PUGET SOUND NAVAL SHIPYARD (PSNS) & INTERMEDIATE MAINTENANCE FACILITY (IMF) ADDENDUM C WASTE ANALYSIS PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
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ADDENDUM C
WASTE ANALYSIS PLAN

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C. WASTE ANALYSIS PLAN

C.1 Introduction to Waste Analysis Plan

The purpose of this Waste Analysis Plan (WAP) is to describe the procedures Puget Sound Naval Shipyard and Intermediate Maintenance Facility (PSNS & IMF) uses to confirm compliance with the waste designation requirements in Washington Administrative Code (WAC) 173-303-070(3)(c) associated with Mixed Waste Storage Facility (MWSF) operations, and the waste analysis requirements in WAC 173-303-300. This WAP documents how PSNS & IMF confirms profile information about mixed waste prior to storage in the MWSF. The procedures ensure mixed waste is managed properly in the MWSF. References to "waste" in this WAP refer to PSNS & IMF generated "mixed waste."

PSNS & IMF generates waste as a result of radiological work on nuclear-powered vessels. In addition to waste generated within the boundary of Naval Base Kitsap–Bremerton (NBK–Bremerton), PSNS & IMF personnel also perform work at off-site facilities (e.g., Naval Base Kitsap–Bangor, Naval Station Everett, etc.). The MWSF only stores waste generated at off-site facilities where PSNS & IMF personnel are directly responsible for the generator activities.

The MWSF is strictly a storage facility for PSNS & IMF personnel-generated waste. PSNS & IMF follows the procedures of this WAP prior to storage in the MWSF.

The following sections describe how each waste item, whether generated on NBK–Bremerton or an off-site facility by PSNS & IMF personnel, is analyzed and confirmed to meet the approved waste streams as documented in this WAP for storage in the MWSF.

C.2 Definitions

Compatibility – A state where waste streams, when mixed, do not create fire or explosion, generate sudden or non-sudden excessive heat, or other unexpected reactions that would affect safe handling or storage.

Confirmation – Checking that the generator profile information is complete and accurate for purposes of documenting designation of the waste stream and all information necessary to safely store the waste.

Discrepancy Resolution – Obtaining adequate knowledge regarding a discrepant waste stream (a waste stream that does not match the profile during verification) to ensure it is stored properly while awaiting appropriate corrective action. Appropriate corrective action includes: modification of existing profile, creation of a new profile, and/or alternative transportation and disposal if the waste is safe for shipment in compliance with shipping regulations.

Profile – A comprehensive physical and chemical description and waste designation of a waste stream to assist the Treatment, Storage and Disposal Facility (TSDF) in determining whether a waste can be safely managed in compliance with the Part B permit. The waste profile will contain specific information that reflects compliance with this WAP for sufficient and reliable information on the waste whether the profile is based on knowledge or laboratory analysis, or some combination of these.

Quality Assurance and Quality Control (QA/QC) – Procedures and criteria for ensuring and determining that data are of acceptable quantity and quality for their intended decision-making purposes.

Re-profiling – Profiles are reviewed and updated if changes are required on a regular interval as required by the permit.

Surrogate Sample – A test on a chemically identical material to a mixed waste that faithfully represents the hazardous constituents in a waste mixture, while avoiding unnecessary exposure to radioactivity.

Technical Work Document (TWD) – A document written by engineering that directs a task to be performed. The document includes upfront characterization of waste that will be generated as a result of completing the task.

Testing – Performance of a procedure that yields a quantitative or qualitative evaluation of a type and/or quantity of material present.

Upfront Waste Characterization – Completion of the initial profile using knowledge or information from laboratory analysis with methods approved by WAC 173-303-110.

Verification – Procedures with criteria for determining the waste stream received is the same as the waste stream described on the manifest and matches the profile. This may include: visual inspection, container count, documentation review, and verification analysis.

Verification Analysis – The results of screening analysis that provide the key elements of the waste stream for comparison with the physical and chemical characteristics of the profile.

Waste Shipment – Dangerous wastes transferred from point A to point B by a single waste manifest.

Waste Stream – Dangerous waste from a single generator (described by a unique waste profile) specific and unique to the waste generation process. PSNS & IMF waste streams are defined by the physical and chemical characteristics and the disposal path of the waste.

C.3 Chemical, Biological, and Physical Characteristics of Waste Streams

Waste items are placed into a waste stream based on the physical and chemical characteristics and disposal path of the waste. The process used to analyze a waste item and develop a waste profile is described in Section C.4 below. The analysis ensures all information is known to properly store waste in the MWSF.

Table C-1 provides a general description of the chemical types and physical forms of dangerous waste streams stored in the MWSF. Waste streams with similar physical and chemical characteristics are assigned different waste stream numbers for the purposes of aiding in off-site treatment. The waste streams in Table C-1 are limited to the waste codes provided in Part A of this Permit.

Reactive wastes are prohibited from storage in the MWSF.

Table C-1 Mixed Waste Streams

Waste Stream Number	Waste Stream Description	Hazardous Properties	Physical Forms	Identification Numbers (Note 5)	Waste Codes (Note 6)
MW1	Solid Waste with Heavy Metals	Toxic Corrosive	Solid	NA3077	D004, D005, D006, D007, D008, D009, D010, D011, WSC2 (Note 1)
MW1-LIQ	Liquid Solid Waste with Heavy Metals	Toxic	Liquid	NA3082	D004, D005, D006, D007, D008, D009, D010, D011 (Note 1)
MW1-CC	Vacuum Contents with Heavy Metals	Toxic Corrosive	Solid	NA3077	D004, D005, D006, D007, D008, D009, D010, D011, WSC2 (Note 1)

Table C-1 Mixed Waste Streams

Waste Stream Number	Waste Stream Description	Hazardous Properties	Physical Forms	Identification Numbers (Note 5)	Waste Codes (Note 6)
MW1-IGN-1	Ignitable Liquids Miscible ≤ 50% Concentration (Note 2)	Ignitable	Liquid	UN1219 NA1993 UN1993	D001, F003 (Note 1)
MW1-IGN-2	Ignitable Liquids Miscible >50% Concentration and Non-Miscible (Note 2)	Ignitable	Liquid	UN1219 NA1993 UN1993	D001, D004, D005, D006, D007, D008, D009, D010, D011, F003 (Note 1)
MW2	Lead Solids or Debris, or Lead Solids or Debris with Bulk Product Polychlorinated biphenyls (PCBs)	Toxic Corrosive	Solid	NA3077	D004, D005, D006, D007, D008, D009, D010, D011, WSC2 (Note 1)
MW3	Solid Waste with Heavy Metals and PCBs	Toxic Corrosive	Solid	NA3077	D004, D005, D006, D007, D008, D009, D010, D011 WSC2 (Note 1)
MW3-CC	Vacuum Contents with Heavy Metals and PCBs	Toxic Corrosive	Solid	NA3077	D004, D005, D006, D007, D008, D009, D010, D011 WSC2 (Note 1)
MW4	State-only Mixed Waste	Toxic Corrosive	Solid	(Note 4)	WT01, WT02, WSC2, WP01, WP02, WP03, WPCB
MW4-LIQ	Liquid State-only Mixed Waste	Toxic	Liquid	(Note 4)	WT01, WT02, WP01, WP02, WP03, WPCB
MW4-CC	Vacuum Contents with State-only Mixed Waste	Toxic Corrosive	Solid	(Note 4)	WT01, WT02, WSC2, WP01, WP02, WP03, WPCB
MW4-BAT	State-only Mixed Waste - Batteries	Toxic Corrosive	Solid	(Note 4)	WT01, WT02, WSC2, WP01, WP02, WP03, WPCB

Table C-1 Mixed Waste Streams

Waste Stream Number	Waste Stream Description	Hazardous Properties	Physical Forms	Identification Numbers (Note 5)	Waste Codes (Note 6)
MW5	Mercury Containing Waste ≥ 260 parts per million (ppm)	Toxic	Solid or Liquid	NA3077 UN3506	D004, D005, D006, D007, D008, D009, D010, D011 (Note 1)
MW7	Potassium Chromate Solution	Toxic	Liquid	NA3082 UN3266	D007
MW8	Mercuric Nitrate Solution	Toxic	Liquid	UN2024 NA3082	D009
MW9	Silver Nitrate Solution	Toxic Corrosive	Liquid	UN3264	D002, D011
MW10-Acid	Liquid Waste with Heavy Metals/Corrosivity Characteristic	Toxic Corrosive	Liquid	UN3264 NA3082	D002, D004, D005, D006, D007, D008, D009, D010, D011 (Note 1)
MW10-Base	Liquid Waste with Heavy Metals/Corrosivity Characteristic	Toxic Corrosive	Liquid	UN2672 NA3082	D002, D004, D005, D006, D007, D008, D009, D010, D011 (Note 1)
MW11	Potassium Chromate Test Solution	Toxic Corrosive	Liquid	UN3264	D002, D007
PCB1	PCB Bulk Product Waste	(Note 3)	Solid	NA3077	N/A
PCB5	Liquid-Filled PCB Articles	(Note 3)	Solid or Liquid	NA3082 NA3077	N/A

Note 1 – State-specific dangerous waste numbers WT01, WT02, WP01, WP02, and WP03 per WAC 173-303-104 may also be present in addition to the Resource Conservation and Recovery Act (RCRA) waste codes.

Note 2 – "Miscible" as defined in National Fire Protection Association (NFPA) 30, Flammable and Combustible Liquids Code.

Note 3 – PCBs are authorized for storage in the MWSF per 40 Code of Federal Regulations (CFR) 761.65(b)(2)(iii).

Note 4 – State regulated wastes do not have an associated United Nations (UN) Number. North America (NA) number can only be used within the United States.

Note 5 – This column contains some of the possible 49 CFR identification numbers associated with the proper shipping name used for the waste within the MWSF. The column does not encompass the radioactive component to the waste, and does not reflect all potential proper shipping names.

Note 6 – Waste codes. (WAC 173-303)

C.4 Waste Analysis Plan

C.4.1 Waste Pre-Acceptance Procedures – Waste Stream Characterization and Profiling

This section describes the procedures to obtain a detailed chemical, physical, and/or biological analysis for every waste stream before accepting waste into the MWSF. Specifically, this section explains the procedures used to meet the performance requirements in WAC 173-303-300(2).

C.4.1.1 Waste Characterization Requirements

C.4.1.1.1 Upfront Waste Characterization

PSNS & IMF performs waste characterization, including waste designation, prior to generation to the maximum extent practical. Upfront waste characterization allows for designation into the proper waste stream prior to any waste generation, and thus prior to storage in the MWSF. When upfront waste characterization is not possible, PSNS & IMF uses knowledge of the generation and laboratory analysis to characterize and designate the waste.

C.4.1.1.2 Knowledge

PSNS & IMF, as both the generator of waste and owner/operator of the MWSF, confirms knowledge of waste streams through the waste characterization process and development of a waste profile. Using knowledge of the waste during upfront waste characterization avoids unnecessary exposure to radioactivity in accordance with the principles of maintaining exposure as low as reasonably achievable (ALARA).

a. PSNS & IMF may also review technical specifications, safety data sheets, historical records, TWDs, military specifications, previous laboratory test results, surrogate samples, and engineering calculations, etc., to determine the chemical and physical characteristics of the waste.
b. Additionally, PSNS & IMF considers the history of construction of naval vessels. The naval vessels PSNS & IMF services were built in classes (e.g., Los Angeles-class submarines, Nimitz-class aircraft carriers, etc.). Each ship within the class is manufactured with limited variability in the materials of construction. With few exceptions, individual vessels of the same class have an identical hazardous constituent profile. Therefore, data from one vessel in that class may be used to characterize waste generated from another vessel in that same class. PSNS & IMF considers the historical data of construction as a component in waste characterization.
c. PSNS & IMF will document information used for waste designation and characterization in the waste profile. Documentation for wastes characterized and designated through surrogate sample analysis will be placed into the MWSF Operating Record. The documentation will include waste process knowledge and surrogate sample knowledge, including how the selected surrogate is representative of the waste subject to characterization and designation.

C.4.1.1.3 Laboratory Analysis

In some cases, PSNS & IMF uses laboratory analysis to confirm waste designation or describe the waste characteristics for safe treatment, storage, and disposal. In these instances, PSNS & IMF will use surrogate analysis where a chemically identical, non-radioactive waste is analyzed in accordance with WAC 173-303-110. The results of the analysis are used to confirm previous knowledge, including waste designation, of the waste stream. If laboratory analysis is chosen to confirm knowledge, PSNS & IMF generally identifies wastes that are regulated for the characteristics of toxicity, ignitability, or corrosivity using the analytical techniques and procedures in WAC 173-303-110 and the Environmental Protection Agency Publication SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* current revision. The use of chemicals in processes that meet the listing definitions of WAC 173-303-082 is rarely encountered in PSNS & IMF waste work.

C.4.1.1.4 Assignment of Waste Codes

PSNS & IMF uses the designation procedures in WAC 173-303-070 to assign federal and state waste codes, as applicable. The assignment of waste codes is performed prior to storage of waste in the MWSF by mixed waste subject matter experts (SME).

C.4.1.1.5 Compatibility

Waste stored in the MWSF must be compatible with other waste in the container, the container itself, and the floor coating. The following paragraphs describe the methodology used for verifying compatibility of waste within the Table C-1 waste streams, waste with containers, segregation of containers, and waste with the floor coating:

a. All waste within a waste stream in Table C-1 is compatible based on *A Method for Determining the Compatibility of Hazardous Wastes* (Hatayama, et al., 1980) and 40 CFR Part 264, Appendix V. Prior to placing a waste into a Table C-1 waste stream, PSNS & IMF uses knowledge of the waste and considers technical specifications, past laboratory analysis, and chemistry procedures to confirm its compatibility with the waste stream.

b. Process knowledge, as described in Section C.4.1.1.2, item a, is used to determine waste compatibility with polyurethane bags. If a waste stream is not compatible with polyurethane bags, high-density polyethylene (HDPE) bags or metal containers are used as a substitute for the waste stream's inner packaging.

c. 49 CFR Part 172 Subpart B, "Table of Hazardous Materials and Special Provisions" (Hazardous Materials Table) is used to select containers for each waste stream prior to storage in the MWSF. The container for the proper shipping name must meet the packaging requirements of 49 CFR Part 172 in Section 8 of the Hazardous Materials Table. The packaging will be compatible with the waste based upon performance oriented packaging requirements for the proper shipping name. Table C-1 provides the identification numbers from the Hazardous Materials Table associated with the proper shipping name for each waste stream. The proper shipping name also provides the hazard class of the waste, which when applied to Table C-2 of the "Waste Analysis Plan" determines compatibility between containers and if separation of containers is necessary. A listing of compatible containers is in Addendum D, "Process Information," Table D-1.

d. Table C-2 shows the primary hazard classes at PSNS & IMF that are incompatible. To prevent incompatibility in storage, waste streams that are incompatible must have a physical barrier and separate secondary containment. Containment coating will be compatible with all the waste in the facility. Addendum D, "Process Information," further describes waste compatibility with the containment coating.

e. A mixed waste SME confirms compatibility of (1) waste within a waste stream and (2) waste and its container prior to waste generation during the upfront waste characterization process by assessing knowledge of the physical and chemical characteristics of the waste.

f. If waste is generated that falls outside of the hazard classes identified in Table C-2, the waste will not be authorized for storage in the MWSF until a mixed waste SME assesses the criteria in items a – e above. Incompatible waste in separate containers require secondary containment and a physical barrier in accordance with Section D.2.1, fourth paragraph, item 3 of Addendum D, "Process Information," to ensure reactions do not occur within the MWSF. The procedures provided for incompatible waste storage will be documented in the operating record.

Table C-2 Compatibility of Hazard Classes

Compatibility Hazard Class* (49 CFR Hazard Class) (Waste streams that fit within the hazard class)	Flammable Liquids (3) (MW1-IGN, MW4-LIQ)	Radioactive Material (7) (All)	Corrosives – Acid (8) (MW8, MW9, MW10-Acid, MW11)	Corrosives – Base (8) (MW7, MW10-Base)	Miscellaneous Hazardous Material (9) (MW1, MW2, MW3, MW5, MW7, PCB1, PCB5)	Other Non-Regulated Waste: Washington State-Only Dangerous Waste (MW4)
Flammable Liquids (3) (MW1-IGN, MW4-LIQ)			X	X		
Radioactive Material (7) (All)						
Corrosives – Acid (8) (MW8X, MW9, MW10-Acid, MW11)	X			X		
Corrosives – Base (8) (MW7, MW10-Base)	X		X			
Miscellaneous Hazardous Material (9) (MW1, MW2, MW3, MW5, MW7, PCB1, PCB5)						
Other Non-Regulated Waste: Washington State-Only Dangerous Waste (MW4)						

*Compatibility is based on 49 CFR Part 177.848 "Segregation Table for Hazardous Materials" and 40 CFR Part 264, Appendix V. Materials will be segregated by their primary hazard class.

*Materials are evaluated according to the primary hazard class, except when there is a subsidiary hazard class, the subsidiary hazard class will be evaluated for compatibility.

An "X" designates that materials are incompatible. Incompatible materials must be stored in separate containers.

Waste streams with abbreviations of -CC, -BAT, and -LIQ are included with the parent waste stream and are not shown separately.

C.4.1.1.6 Documentation of Profiles

The results of the waste characterization constitute the waste profile. Because the MWSF is strictly a storage facility, the purpose of documenting profiles is to ensure waste characterizations, including waste designation and compatibility determinations, are correct and waste is authorized for storage in the MWSF per this Permit. The documentation identifies the hazardous constituents, waste codes authorized in Part A of this Permit, and if the waste is incompatible.

C.4.1.1.7 Land Disposal Restrictions

Land disposal restrictions apply to all waste destined for treatment and disposal per WAC 173-303-140. 40 CFR 268, Subpart C prohibits land disposal of ignitable, corrosivity, and toxicity characteristic waste unless the concentration based treatment standards and/or technology based standards are met prior to land disposal. Prior to storage in the MWSF, the mixed waste SME documents waste designation in the operating record. The waste designation determines the applicable treatment standards under

40 CFR 268, Subpart D. All waste regulated by WAC 173-303 stored in the MWSF requires further treatment prior to disposal because of its ignitable, corrosivity, and toxicity characteristic. The provisions in WAC 173-303-140 incorporating 40 CFR 268.50 regarding prohibition of storage of waste also apply.

a. Land disposal restriction notifications are not required for storage of waste generated on-site. A land disposal restriction notification will be completed and provided prior to off-site shipment to a treatment or disposal facility in accordance with the “Generator Paperwork Requirements Table” in 40 CFR 268.7(a) as incorporated by WAC 173-303-140(2)(a).

b. Land disposal restriction notifications are placed in the operating record for waste received from off-site facilities.

C.4.1.1.8 Additional Pre-Acceptance Requirements

The following address additional requirements:

a. A mixed waste SME ensures that any waste stream meets the MWSF’s storage and process (i.e., meets the analysis and waste profile requirements) design limits prior to authorizing storage in the MWSF. Addendum D, Section D.2.2, “Container Management Practices,” paragraph 6 provides the storage design limits for the MWSF.

b. Any waste streams claiming to have no free liquids are verified by PSNS & IMF by virtue of being both the generator of the waste and owner/operator of the MWSF. When PSNS & IMF generates waste, the generator confirms and affirmatively documents the presence or absence of free liquids at the point of generation. This documentation is included in the waste profile for the mixed waste SME to review prior to storage in the MWSF.

c. The air emissions standards in WAC 173-303-300-690, -691, and -692 are not applicable to MWSF operations.

   i. PSNS & IMF does not store, treat, or dispose of waste using devices that have process vents per WAC 173-303-690.

   ii. PSNS & IMF does not use control equipment under WAC 173-303-691.

   iii. PSNS & IMF does not store, treat, or dispose of waste in tanks or surface impoundments. Air emission controls for containers storing mixed waste are exempt under WAC 173-303-692(1)(b)(vi).

d. Addendum D, “Process Information,” D.2.2 and D.2.5 provide the specific waste management methods for the storage of containers and storage of ignitable waste in accordance with WAC 173-303-630 and WAC 173-303-395(1), respectively.

C.4.1.2 Confirming/Reconfirming Waste Stream Profiles

PSNS & IMF complies with WAC 173-303-300(4) by virtue of being both the waste generator and MWSF owner and operator. PSNS & IMF is the process owner for waste generation. Therefore, PSNS & IMF will know when the process generating waste changes. The basis for a change in process requiring a re-evaluation of waste profile information includes:

a. A change in the type of material used to maintain the fleet of naval vessels and

b. A change in the chemistry procedures for liquid waste.

To ensure the analysis information in Section C.4 is accurate and current, PSNS & IMF reviews the waste profile for all waste stored in the MWSF once every two calendar years. PSNS & IMF also performs an ongoing review of waste streams during upfront characterization to verify the waste to be generated is properly characterized and documented. If re-evaluation is required due to process or regulatory changes, PSNS & IMF will update the waste profile (characterization documentation) and Part A of this permit (if necessary) through the permit modification process in accordance with WAC 173-303-830 prior to generation and prior to storage in the MWSF. If a revision to the waste profile prior to generation is not possible (e.g., the waste has already been generated), the waste will be stored in a Central Accumulation Area (CAA) and the waste profile will be updated prior to storage in the MWSF.

C.4.1.3 Formal Profile Approval

Mixed waste SMEs approve waste, based on sections C.4.1.1 and C.4.1.2 above, prior to storage within the MWSF. Upon receipt at the MWSF, waste approval documentation is placed in the operating record.

C.4.2 Incoming Waste Procedures

This section describes the procedures PSNS & IMF uses to confirm waste authorized for storage in the MWSF is in accordance with this WAP as required by WAC 173-303-300(3).

C.4.2.1 Waste Management Overview

1. PSNS & IMF's typical waste management process is outlined in Figure C-1. This process demonstrates the method of confirming knowledge of the waste. PSNS & IMF personnel perform the same roles at both on-site and off-site locations to provide control of the process and consistency in execution. The following paragraphs provide more detail on the typical PSNS & IMF waste process.
    a. Upfront Waste Characterization - PSNS & IMF performs upfront waste characterization prior to generation to the maximum extent practical (see Section C.4.1.1 above). Engineering evaluates the proposed work and documents the characterization of waste in a TWD. Mixed waste SMEs, specifically trained per Addendum H, "Personnel Training," verify the waste characterization and assignment of waste codes are in accordance with regulations, and that the generated waste profile is current and accurate.
    b. Generation - A waste generator will execute the TWD as written to manage the waste. Executing the TWD as written ensures waste is generated as planned. Each individual package of waste generated requires the waste generator to fill out paperwork describing the waste. The paperwork provides traceability and firsthand verification for all waste generated.
    c. Accumulation Area Management - Waste is transferred to an accumulation area where a mixed waste accumulation area operator (MWAAO) receives the waste, observes the waste by visual and physical external inspections of the outer packaging, and confirms this observation matches the description on the paperwork and the TWD instructions. Waste is managed in an accumulation area in accordance with WAC 173-303-200.
    d. Radiological Characterization - Waste typically undergoes radiological characterization for waste minimization purposes using radiological analysis equipment. If the waste meets the criteria for release from radiological controls, it is transferred to the PSNS & IMF non-radioactive dangerous waste program. Otherwise, the waste is managed in the accumulation area.
    e. Transfer to MWSF - Mixed waste SMEs review the waste profile documentation associated with each package prior to transfer to the MWSF. The documentation is compared to those waste streams authorized in Table C-1. This review and comparison verifies PSNS & IMF's knowledge of the waste. Once this confirmation has been made, mixed waste SMEs provide written direction to move the waste container from the accumulation area to the MWSF.

C.4.2.2 Manifest Review Procedures

1. PSNS & IMF receives waste from off-site facilities for storage in the MWSF. Any waste received at the MWSF has been generated, accumulated, and reviewed by PSNS & IMF personnel in accordance with the same written procedures and training as waste generated on-site. The mixed waste SMEs from NBK–Bremerton perform a review to include waste analysis documentation, sample results, description of the waste, and all applicable waste codes prior to allowing waste to be shipped to the MWSF. Provided this review demonstrates that characterization of off-site

waste is complete and accurate, off-site waste from PSNS & IMF-controlled generating processes is not required to be sampled or tested when it arrives at the MWSF.

2. PSNS & IMF personnel prepare shipping paperwork for waste sent from off-site facilities to the MWSF. Therefore, manifest discrepancies in quantity and identity of a waste stream on a shipment are unlikely. If there is a manifest discrepancy, PSNS & IMF will contact the transporter for resolution.
3. Upon receipt at the MWSF, PSNS & IMF reviews the shipping paperwork, including manifests, to confirm the quantity and identity of waste received from off-site. Mixed waste storage facility operators (MWSFO) then place the shipping paperwork and manifest in the operating record.

C.4.2.3 Waste Stream Verification

Verification that each waste stream matches its profile is provided in C.4.2.1 (for waste generated on-site) and C.4.2.2 (for waste received from off-site).

C.4.3 Discrepancy and Rejection Policy

1. Any unplanned or unknown waste intended for storage at the MWSF will be rejected and returned to the generator of the waste. This waste has not met the requirements of this WAP; therefore, storage will not be authorized until the requirements of this WAP are met. Such situations are unlikely due to the base access controls in place at PSNS & IMF.
2. For known shipments where containers are damaged upon receipt that threaten human health and the environment, PSNS & IMF will respond in accordance with spill procedures and initiate Addendum G, "Contingency Plan," if required.

C.4.4 Process Analyses

This section provides the requirements for process analyses for treatment or consolidation facilities. This section is not applicable because the MWSF is strictly a storage facility.

C.4.5 Waste Generated On-site

This section provides the requirements for new waste streams generated when a facility treats and consolidates wastes. This section is not applicable because the MWSF is strictly a storage facility and new waste is not generated within the MWSF.

C.4.6 Sampling and Analyses Methodologies

PSNS & IMF personnel characterize mixed waste prior to storage in the MWSF. The MWSF is strictly a storage facility for wastes generated by PSNS & IMF personnel. Therefore, waste generated at both on-site and off-site locations by PSNS & IMF personnel is not required to be directly sampled or tested upon receipt at the MWSF. When laboratory analysis is required to confirm waste characterization prior to storage, PSNS & IMF follows methodology in this section, C.4.1.1.3, and C.4.7. If the waste is not yet characterized, or does not the meet requirements in C.4.1.1.8 above, then the waste is prohibited from storage in the MWSF.

C.4.6.1 Sampling Objectives

When sampling is necessary, a sampling plan will be developed. Sampling plans will meet the following objectives:

a. Ensure the sample is representative of the waste being characterized and designated.
b. Collect an uncontaminated sample and ensure chain-of-custody requirements are followed.
c. Present the sample to the lab in a container that is compatible with the waste, will not result in sample degradation while awaiting analysis, and will allow the laboratory to perform the desired analysis. Follow preservation requirements as necessary.

d. Ensure the sample and sampling method can be traced back to the material being sampled.

e. Specify the chemical constituents for which the laboratory will analyze the sample. Sampling personnel use this information to complete the Sample Analysis Request (SAR) form (or other authorized sample request form). The SAR is sent to the laboratory with the sample.

C.4.6.2 Sample Types

The type of sample collected is based on the parameters selected for analysis and the physical state of the waste. The type of sample will be specified in the sampling plan. Two basic types of samples can be taken as described in the following paragraphs.

The grab/discrete sample is an individual sample taken from a single location at a specific time. As a result, the analytical results represent the specific sample site. Several grab/discrete samples can be taken and statistically evaluated to determine how well the samples actually represent the material being sampled. Grab/discrete samples can also be used to characterize homogenous waste streams.

A composite sample involves obtaining multiple grab/discrete samples from the waste. The samples are mixed together and the mixture presented to the lab for analysis. This type of sample will give analytical results as an average constituent concentration.

Liquid sampling may be accomplished using a composite liquid waste sampler device (COLIWASA). This is a device that is used to obtain representative samples from stratified or unstratified liquids. COLIWASAs are most commonly used to extract samples from tanks, barrels, drums, and may also be used to take samples from pools or other bodies of stagnant liquid.

C.4.6.3 Representative Sampling

Sampling is normally conducted at the site of waste generation or at an accumulation area prior to transferring the waste to the MWSF. To obtain a representative sample, the technical work document must specify the exact location to take the sample and the number of samples required, or the methodology to use to determine the required number of samples. A sample plan may be very simple, such as obtaining a single grab/discrete sample from a container of waste, or very complicated, such as establishing grids and taking composite samples from each grid location.

C.4.6.4 Sampling Frequency

Sample mixed waste through surrogate sampling when data is needed to assist in waste characterization or for a periodic re-analysis of waste streams.

C.4.6.5 Sample Collection and Handling Techniques

The sampling plan must contain all sampling and handling techniques. Samplers must be trained in accordance with PSNS & IMF requirements for sampling and handling of radioactive and hazardous samples.

C.4.6.6 Chemical Properties of Sampled Waste

The chemical properties of the waste may need to be addressed in developing a sampling plan. Ensure the sampling technique specified will result in representative samples of the waste, not products of reaction of the waste with the air or sample equipment.

C.4.6.7 Method of Sampling

Authoritative sampling is used when sufficient historical, site, or process knowledge is available to accurately assess the chemical and physical properties of a waste. This type of sampling involves the selection of sample locations based on knowledge of the waste distribution, waste properties, and waste management practices. The validity of the sampling depends upon the accuracy of the information used. The rationale for the selection of the sample locations is critical and must be well documented. Random sampling is used when insufficient knowledge exists to perform authoritative sampling. See Table C-3 below for random sampling techniques.

Table C-3 Random Sampling Techniques

Type	Description	Use	Advantages/ Disadvantages
Random (simple, stratified, and systematic)	Techniques where sample selection and location are determined through the application of statistical methods.	Used to collect representative samples where data are insufficient to justify authoritative sampling.	See discussion below for each respective random sampling technique.
Simple Random	All location/points in a waste or unit from which a sample can be attained are identified, and a suitable number of samples are randomly selected.	Used to collect representative samples of waste that are heterogeneous.	<u>Advantage</u>: Most appropriate where little or no information is available concerning the distribution of chemical contaminants. <u>Disadvantage</u>: May misrepresent waste streams with areas of high concentration or stratification.
Stratified Random	Areas of non-uniform properties or concentrations are identified and stratified. Subsequently, simple random samples are collected from each stratum of the waste.	Used to collect representative samples from waste or units that are known to have areas of non-uniform properties (strata) or concentrations (hot spots).	<u>Advantages</u>: Provides for increased accuracy of waste streams representation if strata or a typically high or low concentration area is present. <u>Disadvantage</u>: Requires greater knowledge of waste stream than for simple random sampling and may require sophisticated statistical applications.
Systematic Random	The first sampling point is randomly selected. All subsequent samples are collected at a specific distance from the previous sample.	An alternate procedure used to collect representative samples from heterogeneous waste streams; allows simplified sample identification.	<u>Advantages</u>: Easier sample identification and collection than other techniques. <u>Disadvantages</u>: May misrepresent waste streams with unknown areas of high concentration or stratification.

C.4.6.8 Sampling Quality Control

Sampling plans will periodically specify one of the following types of quality control methods to be used in the field.

Field duplicates are independent samples that are taken from the same location at the same time and are used to measure the effectiveness of obtaining representative samples. The precision of the field duplicates provides a reflection of the variance inherent in the waste composition and the sample technique. Field duplicates should be collected from a homogenized sample (solid/sludge) or as consecutively collected samples (liquid).

Trip blanks are sample containers prepared with an inert material, such as deionized water, that are carried into and out of the field without being opened at any time during the sampling event. If the trip blank is contaminated, the source of the contamination is assumed to be the container itself, the environment in which the trip blank was prepared, or some other source located outside the sample area. Trip blanks are provided by the laboratory personnel and should be used for each sampling event that includes volatile organic compound analysis.

Equipment blanks are prepared prior to sampling by running deionized water over sampling equipment and collecting the water into a clean sample container. If the equipment blank is contaminated, the source of contamination is assumed to be equipment used during the sampling operations.

Field blanks are prepared in the field by filling a clean container with deionized water and appropriate preservatives, if any, for the specific sampling activity. Field blanks are collected between sampling locations or after sampling is completed, following decontamination of sampling equipment, where applicable. If contaminants are found in the field blank, it is assumed that environmental factors, such as airborne contamination; sampling procedures, causing cross contamination; or contaminated equipment were contributing to the concentration of hazardous waste constituents found in the sample.

Split samples are typically collected for enforcement purposes and as a check on PSNS & IMF's analytical program and data record keeping. The sample is collected, and the sample volume is divided into halves. Each half is dispensed it into a different container.

C.4.7 Quality Assurance Program

If PSNS & IMF, as the only generator of wastes stored in the MWSF, performs sampling and analysis to confirm waste characterization prior to generation (i.e., laboratory analysis of a surrogate sample), PSNS & IMF ensures the following:

1. Samples will be analyzed by the on-site PSNS & IMF Laboratory Division, accredited by the Washington State Department of Ecology, or another Washington State Accredited Laboratory contracted by PSNS & IMF. All laboratory QA/QC will be in accordance with SW-846 protocols or accepted industry practice.
2. The PSNS & IMF laboratory QA/QC program addresses both the qualitative and quantitative aspects of laboratory operations, to include:
   a. Sample handling practices and chain-of-custody,
   b. Analytical procedures,
   c. Calibration procedures and frequency,
   d. Performance and system audits,
   e. Data reduction, review, and reporting,
   f. Data quality assessment and corrective action, and
   g. Preventative maintenance.
3. For waste characterizations that include sampling and analysis, PSNS & IMF confirms the sample analysis results in Section C.4.2.1, paragraph 1, item a above.

C.4.8 Waste Tracking

Containers are tracked with unique identification numbers as they enter the MWSF from both on-site and off-site locations and during transport from the MWSF for treatment and disposal. The date containers are placed into the MWSF is also tracked to ensure storage does not exceed one year.

C.4.9 Recordkeeping

PSNS & IMF maintains a written operating record for waste stored in the MWSF. The operating record for prior years is archived until closure of the facility. The following information related to this WAP is recorded and maintained in the operating record:

- Waste analysis documentation for each waste item received into the MWSF. The documentation includes a description of the item, the waste determination, and assignment of waste codes performed per this WAP.
- A copy of each manifest and shipping paperwork for waste received from an off-site facility.

C.4.10 Waste Analysis Personnel Responsibilities

Mixed waste SMEs and MWSFOs provide key functions described in this WAP. These personnel are trained per Addendum H, “Personnel Training.”

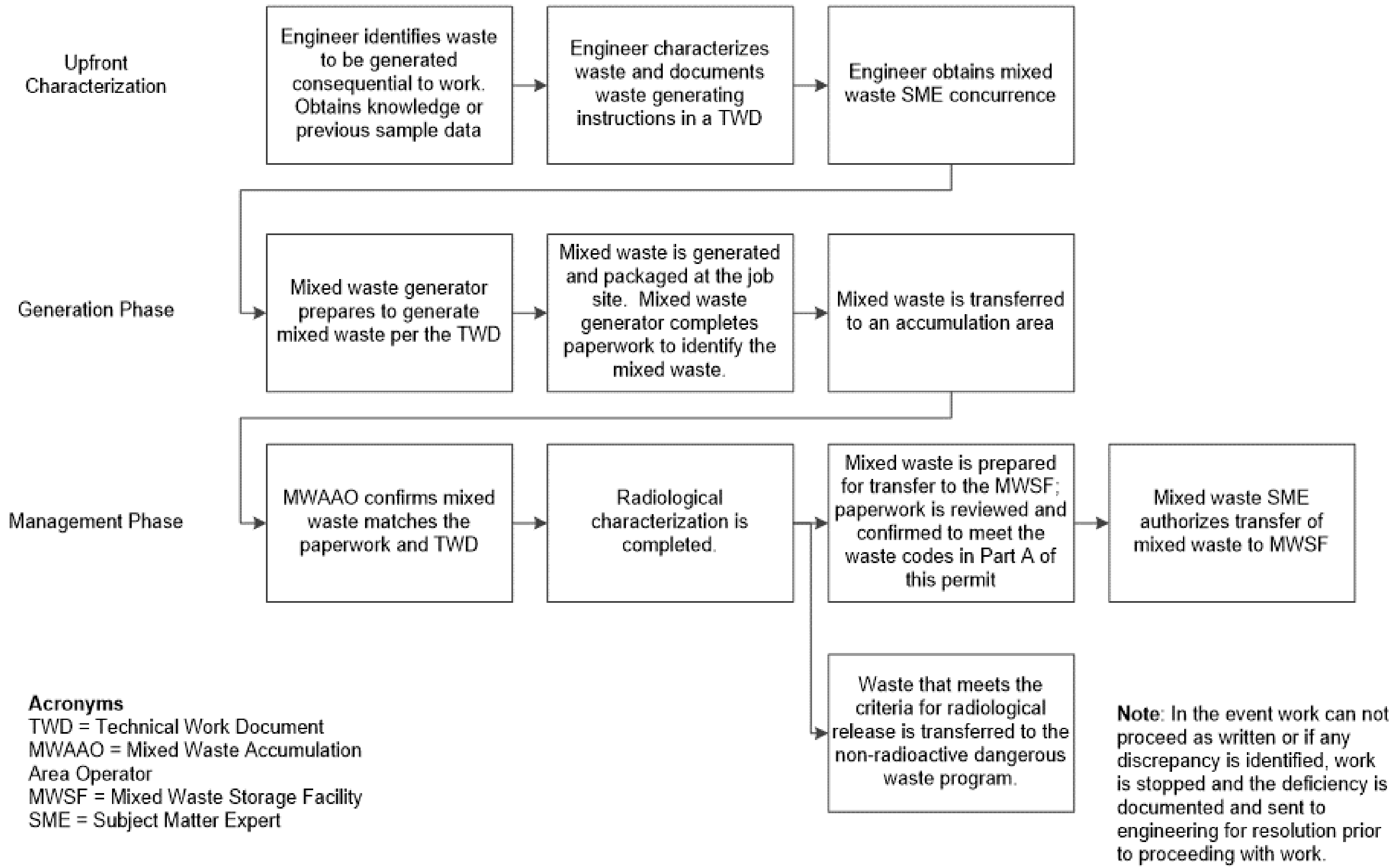

Figure C-1 Flowchart for Puget Sound Naval Shipyard and Intermediate Maintenance Facility Mixed Waste Management Process

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