



# MIXED WASTE DISPOSAL UNIT

## WASTE ANALYSIS PLAN

### REVISION 0

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# MIXED WASTE DISPOSAL UNIT WASTE ANALYSIS PLAN Revision 0

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# MIXED WASTE DISPOSAL UNIT (MWDU) WASTE ANALYSIS PLAN (WAP) [40 CFR 264.13 and 270.21(a)]

The Nevada Test Site (NTS) Waste Acceptance Criteria (NTSWAC) establishes the requirements generators shall meet to dispose of waste at the NTS. It includes requirements for waste certification programs, characterization, traceability, prohibited items, waste profiling, waste form, packaging and shipment of waste. The NTSWAC outlines the process requirements for generators to receive National Nuclear Security Administration Nevada Site Office (NNSA/NSO) Assistant Manager for Environmental Management (AMEM) approval to ship radioactive Low-Level Waste (LLW) and Low-Level Mixed Waste (LLMW) to the NTS. Applicable portions of this WAP are incorporated into the NTSWAC. This WAP applies to LLMW disposed in the MWDU. References are made throughout this plan to regulations promulgated by the EPA regarding waste analysis requirements for hazardous waste management facilities. These requirements are generally found in Title 40 Code of Federal Regulations (CFR) Part 264, Subpart B, and unless otherwise stated have been adopted by reference in the Nevada Administrative Code (NAC).

## 1.0 Waste Description and Sources

Accepted wastes will be generated from U.S. Department of Energy (DOE) and NNSA activities including routine waste generation, remediation, and decontamination and decommissioning. Wastes may include contaminated soil and debris, pond sludge, personnel protective equipment (PPE), spill residue, decontamination effluent, lead debris and shielding, and other forms of contaminated media. The final treated waste forms may include incinerator ash; stabilized ash; debris; macroencapsulated debris and lead, and soil. NNSA/NSO may also accept wastes treated by equivalent technologies, provided the Nevada Division of Environmental Protection (NDEP) has approved the technologies. Acceptable hazardous waste codes are provided in Table 1.

Table 1: General Information - MWDU

<b>PROCESS CODE:</b>	D80 (Landfill Disposal)
<b>WASTE CODES:</b>	D004 through D043 F001 through F009, F039 P001 through P205 U001 through U249, U271, U278, U279, U280, U328, U353, U359, U364, U367, U373, U387, U389, U394, U395, U404, U411.
<b>Other Wastes:</b>	PCBs, Friable Asbestos, State Regulated.

## 2.0 Waste Characteristics

The LLMW waste disposed in MWDU contains both radioactive and hazardous material components as defined by the Atomic Energy Act (AEA), the Resource, Conservation, and Recovery Act (RCRA), Nevada Revised Statutes (NRS), and NAC. LLMW streams accepted at the MWDU for disposal may carry only the EPA hazardous waste numbers listed in Table 1 and must meet the NTSWAC. Waste must also meet the Land Disposal Restriction (LDR) treatment standard requirements in 40 CFR 268.40 and 268.45, including applicable standards for underlying hazardous constituents (UHCs). Waste meeting the alternative LDR treatment standard for contaminated soil (40 CFR 268.49) or equivalent treatment technologies (40 CFR

268.42(b)) approved by NDEP may also be accepted. State-only designated hazardous waste may be received at the NTS as hazardous waste. Polychlorinated Biphenyls that meet the requirements for the disposal in permitted hazardous waste landfill as specified in 40 CFR Part 761 and NAC 444.9452 are also accepted.

LLMW waste received from generators will include waste containing metals, solvents, organics, and listed constituents; or waste from specific processes regulated in 40 CFR 261.

### 3.0 Waste Identification Parameters

The NTS onsite generators, DOE offsite generators, and the treatment, storage, and/or disposal facilities (TSDF) sending DOE waste for disposal in the MWDU will be referred to as the "generator." The operating organization is required to test certain LLMW, depending on the type of treatment standard, to ensure that the waste or treatment residual is in compliance with applicable LDR requirements. Such testing is performed according to the frequency specified in this WAP.

Characterization data must be developed under 40 CFR Part 261. Data may be obtained from acceptable knowledge and/or sampling and analysis.

When demonstrating that a concentration-based LDR treatment standard has been met, a representative sample of the waste shall be submitted to a laboratory accepted under Section 12.4 for analysis. This sample shall be taken by the generator and is required to demonstrate compliance with the LDR treatment standards contained in 40 CFR 268.40. When demonstrating that a treatment technology standard has been met, a LDR certification shall be submitted.

### 4.0 Waste Form and Containers

#### 4.1 Prohibited Waste forms

- a. RCRA D, F, P, K, or U waste numbers other than those listed in Table 1.
- b. Wastes which contain only a hazardous component.
- c. Non LDR (40 CFR part 268) compliant waste.
- d. Pathogens, infectious wastes, or other etiologic agents.
- e. Compressed gases - aerosol cans must be punctured and valve mechanisms removed from expended gas cylinders.
- f. Free liquids - must be absorbed, stabilized, or otherwise removed from the waste. Containerized free liquids such as ampules and small articles that contain free liquids required for the article to function are acceptable. Provisions for additional sorbent should be made when significant temperature and atmospheric differences exist between the generating site and the disposal site.
- g. Non - biodegradable sorbents - Examples of nonbiodegradable sorbents are found in 40 CFR 264.314[e].
- h. PCBs requiring disposal in chemical waste landfills.
- i. Chelating or complexing agents in amounts greater than 1% of the waste - unless stabilized or solidified.

## 4.2 LLMW Containers

Containers must meet the following requirements:

- a. Incompatible wastes, or incompatible wastes and materials shall not be placed in the same container if such placement:
  - (1) Generates extreme heat or pressure, fire or explosion, or violent reaction;
  - (2) Produces uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health;
  - (3) Produces uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions; or
  - (4) Damages the structural integrity of the device containing the waste.
- b. LLMW containers of 416 liters (110 gallons) or less must be marked for the hazardous characteristics of the waste. Containers must be marked with the following:
  - (1) The words "HAZARDOUS WASTE -- FEDERAL LAW PROHIBITS IMPROPER DISPOSAL. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency";
  - (2) Generator's Name and Address; and
  - (3) Manifest Document Number.
- c. LLMW container marking must be:
  - (1) Durable;
  - (2) In English;
  - (3) Printed on or affixed to the surface of a package or on a label, tag, or sign;
  - (4) Displayed on a background of sharply contrasting color;
  - (5) Unobscured by other labels or attachments; and
  - (6) Located away from any marking that could substantially reduce its effectiveness.
- d. LLMW packages must be at least 90 percent full (40 CFR 264.315[a]).
- e. A TID may be employed on packages that are inspected off site as part of verification. The number of the TID must be recorded on the verification documentation. Some waste packaging does not allow for the application of TIDs (e.g., welded boxes).
- f. Intermodal containers that are emptied and returned to the generator are prohibited.

## 5.0 LDR Notification and Certification

40 CFR 268.7(a) requires each generator evaluate waste to determine if it is restricted from land disposal. As applicable, wastes containing specific hazardous characteristics must be evaluated for UHCs reasonably expected to be in the waste. LLMW destined for disposal at the MWDU must meet LDR requirements prior to shipment to the NTS. LDR Notification and certification forms must be submitted per 40 CFR 268.7. The information on the notification (i.e., manifest number, EPA waste code(s), waste constituents to be monitored, category of waste, and waste analysis data) is compared with accompanying shipment documentation. If a certification statement is missing or unsigned and the discrepancy cannot be resolved, the waste shipment is not accepted and will be returned to a generator specified facility.

Generators are required to perform hazardous waste determinations including evaluating LDR treatment standard requirements on their waste streams. Generators are required to test the waste to ensure compliance with applicable concentration based treatment standards. On the waste profile, generators identify the applicable treatment standard, and whether the waste meets the standards as generated, is excluded, or requires treatment before disposal.

When shipping waste to the MWDU, generators are required to submit all information, notifications, and certifications described in 40 CFR 268.7 to the operating organization. If the waste changes, the generator must send a new notice and certification to the operating organization.

## 6.0 Waste Profile and Data Quality Assurance Process

Characterization data must be sufficient to verify compliance with the WAC, ensure safe management, identify UHCs, and verify waste meets LDR treatment standards prior to disposal. The waste profile shall provide a clear picture of the waste's radiological, physical, and chemical characteristics; its regulatory classification; and packaging. Generator-supplied data are the primary means by which NNSA/NSO demonstrates compliance with 40 CFR 264.13(a) and 264.13(b)(5) for obtaining detailed chemical, physical, and radiological analysis.

Generators shall determine the appropriate analysis (total vs. TCLP) to use when performing hazardous waste determinations and identifying UHCs.

Generators' waste characterization data must be based on samples collected using methods specified in EPA SW-846 or other equivalent methods.

### 6.1 General Waste Profile Requirements

- a. Waste profiles will be submitted to NNSA/NSO for review and approval.
- b. Changes to approved waste streams may be submitted at any time. Depending on the significance of the change, the approval to ship may be temporarily suspended until the changes are reviewed and approved.
- c. Waste profiles shall have annual expiration dates if not recertified by the generator.
- d. Generators shall notify NNSA/NSO in writing when terminating an approved waste profile.

### 6.2 Specific Waste Profile Requirements

The following information shall be included:

- a. EPA waste codes
- b. Applicable state waste codes
- c. Identification of sorbent(s) used and certification of the use of nonbiodegradable sorbents
- d. Chemical, physical, radiological, and general characteristics and properties
- e. Compliance with WAC items prohibitions
- f. Container type, size, weight, dose rate, and approximate number
- g. Demonstration of compliance with LDR standards including compliance with Universal Treatment Standards, if applicable
- h. Supplemental attachments consisting of container drawings, process flow information, analytical data, etc., if necessary.
- i. Visual inspection forms; analytical results or log books; and/or procedures or treatability tests results, as necessary.

## 7.0 Pre-Acceptance Approval Process

The NTSWAC establishes the requirements generators shall meet to dispose of waste at the NTS. It includes requirements for waste certification programs, characterization, traceability, prohibited items, waste profiling, waste form, packaging and shipment of waste. The NTSWAC outlines the process requirements for generators to receive AMEM approval to ship radioactive LLW and LLMW to the NTS. Applicable portions of this WAP are incorporated into the NTSWAC. Approval flow diagrams are provided in Exhibit 1.

The NTSWAC establishes a facility evaluation system (audit and surveillance) to approve the generator's shipment of waste to the NTS. These evaluations, conducted by the operating organization, include rigorous attention to the characterization, certification, and QA programs at the generator site. The evaluations are conducted in accordance with written procedures and checklists.

During the evaluation of the generator's waste management program Corrective Action Requests (CARs) may be issued for quality affecting problems. These CARs must be answered by a corrective action plan identifying the root cause, corrective actions, and actions to preclude re-occurrence. The generator is not approved until all CARs are closed.

Once the AMEM approves the generator, waste profiles are accepted for review. The AMEM can suspend approvals at any time, based on programmatic or waste stream deficiencies.

## 7.1 Generator Approval Process

Once a generator is approved for shipping waste to the NTS, a waste stream approval process is initiated. This process includes submitting a notification and/or waste profile, waste profile review, and determining the physical screening type and frequency. The generators program and waste profile are reevaluated at the specified frequency. If the waste analysis data are sufficient and the waste stream meets the WAC, the waste profile is approved. The approved waste is then scheduled for receipt at the RWMS.

The operating organization obtains detailed chemical and physical analysis of LLMW from generators requesting disposal in the MWDU. Before waste can be disposed, generators must perform a hazardous waste determination as required by their state regulations, 40 CFR 262.11, and 40 CFR 268.7. The characterization data are used to complete a waste profile for each waste stream.

A notification form (Exhibit 2) will be submitted for waste that has not yet been treated. By requiring generators to submit the notification, coordination of remote sampling and offsite visual verification is more readily accomplished. A waste profile form will be submitted for post-treatment final waste forms. For waste already treated, the generator will submit the waste profile. The notification and/or waste profile is submitted to NNSA/NSO for review and approval.

In general, LLMW received from onsite generators is managed the same as waste received from offsite generators. Differences include, but are not limited to: physical and chemical screening and shipping documentation (Uniform Hazardous Waste Manifests are used for waste from offsite generators, and onsite waste manifest forms are used for waste from onsite generators).

Generators shall provide, as necessary, sampling and analysis data that are of a known precision and accuracy to identify the physical and chemical properties of the waste.

## 7.2 Notification Review

If treatment is required but has yet to occur, the operating organization will review the notification form, determine the physical screening frequency (section 7.4), and schedule offsite verification activities with the generator. See Exhibit 2 for an example of a notification review form.

## 7.3 Waste Profile Review

The operating organization will review the initial generator-supplied waste analysis for waste profile approval in accordance with 40 CFR 264.13(b)(4).

The operating organization reviews the waste profile information including general waste stream information, chemical and physical characterization, treatment, and packaging information to verify that waste streams are defined adequately. This will demonstrate that the waste meets the WAC and complies with appropriate LDR treatment standards. If discrepancies are found, or inadequate characterization data have been provided, the operating organization requests additional information from the generators. Resolutions could include providing processing or treatment procedures, drawings, process flow information, or supplemental analytical data. Results from the review are documented in the operating record (see Exhibit 3 for an example of a Waste Stream Recommendation Form).

The operating organization will evaluate sampling and analysis documentation to ensure that: (1) samples are representative of the waste stream, (2) appropriate analytical procedures are used, and (3) sufficient quality controls are established to allow measurement and documentation of data quality. The initial physical screening frequency will be determined.

Generators who submitted a notification form will include any verification activity documentation with the waste profile. This information will be reviewed for final approval of the waste profile. After approval, generators can schedule waste shipments.

## 7.4 Screening Frequency

The screening frequency is determined by the operating organization using the following process.

- a. Review of the generator waste profile information to determine the relative potential for mischaracterization or inappropriate segregation based on all relevant information, including any previous experience with the generator. Based on this review, the operating organization identifies any concerns associated with the following criteria:
  - (1) documented waste management program
  - (2) waste stream characterization information
  - (3) potential for inappropriate segregation
  - (4) waste type and packaging.
- b. Establishment of the physical screening frequency for the waste stream:
  - (1) The physical screening minimum is five percent of the waste stream

## 7.5 Screening Options

The following are the screening options available:

- a. offsite (at generator or treatment facility) visual inspection
- b. offsite chemical screening
- c. offsite or onsite (NTS) review of photographs, videos, RTR images, and/or RTR recordings of treatment
- d. onsite RTR
- e. onsite visual inspection of container exterior (performed 100%)

## 8.0 Physical and Chemical Screening

Verification activities are performed as required in 40 CFR 264.13[c]. The activities include container receipt inspection and could also include physical screening and/or chemical screening. Containers can be inspected visually, verified by RTR, or sampled for field or laboratory analysis to confirm that the waste matches the waste profile and container data information supplied by the generator. Any discrepancies between the verification results and the waste profile must be resolved before acceptance at the MWDU.

Screening methods have sufficient performance levels to yield valid decisions when considering method variability (precision and accuracy). When screening is performed at a location not within the RWMS, tamper-indicating devices (TIDs) may be applied to each container examined and, on receipt, verified as acceptable to ensure that no changes could have occurred to the packaging and waste content. Written procedures are maintained detailing the requirements for applying TIDs. Some waste packaging does not allow for the application of TIDs (e.g., welded boxes). The following elements are used to verify and provide sufficient data to ensure that waste received is correctly described in the shipping documentation.

### 8.1 Physical Screening

This section describes the requirements pertaining to methods, frequency, and exceptions for verification by physical screening. Physical screening can be performed before the waste is shipped to the MWDU.

#### 8.1.1 Physical Screening Frequency

The minimum physical screening frequency is 5 percent. The operating organization adjusts the visual and RTR inspection levels for generators based on objective performance criteria.

#### 8.1.2 Physical Screening Exceptions

- a. Waste that cannot be physically screened at the Area 5 RWMS may be visually inspected at the generator location (e.g., classified LLMW, large components, remote-handled containers that cannot be opened, will not fit in RTR).
- b. A waste that was treated prior to issuance of the Permit is considered previously treated waste. The operating organization will evaluate the generator's approved Waste Certification Program, the waste profile including the LDR Certification Statement, treatment and packaging procedures, package inventories, acceptable knowledge information and any historical analytical data for acceptability.

### 8.1.3 Physical Screening Methods

The following physical screening methods comply with the requirement to verify waste [40 CFR 264.13(c)]:

- a. Visual inspection
- b. RTR

### 8.1.4 Physical Screening QC

Physical screening QC is used to ensure that quality data are obtained when performing RTR. Visual inspection does not use instrumentation or chemical tests. The operating organization RTR procedures and training requirements identify necessary QC elements.

### 8.1.5 Physical Screening Parameters

The following methods are approved for use.

#### 8.1.5.1 Visual Inspection

Rationale: Because the NTS does not have a container-opening facility, a visual verification of the waste will be accomplished at the generator or treatment facility. This method meets the requirement to ensure consistency among the waste containers and the waste profile.

Method: The container is opened and the contents are inspected by direct visual observation or review of the images of the treatment process and package. Homogenous loose solids are probed. If the waste is being treated, direct visual observation of the treatment and container filling process is performed. Visual observations are compared with the applicable waste profile and container-specific information. Visual observations may include review of available RTR tapes, videotapes, photographs, digital images, etc. of the treatment and packaging process to ensure compliance.

Failure Criteria: A container fails inspection for any of the following: (1) undocumented or improperly packaged waste; (2) discovery of prohibited articles or materials; (3) discovery of material not consistent with the applicable waste profile (i.e., waste form); and (4) void space greater than 10 percent.

#### 8.1.5.2 Real-Time-Radiography

Rationale: This method meets the requirement to ensure the absence of prohibited items and consistency among waste containers, the waste profile, and the shipment documentation. Containers that are not amenable to visual inspection because of physical or radiological content can be examined safely and economically.

Method: The container is scanned with an RTR system. Images are observed on a video monitor and/or captured on videotape. Personnel trained in the interpretation of RTR imagery record their observations. These observations are compared to the contents listed on the waste profile and accompanying shipment documentation.

Failure Criteria: A container fails inspection criteria for any of the following reasons: (1) undocumented or improperly packaged waste, (2) discovery of prohibited articles as

identified in the NTSWAC and section 4.1 of this document, (3) image data inconsistent with the waste profile or shipment documentation; and (4) void space greater than 10 percent.

## 8.2 Chemical Screening

Chemical screening will be performed before the waste is shipped to the Area 5 RWMS. The operating organization will determine which screening parameters are appropriate for the waste stream. Interpretation of the appropriate chemical screening method(s) are conducted and performed by trained personnel. Unless otherwise noted, chemical screening tests are qualitative, not quantitative. The objective of chemical screening is to obtain reasonable assurance that the waste received is consistent with the description of the waste on the waste profile and to ensure that the waste is safely managed.

### 8.2.1 Chemical Screening Frequency

At a minimum, 10 percent of the waste containers amiable to chemical screening and verified by visual inspection will be chemically screened.

### 8.2.2 Chemical Screening Exceptions

The following are cases in which chemical screening is not required:

- a. Waste subject to a technology based treatment standard.
- b. Chemical containing equipment removed from service (e.g., ballasts, batteries).
- c. Waste containing regulated asbestos.
- d. Waste containing beryllium
- e. Waste, environmental media, and/or debris from the cleanup of spills or release of single substance or commercial product or otherwise known material (e.g., material for which a material safety data sheet can be provided).
- f. Confirmed noninfectious waste (e.g., xylene, acetone, ethyl alcohol, isopropyl alcohol) generated from laboratory tissue preparation, slide staining, or fixing processes.
- g. Hazardous debris.
- h. Package is greater than 100 mrem/hr at 30 cm

### 8.2.3 Chemical Screening Sampling

The chemical screening methods do not require any sample preservation methods because the screening tests are performed at the time and location of sampling or as soon as possible thereafter. When a delay is required, the samples are stored in a manner that maintains chain-of-custody controls and protects the sample composition. The equipment requirements in Table 2 may apply to sampling for chemical screening.

Individual containers are selected based on a review of the contents described in the associated documentation. If the containers and their contents are similar, containers are selected randomly for screening. If there are substantial differences among the containers or their contents, the containers are selected by stratified sampling with the strata being the types of containers and or contents presented.

### 8.2.4 Chemical Screening QC

The following QC elements are used when performing chemical screening.

- a. Containers and equipment of the appropriate size, given the analytical method and that are chemically compatible with the waste and testing reagents.
- b. Chemicals and test kits are labeled so that they are traceable.
- c. QC checks shall be performed on each test kit and associated replacements at the frequency specified in operating procedures.

#### 8.2.5 Chemical Screening Parameters

The following methods are approved for use in performing chemical screening.

##### 8.2.5.1 pH Screen

Rationale: To identify the pH and corrosive nature of waste and to confirm consistency with the shipment 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 pH meter could be used, or a narrow-range pH paper. Solids are mixed with an equal weight of water and the liquid portion of the solution is tested.

Failure Criteria: If the pH of a matrix exceeds regulatory limits (less than or equal to 2.0 or greater than or equal to 12.5) the container fails verification.

##### 8.2.5.2 Peroxide Screening

Rationale: To determine the presence of organic peroxides in solvent waste, to alert personnel to potential hazards, and to confirm consistency with the shipment documentation. The test is sensitive to low parts per million (ppm).

Method: Solids are tested by first wetting the test strip with water and contacting a small sample of the waste. A color change indicates a positive reaction. The color change can be compared with a chart on the packaging to determine an approximate organic peroxide concentration.

Failure Criteria: Peroxide concentrations greater than 20 ppm in liquid waste constituents that are known organic peroxide formers and are not documented as having been stabilized constitute failure.

##### 8.2.5.3 Paint Filter Test

Rationale: To verify the presence or absence of free liquid in solid or semisolid material.

Method: Using a standard paint filter, 100 cubic centimeters or 100 grams of waste are added and allowed to settle for five minutes. Any liquid passing through the filter signifies failure of the test. EPA SW 846 requires Method 9095 for the paint filter test.

Failure Criteria: Failure of the test in waste matrices constitutes failure of the container.

Exceptions: small quantities of condensate trapped in inner plastic liner folds are acceptable.

#### 8.2.5.4 Oxidizer Screen

Rationale: To determine if a waste exhibits oxidizing properties and to confirm consistency with the shipment documentation.

Method: Acidified potassium iodide test paper is used to measure the oxidizing properties of waste in accordance with written procedures or manufacturer's suggested method.

Failure Criteria: A positive oxidizing indication in a waste that is not consistent with documented constituents fails verification.

#### 8.2.5.5 Water Reactivity Screen

Rationale: To determine if the waste has the potential to vigorously react with water or to form gases or other reaction products. This information is used to confirm consistency with the shipment documentation.

Method: Water reactivity screen is performed in accordance with written procedures or manufacturer's suggested method

Failure Criteria: A positive reactivity indication in a waste that is not consistent with documented properties fails verification.

#### 8.2.5.6 Cyanide Screen

Rationale: To indicate if waste releases hydrogen cyanide upon acidification near pH 2. This information is used to confirm consistency with the shipment documentation.

Method: A cyanide screen is performed in accordance with written procedures or manufacturer's suggested method.

Failure Criteria: A positive cyanide indication in a waste that is not consistent with documented constituents fails verification.

#### 8.2.5.7 Sulfide Screen

Rationale: To indicate if the waste could release hydrogen sulfide upon acidification near pH 2. This information is used to confirm consistency with the shipment documentation.

Method: A sulfide screen is performed in accordance with written procedures or manufacturer's suggested method.

Failure Criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

## 9.0 Preshipment Authorization Process for Approved Wastes

For each shipment that is a candidate for disposal, the generator provides the following information:

- a. Container identification number
- b. Profile number
- c. Waste description
- d. Generator information (e.g., name, address, point of contact, telephone number)
- e. Container information (e.g., type, size, weight)
- f. EPA waste codes
- g. Waste composition
- h. Packaging materials and quantities
- i. Applicable treatment standard/technology.

Where potential conformance issues exist in the information provided (i.e., waste characteristics do not match the waste profile information, WAC, or additional constituents are expected to be present that do not appear on the documentation), the generator is contacted and the issue addressed. Container data are compared to the waste profile data to ensure that the waste to be shipped is as described on the profile. Screening provides a means to minimize the potential for acceptance of incorrectly identified waste.

### 9.1 Paperwork Review.

Every shipment is reviewed to ensure that the waste meets the WAC. If the shipment information is verified to be acceptable, the operating organization determines if any of the waste containers are required to be RTR'd.

### 9.2 Visual inspection and Chemical Screening Documentation Review.

For those waste streams that underwent verification at the generator's or TSDFs site, the verification documentation will be reviewed for completeness.

### 9.3 RTR Container Selection.

A list of waste packages with discrete identification numbers is required for random selection of containers to undergo RTR verification. The operating organization will follow procedures to select containers for RTR verification.

## 10.0 Waste Acceptance and Verification Procedures Upon Arrival of Shipment

Waste containers undergo verification upon arrival at the NTS. The following section provides a description of verification methods available at the NTS. When a conformance issue exists, a determination is made regarding the acceptability of the container, and appropriate action is taken based on the severity of the issue.

### 10.1 RWMS Paperwork Review

Rationale: Each shipment's paperwork is reviewed for completeness.

Method: The shipment is documented on a shipping/receiver log upon arrival at the Area 5 RWMS. Operations personnel perform a completeness review of the generator's required shipping paperwork which may include: a bill of lading, uniform hazardous waste manifest or equivalent state-of-generation manifest, LDR form, the original package storage and disposal request, and the original waste certification statement. Paperwork review and inspection requirements are documented on a shipment checklist.

Failure Criteria: A shipment fails inspection if there is (1) missing paperwork, (2) a discrepancy in the number of containers in the shipment, and/or (3) incorrect paperwork.

## 10.2 Area 5 RWMS Visual Examination

Rationale: Each container in the shipment is inspected in its entirety for possible damage or content leakage, complete marking and labeling, and intact TIDs as required. This is to ensure that the shipment (1) is received in good condition, (2) has the container(s) corresponding to the shipping papers, (3) has not been opened after physical screening is performed, and (4) is complete.

Method: When the container is off-loaded, markings, and labels are inspected and compared with the associated manifests. Container inspections are individually recorded on a waste package checklist. These checklists, along with the shipment checklist, are recorded and filed with the shipping paperwork

Failure Criteria: A container fails inspection if (1) there is evidence of leaking or breaching of the container, (2) incorrect container numbers, (3) incorrect marking or labeling, (4) missing marking or labeling, (5) broken or missing TID, and/or (6) discrepancy in TID number.

## 10.3 Area 5 RWMS RTR Examination

See Section 8.1.5.2 for the rationale, method, and failure criteria for the RTR.

## 11.0 Manifest Tracking and Record Keeping

The generator will contact the operating organization, prior to shipment of waste to arrange for waste verification and shipment. The generator will be responsible for the identification and tracking of the waste shipment. Upon receipt of waste, each shipment will be screened according to the above sections. Once a shipment is accepted, the manifest will be:

- a. Signed and dated on each copy to certify that the LLMW covered by the manifest was received;
- b. Any significant discrepancies noted on each copy;
- c. One signed copy given to the transporter;
- d. Within 30 days of delivery, a copy will be sent to the generator; and
- e. Will be retained at the facility for at least three years from date of delivery.

The following data will be maintained in the operating record in accordance with the records inventory and disposition schedule:

- a. The RWMS will maintain the waste profile, supporting documentation, shipping documentation, and any associated QA/QC data.
- b. Errors and omissions (e.g., transcription errors, typographical errors, errors in calculations) shall be corrected as information becomes available. These corrections shall be in ink and initialed and dated by the person making the correction.
- c. Documentation from sampling events.

## 12.0 Sampling and Analysis

LLMW must be sampled and analyzed by the test methods specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA Publication SW-846 [SW-846]) or approved equivalent methods. Analysis must be performed by an accepted laboratory as discussed in Section 12.4. The recommended sampling devices, EPA methods, parameters, and rationale for parameter selection for characterization and LDR requirements are identified in Tables 2 and 3.

Compliance with LDR [40 CFR 268.40] for wastes that have a treatment standard expressed as constituent concentrations in wastes can be shown using any appropriate method. If the waste treatment standard is expressed as constituent concentrations in waste extracts, then the Toxicity Characteristic Leaching Procedure (TCLP), must be performed.

For other parameters or methods not otherwise specified, the following are acceptable sources of testing methods (standard methods):

- a. The most recently promulgated version of EPA SW-846.
- b. Other current EPA methods, as applicable to the matrix under evaluation.
- c. Standard Methods for the Examination of Water and Wastewater, American Public Health Association (APHA), American Water Works Association, Water Environment Federation.
- d. Annual Book of ASTM Standards, American Society for Testing and Materials.
- e. AOAC Official Methods of Analysis, AOAC (Association of Official Analytical Chemists), International.

Specific sampling procedures and techniques depend on both the nature of the waste and type of packaging. Waste samples are treated and preserved as necessary to protect the sample. Recommended treatment, preservation techniques, and holding times are stated in SW 846.

Table 2: Sampling Devices

Material	Equipment
Liquid	Coliwasa, Dipper, Weighted Bottle
Soil and Soil-like Material	Thief, Trier, Scoops, Shovels, Auger, Veihmeyer Soil Sampler

Table 3: EPA Methods, Parameters, and Rationale for Parameter Selection

EPA Method <sup>1</sup>	Parameter	Rationale for Parameter Selection
9040, 9041, or 9045	PH	To assign hazardous waste number and identify prohibited waste.
ASTM D 93-79, D 93-80, D 3278-78, or 1030	Ignitability	To assign hazardous waste number and identify prohibited waste.
9014, 9034	Reactivity	To assign hazardous waste number and identify prohibited waste.
9095	Free liquids	To assign hazardous waste number and identify prohibited waste.
1311 <sup>2</sup>	Toxicity characteristic leaching procedure (TCLP)	To assign hazardous waste numbers and verify compliance with LDR treatment standards.
2540C	Total Suspended Solids	To determine whether LDR wastewater or non-wastewater treatment standards apply.
6010, 6020, or 7000 series	TCLP metals analysis	To assign hazardous waste numbers and verify compliance with LDR treatment standards.
8000 series	Volatiles analysis	To assign TC hazardous waste numbers and verify compliance with LDR treatment standards.
8000 series	Semi volatiles analysis	To assign TC hazardous waste numbers and verify compliance with LDR treatment standards.
8000 series	Halogenated organic compounds (HOCs) <sup>3</sup>	To verify applicability of LDR requirements of soil.
8082	Polychlorinated biphenyls (PCBs)	To identify prohibited items, meet Toxic Substances Control Act (TSCA) requirements and verify compliance with LDR treatment standards.

<sup>1</sup> Referenced methods are from Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, SW-846 unless otherwise noted. More current SW-846 methods may be substituted for any method listed in this column.

<sup>2</sup> An alternative to performing Method 1311 is to perform total contaminant concentration analysis and assume all contaminants to be leachable using the Toxicity Characteristic Leachate Procedure (TCLP) method. For purposes of this requirement, the total results based on a dry weight basis shall be divided by a conversion factor of 20 mg/kg in order to determine whether a TCLP limit has the possibility of being exceeded.

<sup>3</sup> As specified in 40 CFR 268.2(a) and Appendix III to 40 CFR 268.

### 12.1. Sampling Equipment and Preservation

Table 2 contains waste forms and sample equipment used to sample referenced waste. Sample preservation follows EPA SW 846 protocol.

## 12.2 Sampling Methods

The appropriate personnel are responsible for arranging sampling and laboratory support. Samples are processed at laboratories qualified to perform analysis of waste samples (refer to 12.4). The operating organization will determine the proper sampling protocol (simple random, stratified simple random, etc) for the grab sample(s) based on the waste type and form. Table 3 illustrates the EPA methods, parameters, and the rationale for parameter selection.

Sampling typically includes the following:

- a. Obtain a unique sample identification number and complete the sample tag before sampling.
- b. Obtain a precleaned sampling device and sample bottles.
- c. For sampling liquid waste, a Coliwasa sampler or pipette is used to sample for two-phase liquids. Homogeneous liquids in small containers are poured into a sample bottle.
- d. For sampling solid waste, a scoop, trier, or hand auger is used to obtain a sample of the waste. For large containers of waste, composite several augers or scoops to ensure samples are representative.
- e. Exterior surfaces of the sample bottles are wiped clean.
- f. Attach sample label to sample bottles.
- g. Complete the chain of custody forms.
- h. Place samples in an appropriate receptacle for transfer to the laboratory. If appropriate, include equipment for temperature sensitive samples to preserve the integrity of the sample as required by EPA methods.
- i. Seal and mark the receptacle.
- j. Transfer receptacle to the analytical laboratory as appropriate to meet sample holding times.
- k. Properly clean and decontaminate nondisposable sampling equipment or package for return to central sampling equipment decontamination area according to onsite requirements.

## 12.3 Establishing QA and QC Procedures for Sampling

The operating organization maintains compliance with DOE Order 414.1C, Quality Assurance. Sampling personnel prepare a permanent log of sampling activities. A log of sampling activities is kept in accordance with EPA SW 846, Chapter 9. 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 method, container description, waste matrix, description of generating process, number and volume of samples, field observations, field measurements (e.g., percent lower explosive limit), laboratory destination, and signature. These log entries are made while sampling is performed. The logs or copies of logs are maintained by appropriate personnel after completion of sampling activities. A chain of custody record accompanies samples at all times.

Compliance with applicable industrial hygiene and safety standards is mandatory during sampling activities. Transportation of samples is performed in accordance with applicable DOT requirements.

The following QA/QC elements are used to ensure that sampling activities result in acceptable laboratory data:

- a. Sampling methods as defined by EPA SW 846, Chapter 9
- b. Appropriate sample containers and equipment for specific waste streams
- c. Samples numbered and labeled
- d. Traceable labeling system
- e. Field QA/QC samples
- f. Equipment calibration
- g. Chain of custody.

#### 12.4 Laboratories and Treatment Facilities

The DOE Consolidated Accreditation Program (DOECAP) provides audits of commercial mixed waste TSDFs and analytical laboratories. TSDFs and laboratories used by generators shall have a current DOECAP or equivalent audit.

DOECAP incorporates a national standard (statement of work/contracts) and reporting requirements consistent with user needs and regulatory requirements (ISO 17025 basis). Treatment facilities and laboratories providing support to DOE are required to be audited by DOECAP. DOECAP is a complex-wide consolidated audit program that uses a multi-checklist audit process. The checklists address the following areas:

- a. Industrial and Chemical Safety
- b. Environmental Compliance/Permitting
- c. Quality Assurance Management Systems
- d. Radiological Control
- e. Transportation Management
- f. Sampling and Analytical Data Quality
- g. Waste Operations

Each facility is audited annually to evaluate the effective implementation of the QA/QC program. QA and technical experts evaluate the facility through onsite observations and/or reviews of the following documentation: copies of the QA/QC documents, records of surveillances/inspections, audits, nonconformances, and corrective actions.

#### 12.5 Evaluation of Analytical Results

The acquired data need to be scientifically sound, of known quality, and thoroughly documented. The operating organization is responsible to ensure that data assessment or evaluation is completed. Data are assessed to determine compliance with the following:

Precision. The overall precision is the agreement between the collected samples (duplicates) for the same parameters, at the same location, subjected to the same preparative and analytical techniques. Analytical precision is the agreement between individual portions taken from the same sample, for the same parameters, subjected to the same preparative and analytical techniques.

Accuracy. Accuracy of the measurement system is evaluated by use of various kinds of QA samples, including, but not limited to, certified standards, in-house standards, and performance evaluation samples.

Representativeness. Representativeness addresses the degree to which the data accurately and precisely represent a real characterization of the waste stream, parameter variation at a sampling point, sampling conditions, and the environmental condition at the time of sampling.

Completeness. Completeness is the amount of usable data obtained from a measurement system compared to the total amount of data requested.

Comparability. Comparability is the confidence with which one data set can be compared to another. This usually is accomplished by using the same methods for each data set.

If the data is found to be insufficient the operating organization may require: re-analysis, data validation and/or re-sampling.

### 13.0 Acceptable Knowledge

Acceptable knowledge is a characterization technique that relies on the generator's knowledge of the physical and chemical properties of the materials and the waste generation processes. It includes knowledge of the fate of those materials during and subsequent to the process, and the associated administrative controls. When collecting documentation on a waste stream, the operating organization must determine if the information provided by the generator is acceptable knowledge. Acceptable knowledge requirements are met using any one or combination of the following types of information:

- a. Mass balance from a controlled process that has a specified input and output
- b. Material safety data sheet on chemical products
- c. Test data from a surrogate sample
- d. Analytical data on the waste or a waste from a similar process.

In addition, acceptable knowledge requirements can be met using a combination of analytical data or screening results and one or more of the following:

- a. Interview information
- b. Logbooks
- c. Procurement records
- d. Qualified analytical data
- e. Radiation work package
- f. Procedures and/or methods
- g. Process flow charts
- h. Inventory sheets
- i. Vendor information
- j. Mass balance from an uncontrolled process (e.g., spill cleanup)
- k. Mass balance from a process with variable inputs and outputs (e.g., washing/cleaning methods).

Acceptable knowledge may be used for determining:

- a. Hazardous waste constituents
- b. Wastes that are listed under 40 CFR 261.31, 261.32, and 261.33
- c. UHCs
- d. Necessary confirmatory sampling
- e. LDR compliance with technology based standards

If the information is sufficient to quantify the constituents of regulatory concern and to determine waste characteristics as required by the regulations and waste acceptance criteria (WAC), the information is considered acceptable knowledge. If the information is not sufficient, sampling may be required. Waste must conform to requirements found in this WAP, the EPA codes found in Table 1, and the NTSWAC.

#### 14.0 Issue Resolution

Conformance issues identified during verification could result in a waste container that does not meet the WAC. If a possible conformance issue is identified, the following actions are taken to resolve the issue:

- a. The operating organization compiles all information concerning the possible conformance issue(s).
- b. The generator is notified and requested to supply additional information that could assist in the resolution of the concern(s). If the generator supplies information that resolves the concern(s) identified, no further action is required.
- c. The operating organization and the generator discuss the conformance issue and identify the appropriate course of action to resolve the container/shipment in question;
- d. The operating organization has the following options (more than one may be used):
  - (1) suspend the waste stream, (2) suspend the generator's entire waste shipping program, (3) issue a CAR, (4) have the generator issue an internal non-conformance, (5) increase physical screening frequencies, (6) ensure issue is included during the next scheduled generator facility evaluation, (7) schedule a facility evaluation, (8) return waste container and/or shipment to a generator specified facility.
- e. On the issuance of a CAR, the operating organization requests the generator to provide a corrective action plan (CAP) that clearly states the reason for the failure and describes the actions to be completed to prevent reoccurrence.
- f. The operating organization reviews the CAP for adequacy.
- g. Issues and their corresponding resolutions will be recorded and tracked by the operating organization.
- h. On resolution of the initial conformance issue, the operating organization requests the generator to provide a corrective action plan (CAP) that clearly states the reason for the failure and describes the actions to be completed to prevent reoccurrence.
- i. The generator may request a reduction in verification of unaffected waste streams. This request must be accompanied by a justification that identifies why this waste stream(s) would not exhibit the same conformance issue.
- j. The operating organization reviews the CAP and waste stream justification for adequacy. If the waste stream justification is accepted, the operating organization adjusts the frequency.

## 15.0 Reducing the Physical Screening Frequency

Physical screening percentages may be reduced based on the waste stream compliance with the waste profile, shipping documentation, and verification results. At no time will the frequency be reduced below 5 percent.

## 16.0 Frequency of Analysis

### 16.1 Facility Evaluations

Generators are evaluated according to the NTSWAC. CARs may be issued for quality affecting problems. These CARs must be answered by a CAP identifying the root causes, corrective actions, and actions to preclude reoccurrence. Dependent upon the severity of the problem(s), the NNSA/NSO may:

- a. Allow continued shipment of all approved waste streams.
- b. Suspend one or more waste streams from shipments,
- c. Suspend the entire waste shipment program.

### 16.2 Waste Profiles

Generators will perform an initial characterization or identification analysis prior to submitting a waste profile. The following are examples of when an analysis may be repeated:

- a. Requested by the operating organization due to insufficient data,
- b. After one year (365 days) from waste profile approval (see Exhibit 4),
- c. The generating process has changed,
- d. On submission of a waste profile revision regarding characterization changes (if revision is submitted within one year of previous evaluation),
- e. If inspection or analysis indicates the waste received does not match the waste profile and/or shipment documentation.

If the generator has informed the operating organization of a change in the waste generation process or if the waste may not conform to the waste profile, the waste must be re-profiled and is re-reviewed.

When a waste profile is re-evaluated, the operating organization could request the generator to do one or more of the following:

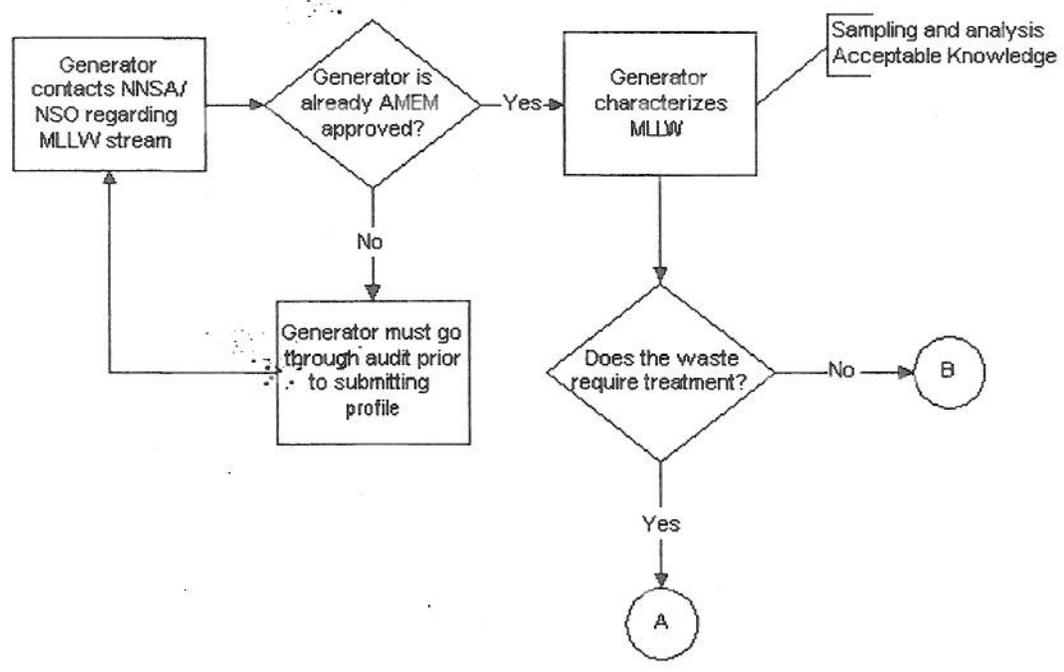
- a. Verify that the current waste profile is accurate
- b. Supply a new waste profile
- c. Submit a sample for analysis
- d. Cancel the waste profile.

# **Exhibit 1**

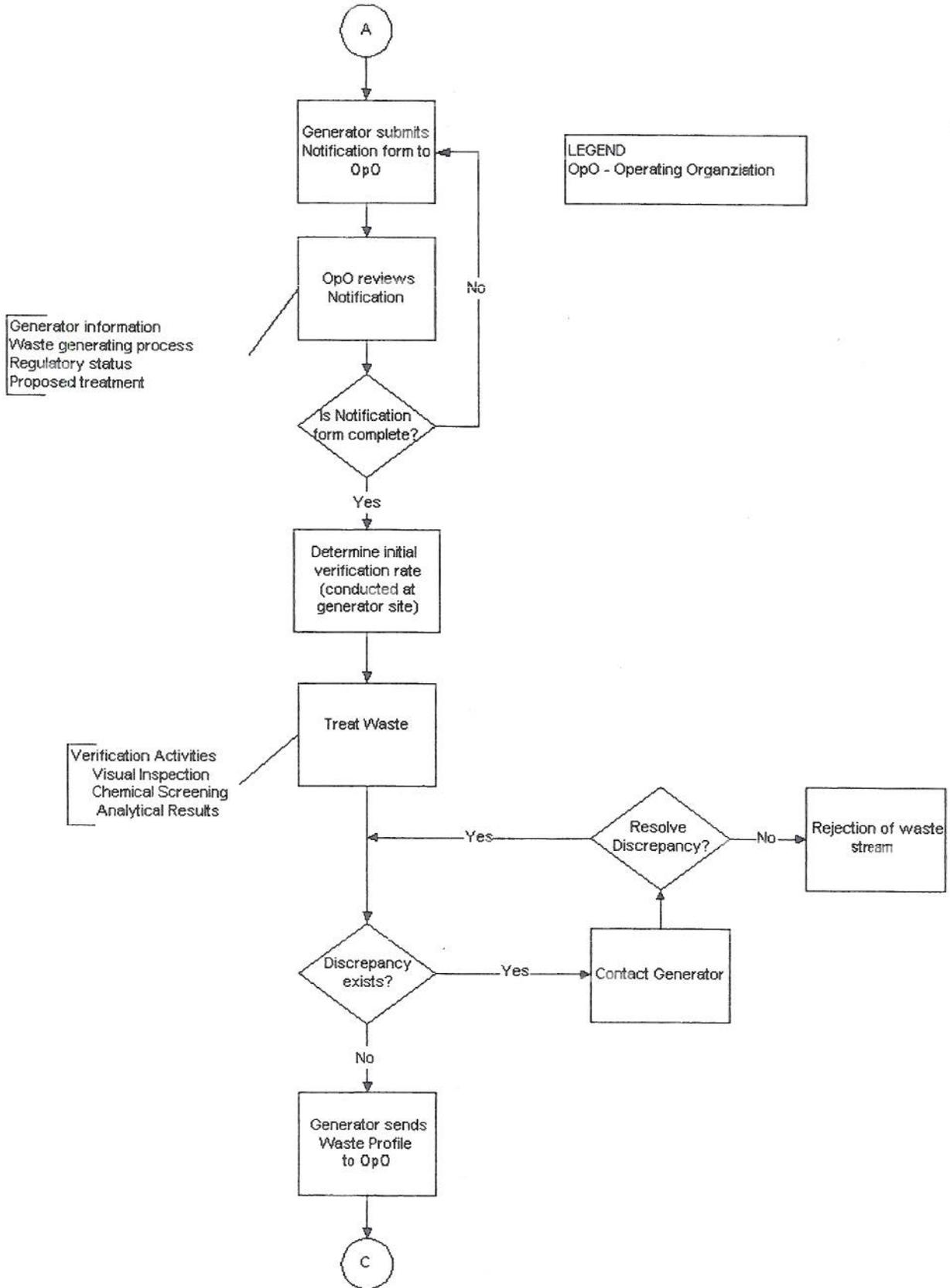
## **Process Flow Diagrams**

# WASTE GENERATOR APPROVAL

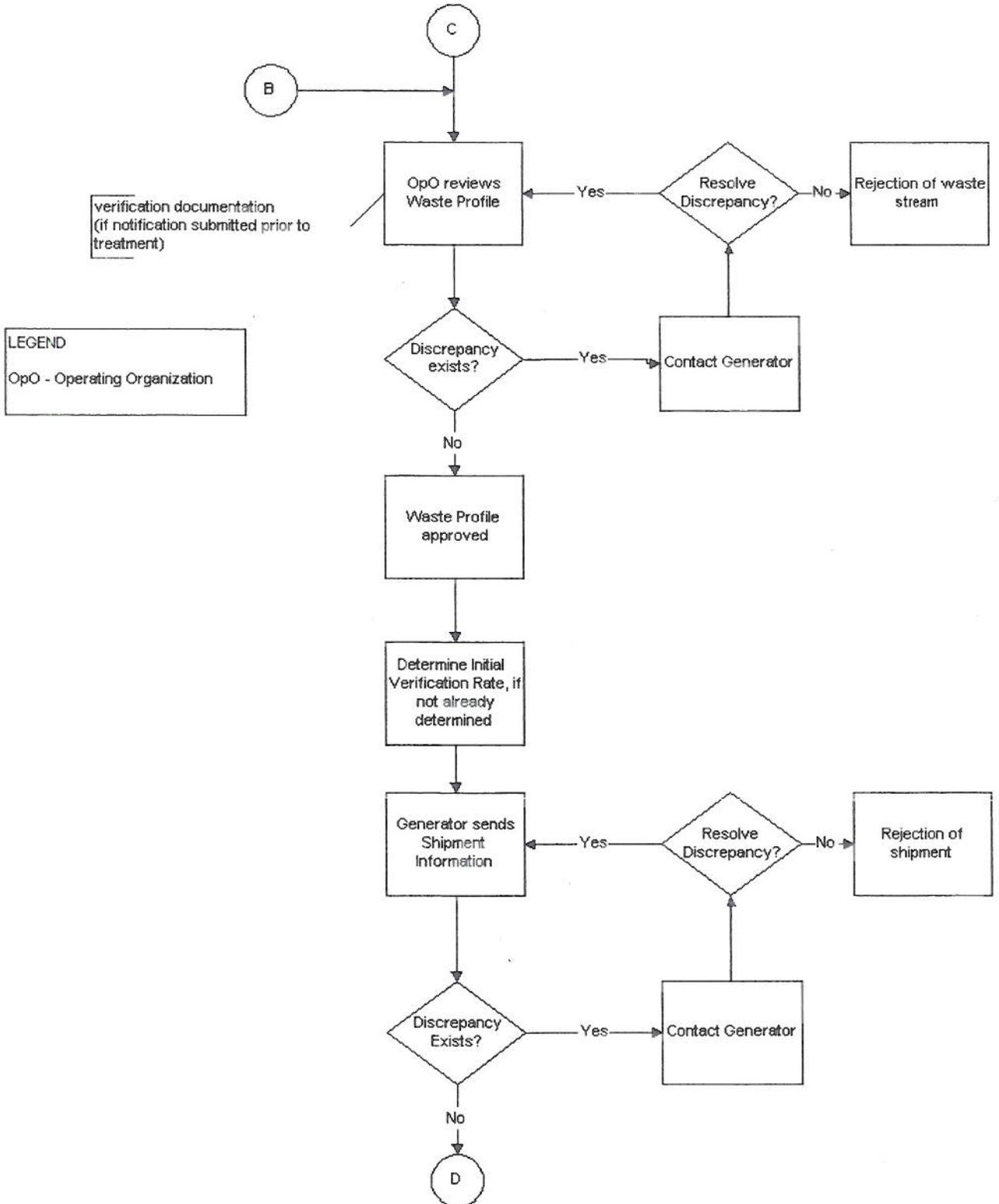
AMEM - Assistant Manager Environmental Management  
NNSA/NSO - National Nuclear Security Administration Nevada Site Office  
MLLW - Mixed low-level radioactive waste



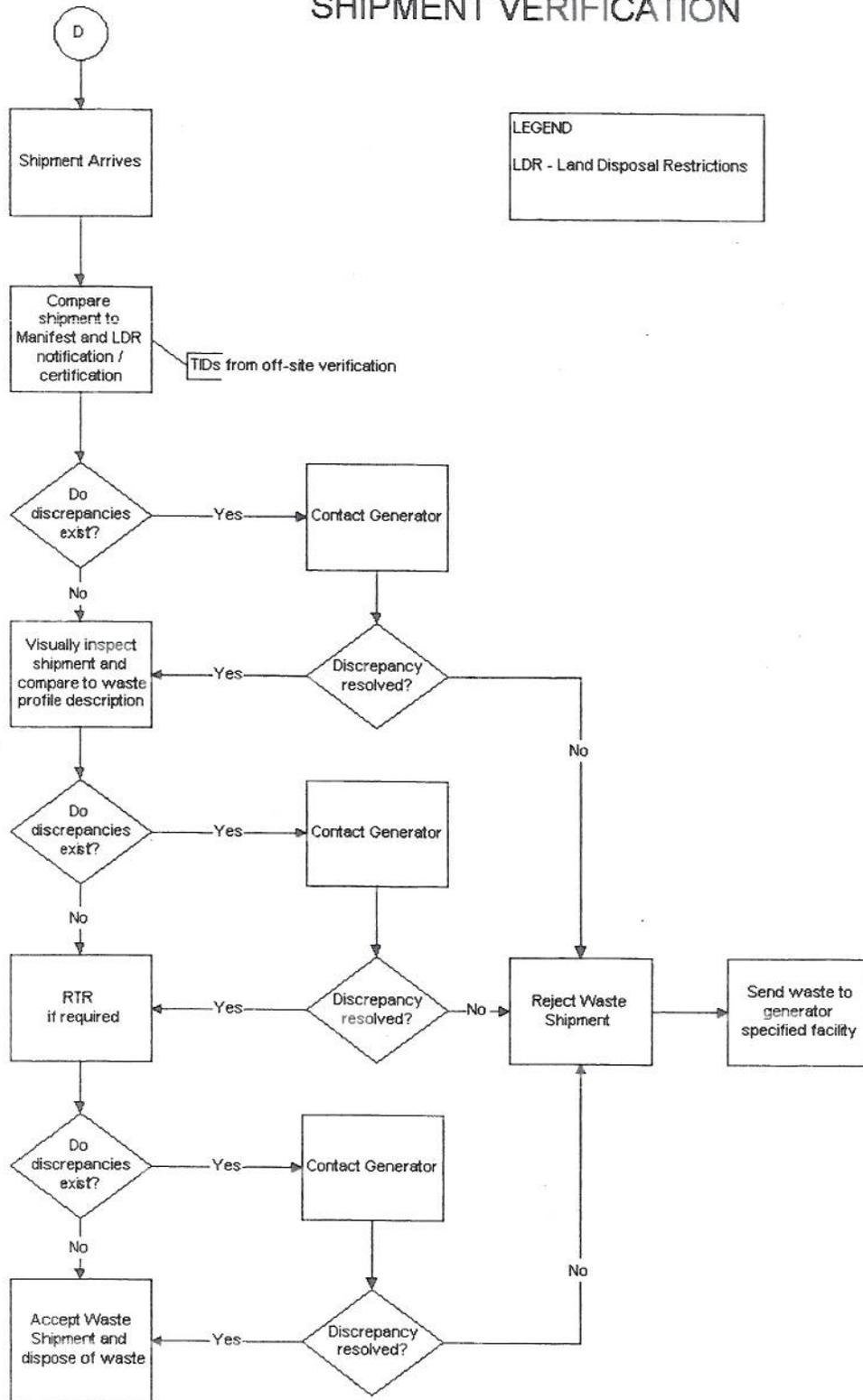
# PRE-TREATMENT NOTIFICATION



# POST TREATMENT PROFILE



# SHIPMENT VERIFICATION



**Exhibit 2**

**NTS Pre-Treatment Notification  
Form for Mixed Waste  
Example**





**Exhibit 3**

**Waste Stream Recommendation Example**

## Waste Stream Recommendation Example

**General Information:**

**Generator Facility:** \_\_\_\_\_  
**Waste Stream Title:** \_\_\_\_\_  
**Waste Profile** \_\_\_\_\_  
**No./Rev.:** \_\_\_\_\_

**Summary**

**Review:** \_\_\_\_\_  **Limited**

**Recommendation:**

- Approved – NTS and Hanford  Reject
- Approved – NTS ONLY  Approved – HANFORD ONLY  Conditional Approval
- Low-Level Waste Subject to Physical Verification
- RTR  Visual
- Mixed Low-Level Waste Subject to Physical Verification (minimum 5% required).  
Estimated number of mixed waste containers: \_\_\_\_\_
- RTR  Visual Verification Frequency:  Five Percent  Other: \_\_\_\_\_ Percent
- Mixed Low-Level Waste Subject to Chemical Screening (requires minimum 10% of physically inspected containers)  
Verification Frequency:  Ten Percent  Other: \_\_\_\_\_ Percent  Exempt
- Special Instructions (See Summary or Waste Profile)

**WARP Participants:**

RWAP Task Manager	Signature	Organization	Date
WARP Lead	Signature	Organization	Date
Disposal Operations Representative	Signature	Organization	Date
Performance Assessment Representative	Signature	Organization	Date
Criticality Safety Review, SME	Signature	Organization	Date
Hanford Representative	Signature	Organization	Date
Review Lead	Signature	Organization	Date

### Mixed Waste Profile Annual Certification Example

Waste Profile Number:

Waste Profile Revision No.:

Expiration Date:

Facility:

WCO:

The above Mixed Waste Profile (MWP) is about to expire. The NTSWAC requires generators to recertify MWPs on an annual basis. No waste may be shipped under this profile after the expiration date unless it has been recertified or a new waste profile has been submitted and approved.

Please indicate your preference by checking the appropriate box below. If the waste stream has not changed significantly and the waste profile is still accurate, recertify by checking the third box below, providing the additional information requested, signing the certification statement, and returning this form to NNSA/NSO WMP. Upon approval, a letter will be sent which authorizes continued shipment of the waste stream for up to an additional year.

Check  
Appropriate  
Box

- This waste profile is no longer needed. Please cancel the waste profile.
- There have been significant changes to this waste stream. I understand that this waste stream cannot be shipped to the NTS until a revised or new profile is approved. I will revise it or submit a new waste profile.
- I want to recertify the waste profile. I have reviewed the revision no. \_\_\_\_\_ and certify that it is current, complete, and accurate description of the waste stream and the methods employed to ensure that the waste meets the NTSWAC.

If you checked the third box above, answer the following questions to confirm that the waste stream has not changed significantly. Significant changes will require a revision to the waste profile.

- |                             |                              |   |
|-----------------------------|------------------------------|---|
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Has the waste generating process changed?   |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Have the methods used to perform radiological characterization changed?                                 |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Have the methods used to perform physical/chemical characterization changed?                            |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Have any of the RCRA or state waste codes changed?  |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Has the LDR status (subcategories, treatment, etc.) changed?  |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Have there been any other changes to the waste stream that could affect management of the waste at NTS? |
| <input type="checkbox"/> No | <input type="checkbox"/> Yes | Do you have any new waste analysis data that confirms or improves your waste characterization?          |

If you checked any "Yes" boxes, please explain below and attach additional sheets as necessary.

Certification: I certify that, to the best of my knowledge, the information provided on this form and any attached documentation is accurate and complete.

WCO Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Print Name: \_\_\_\_\_