Liquids/Solids	Fourier Transform Infrared Spectroscopy Fourier Transform Raman Spectroscopy
Asbestos	Asbestos fibers	Solids	HazCat Asbestos Test
Solids	Verification of the presence or absence of free liquid in solid or semi-solid material to be landfilled.	Solids/Semi-solids	Paint Filter Test (SW-846 Method 9095 [USEPA 1990])

6.2 LABORATORY ANALYSIS FOR CHEMICALS

The objective for this analysis activity is to obtain enough information necessary to properly designate waste and/or confirm that the data collected for waste characterization is of sufficient quality to support waste management decisions (i.e., waste treatment). The data package quality for this analytical activity is Level III.

Although the listing in Appendix A identifies regulated analytes by generator, in all reality it is nearly impossible to identify these chemicals by name even when using laboratory analysis. Because of this, analysis is geared to the characteristic of the constituent as opposed to the actual chemical. If the internal containers are labeled as to the specific chemicals that can be found in the waste, *WRAP Module 1 Sampling Strategy and Waste Characterization Alternatives Study* (Bergeson et. al. 1994) lists the

analytical methods by chemical and can be used as a guide. The suggested analysis methods that can be used are listed in Table 6-2. Analysis methods specifically for TRU waste are listed in Table 6-3.

Table 6-2 WASTE CHARACTERISTICS PER WAC-173-303

Analysis Name		Waste Form of Sample	Analytical Procedure
Ignitability		Liquid	ASTM Standard D93-79 or D93-80, D3278-78 (WDOE 1984)
Corrosivity		Aqueous	pH, SW-846, 9040
		Liquid	NACE Standard TM-01-69 SW-846
		Solid or semi-solid	When mixed with water, the liquid is sampled for pH, SW-846, 9040
Toxicity Characteristic Leaching Procedure (TCLP) Constituents	Metals	Liquid or solid	SW-846, 6010
	Volatile organic compounds	Liquid or solid	SW-846, 8240
	Semi-volatile organic compounds	Liquid or solid	SW-846, 8250
	Pesticides	Liquid or solid	SW-846, 8080
	Herbicides	Liquid or solid	SW-846, 8050
Reactivity	Cyanide	Liquid or solid	SW-846, 9010
	Sulfide	Liquid or solid	SW-846, 9030
	Other characteristics	Liquid or solid	WAC 173-303-090
Persistence	Halogenated hydrocarbons	Liquid or solid	WDOE 83-13
	Polycyclic aromatic hydrocarbons	Liquid or solid	WDOE 83-13

SW-846 Methods (USEPA 1990)
WDOE 83-13 (WDOE 1984)

Table 6-3 WASTE CHARACTERIZATION CHEMICAL ANALYSIS

Analysis Name	Waste Form of Sample	Suggested Reference Analytical Procedures
Ignitability	Liquid/Solid	1010/1020 ¹
	Gas Sample	ASTM E681-85 (1989)
Corrosivity	Aqueous Liquid	WDOE 83-13, 9040 ¹
	Non-Aqueous Liquid	WDOE 83-13, NACE Standard TM-01-69 (WDOE 1984)
	Solid or Semisolid	WDOE 83-13, 9045
Reactivity Total cyanide Total sulfide	Liquid and Solid	9010 ¹ 9030 ¹
Toxicity Characteristic Leaching Procedure (TCLP)/RCRA ² Metals (non-mercury)	Liquid and Solid	6010 ¹
TCLP Metal mercury		7470/7471 ¹
TCLP/RCRA ² Volatile organic compound		8240 ¹
TCLP/RCRA ² Semi-volatile organic compound		8270/8250 ¹
TCLP/RCRA ² Polychlorinated biphenyls (PCB)/Pesticides		8080 ¹
PCB	Oils	ASTM D4059-86
TCLP/RCRA ² Herbicides	Liquid and Solid	8150 ¹
Persistence	Liquid and Solid	WDOE 83-13, Appendix E
Toxic organic carbon	Liquid/Solid	9020 ¹
Total organic carbon	Liquid/Solid	9060 ¹

¹ SW-846 Methods (USEPA 1990).² Metals or organics in the target compound list of the referenced procedure.

6.3 LABORATORY ANALYSIS FOR RADIONUCLIDES

The radionuclides measured will provide data for three major objectives:

- o Verification of TRU content as predicted by passive-active neutron (PAN) interrogation and waste generator records.
- o Verification of non-TRU radionuclide content as predicted by gamma energy assay (GEA) of the drum and waste generator records.
- o Radionuclide content as required for LLW classification per WHC-EP-0063-4 (WHC 1993).

The quality of the data package for this activity is analytical Level V.

The TRU radionuclides are radionuclides having an atomic number greater than 92. TRU waste is defined as waste that, without regard to source or form, is contaminated with more than 100 nCi of alpha-emitting transuranic isotopes (with half-lives >20 years) per gram of waste at the time of assay. In addition, radium sources and ^{233}U in concentrations >100 nCi/g of the waste matrix are managed as TRU waste per the requirements of DOE Order 5820.2A (DOE 1989) because of hazards similar to TRU waste. A list of fissile radionuclides is provided in Table 6-4.

Non-TRU radionuclide content, as measured by GEA, will be used to test correlation between measurements of the unsorted waste in the drum and measured activity on the individual waste types. Table 6-5 is a list of radionuclides required for LLW characterization per WHC-EP-0063-4 (WHC 1993).

In order to characterize the waste as fully as possible within the limitations of procedures known to be available, analysis should be performed for the list of radionuclides in Table 6-6 using the recommended procedures. The data from these analyses can be used to characterize the waste with regard to waste disposal and packaging and transportation requirements.

If generator knowledge or documentation indicates the presence of a radionuclide not scheduled for analysis, the appropriate analysis will be added. Characterization data must include all radionuclides that contribute greater than 1% (by curies) of the total activity of waste matrix.

Table 6-4 FISSILE TRU RADIONUCLIDES

Isotope	Ci/g
^{233}U	1.0 E-02
^{238}Pu	1.7 E+01
^{239}Pu	6.2 E-02
^{240}Pu	2.3 E-01
^{241}Pu	2.4 E-03
^{242}Pu	3.9 E-03
^{241}Am	3.4 E+00
^{242}Am	3.6
^{243}Am	2.0 E-01
^{243}Cm	5.2 E+01
^{244}Cm	8.1 E+01
^{245}Cm	1.7 E-01
^{247}Cm	9.8 E-05
^{249}Cf	4.1 E+00
^{252}Cf	5.4 E+02

Table 6-5 RADIONUCLIDE CONCENTRATION LIMITS FOR LLW
(From WHC-EP-0063-4)

Radionuclides	Half-life (yr)	Category 1 Hanford limit Ci/m ³	Category 3 Hanford limit Ci/m ³
³ H	1.2 E+01	5 E+00	- ^a
¹⁴ C	5.7 E+03	6 E-04	8 E+00
¹⁴ C (act. metal)	5.7 E+03	6 E-04	8 E+01
⁶⁰ Co	5.3 E+00	3 E+02	- ^a
⁵⁹ Ni (act. metal)	8.0 E+04	3 E+00	2.2 E+02
⁶³ Ni	9.2 E+01	2 E+00	7 E+02
⁶³ Ni (act. metal)	9.2 E+01	2 E+01	7 E+03
⁹⁰ Sr	2.8 E+01	5 E-03	7 E+03
⁹⁴ Nb	2.0 E+04	8 E-04	2 E-01
⁹⁹ Tc	2.1 E+05	7 E-03	3 E+00
¹²⁹ I	1.2 E+07	1 E-03	8 E-02
¹³⁷ Cs	3.0 E+01	2 E-02	4.6 E+03
²⁴¹ Pu	1.3 E+01	5 E+01 ^b	3.5 E+03 ^b
²⁴² Cm	4.4 E-01	2 E+03 ^b	2 E+04 ^b
⁷⁹ Se	6.5 E+04	7 E-03	7 E-02
Alpha-emitting transuranic radionuclides	>5	10 ^{b,c}	100 ^{b,c}

^a A dash indicates no values are provided.

^b Expressed in units of nanocuries per gram of waste.

^c Number selected in accordance with already-established limits and definitions.

Category 1 and Category 3 classification dictates the waste disposal handling requirements that are identified in WHC-EP-0063 (WHC 1993).

Table 6-6 WASTE CHARACTERIZATION RADIONUCLIDE ANALYSES

Analytical Method/Radionuclide		Reference Methods	Suggested Methods (WHC/PNL)
Liquid Scintillation	³ H	707 ^a	LA-218-114 PNL-SP-30
Liquid Scintillation	¹⁴ C	NA	LA-348-104 PNL-ALO-442
Liquid Scintillation	⁶³ Ni	NA	To Be Determined ^d PNL-ALO-439
Liquid Scintillation	⁷⁵ Se	NA	LA-365-132 PNL-ALO-444
Beta Prop.	⁹⁰ Sr	NA	LA-220-102/101 PNL-ALO-433
Liquid Scintillation and beta	⁹⁹ Tc	EC-186 ^b	LA-438-101 PNL-ALO-432
Low Energy Photon Detector	¹²⁹ I	NA	LA-378-103 PNL-ALO-454
Gamma Energy Analysis	⁹⁴ Nb, ⁶⁰ Co, ¹³⁷ Cs, Others	901.1 ^c	LA-548-121 PNL-ALO-451
Alpha Spectroscopy	²³⁵ U, ²³³ U, ²³⁸ U	00-07 ^d	PNL-ALO-455
Alpha Spectroscopy	²³⁷ Np	00-07	LA-933-141/201 PNL-ALO-425
Alpha Spectroscopy	²³⁸ Pu, ^{239/240} Pu	00-07	LA-503-156 PNL-ALO-423
Alpha Spectroscopy	²⁴¹ Pu, ²⁴² Pu	To Be Determined ^e	To Be Determined ^e
Alpha Spectroscopy	²⁴¹ Am, ²⁴⁴ Cm	AM-01 ^f	LA-503-156 PNL-ALO-424
Fluorimeter	U	NA	LA-925-106 PNL-ALO-445
Alpha Prop	Total α	9310 ^g	LA-508-104/101 PNL-ALO-421
Beta Prop	Total β	9310	PNL-ALO-431
Alpha Prop	Radium (total)	9315	To Be Determined To Be Determined

^a Standard methods are from Standard Methods for the Examination of Water and Wastewater (APHA 1989).

^b Standard methods are from The Environmental Survey Manual, Appendix D (DOE 1987).

^c Standard methods are from Prescribed Procedures for the Measurement of Radioactivity in Drinking Water (USEPA 1980).

^d Standard methods are from Eastern Environmental Radiation Facility, Radiochemistry Procedures Manual (USEPA 1984).

^e Analyses shall be performed by an approved Westinghouse Hanford, participant contractor, or subcontractor laboratory.

^f Standard methods are from EML Procedures Manual, 25th Edition (DOE 1982).

^g Standard methods are from Test Methods for Evaluating Solid Waste (SW-846) (USEPA 1990).

Alpha or Beta Prop = counting radionuclide with an alpha or beta gas proportional counter

7.0 QUALITY ASSURANCE AND QUALITY CONTROL

The Quality Assurance (QA) and Quality Control (QC) requirements for this sampling and analysis plan are outlined in this section.

7.1 FIELD DATA COLLECTION

All sampling activities associated with the waste processed through or generated at WRAP Module 1 are documented in a controlled field logbook and/or the Data Management System depending on the sample collection location. The logbook and/or Data Management System are maintained by WRAP Module 1. The logbook and/or Data Management System are completed and controlled per WRAP Module 1 procedures. Information collected includes the following:

- o Name of person collecting the sample or performing the screening
- o Any pre-job meetings held for the sampling events
- o Sample identification number
- o Sample location
- o Package identification number of the container sampled or screened
- o Date and time sample collected or screening performed
- o Temperature that the sample is collected at
- o Sample volume
- o Description of sample matrix
- o Package identification of any outer container used to transport the sample (as appropriate)
- o Lot number of the bottles used to collect samples
- o Sampling methods
- o Marking/labeling on any containers sampled (if applicable)
- o Field screening methods
- o Field screening results initially recorded on a field assessment worksheet as defined in the *Solid Waste Assessment Team Manual*, WHC-IP-1007 (Triner 1994)
- o Equipment identification numbers

- o Photocopies or other electronic scans of the logs/worksheets (including calibration data) and waste profile forms containing data collected during field screening

Other information deemed necessary by the sample or screening personnel shall also be recorded.

7.2 FIELD SCREENING

Quality control standards shall be analyzed prior to the analysis of collected samples. The results of the standards shall be documented on the field screening information logbook.

Duplicate analyses can be performed on positive results or as needed. Where applicable, a blank shall be analyzed along with the sample. Approximately 1 out of every 20 samples will be sent to a laboratory for confirmation of the field screening method.

7.3 QA/QC SAMPLES

All QA/QC samples shall be collected on a day of sampling during which actual samples are collected. Sampling for RCRA protocol laboratory analysis will utilize trip blanks, equipment blanks, and duplicate samples. The following sections describe the types of QA/QC samples.

7.3.1 Trip Blank

Trip blanks shall be collected by filling a sample bottle with Reverse Osmosis/De-Ionized (RO/DI) type II "Q" water prior to sampling. The collection bottle shall be filled in a manner consistent with SW-846 (USEPA 1990). The field bottle shall travel with the bottle designated for sample collection. The above method will apply for a solid matrix; pre-certified silica sand shall be substituted in place of the RO/DI water.

The trip blank bottle(s) shall be labeled in the same manner as the sample collection bottles, but shall have a unique identification number different from the actual samples. As a guide, a trip blank should be collected on every fifth day of sampling.

7.3.2 Equipment Blanks

Equipment blanks are to be collected to represent the potential contamination of the sample due to the equipment used to collect the sample. Pre-certified silica sand or RO/DI water shall be used to mimic collection of the sample, dependent on the matrix of the actual sample. The equipment blank shall be analyzed for the same constituents as the actual sample that it represents. The equipment blank sample bottles shall be labeled identically to the actual sample, but will be assigned a unique identification number. This information

shall not be indicated on the label, the chain of custody or any other documents that accompany the sample to the laboratory. The field notebook/Data Management System entry shall document the equipment blank. As a guide, the equipment blank should be collected the same time as the trip blank.

7.3.3 Duplicate Samples

A duplicate sample will be collected at the same time and from the same homogenized mixture that the actual sample is collected. The duplicate shall be analyzed for the same constituents as the actual sample that it represents. The duplicate sample bottles shall be labeled identically to the actual sample, but will be assigned a unique identification number.

The field logbook/Data Management System shall contain indicators of the sample locations that were composited and that one sample is a duplicate of the other. This information shall not be indicated on the label, the chain of custody, or any other documents that accompany the sample to the laboratory. This is done to ensure that the laboratory cannot ascertain the existence of a duplicate. As a guide, one duplicate sample should be collected for every 20 actual samples (or every 5 per cent of the time) at a minimum.

7.4 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The development of the Data Quality Objectives (DQOs) for this project were discussed in Section 2.3 of this document. The Quality Assurance (QA) objectives presented in this section address the test procedures that will be implemented to achieve analytical results of known and acceptable quality for RCRA protocol samples. The QA objectives for measurement data are target levels for precision, accuracy, representativeness, comparability, and completeness.

7.4.1 Precision

Precision is a qualitative measure to determine how measurements are reproduced under a given set of conditions. For duplicate measurements, analytical precision can be expressed as the relative standard deviation (RSD). The level of effort for precision measurements will be at a minimum of one in twenty (five percent) or one per batch, whichever is more frequent. Precision measurements will be a comparison between the concentrations from the matrix spike and matrix spike duplicate. For inorganic, radioactive, and other parameters, the comparison will be between duplicate sample analyses. The target quantitative precision objectives for all analyses are $\pm 25\%$ at the Practical Quantitation Limits (PQLs) listed in Section 7.4.5.

7.4.2 Accuracy

Accuracy is a measure of the closeness of the measured value to the true value. The accuracy of chemical test results is estimated by "spiking" matrix samples with known standards and establishing the average recovery.

Two types of recoveries are measured for volatile and semi-volatile organic parameters: matrix spike recoveries and surrogate spike recoveries. For a matrix spike, known amounts of selected standard compounds identical to the compounds of interest are added to the sample. For a surrogate spike, the standards added to the sample are chemically similar but not identical to the compounds of interest in the sample being analyzed.

The laboratory shall perform matrix spike and matrix spike duplicate measurements for organic parameters at a minimum frequency of one in twenty samples or one per batch, whichever is more frequent. Matrix spike measurements shall be at minimum frequency of one in ten samples, or one per batch, whichever is more frequent, for inorganic, radioactive, and other parameters. The target quantitative accuracy objective for all analyses is $\pm 25\%$ for matrix spike recoveries at the PQLs listed in Section 7.4.5. Surrogate recoveries shall conform to limits specified in the procedures.

7.4.3 Representativeness

Representativeness is a measure of how closely the measured results reflect the actual concentration or distribution of the chemical compounds in the waste sampled. Proposed documentation shall be established to verify that procedures have been followed and sample identification and integrity are assured. Field blanks and field duplicates obtained at a minimum 10 percent or one-per-batch frequency will be used to assess field and transport contamination and method variation. Laboratory method blanks shall be run at the minimum frequency of 5 percent or one-per-batch to assess laboratory contamination.

Concerted efforts should be made to assure that samples collected from wastes are representative. Where thorough mixing of samples is not possible, or other characteristics of the sample (i.e., particle sorting, viscosity, multiple phases, etc.) hinder thorough mixing, these conditions shall be documented during sampling and the results shall be reviewed with consideration of the possible non-representative conditions. When possible, after As Low As Reasonably Achievable (ALARA) considerations have been met, the procedures referenced in Section 5.1 of the SAP should be used to obtain a representative sample.

7.4.4 Completeness

Completeness is a measure of the amount of valid data obtained from the measurement system. The initial QA objective for completeness of chemical analyses in the laboratory is 90%. This means that the goal is to produce usable analytical data for a minimum of 90% of the analyses requested on all

samples submitted to the laboratory. This objective shall be reviewed after actual performance data are available for each sample type analyzed. The laboratory's actual performance shall be evaluated against the 90% objective. If the laboratory's performance drops below this limit, corrective action shall be initiated. This action shall identify and correct those activities within the laboratory that have caused the drop in performance. Based on actual laboratory performance in analysis of samples, individual completeness objectives for individual analytical methods may be developed.

Loss of analytical data will initiate a corrective action to identify the cause of the loss and prevent recurrence.

7.4.5 Required Method Detection Limits

Method Quantitation Limits (MQLs) shall be determined for each analytical method. MQLs shall always be less than or equal to the PQLs discussed below. Because some non-standard techniques are required to safely handle the highly-radioactive samples to be analyzed under this project, it is necessary to establish minimum criteria needed to meet the needs of this project. Due to method variations (i.e., additional dilution, change in sample aliquot size, etc.) and matrix variations in the waste, it is anticipated that the MQLs specified in SW-846 (USEPA 1990) and in other documents may not be achievable in many cases. Because the samples analyzed under this plan are being characterized to assist in determining their regulatory compliance status, the required PQLs are usually based on an assessment of regulatory requirements for characterization of the materials where possible. The PQLs needed to determine adequate characterization with respect to applicable regulations are shown in Table 7-1. These PQLs are generally 20-50% of the regulatory limit. When coupled with the precision and accuracy specified in this section, decisions as to whether an analyte exceeds a regulated level may be made to a known confidence level. This scheme allows regulatory compliance decisions to be made based on analytical results measured in a range where both accuracy and precision, as stipulated in Sections 7.4.1 and 7.4.2, are at acceptable levels.

The MQL for radionuclide analysis is highly dependent on the size of the original sample used to prepare the sample mount. The presence of multiple radionuclides in a sample will raise the MQL for a specific nuclide. MQLs based on analyses of actual samples shall be reported to the customer or data user. Due to the nature of the samples and the regulatory levels that are applicable, it is expected that PQLs will not be difficult to meet.

Table 7-1 SUGGESTED WASTE CHARACTERIZATION ANALYSIS PQLs

Analysis	Source of Regulatory Limit	Regulatory Limit	Suggested PQL ¹
Ignitability	WAC 173-303-090	< 60°C Flashpoint	NA
Corrosivity			
aqueous liquid, solid	WAC 173-303-090	pH < 2, pH > 12.5	pH = 1 to 13
liquid	WAC 173-303-090	corrodes steel at a rate $\geq$ 6.35 mm/yr at 55°C	3.0 mm/yr
Reactivity - all forms	WAC 173-303-090 49 CFR 172, 173, SW-846	see qualitative descriptions in regulations. sulfide 500 mg/kg cyanide 250 mg/kg	NA 50 mg/kg 25 mg/kg
TCLP metals	WAC 173-303 40 CFR 261.24	see TCLP levels	TCLP ² limits for solids 50% TCLP for liquids per procedure 6010
Persistence	WAC 173-303 WDOE-83-13 (WDOE 1984)		
Halogenated Hydrocarbons		0.01% (100 ppm)	0.005%
Polycyclic Aromatic Hydrocarbons		1% (10,000 ppm)	0.5%
Headspace Gases	DOE/EM/48063-1 (DOE 1991b)	50% of LEL 2.5% v/v H ₂ 2.5% v/v CH ₄	25% of LEL 0.5% v/v H ₂ 0.5% v/v CH ₄
Headspace Gases Volatile Organic Compounds (VOC)	DOE/EM/48063-1 (DOE 1991b)	500 ppm	100 ppm
Toxic Organic Carbon	NA	NA	0.005%
Total Organic Carbon	WAC 173-303	10%	0.5%
Radionuclides LLW	WHC-EP-0063-4	per Table 6-11 ³ column 1 limits 100 nCi/g	1% of Table 6-11, Column 1 values 10 nCi/g
TRU			
TCLP VOCs	WAC 173-303 40 CFR 261	TCLP levels NA	TCLP limits for solids 50% TCLP for liquids per Method 8240/8260
TCLP Semivolatile Organic Compounds	WAC 173-303 40 CFR 261	TCLP levels	TCLP limits for solids 50% TCLP for liquids per Method 8250/8270

Analysis	Source of Regulatory Limit	Regulatory Limit	Suggested PQL ¹
Pesticide/Polychlorinated Biphenyls (PCB)			
TCLP Pesticide	WAC 173-303 40 CFR 261	TCLP levels	TCLP limits for solids 50% TCLP for liquids
PCB	WAC 173-303 40 CFR 761 if > 50 ppm	2 ppm	1.0 ppm
TCLP Herbicides	WAC 173-303 40 CFR 261	TCLP levels	TCLP limits for solids 50% TCLP for liquids per method 8150

¹ PQL is "Practical Quantitation Limit" with the definition of Chapter 1, SW-846 (USEPA 1990).

² TCLP limits mg/kg wet weight for solid waste, mg/L for liquid waste.

7.4.6 Holding Times

Analytical holding times are defined periods of time after sampling that are determined by regulators for a given analyte or analytical procedure. Results obtained from a properly preserved sample within that defined period of time are considered valid. After that defined period of time (analytical holding time) results obtained from the sample are considered degraded. Holding times for sample analyses will attempt to conform to those stated in the appropriate analytical procedure as applicable and will be identified prior to collection and shipment of the sample to the appropriate laboratory. However, it may not always be possible to meet the holding times for highly radioactive wastes, due to ALARA considerations. The goal of the laboratory operation shall be to perform analyses within the holding times specified and to assess individually each sample where holding times were exceeded. If holding times are exceeded, data may be reported if otherwise valid, but results shall be flagged in the report.

7.4.7 Comparability

Comparability is the level of confidence with which one data set can be compared with another. The SAP lists specific suggested analytical parameters and reference methods. Actual detection limits are sample-dependent and will be reported on an individual basis. Comparability shall also be maintained by use of consistent reporting units established at the beginning of the project.

In order for analytical results to be comparable to other similar projects, the methods utilized should be based on those methods specified by the State of Washington in WAC 173-303-110. When standard methods are not available, other procedures may be used.

Whenever possible, within the constraints of limiting radiation exposure and consideration of sample matrix, these methods shall conform to those specified in terms of reagents used, extraction or solvent ratios, and instruments

utilized. It is anticipated that the use of smaller aliquot of sample will be one of the most common amendments to the methods. Where significant deviations from the reference methods are made, the deviation shall be documented and the modified method proven by repeat analyses to perform comparably.

8.0 REPORTING

This section summaries reporting of field screening and laboratory data for waste generated or processed through WRAP Module 1.

8.1 FIELD SCREENING

Field screening data will be initially verbally communicated to the WRAP Module 1 representative(s) once the screening has been completed. All results will be entered into the field logbook and/or Data Management System. A complete field screening data report will be generated after each activity for review by WRAP Module 1 personnel.

8.2 LABORATORY DATA

The analytical laboratory shall provide WRAP Module 1 a case narrative of the sample analyzed. This case narrative shall include the following:

- o Sample identification number
- o Results of the analysis
- o How the sample was analyzed
- o Any anomalies encountered during sample analysis.

Other information may be included as appropriate.

9.0 HEALTH AND SAFETY CONSIDERATIONS

The personal protective equipment to be worn during sampling shall be listed on the job-specific job hazard analysis and radiation work permit for each sampling and/or field screening activity. Prior to each day's sampling effort, pre-job meetings shall be conducted to discuss the work to be performed, the job hazard analysis, the radiation work permit, and the personal protective equipment requirements. This meeting shall be documented by the shift supervisor with a roster of the attendees.

10.0 REFERENCES

- American Society for Testing and Materials (ASTM), 1989, Method E681-85, American Society for Testing and Materials, Philadelphia, Pennsylvania.
- APHA, 1989, *Standard Methods for the Examination of Water and Wastewater*, APHA-AWWA, WPCS, February 1989, 17th Edition.
- Bergeson, C.L., et al., 1994, *WRAP Module 1 Sampling Strategy and Waste Characterization Alternatives Study*, WHC-SD-W026 ES-013, Revision 0, Westinghouse Hanford Company, Richland Washington
- 49 CFR 172, 1992, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements," *Code of Federal Regulations*, as amended.
- 49 CFR 173, 1990, "Transportation," *Code of Federal Regulations*, as amended.
- 40 CFR 261, 1992, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, as amended.
- 40 CFR 268, 1992, "Land Disposal Restrictions," *Code of Federal Regulations*, as amended.
- 40 CFR 761, 1993, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and use Prohibitions," *Code of Federal Regulations*, as amended.
- Duncan, D.R., et al., 1993, *Characterization of Past and Present Solid Waste Streams from the Plutonium Finishing Plant*, WHC-EP-0621, Revision 0, Westinghouse Hanford Company, Richland Washington.
- Duncan, D.R., 1994a, *Radioactive Waste Shipments to Hanford Retrievable Storage from Babcock and Wilcox, Leechburg, Pennsylvania*, WHC-EP-0719, Revision 0, Westinghouse Hanford Company, Richland Washington.
- Duncan, D.R., 1994b, *Radioactive Waste Shipments to Hanford Retrievable Storage from Westinghouse Advanced Reactors and Nuclear Fuels Divisions, Cheswick, Pennsylvania*, WHC-EP-0718, Revision 0, Westinghouse Hanford Company, Richland Washington.
- DOE, 1989, *Radioactive Waste Management*, DOE Order 5820.2A, U.S. Department of Energy, Washington, D.C.
- DOE, 1991a, *TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant*, WIPP-DOE-069, Revision 4, Westinghouse Waste Isolation Division, Carlsbad, New Mexico.

- DOE, 1991b, *Quality Assurance Program Plan for the Waste Isolation Pilot Plant Experimental-Waste Characterization Program*, DOE/EM/48063-1, Revision 1, U.S. Department of Energy, Washington, D.C.
- DOE, 1987, *The Environmental Survey Manual*, Appendix D, U.S. Department of Energy/Office of Environmental Audit, Washington, D.C.
- DOE, 1982, *EML Procedures Manual, 25th Edition*, Environmental Measurement Laboratory, U.S. Department of Energy, Washington, D.C.
- Pottmeyer, J.A., et al., 1993a, *Characterization of Past and Present Solid Waste Streams from the Plutonium-Uranium Extraction Plant*, WHC-EP-0646, Revision 0, Westinghouse Hanford Company, Richland Washington.
- Pottmeyer, J.A., et al., 1993b, *Characterization of Past and Present Solid Waste Streams from 231-Z*, WHC-EP-0659, Revision 0, Westinghouse Hanford Company, Richland Washington.
- Pottmeyer, J.A., et al., 1993c, *Characterization of Past and Present Solid Waste Streams from the 325 Radiochemistry Building*, WHC-EP-0696, Revision 0, Westinghouse Hanford Company, Richland Washington.
- Pottmeyer, J.A., et al., 1993d, *Radioactive Waste Shipments to Hanford Retrievable Storage from the General Electric Vallecitos Nuclear Center, Pleasanton, California*, WHC-EP-0672, Revision 0, Westinghouse Hanford Company, Richland Washington.
- Triner, G.C., 1994, *Solid Waste Assessment Team Manual*, WHC-IP-1007, as amended, Westinghouse Hanford Company, Richland Washington.
- Turkington, R., 1993, *HazCat Manual*, HAZTECH SYSTEMS, INC., San Francisco, CA.
- USEPA, 1990, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, Updates I and II, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
- USEPA, 1984, *Eastern Environmental Radiation Facility (EERF) Radiochemistry Procedures Manual*, EPA-520/5-84-006, U.S. Environmental Protection Agency, Washington DC.
- USEPA, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*, EPA-600/4-80-032, U.S. Environmental Protection Agency, Washington DC.
- WAC 173-303, 1993, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended

WDOE, 1984, *Chemical Testing Methods for Complying with the Dangerous Waste Regulations*, WDOE 83-13, Washington State Department of Ecology, Olympia, Washington.

WHC, 1993, *Hanford Site Solid Waste Acceptance Criteria*, WHC-EP-0063-4, as amended, Westinghouse Hanford Company, Richland, WA.

WHC, 1990b, *Sample Management and Administration*, WHC-CM-5-3, Westinghouse Hanford Company, Richland, WA.

WHC-SD-W026-PLN-006 Rev 0

APPENDIX A ANALYTE LIST

WHC-SD-W026-PLN-006 Rev 0

This appendix summaries by generator the hazardous constituents that may be found in the retrieved waste stream.

Plutonium Finishing Plant Analyte List

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Acetic acid, Glacial (64-19-7)	C	-	-	F	CR	-	-	-	organic salt	pH
Acetone (Isobutyl Alcohol) (67-64-1)	D	-	-	F	-	-	U002 F003	-	VOC	VOA
Aluminum (fines) (7429-90-5)	-	-	-	F	-	R	-	-	metal or alloy fines	ICP
Aluminum (III) nitrate (nonhydrate) (13473-90-0)	D	-	-	O	-	-	-	-	soluble salt/complexant	ICP, anions
Ammonium ceric nitrate (16774-21-3)	-	-	-	O	-	-	-	-	soluble salt/complexant	ICP, anions
Ammonium chloride (12125-02-9)	D	-	-	-	-	-	-	-	soluble salt/complexant	anions
Ammonium hydroxide (1336-21-5)	C	-	-	-	CR	-	-	-	soluble base	pH
Ammonium sulfate (7783-20-2)	D	-	-	-	-	-	-	-	soluble salt/complexant	anions
Arsenic (7440-38-2)	D	-	-	-	-	-	-	-	soluble salt/complexant	anions
Arsenic trioxide (1327-53-3)	B	-	-	-	-	-	P012	D004	metal or alloy fines	ICP
Asbestos (1332-21-4)	-	-	-	-	-	-	-	-	asbestos fibers	asbestos
Barium nitrate (10022-31-8)	C	-	-	O	-	-	-	D005	insoluble salt	ICP, anions
Benzene (71-43-2)	D	C	-	F	-	-	U019 F005	D018	VOC	VOA
Beryllium (powdered-ultrafine) (7440-41-7)	-	C	-	I	-	-	P015	-	metal or alloy fines	ICP
Boric acid (10043-35-3)	D	-	-	-	-	-	-	-	acid low solubility	pH, ICP
Cadmium (powdered-ultrafine) (7440-43-9)	A	C	-	I	-	-	-	D006	metal or alloy fines	ICP
Carbon tetrachloride (56-23-5)	D	C	HH	-	-	-	U211 F001	D019	VOC	VOA
Hydrazine (Diamine) (302-01-2)	B	C	-	F	CR	R	U133	-	-	pH
Hydrobromic acid (10035-10-6)	-	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Hydrochloric acid (7647-01-0)	C	-	-	-	CR	-	-	-	inorganic acid	anions, pH

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Hydrofluoric acid (7664-39-3)	B	-	-	-	CR	-	U134	-	inorganic acid	anions, pH
Hydrogen peroxide (30% solution) (7722-84-1)	-	-	-	0	CR	-	-	-	-	pH
Hydroiodic acid (Hydrogen iodide) (10034-85-2)	-	-	-	I	CR	-	-	-	inorganic acid	pH
Lead (7439-92-1)	-	C	-	-	-	-	-	D008	metal or alloy fines	ICP
Lead chromate (7758-97-6)	-	C	-	-	-	-	-	D008, D007	insoluble salt	ICP
Mercuric thiocyanate (592-85-8)	B	-	-	-	-	-	-	D009	insoluble salt	ICP, anions
Mercury (7439-97-6)	-	-	-	-	-	-	U151	D009	metal or alloy fines	ICP
Methanol (67-56-1)	D	-	-	F	-	-	U154 F003	-	VOC	VOA
1-Naphthylamine (1-Naphthylamine) (134-32-7)	D	-	-	-	-	-	U167	-	SVOC	SVOA
2-Naphthylamine (2-Naphthylamine) (91-59-8)	D	-	-	-	-	-	U168	-	SVOC	SVOA
Nitric acid (7697-37-2)	-	-	-	0	CR	-	-	-	inorganic acid	anions, pH
Oxalic acid (144-62-7)	-	-	-	-	CR	-	-	-	organic acid	pH
Phosphoric acid (7664-38-2)	D	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Polychlorinated biphenyls (1336-36-3)	-	C	HH	-	-	-	-	-	PCB	PCB
Potassium acetate (127-08-2)	D	-	-	-	-	-	-	-	soluble salt/complexant	ICP
Potassium carbonate (584-08-7)	D	-	-	-	-	-	-	-	soluble salt/complexant	ICP
Potassium hydroxide (1310-58-3)	C	-	-	-	CR	-	-	-	soluble base	ICP, pH
Propane (74-98-6)	-	-	-	F	-	-	-	-	-	visual on x-ray
Silver chloride (7783-90-6)	-	-	-	-	-	-	-	D011	insoluble salt	ICP, anions
Silver nitrate (7761-88-8)	-	-	-	0	-	-	-	D011	soluble salt/complexant	ICP, anions
Silver oxide (20667-12-3)	D	-	-	-	-	-	-	D011	insoluble salt	ICP
Silver sulfite (10294-26-5)	-	-	-	-	-	-	-	D011	insoluble salt	ICP, anions

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Sodium bisulfite (7631-90-5)	D	-	-	-	-	-	-	-	soluble salt/complexant	ICP, anions
Sodium carbonate (497-19-8)	C	-	-	-	-	-	-	-	soluble salt/complexant	ICP
Sodium fluoride (7681-49-4)	C	-	-	-	CR	-	-	-	soluble salt/complexant	ICP, anions
Sodium hydroxide	-	-	-	-	CR	-	-	-	soluble base	ICP, pH
Sodium nitrate (7631-99-4)	D	-	-	0	-	-	-	-	soluble salt/complexant	ICP, anions
Sodium nitrite (7632-00-0)	C	-	-	0	-	-	-	-	soluble salt/complexant	ICP, anions
Sulfamic acid (5329-14-6)	D	-	-	-	CR	-	-	-	inorganic acid	pH
Sulfuric acid (7664-93-9)	B	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Toluene (108-88-3)	D	-	-	F	-	-	F005	-	VOC	VOA
Tributyl phosphate (Phosphoric acid, tributyl ester) (126-73-8)	D	-	-	-	-	-	-	-	SVOC	SVOA
Tungsten powder (7440-33-7)	-	-	-	F	-	-	-	-	metal or alloy fines	ICP
Xylene (Dimethylbenzene) (130-20-7) (mixed)	D	-	-	F	-	-	U239 F003	-	VOC	VOA

Plutonium Uranium Extraction Plant Analyte List

Constituent Name	WA STATE TOXICITY (1)	C	P	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Acetic acid, Glacial (64-19-7)	C	-	-	F	CR	-	-	-	organic salt	pH
Acetone (Isobutyl Alcohol) (67-64-1)	D	-	-	F	-	-	U002 F003	-	VOC	VOC
Aluminum (fines) (7429-90-5)	-	-	-	F	-	R	-	-	metal or alloy fines	ICP
Aluminum (III) nitrate (nonhydrate) (13473-90-0)	D	-	-	D	-	-	-	-	soluble salt/complexant	ICP, anions
Ammonium fluoride (12125-01-8)	-	-	-	-	CR	-	-	-	soluble salt/complexant	anions
Ammonium nitrate (6484-52-2)	D	-	-	D	-	R	-	-	soluble salt/complexant	anions
Asbestos (1332-21-4)	-	-	-	-	-	-	-	-	asbestos fibers	asbestos
Barium (metal fines) (7440-39-3)	-	-	-	F	-	R	-	D005	metal or alloy fines	ICP
Beryllium (powdered-ultrafine) (7440-41-7)	-	C	-	I	-	-	P015	-	metal or alloy fines	ICP
Cadmium (powdered-ultrafine) (7440-43-9)	A	C	-	I	-	-	-	D006	metal or alloy fines	ICP
Cadmium nitrate (10325-94-7)	C	C	-	-	-	-	-	D006	soluble salt/complexant	ICP, anions
Carbon tetrachloride (56-23-5)	D	C	HH	-	-	-	U211 F001	D019	VOC	VOC
Ceric sulfate (13590-82-4)	-	-	-	D	-	-	-	-	insoluble salt	anions
Chloroform (67-66-3)	B	C	HH	-	-	-	U044	D022	VOC	VOC
Cyclohexene (Hexahydrobenzene) (110-82-7)	-	-	-	F	-	-	U056	-	VOC	VOC
Decane (124-18-5)	-	-	-	I	-	-	-	-	VOC	VOC
Formaldehyde (50-00-0)	C	C	-	-	-	-	U122	-	VOC	ICP, anions, VOC
Hydrazine (Diamine) (302-01-2)	B	C	-	F	CR	R	U133	-	-	pH
Hydrobromic acid (10035-10-6)	-	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Hydrochloric acid (7647-01-0)	C	-	-	-	CR	-	-	-	inorganic acid	anions, pH

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Hydrogen peroxide (30% solution) (7722-84-1)	-	-	-	O	CR	-	-	-	-	pH
Isopropyl ethanol (isopropyl alcohol) (67-63-0)	D	-	-	F	-	-	-	-	VOC	VOC
Kerosene (8008-20-6)	-	-	-	CO	-	-	-	-	hydrocarbon mixture	-
Lead (7439-92-1)	-	C	-	-	-	-	-	D008	metal or alloy fines	ICP
Magnesium (metal fines) (7439-95-4)	-	-	-	F	-	R	-	-	metal or alloy fines	ICP
Mercury (7439-97-6)	-	-	-	-	-	-	U151	D009	metal or alloy fines	ICP
Methyl isobutyl ketone (4-METHYL-2-PENTANONE) (Hexone) (108-10-1)	D	-	-	F	-	-	U161 F003	-	VOC	VOC
Naphthalene (91-20-3)	C	-	-	C	-	-	U165	-	SVOC	SVOC
Nitric acid (7697-37-2)	-	-	-	O	CR	-	-	-	inorganic acid	anions, pH
Oxalic acid (144-62-7)	-	-	-	-	CR	-	-	-	organic acid	pH
Phosphoric acid (7664-38-2)	D	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Potassium fluoride (7789-23-3)	C	-	-	-	CR	-	-	-	soluble salt/complexant	ICP, anions
Potassium hydroxide (1310-58-3)	C	-	-	-	CR	-	-	-	soluble base	ICP, pH
Silicon (fines) (7440-21-3)	D	-	-	F	-	-	-	-	metal or alloy fines	ICP
Silver nitrate (7761-88-8)	-	-	-	O	-	-	-	D011	soluble salt/complexant	ICP, anions
Sodium bisulfite (7631-90-5)	C	-	-	-	-	-	-	-	soluble salt/complexant	ICP, anions
Sodium bromate (7789-38-0)	-	-	-	O	-	-	-	-	soluble salt/complexant	ICP, anions
Sodium carbonate (497-19-8)	C	-	-	-	-	-	-	-	soluble salt/complexant	ICP
Sodium fluoride (7681-49-4)	C	-	-	-	CR	-	-	-	soluble salt/complexant	ICP, anions
Sodium hydroxide	-	-	-	-	CR	-	-	-	soluble base	ICP, pH
Sodium nitrate (7631-99-4)	D	-	-	O	-	-	-	-	soluble salt/complexant	ICP, anions
Sodium nitrite (7632-00-0)	C	-	-	O	-	-	-	-	soluble salt/complexant	ICP, anions
Sulfamic acid (5329-14-6)	D	-	-	-	CR	-	-	-	inorganic acid	pH

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Sulfuric acid (7664-93-9)	B	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Tributyl phosphate (Phosphoric acid, tributyl ester) (126-73-8)	D	-	-	-	-	-	-	-	SVOC	SVOC
1,1,1-Trichloroethane (Methylchloroform) (71-55-6)	D	-	HH	-	-	-	U226 F001 F002	-	VOC	VOC
1,1,2-Trichloroethane (79-00-5)	D	C	HH	-	-	-	U227 F002	-	VOC	VOC
Xylene (Dimethylbenzene) (1330-20-7) (mixed)	D	-	-	F	-	-	U239 F003	-	VOC	VOC
Zincorium (metal fines) (7440-67-7)	-	-	-	F	-	-	-	-	metal or alloy fines	TCP

325 Building Analyte List

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Acetic acid, Glacial (64-19-7)	C	-	-	F	CR	-	-	-	organic salt	pH
Acetone (Isobutyl Alcohol) (67-64-1)	D	-	-	F	-	-	U002 F003	-	VOC	VOC
Aluminum (fines) (7429-90-5)	-	-	-	F	-	R	-	-	metal or alloy fines	ICP
Ammonia (Anhydrous) (7664-41-7)	B	-	-	-	-	-	-	-	-	HH ₄
Ammonium hydroxide (1336-21-6)	C	-	-	-	CR	-	-	-	soluble base	pH
Asbestos (1332-21-4)	-	-	-	-	-	-	-	-	asbestos fibers	asbestos
Barium nitrate (10022-31-8)	C	-	-	O	-	-	-	D005	insoluble salt	ICP, anions
Beryllium (powdered-ultrafine) (7440-41-7)	-	C	-	I	-	-	P015	-	metal or alloy fines	ICP
Boric acid (10043-35-3)	D	-	-	-	-	-	-	-	acid low solubility	pH, ICP
1-Butanol (n-Butyl alcohol) (71-36-3)	D	-	-	F	-	-	U031 F003	-	VOC	VOC
Calcium chloride (10043-52-4)	D	-	-	-	-	-	-	-	soluble salt/complexant	ICP, anions
Calcium nitrate (10124-37-5)	C	-	-	O	-	R	-	-	soluble salt/complexant	ICP, anions
Carbon tetrachloride (56-23-5)	D	C	HH	-	-	-	U211 F001	D019	VOC	VOC
Ceric sulfate (13590-82-4)	-	-	-	O	-	-	-	-	insoluble salt	anions
Cerous nitrate (10108-73-3)	D	-	-	O	-	-	-	-	insoluble salt	anions
Chromic acid (VI) (7738-94-5)	-	C	-	O	CR	-	-	D007	inorganic acid	ICP, pH
Citric acid (77-92-9)	D	-	-	-	CR	-	-	-	organic acid	pH
Ethanol (Ethyl alcohol) (64-17-5)	-	-	-	F	-	-	-	-	VOC	VOC
Ferrous sulfate (7720-78-7)	C	-	-	-	-	-	-	-	soluble salt/complexant	ICP, anions
Hydrazine (Diamine) (302-01-2)	B	C	-	F	CR	R	U133	-	-	pH

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Hydrochloric acid (7647-01-0)	C	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Hydrofluoric acid (7664-39-3)	B	-	-	-	CR	-	U134	-	inorganic acid	anions, pH
Hydrogen peroxide (30% solution) (7722-84-1)	-	-	-	O	CR	-	-	-	-	pH
Hydroiodic acid (Hydrogen iodide) (10034-85-2)	-	-	-	I	CR	-	-	-	inorganic acid	pH
Isopropyl ethanol (isopropyl alcohol) (67-63-0)	D	-	-	F	-	-	-	-	VOC	VOC
Kerosene (8008-20-6)	-	-	-	CO	-	-	-	-	hydrocarbon mixture	-
Lead (7439-92-1)	-	C	-	-	-	-	-	D008	metal or alloy fines	ICP
Mercury (7439-97-6)	-	-	-	-	-	-	U151	D009	metal or alloy fines	ICP
Methanol (67-56-1)	D	-	-	F	-	-	U154 F003	-	VOC	VOC
Methylene chloride (Dichloromethane) (75-09-2)	B	C	HH	-	-	-	U080 F001 F002	-	VOC	VOC
Methyl Ethyl Ketone (2-Butanone) (78-93-3)	D	-	-	F	-	-	U159 F005	D035	VOC	VOC
Methyl isobutyl ketone (4-METHYL-2-PENTANONE) (Hexone) (108-10-1)	D	-	-	F	-	-	U161 F003	-	VOC	VOC
Nitric acid (7697-37-2)	-	-	-	O	CR	-	-	-	inorganic acid	anions, pH
Nitritotriacetic acid (139-13-9)	D	-	-	-	-	-	-	-	organic acid	pH
Oxalic acid (144-62-7)	-	-	-	-	CR	-	-	-	organic acid	pH
Perchloric acid (7601-90-3)	D	-	-	O	CR	R	-	-	inorganic acid	pH
Phosphoric acid (7664-38-2)	D	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Potassium carbonate (584-08-7)	D	-	-	-	-	-	-	-	soluble salt/complexant	ICP
Potassium chromate (7789-00-6)	-	-	-	-	-	-	-	D007	soluble salt/complexant	ICP, anions
Potassium hydroxide (1310-58-3)	C	-	-	-	CR	-	-	-	soluble base	ICP, pH
Silver nitrate (7761-88-8)	-	-	-	O	-	-	-	D011	soluble salt/complexant	ICP, anions

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Sodium (7440-23-5)	-	-	-	F	CR	R	-	-	metal or alloy fines	ICP
Sodium bicarbonate (144-55-8)	D	-	-	-	-	-	-	-	soluble salt/complexant	ICP
Sodium bisulfite (7631-90-5)	D	-	-	-	-	-	-	-	soluble salt/complexant	ICP, anions
Sodium carbonate (497-19-8)	C	-	-	-	-	-	-	-	soluble salt/complexant	ICP
Sodium dichromate (10588-01-9)	C	-	-	-	-	-	-	D007	soluble salt/complexant	ICP
Sodium fluoride (7681-49-4)	C	-	-	-	CR	-	-	-	soluble salt/complexant	ICP, anions
Sodium hydroxide	-	-	-	-	CR	-	-	-	soluble base	ICP, pH
Sodium nitrate (7631-99-4)	D	-	-	O	-	-	-	-	soluble salt/complexant	ICP, anions
Sodium nitrite (7632-00-0)	C	-	-	O	-	-	-	-	soluble salt/complexant	ICP, anions
Sodium phosphate, tribasic (7601-54-9)	-	-	-	-	CR	-	-	-	soluble salt/complexant	ICP, anions
Sodium silicate solution (pH = 3, 9 per chem. dict.) (1344-09-8)	D	-	-	-	-	-	-	-	soluble salt/complexant	ICP
Strontium nitrate (10042-76-9)	D	-	-	O	-	-	-	-	soluble salt/complexant	ICP, anions
Sulfuric acid (7664-93-9)	B	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Toluene (108-88-3)	D	-	-	F	-	-	F005	-	VOC	VOC
Tributyl phosphate (Phosphoric acid, tributyl ester) (126-73-8)	D	-	-	-	-	-	-	-	SVOC	SVOC
1,1,1-Trichloroethane (Methylchloroform) (71-55-6)	D	-	HH	-	-	-	U226 F001 F002	-	VOC	VOC
1,1,2-Trichloroethane (79-00-5)	D	C	HH	-	-	-	U227 F002	-	VOC	VOC
Vanadium pentoxide (1314-62-1)	B	-	-	O	-	-	P120	-	insoluble salt	ICP
Xylene (Dimethylbenzene) (1330-20-7) (mixed)	D	-	-	F	-	-	U239 F003	-	VOC	VOC
Zincium (metal fines) (7440-67-7)	-	-	-	F	-	-	-	-	metal or alloy fines	ICP

231-Z Analyte List

Constituent Name	WA STATE TOXICITY (1)	C	P	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Acetone (isobutyl Alcohol) (67-64-1)	D	-	-	F	-	-	U002 F003	-	VOC	VOA
Asbestos (1332-21-4)	-	-	-	-	-	-	-	-	asbestos fibers	asbestos
Benzene (71-43-2)	D	C	-	F	-	-	U019 F005	D018	VOC	VOA
Beryllium (powdered-ultrafine) (7440-41-7)	-	C	-	I	-	-	P015	-	metal or alloy fines	ICP
Cadmium (powdered-ultrafine) (7440-43-9)	A	C	-	I	-	-	-	D006	metal or alloy fines	ICP
Carbon tetrachloride (56-23-5)	D	C	HH	-	-	-	U211 F001	D019	VOC	VOA
Freon-113 (1,1,2-Trichloro-1,2,2-trifluoroethane) (76-13-1)	-	-	HH	-	-	-	F001 F002	-	VOC	VOA
Hydrochloric acid (7647-01-0)	C	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Hydrogen peroxide (30% solution) (7722-84-1)	-	-	-	O	CR	-	-	-	-	pH
Lead (7439-92-1)	-	C	-	-	-	-	-	D008	metal or alloy fines	ICP
Mercury (7439-97-6)	-	-	-	-	-	-	U151	D009	metal or alloy fines	ICP
Methylene chloride (Dichloromethane) (75-09-2)	B	C	HH	-	-	-	U080 F001 F002	-	VOC	VOA
Nitric acid (7697-37-2)	-	-	-	O	CR	-	-	-	inorganic acid	anions, pH
Phosphoric acid (7664-38-2)	D	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Polychlorinated biphenyls (1336-36-3)	-	C	HH	-	-	-	-	-	PCB	PCB
Propane (74-98-6)	-	-	-	F	-	-	-	-	-	visual on x-ray
Sodium (7440-23-5)	-	-	-	F	CR	R	-	-	metal or alloy fines	ICP
Sodium hydroxide	-	-	-	-	CR	-	-	-	soluble base	ICP, pH
Sodium phosphate, tribasic (7601-54-9)	-	-	-	-	CR	-	-	-	soluble salt/complexant	ICP, anions

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Sulfamic acid (5329-14-6)	D	-	-	-	CR	-	-	-	inorganic acid	pH
1,1,1-Trichloroethane (Methychloroform) (71-55-6)	D	-	HH	-	-	-	U226 F001 F002	-	VOC	VOA
1,1,2-Trichloroethane (79-00-5)	D	C	HH	-	-	-	U227 F002	-	VOC	VOA
Trichloroethylene (79-01-6)	-	-	HH	-	-	-	U228 F001 F002	D040	VOC	VOA
Tungsten powder (7440-33-7)	-	-	-	F	-	-	-	-	metal or alloy fines	ICP
Uranyl nitrate hexahydrate (13520-83-7)	-	-	-	-	CR	-	-	-	soluble salt/complexant	ICP, anions
Xylene (Dimethylbenzene) (1330-20-7) (mixed)	D	-	-	F	-	-	U239 F003	-	VOC	VOA
Zirconium (metal fines) (7440-67-7)	-	-	-	F	-	-	-	-	metal or alloy fines	ICP

Babcock & Wilcox Analyte List

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Beryllium (powdered-ultrafine) (7440-41-7)	-	C	-	I	-	-	P015	-	metal or alloy fines	ICP
Hydrofluoric acid (7664-39-3)	B	-	-	-	CR	-	U134	-	inorganic acid	anions, pH
Mercury (7439-97-6)	-	-	-	-	-	-	U151	D009	metal or alloy fines	ICP
Nitric acid (7697-37-2)	-	-	-	O	CR	-	-	-	inorganic acid	anions, pH
Phosphoric acid (7664-38-2)	D	-	-	-	CR	-	-	-	inorganic acid	anions, pH
Sodium nitrite (7632-00-0)	C	-	-	O	-	-	-	-	soluble salt/complexant	ICP, anions
Sulfuric acid (7664-93-9)	B	-	-	-	CR	-	-	-	inorganic acid	anions, pH

Westinghouse Advanced Reactor and Nuclear Fuels Divisions Analyte List

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Asbestos (1332-21-4)	-	-	-	-	-	-	-	-	asbestos fibers	asbestos
Lead (7439-92-1)	-	C	-	-	-	-	-	D008	metal or alloy fines	ICP
Mercury (7439-97-6)	-	-	-	-	-	-	U151	D009	metal or alloy fines	ICP
Nitric acid (7697-37-2)	-	-	-	O	CR	-	-	-	inorganic acid	anions, pH
Oxalic acid (144-62-7)	-	-	-	-	CR	-	-	-	organic acid	pH

Vallecitos Nuclear Center Analyte List

Constituent Name	WA STATE TOXICITY (1)	C (2)	P (3)	D1 (4)	D2 (5)	D3 (6)	LISTED WASTE CODE (7)	FED. TCLP (8)	General Description (9)	General Grouping (10)
Aluminum (fines) (7429-90-5)	-	-	-	F	-	R	-	-	metal or alloy fines	ICP
Asbestos (1332-21-4)	-	-	-	-	-	-	-	-	asbestos fibers	asbestos
Ethylene glycol (107-21-1)	D	-	-	-	-	-	-	-	SVOC	SVOA
Lead (7439-92-1)	-	C	-	-	-	-	-	D008	metal or alloy fines	ICP
Mercury (7439-97-6)	-	-	-	-	-	-	U151	D009	metal or alloy fines	ICP
Nitric acid (7697-37-2)	-	-	-	O	CR	-	-	-	inorganic acid	anions, pH

Code Key and Guidelines

(1) Washington State Toxicity Category

Table Code: X - Category X, A - Category A, B - Category B, C - Category C, D - Category D

(2) Carcinogen (C)

Table Code: C - Potential carcinogen

(3) Persistence (P)

Table Code: HH - Potential for persistence for halogenated hydrocarbons

(4) D1 (D001) - Ignitable

Table Code: F - Potential flammability, O - Potential oxidizer, CO - Potential combustibility

(5) D2 (D002) - Corrosive

Table Code: CR - Potential corrosivity

(6) D3 (D003) - Reactive

Table Code: R - Potentially reactive

(7) Listed Waste Code

U and P codes, F001, F002, F003, F004, F005

(8) Federal TCLP Toxicity Characteristic (FED. TCLP)

D004, D005, D006, D007, D008, D009, D010, D011, D018, D019, D022, D026, D032, D035, D038, D039, D040

(9) General Description

General description of the constituent.

(10) General Grouping

General grouping designator for analysis.

AIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910

301/587-8202

Centimeter

Inches

MANUFACTURED TO AIM STANDARDS
BY APPLIED IMAGE, INC.

**DATE
FILMED**

5 / 30 / 95

END