PART III, OPERATING UNIT 8
222-S DANGEROUS AND MIXED WASTE TREATMENT STORAGE AND DISPOSAL UNIT
ADDENDUM B

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ADDENDUM B
WASTE ANALYSIS PLAN

Contents

Tables and Figures

ACRONYMS

ALARA	as low as reasonably achievable
CFR	Code of Federal Regulations
Coliwasa	composite liquid waste sampler
DMWSA	Dangerous and Mixed Waste Storage Area
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DST	double-shell tank
Ecology	State of Washington Department of Ecology
EPA	U.S. Environmental Protection Agency
LDR	land disposal restriction
PCB	polychlorinated biphenyls
QA	quality assurance
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
TSD	Dangerous and Mixed Waste Treatment, Storage, and Disposal
WAC	Washington Administrative Code
WAP	waste analysis plan

METRIC CONVERSION CHART

Into metric units

If you know	Multiply by	To get
Length		
inches	25.40	millimeters
inches	2.54	centimeters
feet	0.3048	meters
yards	0.9144	meters
miles (statute)	1.60934	kilometers
Area		
square inches	6.4516	square centimeters
square feet	0.09290304	square meters
square yards	0.8361274	square meters
square miles	2.59	square kilometers
acres	0.404687	hectares
Mass (weight)		
ounces (avoir)	28.34952	grams
pounds	0.45359237	kilograms
tons (short)	0.9071847	tons (metric)
Volume		
ounces (U.S., liquid)	29.57353	milliliters
quarts (U.S., liquid)	0.9463529	liters
gallons (U.S., liquid)	3.7854	liters
cubic feet	0.02831685	cubic meters
cubic yards	0.7645549	cubic meters
Temperature		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius
Energy		
kilowatt hour	3,412	British thermal unit
kilowatt	0.94782	British thermal unit per second
Force/Pressure		
pounds (force) per square inch	6.894757	kilopascals

Out of metric units

If you know	Multiply by	To get
Length		
millimeters	0.03937	inches
centimeters	0.393701	inches
meters	3.28084	feet
meters	1.0936	yards
kilometers	0.62137	miles (statute)
Area		
square centimeters	0.155	square inches
square meters	10.7639	square feet
square meters	1.19599	square yards
square kilometers	0.386102	square miles
hectares	2.47104	acres
Mass (weight)		
grams	0.035274	ounces (avoir)
kilograms	2.204623	pounds (avoir)
tons (metric)	1.1023	tons (short)
Volume		
milliliters	0.033814	ounces (U.S., liquid)
liters	1.0567	quarts (U.S., liquid)
liters	0.26417	gallons (U.S., liquid)
cubic meters	35.3147	cubic feet
cubic meters	1.308	cubic yards
Temperature		
Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy		
British thermal unit	0.000293	kilowatt hour
British thermal unit per second	1.055	kilowatt
Force/Pressure		
kilopascals	0.14504	pounds per square inch

06/2001

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

B.1 UNIT DESCRIPTION

The purpose of this Waste Analysis Plan (WAP) is to document the waste acceptance process, waste acceptance criteria, sampling methodologies, analytical techniques, quality assurance/quality control requirements, and processes that are undertaken for sampling and analysis of dangerous or mixed waste managed in the 222-S dangerous waste management units which are part of the 222-S Operating Unit Group. The 222-S dangerous waste management units are located in the 200 West Area of the Hanford Facility, Richland, Washington. For a detailed description of the 222-S Operating Group see the Part A Form, and Addendum C, Process Information. The following wastes may be managed at 222-S Operating Unit Group: dangerous or mixed waste that is generated from processes at the Hanford site, or waste that is specifically identified in Section II, paragraph 8 of the Settlement Agreement re: Washington versus Bodman, Civil No. 2:30-cs-05018-AAM, January 6, 2006. No other wastes may be managed at 222-S unless authorized via permit modification decision pursuant to Permit Condition 1.C.3. Requests for Permit modifications much be accompanied by an evaluation adequate for Ecology to comply with SEPA.

Where information regarding treatment, management, and disposal of the radioactive source byproduct material and/or special nuclear components of mixed waste(as defined by the *Atomic Energy Act of 1954* as amended) is incorporated into this document, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit or Chapter 70.105, "Hazardous Waste Management," of the Revised Code of Washington and its implementing regulations but is provided for information purposes only.

B.1.1 Description of Unit Processes and Activities

The 222-S Laboratory Complex contains analytical laboratories, maintenance areas, operations areas, administrative buildings, and the dangerous waste management units which make up the 222-S Operating Unit Group. The dangerous waste management units include the 219-S Waste Handling Facility, which consists of a three tank system, and three container storage units: the Dangerous Mixed Waste Storage Area (DMWSA), Room 4-E, and portions of Room 2-B. Additional details of these dangerous waste management units can be found in Addendum C, Process Information.

Mixed waste is managed in each of the 222-S dangerous waste management units. Dangerous waste numbers managed in the 222-S dangerous waste management units are listed in Tables B.1-1 and B.1-2.

Table B.1.1 Waste Designation Numbers and Treatment for Waste Stored in the DMWSA, Room 4-E, and Room 2-B Container Storage Areas

Waste Designation Number	Reference	Treatment*
D001	WAC 173-303-090(5)	None
D002	WAC 173-303-090(6)	None
D003	WAC 173-303-090(7)	None
D004 - D043	WAC 173-303-090(8)	None
WSC2	WAC 173-303-090(6)	None
WP01 – WP03	WAC 173-303-100 and 104	None
WT01 – WT02	WAC 173-303-100 and 104	None
F001 – F012 F019 – F023 F026 – F028 F039	WAC 173-303-9904	None
All U and P numbers	WAC 173-303-9903	None
WPCB	WAC 173-303-9904	None

WL01 – WL02		None

*Except as allowed for by treatment by generator per WAC 170-303-170(3)(b) and (c)

Table B.1.2 Waste Designation Numbers and Treatment for Waste Stored in the 219-S Tank System

Waste Number	Reference	Treatment
D001	WAC 173-303-090(5)	DEACT (slow controlled addition of water)
D002	WAC 173-303-090(6)	• DEACT (controlled addition of water) • pH adjustment
D003	WAC 173-303-090(7)	DEACT (controlled addition of water)
D004 - D011 D018 D019 D022 D028 – D030 D033 – D036 D038 – D041 D043	WAC 173-303-090(8)	None
WP01 – WP02	WAC 173-303-100 and 104	None
WT01 – WT02	WAC 173-303-100 and 104	None
F001 – F005	WAC 173-303-9904	None

Samples received for analysis in the 222-S laboratory will be accompanied by waste information documenting generator knowledge of waste codes and characteristics. Samples identified with prohibited listed codes are identified and isolated from transfer into the 219-S Tank System. If samples are coded with F039, they will be identified and precautions will be taken to avoid transfer into 219-S. If waste coded F-039 is introduced into the 219-S Tank System, the waste will not be transferred to the DST system and transfers to another on-site or off-site TSD will be made in accordance with Addendum C, Section C.3.4.5.

The 219-S Waste Handling System, which is comprised of the 219-S Tank System, is located northeast of the 222-S Laboratory. The 219-S Tank System includes tanks 101, 102, and 104 and all associated ancillary equipment. See Table C-1 in Addendum C, Process Information. The 219-S Tank System accepts mixed waste for treatment and storage as well as radioactive waste for storage. Mixed and radioactive waste can be introduced into the 219-S Tank System from the sinks in Room 2-B/Hood 16, hot cell drains and piping connected from analytical instrumentation within the 222-S Laboratory, and various-sized containers pumped (e.g., tanker trucks, 208-liter drums) directly into one of the tanks. Mixed waste is aggregated in the tanks and prepared for transfer to DST tank system via underground piping or transfer to tankers or containers (Addendum C.3.4) for shipment to onsite or offsite TSD facility. Acceptance criteria established in this addendum is designed to allow transfer of the mixed waste to the Double-Shell Tank (DST) System, an onsite TSD unit.

After aggregation of mixed and/or radioactive waste in the tanks of the 219-S Tank System, the batch of mixed waste proposed for transfer is isolated from other mixed waste in the tank system. For transfers into the DST System, a sample is acquired before and after treatment. Sampling and analysis results from the sample acquired before treatment will determine the amount of sodium hydroxide (NaOH) and sodium nitrite ($NaNO_2$) that will be added to the isolated batch of mixed waste. The addition of these chemicals makes the mixed waste more amenable for storage in the DST System. A sample is

acquired from the treated waste to ensure that the waste meets the DST waste acceptance criteria. Table B.3-1 provides the parameters, methods, and rationale for selecting the parameters.

For all transfers out of the 219-S Tank System, a sample is acquired from the mixed waste and analyzed according to Table B.3-1 to determine whether the mixed waste displays the characteristics of dangerous waste. Sampling and analysis frequencies to determine whether the mixed waste contains underlying hazardous constituents are discussed in Section 7.3. Furthermore, 222-S Laboratory Complex management will determine on a case-by-case basis whether sampling and analysis results are needed for other parameters [e.g., organic constituents (D018-D043)]. This determination is based on the ultimate destination of the waste (i.e., if the waste is being transferred offsite, additional sampling and analysis may be required to meet the receiving unit's waste acceptance criteria.). A more detailed description of the 219-S Tank System is provided in Addendum C.

The 222-S Operating Unit Group includes three container storage units: DMWSA, Room 2-B, and Room 4-E. The 222-S DMWSA is located north of the 222-S Laboratory (Figure B.1-1) and consists of two metal storage structures. Rooms 2-B and 4-E are located within the 222-S laboratory (Figure B.1-1). The 222-S DMWSA, Rooms 2-B and 4-E provide container storage of dangerous, mixed, and/or radioactive waste. The Room 2-B waste container storage unit is a portion of Room 2-B. The containers are stored until transfer to another 222-S dangerous waste management unit, an onsite TSD unit, or an offsite TSD facility.

Waste management activities occurring in the 222-S container storage units include storage, packaging, repackaging, and sampling. 222-S Laboratory Complex management will determine on a case-by-case basis when knowledge of the waste is insufficient to confirm waste designation in accordance to this plan. Sampling and analysis results will be obtained:

- To ensure the waste acceptance criteria are met for subsequent transfers/shipments.
- To complete physical/chemical screening requirements.
- To verify knowledge of the waste.
- To perform characterization.

Sampling and analysis is done in accordance with this addendum. Some of the waste numbers appearing on the 222-S Operating Unit Group Part A Form for the 222-S container storage units are included because of the use of calibration standards formulated for a large variety of analytes for which 222-S Laboratory may perform analyses. A more detailed discussion of the 222-S container storage unit is provided in Section C.1.1 of Addendum C.

B.1.2 Identification, Classification, and Quantities of Waste Managed in the 222-S Laboratory Treatment, Storage, and Disposal Units

The dangerous or mixed waste managed in the 222-S Operating Unit Group dangerous waste management units is received from waste generated within the 222-S Laboratory Complex, from waste generated at other Hanford Site locations (off-unit), and from waste generated offsite (Addendum C of this permit). The following general sources describe the types of dangerous or mixed waste managed in the units of the 222-S Operating Unit Group:

a. Waste generated within the 222-S Laboratory Complex.

   1. Analytical waste resulting from sample analysis.
   2. Discarded chemical products from laboratory reagents/standards.
   3. Waste from chemicals synthesized or created during research activities.
   4. Unused samples.
   5. Maintenance, construction, operations waste.

b. Off-unit/offsite[1]

B.1.2.1 Waste Storage Criteria for the 222-S Dangerous Waste Management Units

B.1.2.1.1 Container Storage Units

The waste storage criteria for the container storage units within the 222S Operating Unit Group Container Storage Units is summarized in Table B.1-3.

Table B.1.3 Waste Storage Criteria for Container Management Units within the 222S Operating Unit Group

Waste Storage Criteria	Dangerous and Mixed Waste Storage Area (DMWSA)	Northern Portion of Room 2B	Room 4E
Waste Types Accepted	• 222S generated waste: o Analytical waste resulting from sample analysis or testing. o Discarded chemical products from laboratory reagents/standards. o Waste from chemicals synthesized or created during research activities. o Unused samples. o Maintenance, construction, operations waste. • Off unit/offsite[1]	• 222S generated waste: o Analytical waste resulting from sample analysis or testing. o Discarded chemical products from laboratory reagents/standards. o Waste from chemicals synthesized or created during research activities. o Unused samples. o Maintenance, construction, operations waste. • Off unit/offsite[1]	• 222S generated waste: o Analytical waste resulting from sample analysis or testing. o Discarded chemical products from laboratory reagents/standards. o Waste from chemicals synthesized or created during research activities. o Unused samples. o Maintenance, construction, operations waste. • Off unit/offsite[1]
Waste Volume Limits	24,520 liters	2,500 liters	1,450 liters
Waste Designation Numbers	See Table B.1-1.	See Table B.1-1.	See Table B.1-1.
Regulatory	• Mixed, Dangerous,	• Mixed, Dangerous,	• Mixed, Dangerous,

[1] *Settlement Agreement re: Washington v. Bodman*, Civil No. 2:03-cv-05018-AAM, U.S. Department of Energy and Washington State Department of Ecology, dated January 6, 2006. (See DOE/RL-91-27, Rev. 2, Appendix 3B.)

Waste Storage Criteria	**Dangerous and Mixed Waste Storage Area (DMWSA)**	**Northern Portion of Room 2B**	**Room 4E**
Status of Waste in Unit	TSCA, and non-Dangerous waste • Radiologically and non-radiologically contaminated waste.	TSCA, and non-Dangerous waste • Radiologically and non-radiologically contaminated waste.	TSCA, and non-Dangerous waste • Radiologically and non-radiologically contaminated waste.
Dangerous waste listed in WAC 173-303-9903 for reactivity	Limited to: • Analytical waste resulting from sample analysis or testing. • Discarded chemical products from laboratory reagents/standards • Waste from chemicals synthesized or created during research activities. • Unused samples. • Laboratory spill cleanup waste	Limited to: • Analytical waste resulting from sample analysis or testing. • Discarded chemical products from laboratory reagents/standards • Waste from chemicals synthesized or created during research activities. • Unused samples. • Laboratory spill cleanup waste	Limited to: • Analytical waste resulting from sample analysis or testing. • Discarded chemical products from laboratory reagents/standards • Waste from chemicals synthesized or created during research activities. • Unused samples. • Laboratory spill cleanup waste
Storage of Reactive Waste	• Separated from containers of other waste types • Storage prohibited for reactive waste defined in WAC 173-303-090(7)(a)(vii) and (viii)	• Separated from containers of other waste types • Waste is placed on separate containment • Storage prohibited for reactive waste defined in WAC 173-303-090(7)(a)(vii) and (viii)	• Separated from containers of other waste types • Waste is placed on separate containment • Storage prohibited for reactive waste defined in WAC 173-303-090(7)(a)(vii) and (viii)
Storage of Water Reactive Waste	• Waste is placed in liquid tight containers	• Waste is placed in liquid tight containers • Waste is placed on separate containment	• Waste is placed in liquid tight containers • Waste is placed on separate containment
Storage of Incompatible Waste	• Waste must be separated from containers of other waste types • Storage must be conducted pursuant to the waste management specific requirements contained in WAC 173-303-630(9).	• Waste must be separated from containers of other waste types • Storage must be conducted pursuant to the waste management specific requirements contained in WAC 173-303-630(9).	• Waste must be separated from containers of other waste types • Storage must be conducted pursuant to the waste management specific requirements contained in WAC 173-303-630(9).
Storage of Ignitable	Separated from containers of other waste	Waste is placed on separate containment	Waste is placed on separate containment

Waste Storage Criteria	Dangerous and Mixed Waste Storage Area (DMWSA)	Northern Portion of Room 2B	Room 4E
Waste	types	systems.	systems.
Storage of Liquids	Allowed (See Addendum C, Section C.2.4.1 for description of DMWSA containment system design and operation)	Containment system required	Containment system required
Physical State of Waste Stored	All	All	All
Storage of "Rejected but not Accepted" off site/off unit waste pending resolution (Section 2.3.1)	Yes	Yes	Yes

B.1.2.1.1.1 219-S TANK SYSTEM

The waste storage criteria for the 219-S Tank System within the 222-S Operating Unit Group is summarized in Table B.1.4.

Table B.1.4 Waste Storage Criteria for 219-S Tank System within the 222-S Operating Unit Group

Waste Storage Criteria	219-S Tank System
1. Waste Types Accepted	• 222-S generated waste: o Analytical waste resulting from sample analysis or testing. o Discarded chemical products from laboratory reagents/standards. o Waste from chemicals synthesized or created during research activities. o Unused samples. o Maintenance, construction, operations waste. • Off unit/offsite [1]
2. Waste Volume Limits	37,472 liters in total from the following tanks: • Tank 101: 15,140 liters • Tank 102: 15,140 liters • Tank 104: 7, 192 liters
3. Dangerous Waste Numbers	See Table B.1.2
4. Regulatory Status of Waste in Unit	• Radiologically contaminated waste • Radiologically contaminated dangerous waste

Waste Storage Criteria	219-S Tank System
	• Radiologically contaminated non-dangerous waste • Radiologically contaminated TSCA waste
5. Physical State of Waste	Liquid
6. Storage of Reactive Waste	• Storage allowed with DEACT treatment (slow controlled addition of water) • Storage prohibited for reactive waste defined in WAC 173-303-090(7)(a)(vi),(vii), and (viii)
7. Storage of Incompatible Waste	• Storage must be conducted pursuant to the waste management specific requirements contained in WAC 173-303-640(10).
8. Storage of Ignitable Waste	• Storage allowed with DEACT treatment (slow controlled addition of water)
9. Waste Limitation	• F-039 coded waste is not normally accepted for storage in 219-S. If waste coded F-039 is introduced into the 219-S Tank System, the waste will not be transferred to the DST system and transfers to another on-site or off-site TSD will be made in accordance with Addendum C, Section C.3.4.5.
10. Waste Prohibitions	• Dangerous waste listed in WAC 173-303-9903 • Organic compounds not miscible with water forming a separable layer • Waste with greater than 10% total organic carbon (TOC) • Storage of Rejected but not Accepted Off Site/off unit waste pending resolution (Section 2.3.1 of this Addendum)

B.1.2.2 Waste Generated within the 222-S Laboratory Complex

Waste generated within the 222-S Laboratory Complex includes analytical waste resulting from sample analysis, discarded chemical products from laboratory reagents/standards, waste from chemicals synthesized or created during research activities, unused samples, maintenance, construction, and operations waste.

B.1.2.2.1 Analytical Waste Resulting from Sample Analysis

Analytical waste resulting from sample analysis constitutes the largest volume of waste to be stored. Liquid and non-liquid waste forms are generated from laboratory activities. Analytical waste resulting from sample analysis can include, but is not limited to, waste generated from performing work under the sample exclusion in WAC 173-303-071(3)(l), or the treatability study exclusions in WAC 173-303-071(3)(r), and (s).

Analytical waste resulting from sample analysis contains chemical reagents used in the laboratory procedures and a contribution from the sample. The management of analytical wastes begins before any waste is generated by pre-designation of laboratory waste streams having consistent characteristics such as process analytical waste streams are based on the following three considerations:

a. Reagents used in the laboratory procedure.
b. Contributions from calibration, verification standards or Method Standard used during an analytical process or procedure.
c. Contributions from equipment rinsate.

Sample contribution is captured by reviewing listed waste numbers and origin identified on documentation accompanying incoming samples to the 222-S Laboratory.

The documented information is evaluated by 222-S Laboratory chemists and subject matter experts (management and/or environmental personnel) as part of the 222-S Laboratory procedure issuance process or test plan development. The evaluation will consist of the following elements:

a. Estimate chemical constituents as highest reasonably expected concentration and apply characteristic codes based on WAC 173-303-080, -100, or -104.

b. A compatibility review to evaluate potential reactions and other hazards for chemicals used in the procedure or test plan using standard chemistry references.

c. Review of applicable waste codes against the Part A Form and the waste acceptance criteria in this addendum for Rooms 2-B, 4-E, the DMWSA and the 219-S Tank System. This is to determine if the mixed waste or associated wastes produced through laboratory operations is prohibited.

After a 222-S Laboratory procedure or test plan is issued, the waste is generated. Information on waste in any given container is evaluated by 222-S Laboratory waste management personnel to determine listed waste numbers. The waste designation is complete after sample contribution for listed waste numbers is considered. This waste designation approach results in a determination whether analytical waste resulting from samples can be introduced into the 219-S Tank System or must be packaged for transfer/shipment in containers. This approach provides waste characterization adequate for waste designation and evaluating compliance with waste acceptance criteria for analytical waste resulting from samples. Reagents and standards drive the characteristic determination of analytical waste.

B.1.2.2.2 Discarded Chemical Products from Laboratory Reagents/Standards

Only a few of these dangerous and/or mixed waste numbers are typically generated at any one time. The Part A Form for the container storage units lists all of the waste numbers because of the potential for a wide variety of analytical and research activities within the 222-S Laboratory. This dangerous and/or mixed waste is in the original container or can be traced back to the original reagent/standard container. Information on the container label and logbooks is used to establish knowledge.

B.1.2.2.3 Waste from Treatability Studies and Research Activities

Waste from treatability studies and research activities typically are generated in quantities ranging from a few grams to a few liters. These waste types consist primarily of radiologically contaminated chemicals, such as organics and treatment products from treatability studies. Waste from treatability studies and research activities will be managed in the same manner as analytical waste resulting from samples (Section 1.2.1.1).

B.1.2.2.4 Unused Samples

Unused waste samples are either returned to the generator in accordance with the sample exclusion in WAC 173-303-071(3)(l) or the treatability study exclusion in WAC 173-303-071(3)(r) and (s), or declared as waste. If declared as waste, 222-S Laboratory Complex waste management personnel will review all information on the unused samples to determine if sufficient knowledge exists to perform a waste designation. Sufficient knowledge may include the following:

a. Sampling and analysis results from 222-S Laboratory activities.

b. Listed waste numbers identified on documentation accompanying incoming samples to the 222-S Laboratory.

The waste designation and the 219-S waste acceptance criteria will determine whether unused samples can be introduced into the 219-S Tank System or must be packaged in containers.

Single shell tank, double shell tank, and 219-S tank samples are returned to the 219-S tank system and subsequently to the double shell tank system under the provisions of the sample exclusion [WAC 173-303-071 (l)].

B.1.2.2.5 Maintenance/Construction Project Waste

Maintenance/construction project waste is generated based on the need for such activities within the 222-S Laboratory Complex. Maintenance waste is typically generated from activities taking place on the 219-S Tank System, the 222-S Laboratory ventilation system, and 222-S Laboratory hoods and analytical equipment. Construction project waste can result from upgrades or renovations within the 222-S Laboratory Complex. Maintenance/construction project waste is primarily debris. Debris may be hazardous debris from maintenance of the 219-S Tank System. Chemicals are evaluated when used in the maintenance/construction project activities work planning process. Nonhazardous chemicals are substituted whenever possible. Hazardous chemicals are considered in the designation of debris. Liquid mixed waste, if generated, may be transferred to 219-S tank system provided it meets acceptance criteria established in this addendum.

B.1.2.3 Off-Unit/Offsite Waste

Off-unit/Off-site waste managed within the 222-S Operating Unit Group dangerous waste management units includes dangerous and mixed wastes. Knowledge is obtained during the confirmation process for off-unit/offsite waste (Section 2.0).

The DMWSA, Rooms 2-B and 4-E receive containerized dangerous and mixed wastes.

The 219-S Tank System is not configured to directly accept containerized waste. Waste is introduced to the 219-S Tank System through Hood 16 sinks in Room 2-B and the hot cell drains. Containerized mixed waste destined for the 219-S Tank System is received and accepted into one of the other dangerous waste management units, Room 2-B, Room 4-E, or the DMWSA. Mixed wastes meeting the 219-S waste acceptance criteria are then transferred to the 219-S Tank System. Highly radioactive off-unit/ offsite containerized waste which meets the 219-S waste acceptance criteria can be received and accepted outside the container storage units, and directly loaded into the hot cell for transfer to the 219-S tank system within 24 hours. Additional time may be authorized by the Ecology Project Manager and documentation entered into the Unit Operating Record.

B.1.3 Process Flow Diagram

Refer to Figures B.1-2 through B.1-5 for flow charts of the 222-S waste management processes.

B.1.4 Waste Tracking System

When waste is entered into a 222-S dangerous waste management unit (except for hard-piped laboratory instrumentation waste (see Section 2.1.2.2)), information about the waste is entered into a waste tracking system for the unit. The waste tracking system is a combination of notebooks, files, and inventories which help comprise the facilities operating record. Information maintained in the waste tracking system includes quantity of waste introduced and estimated volumes of waste transferred in the dangerous waste management unit. For transfer between container storage units (i.e. DMWSA, Room 4-E, and parts of Room 2-B) the waste tracking system needs only to be updated to reflect the new location of the mixed waste and any new packaging configuration. For waste introduced into the 219-S tank system the estimated volumes introduced are recorded using volumes of the waste containers. The tracking system for the dangerous waste management units are maintained in the Operating Record [WAC 173-303-380(b)].

Figure B.1.1 222-S Laboratory Complex Dangerous Waste Management Units.

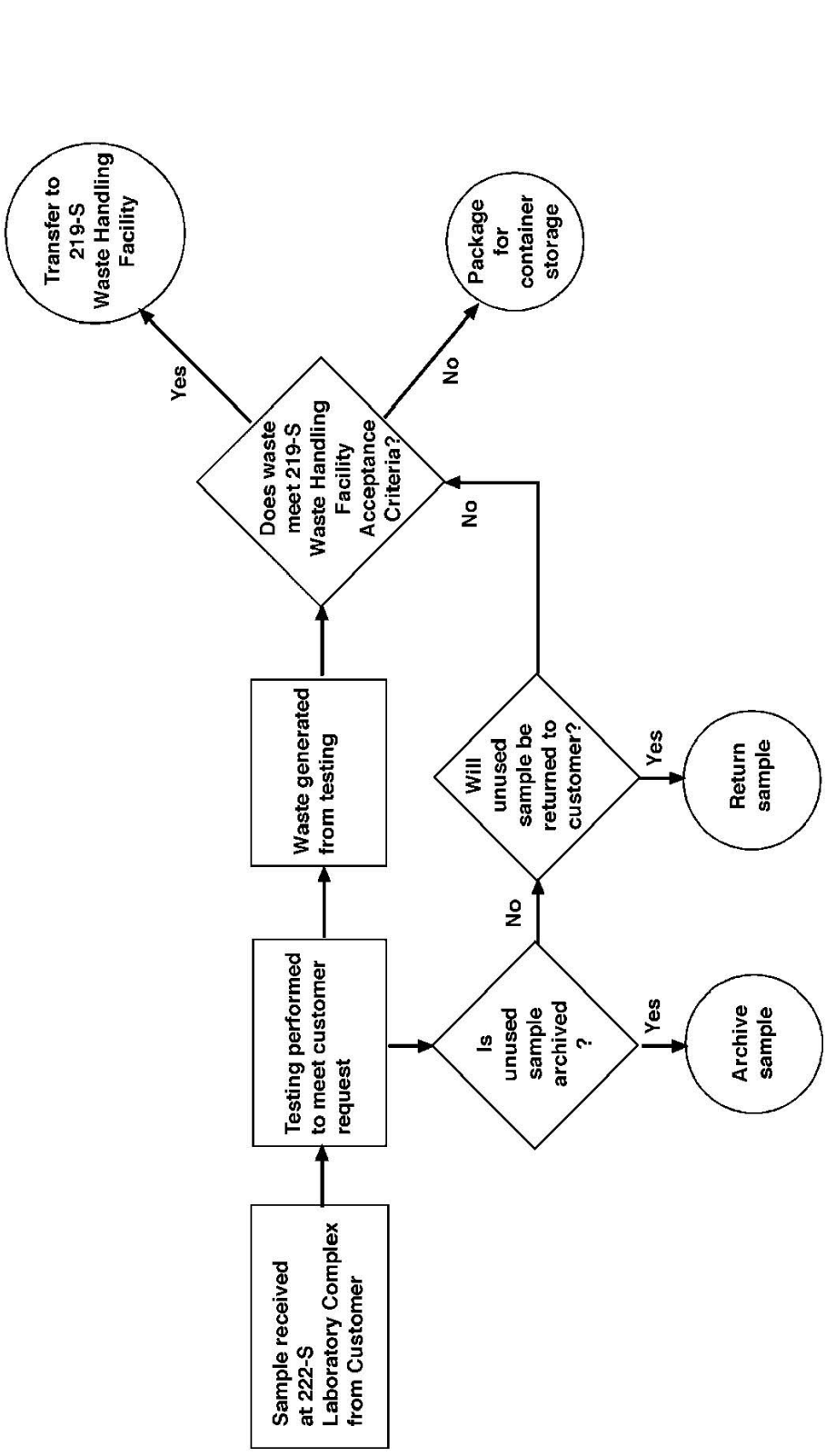

Figure B.1.2 Sample Management.

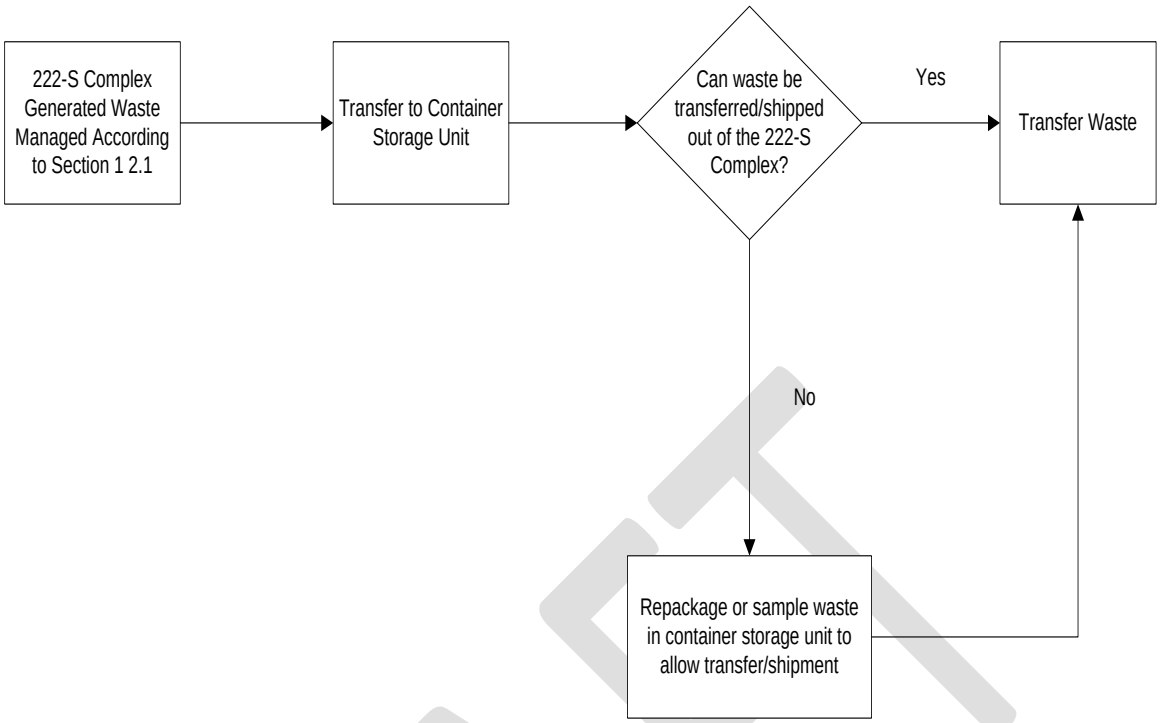

Figure B.1.3 Container Storage Units.

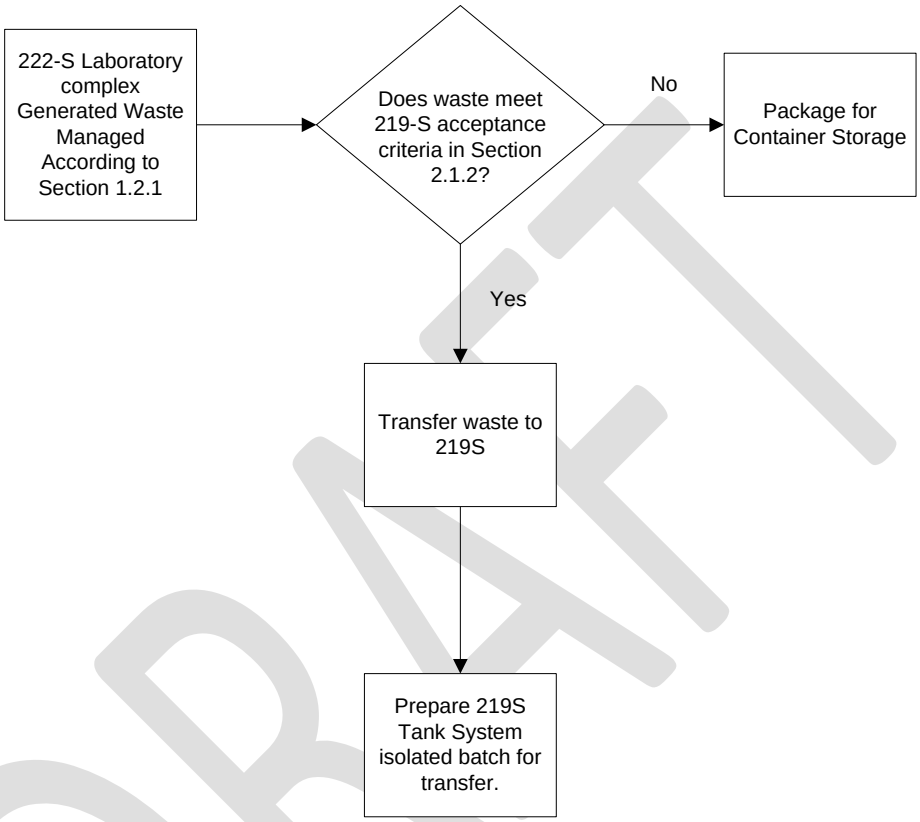

Figure B.1.4 219-S Tank System - 222-S Laboratory Complex Generated Waste.

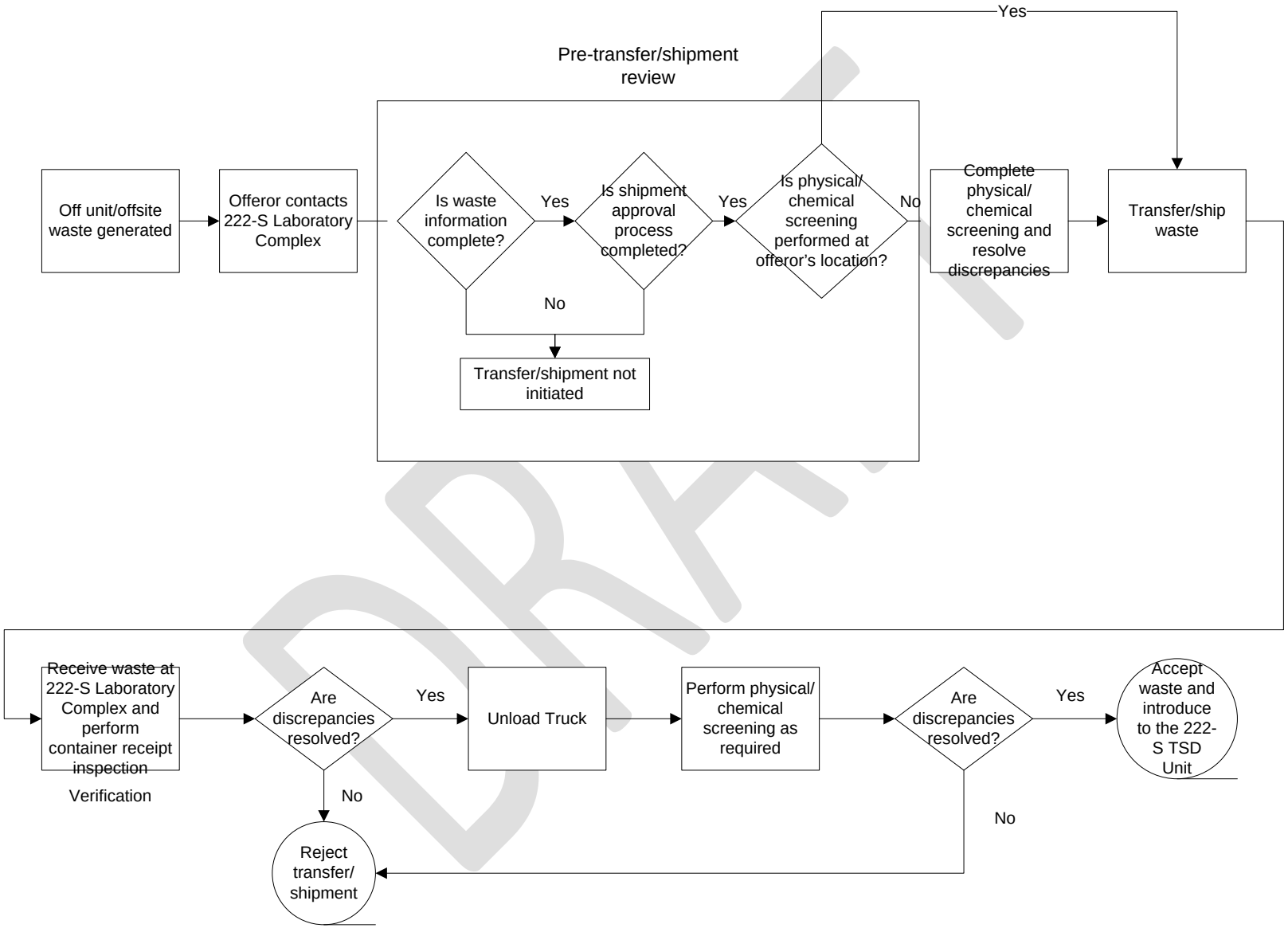

Figure B.1-5 222-S Off unit/Offsite Waste Acceptance

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B.2 CONFIRMATION PROCESS

WAC 173-303-300(1) requires confirmation of dangerous or mixed waste before initial acceptance of waste to ensure the waste is managed properly. Confirmation occurs prior to transfer as part of the pre-transfer review for 222-S Laboratory Complex generated waste. Confirmation occurs prior to (pre-transfer/shipment review) and after transfer or shipment for off-unit waste. Confirmation activities will be performed in accordance with the following requirements.

The confirmation process for the 222-S container storage units is different from the confirmation process for the 219-S Tank System. Enough differences exist to warrant separate processes for different types of waste management units. Confirmation is not required for transfer of waste between 222-S container storage units. When a transfer of waste occurs between container storage units, information has already been obtained on the mixed waste prior to entry into the container storage unit. In addition, the waste numbers on the Part A Form for the different container storage units are identical. As a result, the waste tracking system(s) need only to be updated to reflect the new location of the mixed waste and any new packaging configuration.

Confirmation is necessary for transfers of mixed waste from a container storage unit into the 219-S Tank System, because the waste numbers allowed for tank storage are more restrictive than those allowed for container storage. The following items must be satisfied prior to transfer of mixed waste from a container storage unit into the 219-S Tank System:

a. A complete waste designation must be performed in accordance with management practices described in Section 1.2.1 to determine the waste numbers. Other parameters of the waste are compared to the waste acceptance criteria in this addendum to determine if the waste can be accepted into the 219-S tank system.

b. Information must address compatibility of the mixed waste to the waste stored in the 219-S Tank System (Section 7.2), and compatibility of the waste with the 219-S tank system components.

c. Authorization for each container of mixed waste must be issued by 222-S management for waste to be introduced into the 219-S Tank System.

d. Following transfer of the mixed waste, the information regarding the waste must be transferred to the waste tracking system for the 219-S Tank System. The quantity of waste introduced is estimated and recorded (except for hard-piped laboratory instrumentation waste flush water, and hot cell housekeeping wash down water. See Section 2.1.2).

For transfer of off-unit containerized waste to Rooms 2-B/4-E or the DMWSA, the confirmation process consists of two parts: pre-transfer/shipment review and container receipt inspection. Sections 2.2 and 2.3 discuss the processes for off-unit/offsite waste. Section 2.1 discusses the processes for 222-S Laboratory Complex generated waste.

B.2.1 Pre-Transfer Review for 222-S Laboratory Complex Generated Waste

222-S Laboratory Complex generated waste is managed in accordance with Section 1.2.1. As a result, confirmation processes of 222-S Laboratory Complex generated waste only include a pre-transfer review. If the 222-S Laboratory Complex generated waste is not managed in accordance with Section 1.2.1, the waste is subjected to container receipt inspection (Section 2.3.1) and physical/chemical screening (Section 2.3.2) requirements.

B.2.1.1 Container Storage Unit

When dangerous and/or mixed waste is managed in accordance with Section 1.2.1, knowledge (as defined in WAC 173-303-040) is obtained on the waste to ensure the waste is managed properly for storage. This knowledge determines whether the dangerous and/or mixed waste meets the acceptance criteria for management in 222-S container storage units. Land disposal restrictions (LDR) information (see Section 7.3) is entered into a waste tracking system used to meet operating record requirements. If

characterization information obtained prior to storage is not sufficient to address characterization parameters for subsequent treatment and/or disposal, sampling and analysis is performed on the waste for the needed parameters after acceptance.

B.2.1.2 219-S Tank System

222-S Laboratory Complex generated waste can be introduced into the 219-S Tank System:

- Waste from hard-piped laboratory instrumentation. "Hard-piped laboratory instrumentation" means instruments that discharge into hard-piped connections from hot cells.
- Flush water.
- Waste from a satellite accumulation area container.
- Waste from a 90-day accumulation area container.
- Waste from a container storage unit container.

A transfer from a container storage unit container is addressed in Section 2.0. For the remaining three scenarios, the following items must be satisfied prior to transfer of mixed waste into the 219-S Tank System:

a. A complete waste designation must be performed in accordance with management practices of Section 1.2 to determine compliance with the waste acceptance criteria. This waste designation includes waste compatibility (Section 7.2 of this addendum) for the 219-S tank system and to determine if the mixed waste is otherwise prohibited by other restrictions in this addendum.

b. Information must address compatibility of the mixed waste to the waste stored in the 219-S Tank System (Section 7.2).

c. Authorization for each container of mixed waste must be issued by 222-S management for waste to be introduced into the 219-S Tank System and documented in the operating records.

d. Following transfer of the mixed waste, the information regarding the waste must be transferred to the waste tracking system for the 219-S Tank System, and the quantity of waste introduced is estimated and recorded (except for hard-piped laboratory instrumentation waste and flush water, Section 2.1.2.2).

e. The 219-S Tank System waste volumes are tracked daily, thereby tracking hard-piped laboratory instrumentation waste additions, flush volumes, and hot cell housekeeping wash down water.

B.2.1.2.1 Hood 16 in Room 2-B

Waste characterization practices in Section 1.2.1 establish whether the mixed waste meets the waste acceptance criteria for the 219-S tank system. Hood 16 associated sinks are located within the physical boundaries of Room 2-B container storage unit. Hood 16 activities include introducing waste into the 219-S Tank System and cleaning radiologically contaminated laboratory equipment. Hood 16 and the associated sinks serve as an entry point into the 219-S Tank System. The 219-S tank system ancillary equipment begins where the piping joins to the Hood 16 sink drains. The sinks are flushed after waste additions to ensure no waste remains in the sink. In addition to the requirements of Section 2.1.2, adequate flush volumes are estimated and recorded.

B.2.1.2.2 Hard-Piped Laboratory Instrumentation

"Hard-piped laboratory instrumentation" means instruments that discharge into hard-piped connections from hot cells. Waste characterization practices in Section 1.2.1 meets the waste acceptance criteria for the 219-S tank system. Section 2.1.2 contains all the requirements for hard-piped laboratory instrumentation waste introduction.

B.2.1.2.3 Hot Cell Drains

Waste characterization in Section 1.2.1 establishes whether the mixed waste is a prohibited waste or whether the waste is ignitable, reactive, or incompatible. Hot cell housekeeping practices result in water wash downs of the interior surfaces of the hot cell and equipment contained in the hot cell. Mixed waste introduced into the 219-S Tank System through hot cell drains is waste generated in the hot cell and waste that cannot be introduced through Hood 16 in Room 2-B due to as-low-as-reasonably-achievable (ALARA) reasons and operational concerns. Storage does not occur in 222-S Laboratory hot cells. In addition to the requirements of Section 2.1.2, adequate flush volumes are estimated and recorded. Hot cells are discussed in detail in Chapter 4. Hot cells in the 222-S laboratory are located in Rooms 1-A, 1-E, 1-F, and 11-A.

B.2.2 Waste approval process for off-unit/offsite waste

The waste approval process for off-unit/offsite waste is used by the 222-S Laboratory Complex waste acceptance organization to obtain and evaluate the generator's analysis of mixed waste to be received by a 222-S dangerous waste management unit and to document whether or not waste acceptance criteria are satisfied. Waste approval is issued on an individual container basis (e.g., labpack, drum, tanker, etc.) prior to waste transfer/shipment to the 222-S Operating Unit Group. Off-unit waste will be received according to Permit Condition II.M and II.N.

The Hanford organization generating mixed waste or Hanford Facility TSD unit personnel (for off-unit wastes) or the offsite generator (for off-site wastes), have the responsibility to provide relevant information pertaining to the proper management and shipping of the waste. These organizations are herein referred to as the “offeror”.

B.2.2.1 Offeror Supplied Information

Characterization information from the offeror pertaining to the management path for storage, treatment and/or disposal of the mixed waste will be obtained prior to or during the waste acceptance process when the mixed waste is destined for a 222-S dangerous waste management unit. The offeror obtains existing information on waste from their specific operating records or other sources.

Waste information submitted by the offeror must contain:

a. Waste information wherein the waste constituents listed add to 100 percent.
b. General physical and chemical properties and composition of the waste.
c. Information that the chemicals are compatible with container type.
d. Description of waste generating process.
e. Characterization data, including composition of waste and regulated constituents of concern. (e.g. analytical results, process knowledge, etc.)
f. Waste numbers.
g. Identification of applicable LDR treatment standards including identification of any treatability subgroups. Waste information should include supporting data. (e.g., analytical results required to determine treatment standards, analytical results to demonstrate compliance with LDR treatment, process knowledge, etc).
h. Number and type of containers.
i. Waste quantity.

B.2.2.2 Waste Information Review

The offeror’s information is reviewed by the 222-S Laboratory waste acceptance organization to determine that any process knowledge provided constitutes “knowledge” as defined in WAC 173-303-040, and that the combination of knowledge and direct testing data in the waste profile documentation is

adequate to demonstrate compliance with the waste acceptance criteria for the receiving dangerous waste management unit.

The waste information review is described as follows:

a. The offeror obtains existing information on waste from their specific operating records.
b. The 222-S Laboratory Complex waste acceptance organization evaluates the offeror's waste information with respect to the waste acceptance criteria for the entire waste management pathway within the 222-S Laboratory Complex.
c. The 222-S Laboratory Complex waste acceptance organization requests additional information from the offeror to address discrepancies for (1) inconsistent information or (2) information not satisfying the decision criteria established in the waste acceptance criteria in this addendum, or (3) insufficient information to demonstrate compliance with waste acceptance criteria.

Minimum information required to receive waste into any of the 222-S dangerous waste management units consists of information to meet characterization for storage requirements. This minimum characterization for storage information contains four elements:

1. Ensure the waste properties satisfy the waste acceptance criteria established in this addendum.
2. Ensure the waste is not prohibited by other restrictions in the permit.
3. Determine if the waste is an ignitable, reactive, or incompatible waste as defined in WAC 173-303-040.
4. Meets waste acceptance criteria for storage at a DWMU specified in Table 1-3.

If analysis of the characterization information leads to a conclusion that the waste is ignitable, reactive, or incompatible, acceptance of the waste into the 222-S Operating Unit Group must be conducted pursuant to Section 7.2.

B.2.2.3 Transfer/Shipment Approval Process

The waste shipment approval process is described as follows:

a. Information is submitted to the 222-S Laboratory Complex designated waste acceptance organization by the offeror as described in Section 2.2.1.
b. The 222-S Laboratory Complex designated waste acceptance organization reviews information, requests additional information from the offeror to address any discrepancies, and resolves concerns as described in Section 2.2.2.
c. If discrepancies are not addressed, shipment is not approved.
d. After waste discrepancies are resolved 222-S management can issue approval for receipt of waste into the 222-S Operating Unit Group. Authorization for each container of mixed waste is issued by 222-S management for waste to be introduced into one of the 222-S dangerous waste management units.
e. Along with the approval documentation, the 222-S Laboratory Complex waste acceptance organization will determine if physical/chemical screening will be performed at the offeror's location prior to transfer/shipment or onsite at Hanford after the transfer/ shipment is received. If physical/chemical screening is performed at the offeror's location, a traceable tamper resistant device will be used on the container to demonstrate the transfer/shipment has not been altered.

Off-site/off-unit generated waste can be introduced into the 219-S Tank System when the following criteria are met:

a. A complete waste designation must be performed in accordance with management practices of Section 1.2.1 to determine compliance with the waste acceptance criteria for the 219-S tank

system, and to determine if the mixed waste is otherwise prohibited by other restrictions in this addendum.

b. Information must address compatibility of the mixed waste to the waste stored in the 219-S Tank System (Section 7.2).

c. Authorization for each container of mixed waste must be issued by 222-S management for waste to be introduced into the 219-S Tank System.

Following transfer of the mixed waste, the information regarding the waste must be transferred to the waste tracking system, and for the quantity of waste introduced, estimated volumes are recorded using volumes of waste containers.

B.2.3 Confirmation of Off-Unit/Offsite Waste

Confirmation of off-unit/offsite hazardous or mixed waste to be accepted into one of the 222-S dangerous waste management units is performed by 222-S Laboratory Complex waste acceptance organization. The 222-S Laboratory Complex waste acceptance organization performs a container receipt inspection of all off-unit/offsite waste. Physical/chemical screening may also be performed if not completed at offeror's location. When physical/chemical screening is performed at the offeror's location, a tamper resistant seal is placed on the outermost container, labpack, overpack, or shipping container that has been screened to ensure that the contents remain unchanged before receipt at the receiving dangerous waste management unit. Screening methods are listed in Table B.3-1. These activities are documented by the 222-S Laboratory Complex waste acceptance organization and maintained in the 222-S section of the facility operating record.

B.2.3.1 Container Receipt Inspection of Off-Unit/Offsite Waste

When the transfer/shipment arrives at the 222-S Laboratory Complex, the container receipt inspection is performed. The container receipt inspection is performed by 222-S Laboratory Complex personnel or the waste acceptance organization. The following criteria are evaluated during the container receipt inspection for discrepancies:

a. Number of containers.

b. Bulk quantities.

c. Size of containers.

d. Labels.

e. Container integrity.

f. Tamper resistant seals, if applicable.

Discrepancies identified during the container receipt inspection are communicated to the offeror. Discrepancies are resolved before the mixed waste is unloaded from the truck. Offsite shipments will comply with Permit Condition I.N.1. Once the discrepancies are resolved, the mixed waste is unloaded from the truck and moved into one of the 222-S container storage dangerous waste management units (DMWSA, Room 2-B, or Room 4-E) or transferred into the permitted 219-S Tank System.

If a noncompliant dangerous waste package is received from an offsite waste generator, the waste package is non-returnable because of condition, packaging, etc., and if an agreement cannot be reached by the involved parties to resolve the noncompliant condition, then the issue will be referred to USDOE for resolution. Ecology will be notified in writing if a discrepancy is not resolved within 15 days after receiving a noncompliant shipment. Pending resolution, such waste packages, although not accepted, might be placed in the 222-S container storage units. The package(s) will be segregated from other waste, and an entry made into the 222-S logbook describing the actions that were taken to store the packages in a safe manner until a resolution has been reached.

B.2.3.2 Physical/Chemical Screening of Off-Unit/Offsite

Physical/chemical screening frequencies are applied to mixed waste based on whether the transfer/shipment is a tanker truck (greater than 417 liters), a bulk container (less than or equal to 417 liters), or a labpack. The parameters for physical/chemical screening may include the following:

a. Visual inspection
b. Water miscibility/separable organics
c. Water reactivity
d. pH
e. Cyanides
f. Sulfides

Visual inspection will be used when performing physical confirmation for both solid and liquid wastes. However, due to ALARA concerns, review of waste records may be used in lieu of visual inspections. Water miscibility/separable organics and pH are used when performing chemical confirmation of liquid and non-debris-type solid wastes. The methods and rationale for selection of these parameters are discussed in Section 3.0. The physical/chemical screening frequencies are as follows:

a. Tanker truck (greater than 417 liters): Every transfer/shipment at the offeror's location.
b. Bulk container (less than or equal to 417 liters): Selected containers from every transfer/shipment from each stream from each offeror at the container storage unit or at offeror's location. Containers on each transfer/shipment from each stream will be randomly selected based on SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, Chapter 9, unless pre-transfer/shipment review targets particular containers. The frequency on each transfer/shipment will be 10% of each shipment with a minimum of two containers. The entire shipment is screened if the shipment is of a single container.
c. Solids/debris type material: Selected containers from every transfer/shipment from each stream from each offeror at the container storage unit or at offeror's location. Containers on each transfer/shipment will be randomly selected unless pre-transfer/shipment review targets particular containers. The frequency for each transfer/shipment will be 10% of each shipment with a minimum of two containers. The entire shipment is screened if the shipment is of a single container.
d. Lab pack: Selected containers from every transfer/shipment from each stream from each offeror at the container storage unit or at offeror's location. Containers on each transfer/shipment will be randomly selected based on SW-846 Chapter 9 unless pre-transfer/shipment review targets particular containers. The frequency on outer containers for each transfer/shipment will be 10% with a minimum of two containers. The entire shipment is screened if the shipment is of a single container. The frequency on inner containers from selected outer containers will be 10% of each shipment with a minimum of five containers. If the inner container count is less than five, all containers will be screened.

Discrepancies identified during physical/chemical screening activities are resolved before the waste is accepted. When physical screening must be performed the 15-day clock described in WAC 173-303-370(4)(b) begins on discovery of the discrepancy. If discrepancies are not resolved, the mixed waste transfer/shipment is rejected. If containers of a rejected shipment are damaged or otherwise unsuitable for further movement or shipment, they are overpacked or repackaged

If a noncompliant dangerous waste package is received from an offsite waste generator, the waste package is non-returnable because of condition, packaging, etc., and if an agreement cannot be reached by the involved parties to resolve the noncompliant condition, then the issue will be referred to USDOE for resolution. Ecology will be notified in writing if a discrepancy is not resolved within 15 days after

receiving a noncompliant shipment. Pending resolution, such waste packages, although not accepted, might be placed in the 222-S container storage units. The package(s) will be segregated from other waste, and an entry made into the 222-S logbook describing the actions that were taken to store the packages in a safe manner until a resolution has been reached

B.2.3.2.1 Physical/Chemical Screening Quality Control

Sections 2.3.2.1.1 and 2.3.2.1.2 describe the quality control (QC) elements used to ensure valid screening results.

B.2.3.2.1.1 Physical Screening Quality Control

Physical screening QC is used by the 222-S Laboratory Complex designated waste acceptance organization to ensure quality visual inspection results. Visual inspection does not consist of the use of instrumentation or chemical tests. Therefore physical screening QC consists of inspecting a minimum number of units (see Section 2.3.2) and comparing the physical content of each container with the waste profile and the container specific information in the document (Section 3.1).

B.2.3.2.1.2 Chemical Screening Quality Control

Chemical screening QC is used by the 222-S Laboratory Complex designated waste acceptance organization to ensure that appropriate data are obtained when performing chemical screening. Chemical screening QC consists of testing a minimum number of containers (see Section 2.3.2) and comparing results of the chemical screening to the manufacturer's instructions or the tolerance listed in Section 3.2.

The following applies to each of the reagents/materials/kits received for chemical screening parameters.

a. Each manufacturer's lot is evaluated to determine that the lot is usable. Unstable reagents are accounted for when determining the usability of the lot. For each lot, the source, concentration, date of receipt, lot number, and manufacturer/preparer (as applicable) are maintained in the operating record.
b. For individual chemical screening parameters, QC checks are performed in accordance with manufacturer's instructions for the associated reagents/materials/kits.

B.2.3.2.2 Physical/Chemical Screening Exceptions

There are cases in which physical/chemical screening is not required. The cases are as follows:

a. Waste that was a commercial chemical product in the original product container(s) or products traceable back to the original product container (e.g., off-specification, outdated, or unused products).
b. Chemical screening is not required for mixed waste introduced into the 219-S Tank System due to ALARA concerns. Physical screening (visual inspection) on mixed waste introduced into the 219-S Tank System will be completed at the offeror's location or delayed until unpackaged.
c. Other special-case waste could be exempted on a case-by-case basis with prior approval from Ecology.

B.2.3.2.3 Physical/Chemical Screening Sampling and Analysis

Nonstandard methods may be used for physical/chemical screening of waste. Descriptions of these nonstandard methods are provided within 222-S Laboratory operating records located at the 222-S Laboratory. These records are available to Washington State Department of Ecology on request.

Chemical screening samples are collected in accordance with WAC 173-303-110(2) or other methods that yield a representative sample, considering the type and form of the waste, and the parameter for which the waste will be analyzed. During any interim period when the sample cannot be tested at the time and location of sampling, the sample is stored in a manner that maintains chain of custody and protects sample integrity.

B.3 SELECTING WASTE ANALYSIS PARAMETERS

Permit Condition III.8.D.1 requires that information regarding waste accepted into any of the 222-S Dangerous Waste Management units be obtained, documented, and/or reported in accordance with this addendum. Corresponding recordkeeping and reporting requirements are also required in accordance with Permit Condition II.I.

Sampling and analysis of the waste is required to determine:

- Waste acceptance criteria are met as documented in this addendum.
- Characterization or other information constitutes knowledge as defined in WAC 173-303-040 and is required to be obtained in accordance with this addendum.
- Completeness of information.

The need to perform sampling and analysis on a dangerous and/or mixed waste will be identified by 222-S Laboratory Complex personnel or designated acceptance organization. Any of the following reasons will help with the identification of the need for sampling and analysis:

1. The pre-shipment review process.
2. The physical/chemical screening activities.
3. Permit conditions associated with management of waste in the 222-S Dangerous Waste Management units.

The 222-S Laboratory Complex personnel or designated acceptance organization may perform sampling and analysis on dangerous and/or mixed waste stored in the 222-S DMWSA, Room 2-B, or Room 4-E based on characterization needs of the receiving onsite TSD unit or offsite TSD facility.

The parameters, methods, and rationale for laboratory analysis of wastes are presented in the following locations in this addendum:

- Waste received from off-unit/off-site sources: Sections B.2.3.2.
- Waste within the 219-S tank system: Table B.3-1.
- Waste within the 222-S DMWSA, Room 2-B, and Room 4-E: Table B.3-2.

Waste analyzed using methods identified in Tables B.3-1 and B.3-2 can be modified to address ALARA protection concerns. This is considered acceptable provided applicable data quality objectives can be met.

The following list shows acceptable sources of testing methods (standard methods) for parameters or methods not otherwise specified in Section 3.2:

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

Methods obtained from above listed sources can be introduced and implemented with Ecology documented approval (e.g. TPA project manager meeting minutes, email, or formal correspondence).

All other modifications from accepted analytical procedures and methods must be approved by Ecology per WAC 173-303-110(5) or the permit modification procedure. Substantial changes to testing methods will be made in accordance with WAC 173-303-110(4).

B.3.1 Physical Screening Parameters

The following methods are used to perform physical screening as identified in Section 2.3.

a. Visual inspection.

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

Method: The container is opened and the contents are removed as needed for visual examination. Homogenous loose solids could be probed to determine the presence of material not documented or for improperly absorbed liquids. Visual observations are compared with the applicable profile information and the container-specific information on documentation.

Criteria: A container fails the inspection for any of the following reasons:

- Undocumented, improperly packaged, or inadequately absorbed liquids.
- Discovery of prohibited articles or materials listed in Section 1.2.
- Discovery of material not consistent with documented knowledge.
- Variability greater than 25% by volume in waste stream components (e.g., paper, plastic, cloth, and metal).

B.3.2 Chemical Screening Parameters

The following methods may be used to perform chemical screening (fingerprint analysis) identified in Section 2.3. Alternatively, for all of the following screening methods, test kits may be used per the manufacturer's instructions given in the kits. Field analytical techniques quality control will involve indicator checks performed quarterly or before use to ensure that the kits are working properly.

a. Water miscibility/separable organics.

Rationale: To determine if the waste is immiscible with water or has separable organics. This information is used to ensure 219-S Tank System waste can meet DST System waste acceptance criteria.

Method: Water equal to the volume of the sample is used to determine water miscibility/separable organics. The solution is observed for evidence of layering. This test shall be done as a routine screening method, if there is indication that it is warranted (i.e., process knowledge).

Tolerance: A positive indication of layering with water in a waste constitutes an indication that the waste is immiscible with water.

b. Water reactivity screen.

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

Method: Water is added to a sample of solid or liquid waste. The solution is observed for evidence of fuming, bubbling, spattering, or temperature change. These reactions are considered to be positive evidence that the waste is water reactive. This test shall be done as a routine screening method if there is indication that it is warranted (i.e., process knowledge).

Tolerance: A positive indication in a waste that cannot be explained by documented constituents constitutes a failure.

c. pH Screen.

Rationale: This method is used to identify the pH and corrosive nature of an aqueous or solid waste, to ensure safe segregation and storage of incompatible waste, and to confirm consistency with shipping documentation and waste profile documentation.

Method: Full range pH paper is used for the initial screening. If the initial screen indicates a pH below 4 or above 10, a "narrow range" pH paper will be used. Solids are mixed with an equal weight of water and the liquid portion of the solution is tested.

Tolerance: pH paper for this test will have a sensitivity of at least ± 1 pH units for the initial screening and a sensitivity of at least ± 0.5 pH units for the "narrow range" pH paper. If the pH of a matrix appears to exceed regulatory limits (less than or equal to 2.0 or greater than or equal to 12.5) in waste not documented as being regulated for this property, the waste fails the test.

d. Cyanide screen.

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

Method: To a test tube or watch dish containing approximately 2 milligrams of sample, an equal amount of freshly prepared ferrous ammonium citrate is added. 3 Normal hydrochloric acid (added in drops) is used to reduce the pH of the solution to near 2. pH is verified. A deep blue color indicates the presence of cyanide. This test shall be done as a routine screening method if there is indication that it is warranted (i.e., process knowledge).

Tolerance: A positive indication in a waste that cannot be explained by documented constituents indicates the presence of cyanide.

e. Sulfide screen.

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

Method: Approximately 2 milligrams of sample is added to a watch dish or test tube and enough 3 Normal hydrochloric acid is added (in drops) to bring the pH down to near 2. pH is verified. A sulfide test strip is placed in the solution. If the paper turns brown or silvery black, the presence of sulfides in the sample is indicated. This test shall be done as a routine screening method if there is indication that it is warranted (i.e., process knowledge).

Tolerance: A positive indication in a waste that cannot be explained by documented constituents indicates the presence of sulfide.

Table B.3.1 Parameters, Methods, and Rationale for Testing of Waste within the 219-S Tank System.

Parameter[a]	Method[b]	Rationale for Selection
General Chemistry and Organic Parameters		
pH or hydroxide	9040	To determine characteristic of transfer/shipment
Total organic carbon	9060/5310B/5310C/AST M D4129	To determine LDR status as a wastewater
Total suspended solids	2540D[c]	To determine LDR status as a wastewater
Toxicity characteristic organic compounds	1311 as applicable/ 8260 (volatile organic compounds) and 1311 as applicable/8270 (semi-volatile organic compounds)	To meet receiving unit waste acceptance criteria if requested by the receiving unit.
Semi-volatile organic underlying hazardous constituents	8270 (semi-volatile organic compounds)	To determine underlying hazardous constituents in aggregated waste
Inorganic Parameters		
Ammonia	300.7[f] /4500-NH_3G[c]	To meet DST System waste acceptance criteria.
Antimony, beryllium, nickel, thallium	1311 as applicable, /6010/ 6020/ 200.8[d]	To determine underlying hazardous constituents in aggregated waste
Arsenic, barium, cadmium, chromium, lead, silver, selenium	1311 as applicable, /6010/ 6020/ 3010/ 200.8[d]	To determine characteristic of transfer/shipment and/or underlying hazardous constituents in aggregated waste.
Mercury	1311 as applicable, / 6010/ 6020/ 7000/ 7470/ 7471/ 200.8[d]	To determine characteristic of transfer/shipment and/or underlying hazardous constituents in aggregated waste.

[a] Additional parameters can be used on current waste acceptance criteria of the downstream TSD unit. Operation limits transfer/shipments are based on current waste acceptance criteria.
[b] Methods numbers are SW 846 unless otherwise noted. Procedures will be based on the method stated or its most current revision.
[c] American Public Health Association (APHA) Method, 2005, 21th Edition. *Standard Methods for the Examination of Water and Wastewater*. Procedures will be based on the most current revision of the method
[d] EPA-600/R-94-111, *Methods for the Determination of Metals in Environmental Samples. (Supplement 1 to EPA-600/4-91-010).*
[e] EPA-600/R-93-100, *Methods for the Determination of Inorganic Samples in Environmental Samples.*
[f] EPA-600/4-86-024, Development of Standard Methods for the Collection and Analysis of Precipitation. (NTIS/ PB86-201365)

Table B.3.2 Parameters, Methods, and Rationale for Waste Managed within the 222-S DMWSA, Room 2-B, and Room 4-E. (2 sheets)

Parameter[a]		Method[b]	Media Type	Rationale for Selection
General Chemistry				
Flashpoint		1010/1020	Liquid	To determine applicability of the requirements in with WAC 173-303-395(1)(b); determine regulatory status as D001 waste and applicability of LDR requirements
pH	Liquid	9040	Liquid, sludge	To determine regulatory status as D002/WSC2 waste; to provide proper waste designation; to determine applicability of LDR requirements and state-only requirements; and to identify waste that might compromise container integrity
	Solid	9045	Solid	
Free liquids		9095	Liquid, sludge, solid	To determine appropriate state-only LDR status of the waste.
Cyanide		9012/ 9213/ 9014/ 4500-CN[c]	Liquid, sludge, solid	To ensure compliance with WAC 173-303-395(1)(b); to provide proper waste designation and applicability of LDR requirements.
Sulfide		9030/ 9034/ 9215	Liquid, sludge, solid	To ensure compliance with WAC 173-303-395(1)(b); to provide proper waste designation and applicability of LDR requirements.
Organic				
PCBs		8082/8270	Liquid, sludge, solid	To determine proper waste management of waste in accordance with WAC 173-303-071(3)(k) to determine LDR requirements and state-only requirements.
Total organic carbon		9060/5310B/5310C/AS TMD4129	Liquid, sludge, solid	To meet 219-S system waste acceptance criteria; to determine LDR status as a wastewater; determine applicability of state-only designation requirements
Total organic halides		9020/ 9021/ 9022	Liquid, sludge	To determine proper waste designation and applicability to state-only requirements.
Persistent constituents: Halogenated organic compounds		9075/ / 9020/ 9021/ 9022/8270	Liquid, sludge	To determine proper waste designation and applicability to state-only designation requirements.

Table B.3.2 Parameters, Methods, and Rationale for Waste Managed within the 222-S DMWSA, Room 2-B, and Room 4-E. (2 sheets)

Parameter[a]	Method[b]	Media Type	Rationale for Selection
Persistent constituents: Polyaromatic hydrocarbons	8270/8310	Liquid, sludge, solid	To determine proper waste designation and applicability to state-only designation requirements.
Total suspended **solids**	2540D[c]	Liquid, sludge	To determine LDR status as a wastewater
Volatile organic compounds	1311/ 8260	Liquid, sludge, solid	To determine proper waste designation and applicability of LDRs.
Semivolatile organic compounds	1311/ 8270	Liquid, sludge, solid	To determine proper waste designation and applicability of LDRs.
Chlorinated herbicides	8151	Liquid	To determine proper waste designation and applicability of LDRs.
Inorganic			
Antimony, beryllium, nickel, thallium	1311 as applicable, /6010/ 6020/ 200.8[d]	Liquid, sludge, solid	To determine treatment requirements for underlying hazardous constituents and applicability of LDRs.
Arsenic, barium, cadmium, chromium, lead, silver, selenium	1311 as applicable, /6010/ 6020/ 3010/ 200.8[d]	Liquid, sludge, solid	To provide for proper waste designation and applicability of LDRs.
Sodium	6010	Liquid	To meet DST System waste acceptance criteria.
Mercury	1311 as applicable, /7000/7470/ 7471/ 6010/ 6020/ 200.8[d]	Liquid, sludge, solid	To provide for proper waste designation and applicability of LDRs.

[a] Additional parameters can be used on current waste acceptance criteria of the downstream TSD unit. Operation limits transfer/shipments are based on current waste acceptance criteria.

[b] Methods numbers are SW 846 unless otherwise noted. Procedures will be based on the method stated or the its most current revision

[c] American Public Health Association (APHA) Method, 2005, 21th Edition. *Standard Methods for the Examination of Water and Wastewater*. Procedures based on the most current revision of the method.

[d] EPA-600/R-94-111, *Methods for the Determination of Metals in Environmental Samples. (Supplement 1 to EPA-600/4-91-010).*

B.4 SELECTING SAMPLING PROCESSES

Sampling processes used to acquire and manage samples differ because of physical variations of waste managed in the 222-S dangerous waste management units. The specific sampling methods and equipment used vary with the chemical and physical nature of the waste material and sampling circumstances. Although worker health and safety aspects are outside the scope of this addendum, health and safety protocols are followed to protect personnel when collecting samples of dangerous and/or mixed waste.

Sampling processes for physical/chemical screening confirmation activities are discussed in Section 2.3.2.3.

B.4.1 Sample Containers and Labels

Sample collection, container selection, and labeling practices follow SW-846 protocol, incorporated by reference. Sample collection containers and equipment are decontaminated according to EPA guidelines before use. Sample containers and equipment are frequently discarded rather than reused. Sample containers and equipment are maintained to ensure the desired data quality of the sampling event is met.

Sampling equipment is constructed of materials that are compatible with waste being sampled. In general, aqueous liquids are sampled using polyethylene or glass sampling devices, organic liquids using glass sampling devices, and solids using polyethylene or metal sampling devices. Stainless steel sampling system is used to sample the contents of Tank 102.

B.4.2 Sample Preservatives

The laboratory shall strive to meet the holding times specified in SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (U.S. Environmental Protection Agency [EPA] 1986). However, it is recognized that high radioactivity and difficult sample matrices may require additional time to ship, prepare, and analyze the samples. Adherence to the holding times is not strictly required if it can be shown and documented that reasonable efforts were made to meet the requirements. All analytical data that exceed holding times shall be identified and discussed in the data report.

B.4.3 Sample Collection Methods

Sample collection conforms to the representative sample methods for the appropriate matrix as discussed below. These methods constitute compliance with WAC 173-303-110(2). Waste type, waste form, and sampling equipment used are identified in Table B.4.1. Representative samples of liquid waste from containers (vertical “core sections”) are obtained using a composite liquid waste sampler (Coliwasa) or tubing, as appropriate. If a liquid waste has more than one phase, each phase is separated for individual testing depending on the waste management pathways of the phases. Other waste types that may require sampling are sludges, powders, and granules. In general, nonviscous sludges are sampled using a Coliwasa. Highly viscous sludges and cohesive solids are sampled using a trier, as specified in SW-846. Dry powders and granules are sampled using a thief, also as specified in SW-846. Waste from the 219-S Tank System is sampled with the sampling equipment installed on the tank system (see Table B.4.1)

The number of grab samples collected from a container depends on the amount of waste present, the homogeneity of the waste and is determined on a case-by-case basis by 222-S Laboratory Complex management or the designated waste acceptance organization. In most instances, there is only one container of waste present. In such instances, it is common to acquire only one vertical composite sample (e.g., Coliwasa). If more than one container of a waste stream is present, all or some of the containers of waste are samples. When some of the waste containers will be sampled, the containers chosen for sampling will be based on random number generating techniques in SW-846 Chapter 9 and the number of samples necessary to achieve desired data quality.

A sample is collected from waste within the 219-S Tank System from the sampling equipment installed on the tank system (DOE/RL-91-27, Chapter 4.0, Rev. 2). The contents of the tank are mixed for at least 15 minutes prior to collection of the sample unless otherwise approved by Ecology (e.g. TPA project manager meeting, email exchange, or letter) and entered into the operating record.

B.4.4 Quality Assurance/Quality Control

This addendum (the Waste Analysis Plan) incorporates the requirements for QA/QC in accordance with Condition II.D.3. Sample collectors prepare a permanent log of sampling activities in accordance with SW-846, Chapter 9.0. Records are maintained in accordance with Section 8 of this addendum. Log entries include as appropriate:

- Date of collection.
- Time of collection.
- Location.
- Batch number.
- Sample number.
- Tank number.
- Copy of the chain-of-custody form.
- Sampling methodology.
- Container description.
- Waste matrix (liquid).
- Description of generating process (e.g., decontamination activities).
- Number and volume of samples.
- Field observations.
- Field measurements (e.g., pH, percent lower explosive limit).
- Laboratory destination and laboratory number.
- Signature.

These log entries are made by the appropriate personnel while the sampling is performed. The logs or copies of logs are maintained in the 222-S section of the facility operating record after completion of sampling activities.

There are many elements of quality assurance (QA)/quality control (QC) associated with sampling processes at the 222-S dangerous waste management units. These elements are as follows.

a. A log of sampling activities is maintained as described above.
b. A record of sample custody from the time of sample collection to receipt by a laboratory custodian is established. This chain of custody includes the names of responsible individuals and the dates and times of custody transfers.
c. Each sample collected is uniquely identified.
d. Upon receipt at a laboratory, the samples receive a laboratory ID number that is traceable to the data records.
e. Samples are packaged to maintain preservation and to meet transportation requirements necessary to maintain the sample under the exclusions contained in WAC 173-303-071(3)(l), (r), and (s). Alterations of samples during collection or transfer are documented.

f. From the time of receipt at the laboratory, samples are protected from loss, damage, or tampering.

g. Analytical data packages are evaluated for completeness (all required parameters present using required methodology), whether applicable holding times have been met, and whether any flags require corrective action.

h. Field QA/QC samples (per applicable SAP)

i. Documentation of equipment calibration per equipment manufacturer specifications.

j. Representative sampling methods as defined by WAC 173-303-110(2) and/or SW-846. For 219-S tank system, representative samples are obtained using the sampling system described in Addendum C Section C.3.1.1.3

B.4.4.1 Quality Assurance/Quality Control Objectives

Laboratory QA/QC programs shall be designed to meet the following objectives:

- Minimize errors. Errors could be introduced during preparative, analytical, and/or reporting phases of work. QC program elements include analysis of samples in accordance with written and approved processes and assessment of the laboratory.
- Provide information. The designation of waste relies on a combination of knowledge and data. QA/QC programs ensure accurate, precise, reliable, and reproducible data.
- Ensure data are of the appropriate quality for their intended decision-making purposes.

Key QA program elements are designed to provide objective evidence that waste analysis methods meet the performance specifications of the 222-S dangerous waste management units and the associated data quality requirements. QA activities include:

- Laboratory analyses are performed on samples of waste using written and approved procedures.
- Instrument calibration and calibration verification. These activities are performed by the laboratory and are required for ensuring data of known accuracy and precision. Calibration data is maintained and stored to ensure traceability to reported results. The laboratory regularly participates in a proficiency testing program (a.k.a. performance evaluation).

B.4.4.2 Laboratory Quality Assurance/Quality Control

All analytical work shall be defined and controlled by a statement of work, work order, or other work authorizing documentation reflecting the data quality criteria established throughout this addendum. These authorizations documents shall include QA performance requirements. Samples will be handled according to written and controlled laboratory processes. The accuracy, precision, and limitations of analytical data are evaluated through QC performance.

Waste analysis shall be conducted in accordance with a current QA plan. The QA plan shall be available for Ecology review and inspection. The QA plan shall, at a minimum, address the following elements:

- Sample custody and management practices (also refer to Section 4.0).
- Sample preservation protocols.
- Sample preparation and analytical process requirements.
- Instrument maintenance and calibration requirements.
- Internal QC measures, e.g., method blanks, spikes.
- Corrective action process.

B.4.4.3 Data Assessment

Data used for decision making need to be of sufficient quantity and quality for their intended decision-making purpose. Third party data validation is not required; however, the 222-S Laboratory Complex personnel are responsible to ensure that data assessment or evaluation is completed.

Table B.4.1 Sampling Equipment

Waste Form	Waste Type	Equipment[a]
Liquids	Free-flowing liquids and slurries	Coliwasa, glass thief or pipette, or 219-S Tank System sampling system
Solidified liquids	Sludges	Trier, scoops and shovels
Sludges	Sludges	Trier, scoops and shovels
Soils	Sand or packed powders and granules	Auger, scoops and shovels
Absorbents	Large-grained solids	Large Trier, scoops and shovels
Wet absorbents	Moist powders or granules	Trier, scoops and shovels
Process solids and salts	Moist powders or granules	Trier, scoops and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, scoops and shovels
	Large-grained solids	Large Trier, scoops and shovels
Ion exchange resins	Moist powders or granules	Trier and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, , scoops and shovels

[a] Other American Society for Testing and Materials approved equipment could be used to collect samples.

Coliwasa = composite liquid waste sampler.

B.5 SELECTING A LABORATORY, LABORATORY TESTING, AND ANALYTICAL METHODS

Quality control is applied in implementing both sampling and analytical techniques. Specific performance standards for QA and QC procedures for individual sampling and analysis activities are dynamic and are revised as warranted to reflect technological advances in available, appropriate techniques. These performance standards are described in policies maintained and used at 222-S Laboratory Complex and are available for review by Ecology on request.

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

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

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

B.5.1 Analytical Program

A program of analytical QC practices and procedures has been developed to ensure that precision, accuracy, representativeness, and completeness are maintained at the 222-S Laboratory. Good laboratory practices that encompass sampling, sample handling, housekeeping, and safety are maintained. The testing methods described in this addendum are intended to comply with WAC 173-303-110(3) requirements.

Laboratories make changes to procedures (both regulatory and internally developed procedures) for a variety of reasons. The nature of the change can vary from minor to significant. Therefore, this document defines three categories of changes made in the laboratory. Laboratory conformance to the documentation requirements for each of these changes shall ensure that the end-user of the data is aware of the significance of the changes and the impact expected on the data. A limited number of methods must be followed as written due to the regulations encompassing how the results will be used.

The three categories of changes in the laboratory are:

- Substitution. Substitution is a procedure that is considered equivalent by a reasonable, technically competent person. Substitution would have no significant effects on the final results. This would be clearly evident in the QC data associated with the final results. Therefore, substitution would be considered inconsequential.
- Deviation. Deviation is divergence from the original procedure that does not adversely impact the analyst's ability to meet the precision, accuracy, detection limit, selectivity, and QC criteria of the procedure. Deviation from the original procedure of the laboratory is acceptable as long as the data satisfies the data acceptance criteria established in this addendum.
- Modification. Modification changes the character of a procedure and thereby potentially limits the capacity of a procedure to meet the originally stated precision, accuracy, detection limit, selectivity, and QC criteria. Because the impact of such a modification cannot be ascertained before implementation, it must be demonstrated by application.

Method substitutions and deviations are allowed under this addendum.

Modifications must be approved by Ecology except for modifications made due to ALARA. The ALARA principle could affect holding times and are not considered modifications. Special handling techniques might need to be used to keep the exposure to radioactive agents as low as reasonably achievable.

B.5.2 Evaluation of Laboratories

Waste analysis shall be conducted in accordance with a current QA plan. The QA plan will be available for Ecology review and inspection. The QA plan will, at a minimum, address the following elements:

- Sample custody and management practices (also refer to Section B.4.0).
- Sample preservation protocols. (also refer to Section B.4.2).
- Sample preparation and analytical method requirements.
- Instrument maintenance and calibration requirements.
- Internal QC measures, e.g., method blanks, spikes, duplicates.
- Corrective action process.

Each laboratory will be audited periodically by an independent organization to evaluate the effective implementation of the laboratory's QA/QC program. QA personnel and a technical expert evaluate the laboratory through onsite observations and/or reviews of the following documentation: copies of the QA/QC documents; records of surveillances/inspections; audits; non-conformances, and corrective actions. 222-S Laboratory QA will ensure independent organizations; QA personnel and technical experts are qualified to perform these evaluations.

B.5.3 Quality Assurance/Quality Control Objectives

Laboratory QA/QC programs will be designed to meet the following objectives:

- Minimize errors. Errors could be introduced during preparative, analytical, and/or reporting phases of work. QC program elements include analysis of samples in accordance with established methods.
- Provide information. The designation of waste relies on a combination of knowledge, historical data, and additional analytical data. Laboratory QA/QC programs ensure accurate, precise, reliable, and reproducible data.
- Ensure data are of the appropriate quality for their intended decision-making purposes.

Key QA program elements are designed to provide objective evidence that waste analysis methods meet the performance specifications for the 222-S dangerous waste management containers and the associated data quality requirements. QA activities include:

- Laboratory analyses are performed by onsite or offsite laboratories on samples of waste using written and approved methods (WAC 173-303-110 and Addendum B).
- Instrument calibration and calibration verification. These activities are performed by the laboratory and are required for ensuring data of known accuracy and precision. Calibration data are maintained and stored to ensure traceability to reported results. The laboratory regularly participates in a proficiency testing program (a.k.a. performance evaluation).

B.5.4 Laboratory Quality Assurance/Quality Control

All analytical work shall be defined and controlled by a statement of work, work order, or other work authorizing documentation reflecting the data quality criteria defined in the laboratory QA plan. These authorization documents will include QA performance requirements. Samples will be handled according to written and controlled laboratory processes. The accuracy, precision, and limitations of analytical data are evaluated through QC performance.

As needed, the 222-S operating organization will conduct analyses to verify that the waste meets the acceptance criteria for treatment, storage, or disposal at one of the Hanford Facility Operating Unit Group or those of a chosen offsite TSD facility. Testing and analytical methods will depend on the type of analyses sought.

B.5.5 Data Assessment

Data used for decision making will be of sufficient quantity and quality for their intended decision-making purpose (i.e. LDR compliance, or waste designation, or meeting downstream TSD waste acceptance criteria). 222-S is responsible for the quality of the data and project usability. Data are assessed to determine compliance with quality standards and established by this Permit are as follows.

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

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

Representativeness – Representativeness is the degree to which data accurately and precisely represents a characteristic of a population, a parameter variation at a sampling point, a process condition, or an environmental condition. Representativeness of a population or an environmental condition depends heavily on sampling and is addressed in other documents. The issue of representativeness is addressed for the following points:

Based on the generating process, the waste stream, its volume, and that an adequate number of sampling locations are selected;

- The representativeness of selected media has been defined accurately;
- The sampling and analytical methodologies as defined in Tables B.3-1 and B.3-2;
- The environmental conditions at the time of sampling are documented in accordance with Section B.8, Recordkeeping.

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

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

B.6 WASTE PROFILING

Waste profiling is not necessary as each container is approved individually.

B.7 SPECIAL PROCEDURAL REQUIREMENTS

Special procedural requirements for the 222-S dangerous waste management units include procedures for receiving waste generated outside the 222-S Laboratory Complex, procedures for ignitable, reactive, and incompatible waste, and provisions for complying with federal and state LDR requirements.

B.7.1 Procedures for Receiving Waste Generated Outside the 222-S Laboratory Complex

Mixed waste received from outside the 222-S Laboratory Complex is referred to as off-unit/offsite waste. Off-unit/offsite waste acceptance procedures are identified in Sections 2.2 and 2.3. The procedures are different because of either regulatory requirements pertaining to offsite waste receipt or the waste generation and management process cannot be detailed in this addendum to address acceptable knowledge requirements. Once off-unit/offsite waste is accepted into a 222-S dangerous waste management unit, the mixed waste is managed using the same process as mixed waste generated within the 222-S Laboratory Complex.

B.7.2 Procedures for Ignitable, Reactive, and Incompatible Waste

The 222-S dangerous waste management units accept ignitable, reactive (as limited by Section 1.2 of this addendum), or incompatible waste. The following precautions are taken before these waste types are accepted.

a. Pre-transfer review for 222-S Laboratory Complex generated waste identifies whether the waste is ignitable, reactive, or incompatible. Pre-transfer/shipment review and/or chemical screening identify whether the off-unit/offsite waste is ignitable, reactive, or incompatible.

b. If analysis of the characterization information leads to a conclusion that the waste is an ignitable or reactive waste, acceptance of the waste into one of the 222-S Dangerous Waste Management units must be conducted pursuant to the waste acceptance criteria identified in this addendum.

c. If analysis of the characterization information leads to a conclusion that the waste is an incompatible waste, acceptance of the waste into one of the 222-S dangerous waste management units must be conducted pursuant to the waste management specific requirements contained in WAC 173-303-630(9) or –640(10).

Mixed waste in the 219-S Tank System consists of dilute aqueous waste with low organic content. EPA Publication PB80-221005, *A Method for Determining the Compatibility of Hazardous Wastes*, was used to determine the 219-S Tank System aggregated waste classification of Reactivity Group Number 106, "water and mixtures containing water". This type of waste could exhibit some reaction with concentrated acids, certain organic or inorganic compounds that could generate innocuous or flammable gases in contact with water, and inorganic sulfides. Additionally, the mixed waste contains mineral acids at low concentrations, which would be incompatible with cyanides, inorganic sulfides, and water reactive substances. Therefore, transfer of waste into the 219-S Tank System is performed with an adequate amount of flush water to control corrosion of the tank system components and mitigate the above incompatibilities.

Given the conditions under which waste is managed in the 219-S Tank System, compliance with WAC 173-303-395(1)(b) is ensured by the following confirmation processes in Section 2.0 of this addendum using adequate flush water and by following the screening tests for off-unit/offsite waste:

a. The pH of mixed waste is measured to identify concentrated acids and bases to ensure adequate flush volumes are used.

b. A water mix screening test is performed to identify any potentially water-reactive waste and to ensure an appropriate introduction rate. This includes waste that generates heat or gases in contact with water. This screen will be used if water-reactive waste is suspected.

c. Cyanide and sulfide screening tests are performed to ensure that uncontrolled toxic gases do not threaten human health and the environment. This screen will be used if cyanide or sulfide bearing waste is suspected.

B.7.3 Provisions for Complying With Federal and State Land Disposal Restrictions

LDR requirements apply to the generation, storage, and treatment of dangerous and/or mixed waste at the 222-S Operating Unit Group.

Chemical constituents subject to LDRs are identified in 40 CFR 268, incorporated by reference in WAC 173-303-140. Prohibited waste may not be land disposed unless they meet certain treatment standards as specified in WAC 173-303-140, which incorporates by reference 40 CFR 268.

If arrangements are made between the organization generating the waste and 222-S Laboratory Complex personnel, LDR information can be obtained on waste while the waste is being managed in the 222-S dangerous waste management units. For waste managed in a container storage unit believed to meet treatment standards, information is obtained through sampling and analysis of a grab sample while waste is managed in the container storage waste management unit, or arrangements are made with subsequent TSD unit personnel to obtain sufficient information capable of proving the treatment standard is met.

For the 219-S Tank System, applicable treatment standards from 40 CFR 268.40 will be identified prior to the introduction of waste into the tank system to identify specified technologies. Underlying hazardous constituents for a batch of mixed waste to be transferred to another onsite TSD unit or offsite TSD facility will be determined based on existing knowledge of the waste constituents contained in waste profile documentation and sampling and analysis results from a grab sample of aggregated tank system waste. A grab sample will be taken from every fifth batch of aggregated tank system waste to be transferred or once a calendar year, whichever occurs sooner. Volatile organics, pesticides and herbicides, and constituents not found at the Hanford Facility are not reasonably expected to be present in aggregated 219-S Tank System waste based on the acceptance criteria of 219-S Tank System. Underlying hazardous constituents parameters selected for testing will include the following:

a. Semi-volatile organic compounds identified by SW-846 Methods listed in Table 3-1 of this document.
b. Inorganic parameters identified in Table B.3-1 of this document except for sodium.

B.7.3.1 Waste Treatment

Within the 222-S dangerous waste management units, waste treatment only occurs in the 219-S Tank System. Treatment does not occur in the container storage waste management units. Specific treatment activities performed in the 219-S Tank System include deactivation, pH adjustment, chemical additions, and treatment of state-only extremely hazardous waste in accordance with WAC173-303-140.

a. Deactivation, or DEACT as defined in 40 CFR 268.42, is used to remove the characteristic of mixed waste due to ignitability (D001), corrosivity (D002), and/or reactivity (D003). Treatment techniques include neutralization and controlled reaction with water. Controlled reaction with water is the primary method of treatment for reactive waste such as strong acids and bases, or incompatible waste.
b. pH adjustment is the primary method of treatment for corrosive waste that has a pH less than or equal to 2 and/or greater than or equal to 12.5. Examples of bases that could be used as pH adjusting agents include sodium hydroxide, calcium hydroxide, or calcium carbonate. Examples of acids that could be used to neutralize bases are hydrochloric acid and sulfuric acid.
c. Chemical additions occur to make the waste more amenable for storage in the DST System. Typically, sodium nitrite is added for corrosion protection.
d. Treatment of state-only extremely hazardous waste (WT01, WP01 and WP03) is performed in accordance with Revised Code of Washington 70.105.050(2) and/or WAC 173-303-140(4)(a) as applicable.

B.7.3.2 Requirements

State-only and federal LDR requirements restrict the land disposal of certain types of waste subject to the *Hazardous Waste Management Act of 1976*. Dangerous waste numbers that are subject to LDRs are identified in 40 CFR 268.40, incorporated by reference by WAC 173-303-140. Waste must meet certain treatment standards, as specified in 40 CFR 268 and/or WAC 173-303-140, if the waste is to be land disposed.

Generators determine what LDR treatment standards apply to each waste stream based on waste designation, and the requirements of 40 CFR 268.40. Generators also determine whether or not the waste satisfies these LDR treatment standards based on knowledge or testing [40 CFR 268.7(a)]. Each waste is analyzed as necessary to establish treatability subgroups and for those LDR constituents subject to treatment as identified by the generator, including any UHC identified by 40 CFR 268.2(i), if the knowledge of the generator is not sufficient to make a determination. Whether the LDR waste does or does not meet the applicable treatment standards, the generator provides waste information with each shipment stating so in accordance with WAC 173-303-380(1)(j),-(k),-(l),-(m),-(n), or -(o).

B.8 RECORDKEEPING

Recordkeeping requirements applicable to this addendum are described as follows:

a. Confirmation records described in Section 2 will be maintained in accordance with Condition II.I.1 of the *Hanford Dangerous Waste Permit*.

b. Waste information documentation described in Section 2 will be maintained in accordance with Condition II.I.1 of the *Hanford Dangerous Waste Permit*.

c. LDR records described in Section 7.3 will be maintained in accordance with Condition II.I.2 in the 222-S Laboratory Complex section of the Hanford Facility operating record.

B.9 REFERENCES

40 CFR 268, "Land Disposal Restrictions," *Code of Federal Regulations*, as amended.

40 CFR 268.7, "Testing, tracking, and recordkeeping requirements for generators, treaters, and disposal facilities," *Code of Federal Regulations*, as amended.

40 CFR 268.9, "Special rules regarding wastes that exhibit a characteristic," *Code of Federal Regulations*, as amended.

40 CFR 268.40, "Applicability of treatment standards," *Code of Federal Regulations*, as amended.

40 CFR 268.42, "Treatment standards expressed as specified technologies," *Code of Federal Regulations*, as amended.

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