# Attachment 2
# Waste Analysis Plan (WAP)
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# C.1 Introduction

The purpose of this Waste Analysis Plan (WAP) is to provide guidance on the necessary waste characterization, sampling methodologies, analytical techniques, and overall procedures which are undertaken during hazardous waste management activities including treatment, storage and/or disposal. Treatment and disposal activities include but are not limited to stabilization[1], solidification, chemical oxidation, chemical reduction, neutralization, deactivation, evaporation, macro/micro encapsulation, adsorption (clay, carbon, etc.) and subsequent landfilling of hazardous and non-hazardous wastes. As a general rule, USEI uses the term stabilization in the more industry wide generic sense, which implies the treatment of a waste material to make it physically and chemically stable. In this sense, stabilization consists of those treatment processes (including but not limited to all the treatment types described above), which are used to meet applicable LDR treatment standards or other applicable standard(s). The specific treatment technologies utilized by USEI are defined in more detail in Section C.8.3. Process operation descriptions for hazardous waste management units are provided in Section D.10. Specifically and in accordance with IDAPA 58.01.05.008 {40 CFR § 264.13(b)}, this plan delineates the following:

- Waste determination procedures (Section C.2);
- Waste Acceptance Criteria and associated review procedures for radioactive materials (Section C. 3);
- Sampling Methodologies and associated sampling equipment (Section C.4);
- The parameters for which each hazardous waste will be analyzed and the rationale for the selection of these parameters [i.e.; how analysis for these parameters will provide sufficient information on the properties of the waste (Section C.5)];
- Test methods which will be used to test for these parameters (Section C.5);
- The frequency with which the initial analysis of the waste will be reviewed or repeated to assure the analysis is accurate and up to date (Section C.6.3);
- The methods which will be used to meet the additional waste analysis requirements for specific waste management methods as specified in IDAPA 58.01.05.008 {40 CFR § 264.17, 264.314, 264.341, 268.7} (Section C.5.2);
- Waste receipt and acceptance procedures (Section C.6 & C.7);
- The types of treatment technologies (Section C.8);
- The treatment units (Section C.9);
- The quality control and quality assurance procedures (Section C.10); and
- Other general considerations for treatment, storage and disposal operations.

It is USEI's policy that all wastes managed on-site will adhere to the procedures outlined in this WAP. This document will ensure facility compliance with applicable permits and regulations. For the purpose of

[1] The term "stabilization" is defined by the EPA under 40 CFR 268.42 as "Stabilization with the following reagents (or waste reagents) or combination of reagents (1) Portland Cement; or (2) lime/pozzolans (e.g., fly ash and cement kiln dust) – this does not preclude the addition of reagents (e.g., iron salts, silicates, and clays) designed to enhance the set/cure time and/or compressive strength, or to overall reduce the leachability of the metal or organic. USEI uses the term Stabilization in a more generic sense to mean the treatment of a waste material to make it physically and chemically stable. In this sense, it consists of those processes, which make the material conform to applicable LDR treatment standards or other applicable standard(s).

implementation and performance of this WAP, "USEI" means any US Ecology Idaho laboratory, subsidiary/affiliated laboratory, or designated contract laboratory.

USEI maintains, as part of its WAP required records, generator/internally developed information. This documentation may be received, stored, transmitted, and/or retrieved electronically in addition to, or in lieu of, hard (paper) copy.

"Facility Management" includes the General Manager and the managers of the major facility functions, such as Laboratory, Technical, Operations, Health and Safety, Environmental, and/or their designees.

References are made throughout this plan to regulations promulgated by the EPA regarding waste analysis requirements for hazardous waste management facilities. These requirements are found in IDAPA 58.01.05.008 and 40 CFR Part 264, Subpart B, which have been adopted by reference in the rules of the Idaho Department of Environmental Quality (IDEQ). Unless otherwise specified herein, cited federal regulations have been adopted by the IDEQ. USEI strives to maintain full compliance with the hazardous waste regulations. New testing requirements, such as those promulgated under the Land Disposal Restrictions (LDRs), often become effective prior to the time WAP revisions can be formally executed and approved by all appropriate agencies. Accordingly, the WAP utilizes references to the most recent appropriate EPA and ASTM methods and analytical procedures. If WAP revisions are necessary because of a new regulatory rule, they will be submitted as appropriate within 90 days after their effective date.

# C.2 Waste Determination

Waste determinations will be conducted in accordance with IDAPA 58.01.05.006 {40 CFR § 262.11}. In general, generators are required to conduct waste determination as follows:

- Determine if the waste is excluded from regulation under IDAPA 58.01.05.005 {40 CFR § 261.4};
- Determine if the waste is listed as a hazardous waste in subpart D of IDAPA 58.01.05.005 {40 CFR Part 261};
- Determine if the waste is identified in subpart C of IDAPA 58.01.05.005 {40 CFR Part 261} by either testing the waste using analytical methods or applying knowledge of the hazard characteristics of the waste;
- Determine if the waste is regulated by a state other than Idaho and associated manifesting requirements; and
- If the waste is determined to be hazardous, the generator must refer to IDAPA 58.01.05.005/008/009/010/016 {40 CFR parts 261, 264, 265, 266, 268, and 273} for possible exclusions or restrictions pertaining to management of the specified waste.

The waste characterization on the Waste Profile Form (WPF) provides information concerning the distribution/concentration, as well as the characteristics of the waste components. An example of the WPF is provided in Figure C-1.

Certain generators will not utilize USEI's WPF and insist on using their own waste characterization form. This is often the case with large generators that are trying to reduce the amount of paperwork associated with the characterization process. Under these circumstances, USEI will transfer the waste characterization information to USEI's WPF and identify data deficiencies, if any. Any data deficiencies necessary for the treatment, storage and disposal of the waste will be added to USEI's WPF by contacting the generator and requesting the deficient information. USEI will then include both USEI's WPF and the generator supplied waste characterization form as part of the profile package.

When a waste shipment arrives on-site for treatment, storage, or disposal, a determination has usually been made by the generator that the waste is either:

- Excluded as a solid waste under IDAPA 58.01.05.005 {40 CFR § 261.4(a)};
- A listed hazardous waste, as defined in Subpart D of IDAPA 58.01.05.005 {40 CFR Part 261};
- A characteristic hazardous waste, as defined in Subpart C of IDAPA 58.01.05.005 {40 CFR Part 261};
- A solid waste, which is not hazardous waste, as defined by IDAPA 58.01.05.005 {40 CFR § 261.4(b)}; and
- A Corrective Action Management Unit (CAMU)-eligible waste, as defined by IDAPA 58.01.05.008 {40 CFR 264.552(a)(1) & (2)

# C.3 Waste Acceptance Criteria

## *C.3.1 Pre-acceptance Review*

The pre-acceptance protocol has been designed to ensure that only hazardous and radioactive material that can be properly and safely stored, treated and/or disposed of by USEI are approved for receipt at the facility. A two-step approach is taken by USEI. The first step is the chemical and/or radiological and physical characterization of the candidate waste stream by the generator. The second step is the pre-acceptance evaluation performed by USEI to determine the acceptability of the waste for receipt at the facility. Figure C.2 presents a logic diagram of the pre-acceptance protocol that is utilized at the facility.

## *C.3.2 Radioactive Material Waste Acceptance Criteria*

The following waste acceptance criteria are established for accepting radiological contaminated waste material that is not regulated under the Atomic Energy Act of 1954 ("AEA"), as amended. This may be accomplished by the following regulatory mechanisms; use of a general or specific exemption from regulation by the Nuclear Regulatory Commission (NRC) or an Agreement State; a Release from Radiological Control declaration by the Department of Energy (DOE); or a determination that 91(b) radioactive material is no longer regulated by the Department of Defense (DoD). Material may also be accepted if it is not regulated or licensed by the NRC or Agreement State or has been authorized for disposal by the IDEQ and is within the numeric waste acceptance criteria. Waste acceptance criteria are consistent with these restrictions.

The following five tables establish types and concentrations of radioactive materials that may be accepted. These tables are based on categories and types of radioactive material not regulated by the NRC, an Agreement State, the DOE, or the DoD for alternate disposal. The criteria are consistent with these restrictions and detailed analyses set forth in *Waste Acceptance Criteria and Justification for FUSRAP Material*, prepared by Radiation Safety Associates, Inc. (RSA) as subsequently refined, expanded and updated in *Waste Acceptance Criteria and Justification for Radioactive Material*, prepared by USEI.

Material may be accepted if the material has been specifically exempted from regulation by rule, order, license, license condition, letter of interpretation, or specific authorization under the following conditions: Thirty (30) days prior to intended shipment of such materials to the facility, USEI shall notify IDEQ of its intent to accept such material and submit information describing the material's physical, radiological, and/or chemical properties, impact on the facility radioactive materials performance assessment, and the

basis for determining that the material does not require disposal at a facility licensed under the AEA. The IDEQ will have 30 days from receipt of this notification to reject USEI's determination or require further information and review. No response by IDEQ within thirty (30) days following receipt of such notice shall constitute concurrence. IDEQ concurrence is not required for generally exempted material as set forth in Table C-4a.

Based on categories of waste described in the waste acceptance criteria, the concentration of the various radionuclides in the conveyance (e.g., rail car gondola, other container etc.) shall not exceed the concentration limits established in the WAC without the specific written approval of the IDEQ unless generally exempted as set forth in Table C-4a. Radiological surveys will be performed as outlined in Exempt Radiological Materials Procedure-01 (ERMP-01) to verify compliance with the WAC. If individual "pockets" of activity are detected indicating the limits may be exceeded, the RSO or RPS shall investigate the discrepancy and estimate the extent or volume of the material with the potentially elevated radiation levels. The RPS or RSO shall then make a determination on the compliance of the entire conveyance load with the appropriate WAC limits. If the conveyance is determined not to meet the limits, USEI will notify IDEQ's RCRA Program Manager within 24 hours of a concentration based exceedance of the facility WAC to evaluate and discuss management options. The findings and resolution actions shall then be documented and submitted to the IDEQ.

The radioactive material waste acceptance criteria, when used in conjunction with an effective radiation monitoring and protection program as defined in the USEI *Radioactive Material Health and Safety Plan* and *Exempt Radioactive Materials Procedures* provides adequate protection of human health and the environment. Included within this manual are requirements for USEI to submit a written summary report of all radioactive material waste receipts showing volumes and radionuclide concentrations and total activities disposed at the USEI site on a quarterly basis. The 4$^{th}$ quarter report of each year will also include an updated analysis of the cumulative impact on the facility performance assessment based upon the previous year's waste receipt.

These criteria and procedures are designed to assure that the highest potential dose to a worker handling radioactive material at USEI shall not exceed 400 mrem/year TEDE dose, and that no member of the public is calculated to receive a potential post closure dose exceeding 15 mrem/year TEDE dose, from the USEI program. TEDE is defined as the "Total Effective Dose Equivalent", which equals the sum of external and internal exposures. The public dose limit during operation activities is limited to 100 mrem/yr TEDE dose. An annual summary report of environmental monitoring results will be submitted to IDEQ by June 1$^{st}$ for the preceding year.

Materials that have a radioactive component that meets the criteria described in Tables C-1 through C-4c and are RCRA regulated material will be managed as described within this WAP for the RCRA regulated constituents.

### Table C-1: Unimportant Quantities of Source Material Uniformly Dispersed* in Soil or Other Media**

| | Status of Equilibrium | Maximum Concentration of Source Material | Sum of Concentrations Parent(s) and all progeny present |
|---|---|---|---|
| a | Natural uranium in equilibrium with progeny | <500 ppm / 167 pCi/g ($^{238}$U activity) | ≤ 3000 pCi/g |
| | Refined natural uranium | <500 ppm / 167 pCi/g ($^{238}$U activity) | ≤ 2000 pCi/g |
| | Depleted Uranium | <500 ppm / 169 pCi/g | ≤ 2000 pCi/g |
| b | Natural thorium | <500 ppm / 55 pCi/g ($^{232}$Th activity) | ≤ 2000 pCi/g |
| | $^{230}$Th (with no progeny) | 0.1 ppm / ≤2000 pCi/g | |
| | Any mixture of Thorium and Uranium | Sum of ratios ≤ 1**** | ≤2000 pCi/g |

*Refined Uranium includes $^{238}$U, $^{235}$U, $^{234}$U; $^{234}$Th, $^{234m}$Pa, $^{231}$Th

### Table C-2: Naturally Occurring Radioactive Material Other Than Uranium and Thorium Uniformly Dispersed* in Soil or Other Media**

| | Status of Equilibrium | Maximum Concentration of Parent Nuclide | Sum of Concentrations of Parent and All Progeny Present |
|---|---|---|---|
| a | $^{226}$Ra or $^{228}$Ra with progeny in bulk form [1] | 500 pCi/g | ≤ 4500 pCi/g |
| b | $^{226}$Ra or $^{228}$Ra with progeny in reinforced IP-1 containers [1] | 1500 pCi/g | ≤ 13,500 pCi/g |
| c | $^{210}$Pb with progeny( Bi & $^{210}$Po) | 1500 pCi/g | ≤ 4500 pCi/g |
| | $^{40}$K | 818 pCi/g | N/A |
| | Any other NORM | | ≤ 3000 pCi/g |

[1] Any material containing $^{226}$Ra greater than 222 pCi/g shall be disposed at least 6 meters from the external point on the completed cell.

### Table C-3: Particle Accelerator Produced Radioactive Material

| Acceptable Material | Activity or Concentration |
|---|---|
| Any particle accelerator produced radionuclide. | All materials shall be packaged in accordance with USDOT packaging requirements. Any packages containing iodine or volatile radionuclides will have lids or covers sealed to the container with gaskets. Contamination levels on the surface of the packages shall not exceed those allowed at point of receipt by USDOT rules. Gamma or x-ray radiation levels may not exceed 10 millirem per hour anywhere on the surface of the package. All packages received shall be directly disposed in the active cell. All containers shall be certified to be 90% full. |

*Average over conveyance or container. The use of the phrase "over the conveyance or container" is meant to reflect the variability on the generator side. The concentration limit is the primary acceptance criteria.

**Unless otherwise authorized by IDEQ, other Media does not include radioactively contaminated liquid (except for incidental liquids in materials). See radioactive contaminated liquid definition (definition section of Part B permit).

*** $$\frac{\text{Conc. of U in sample}}{\text{Allowable conc. of U}} + \frac{\text{Conc. of Th in Sample}}{\text{Allowable conc. of Th}} \leq 1$$

**Table C-4a: NRC Exempted Products, Devices or Items**

| Exemption 10 CFR Part* | Product, Device or Item | Isotope, Activity or Concentration |
|---|---|---|
| 30.15 | As listed in the regulation | Various isotopes and activities as set forth in 30.15 |
| 30.14, 30.18 | Other materials, products or devices specifically exempted from regulation by rule, order, license, license condition, concurrence, or letter of interpretation | Radionuclides in concentrations consistent with the exemption |
| 30.19 | Self-luminous products containing tritium, $^{85}$Kr, $^{3}$H or $^{147}$Pm | Activity by Manufacturing license |
| 30.20 | Gas and aerosol detectors for protection of life and property from fire | Isotope and activity by Manufacturing license |
| 30.21 | Capsules containing $^{14}$C urea for *in vivo* diagnosis of humans | $^{14}$C, one µCi per capsule |
| 31.12 | General License for certain items and self-luminous products containing Radium 226 | As set forth in 31.12 and see #4 under Additional information below |
| 40.13(a) | Unimportant quantity of source material: see Table C-1 | ≤0.05% by weight source material |
| 40.13(b) | Unrefined and unprocessed ore containing source material | As set forth in rule |
| 40.13(c)(1) | Source material in incandescent gas mantles, vacuum tubes, welding rods, electric lamps for illumination | Thorium and uranium, various amounts or concentrations, see rules |
| 40.13(c)(2) | (i)Source material in glazed ceramic tableware<br><br>(ii)Piezoelectric ceramic<br><br>(iii) Glassware not including glass brick, pane glass, ceramic tile, or other glass or ceramic used in construction | ≤20% by weight<br><br>≤2% by weight<br><br>≤10% by weight |
| 40.13(c)(3) | Photographic film, negatives or prints | Uranium or Thorium |
| 40.13(c)(4) | Finished product or part fabricated of or containing tungsten or magnesium-thorium alloys. Cannot treat or process chemically, metallurgically, or physically. | ≤4% by weight thorium content. |
| 40.13(c)(5) | Uranium contained in counterweights installed in aircraft, rockets, projectiles and missiles or stored or handled in connection with installation or removal of such counterweights. | Per stated conditions in rule. |
| 40.13(c)(6) | Uranium used as shielding in shipping containers if conspicuously and legibly impressed with legend “CAUTION RADIOACTIVE SHIELDING – URANIUM” and uranium incased in at least 1/8 inch thick steel or fire resistant metal. | Depleted Uranium |
| 40.13(c)(7) | Thorium contained in finished optical lenses | ≤30% by weight thorium, per conditions in rule. |
| 40.13(c)(8) | Thorium contained in any finished aircraft engine part containing nickel-thoria alloy. | ≤4% by weight thorium, per conditions in rule. |

**Table C-4b: Materials Specifically Exempted by the NRC or NRC Agreement State**

| Exemption | Materials | Isotope, Activity or Concentration* |
|---|---|---|
| 10 CFR 30.11** | Byproduct material including production particle accelerator material exempted from NRC or Agreement State regulation by rule, order, license, license condition or letter of interpretation may be accepted as determined by specific NRC or Agreement State exemption.*** | Byproduct material at concentrations consistent with the exemption |
| 10 CFR 40.14** | Source material exempted from NRC or Agreement State regulation by rule, order, license, license condition or letter of interpretation may be accepted as determined by specific NRC or Agreement State exemption.*** | Source material at concentrations consistent with the exemption. |
| 10 CFR 70.17 | Special Nuclear Material (SNM) exempted from NRC regulation by rule, order, license, license condition or letter of interpretation may be accepted as determined by specific NRC or Agreement State exemption.*** | SNM at concentrations consistent with the exemption. |

*Sum of all isotopes up to a maximum concentration of 3,000 pCi/gm.

** Alternate disposals authorized by Agreement States also require an NRC exemption for the purposes of disposal in the State of Idaho.

*** Similar material not regulated or licensed by the NRC may also be accepted. Sum of all isotopes up to a maximum concentration of 3,000 pCi/gm. IDEQ shall be notified prior to the receipt of Special Nuclear Material not regulated or licensed by the NRC.

**Table C-4c Material Released by Other Government Agencies**

| Exemption | Materials | Isotope, Activity or Concentration* |
|---|---|---|
| US DOE | Radioactive materials that have been released or cleared from radiological control | Radioactive materials at concentrations consistent with the Release** |
| US DoD | Radioactive materials determined not to be regulated under the AEA under authority granted to the DoD in Section 91(b) of the AEA of 1954, as amended | Radioactive materials at concentrations consistent with the Authorization** |

*Sum or all isotopes up to a maximum of 3,000 pCi/gm.

**May include byproduct materials, source materials and special nuclear material as defined in the AEA of 1954 as amended. NORM and Particle Accelerator Produced Radioactive Material may also be accepted under Tables C.2 and C.3, as part of these Releases and Authorizations.

Additional Information for USEI's Waste Analysis Plan

1. US Ecology Idaho, Inc. (USEI) may receive contaminated materials or other materials as described in Tables C-1 - C-4b above. USEI may not accept for disposal any material that by its possession would require USEI to have a radioactive material license from the Nuclear Regulatory Commission (NRC).

2. Unless approved in advance by USEI and IDEQ, average activity concentrations may not exceed those concentrations enumerated in Tables C-1 and C-2. Additionally, for Tables C-1 and C-2, individual pockets of material may exceed the WAC for the radionuclides present as long as the average concentration of all radionuclides within the package or conveyance remains at or below the WAC and the highest dose rate measured on the outside of the unshielded package or conveyance does not exceed those action levels enumerated in ERMP-01.

3. Other items, devices or materials listed in Table C-4a, which are exempted in accordance with 10 CFR Parts 30, 40 or equivalent Agreement State regulations or 10 CFR Part 70 may be accepted at or below the activities (per device or item) or concentrations specified in those exemptions.

4. 10CFR20.2008 authorizes disposal of certain byproduct material as defined in Section 11.e(3) and 11.e(4) of the Atomic Energy Act, as amended, at disposal facilities authorized to dispose of such material in accordance with any Federal or State solid or hazardous waste law, as authorized under the Energy Policy Act of 2005.

5. The generator of particle accelerator produced waste must specify that the waste meets applicable acceptance criteria.

6. In accordance with permit requirements, notification of any exceedance of the WAC will be provided to the RCRA Program Manager within 24 hours, in accordance with the permit.

# C.4 Sampling Methodology

Sampling is performed by the generator and/or their representatives to make the initial waste determination and/or by USEI to identify incoming waste shipments. Waste generators are referred to IDAPA 58.01.05.005 {40 CFR Part 261}, Appendix I, II and III for sampling procedures. IDAPA 58.01.05.005 {40 CFR Part 261, Appendix I, II and III} describes sampling and analysis method selection procedures generators should consult when determining the specific sample analysis situation. Sampling is usually conducted as described in EPA document SW-846.
The sampling strategy employed for a given WAP activity is dependent on the nature of the waste being sampled, the type of container/vehicle in which it has been shipped, or the type of hazardous waste management unit in which the waste resides. Hazardous waste is received at the facility in various containers/vehicles including, but not limited to, bulk tanks, end dump trucks, drums, and boxes. Inside the facility, hazardous wastes are contained in landfills, surface impoundments, tanks, waste bins, containers, and other hazardous waste management units. Access to the container/vehicle or hazardous waste management unit influences sampling strategy.

This section presents sampling methodologies to be utilized by USEI personnel when collecting representative samples for analysis pursuant to IDAPA 58.01.05.008 {40 CFR §§264.13(a), 264.13(b), and 264.13(c)}.

The waste shipment is inspected, sampled, and/or analyzed to ensure it matches the overall identity of the waste designated on the accompanying manifest (or shipping paper) and the pre-acceptance paperwork (WPF, etc.). If examination indicates strata in the waste, then each layer may be composited in proportion to its estimated volume or analyzed separately.

The sampling equipment and procedures described in this WAP represent USEI's recommended sampling protocol for general types of waste materials and containment. Specific waste materials or shipments may require different sampling techniques as outlined in the Waste Analysis at Facilities That Generate, Treat, Store, and Dispose of Hazardous Wastes: A Guidance Manual, USEPA OSWER 9938.4-03, April 1994. Therefore, deviations from the recommended protocol do not constitute violations of acceptable sampling practices or conditions of this WAP. USEI personnel follow the QA/QC procedures outlined in Section C.10 when collecting samples for characterization.

## *C.4.1 Sampling Materials*

At a minimum, the methodologies utilized for specific materials correspond to those referenced in IDAPA 58.01.05.005 {40 CFR Part 261, Appendix I}. The types of sampling methods and the most common equipment utilized for different materials are presented in the following table

**Table C-5 Sampling Methods and Equipment**

| Material | Equipment |
|---|---|
| Extremely viscous liquid | Thief or COLIWASA/tube sampler |
| Crushed or powdered material | Tube sampler, trier, auger, scoop, or shovel |
| Soil-like material | Tube sampler, trier, auger, scoop, or shovel |
| Fly ash-like material | Tube sampler, trier, auger, scoop, or shovel |
| Containerized liquids | COLIWASA/tube sampler, weighted bottle, cup, bomb, or tank sampling port |

## *C.4.2 Sampling of Containers*

USEI has instituted specific methodologies for taking samples from various container types. The type of container may be stationary or transportable, such as drums, tanks, portable transport units (e.g., tote bins, drums, roll-off boxes, lugger boxes), tankers, or dump-type trucks. Sampling devices are selected depending on the size and type of the container and on the specific material involved.

Access to a container influences the location from which samples can be taken. Specific sampling procedures are dependent on both the distribution and the nature of the waste components in the container. Due to these variations, minor modifications may be needed to the recommended sampling procedure in order to obtain a sample.

### C.4.2.1 Sampling Containers and Tanks

Sampling small containers (e.g., drums, boxes, cartons, & other small units) varies with the nature of the waste. For flowable materials, the sampling device of choice is either a Coliwasa or tubing (or other device noted in Table C-5). For non-flowable wastes, a tubing or trier is typically used to obtain a representative sample (or other device noted in Table C-5).

Large containers and tanks of flowable materials and bulk containers of solid materials may be either stationary or mobile. Liquids may be sampled with Coliwasa, tubing, weighted bottle, or bomb sampler to allow for sampling at various depths. Tank sampling may be accomplished through ports or taps located along the side of the tank or sampling through pumps or fittings at the tank inlet or outlet.

Under some circumstances, multiple samples collected from a single container/tank or hazardous waste management unit are composited prior to analysis. For example, multiple point samples obtained from a bulk truckload can be composited so long as there are no obvious physical differences among the samples. In all cases, wastes exhibiting distinctly different visual physical characteristics that are inconsistent with the approved WPF and/or Internal Control Form (ICF) are sampled and analyzed independently.

## *C.4.3 Compositing Samples*

Compositing of samples is conducted at the facility laboratory. Each composited sample is composed of equal portions, by weight, of each sample. The individual sample portions are combined and mixed until homogenous (i.e., the sample visually appears uniform in texture, particle size distribution, and color). The weight of sample portions utilized for the composited sample is determined with consideration of the sample size required by the analytical method to be performed. The appropriate sized sample, in accordance with the analytical procedures to be utilized, is then randomly removed from the homogenous composited sample for analysis.

Where the composited samples of separate batches of treated waste are to be further composited for additional testing, the composited sample from each batch is stored for inclusion in the final composited sample for additional testing. At the time of additional testing, each composited batch sample is particle

size reduced and mixed until homogeneous, as necessary, in accordance with the analytical procedures to be utilized. The individual composited samples of each treated batch are then composited, as described above, to produce the final composited sample for additional testing.

# C.5 Analytical Rationale

Waste characterization information is obtained by USEI on a WPF. An example of the WPF is provided in Figure C-1. USEI obtains all the information required by IDAPA 58.01.05.008 {40 CFR §§264.13(a)(1) and 264.13(a)(2)} to treat, store, or dispose of a waste. At a minimum, the analysis must contain all the information necessary to treat, store, or dispose of the waste.

Analyses are provided by USEI to augment the waste characterization, when necessary, and to identify incoming waste shipments. Analyses are utilized to provide data necessary for proper waste handling.

Analytical parameters are classified as Fingerprint Analyses and Supplemental Analyses.

**Fingerprint Analyses** – Fingerprint Analyses are performed on incoming waste shipment samples, except as noted in Section C.5.1 and C.7.1.6, in order to: 1) identify a waste shipment; and 2) ensure the appropriate waste management technique will be utilized. Fingerprint Analyses will be performed on a waste sample, when necessary for pre-acceptance purposes, if the generator-supplied information is not sufficient.

**Supplemental Analyses** – Facility management may select additional supplemental analyses to obtain information required for efficient process control or to further evaluate a positive result from a screening test (for example, a flash point may be run to provide more specific waste data when a positive flammability potential is reported during the initial testing). Supplemental analyses are performed on incoming waste shipment and in-process samples as specified by this WAP or facility management to:

- Confirm and/or augment existing information on the waste;
- Further identify a waste;
- Further ensure the appropriate treatment, storage, or disposal process(es) can be utilized to provide operations information utilized for control of these processes; and
- Supplemental Analyses may also be performed on any waste sample, when necessary for pre-acceptance purposes, if the generator-supplied information is not sufficient.

This arrangement allows a tiered approach to waste identification, enabling USEI to structure the analyses to adequately identify the waste or to define operational parameters for various treatment processes. At a minimum, all wastes, except as noted in Section C.7.1.6, are subjected to the Fingerprint Analyses as a 1$^{st}$ step in the analytical scheme. Supplemental Analyses are performed at the direction of facility management. The parameters which constitute the Fingerprint Analyses and Supplemental Analyses are described below and primarily consist of “standard” analytical techniques (recognized by the EPA, ASTM or other authoritative sources). In addition to the identified Fingerprint and Supplemental Analyses, USEI may utilize other “standard” analytical techniques and “unique” analyses (developed by USEI) for analysis of wastes. A summary of the analytical parameters and their usage is provided herein. Analyses will be consistent with the QA/QC procedures outlined in Section C.10.

## *C.5.1 Fingerprint Analyses*

Fingerprint Analyses consist of basic screening procedures performed to provide general waste identification and associated waste confirmation. The Fingerprint Analysis is compared with the WPF/ICF and pre-acceptance evaluation data to confirm that the waste is the same waste that was characterized

during the pre-acceptance process (e.g., WPF, manifest and/or shipping papers). These analyses may be used in conjunction with other waste analyses and information to further identify a waste and/or ensure the type of on-site management chosen is suitable for that particular waste.

During the Pre-Acceptance process, USEI personnel develop a fingerprint analysis based on the characteristics of the waste in question as well as the limits of fingerprint parameter variability. Parameters that are applicable to the waste stream will be specified for fingerprinting. Certain types of waste streams that are not conducive to fingerprint sampling (e.g., debris, solid resins) are not readily sampled and as a result fingerprint parameters may be limited to field-testing and observations. Also, due to the diversity of potential waste streams, the selection of discretionary parameters for waste receipt (and process control) is made on a case-by-case evaluation. If a discretionary fingerprint is no longer needed for proper waste receipt control, it may be suspended or eliminated. USEI will conduct a visual inspection on 100% of all waste received.

Table C-6 provides a default list of fingerprint control parameters and the allowable variability for fingerprint parameters. Unless otherwise specified by the Lab Manager (or his/her designee) or on the WPF/ICF the default values from Table C-6 will apply.

The primary parameters and associated rationale of the Fingerprint Analyses are as follows:

- **Physical Description** (appearance) is used to determine the general properties of the waste. This facilitates comparison of the sampled waste with prior waste descriptions or samples. It is also used to verify the presence or absence of free standing liquid, as well as any obvious change in physical properties. Typical physical properties include color, physical description, texture, and percent water (free liquids).

- **pH Screen** is undertaken to indicate the pH and, in general, the corrosive nature of the waste. pH may not apply to certain waste types, (e.g., organic wastes, oil waste, or wastes which are not water soluble).

- **Water Reactivity Screen (Water Compatibility)** is used to determine whether the waste has a potential to vigorously react with water to form gases or other products, or whether it generates significant heat. This testing does not apply to wastes that are already in contact with excess water, or for which sufficient analytical data indicate no potential reactivity with water.

- **Flammability Potential Screen** is used to indicate the fire-producing potential of the waste. This testing can be applied to all waste liquids, semi-solids or solids. It is used to identify obvious changes in a waste such as flammable waste substituted for an inert solid. This test is not performed on solids unless the waste contains free liquids.

- **Cyanides Screen** is used to indicate whether the waste has the potential to produce hydrogen cyanide gas upon acidification below pH 2. It is not required if the pH of the waste is < 5.0, or if the waste is not water-soluble.

- **Sulfide Screen** is used to indicate whether the waste has the potential to produce hydrogen sulfide gas upon acidification below pH 2. It is not required if the pH of the waste is < 5.0, or if the waste is not water-soluble.

- **Radioactive Screen** is used on materials that are considered radioactive (per the WPF) to ensure compliance with the WAC. A radioactive screen is not required on non-radioactive waste streams.

- **Fine Waste Determination** is performed per Figure C-11.

**Table C-6 Default Fingerprint Parameters and Control Limits**

| Parameter | Variability Limits |
|---|---|
| Visual inspection | Visible variation in color, physical appearance, consistency, and free liquid content as described in the WPF. |
| Water reactive | No water reactive wastes will be approved for land disposal (other than exceptions listed in Section C.7.1.6). |
| pH | ±3 units unless range specified on WPF/ICF. |
| Cyanides | Positive or Negative (consistent with WPF) |
| Sulfides | Positive or Negative (consistent with WPF) |
| Flame Test | Must be consistent with requirement from pre-acceptance fingerprint parameter determination as listed on WPF/ICF. |
| Fine Waste | |

## *C.5.2 Supplemental Analyses*

Supplemental Analyses are performed to further identify wastes, verify treatment standards, provide safety information, and/or to provide process control information, as directed by facility management. The results of these analyses provide additional confidence concerning the proper management methods. Most of the parameters, which constitute the Supplemental Analyses utilize the most recent analytical techniques recognized by EPA, ASTM and other authoritative sources or have been developed by USEI through its operating experience for general waste identification and / or proper waste management and which meet USEI performance standards. Standard supplemental analytical parameters are identified in Table C-7. The referenced method or equivalent standard method will be used for analyses of these parameters. Table C-7 provides a list of available test methods.

# Table C-7
## Test Methods

| | | | |
|---|---|---|---|
| Sample Work Up Techniques: | | | |
| | Method | | Reference |
| **General Extractions** | | | |
| | EP Toxicity | | 1-1310A |
| | TCLP | | 1-1311 |
| **Metals Acid Digestion** | | | |
| | Flame atomic absorption spectroscopy (AAS) or inductively coupled plasma spectroscopy (ICP) | | 1-3005, 3010 |
| | Microwave assisted | | 1-3015, 2-3030, 3-D4309, D5258 |
| | Graphite furnace atomic absorption spectroscopy (GFDAA) | | 1-3020 |
| | Oils, greases, or waxes | | 1-3031 |
| | Dissolution procedure for oils, greases, waxes | | 1-3040 |
| | Sludge's, soils, and oils | | 1-3050 |
| | Microwave assisted | | 1-3051 |
| | Alkaline digestion | | 1-3060 |
| **Organic Extractions and Cleanups** | | | |
| | Extraction Procedure for Oily Wastes | | 1-1330 |
| | Organic Extraction and Sample Preparation | | 1-3500 |
| | Waste Dilution | | 1-3580, 3585 |
| | Separatory funnel liquid-liquid extraction | | 1-3510 |
| | Continuous liquid-liquid extraction | | 1-3520 |
| | Soxhlet extraction | | 1-3540, 3541 |
| | Sonication extraction | | 1-3550 |
| | Purge and Trap | | 1-5030 |
| | Solid phase extraction (SPE) | | 1-3535 |
| | Hexadecane Extraction and Screening of purgeable organics | | 1-3820 |
| | Alumina cleanup | | 1-3610, 3611 |
| | Florisil cleanup | | 1-3620 |
| | Silica gel cleanup | | 1-3630 |
| | Gel-permeation cleanup | | 1-3640 |
| | Acid-base partition cleanup | | 1-3650 |
| | Sulfur cleanup | | 1-3660 |
| | Sulfuric acid / permanganate cleanup | | 1-3665 |
| Inorganic analytical methods: | | | |
| | Inductively coupled plasma atomic emission spectroscopy/Mass spec. | | 1-6010, 6020 |
| | Antimony | | |
| | | Atomic absorption, borohydride reduction method | 1-7062 |
| | | | |
| | Arsenic | | |
| | | Atomic absorption, gaseous hydride method | 1-7061 |
| | | Atomic absorption, borohydride reduction method | 1-7062 |
| | | Anodic Stripping Voltammetry (ASV) | 1-7063 |
| | Chromium | | |
| | | Atomic absorption, direct aspiration method | 1-7190, 4-218.1 |
| | | | |
| | | Hexavalent chromium: Co-precipitation | 1-7195 |
| | | Hexavalent chromium: Colorimetric | 1-7196, 2-3500CrB |
| | | Hexavalent chromium: Chelation-extraction | 1-7197, 4-218.4 |
| | | Hexavalent chromium: Diff. phase polarography | 1-7198 |
| | | Hexavalent chromium: Ion chromatography | 1-7199 |
| | Iron | | |
| | | | |
| | | | |
| | | Phenanthroline method (ferrous) | 2-3500FeB |
| | Mercury (manual cold-vapor technique) | | |
| | | In liquid waste | 1-7470 |
| | | In solid or semisolid waste | 1-7471 |
| | Mercury (Thermal Decomposition, Amalgamation, Atomic Absorption Spectrophotometry) | | |
| | | In solids and solutions | 1-7473 |

| Sample Work Up Techniques: | |
|---|---|
| Method | Reference |
| Selenium | |
| Atomic absorption, gaseous hydride method | 1-7741, 4-270.3 |
| Atomic absorption, gaseous hydride method | 1-7742, 4-206.3 |
| Organic Analytical Methods: | |
| Gas Chromatographic Methods | |
| Halogenated volatile organics | 1-8021 |
| Non-halogenated Volatile Organics | 1-8015 |
| Aromatic Volatile Organics | 1- 8021 |
| Acrolein, Acrylonitrile, Acetonitrile | 1-8031 |
| Phenols | 1- 8041 |
| Phthalate Esters | 1- 8061 |
| Nitrosamines | 1-8070 |
| Organochlorine pesticides, halowaxes, and PCB's | 1-8081 |
| PCBs | 1- 8082 |
| Nitroaromatics and cyclic ketones | 1- 8091 |
| Polynuclear Aromatic Hydrocarbons | 1-8100 |
| Haloethers | 1- 8111 |
| Chlorinated Hydrocarbons | 1- 8121 |
| Organophosphate Pesticides | 1- 8141 |
| Chlorinated Herbicides | 1- 8151 |
| **Gas Chromatographic/Mass Spectroscopy Methods** | |
| Volatile Organics | 1- 8260, 7-624 |
| Semi-volatile Organics: | 1- 8270, 7-625 |
| **Other Organic Methods** | |
| Qualitative infrared (IR) spectroscopy method | 1-8410, 8430, 8440, 3-D2621, D4053 |
| GC/FTIR method | 1-8410 |
| Heating value, bomb combustion method | 1-5050, 3-D240, D2015 |
| Halogen and Sulfur Content | |
| Chlorine content | 3-D808, D2361, D4327 |
| Halogen content | 3-D808, D2361, D4327 |
| Sulfur content | 3-D129, D3177, D4327 |
| Oil and Grease | 1-4030, 9070, 9071, 2-5520, 4-413.1, 413.2 |
| Petroleum hydrocarbons, total recoverable | 2-5520, 4-418.1 |
| Solvent distillation | 3-D86, D1078 |
| Total Organic Carbon (TOC) | 1-9020, 9060, 2-5310 |
| Total Organic Halides (TOX) | 2-506 |
| Screening Methods | |
| Physical description | 3-D4979 |
| Flammability potential screen | 3-D4982 |
| Water compatibility | 3-D5058 |
| Oxidizer screen | 3-D4981 |
| pH screen | 3-D4980 |
| Sulfide screen | 3-D4978 |
| | Gas Detection Tubes (e.g. Dragger, Sensidyne, MSA |
| Cyanide screen | 3-D5049 |
| | Gas Detection Tubes (e.g. Drager, Sensidyne, MSA |
| Commingled liquid waste compatibility test | 3-D5058 |
| Polymerization potential | 3-D5058 |
| Paint filter test | 1-9095 |
| Bulk density and apparent specific gravity screen | 3-D5057 |
| Polychlorinated biphenyl's (PCBs) screen | 1-4020, 9079 |
| Liner compatibility determination | 1-9090 |
| Miscellaneous Analytical Methods: | |
| Acidity | 2-2310 |
| Alkalinity | 2-2320 |
| Ammonia | 2-4500$NH_3$, 4-350.3 |
| Anions | |
| By ion chromatography | 1-9056, 3-D4327, 4-300.0 |
| Chlorides | 1-9250, 9251, 9253, 2-4500$Cl^-$, 4-300.0, 325.3 |
| Sulfates | 1-9035, 9036, 9038, 2-4500$SO_4^{2-}$, 4-300.0, 375.3 |
| Nitrates | 1-9210, 2-4500$NO_3^-$, 4-300.0, 352.1, 353.2 |
| Fluoride | 1-9214, 2-4500$F^-$, 4-300.0, 340.2, 340.3 |
| Bromides | 1-9211, 2-4500$Br^-$, 4-300.0, 320.1 |

| Sample Work Up Techniques: | | |
|---|---|---|
| | Method | Reference |
| | Phosphates | 2-4500P, 4-300.0, 365.1 |
| | % Ash | 2-2540, 3-D482, D3174 |
| | Conductivity / conductance | 1-9050, 2-2510, 3-D1125, 4-120.1 |
| | Cyanides | |
| | Total and amenable cyanides | 1-9010, 9012, 9013, 2-4500CN$^-$, 4-335.1 |
| | Dissociable cyanides | 1-9213, 2-4500CN$^-$ |
| | Flash point / Ignitability | |
| | Pensky-Martens closed-cup method | 1-1010, 3-D93 |
| | Setaflash closed-cup method | 1-1020, 3-D3278 |
| | Cleveland open-cup method | 3-D92 |
| | Oxidation / reduction (redox) potential (ORP) | 2-2580, 3-D1498 |
| | PH measurement | 1-9040, 9041, 9045, 2-4500H$^-$, 3-E70, 4-150.1 |
| | Solids | |
| | Total (TS) at 103/105$^O$C | 2-2540, 4-160.3 |
| | Dissolved (TDS) at 180$^O$C | 2-2540, 4-160.1 |
| | Total suspended (TSS) at 103/1`05$^O$C | 2-2540, 4-160.2 |
| | Fixed and volatile at 500$^O$C | 2-2540, 4-160.4 |
| | Total Solids (moisture content) | e.g., Ohaus, Microwave, Oven |
| | Sieve Analysis of Fine and Coarse Aggregates | 3-C136 |
| | Specific Gravity | 1-9030, 2-2710F, 3-D70, D891, D1217, D1429 |
| | Sulfides | |
| | Extractable sulfides | 1-9031 |
| | Soluble sulfides | 1-9215, 2-4500S$^{2-}$ |
| | Total sulfides | 1-9030A, 2-4500S$^{2-}$ |
| | Viscosity | 3-D88, D446, D2983 |
| | Water Content | 3-D95, D3173, D4006, E203 |

The above referenced procedures are described in the following publications (the latest update to any of the below referenced documents are acceptable). The first digit of the reference numbers above are keyed to the numbers shown below:

| | |
|---|---|
| 1. | ***Test Methods for Evaluating Solid Waste***, SW-846, U.S. Environmental Protection Agency, Office of Water and Waste Management, Washington, D.C. 20406 |
| 2. | ***Standard Methods for the Examination of Water and Waste Water***, American Public Health Association (APHA), American Water Works Associations, Water Environment Federation |
| 3. | ***Annual Book of ASTM Standards***, American Society for Testing Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428 |
| 4. | ***Methods for Chemical Analysis of Water and Wastes***, EPA-600/4-79-020, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory (EMSL), Cincinnati, Ohio 45268 |
| 5. | "Infrared Analysis Method," IERL-RTP Procedures Manual: level I Environmental Assessment, EPA-600/7-78-201 |
| 6. | "Acid Digestion Bombs," Bulletin 4745, Parr Instrument Company, Moline, IL 61265 |
| 7. | "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater," Title 40, Part 136, Appendix A, CFR, USEPA, EMSL |
| 8. | Bellar, T.A., and Lichtenberg, J.J., "The Determination of Polychlorinated Biphenyls in Transformer Fluid and Waste Oils," EPA-600/4-81-045, USEPA, EMSL |

Standard analytical procedures not listed here, which may be needed, will be taken from the above-referenced sources or other recognized sources (e.g.; Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC), 15$^{th}$ Edition, AOAC, Arlington Virginia, 1990) or more recent supplements or editions.

The following list provides a general explanation of various analytical methods that may be used:

- **Beilstein Screen** is used to indicate the presence of halogenated organics in aqueous and organic wastes.

- **Bench-Scale Treatment Evaluation** to determine the appropriate ratios of wastes to reagents or waste-to-waste to be used in the treatment process to produce the desired reaction / result.

- **Chlorides** determine if the major acid component is hydrochloric acid or its salt.
- **Cyanides Peroxide Amenability** determines the effectiveness of $H_2O_2$ for cyanide treatment.
- **Cyanides Chlorination Amenability** (Sodium Hypochlorite or direct Chlorination) is run to determine the effectiveness of hypochlorite for cyanide treatment.
- **Cyanides Conversion Amenability** is performed to determine the effectiveness of other types of reagents treatment for cyanides.
- **Filter time** is used to determine filterability of waste.
- **Filterable Residue** quantifies the suspended solids present to determine filtration requirements in process operations.
- **Flash Point/Ignitability** further identifies ignitable wastes to establish proper storage mode and conformance with permit conditions.
- **Gas Chromatographic Scan** is used to identify specific organic compounds.
- **Qualitative IR Spectroscopy** is run to provide a fingerprint spectrum of organic wastes.
- **Liquid Waste Compatibility** determines whether liquid wastes which are to be combined together are compatible. This is a required supplemental analysis when combining different wastes.
- **Metals Content** may be determined to quantify metals concentrations for process operating parameters or potential salt precipitation for monitoring certain processes.
- **Nitrates** determine if the major acid component is nitric acid or its salt.
- **Non-Filterable Residue** quantifies the dissolved solids present to determine acceptability for certain processes.
- **Oil and Grease** quantifies the amount of oil and grease so as not to impact certain processes.
- **Organic Content** (OC) provides a conservative measure of organic carbon in a waste. This determination may use the procedure for Total Organic Carbon (for suitable waste forms), or may be calculated based on the results of a water content test using Karl Fisher or Dean Stark methods. Organic content is conservatively determined as the difference of water and ash from the total sample.
- **Oxidizer Screen** is used to indicate the oxidation characteristics of a waste stream.
- **Paint Filter Test** is used to indicate if free liquids are present in a solid or semi-solid material.
- **PCB Screening** indicates whether or not PCBs are present in a waste.
- **PCBs in Aqueous Liquids** determine whether PCBs are present in a liquid waste.
- **Percent Acidity** determines the acidity in the waste. It may be performed if the waste is aqueous and below a pH of 4.

- **Percent Alkalinity** determines the amount of alkalinity in the waste. It may be performed if the waste is aqueous and above a pH of 7.
- **Percent Ash** is used to determine the ash content in waste feeds to the indirect thermal desorber.
- **Percent Solids by Centrifuge** determines the percentage of suspended solids by centrifugation.
- **pH** provides a more precise measurement of pH and an indication of corrosivity when determining process parameters.
- **Phosphates** determine if the major acid component is phosphoric acid or its salt.
- **Soluble Sulfides** are analyzed to provide quantitative backup to the reactive sulfides screen.
- **Solvent Screen** is used to identify the presence of LDR solvent constituents.
- **Specific Gravity / Bulk Density** indicates density of the waste. This information is used to convert weight of materials to volumes (and vice versa).
- **Stabilization Treatment Studies** are run to determine if a waste is amenable to stabilization and to determine the appropriate reagent-to-waste ratio.
- **Sulfates** determine if the major acid component is sulfuric acid or its salt.
- **Sulfide** Peroxide Amenability determines the effectiveness of $H_2O_2$ for sulfide treatment.
- **Sulfide Conversion Amenability** is tested to determine the effectiveness of other types of reagents treatment for sulfides.
- **Sulfur Content** determines the sulfur content of waste to be incinerated and thus its capability to generate $SO_2$ ($SO_x$) gases.
- **Total and Amenable Cyanides** quantifies the concentration of all free and most complexed cyanides (total cyanides) and/or cyanide species amenable to alkaline chlorination (amenable cyanides). Results may be used for treatability determinations, to monitor treatment processes, and/or to meet disposal restrictions including Land Disposal Restrictions.
- **TOC** may be used to determine the organic concentration in waste.
- **TOX** may be used to determine the organic-chloride concentration in waste.
- **Total Solids** quantifies suspended and dissolved solids and moisture content for selected processes.
- **Total Sulfides** is used to quantify the concentration of total sulfides to back up the sulfides screen.
- **Viscosity** determines the waste pumpability.
- **Visual Oil and Grease** provides a qualitative assessment of filterability and organic contents.

- **Waste Compatibility** is tested to determine whether wastes stored or processed together are compatible.

- **Water Compatibility** is used to determine whether the waste has a potential to react vigorously with water, to form gases, other products, or to generate extreme heat and to determine if it is soluble in water. This test does not apply to wastes already in contact with excess water or to wastes known to be water reactive.

- **Water Content** is used to determine the percent of water present in a waste.

Other standard analytical techniques not listed here may be added as required by changes in regulations, company policy, etc. These techniques will be taken from recognized sources (e.g., SW-846, ASTM, AWWA, etc.).

# C.6 Pre-acceptance Procedures

The generator is responsible for characterizing the waste (IDAPA 58.01.05.006) (40 CFR §262.11) and determining the applicability of IDAPA 58.01.05.008 {40 CFR Part 264, Subpart CC} via an associated certification of subpart CC compliance. The generator is also responsible for presenting the waste characterization results on a completed WPF. Although USEI cannot require generators to submit a certification by regulation, USEI asks waste generators to provide a certification on the WPF as follows:

> "I authorize US Ecology to correct inconsistencies on the waste profile form that impact waste management decisions with my oral or written authorization. US Ecology will require re-submittal of the waste profile information if substantial changes are determined necessary. I understand material that does not conform to specifications described in this profile may be rejected by US Ecology unless other contractual arrangements have been agreed to by both parties. I certify, under penalty of law, that I am familiar with this waste stream through analysis and/or process knowledge, and that all information provided is true, accurate, representative and complete, that all known or suspected hazards have been disclosed, and that this form was completed in accordance with the instructions provided."

The generator's waste characterization normally includes an analysis of at least one representative sample of the waste for hazardous characteristics and chemical composition. In some cases, generator knowledge of the waste is sufficient. The generator or an independent laboratory (including USEI) may perform analyses. Testing and analyses are performed using standard test methods (EPA, ASTM, AWWA, or other approved standards) or alternative methods approved in the facility's RCRA permit. The generator also evaluates the candidate waste for additional characteristics that may prohibit the waste from acceptance at USEI. Table C-8 provides a complete list of materials that are restricted from on-site disposal.

USEI has developed a series of criteria to determine the acceptability of specific wastes for management at USEI. These criteria are referred to as pre-acceptance reviews and dictate what information USEI must have available in order to determine the acceptability of the waste for on-site management. At a minimum, USEI will obtain all the information required by IDAPA 58.01.05.008 {40 CFR §264.13(a)(1)}.

The pre-acceptance review is the mechanism for deciding to reject or accept a particular type of waste, prior to its acceptance at the facility, based on the conditions or limitations of existing permits, the waste's compatibility with other wastes being managed on-site, and the waste's suitability for management utilizing the process options available on-site. The pre-acceptance review for USEI may be carried out on-site, or upon receipt of the load prior to (or in conjunction with) waste acceptance. Accordingly, and consistent with EPA guidance and this WAP, USEI will obtain applicable information, either during the pre-acceptance, incoming load review, or prior to on-site disposal to confirm the concentration level of constituents of concern (those reasonably expected to be in the waste).

**Table C-8 List of Wastes Restricted from On-site Disposal at the USEI Facility**

| Restrictions | Rationale |
|---|---|
| Explosive, pyrophoric, shock-sensitive wastes. | No treatment capability for extremely hazardous materials. |
| Highly reactive wastes in concentrated form (e.g., white phosphorous, sodium metal, lithium metal, potassium metal) | Restricted due to handling hazards and potential incompatibility with leachate. |
| Etiological wastes. | No treatment capability for etiological wastes. |
| Non-conforming radiological waste | Regulatory restriction |
| Compressed Gases | Regulatory restriction |

## *C.6.1 Procedural Requirements*

For each new waste stream that is a candidate for on-site management, except where noted herein, the following procedures are implemented:

During the pre-acceptance process USEI will obtain:

- Pertinent chemical and physical data (i.e., waste characteristics) and associated certification on the WPF.
- A representative sample, if required (a representative sample may not be required by USEI if facility management determines the pre-acceptance documentation gives sufficient information to maintain compliance with permit and operational constraints and submittal of a sample for analysis would not aid in the disposal decision process).
- Land Disposal Restriction Notification/Certification and/or data (IDAPA 58.01.05.011) (40 CFR §268.7) unless submitted on a load-by-load basis or the certification required by IDAPA 58.01.05.008 (40 CFR § 264.555) if the waste is received under a CAMU-eligibility determination.
- Other supporting documentation as appropriate, including any information such as process description, additional analytical results, Material Safety Data Sheets (MSDS), product ingredients, etc.

As required, USEI will perform the Fingerprint Analyses and any Supplemental Analyses necessary on a pre-acceptance sample of the waste. These analyses are performed to provide the information needed to determine if the waste can be managed on-site and/or to determine if it matches the identity of the waste from the pre-acceptance review. The analyses will be performed utilizing the parameters outlined in Section C.5.

After evaluating the above information and any information obtained from the Fingerprint Analyses or Supplemental Analyses, USEI will determine the acceptability of the waste based on:

- The permit conditions for the facility, and
- The availability of the proper waste management techniques.

USEI maintains, as part of its pre-acceptance information, generator-supplied and USEI-developed information. This information may be accessed either electronically or via hard copy.

## *C.6.2 Pre-acceptance Evaluation*

USEI is responsible for the pre-acceptance evaluation decision (i.e., whether to accept or reject the waste). Samples of waste necessary for pre-acceptance consideration are subjected to Fingerprint Analyses. USEI may require Supplemental Analyses to screen samples for other contaminants or properties, which indicate possible treatment or disposal modes. Figure C-2 provides a flow diagram for the pre-acceptance evaluation. The basis for requiring these additional analyses is:

- Determination of waste management technique(s) to be used;
- Facility management's experience and judgment;
- WPF description of the chemical and physical properties of the waste;
- WPF description of the process generating the waste;
- Any additional documentation supplied by the generator, including information that the waste is subject to the Land Disposal Restrictions of IDAPA 58.01.05.011 {40 CFR Part 268}, or the treatment standards referenced in IDAPA 58.01.05.008 {40 CFR § 264.555) if appropriate; and
- Results of any Fingerprint Analyses and any previous Supplemental Analyses, including LDR confirmatory analyses.

The pre-acceptance evaluation is concluded with documentation of the decision regarding the acceptability of the waste and the proposed method of management. Included within the documentation is the required notification to the generator that the waste is approved for management in accordance with the facility's permit and IDAPA 58.01.05.008 {40 CFR §264.12(b)}. A Waste Shipment Identification Number (WSID) is assigned to the waste shipment upon approval for acceptance.

USEI's technical disposal decisions are based on:

- Management methods available;
- Conditions or limitations of existing permits and regulations;
- Capability to manage the waste in a safe and environmentally sound manner;
- WPF description of the process generating the waste;
- WPF description of the chemical and physical properties of the waste;
- Any additional documentation supplied by the generator, including information that the waste is subject to a Land Disposal Restriction of IDAPA 58.01.05.011 {40 CFR Part 268}, or the treatment standards referenced in IDAPA 58.01.05.008 {40 CFR § 264.555) if appropriate;
- Results of Fingerprint Analyses, if necessary;
- Results of Supplemental Analyses, as appropriate; and
- Management's technical experience and judgment.

Table C-8 provides a list of restricted waste for on-site disposal and the management response if this type of material is received.

## *C.6.3 Waste Profile/WPF Re-evaluation*

In accordance with IDAPA 58.01.05.008 {40 CFR §264.13(a)(3)}, a WPF/waste profile re-evaluation will be repeated as necessary to ensure that it is accurate and up to date. At a minimum, the analysis must be conducted when one of the following occurs:

- A generator notifies USEI that the process generating the waste has changed; or
- The results of inspection or analysis indicate the waste received at the facility does not match the identity of the waste designated on the accompanying manifest (or shipping paper).

When this occurs USEI will review the available information, if existing analytical/knowledge of the waste is not sufficient, the generator may be asked to review and update the current WPF, supply a new WPF, and/or to submit a sample for analysis, or USEI may utilize a sample obtained from a load of the waste. Figure C-3 provides a flow chart for waste/process change management methods.

## *C.6.4 Requirements for Ignitable, Reactive, or Incompatible Wastes*

USEI takes precautions to prevent the accidental ignition or reaction of ignitable or reactive waste per the requirements of IDAPA 58.01.05.008 {40 CFR §264.17}. This waste must be separated and protected from sources of ignition or reaction including but not limited to: open flames, smoking, cutting, and welding hot surfaces, frictional heat, sparks, spontaneous ignition, and radiant heat.

Any time USEI treats, stores, or disposes of ignitable or reactive wastes, or mixes reactive incompatible wastes, USEI will take precautions to prevent reactions which:

- Generate extreme heat or pressure, fire or explosions, or violent reactions;
- Produce uncontrolled toxic mists, fumes or gasses in sufficient quantities to threaten human health or environment;
- Produce uncontrolled flammable fumes or gasses in sufficient quantities to threaten human health or environment;
- Damage the structural integrity of the device or facility;
- Through other means threaten human health or environment.

USEI will document compliance with these requirements through references to published literature, data from test trials (e.g., treatability studies), waste analysis or the results from similar treatment processes under similar conditions.

Highly reactive wastes and other wastes identified in Table C-8 are restricted from on-site disposal at the facility.

## *C.6.5 Compatibility Groups*

Establishing waste compatibility and identifying potential incompatibilities are important components of the pre-acceptance evaluation. The waste compatibility evaluation accomplishes the following:

- Prevents the intermingling of incompatible wastes;
- Prevents the contact of waste streams or leachate from wastes with incompatible process equipment; and
- Establishes handling, storage, treatment, and disposal requirements consistent with regulatory compliance, worker safety and health, and the protection of human health and the environment.

To achieve these objectives, waste compatibility information and processing requirements for each waste stream are required. The basic waste compatibility characteristics for a given candidate waste stream are established using the generator's waste characterization information as reviewed and approved by USEI. The key compatibility concerns at this stage of the pre-acceptance evaluation are compatibility groupings as follows:

- Waste/waste compatibility;
- Waste/tank compatibility;
- Waste/container compatibility;
- Waste/stabilization equipment compatibility;
- Waste/landfill liner compatibility;
- Waste/evaporation pond liner compatibility; and
- Waste/containment building barrier compatibility.

The pre-acceptance waste/waste compatibility determination identifies:

- Drum storage, landfill disposal, and laboratory pack segregation requirements;
- Storage tanks or the stabilization unit decontamination requirements; and
- Preliminary classifications for tank storage and evaporation pond scheduling (confirmed by waste-to-waste testing).

Waste/waste compatibility is determined by categorizing a waste's reactive characteristics. The USEPA guidance document ”A Method for Determining the Compatibility of Hazardous Wastes" (EPA-600/2-80-076) is used as a guide to group the wastes listed in the Part A of this Document into the 41 different reactivity groups established in the USEPA guidance manual. An example of the Hazardous Waste Compatibility Chart provided in EPA-600/2-80-076 is included in Appendix C.2 for reference. The 41 reactivity groups established in the guidance document have been composited into eight compatibility groupings (Groups A through H). A majority of the USEPA-listed wastes accepted by the facility are listed by both reactivity group numbers (RGNs) and by USEI compatibility groupings in Table C-9 and Appendix C.2. Additional wastes not listed on this compatibility chart will be placed in the appropriate compatibility grouping based on the characteristics of the material in question. Chemical composition plays an important role in classifying wastes into compatibility groups. The major constituents of the waste determine the primary compatibility characteristics of the waste. Minor components are screened and assessed on the basis of their relative proportion to the total waste and the potential incompatibilities they might present. If the hazardous constituent contained in the USEPA waste listing is a minor component, and if the major component(s) is of a different compatibility group than that indicated for the listing constituent, then the major components will generally determine the compatibility group. If necessary, analyses for compatibility are conducted to assist in the proper compatibility group classification.

Waste/waste compatibility is typically determined using the following three steps:

1. Initially, all data regarding the waste are compared with the waste compatibility chemical listings in Appendix C.2 and with USEPA guidance document EPA-600/2-80-076 to determine waste/waste compatibility.

2. If necessary, a representative sample of the candidate waste is submitted by the generator to the facility for compatibility testing. The waste is tested for compatibility with a mixture of laboratory reagent chemicals representing each reactivity group (in equal proportion) within the candidate waste's compatibility group. If the compatibility group mixture results in separate liquid or solid phases, waste compatibility testing is performed on each phase.

3. The information generated in Steps 1 and 2 is evaluated to verify that no excessive, flammable, or toxic gas is generated, that fire and/or explosions do not occur, and that violent polymerization or uncontrolled reactions do not occur. Should the data indicate any of these conditions, testing may be conducted to identify the correct reactivity group.

The compatibility group determination is used to segregate drummed wastes and laboratory pack wastes for storage and landfill disposal, to segregate bulk wastes for landfill disposal, and to determine the probable compatibility for direct contact of liquids in tank storage and evaporation pond treatment. Should a waste be suspected of having any storage, treatment, or disposal incompatibilities with other wastes within its assigned compatibility group, additional compatibility tests will be performed.

There are multiple methods and schemes for determining compatibility. As a result, USEI may submit an alternate method for compatibility for Department review.

**Table C-9 Compatibility Groups Based on Reactivity Groups**

| USEI Compatibility Group | Reactivity Group Number[a] | Reactivity Group Name[a] |
|---|---|---|
| A | 1<br>2<br>3 | Acids, minerals, nonoxidizing<br>Acids, mineral, oxidizing<br>Acid, organics |
| B | 104 | Oxidizing agents, strong |
| C | 10<br>11<br>33<br>105 | Caustics<br>Cyanides<br>Sulfides, inorganics<br>Reducing agents, strong |
| D | 6<br>7<br>8<br>26<br>27 | Amides<br>Amines, aliphatic, and aromatic<br>Azo compounds, diazo compounds, and hydrazines<br>Nitriles<br>Nitro compounds, organics |
| E | 4<br>5<br>13<br>14<br>15<br>16<br>20<br>23<br><br>24<br>29<br>31<br>32<br><br>101 | Alcohols and glycols<br>Aldehydes<br>Esters<br>Ethers<br>Fluorides, inorganic<br>Hydrocarbons, aromatic<br>Mercaptan and other organic sulfides<br>Metals, other elemental & alloys as sheets, rods, drops, moldings, etc.<br>Metals and metal compounds, toxic<br>Hydrocarbons, aliphatic, saturated<br>Phenols and cresols<br>Organophosphates, phosphothioates, phosphodithioates<br>Combustible and flammable materials, miscellaneous |
| F[b] | 106<br>17<br>19<br>28<br>34<br>103 | Water and mixtures containing water<br>Halogenated organics<br>Ketones<br>Hydrocarbons, aliphatic, unsaturated<br>Epoxides<br>Polymerizable compounds |
| G[b] | 9<br>12 | Carbamates<br>Dithiocarbamates |

| | | |
|---|---|---|
| H | 21<br>22 | Metals, alkali and alkaline earth, elemental<br>Metals, other elemental & alloys as form powders, vapors, or sponges |
| [a]Reactivity groups, established in the USEPA guidance document "A Method for Determining the Compatibility of Hazardous Wastes" (EPA-600/2-80-076), are identified by a reactivity group number (RGN). The reactivity groups established in the guidance manual were composited into eight ESII compatibility groups (Groups A through H). | | |
| [b]Groups F and G are considered compatible with Group E unless determined that high concentrations of specifically incompatible compounds are present that may cause unacceptable reactions. | | |

# C.7 Incoming Waste Shipment Procedures

Each shipment of waste will be inspected, sampled and analyzed as defined herein before acceptance, except as noted in Section C.7.1.6. This serves two purposes. First, it compares the actual waste identity with that determined in the pre-acceptance phase and the waste manifest. Second, it further ensures proper disposition of the waste for treatment, storage, and/or disposal. Other USEI personnel (or USEI-approved subcontractor) can provide the Fingerprint and/or Supplemental Analyses required for acceptance. Waste shipments, which have arrived on-site, are considered to be in the receiving process until a final decision regarding waste acceptability is made; at such time the wastes are considered "accepted" or "rejected". Waste may be stored at the "staging area" or one of waste management units while awaiting receipt determination. Figure C-4 provides a flow chart for waste receipt control procedures.

In addition, all initial waste shipments which are subject to the Land Disposal Restrictions of IDAPA 58.01.05.011 {40 CFR Part 268}, or the CAMU-eligible treatment standards referenced at IDAPA 58.01.05.008 {40 CFR § 264.555}, and which have been treated, exempted, subject to a variance, or already meet the appropriate treatment standard may be accompanied by a one-time form from the treater or generator certifying the waste meets the appropriate treatment standard, treated with the prescribed treatment method, prohibition exemption, or variance. This form must include the applicable analytical data or reference to such data, in accordance with IDAPA 58.01.05.011 {40 CFR §268.7}. Furthermore, initial waste shipments subject to the Land Disposal Restrictions of IDAPA 58.01.05.011 {40 CFR Part 268} that require treatment may be supported by one-time written documentation notifying USEI of the appropriate treatment standard or prohibition including any applicable data or reference to such data or documentation which must be met in accordance with IDAPA 58.01.05.011 {40 CFR §268.7}, except as otherwise allowed.

## *C.7.1 Receiving Procedures*

Upon receipt of a waste shipment, samples are assigned an internal tracking number. If the waste is a routine waste stream, it has an associated Internal Control Form (ICF)/load number assigned. The sample identification number consists of an ICF/load number followed by the ICF item number and a specific container designation. Non-routine samples (those without an ICF number) are consecutively numbered based upon yearly sequential numbers as follows:

**03-0001**

"03" indicates the year received and/or sample collected and

"0001" is a consecutive number that progresses upwards throughout the year.

The type of tracking system may change depending on the type of waste management tracking software and other operational considerations, however, the facility will have a waste tracking system in place at all times.

The sampling and analysis of the incoming waste will utilize appropriate methods (Section C.4) and parameters (Section C.5). Inspections are performed as described in Section F. Upon arrival of a waste shipment at USEI, the accompanying manifest is reviewed for completeness and the shipment is inspected for agreement with the manifest information (see Section C.11.8 for resolution of significant manifest discrepancies).

All shipments arriving on-site will be visually inspected. The visual inspection is the first step in the fingerprint process. The intent of the visual is to identify any obvious discrepancies such as unidentified liquids or other physical properties.

Incoming shipments are also sampled and analyzed for the Fingerprint Parameters as identified in Section C.5 and any Supplemental Analyses specified by facility management, except as noted in Section C.7.1.6.

## C.7.1.1 Debris Receipt

For Debris, a visual inspection will be utilized to determine if the waste meets the definition of debris. Debris refers to solid material exceeding 60 mm in particle size that is a manufactured object, plant or animal matter, or natural geologic material. However, the following materials are not debris:

> Any material for which a specific treatment standard is provided in Subpart D, Part 268 (e.g., lead acid batteries, cadmium batteries, radioactive lead solids);
>
> Process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludge's, or air emission residues; and
>
> Intact containers of hazardous waste that are not ruptured and contain at least 75% of their original volume.

A mixture of debris that has not been treated to the standards provided by IDAPA 58.01.05.011 {40 CFR §268.45} and other material is subject to regulation as debris if the mixture is comprised primarily of debris, by volume based on the visual inspection. Figure C-5 provides a flow chart describing the decision process for the pre-acceptance of debris and debris loads.

## C.7.1.2 Bulk Receipt

Subject to the exceptions in Section C.7.1.6, bulk waste loads are sampled and analyzed, except where large volumes from a campaign shipment of a single waste stream are received from a single source, (e.g., a site cleanup, a large volume generator, etc.). In such cases, all shipments are visually inspected and at least 10% of such loads are sampled and analyzed except as otherwise noted in Section C.5.1. Bulk waste may also be sampled in an original bulk container (e.g., rail tanker, gondola car, etc.).

For campaign shipments, 50 percent of the first 10 truckloads are sampled for fingerprint analysis. In addition, every truck comprising a campaign shipment is visually inspected (per Waste Receipt Control procedures) and any truckload of waste showing unexpected variations in color, texture, or moisture content is subject to sampling. If the sampled truckloads show variation, the 50 percent sampling frequency is continued for the next 10 truckloads. If there are no variations among the sampled truckloads, the sample regime is reduced to 10 percent of the truckloads for the remainder of the campaign shipment, thereafter. If variations are later found during the 10 percent sampling regime, the 50

percent sampling frequency is re-instituted for the next 10 truckloads. If these do not show variation, then the frequency is returned to 10 percent of the next 10 truckloads.

Bulk solids are sampled by obtaining point samples using the sampling equipment indicated in Table C-5. These samples are collected from the following three points:

The front 1/3 of the truck/container load;

The center 1/3 of the truck/container load; and

The rear 1/3 of the truck/container load, within one (1) to two (2) feet of the rear tailgate or container wall, if possible.

Samples are collected in a manner that is best representative of the vertical composition of the waste within the limitations of the available sampling equipment and container configuration. If the physical characteristics of the hazardous waste are such that a full vertical section of the load cannot be reasonably sampled with the equipment listed in Table C-5 then a sample is collected at an approximate depth of one foot at each sampling point. The three point samples are composited prior to analysis. If a truckload is domed and easily accessible to within one (1) to two (2) feet of the bottom of the load, then one of the samples is collected near the bottom to obtain a more appropriate vertical sample of the waste.

In addition, all visible areas of each bulk hazardous waste load are inspected for physical differences and for variations from the characterization of the hazardous waste presented in the WPF. The load is also visually observed during off-loading for any such variations. Any portion of the waste that exhibits such variations is sampled and analyzed separately, if possible.

A hazardous waste bulk load (e.g., truck and trailer or two truck-mounted rolloffs) manifested as a single item is considered one shipment for sampling purposes. Each container is sampled per the previous paragraph, and the six sample points are composited into one sample for analysis. Alternatively, a hazardous waste bulk load (i.e., truck and trailer or two truck-mounted rolloffs) manifested on separate distinct manifests or presented as two waste streams is considered two units for sampling and analysis purposes.

### C.7.1.3 Bulk Liquid Receipt

Liquids are sampled utilizing the appropriate sampling equipment as shown in Table C-5. Shipments of bulk liquid are generally received in tanker trucks. For each tanker, a single sample is removed for analysis from each segregated compartment within the tanker. If the compartments all hold the same waste stream, the samples may be composited at a rate of five samples per composite. This presumes that all samples are visually equivalent and match the characteristics expected from information on the WPF.

A tanker may be sampled by withdrawing a sample from available valves on the tanker. This necessitates that the waste within the tanker is either homogenous or that the tanker is adequately circulated/mixed prior to sampling to ensure a representative sample is obtained.

### C.7.1.4 Sludge Receipt

Bulk shipments of sludge are sampled as either liquids in bulk or solids in bulk depending on the physical characteristics of the sludge. If the sludge is primarily liquid in nature, then it is sampled as appropriate for a liquid in bulk. Conversely, if the sludge is essentially a solid, then it is sampled as appropriate for a solid in bulk.

## C.7.1.5 Non-Bulk Receipt

In the case of shipments of non-bulk containers, at least 10% of the containers from each waste stream in the shipment are sampled, except as provided in Section C.7.1.6. Container samples from the same profile may be composited prior to analysis, providing the individual samples are similar. Any composited samples will be composited as described in Section C.4.3. At a minimum, all remaining unopened containers are visually inspected for container integrity and consistent labeling. If a significant discrepancy in waste type is discovered, the contents of all of the containers for that waste stream are inspected. In some cases, where the waste stream is consistent but packaged for ease of transportation or disposal (e.g., multiple $yd^3$ bags containing the same waste) the load may be managed as a bulk load.

## C.7.1.6 Exceptions

Exceptions to the foregoing requirements include the following:

Waste contained in a lab-Pack (combination packaging). Combination packaging is defined in 49 CFR §171.8 as ".....one or more inner packagings secured in a non-bulk outer packaging" and is subject to the Department of Transportation shipping package requirements of 49 CFR Part 173.

Commercial products or chemicals: off-specification, outdated, unused, or banned. This also includes products voluntarily removed from the market place by a manufacturer or distributor.

"Empty" containers of waste materials, commercial products or chemicals. This applies to portable containers which have been emptied, but which may hold residues of the product, chemical, or containers containing other empty containers. Examples of containers are: tanks, drums, barrels, cans, bags, liners, etc. A container shall be determined "empty" according to the criteria specified at IDAPA 58.01.05.005 {40 CFR §261.7}. These empty containers may be crushed, shredded, or intact.

Residue and debris from the cleanup of spills or releases of chemical substances, previously approved wastes, commercial products, or a waste, which would otherwise qualify as an exception.

Wastes, which are visually identifiable through an inspection process. (Examples may include cathode ray tubes, batteries, fluorescent light tubes, filters and filter cartridges, wire or tubing, paper products, metal sheeting and parts, crushed glass, piping, etc.)

Demolition wastes. This consists of waste produced from the demolition or dismantling of industrial process equipment or facilities contaminated with chemicals from the process. Knowledge of the process and chemicals used in the process allows characterization of the waste sufficient for safe management.

Articles, debris, non-RCRA wastes, equipment and clothing containing or contaminated with polychlorinated biphenyl's (PCBs). This includes PCB capacitors, transformers, gloves or aprons from draining operations, empty drums that formerly held PCBs, etc.

PCB draining and flushing removed from PCB articles. This includes PCB articles flushed with a substance (e.g. toluene or unused diesel).

USEI site generated waste, including hazardous and non-hazardous waste.

Controlled substances regulated by government agencies including drugs and/or materials from clandestine labs.

Materials that are brokered for management at an alternate facility. These materials are received for storage and subsequent offsite management only. If it is determined USEI will process a waste previously designated for storage and subsequent off-site shipment, the waste will be reviewed utilizing the normal approval process prior to on-site processing. For materials received at another regulated company and subsequently shipped to USEI, the other facility may transmit the relevant information to USEI for use in the pre-acceptance or load arrival review programs, as is appropriate.

Wastes from remedial projects in which the waste characterization is known through a sampling plan that was approved by a federal or state agency (e.g.; CERCLA or Potentially Responsible Party type project) or other well-developed plan.

Debris as defined at IDAPA 58.01.05.011 {40 CFR §268.2}. These materials will be visually inspected prior to acceptance in order to ensure the waste meets the definition of debris. Detailed procedures are provided in Section C.7.1.1.

Contaminated personnel protective equipment (PPE) (e.g., gloves, Tyvek, respirator cartridges).

Aerosol cans.

Vitrified, Cemented, and Other Materials Exhibiting High Structural Integrity. There are several materials which are not conducive to sampling which must be recognized. Structural steel, tanks, pipe, cement, glass, empty drums, machinery, equipment, manufactured items, monolithic / cemented materials, and several other materials are managed which do not allow for normal sampling protocols. By necessity, these materials must be managed on a case-by-case basis. In some cases a clean-up agency (e.g., EPA, IDEQ, etc.), generator, or contractor has established a rational basis of data and waste characterization information. In those cases, this information may be utilized in lieu of pre-acceptance analytical and incoming load analytical information, and the physical appearance screen will be utilized to confirm material acceptability upon arrival;

Non- RCRA Radioactive Waste (including NORM, NARM, etc.) and waste as described below:

- Sampling and analysis of the above waste materials is not required unless specifically requested by USEI. These materials are not sampled and analyzed because the chemical and physical characteristics of the waste are known in sufficient and reliable detail or the waste has been previously characterized and shipped from another generator, broker or TSDF, or visual inspection of these shipments is sufficient for verification of their identity. Section P, ERMP-01, provides detailed procedures for the receipt of radiological materials. USEI will obtain and evaluate all the information required by IDAPA 58.01.05.008 {40 CFR §§264.13(a)(1) and 264.13(a)(2)} necessary to characterize, treat, store, or dispose of the waste.

In addition, USEI may waive incoming waste load sampling and analysis where the pre-acceptance documentation supplies sufficient information to assure compliance with permit conditions and operational constraints, or any of the following conditions exist:

- A sample cannot be reasonably obtained, such as filter cartridges, tank clean-out sludge (prior to the clean-out), large pieces of contaminated material, or contaminated debris. In these cases, the shipment will still be inspected for conformance with manifest and pre-acceptance documentation as previously described;

- Obtaining a representative sample poses an unnecessary or unavoidable hazard of acute or chronic exposure of USEI employees to carcinogenic, mutagenic, neoplastigenic, teratogenic, or sensitizing materials (e.g., asbestos); or,

- The material's odor poses a public nuisance when sampled.

## *C.7.2 Decision Evaluation Logic*

There are major decision points regarding the need for evaluation of whether a waste found to be dissimilar to the pre-acceptance evaluation can still be accepted. USEI decides whether additional analyses are required for a particular waste based on the following:

Results of Fingerprint Analyses;

Knowledge of generator and/or waste-generating process;

Results of pre-acceptance evaluation; and

Waste codes.

Further testing will be conducted as necessary if the results indicate unexpected characteristics with respect to pre-acceptance analytical results, or if there is suspicion the waste composition has changed. Effectiveness of the waste identification step is dependent on the following components:

Inspection;

Sampling (where required);

Analytical results (where required);

Waste Product Questionnaire;

Hazardous Waste Manifest;

Waste Screening Analytical Results;

Facility management's judgment.

To facilitate the waste identification process, fingerprint analytical data is compared to the corresponding pre-acceptance analysis (WPF, ICF, etc.). The Fingerprint Analysis verifies the waste is indeed the same waste as represented by the pre-acceptance analysis. When a load is received, the pre-acceptance information is reviewed. USEI classifies waste as being in non-conformance when it is significantly different in composition from the information shown in the WPF or the pre-acceptance results, or if there is a significant discrepancy between the waste shipment and the manifest (as defined in IDAPA 58.01.05.008 and 40 CFR §264.72), unless the discrepancy can be clarified. Figure C-6 provides a flow chart for waste re-evaluation procedures.

Wastes found to be in non-conformance may be rejected immediately, or may be re-evaluated for possible acceptance despite the variance. Re-evaluation will be based on any or all of the following criteria:

Permit authorization;

Land Disposal Restrictions;

Discussions with the generator; and

Facility conditions.

Pursuant to IDAPA 58.01.05.008 {40 CFR §264.72}, USEI must attempt to resolve with the generator or transporter significant discrepancies between the actual waste and that shown on the manifest. Changes to the manifest or WPF may be made with the customer's concurrence or at the customer's request. Any corrections or other changes made to the manifest or WPF will be initialed by the person making the change. Other discrepancies noted (such as improper mailing addresses, identification numbers, telephone numbers) may be either corrected or noted in manifest block 19.

For bulk loads manifested by weight, the load is typically weighed on-site. However, if the scale is out of service, other methods may be employed to estimate the weight of the delivery. Other methods include utilization of nearby (off-site) scales, weight estimation techniques, and utilization of tare weights to calculate approximate net weights. If a significant weight discrepancy is noted, the procedures of IDAPA 58.01.05.008 {40 CFR §264.72} are employed. For piece count deliveries (e.g., vans of containers, etc.), the piece count is confirmed. Under typical conditions all of these activities are conducted upon delivery to the facility or within a short time thereafter. However, there are situations when these conditions are not satisfied upon delivery (e.g., a load is delivered and staged prior to being approved or accepted, small containers are contained within heat shrink material and cannot be counted prior to breaking the load, etc.). In these instances and consistent with IDAPA 58.01.05.008 {40 CFR §264.71(a)(3)}, the transporter is given a signed copy of the manifest. If a significant weight or piece count discrepancy is later discovered, an attempt to reconcile it will be made. If a significant manifest discrepancy cannot be resolved within 15 days of discovery, notification of the discrepancy will be sent to the IDEQ, along with the steps taken to resolve the discrepancy.

# C.8 Process Operations Procedures

Each movement of a waste within the facility, during which any change in its characteristics may occur, may make the waste subject to additional inspection, sampling, and analysis to determine appropriate handling and management of the waste. Many of the analyses needed for the treatment, storage, and/or disposal functions are performed during incoming shipment identification and are not repeated unless it is known or believed that waste characteristics may have significantly changed during storage or processing and/or such information is deemed necessary for the safe management of the waste.

Existing and anticipated process operations at the facility, for which current and periodic sampling and analyses are important, include the following:

Treatment, including stabilization;

Storage; and

Disposal, consisting of landfilling and/or solar evaporation.

The analytical procedures for each of these processes are described in the following Sections.

## *C.8.1 Storage*

Before any waste is placed into storage USEI will assess the compatibility of the waste with wastes already in storage as described in Section C.6.5.

### C.8.1.1 Liquid Storage / Transfer / Management

Liquid wastes may be transferred from containers to tanks or to trucks although a waste may be fed directly to the designated treatment unit (e.g.; tanks). Upon arrival, liquid waste will be subjected to the appropriate waste identification analyses, plus a commingled waste compatibility test, if appropriate, to assure safe storage. If a liquid load is exempted from sampling, as described in Section C.7.1.6, the waste will be segregated from other wastes based on USEI's technical assessment of the waste (e.g., compatibility class).

### C.8.1.2 Containerized Storage

Using the predominant hazard classification on incoming containerized waste, the proper storage area will be designated to ensure segregation of stored incompatible waste.

Based on the initial hazard determination made by the generator on the WPF and/or the final identification of the waste shipment, containerized waste will be segregated in the following manner: flammable, corrosive, and oxidizing waste materials will be separated from incompatible materials or stored in separate areas. Wastes are separated/maintained in separate storage areas until they are treated, transferred, or disposed as described in Section C.6.5.

## *C.8.2 Brokering and Material Transfer Operations*

This section discusses process analyses associated with the brokering of materials. Transfer of materials for off-site disposition is discussed, since this process may involve consolidation/bulking of waste materials to meet the receiving facility's specifications.

### C.8.2.1 Consolidation/Bulking for Off-Site Transfer

This activity involves the consolidation/bulking of solid wastes into rolloffs or other appropriate containers or the pumping of containerized liquid wastes into tank trucks or other large containers for delivery off-site. Additionally, liquid waste containing sufficient heating values for combustion are bulked with other suitable waste. The resultant liquid bulked materials are used to provide heat content for combustion processes (either as hazardous waste derived fuel or as a hazardous waste, as applicable) at off-site lime kilns, incinerators, or similar operations (e.g. disposal).

According to IDAPA 58.01.05.004 {40 CFR §260.10}, treatment is defined as "Any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such wastes non-hazardous; safer to transport, or dispose of; or amenable for recovery, amenable for storage or reduced volume". In short, if an activity does not change a hazardous waste, it is not treatment. Waste bulking or otherwise containerizing multiple hazardous wastes for transportation will not typically change the physical and chemical properties of the waste.

The EPA has provided guidance (Faxback 13308, 13720, 11281, 11497, 12458, and 13764) that activities such as bulking, containerizing, and consolidation are not considered treatment, as long as no blending (e.g., selective mixing to meet a fuel standard) is taking place. Incidental mixing of wastes that occurs when several waste streams of similar waste types are bulked is not considered treatment. Also, if the intent of consolidation is to make it more efficient and cost effective to transport the shipment, the activity is not considered treatment. The important point in this discussion is that as long as the intent of the consolidation/bulking in question is not intended as treatment and the material is still sent to an appropriate TSD facility for treatment, then the activity is not considered treatment (i.e., intent of the consolidation/bulking is not to conduct treatment).

When evaluating hazardous waste for consolidation/bulking, the pre-acceptance analysis is used to determine the acceptability of each waste stream. Additional analysis for heat value may be required for materials destined for supplemental fuels, depending on the regulatory status of the potential receiving BIF(s), to evaluate sham-recycling restrictions. For materials destined for incineration, or other processes this analysis is not necessary.

In-process analyses may be performed to assure the aggregation / bulking of wastes is within the receiving facility's specifications, if any. This is necessary because acceptance criteria for the USEI facility may be different than the receiving facility's specifications, which are based upon that facility's permits, regulations, or other needs. For example, if the receiving facility has a minimum requirement for heat value and a maximum requirement for chlorides, then the bulked material requirements will be a function of the receiving facility's requirements for both parameters.

Post-consolidation analyses may consist of tests necessary to confirm that the bulked material is suitable for offsite disposal. Consolidation activities will occur in the CMU's as described in Section D.1.

## *C.8.3 Treatment Technologies*

USEI utilizes several different treatment technologies in order to meet the applicable land disposal restriction (LDR) or other standard as applicable. USEI utilizes the term "stabilization" throughout this document in a generic sense to mean the treatment of a waste material to make it physically and chemically stable. In this sense, it consists of those processes, which make the material pass applicable LDR standards or other applicable standard(s).

In this process, waste is treated to meet land disposal restrictions (e.g., elimination of free liquids, chemical and/or physical stabilization to remove or immobilize hazardous constituents, micro-encapsulation, macro-encapsulation, etc.) or to meet other appropriate requirements (e.g., permit or regulatory requirements). IDAPA 58.01.05.011 {40 CFR §268.42} provides specific definitions for several potentially distinct treatment technologies including Stabilization, Chemical Oxidation, Chemical Reduction, Deactivation, Macro/Micro Encapsulation, Neutralization, Adsorption, Bio-remediation, Evaporation, and Precipitation. Although the above treatment technologies may be considered distinct processes, the stabilization process is defined in the more generic sense due to the overlap of the associated treatment technologies and methods.

Pre-treatment analyses consist of tests necessary to ensure the wastes can be treated to meet the applicable treatment requirement. In-process analyses are generally not required. Post-treatment analyses are performed, as necessary, to ensure restricted wastes meet applicable treatment standards.

The following technologies, defined as "stabilization" within this WAP and associated documents are utilized by USEI:

### C.8.3.1 Stabilization

Stabilization is defined by IDAPA 58.01.05.011 {40 CFR §268.42} as stabilization with the following reagents (or waste reagents) or combinations of reagents (1) Portland Cement; or (2) lime/pozzolans (e.g., fly ash and cement kiln dust) – this does not preclude the addition of reagents (e.g., iron salts, silicates, and clays) designed to enhance the set/cure time and/or compressive strength, or to overall reduce the leachability of the metal or organic. Stabilization is the treatment of appropriate waste streams by use of pozolonic materials or wastes with pozolonic properties to reduce the leachability of organic, inorganic or metals of concern. Appropriate use of this treatment technology is determined during the approval process. A mix design is developed prior to the treatment of a waste stream. Stabilization may be performed within Mix Bin Tanks, or Containers. Treatment locations may be the Stabilization portion of the Containment Building, the Debris portion of the Containment Building or the Stabilization Facility. Treatment is performed to meet applicable LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

## C.8.3.2 Chemical Oxidation

Chemical oxidation is a treatment process targeted primarily at organic constituents, (e.g., toluene and benzene) but may be used for inorganic constituents as well (e.g., cyanides and heavy metals such as mercury). An organic or inorganic species is oxidized when its respective chemical oxidation number increases (i.e., loses electrons). Consistent with IDAPA 58.01.05.011 {40 CFR 268.42}, the following oxidation reagents (or waste reagents) may be used in part or whole: (1) Hypochlorite (e.g. bleach); (2) chlorine; (3) chlorine dioxide; (4) ozone or UV (ultraviolet light) assisted ozone; (5) peroxides; (6) persulfates; (7) perchlorates; (8) permanganates; and/or (9) other oxidizing reagents of equivalent efficiency. An approved mix design is formulated and tested prior to treatment.

Chemical oxidation may be performed within Mix Bin Tanks or Containers. Treatment is performed to meet EPA LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

## C.8.3.3 Chemical Reduction

Chemical reduction or redox occurs when the targeted component/constituent atoms change as a resultant transfer of electrons from one chemical species to another. The chemical oxidation number for the targeted components decreases (i.e., gains electrons) when the target constituents are reduced. Conversely, the reducing reagents used in this process lose electrons or become oxidized. Derived from IDAPA 58.01.05.011 {40 CFR 268.42}, the following reducing reagents (or waste reagents) may be used in whole or part: (1) Sulfur dioxide; (2) sodium, potassium, (salts), or other alkali salts or sulfites, bisulfites, metabisulfites and polyethylene glycols (e.g., NaPEG and KPEG); (3) sodium hydrosulfide; (4) ferrous salts; and/or (5) other reducing reagents of equivalent efficiency. An approved mix design is formulated and tested prior to treatment.

Chemical reduction may be performed within Mix Bin Tanks or Containers. Treatment is performed to meet EPA LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

## C.8.3.4 Deactivation

Deactivation is the treatment of those wastes that exhibit the characteristics of ignitability, corrosivity, and/or reactivity. Appropriate use of this treatment technology is determined during the pre-acceptance process. A mix design is developed prior to the treatment of the waste stream. Deactivation may be performed within Mix Bin Tanks, or Containers. Treatment is performed to meet applicable LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

## C.8.3.5 Macro Encapsulation

Macro-encapsulation is a confining or immobilization technology used to treat all types of hazardous debris independent of the hazardous constituents involved (with the exception of cyanide-reactive debris). The macro-encapsulation process encases the debris to provide a physical barrier that prevents/minimizes potential leaching of hazardous constituents from the debris. The encapsulating barrier does not need to chemically bond to either the debris or hazardous constituents. Macro-encapsulation is defined in IDAPA 58.01.05.011 {40 CFR §268.42, Table 1} as the application of surface coating materials such as polymeric organics (e.g., resins, plastics) or use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media. Inert non-waste material, or waste meeting appropriate LDRs, may be used for filler material.

Macro-encapsulation does not require specific testing for LDR constituent standards. This waste is treated at the facility to meet all requirements of the LDR treatment technology standard and is certified by USEI to meet these requirements prior to disposal. Macro-encapsulation may be performed at the Containment Building, CMU's: CSP # 4/5, Truck Unloading Aprons, and the RCRA/PCB Building.

The performance standard for the macro-encapsulation technology is described under IDAPA 58.01.05.011 {40 CFR Part §268.45, Table 1}, entitled "Alternative Treatment Standards for Hazardous Debris". This standard states that "Encapsulating material must completely encapsulate debris and be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other wastes, microbes).

## C.8.3.6 Micro Encapsulation

Micro-encapsulation is confining or immobilization technology that requires the stabilization of the debris with the following types of reagents (or waste reagents) such that the leachability of the hazardous contaminants is reduced: (1) Portland cement; or (2) lime/pozzolans (e.g., fly ash and cement kiln dust) (3) Additional reagents (e.g., iron salts, silicates, carbon, polymers or clays) as appropriate.

Micro encapsulation does not require specific testing for LDR constituent standards. Following the treatment process, the micro-encapsulated debris is visually inspected. Micro encapsulation may be conducted in tanks or containers. The performance standard for the micro-encapsulation technology is described under IDAPA 58.01.05.011 {40 CFR Part §268.45, Table 1} titled "Alternative Treatment Standards for Hazardous Debris". This standard states that "Leachability of contaminants must be reduced".

## C.8.3.7 Neutralization

Neutralization is a treatment process designed to render corrosive matrices non-corrosive. According to IDAPA 58.01.05.011 {40 CFR 268.42}, the following reagents (or waste reagents) in part or whole may be used for neutralization: (1) Acids; (2) Bases; or (3) water (including wastewater's) resulting in a pH greater than 2 but less than 12.5 measured in the aqueous residuals. An approved mix design will be formulated and tested before waste is treated by neutralization.

Neutralization may be performed within Mix Bin Tanks or Containers. Treatment is performed to meet EPA LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

## C.8.3.8 Precipitation

Precipitation is the process by which regulated metals and/or inorganics are precipitated out as insoluble precipitates of oxides, hydroxides, carbonates, sulfates, chlorides, fluorides, or phosphates. This process entails adjusting the pH of the waste matrix between 9 and 11. This pH range is ideal for hydroxide precipitation. An alternative to this common standard practice is sulfide precipitation. Sulfide precipitates are less soluble and non-amphoteric (less pH dependent than hydroxyl precipitates). However, caution must be employed to ensure hydrogen sulfide is not released at harmful levels by maintaining a pH greater than 8 throughout the treatment process. Based on IDAPA 58.01.05.011 {40 CFR 268.42}, the following reagents (or waste reagents) are typically used alone or in combination: (1) Lime (i.e., containing oxides and/or hydroxides of calcium and/or magnesium; (2) caustic (i.e., sodium and/or potassium hydroxides; (3) soda ash (i.e., sodium carbonate); (4) sodium sulfide; (5) ferric sulfate or ferric chloride; (6) alum; or (7) sodium sulfate. Additional flocculating, coagulation or similar reagents/processes that pertain to precipitation are not precluded from use. An approved mix design will be tested prior to treatment.

Precipitation may be performed within Mix Bin Tanks or Containers. Treatment is performed to meet EPA LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

## C.8.3.9 Adsorption

Adsorption is the use of an appropriate reagent (e.g. activated carbon or treated clay) to remove chemical components from aqueous or compressed gas waste streams. Adsorption of compressed gas waste streams is not currently employed at USEI, but may be in the future, with prior IDEQ approval. It is most commonly employed for the removal of organic compounds, although some inorganic constituents are effectively removed as well. This process is achieved through physical, chemical, and electrostatic interactions between the waste material and the adsorbent media. Pursuant with IDAPA 58.01.05.011 {40 CFR 268.42}, Total Organic Carbon can be used as an indicator parameter for the adsorption of many organic constituents that cannot be directly analyzed in wastewater residues.

Adsorption primarily occurs in the carbon vessels located in the site leachate building. Adsorption at USEI is primarily used to treat site leachate, but could also be used to treat shipments of liquids contaminated with organics or other compounds amenable to removal by adsorption. Site leachate is pumped from landfill sumps into Tank 4. Leachate is pumped from the tank through the carbon vessels and collected in Tank 1, prior to being released to the site Evaporation Pond. For a full description of the process used for managing site leachate, please refer to Appendix D.2.5 of the RCRA Part B Permit application. Adsorption may also be performed within Mix Bins, Tanks or Containers. Treatment is performed to meet EPA LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP and Appendix D.2.5 (for on-site generated waste).

## C.8.3.10 Evaporation

Evaporation of wastes primarily occurs within the Evaporation Pond. Non-hazardous liquids and hazardous liquids meeting applicable LDR's that meet the conditions of this WAP are placed in the Evaporation Pond for evaporation. The USEI facility has a net evaporation rate of approximately 53 inches per year, which allows for evaporation of liquids using solar energy. Waste liquids selected for evaporation must meet Evaporation Pond Parameters set forth in this WAP before being placed in the pond. Parameters are presented in Table C-10, Process Tolerance Limits for Each Process Unit.

## C.8.3.11 Bio-remediation

Bio-remediation is the use of biological mechanisms to destroy, transform, or immobilize environmental contaminants. Bio-remediation is normally conducted in-situ, however, there may be scenarios where it would be conducted at an alternate facility such as a TSDF. Bio-remediation would be performed within tanks or containers. Bio-remediation is not currently employed at USEI.

## Table C-10 Process Tolerance Limits for Each Process Unit

| Process Unit | Limit | Rationale |
|---|---|---|
| Landfill | No hazardous waste (including on-site stabilized waste) containing free liquids per paint filter test except those allowed by 40 CFR 264.315 | Regulatory restriction |
| | Compressed gasses | Regulatory restriction |
| | No IDAPA 58.01.05.011 (40 CFR Part 268) Land Ban waste unless allowed by regulatory variance, exception, or treatment standard | Regulatory restriction |
| | Containers of hazardous waste must be filled to 90 percent of capacity. Empty Containers must be crushed | Regulatory restriction |
| | Must be compatible with other waste classifications in segregation cell | Adjacent waste in landfill must be compatible |
| Stabilization Units (e.g. Mixing Tanks and Containers) | Wastes in Stabilization Units are subject to the applicable Control/ Management standards of 40 CFR Part 264 Subpart CC Air Emission Standards for Tanks, Surface Impoundments and Containers | Regulatory requirement |
| | No fine wastes may be processed in the Stabilization Facility or the Debris portion of the Containment Building | Fine wastes are restricted to the Stabilization Building to comply with applicable air emission standards |
| | No hazardous wastes with a pH less than 2.0 unless treated or removed in the same day or placed in compatible container | Compatibility with equipment and additives |
| | No flammable liquid wastes (flash point <100 F) | Safety |
| | Treatability to achieve chemical stabilization must be established | Processing conditions and ability to meet process parameter requirements must be established |
| Container Crushing | Container must be RCRA empty | Regulatory restriction |
| Drum Storage | Wastes in Storage are subject to the applicable Control/ Management standards of 40 CFR Part 264 Subpart CC Air Emission Standards for Tanks, Surface Impoundments and Containers | Regulatory requirements |
| | Waste must be compatible within a single storage cell | Prevent reactions due to incompatibility |

| Process Unit | Limit | Rationale |
|---|---|---|
| Waste Water Tank Storage | Wastes in Tank Storage are subject to the applicable Control I Management standards of 40 CFR Part 264 Subpart CC Air Emission Standards for Tanks, Surface Impoundments and Containers | Regulatory requirement |
| | Must be compatible with other wastes in tank | Prevent reactions due to incompatibility |
| Evaporation Pond | No hazardous waste subject to the management standards of 40 CFR Part 264 Subpart CC Air Emission Standards for Tanks, Surface Impoundments and Containers | Surface impoundments do not meet the design and operational standards required by 40 CFR §264.1085 |
| | No visible oil phase separation | Prevent barrier to evaporation |
| | No IDAPA 58.01.05.011 (40 CFR Part 268) Land Ban wastes unless allowed by regulatory variance, exception, or treatment standard | Regulatory restriction |
| | No pH less than 2.0 | Prevent reactions due to incompatibility |
| | No pH greater than 12.5 | Prevent reactions due to incompatibility |
| | Must be compatible with other wastes in pond | Prevent reactions due to incompatibility |
| Containment Building (storage) | Waste must be compatible with other wastes within each receiving/processing area | Prevent reactions due to incompatibility |
| Macro-encapsulation | No flammable liquid wastes (flash point <100F) | Safety |
| | No hazardous waste consisting of containers that retain at least 75% of their original volume, unless the container is ruptured | Regulatory restriction; not considered hazardous debris per IDAPA 58.01.05.011 (40 CFR Part 268) |
| | No hazardous debris exhibiting the characteristic of reactivity for cyanide | Regulatory restriction; not allowed to be treated by macro-encapsulation per IDAPA 58.01.05.011(40 CFR Part 268.45) |
| | Process wastes are not considered debris per IDAPA 58.01.05.011 (40 CFR §268.2) | Regulatory restriction; not considered hazardous debris per IDAPA 58.01.05.011 (40 CFR Part 268) |
| | Waste with a specific treatment standard per IDAPA 58.01.05.011 (40 CFR Part 268 Subpart D) (e.g., intact lead acid batteries) are not considered debris | Regulatory restriction; not considered hazardous debris per IDAPA 58.01.05.011 (40 CFR Part 268) |

| Process Unit | Limit | Rationale |
|---|---|---|
| Macro-encapsulation (continued) | Must be compatible with equipment and additives | Prevent uncontrolled reaction or toxic gas generation |
| Micro-encapsulation | Waste subject to the 40 CFR Part 264 Subpart CC Air Emission Standards when managed in Tanks, Surface Impoundments and Containers | Regulatory requirement |
| | No flammable liquid wastes (flash point <100F) | Safety |
| | No hazardous waste consisting of containers that retain at least 75% of their original volume, unless the container is ruptured | Regulatory restriction; not considered hazardous debris per IDAPA 58.01.05.011 (40 CFR Part 268) |
| | No waste exhibiting the characteristic of reactivity for cyanide | Regulatory restriction; not allowed to be treated by micro-encapsulation per IDAPA 58.01.05.011 (40 CFR §268.45) |
| | Waste with a specific treatment standard per IDAPA 58.01.05.011 (40 CFR Part 268 Subpart D) (e.g., intact lead acid batteries) is not considered debris | Regulatory restriction; not considered hazardous debris per IDAPA 58.01.05.008 (40 CFR Part 268) |
| | Process wastes are not considered debris per IDAPA 58.01.05.011 (40 CFR §268.2) | Regulatory restriction; not considered hazardous debris per IDAPA 58.01.05.011 (40 CFR Part 268) |
| | Hazardous debris surfaces must be in contact with the reagents used | Definition of micro- encapsulation |
| | Material must be predominantly hazardous debris as defined 40 CFR 268.45 | Regulatory restriction |
| Crusher Operation | No flammable liquid wastes (flash point <100 F) | Safety |
| | No large sheets of plastics, rubber or cloth | Potential for equipment jams |
| | No steel drums that are not RCRA empty | Crusher limits and safety |
| | No compressed gas cylinders | Safety |
| | Must be compatible with equipment and additives | Prevent potential uncontrolled reaction or toxic gas generation |

## *C.8.4 Acceptance and Management of Corrective Action Management Unit (CAMU) Wastes*

The Permittee is authorized to accept, manage, and dispose of CAMU-eligible wastes, as defined in IDAPA 58.01.05.008 [40 CFR § 264.552(a)(1) & (2).]

For each CAMU remediation waste proposed for acceptance, the Permittee must submit a CAMU-eligible waste stream information package for review by the Director unless exempted as provided below. The information package will document that:

1. The designation of CAMU-eligible waste has been performed by a duly authorized agency,
2. Principal hazardous constituents have been identified and are required to be treated to meet any of the standards referenced in 40 CFR §264.555 (a) (2),
3. The CAMU-eligible waste designating authority provided a public notice and an opportunity for public comment for both the CAMU designation and the placement of the CAMU in an off-site permitted hazardous waste landfill,
4. The approval is specific to a single remediation,
5. All information provided by the person seeking approval (the waste generator) to the duly authorized agency making the CAMU-eligible waste designation has been included in the information package.

For each CAMU-eligible waste proposed for acceptance, the Director and persons on the Permittee's mailing list will be notified of the Permittee's intent to receive CAMU-eligible wastes. This notification shall include the source of the remediation waste, the principal hazardous constituents in the waste, and the treatment requirements. The mailing list notice will be sent within 7 days of the request to the Director and will state that comments or objections to receipt of the waste may be submitted to the Director within 15 days of the notice. Proof of the mailing list notification will be submitted to the Director within seven (7) days of completion.

The Permittee must comply with 40 CFR § 268.7(b)(4) except the certification must state the CAMU wastes meet the referenced treatment requirements at 40 CFR § 264.555(a)(2). The Permittee must dispose of all CAMU-eligible wastes in Permitted landfill cells only. Prior to disposal, all CAMU-eligible wastes must meet one of the standards as discussed in 40 CFR § 264.555(a)(2)(i), (ii), or (iii).

The Permittee may not receive any CAMU-eligible waste until written approval is received from the Director. The Director may take a 30-day review period, with an optional 30-day extension, from the date of receipt of the request from the Permittee.

The Director may object to the Permittee's acceptance of any specific CAMU-eligible waste stream. If such written objection is issued, the Permittee may not receive the specific CAMU-eligible waste stream. If at the end of the review period the Director has not notified the Permittee that he or she has chosen not to object, the Permittee may not receive the specific CAMU-eligible waste stream until the objection has been resolved, or the Permittee obtains a permit modification specifically authorizing receipt of the specific CAMU-eligible waste stream.

As part of the permit modification process, the Director may modify, reduce, or eliminate the notification requirements described in this section of the WAP as they apply to specific categories of CAMU-eligible waste, based on minimal risk.

## *C.8.5 Wastes Meeting the Treatment or Technology Standard upon Arrival*

USEI receives waste meeting applicable treatment standards that either has been treated by the generator, a treatment facility, or meets the standard as initially generated. These shipments must be

accompanied by a proper notification and certification or, if determined to meet the standard by USEI, USEI may complete the certification. Wastes in this category may be analyzed for conformance with the treatment standards during the pre-acceptance review, during the load acceptance review, or when USEI believes the waste may no longer meet the standard.

Wastes received meeting a technology-based treatment standard will not be tested for LDR constituent standards. The only LDR required analysis for this type of waste is that it is properly certified, in full or in part, to have been treated by the appropriate technology for the waste codes applied.

## *C.8.6 Treating Wastes Containing Free Liquids*

In this process, wastes not otherwise restricted are treated solely to stabilize (solidify) free liquids. Pre-treatment analyses consist of the Fingerprint Analyses performed on incoming shipments unless freestanding liquids are observed (in which case USEI can conclude the waste has free liquids without the analytical test). If free standing liquids are present, they are either removed, stabilized by either placing a stabilization agent in the container or placing the contents into a stabilization unit, or by shredding the container and its contents and, if necessary, stabilizing the shredded material. If freestanding liquids are not observed and process specific criteria are met, (e.g., paint filter test) then the waste may be landfilled directly. If free liquids are decanted, any remaining material containing free liquids will be stabilized using appropriate reagents prior to landfilling, if necessary. Bulk loads, which otherwise do not contain significant quantities of free standing liquids may be “spot stabilized” in order to meet the requirements of IDAPA 58.01.05.008 {40 CFR §264.314(a)} as is sometimes necessary for otherwise dry wastes which have received precipitation during transportation.

In addition, Supplemental Analyses may be requested by USEI to further evaluate the waste. Stabilized wastes will be tested using the Paint Filter Liquids test if the presence of free liquids is still suspected. Figure C-8 provides a flow chart for potential processing techniques, following decanting.

## *C.8.7 Treating Wastes to an Approved Delisting Requirement*

USEI successfully petitioned the IDEQ to implement its patented treatment technology for the delisting of K061 waste. Wastes treated to an approved delisting requirement shall be sampled and analyzed in accordance with the specific delisting requirements outlined in IDAPA 58.01.05.005.01. This includes specific verification testing and delisting levels.

## *C.8.8 Landfill Disposal*

USEI’s sampling & analyses program is an integral part of this phase of operation as the results serve to evaluate compliance with permit constraints, land disposal restrictions, and determine safety constraints. Landfill disposal operations require only pre-disposal analyses. Wastes to be landfilled are subject to the Fingerprint Analyses for pre-acceptance samples and incoming waste shipments, unless otherwise specified.

## *C.8.9 Solar Evaporation*

The Evaporation Pond is used to reduce the volume of waste by solar evaporation of the liquid components of waste. There are two other permitted surface impoundments (Collection Pond Nos. 1 and 3) at the facility which collect surface runoff from active portions of the facility. This water may also be stabilized prior to disposal/evaporation or may be used in the stabilization process as an additive. The end use of the collected runoff depends on its quantity and composition. The runoff is evaluated prior to transfer from the collection ponds to confirm that it is suitable for the intended use.

Pre-acceptance evaluation and waste receipt control requirements are discussed in Section C.6. These control requirements are also used as part of the waste process controls. Wastes designated for

placement in the Evaporation Pond are also subjected to the balance of process control parameter analyses as presented in Table C-10 to verify that the waste is amenable to Evaporation Pond treatment. Figure C-9 shows the process control procedures used for the Evaporation Pond.

The wastes to be placed in the Evaporation Pond consist of aqueous wastes. They have relatively low concentrations of total or suspended solids, relatively non-aggressive corrosive characteristics (pH of 2 to 12.5), low concentrations of organic compounds, and no visible oil phase separation, which would impede evaporation.

No hazardous waste subject to IDAPA 58.01.05.008 {40 CFR Part 264} Subpart CC management requirements is accepted for placement into the Evaporation Pond. Waste/liner compatibility and waste/waste compatibility are established in the pre-acceptance evaluation.

USEI's sampling & analyses program is also an integral part of the Evaporation Pond as the results serve to evaluate compliance with permit constraints, land disposal restrictions, and determine safety constraints. Evaporation operations require only pre-disposal analyses. Wastes to be evaporated are typically subject to the Fingerprint Analyses for pre-acceptance samples and incoming waste shipments. Figure C-9 provides a flow chart of process control parameters for evaporation activities.

## *C.8.10 Wastes Treated On-site*

Certain wastes are treated on-site to meet specific treatment standards. Typically, USEI requires a representative sample of the waste prior to on-site management. The waste sample is then mixed with various types of reagents to determine an acceptable mix-design (recipe) by which the waste is treated (separately or along with other wastes) to pass the required LDR standard(s).

A mix design is chosen by USEI, which will meet LDR standard(s). Waste shipments of that particular waste are then treated according to the treatment identified as capable of meeting the applicable treatment standard(s). A treatment certification will be made for each batch treated. In some cases, it may be appropriate to create mix designs after acceptance, but prior to treatment (e.g., batches of mixed wastes streams, etc.), or perhaps during or after treatment (if an approximate recipe is first determined and in-process analysis aids in further mix design development).

Debris, as defined in IDAPA 58.01.05.08 (40 CFR §268.45) may be treated by micro-encapsulation or macro-encapsulation.

## *C.8.11 LDR and CAMU Verification*

The treatment standards are verified prior to ultimate disposal per the requirements of this WAP. LDR or CAMU conformational testing is conducted on waste stabilized at the facility or the CAMU remediation site to verify applicable treatment standards, except alternate treatment standards (e.g.; macro- & micro-encapsulation). Samples are collected from the first two batches of each hazardous waste stream treated at the facility, and at least once a year thereafter. In order to perform verification testing on batches of wastes exceeding 50yds.$^3$ treated in MBT-3 or MBT-4 in the Containment Building – Debris Portion, samples will be collected from each truckload of treated waste removed from the tank(s) in accordance with the procedures described in Section C.4. Batches of treated waste less than or equal to 50yds.$^3$ will be sampled in the same manner as MBT-1 and MBT-2 in the Containment Building – Stabilization Portion. The sampling frequency may be increased on waste streams that exhibit significant variable characteristics, as determined necessary by the technical reviewers.

Since treated wastes are treated based on an established recipe, they are assumed to meet the applicable treatment standard(s) and may be staged pending verification analyses, if applicable. Additional samples may be collected as necessary while performing verification analyses. Resampling associated with interim Processing Piles is discussed in more detail in Section C.11.5.

Macro-encapsulation does not require specific testing for LDR constituent standards. The performance standard for the macro-encapsulation technology is described under IDAPA 58.01.05.011 {40 CFR Part §268.45, Table 1}, entitled "Alternative Treatment Standards for Hazardous Debris". This standard states that "Encapsulating material must completely encapsulate debris and be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other wastes, microbes).

Additionally, micro-encapsulation does not require specific testing for LDR constituent standards. Following the treatment process, the micro-encapsulated debris is visually inspected. Micro encapsulation may be conducted in tanks or containers. The performance standard for the micro-encapsulation technology is described under IDAPA 58.01.05.011 {40 CFR Part §268.45, Table 1} titled "Alternative Treatment Standards for Hazardous Debris". This standard states that "Leachability of contaminants must be reduced".

# C.9 Waste Management Units

Section D provides detailed process information associated with all waste management units. The following sections describe the types of treatment conducted in the various waste management units available at the facility.

## *C.9.1 Containment Building*

This Section provides information for the Containment Building. Further detail is provided in Section D.9. The Containment Building (Stabilization and Debris portions) is designed, and operated to meet the criteria for containment buildings described under IDAPA 58.01.05.008 {40 CFR 264 Subpart DD - Containment Buildings}. Operations occur as follows:

Physical Treatment, including stabilization; and

Mechanical Processing, including sorting/size reduction/crushing (Misc. Unit – Subpart X).

The Containment Building is used to store and treat non-bulk and bulk containers with or without free liquids anywhere within the unit, including in the Mixing Bin Tanks, oversized debris bin and/or on the sort floors. Also, non-containerized bulk materials with or without free liquids may be stored and treated in limited amounts on the unit floor (e.g. frozen material within load). Treatment methods for hazardous waste include the following:

- Stabilization[2];
- Chemical Oxidation;
- Chemical Reduction;
- Neutralization;
- Deactivation;

[2] The term "stabilization" is defined by the EPA under 40 CFR 268.42 as "Stabilization with the following reagents (or waste reagents) or combinations of reagents (1) Portland Cement; or (2) lime/pozzolans (e.g., fly ash and cement kiln dust) – this does not preclude the addition of reagents (e.g., iron salts, silicates, and clays) designed to enhance the set/cure time and/or compressive strength, or to overall reduce the leachability of the metal or organic. USEI uses the term Stabilization in a more generic sense to mean the treatment of a waste material to make it physically and chemically stable. In this sense, it consists of those processes, which make the material conform to applicable LDR treatment standards or other applicable standard(s).

- Macro Encapsulation;
- Micro Encapsulation;
- Adsorption (clay, carbon, etc.);
- Precipitation;
- Bio-remediation;
- Mechanical Processing, including sorting/size reduction/crushing; and
- Decanting.

To facilitate treatment, a crushing system is also located inside the Containment Building as described in D.9. The location of the crusher in the Containment Building is shown on Drawing #D2020-A02, -R07 and -R08. The crushing system is physically located within the Containment Building to provide containment for any material spills or release of fugitive dust emissions, for protection from the weather, and to minimize the potential for release of waste constituents.

### C.9.1.1 Truck Unloading Apron #1 and #2

Truck Unloading Aprons #1 & #2, contiguous with the Stabilization Facility, are existing, unenclosed storage, processing, and receiving areas for containers with or without free liquids. The aprons consist of individual reinforced concrete slabs with underlying 80 mil HDPE liners for containment.

### C.9.1.2 Truck Unloading Apron #3

Truck Unloading Apron #3, contiguous with the Containment Building, is an existing, unenclosed, subdivided storage, processing, and receiving area for containers with or without free liquids. The apron consists of three (3) curbed, reinforced concrete slabs with underlying 80 mil HDPE primary and secondary liners for containment.

### C.9.1.3 Mixing Bin Tanks (Stabilization Portion)

The Stabilization Portion's stationary Mixing Bin Tanks are internally lined with steel wear plates that do not act as the primary containment. The wear plates protect the primary containment structures during the mixing of wastes, which is performed with an excavator. Each Mixing Bin Tank is provided with a primary barrier and a secondary system equipped with collection sumps. The concrete slab floor area inside the Containment Building is provided with a primary barrier, also equipped with monitoring and collection sumps, that comply with the requirements of IDAPA 58.01.05.008 {40 CFR §264.193(e)(1)(i)}. Secondary and primary volume calculations are provided in Appendix D.2.7. Further detailed information concerning the Containment Building and the mix bin Tanks is found in Section D.9. This system is designed to manage both solid and liquid type waste streams that require treatment prior to landfill disposal.

### C.9.1.4 Mixing Bin Tanks (Debris Portion)

The Debris Portion's stationary Mixing Bin Tanks are constructed of steel and will be placed on top of the existing floor in the containment building. Since the tanks are constructed of steel, wear plates will not be installed in the Mixing Bin Tanks. The Mixing Bin Tanks will provide primary containment. The existing floor of the Debris portion of the Containment Building will provide secondary containment for each Mixing Bin Tank. This is the same surface which provides primary containment for the Containment Building. The Containment Building is provided with a primary barrier and a secondary system equipped with collection

sumps. The concrete slab floor area inside the Containment Building is provided with a primary barrier, also equipped with monitoring and collection sumps, that comply with the requirements of IDAPA 58.01.05.008 {40 CFR §264.193(e)(1)(i)}. Primary and secondary volume calculations are provided in Attachment 14a, Tables D-2a, D-2b, and D-2c. Further detailed information concerning the Containment Building and the Mixing Bin Tanks is found in Section D.9. This system is designed to manage both solid and liquid type waste streams that require treatment prior to landfill disposal.

## *C.9.2 Stabilization Facility*

Stabilization in the Stabilization Facility is conducted in Mixing Bins (i.e., containers) (See Section D, Figure D-2 for the Process Flow Diagram). Further information is provided in Section D, Section D.9 and D.10. Empty Mixing Bins are loaded onto one of two parallel tracks located on the South Side of the Stabilization Facility. The Mixing Bins are then pulled towards the Access Ramps where they are loaded with solid, sludge, and liquid wastes via elevated Access Ramps located on both sides of the Stabilization Facility (east and west sides).

After waste has been loaded into the Mixing Bin, the bins continue northward towards the reagent silos where the appropriate amounts of treatment material are added. Reagents are added to the Mixing Bins via a series of bulk material handling systems or a front-end loader, dump truck, or other appropriate equipment. Water is added directly into the mix bin at the mixing areas.
After the required reagents have been introduced to the mix bin(s), the bins are moved to the mixing area on the western portion of the facility. Excavators, located on mixing platforms above the mix bins, thoroughly mix the contents of the bins.

After the reagents have been thoroughly mixed, the mix bins are indexed to the sampling area where if appropriate, waste process control samples are collected and analyzed as discussed in Sections C.10, and C.11.4. The Mixing Bins are can then be reprocessed, emptied into another container or pile for additional on and/or off-site treatment or disposal, taken to an appropriate storage area, or taken to the landfill for disposal.

## *C.9.3 Drum Pads 4 and 5 (CSP #4 & 5)*

CSP #4 is an existing, unenclosed, subdivided storage, processing, and receiving area for containers with or without free liquids. It is curbed and constructed of reinforced concrete and sealed with an epoxy coating for containment. Drawing #PRMI-R11 shows the locations, dimensions and designations of the subdivided storage areas used for segregating incompatible wastes; this drawing also shows the locations and design of the containment systems, including slope and drainage information.

CSP #5 is an existing, unenclosed, subdivided storage, processing, and receiving area for containers with or without free liquids. It is curbed and constructed of reinforced concrete and sealed with an epoxy coating for containment. Drawing #PRMI-R11, -C12, and -C13 show the locations, dimensions, and designations of the subdivided storage areas used for segregating incompatible wastes; these drawings also show the locations and design of the containment systems, including slope and drainage information. Further details for these storage pads are provided in Section D, Section D.1.

## *C.9.4 Container Storage Area No. 1 (CSA #1)*

CSA #1 is an unlined storage pad primarily constructed of native compacted soils. CSA #1 is sloped to the North to Northeast to drainage collection points. Diversion channels are located South and Southwest of the unit to control run-on (Drawing PRMI-R15). Only solid materials are managed in CSA #1.

Solid wastes in non-bulk containers (e.g. bags, boxes and drums, etc.) placed into storage at CSA #1 will be elevated or otherwise protected from contact with potentially accumulated liquid (IDAPA 58.01.05.008 and 40 CFR §264.175(c)). Bulk containers are stored with a minimum of 24 in. between individual

containers. Additionally, a minimum of four feet wide aisle is located between every two rows of bulk containers to allow emergency equipment access. A typical storage arrangement for bulk containers in CSA #1 is shown on Drawing # PRMI-R15.

## *C.9.5 RCRA(Pad 7)/PCB Storage Building*

The RCRA(Pad 7)/PCB Storage Building is an existing, enclosed storage, processing, and receiving area for containers with or without free liquids. Part of the building consists of a curbed, welded steel floor for containment within a steel framed building and part of the floor of the building consists of curbed reinforced concrete and is sealed with an epoxy coating for containment. The area with the concrete floor is Pad 7. Drawings #PRMI-R21, R22, C16, and C17 show the location, dimensions, and designation of the storage areas; these drawings also show the locations and design of the containment systems, including slope and drainage information.

## *C.9.6 Surface Impoundments*

A total of three (3) surface impoundments are located at the facility. The Evaporation Pond is utilized to handle onsite or offsite generated liquid wastes, including landfill leachate that may be effectively reduced by evaporation. Two other ponds (Collection Pond Nos. 1 and 3) are utilized to collect surface water runoff and, if necessary, liquids from the Evaporation Pond on a contingency basis. Acceptable wastes are either placed in the appropriate tanks pending transfer to the Evaporation Pond or unloaded directly into the Evaporation Pond.

## *C.9.7 Waste Water Treatment Tank System*

Four (4) above ground tanks are currently used for storage and treatment of RCRA hazardous wastes at the facility designated as Tanks #1, #2, #3 & #4 and are located within secondary containment, adjacent to the southeast corner of CSP #4 as shown on Drawing # PRMI-R11, PRMI-C11, -C12, and -C13. Tank Certifications are provided in Appendix D.2.2.

The four (4) tanks are constructed of 3/8 inch welded carbon steel. Specific components of these tanks are listed in Table D-2.

All (4) tanks are vertical, shell mounted, uniformly structurally supported and anchored on concrete foundations satisfying the requirements of the American Concrete Institute Building Code 318 (ACI 318). Tanks are equipped with a 16 in. or 24 in. manhole, a conservation breather vent, a liquid level indicator, inlet and outlet valves, and spare valves. Each tank is equipped with a fixed roof and is vented through a closed vent system to a carbon adsorption canister to remove potential volatile organic vapors.

The flow diagram shown on Drawing # 720C-P02, illustrates how the tanks are integrated into the facility's RCRA operations and provide instrumentation details for each tank. Drawing # 720C-P01 and Appendix D.2.4 provide information on the leachate piping. The tanks are operated under ambient temperature and pressure conditions and are heat traced to prevent freezing in the winter.

Leachate Piping is either placed directly on the ground surface to facilitate regular inspection or consists of double walled pipe. The specification for this piping is included in Appendix D.2.4. The leachate piping system is operated such that it is essentially empty when not in use. The system is designed to drain back towards the leachate risers to prevent the potential for freezing. Pipe culverts have been constructed at all road crossings to protect the pipes from vehicle traffic.

# C.10 Quality Assurance/Quality Control

The following quality assurance/quality control (QA/QC or "quality") information is utilized to ensure adequate quality assurance and quality control during waste management activities. The following documents were utilized during the development of USEI's QA/QC procedures:

1. *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846*, Third Edition, Final Update I, U.S. EPA, Office of Solid Waste, Washington, DC, July 1992, Section One, as updated

2. Handbook for analytical Quality Control in Water and Wastewater laboratories, EPA 600/4-79-019, March 1979, US Environmental Protection Agency (USEPA), Environmental Monitoring and Support Laboratory (EMSL), Cincinnati, OH.

Quality protocols are applicable to both sampling and analytical techniques. The following sections provide general QA/QC procedures USEI utilizes during the collection, transfer, storage and analysis.

The objective of the Quality Assurance/Quality Control (QA/QC) program is to ensure that operational decisions result in the proper treatment, storage and disposal of the hazardous wastes handled at the facility. An additional aspect of this program is to ensure that hazardous wastes, which are restricted from disposal at the facility, are adequately screened prior to acceptance of waste shipments. The principal components of this program are listed as follows for the routine acceptance, treatment, and disposal of hazardous waste.

- Pre-acceptance review to screen and classify waste;
- Review and cross-check of shipping and manifest documentation for each shipment as it arrives at the facility;
- Second review of pre-acceptance information, classification, and shipping documentation prior to any storage, treatment, or disposal activity;
- Field inspections, item counts, and other physical verification of shipment contents performed independently by technical personnel;
- Sampling performed by trained personnel using accepted procedures;
- Fingerprint analysis performed by qualified technical personnel;
- Comparison of field data, fingerprint data, and pre-acceptance information for consistency prior to QC release of waste for disposal; and
- Treatment determination study of process capabilities for stabilization of hazardous constituents by demonstration and analysis during the pre-acceptance review process.

## *C.10.1 Sampling QC*

Personnel involved in the sampling of waste are given formalized training. This consists of a presentation of the theoretical aspects of random sampling and the practical considerations of sample collection and sampling handling. Documentation is maintained in the employee's personnel file to reflect the nature and content of the training per the requirements of Section H of this Document.

### C.10.1.1 Fingerprint Analysis

Fingerprint analysis performed in the routine acceptance of waste shipments provides qualitative confirmation that the waste actually received on-site is consistent with the more rigorous pre-acceptance criteria. For personnel and equipment involved with this analysis, personnel receive training in the types and methods involved in the physical characterization of waste and specific factors of concern. Notations of non-conforming physical characteristics and other fingerprint parameters may be recorded on the ICF and/or other pertinent documentation associated with the processing of the waste for disposal.

### C.10.1.2 General Sample Handling

Hazardous waste samples, sample containers, and sampling equipment are handled in a manner that is consistent with the required analytical procedures. Samples are sealed and transported to the laboratory as soon as practical after collection. The seal normally consists of a bottle cap or other closure that prevents spillage. The outside of the sample container is cleaned prior to being removed from the sampling location to limit the potential spread of any contamination. This is accomplished by wiping the sample container with a dry or dampened cloth. In some cases, rinsing with water or other solvents may be appropriate.

### C.10.1.3 Sample Identification and Documentation

Hazardous waste samples collected under the requirements of this WAP are currently numbered by one of two systems (or equivalent), depending on whether the samples are from routine waste or non-routine wastes. If the sample is from waste routinely received for disposal, it has an associated Internal Control Form (ICF)/load number assigned. The sample identification number consists of that ICF/load number followed by the ICF item number and a specific container designator.

Non-routine samples (those with no associated ICF number) are consecutively numbered based upon yearly sequential numbers as follows:

03-0001

"03" indicates the calendar year the sample is collected.

"0001" is a consecutive number that progresses upwards until the end of the year.

The following information is placed on all sample labels:

- Essential information;
- Sample Identification Number;
- Date the sample was collected; and
- Initials or name of sample collector.

Additional information (to be provided as requested):

- Generator's name;
- Description of waste, including shipping name, identification numbers, container type, etc.;
- Location of sampling site/grid;
- Waste Stream Identification (WSID) Number; and

- Analysis requested.

Records of all samples collected under the requirements of this WAP are kept by the facility. For all ICF/load related samples, these records include information on physical characteristics (e.g., liquid, solid, etc.), item count, discrepancies/problems, and other related data.

Incoming samples are recorded in the sample logs and/or electronically by the facility. ICF-related samples have a completed WPF that outlines the required fingerprint parameters and expected results. The specific tracking system is dependent on the current database tracking system, which is periodically updated, as necessary. The above outline provides an example of how a tracking system is organized.

Chain-of-custody procedures are used when deemed necessary to document sample possession from time of collection through transfer to other facilities. Normally, these procedures are used when outside laboratories are utilized and/or there is legal reason to document the chain of possession of the sample. Samples are stored in a secure and controlled location. An example of a chain-of-custody form is shown in Figure C-10.

### C.10.1.4 Sample Storage and Preservation

Samples are properly preserved, stored, and analyzed as soon as practical after they are collected. Refrigeration is a part of most sample storage/preservation techniques; however, some sample constituents, such as metal cations, which may precipitate into a salt that will not readily re-dissolve, may be adversely affected by refrigeration.

Chemical preservation is used for specific constituents because of the potential reaction of the preservative with other possible constituents. Where a sample is needed for multiple constituents, several separate sample bottles may be required for proper preservation. For those samples required to be sent to an off-site laboratory, the normal procedure is to contact the off-site laboratory for type of container (e.g. plastic, glass etc.), preservative requirement, required volume, and storage time limitations associated with the analytical method and the requested analysis.

Routine samples for receipt and process control purposes are not usually preserved because analysis is begun shortly after sample collection.

## *C.10.2 QC for Other Analytical Procedures*

The facility maintains a substantial amount of analytical capacity above that required performing routine fingerprint analysis. In order to maintain a high level of confidence in the data generated from the use of the analytical procedures, the QC provisions cited in these procedures are followed as appropriate based on the need for information. For example, if a procedure is run for the purpose of confirmation of analytical information supplied from an outside source, the QC considerations may be relaxed somewhat as opposed to the same procedure run for the precise quantification of a chemical species. The facility may, from time to time, determine the need to incorporate additional analytical procedures for various reasons. As these are adopted for use, appropriate QC provisions are also implemented consistent with the confidence levels associated with the need for additional information.

## *C.10.3 Additional Laboratory QC Provisions*

Additional components of the laboratory QC program are as follows:

- Instrumentation and equipment are maintained in serviceable condition as determined by manufacturer’s recommendations and by the facility's internally determined need for analytical capability.

- All volumetric glassware is designated as Class "A" as defined by the National Bureau of Standards, if required by the analytical methodology.
- All chemicals and reagents used in any fingerprint test or other analytical procedure are of sufficient purity to be non-interfering with the results desired. In those tests and procedures where minimum purity levels are specified, such as "ACS Reagent Grade", or equivalent are used, as appropriate.

## *C.10.4 Laboratory and Sampling Quality Assurance Program*

The basis for obtaining reliable data consistent with the identified needs of the facility rests with the equipment, procedures, and personnel involved. The methods for maintaining high standards of performance in these areas lie in the detection of deviations from established protocols or the appearance of previously undetected or procedural interference's. In the first case, the assurance of quality is based on observations derived from daily observations and periodic internal compliance audits. In the second case, numerical information is required from the analysis of blanks, spikes, surrogates, and other known quantities. Documentation of the QC activities associated with and required by the sample collection and analyses procedures are maintained.

### C.10.4.1 Sampling Program

Sampling procedures are described in Section C.4 of this WAP. The selection of the sample collection device depends on the type of sample, the sample container, the sampling location and the nature and distribution of the waste components. In general, the methodologies used for specific materials correspond to those referenced in IDAPA 58.01.05.005 {40 CFR Part 261, Appendix I}. The selection and use of the sampling device is supervised or performed by a person thoroughly familiar with the sampling requirements. Sampling equipment is constructed of non-reactive materials such as glass, PVC plastic, aluminum, or stainless steel. Care is taken in the selection of the sampling device to prevent contamination of the sample and to ensure compatibility of materials. For example, glass bottles are not used to collect hydrofluoric acid wastes.

Individual container samples that are related may be composited prior to analysis as described in Section C.4.3.

### C.10.4.2 Analytical Program

USEI has developed a program of analytical quality practices and procedures to ensure that precision and accuracy are maintained. These programs include the use of control standards, duplicates, spikes, and blanks. Non-company laboratories employed by the company demonstrate quality control practices that are comparable to USEI’s practices.

# C.11 General Considerations

In the operation of a hazardous waste management facility a number of issues become apparent which are not necessarily anticipated in the regulations and may present unique management methods. Below are sections addressing several issues of this nature and other unique situations. It is USEI’s intention to address these issues in this forum to provide insight into the technique development.

## *C.11.1 Disposition of Samples*

Samples of waste streams are commonly disposed in the same fashion as the waste stream itself. If, for example, a waste is approved for stabilization and landfilling, the sample may be stabilized (e.g.; in the lab, in containers, or mix bins) and subsequently disposed. Samples received, which are unauthorized for management on-site, are returned to the generator (or representative) or aggregated (under the

provisions of IDAPA 58.01.05.006 and 40 CFR §262.34) and sent off-site to an authorized facility for subsequent management. To facilitate sample management, samples approved for the same management processes may be consolidated (e.g.; in tanks or containers) and managed under the provisions of IDAPA 58.01.05.006 {40 CFR §262.34}. Should samples arrive on-site from an identified generator, but without proper waste identification, USEI will attempt to contact the generator to identify the associated waste and appropriate hazardous waste codes, if any. If a sample identity cannot be resolved with a generator, or if the generator of the waste sample cannot be determined, USEI will attempt to identify the generator and send it back or such samples may be managed as on-site generated waste and subject to classification as characteristic wastes (D001 through D043) for the characteristics / contaminants reasonably expected to be in the waste.

### C.11.1.1 Frozen Samples

Samples of frozen loads are defrosted prior to analysis (Note: to speed up fingerprinting, samples may be heated under the vent hood). In some cases, it may be necessary to defrost entire loads or, for drum loads, 10% of the load, to facilitate sampling or to inspect for free standing liquids. As an alternative, and if conditions warrant (e.g., anticipated freezing conditions) a sample of waste being delivered may be taken at the point of generation for the purpose of satisfying the requirements of this plan. Such samples will be taken from either the load or place of generation or accumulation. If this procedure is utilized, the load will also be visually inspected on-site for Physical Appearance to check against obvious differences in waste type.

## *C.11.2 Sampling Safety Precautions*

Sampling personnel wear personal protective equipment (PPE) (e.g.; eye, foot, hand, head & respiratory protection & protective clothing), as necessary. Load receipt personnel check the manifest or other shipping or pre-acceptance information to be familiar with the material and ensure necessary precautions are taken. Specific safety precautions are outlined in USEI's Health and Safety Plan.

## *C.11.3 Remote Project Sampling and/or Analysis*

In cases where USEI directs off-site sampling (e.g.; at USEI's Rail Transfer Station) or analysis for the purpose of having that sample or analysis meet the requirements of the USEI provisions (e.g., Fingerprint Testing, etc.), USEI will instruct an on-site representative in the requirements of this WAP or a USEI representative will be at the project site to ensure compliance with the provisions of this WAP including the applicable QA/QC requirements.

## *C.11.4 Sampling of LDR Waste and CAMU Waste*

When waste is treated on-site for the purpose of meeting LDR or CAMU treatment standards or, for LDR or CAMU-eligible waste confirmation testing, samples are taken on a grab sample basis. EPA has promulgated compliance of concentration based treatment standards for all non- wastewaters based on grab samples as stated in IDAPA 58.01.05.011 {40 CFR §268.40(b)}. USEI follows this sampling methodology for waste treated on-site. Any grab sample must pass the treatment standards in order for compliance to be assured. When there is any uncertainty in achievement of treatment standards, the sample should be re-sampled and/or re-analyzed as necessary.

## *C.11.5 Interim Processing Loads*

Following treatment, the treated waste is placed into roll-off bins and "staged" in Container Storage Area 1 (CSA 1) while applicable verification testing is performed as described in Section C.6. Treated material may be stored for up to one year.

### C.11.5.1 Re-Sampling of Interim Loads

Wastes treated on or off-site and "staged" prior to disposal, that result in a failure of applicable standards (from an initial sample) may need re-sampling for verification analyses. If the re-sampling indicates the waste meets treatment standards the waste may be released for disposal. If re-sampling indicates the material does not meet applicable treatment standards the waste will be redirected for further treatment, as necessary.

## *C.11.6 Lab Packs*

Lab Packs are managed in accordance with IDAPA 58.01.05.008 {40 CFR §264.316}. Lab Packs are not sampled. Lab packs must be packaged in non-leaking inside containers and must be over packed in an open head metal container with less than 110 gallon capacity and surrounded by a sufficient quantity of non-biodegradable sorbent material capable of absorbing the liquid contents of the container. The sorbent material must not be capable of reacting dangerously with, being decomposed by, or being ignited by the contents of the lab pack. Reactive wastes, other than cyanide or sulfide bearing waste (as defined by IDAPA 58.01.05.005 and 40 CFR §261.23(a)(5)) must be treated or rendered non-reactive prior to packaging. Lab pack material is accepted subject to a contents and packaging review. Lab pack materials which are proposed to be treated, stored, or disposed are inventoried, and the inventories are sent to the facility for review. The inventories are reviewed for incompatibility of contained materials, land disposal restrictions, and utilization of appropriate packing materials. Since lab packs contain many small quantities of individual materials, they are not sampled, but are inspected to ensure adequate packing material is present and the drum is at least 90% full (if destined for direct landfilling). If necessary, sorbent material may be added until the lab pack is 90% full.

## *C.11.7 Management of Residues*[3]

Management of waste residues and other miscellaneous equipment or debris originating from on-site management areas or activities may be managed as on-site generated wastes and classified according to their hazardous waste characteristics, if any. However, where an on-site generated waste is derived from one or more wastes, it will be managed in accordance with the approved management conditions for that waste(s) (e.g.; a spill of F002 material may be managed as F002), or if precluded by permit, regulation, or operational conditions, it may be subject to alternative management, as appropriate. Stabilization residues and other treatment residues will carry the waste code(s) and will be managed in the same manner as the last waste stream in the unit. For example, sludge's removed from a stabilization mix bin which last received K061 wastes would carry the K061 code and must meet appropriate treatment standards for K061 before being land disposed on-site, if that were the selected disposal option. Residues from waste treatment units will carry the waste codes and be managed consistent with the waste last managed in the unit. The applicable waste codes and corresponding waste management methods will be based upon the "First In, First Out" principle and the estimated resident time. Residues from truck cleaning, Containment Building, Stabilization Facility, or in other waste management units are managed either with the like materials being managed at those locations or as on-site generated waste. Residues in "RCRA Empty" containers are not subject to this WAP since they are not solid or hazardous wastes per IDAPA 58.01.05.005 {40 CFR §261.7}.

## *C.11.8 Rejected Load or Rejected Partial-Load, and Re-Manifesting Procedures*

Manifest discrepancies are resolved, if possible, by contacting the generator or its representative to obtain the needed information. There are many cases where entire loads or portions of loads may be

[3] Residues is used to mean solids and liquids contained or generated in sumps, truck & equipment washing, tank cleaning, boiler cleaning, evaporator cleaning, distillation unit cleaning, equipment maintenance, repair, or replacement, pipes, valves, filters, filter media, miscellaneous samples, and personal protective equipment.

rejected (e.g., a bulk load contains un-profiled or unacceptable[4] materials). The regulations (IDAPA 58.01.05.008 and 40 CFR Parts 264, Subpart E – *Manifest System, Recordkeeping, and Reporting*) do not give instructions on how materials are rejected or re-manifested. The exact manifesting procedures will be determined considering the variables associated with any particular rejection, but, in general, the following is a summary of the typical considerations associated with rejecting materials.

Two options are available for rejecting some or all of a load. The 1st option includes sending material out on the original manifest noting in Block 19 that the load is being rejected back to the point of origination or the alternate facility designated on the manifest or verbally designated by the generator. If the manifest has not already been signed, the original manifest may be utilized by either striking through the original TSDF destination and inserting the new (alternate) destination or by simply noting in block 19 the new destination. If the manifest has been signed, an additional line may be struck through USEI's signature on the manifest.

A 2nd option is to generate a new manifest. This procedure is less preferable since USEI must complete the Generator's section of the manifest and, in this case, language may be inserted in blocks J, K, or 15 indicating USEI is the generator for shipping purposes only and referencing the original manifest. This option is often useful for bulk loads for which a portion is being rejected in containers (e.g.; aerosol cans removed from a bulk load may be sent back to the generator packaged in DOT shipping containers) and for rejecting or forwarding on a portion of a container shipment. In either case, USEI will copy the generator notifications and/or certifications for that shipment and attach a copy to the outgoing manifest(s) rather than altering the notifications and/or certifications made by the generator.

Although not required for entire load rejections, USEI will usually keep a copy of the manifest(s), subsequently generated manifest(s), and notifications and/or certifications. In cases where the waste is being manifested back to the generator, USEI does not need to complete the LDR Notifications or Certifications since the waste is not being sent for land disposal.

## *C.11.9 Restricted Waste*

Certain wastes are restricted from on-site disposal at the facility. Table C-8 provides the list of on-site disposal restricted waste.

## *C.11.10 Brokerage of Non-Hazardous and Hazardous Waste*

Wastes accepted for management may be subsequently sent to an alternate facility for disposal and or other management, if necessary. At times, USEI may elect to send waste to an alternate TSDF due to scheduling, economic, and/or operational complications associated with the waste in question. Alternatively, some waste streams may have a specific technology code (IDAPA 58.01.05.011 {40 CFR §268.40} Treatment Standards) that requires a type of treatment not offered by USEI. Other undefined reasons may result in the decision to send waste offsite for disposal. As a result, these wastes will be brokered for further treatment at an appropriate facility, as necessary. Examples of wastes that may require brokering include:

- Wastes greater than 260 mg/kg total mercury;
- Specific customer requests;
- Flammable liquids;
- Wastes with specific technology codes not offered by USEI;

[4] The material may be "unacceptable" for many reasons, of which only some are due to permit constraints. The term "unacceptable" is not meant to mean unacceptable due to permit constraints, but to also cover those materials for which the facility has not developed the appropriate management procedures or process in managing the waste and for other causes.

- Certain wastes regulated under Subpart CC.

Brokered wastes will be managed under the same management methods, procedures and restrictions outlined within this WAP. For example, USEI will utilize appropriate waste determination/characterization, sampling, pre-acceptance, receiving, and storage requirements as outlined in this WAP. Wastes may also be consolidated or bulked as necessary for off-site shipment.

Additionally, material that will be brokered for offsite disposal will be designated as such by placing a red dot on the top of the drum or other visible location. Specific markings for brokered waste will facilitate tracking of brokered material as described in Section D.1.b.

### C.11.10.1 Storage of Brokered Waste

Waste that will be brokered for offsite shipment will conform to the same management requirements outlined in this WAP including associated compatibility requirements. Section D.1.b provides more detailed storage requirements.

## *C.11.11 Non-Hazardous Wastes (NHW)*

USEI accepts wastes, which are not hazardous as defined under RCRA or are exempt from RCRA regulations (e.g., household hazardous waste, etc.). USEI utilizes this WAP and the procedures contained herein to review non-hazardous wastes, however, depending on the specific waste, specific sections of this WAP may not be applicable (e.g., manifesting provisions, sampling requirements, LDR verification of treated wastes, etc.).

Each load of NHW arriving for on-site treatment or disposal will be visually inspected in order to verify waste conformance and/or acceptability. If applicable, NHW liquids will be solidified prior to disposal and will follow the requirements of IDAPA 58.01.05.008 {40 CFR §264.314}.

## *C.11.12 Protectively-Characterized Wastes*

Generators occasionally “protectively” (overly)-characterize[5] wastes sent to off-site TSDFs for a variety of reasons (including public relations, legal reasons, financial incentives, lack of characterization experience, or lack of specific analytical information). USEI has analytical resources and technical personnel trained and experienced in proper regulatory/waste classification and who are capable of detecting protective-classification. Examples of protective-characterization include remedial projects where soils are classified according to a specific waste characteristic (e.g., D008 – lead), but where any specific load(s) do not fail the TCLP analysis for the specific waste characteristic as a “protective” measure. USEI, where it possesses specific analytical data, process knowledge, or regulatory knowledge may properly characterize waste during the pre-acceptance or load-arrival process. The primary criteria for re-classifying hazardous waste are analytical data (e.g., TCLP test as described above) unless the re-classification is a result of a regulatory exemption and/or other criteria. Prior to disposal, USEI will complete an appropriate Notification and/or an appropriate LDR Certification, as required.

## *C.11.13 Standard Profiles*

“Standard profiles” may be used for waste streams which are 1) similar in physical or chemical characteristics or 2) generated by similar industries or processes. This profile designation is consistent with EPA’s approach of assigning a listed waste code to similar process wastes. All the wastes within a standard profile are usually managed at USEI using the same treatment process.

[5] “Over-characterization” means the practice of applying waste codes or UHCs to a waste which do not apply and/or to the practice of not applying appropriate LDT Notifications or Certifications.

USEI may develop standard profiles based on information from waste streams targeted for this process. USEI reviews the generator provided information to evaluate whether an individual waste stream is sufficiently similar in physical and/or chemical characteristics to an established standard profile. A specific waste stream may be identified as conforming to an approved standard profile by evaluating the individual waste stream information against the standard profile. The specific waste stream information must fall within the standard profile representative ranges in order to incorporate that waste stream into the standard profile.

Specific candidate waste streams, which upon review, are identified as conforming to an existing approved standard profile, will be managed under the existing waste management decision specific for that standard profile. Standard profiles are maintained as described in Section C.6 of this WAP.

### *C.11.14 RCRA/PCB Waste*

The USEI facility is a fully permitted RCRA and TSCA facility. Often, material is accepted that is both a characteristic/listed RCRA waste and a PCB contaminated TSCA waste. When this occurs, the material is managed as a RCRA waste since the PCB component is managed as a UHC under the RCRA regulations. In this manner, the material is not a PCB waste but a RCRA waste subject to RCRA regulations. If the material in question is not characteristic/listed under RCRA and does have a PCB component (i.e., regulated under TSCA) then the waste will be managed as a TSCA waste as described by USEI's TSCA permit. This distinction provides important guidance as the two sets of regulations are not always the same and it is necessary that the material be managed under clear and consistent regulations.

## C.12 Conclusion

The aforementioned sampling and analytical quality practices help ensure the data obtained are precise and accurate for the waste stream being sampled. The analytical results are used by facility management to decide whether or not to accept a particular waste and, upon acceptance, to determine the appropriate method of treatment, storage, and disposal. Results are also important to ensure that wastes are managed properly by the facility and that incompatible wastes are not inadvertently combined. The quality of these results is as important as the results themselves. Thus, the quality of the analytical data, the thoroughness and care with which the sampling and analyses are performed and reported, provides an important basis for day-to-day operational decisions.

# Figure C-1 – Waste Profile Form (WPF) Example

US Ecology

# WASTE PROFILE FORM

US Ecology Nevada (Beatty) usencs@usecology.com
US Ecology Idaho (Grand View) useics@usecology.com
US Ecology Texas (Robstown) usetcs@usecology.com
US Ecology Michigan (Detroit) usemcs@usecology.com

**PROFILE #**_____

## A. GENERATOR INFORMATION

| | |
|---|---|
| **1. Generator:** | ☐ Billing information is same ☐ P.O. required for payment |
| **2. Facility Address:** | **12. Billing Company:** |
| | **13. Billing Address:** |
| **3. Mailing Address:** | **14. City/State/Zip:** |
| **4. City/State/Zip:** | **15. Billing Contact:** |
| **5. Technical Contact:** | **16. Phone:** **17. Fax:** |
| **6. Phone:** **7. Fax:** | **18. Email:** |

**8. Generator Status:** ☐ CESQG ☐ SQG ☐ LQG

**9. EPA ID #:** **10. State ID #:**

**11. SIC Codes:**

## B. SHIPPING INFORMATION

**1. US DOT Shipping name:**

**2. Hazard Class:** **3. UN/NA #:** **4. Packaging Group:** **5. RQ:**

**6. Container Type:** ☐ Bulk ☐ Totes ☐ Pallet ☐ Boxes ☐ Drums ☐ Other, **Describe:**

**7. Frequency:** ☐ Year ☐ Quarterly ☐ Monthly ☐ 1 time ☐ Other, **Describe:**

**8. Shipment:** **Size:** _____ **Quantity:** _____

9. **Waste Import:** ☐ Yes ☐ No
***(If yes, complete Waste Import Supplement)***

## C. GENERAL MATERIAL & REGULATORY INFORMATION

**1. Common name for this waste:**

**2. Process generating the material:**

**3. Describe physical appearance and odor of the waste:**

**4. Odor of the waste:** ☐ None ☐ Slight ☐ Strong
**5. Physical State:** ☐ Liquid ☐ Sludge/Slurry ☐ Solid

**6. Describe Color:**
**7. Liquid phases:** ☐ Single ☐ Double Layer ☐ Multi-layer

**8. Knowledge is from:** ☐ Lab analysis ☐ MSDS ☐ Process/generator knowledge

**9. Waste Type (US Ecology Texas customers only):** ☐ Industrial ☐ Non-Industrial

**10. Is the waste restricted under EPA Land Disposal Restrictions (§268)?** ☐ Yes ☐ No

**11. If LDR "Yes", is waste:** ☐ Wastewater ☐ Non-wastewater ☐ Debris (§268.2)
**12. Alt. Standards for soil?** ☐ Yes ☐ No

**13. Is the waste RCRA hazardous waste containing benzene and originating at a Petroleum Refinery (SIC 2911), Chemical Manufacturing Plant (SIC 2800 thru 2899) or Coke by-Product Recovery Plant (SIC 3312)?** ***(If yes, complete Benzene Waste Operations Supplement form)***: ☐ Yes ☐ No

**14. VO Conc.(§264.1083):** ☐ <500 ppmw ☐ ≥500ppmw
**15. Has waste been treated after point of generation?** ☐ Yes ☐ No

**16. CERCLA Regulated (Superfund) Waste:** ☐ Yes ☐ No
**17. Butadiene waste regulated by §63 Subpart XX:** ☐ Yes ☐ No

**18. Waste contains UHC constituent(s) (§268.48), above a treatment standard, other than those for which the waste exhibits a characteristic.** ***(If yes, list all UHC's in Section D):*** ☐ Yes ☐ No

**19. Waste exempt from definition of "solid waste" or "hazardous waste"** ***(If yes, list reference 40CFR _____ψψψψψψ):*** ☐ Yes ☐ No

**20. State Waste Codes:**

**21. RCRA Waste Codes:**

**22. Source Code:** N/A **23. Form Code:** W609 **24. Management Code:** H_____ **(USE only)**

## D. MATERIAL COMPOSITION (use additional form if necessary)

**Values are:** ☐ TCLP ☐ TOTALS

| Constituent | Units | Range total ≥ 100% Typical | Min | Max |
|---|---|---|---|---|
| | | | | |
| | | | | |
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## E. WASTE CHARACTERISTICS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | **Oxidizer** | ☐ Yes | ☐ No | 9. | **Reactive sulfides _____ppm** | ☐ Yes | ☐ No |
| 2. | **Explosive** | ☐ Yes | ☐ No | 10. | **Reactive cyanides_____ppm** | ☐ Yes | ☐ No |
| 3. | **Organic peroxide** | ☐ Yes | ☐ No | 11. | **Water/air reactive** | ☐ Yes | ☐ No |
| 4. | **Shock sensitive** | ☐ Yes | ☐ No | 12. | **Thermally unstable** | ☐ Yes | ☐ No |
| 5. | **Tires** | ☐ Yes | ☐ No | 13. | **TSCA regulated PCB waste** ***(control sheet required with shipment)*** | ☐ Yes | ☐ No |
| 6. | **Pyrophoric** | ☐ Yes | ☐ No | 14. | **Medical/infectious waste** | ☐ Yes | ☐ No |
| 7. | **Compressed gas** | ☐ Yes | ☐ No | 15. | **Radioactive (*If yes, complete Profile Addendum for Radioactive Waste)*** | ☐ Yes | ☐ No |
| 8. | **Halogenated organics** | ☐ Yes | ☐ No | | | | |

16. **Possibility of incidental liquids from transportation?** ☐ Yes ☐ No

17. **Is waste a solid using the paint filter test?** ☐ Yes (solid) ☐ No (not solid)

18. **pH:** ***(If solid, what is pH if mixed with water?)*** **Range _____ to _____ Typical _____** ☐ ≤ 2 ☐ 2 < 12.5 ☐ ≥ 12.5

19. **Flash Point: _____º F** ☐ < 140 º F

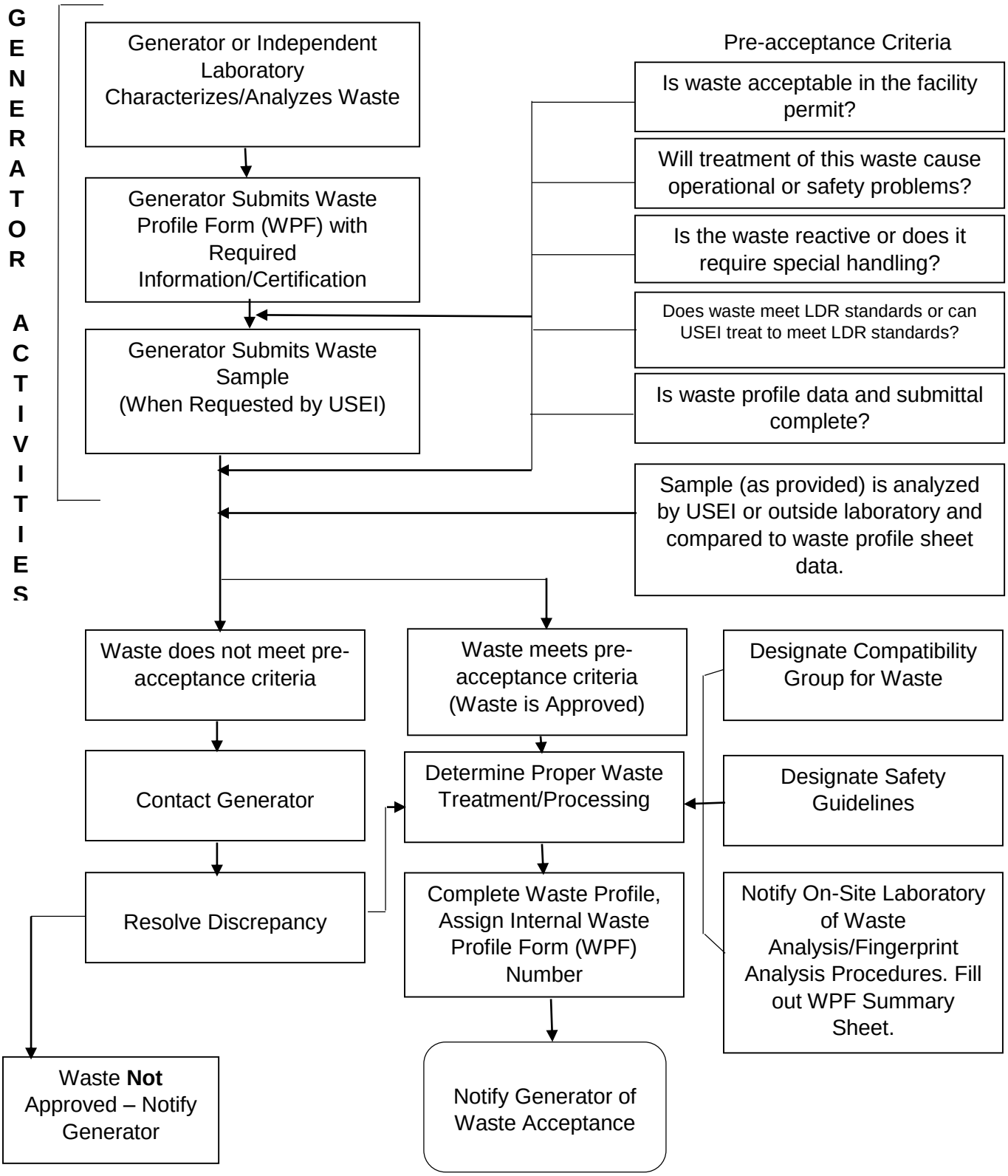
## F. GENERATOR'S CERTIFICATION

☐ Yes ☐ No **I certify this material may be disposed without further treatment.**

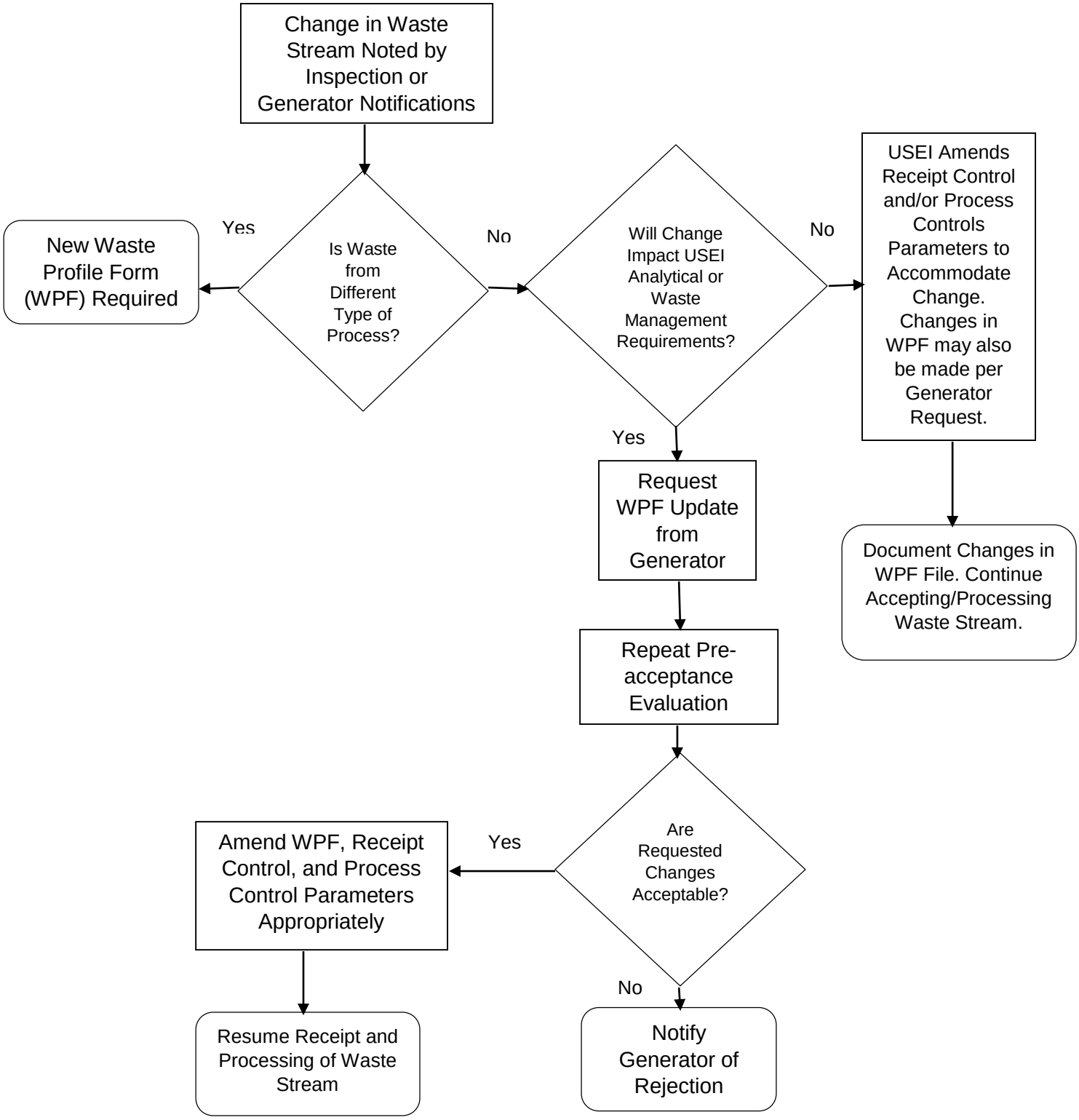
I authorize US Ecology to correct inconsistencies on the waste profile form that impact waste management decisions with my oral or written authorization. US Ecology will require re-submittal of the waste profile information if substantial changes are determined necessary. I understand material that does not conform to specifications described in this profile may be rejected by US Ecology unless other contractual arrangements have been agreed to by both parties. I certify, under penalty of law, that I am familiar with this waste stream through analysis and/or process knowledge, and that all information provided is true, accurate, representative and complete, that all known or suspected hazards have been disclosed, and that this form was completed in accordance with the instructions provided.

| Print Name | Signature | Title | Date |
|---|---|---|---|
| | | | |

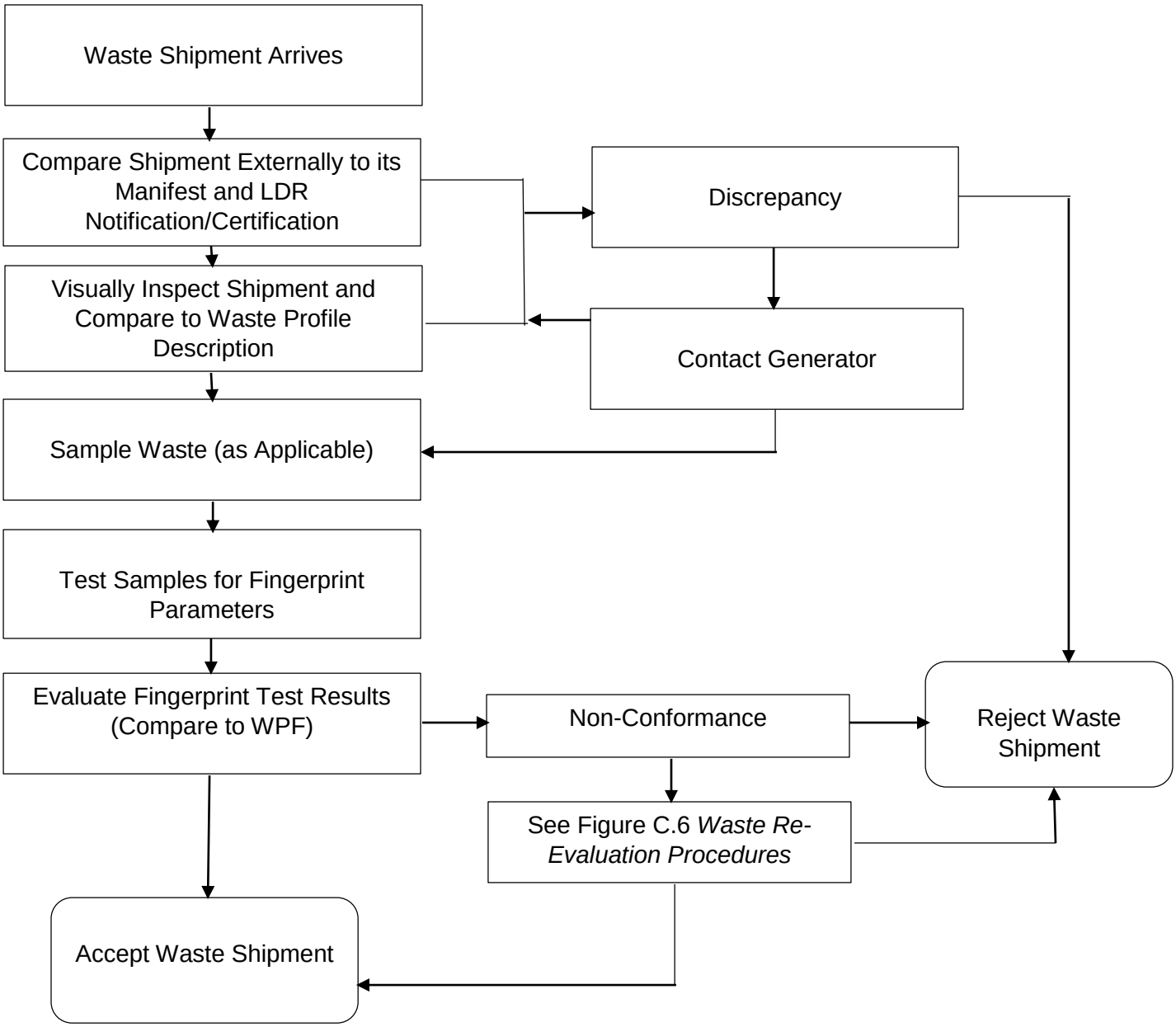
# Figure C-2 Pre-acceptance Evaluation



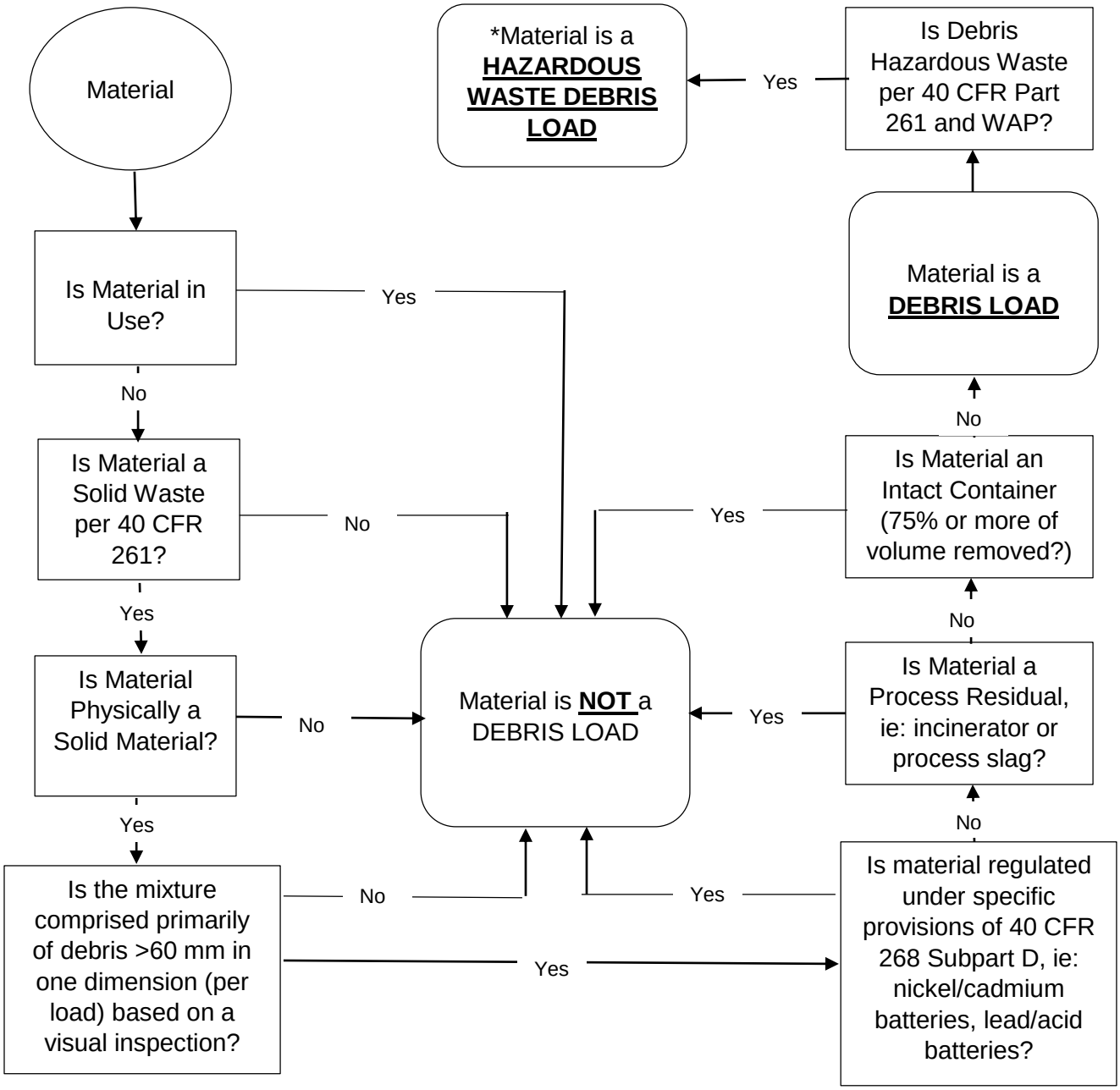
## Figure C-3 Waste / Process Change Flowchart



## Figure C-4 Waste Receipt Control Procedures

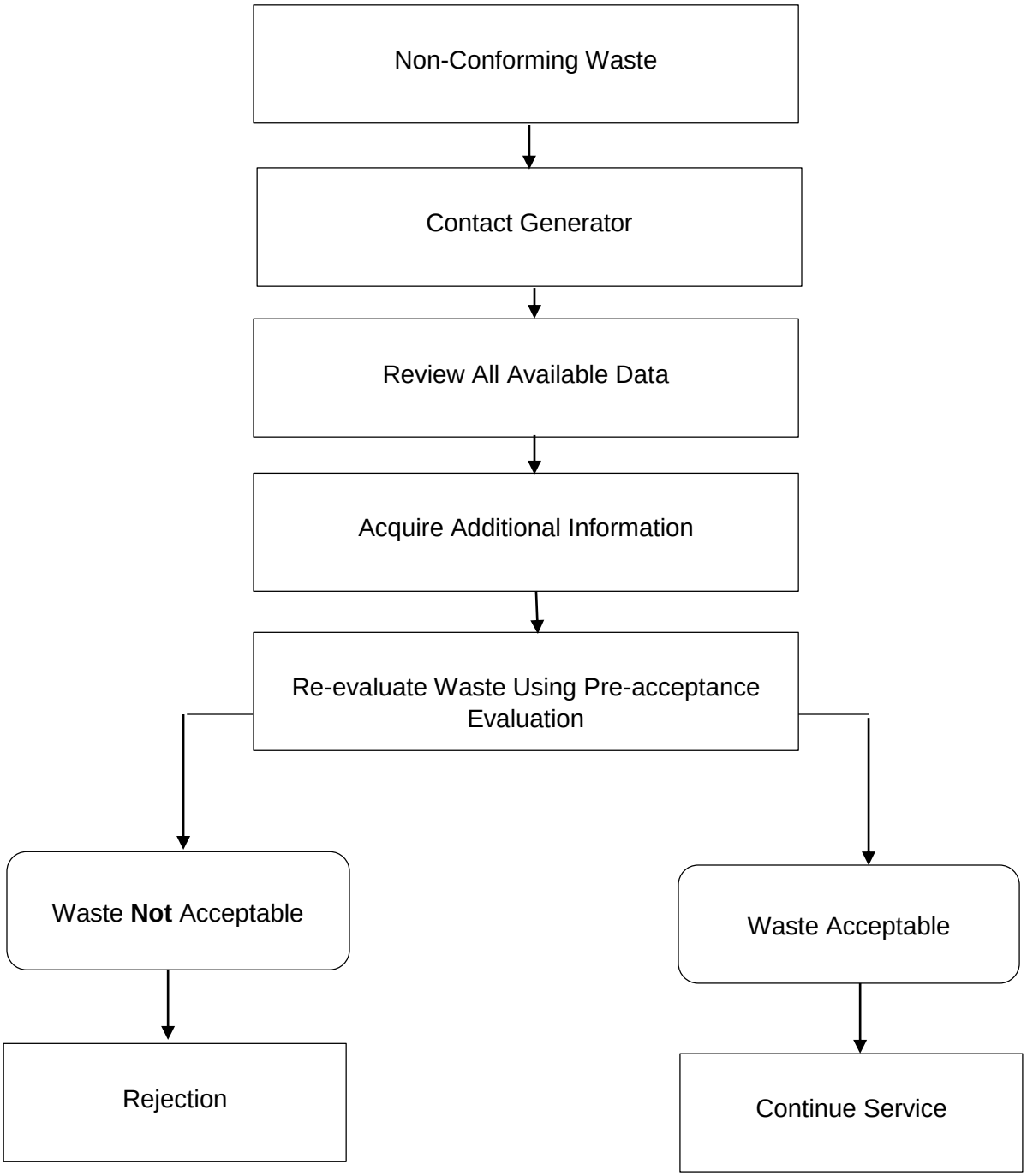


## Figure C-5 Decision Diagram for the Pre-acceptance Identification of Debris and Debris Loads

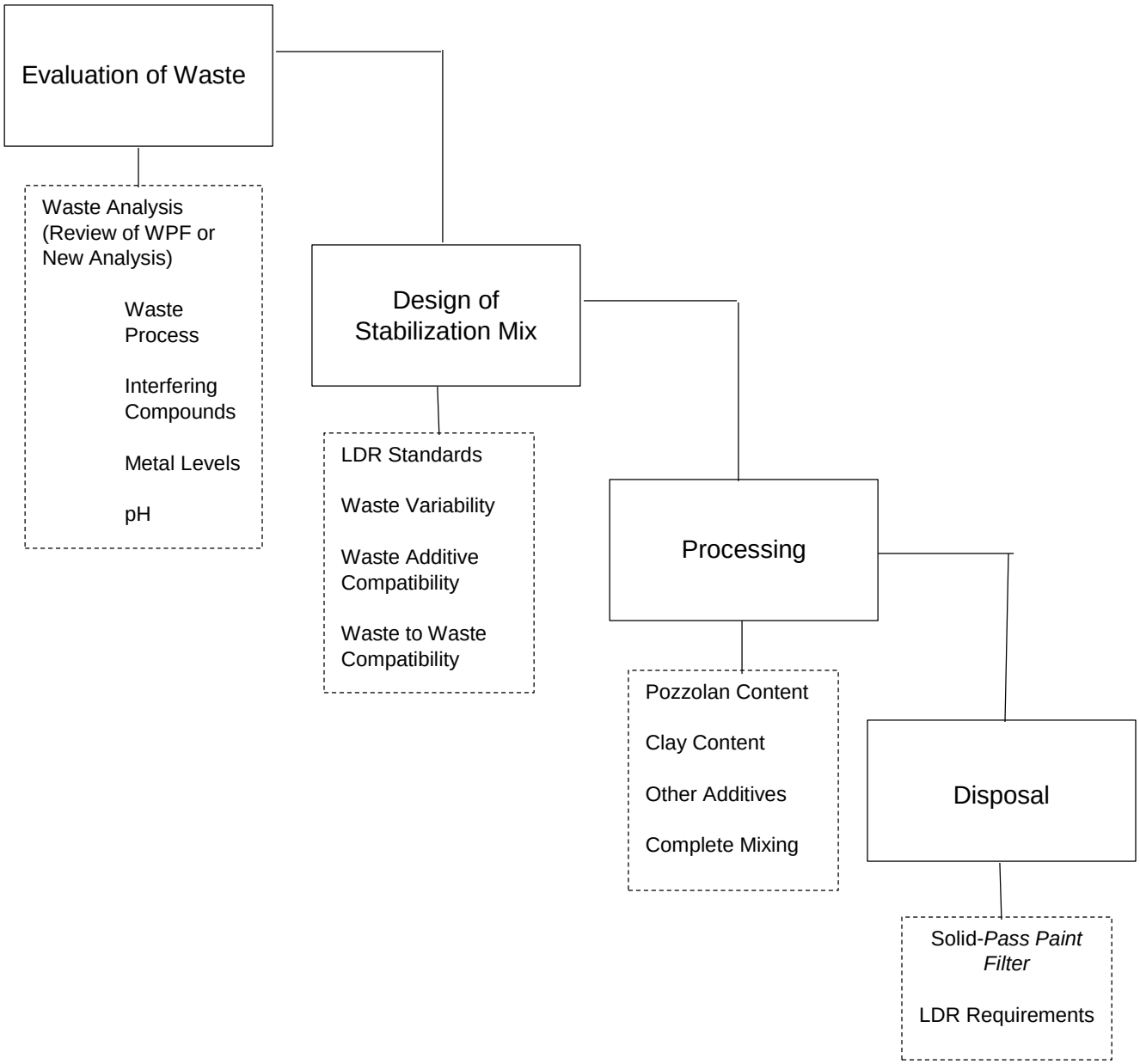



*The only difference in the identification of hazardous waste debris and a hazardous waste debris load is the requirement for the hazardous waste debris load to be comprised primarily of debris based on visual inspection.

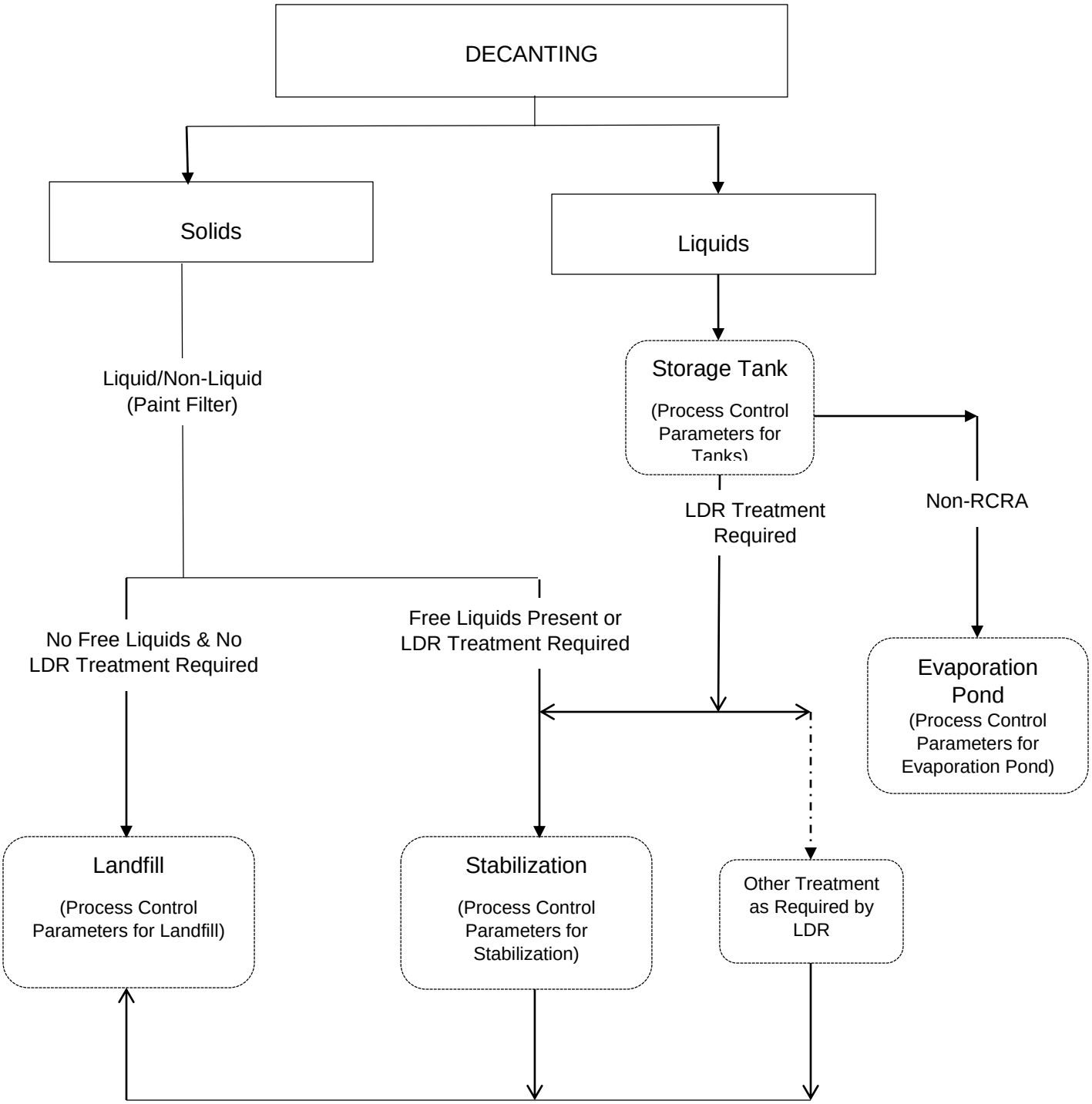
## Figure C-6 Waste Re-Evaluation Procedures



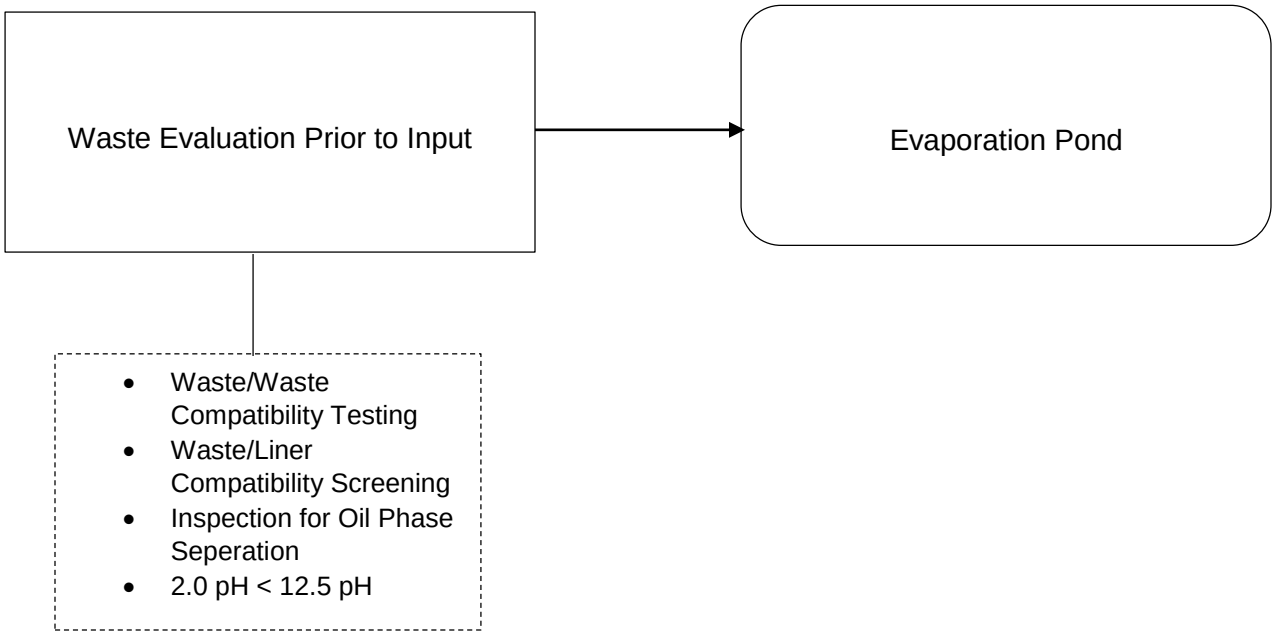
# Figure C-7 Stabilization Processing Requirements and Input Process Control Parameters



## Figure C-8 Processing Techniques – Decanting



## Figure C-9 Process Control Parameters – Evaporation Pond



## Figure C-10 Chain of Custody Form (Example)

PROJECT NUMBER _____

CHAIN OF CUSTODY RECORD

LOCATION OF SAMPLING _____

DATE _____ TIME _____

FIELD INFORMATION _____ (consistency)

_____ (moisture)

_____ (temperature)

SAMPLE COLLECTOR'S NAME _____
(signature)

SAMPLE DATA _____

_____

_____

DELIVERED BY _____

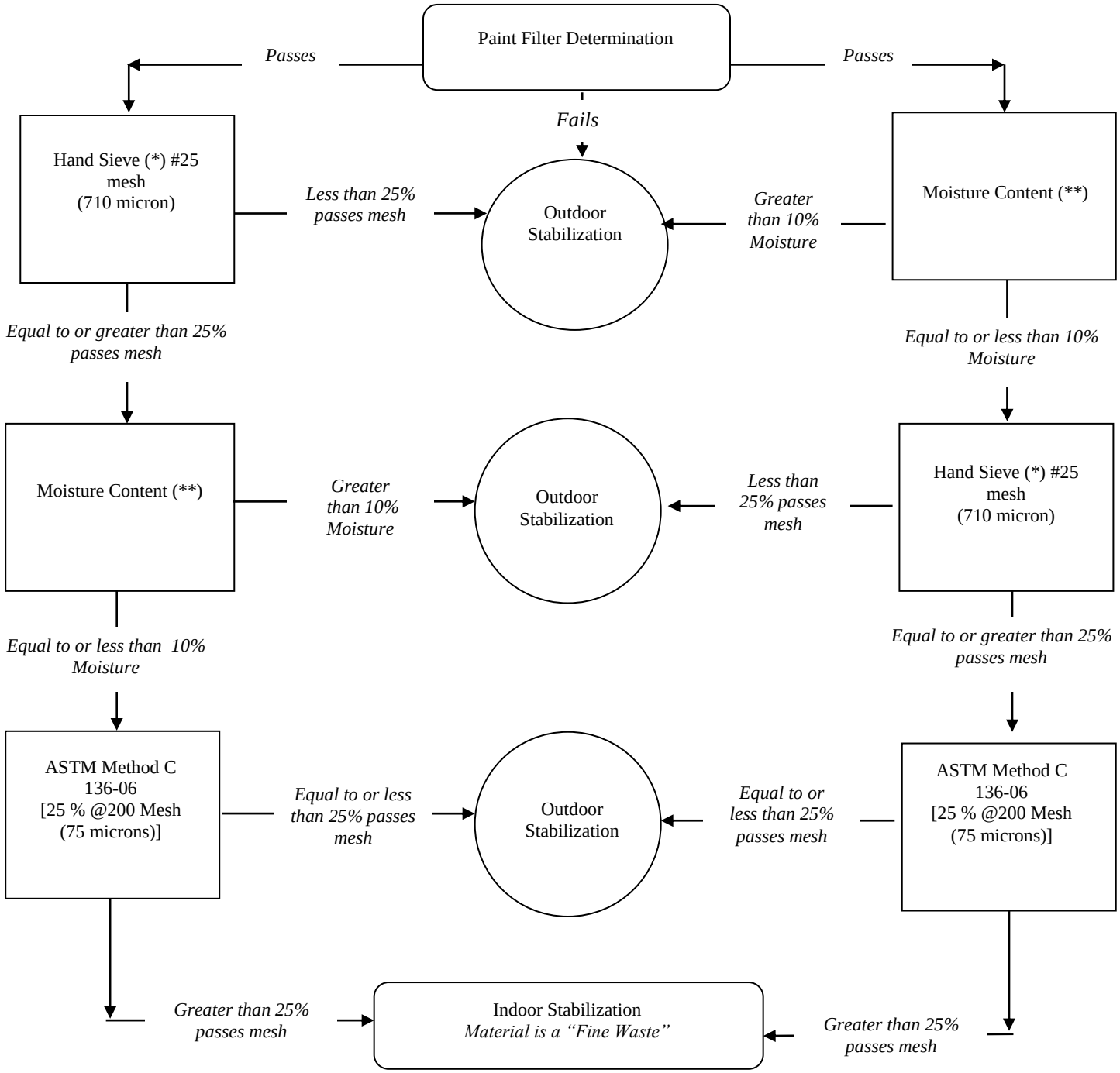
CHAIN OF POSSESSION 1. _____, _____, _____

2. _____, _____, _____

3. _____, _____, _____
(signature) (title) (date)

NOTE: "CHAIN OF POSSESSION" SHOULD INCLUDE EVERYONE WHO HANDLES THE SAMPLE. STARTING WITH THE SAMPLE COLLECTOR AND ENDING WITH THE PERSON HAVING FINAL CUSTODY (*e.g.*, The Lab Analyst).

## Figure C-11 Determination of "Fine Wastes"




(*)Hand Sieve evaluation shall be performed as discussed in Paragraph 8.4 of ASTM Procedure C 136-06.

(**) Moisture content shall be determined by drying the sample to a constant mass without generating pressure sufficient to fracture the particles or temperature so great as to cause chemical breakdown of the sample (e.g. : ashing).

# Appendix C.1
# Analytical Procedures

The following analytical procedures are designed to identify or screen waste. They are used by USEI, based upon its operating experience, as rapid but effective means for establishing key decision parameters pertinent to proper waste management. Analytical procedures, not listed below, may be added as necessary and will be taken from the references listed at the end of this appendix, or other recognized sources, for example, Association of Official Analytical Chemists (AOAC), of will be developed by USEI and meet USE performance standards.

It should be noted that the information presented in this appendix is generic in character. Therefore, certain test methods are discussed which may pertain to treatment or disposal processes that are excluded from the facility for which the foregoing waste analysis plan is presented.

## *C.1.1 Unique Analytical Procedures*

The following analytical procedures have been found by USEI to provide important information pertinent to certain processes. In some cases, these tests provide information not available from standard analytical procedures found in Section II, below. The methods described below are based on ASTM standards or standard procedures recognized by EPA or are based on procedures and protocol formulated by USEI and meet internal performance standards. These tests provide important operational information.

**Percent Acidity** is determined based on “Standard Methods for the Examination of Water and Wastewater,” Method 402(d) to a pH of 7 usually using 1N NaOH as a titrant. However, results are reported as a percent of the specific acid species (e.g., H2SO4).

**Percent Alkalinity** is determined based on “Standard Methods for the Examination of Water and Wastewater,” Method 403(d) to a pH of 7 using a back titration technique. However, the results are reported as a percent of the specific alkaline species (e.g., NaOH).

**Beilstein Screen** consists of heating a copper wire in a flame until it is red hot, then dipping the wire into a portion of the sample and reheating the wire in a flame. The presence of a green flame during the reheating of the wire is considered a positive and indicates the presence of halogens in the sample.

**Bench-Scale Treatment Evaluation** is a method where samples of wastes are combined with samples of other wastes or reagents at predetermined ratios. Further testing may be required in order to confirm that the desired reaction has occurred.

**Disolved Sulfides** is a method where an aliquot of waste is mixed with distilled water. The solution/slurry is filtered through filter paper and the resultant filtrate is then analyzed for sulfide. Antimony potassium tartrate and hydrochloric acid are added and the color produced is visually compared with standards.

**Heat of Combustion (BTUs) by Near Infrared Reflectance (NIR)** Spectroscopy. Heat of combustion is determined by near infrared spectroscopy in a diffuse reflectance mode by placing a proper mixed sample in a diffuse reflectance mode by placing a properly mixed sample in a diffuse reflectance cell. The instrument produces NIR absorbance spectrum which are converted to a heat combustion value using a previously defined calibration curve. The method first screens for samples to extract qualitative spectroscopic features from the NIR spectra and then produces quantitative data for hear of combustion using multivariate calibrations.

Load Bearing Strength by Pocket Penetrometer. The load bearing strength of the stabilized waste material is determined by pushing a pocket penetrometer or similar device into the sample. It is grasped

by the handle and pushed into the sample at a constant rate up to the calibration mark. The load bearing strength is read from the low side of the indicator ring. This process is repeated two more times and the average of the three results is recorded in tons/ft2.

Metals Screen by X-Ray Fluorescence (XRF). Waste samples may be prepared, if necessary, by grinding to a specified mesh size. The prepared sample is placed in a sample holder and positioned for reading. Instrument output identifies the presence of several metals for screening purposes. Semi-quantification of selected metals is then possible relative to matrix matched standards.

Microwave-aided Acid Digestion. A sample portion is weighed into an appropriate microwave digestion vessel and digested using an acid or acid mixture. The vessel is heated in a microwave oven. After cooling, the contents are diluted to volume, filtered and analyzed by appropriate methods.

Microwave-aided Solvent Extraction. A sample portion of a sludge, sediment, soil, solid, or other waste is extracted for organic contaminants, for example, total petroleum hydrocarbons (TPH), using appropriate solvents, for example, hexane and acetone, in a closed vessel microwave heating system designed for solvent extraction. The resulting extract is cleaned up and the contaminants of interest are determined using appropriate methods.

Organics Screen by Immunoassay. A sample portion is prepared for immunoassay by using appropriate separation procedures (for example, extraction, filtration, and/or thin layer chromatography). The extract is then mixed and incubated in a step-wise process inside antibody-coated tubes. The mechanics of mixing, incubating and measuring takes about 30 minutes and results in a color change in each tube. The color development is inversely proportional to the concentration of the antibody-specific analyte(se) of interest, for example, herbicides, pentachlorophenol (PCP), pesticides, polyaromatic hydrocarbons (PAHs), or total petroleum hydrocarbons (TPHs).

Percent Organics. To a measured aliquot of sample add a measured amount of xylene (or hexane). The mixture is placed in a boiling flask. A Dean Stark trap is attached to the boiling flask and both are attached to a condenser. The material is then heated and allowed to reflux. Water is then trapped in the Dean Stark trap and the percent water is volumetrically determined. The percent solids is determined on the waste/xylene mixture. The percent organics is then determined by subtracting the amount of water solids from the original sample size or weight and reported in percent.

PCBs by Immunoassay. A sample portion is prepared for immunoassay by using appropriate procedures (for example, solvent extraction, filtration, and/or thin layer chromatography). The extract is then mixed and incubated in a step-wise process inside antibody-coated tubes. The mechanics of mixing, incubating and measuring takes about 30 minutes and results in a color change in each tube. The color development is inversely proportional to the concentration of PCBs.

PCBs in Aqueous Liquids. A sample is extracted using a volumetric flask and a non-polar solvent (e.g.; isooctane or hexane). The extract is cleaned and prepped for analysis, injected into a GC for separation of isomers, and measurement is accomplished with an ECD.

Peroxide Screen. Peroxide test strips are used to determine the presence of organic peroxides or other oxygen donors (oxidizers) in solvent and aqueous wastes.

Phenol Screen. After extraction and pH adjustment, the sample is mixed with reagents. Phenolic materials react with 4-aminoantipyrine in the presence of potassium ferricyanide at a pH of 10, to form a stable reddish-brown colored antipyrine dye. The generation of color indicates phenolics.

Quick Leach Extraction. An amount of sample is mixed with the appropriate extraction fluid and stirred for a designated time period. After filtration, the pH and/or metals content are determined using the appropriate methods.

Radioactivity Screen. [Reserved]

Reagent Compatibility Screen. Equal portions of stabilization reagent and waste are mixed. The generation of any unacceptable or adverse reactions are evaluated and noted.

Solvent Distillation. To an appropriate-sized standard flask-condenser distillation setup, a known quantity of sample and boiling chips are added. Heat is applied. During distillation, heat is maintained so that a drop of liquid remains on the thermometer bulb. Temperatures are monitored and volumes of each fraction are collected. Additional testing on one or more fractions may be requested.

Solvent Screen uses standard analytical procedures tailored to cover a range of organic compound types for quick screening of common industrial organics.

Stabilization Evaluation. The waste to be stabilized is mixed with at least one combination of cement kiln dust and/or other suitable reagent(s). Heat change (as evidence of curing) which occurs is recorded as the waste/reagent(s) mixture is “setting.” The occurrence of any violent reactions of reagent(s) to waste sample is noted.

# Appendix C.2
# Part A Listed Wastes Compiled into Reactivity Groups within USEI's Compatibility Groups

| RCRA Hazardous Waste Code | Substance |
|---|---|

**Group A**

**RGN-1: Acids. Minerals. Nonoxidizing**

| | |
|---|---|
| KO11 | Acrylonitrile, acetonitrile, hydrocyanic acid |
| K013 | Hydrocyanic acid, acrylonitrile, acetonitrile |
| K062 | Spent pickle liquor[b] |
| U134 | Hydrogen fluoride |
| U204 | Selenious acid[b] |

**RGN-2: Acids. Mineral. Oxidizing**

| | |
|---|---|
| K062 | Spent pickle liquor[b] |

**RGN-3: Acids. Organics**

| | |
|---|---|
| D016 | 2,4-D (2,4-dichlorophenoxyacetic acid)[b] |
| K043 | 2,4-D[b] |
| P058 | Fluoroacetic acid, sodiums |
| U008 | Acrylic acid |
| U112 | Acetic acid |
| U123 | Formic acid |
| U149 | Malononitrile[b] |

**Group B**

**RGN-104: Oxidizing Agents. Strong**

| | |
|---|---|
| K071 | Chlorine |
| K106 | Chlorine |
| P078 | Nitrogen Dioxide (nitrogen (IV) oxide) |

**Group C**

**RGN-10: Caustics**

| | |
|---|---|
| None Listed | Characteristic wastes only |

**RGN-11: Cyanides**

| | |
|---|---|
| F006 | Cyanide (complexed), cadmium, hexavalent, chromium, nickel[b] |
| F007 | Cyanide (salts) |
| F008 | Cyanide (salts) |
| F009 | Cyanide (salts) |
| F010 | Cyanide (salts) |
| F011 | Cyanide (salts) |
| F012 | Cyanide (complexed) |
| F019 | Cyanide (complexed) hexavalent chromium[b] |
| K011 | Acrylonitrile, acetonitrile, hydrocyanic acid |
| K013 | Hydrocyanic acid, acrylonitrile, acetonitrile |
| K051 | API separator sludge |
| K060 | Ammonia still lime sludge from coking operations[b] |
| K087 | Tank tar sludge from coking operations[b] |
| P029 | Copper cyanides[b] |
| P074 | Nickel cyanide[b] |
| P098 | Potassium cyanide |
| P104 | Silver cyanide[b] |
| P106 | Sodium cyanide |
| P121 | Zinc cyanide[b] |
| U246 | Bromine cyanide |

**RGN-33: Sulfides. Inorganics**

| | |
|---|---|
| K048 | Dissolved air flotation emulsion[b] |
| K051 | API separator sludge[b] |
| P107 | Strontium sulfide[b] |

**RGN-105: Reducing Agents. Strong**

| | |
|---|---|
| P107 | Strontium sulfide[b] |

## Group D

**RGN-6: Amides**

| | |
|---|---|
| P085 | Octamethylpyrophosphoramide[b] |

**RGN-7: Amines. Aliphatic. and Aromatic**

| | |
|---|---|
| F005 | Pyridine, toluene, methyl ethyl ketone, carbon disulfide, isobutanol[b] |
| K026 | Methyl ethylpyridines |
| K060 | Ammonia still lime sludge from coking operations[b] |
| K083 | Aniline |
| K087 | Tank tar sludge from coking operations[b] |
| K103 | Aniline |
| K104 | Aniline |
| K112 | 2,4-toluenediamine, o-toluidine, p-toluidine, aniline |

| | |
|---|---|
| K113 | 2,4-toluenediamine, o-toluidine, p-toluidine, aniline |
| K114 | 2,4-toluenediamine, o-toluidine, p-toluidine |
| K115 | 2,4-toluenediamine |
| P054 | Aziridine (ethylenime) |
| P067 | 2-methylaziridine |
| P077 | p-nitroaniline |
| P082 | n-nitrosodimethylamine |
| U012 | Aniline |
| U021 | Benzidine |
| U049 | 4-chloro-o-toluidine, hydrochloride[b] |
| U073 | 3,3'-dichlorobenzidine[b] |
| U092 | Dimethylamine |
| U093 | Dimethylaminoazobenzene |
| U110 | Dipropylamine |
| U167 | 1-naphthylamine |
| U168 | 2-naphthylamine |
| U172 | n-nitrosodi-n-butylamine |
| U174 | n-nitrosodiethylamine |
| U196 | Pyridine |
| U328 | o-toluidine |
| U353 | p-toluidine |

**RGN-8: Azo Compounds, Diazo Compounds. and Hydrazines**

| | |
|---|---|
| P068 | Methyl hydrazine |
| U093 | Dimethylaminoazobenzene |
| U098 | 1,1-dimethylhydrazine |
| U099 | 1,2-dimethylhydrazine |
| U133 | Diamine (hydrazine)[b] |

**RGN-26: Nitriles**

| | |
|---|---|
| K011 | Acrylonitrile, acetonitrile, hydrocyanic acid |
| K013 | Hydrocyanic acid, acrylonitrile, acetonitrile |
| KO14 | Acetronitrile, acrylamide |
| P031 | Cyanogen |
| U003 | Acetonitrile |
| U009 | Acrylonitrile |
| U149 | Malononitrile[b] |

**RGN-27: •Nitro Compounds. Organics**

| | |
|---|---|
| F004 | Cresols and cresylic acid, nitrobenzene[b] |
| K025 | Nitrobenzene[b] |
| K104 | Nitrobenzene |
| K111 | 2,4-dinitrotoluene |

| | |
|---|---|
| P020 | Phenol, 2,4-dinitro-6-( 1-methyl propyl)[b] |
| P047 | 1 4,6-dinitro-o-cresol and salts[b] |
| P048 | 2,4-dinitrophenol[b] |
| P077 | p-nitroaniline |
| P082 | n-nitrosodimethylamine |
| P112 | Tetranitromethane |
| U105 | 2,4-dinitrotoluene |
| U106 | 2,6-diniti-otoluene |
| U169 | Nitrobenzene |
| U170 | p-nitrophenol[b] |
| Ul71 | z-nitropropane |
| U172 | n-nitrosodi-n-butylamine |
| U174 | n-nitrosodiethylamine |
| U234 | Sym-trinitrobenzene |

## Group E

### RGN-4: Alcohols and Glycols

| | |
|---|---|
| F005 | Isobutanol (pyridine, toluene, methyl ethyl ketone, carbon disulfide) |
| P005 | Allyl alcohol |
| U031 | n-butyl alcohol |
| U140 | Isobutyl alcohol |
| U154 | Methanol |
| U359 | Ethylene glycol monoethyl ether[b] |

### RGN-5: Aldehydes

| | |
|---|---|
| K009 | Acetaldehyde[b] |
| KO 10 | Acetaldehyde[b] |
| P003 | Acrolein[b] |
| P023 | Chloroacetaldehyde[b] |
| U001 | Acetaldehyde |
| U053. | Crotonaldehyde |
| U113 | Ethyl acrylate |
| U122 | Formaldehyde |
| U156 | Methyl chlorocarbonate |
| U162 | Methyl methacrylate |

### RGN-13: Esters

| | |
|---|---|
| U113 | Ethyl acrylate |
| U156 | Methylchlorocarbonate[b] |
| U162 | Methyl methacrylate |

### RGN-14: Ethers

| | |
|---|---|
| U025 | Dichloroethyl ether[b] |
| U124 | Furan |
| U213 | Tetrahydrofuran |
| U359 | Ethylene glycol monoethyl ether[b] |

**RGN-15: Fluorides. Inorganic**

| | |
|---|---|
| U134 | Hydrogen fluoride |

**RGN-16: Hydrocarbons. Aromatic**

| | |
|---|---|
| F005 | Toluene, methyl ethyl ketone, carbon disulfide, isobutanol pyridine[b] |
| F024 | Chloromethane, dichloromethane, trichloromethane, carbon tetrachloride, chloroethylene, 1,1-dichloroethane, 1,2-dichloroethane, trans- I ,2-dichloroethylene, 1,1-dichloroethylene, 1,1,!-trichloroethane, 1,1,2-trichloroethane, trichloroethylene, 1,1,1,2-tetra-chloroethane, 1,1,2,2-tetrachloroethane, tetrachloroethylene, pentachloroethane, hexachloroethane, allyl chloride (3-chloropropene), dichloropropane, dich1oropropene, 2- chloro-1,3-butadiene, hexachloro-1 ,3-butadiene, hexachlorocyclopentadiene, hexachlorocyclohexane, benzene, chlorbenzene, dichlorobenzenes, 1,2,4:.. trichlorobenzene, tetrachlorobenzene, pentachlorobenzene, hexachlorobenzene, toluene, naphthalene |
| K015 | Benzyl chloride, chlorobenzene, toluene, benzotrichloride |
| K022 | Cumeneb |
| K023 | Naphthalene |
| K024 | Naphthalene |
| K025 | Benzeneb |
| K036 | Toluene |
| K048 | Dissolved air flotation emulsionb |
| K049 | Slop oil emulsion |
| KOSO | Exchange bundle cleaning sludge |
| K051 | API separator sludgeb |
| K052 | Leaded tank bottoms sludge |
| K060 | Ammonia still lime sludge (from coking operations)[b] |
| K087 | Tank tar sludge[b] |
| U019 | Benzene |
| U022 | 3,4-benzopyrene |
| U050 | Chrysene |
| U055 | Cumene |
| U120 | Fluoranthene |
| U165 | Naphthalene |
| U220 | Toluene |

**RGN-20: Mercaptans and Other Organic Sulfides**

| | |
|---|---|
| F005 | Carbon disulfide, isobutanol, pyridine, toluene, methyl ethyl ketone[b] |
| P022 | Carbon bisulfide |
| P050 | Endosulfan[b] |

| | |
|---|---|
| P066 | Methomyl[b] |
| P070 | Aldicarb[b] |
| U153 | Methanethiol |

**RGN-23: Metals. Other Elemental & Alloys as Sheets. Rods, Drops, Moldings. etc.**

| | |
|---|---|
| D006 | Cadmium |
| D007 | Chromium |
| D008 | Lead |
| D010 | Selenium |
| F003 | Cadmium, hexavalent chromium, nickel, cyanide (complexed) |
| F019 | Hexavalent chromium, cyanide (complexed) |
| K002 | Chrome yellow and orange pigments |
| K003 | Molybdate orange pigments |
| K004 | Zinc yellow pigments |
| K005 | Chrome green pigments |
| K006 | Chrome oxide green pigments |
| K007 | Iron blue pigments |
| K008 | Chrome oxide green |
| K021 | Fluoromethanes[b] |
| K046 | Lead |
| K061 | Dust/sludge |
| K069 | Dust/sludge lead smelting |
| K084 | Arsenic or organo-arsenic compounds |
| K086 | Caustics and sludges from ink formation |
| K100 | Leaching solution |
| K101 | Aniline based and arsenic or organo-arsenic compounds |
| K102 | Arsenic or organo-arsenic compounds |

**RGN-24: Metals and Metal Compounds. Toxic**

| | |
|---|---|
| D004 | Arsenic |
| D005 | Barium |
| D006 | Cadmium |
| D007 | Chromium |
| D008 | Lead |
| D009 | Mercury |
| D010 | Selenium |
| F006 | Cadmium, hexavalent chromium, nickel, cyanide (complexed)[b] |
| F019 | Hexavalent chromium, cyanide (complexed)[b] |
| K002 | Chrome yellow and orange pigments |
| K004 | Zinc yellow pigments |
| K005 | Chrome green pigments |
| K006 | Chrome oxide green pigments |
| K007 | Iron blue pigments |

| | |
|---|---|
| K008 | Chrome oxide green |
| K021 | Fluoromethanes[b] |
| K031 | Cacodyllic acid |
| K046 | Lead |
| K048 | Dissolved air flotation emulsion |
| K049 | Slop oil emulsion |
| K050 | Exchange bundle cleaning sludge |
| K051 | API separator sludgeb |
| K052 | Leaded tank bottoms sludge |
| K061 | Dust/sludge |
| K062 | Spent pickle liquor |
| K064 | Blowdown Slurry/Sludge-Primary Copper |
| K066 | Sludges/Solids-Primary Zinc |
| K069 | Dust/sludge lead smelting |
| K071 | Mercury |
| K084 | Arsenic or organo-arsenic compounds |
| K086 | Caustics and sludges from ink formation |
| K088 | Spent Potliner-Primary Aluminum |
| K090 | Dust/Sludge-Ferroalloys |
| K091 | Dust/Sludge-Ferroalloys |
| K100 | Leaching solution |
| K101 | Aniline-based and arsenic or organo-arsenic |
| K102 | Arsenic or organo-arsenic compounds |
| K106 | Mercury |
| P011 | Arsenic (V) oxide |
| P012 | Arsenic (III) oxide |
| P015 | Beryllium dust |
| P029 | Copper cyanides[b] |
| P073 | Nickel carbonyl |
| P074 | Nickel cyanide[b] |
| Pl04 | Silver cyanide[b] |
| Pl07 | Strontium sulfide[b] |
| P110 | Tetra ethyl lead |
| P115 | Thallium (I) sulfate |
| P120 | Vanadium pentoxide |
| P121 | Zinc cyanide[b] |
| P122 | Zinc phosphide |
| U144 | Lead acetate |
| U151 | Mercury |
| U204 | Selenious acid[b] |

**RGN-29: Hydrocarbons. Aliphatic, Saturated**

| | |
|---|---|
| U056 | Cyclohexane |

**RGN-31: Phenols and Cresols**

| | |
|---|---|
| F004 | Cresols and cresylic acid, nitrobenzene[b] |
| K001 | Creosote, pentachlorophenol[b] |
| K022 | Phenol[b] |
| K035 | Creosote |
| K043 | 2,6-dichlorophenol[b] |
| K048 | Dissolved air flotation emulsion[b] |
| K049 | Slop oil emulsion |
| K050 | Exchange bundle cleaning sludge |
| K051 | API separator sludgeb |
| K052 | Leaded tank bottoms sludge |
| K060 | Ammonia still lime sludge[b] |
| K087 | Tank tar sludge[b] |
| K140 | 2,4,6-Tribromophenol |
| P020 | Phenol, 2,4-dinitro-6-(1-methylpropyl)[b] |
| P047 | 4,6-dinitro-o-cresol and salt[b] |
| P048 | 2,4-dinitrophenol[b] |
| U048 | o-chlorophenol |
| U051 | Creosote |
| U052 | Cresols |
| U081 | I2,4-dichlorophenol[b] |
| U082 | 2,6-dichlorophenol[b] |
| U170 | p-nitrophenol[b] |
| U188 | Phenol |
| U201 | Resourcinol |
| U212 | 2,3,4,6-tetrachlorophenol[b] |
| U242 | Pentachlorophenol[b] |
| M408 | 2,4,6-Tribromophenol |

**RGN-32: Organophosphates. Phosphothioates and Phosphodithioates**

| | |
|---|---|
| K036 | Disulfoton |
| K037 | Disulfoton |
| K038 | Phorate |
| K039 | Phorate |
| K040 | Phorate |
| P062 | Hexaethyl tetraphosphate |
| P071 | Methyl parathion |
| P085 | Octamethylpyrophosphoramide[b] |
| P089 | Parathion |
| P094 | Phorate |
| P109 | Tetraethyldithiopyrophosphate |
| P111 | Tetraethylpyrophosphate |

**RGN-101: Combustible Flammable Materials, Miscellaneous**

| | |
|---|---|
| K048 | Miscellaneous Dissolved air flotation emulsion[b] |
| K049 | Slop oil emulsion |
| K050 | Exchange bundle cleaning sludge API separator sludge[b] |
| K051 | Leaded tank bottoms sludge |
| K052 | Miscellaneous Dissolved air flotation emulsion[b] |

## Group F

**RGN-106: Water and Mixtures Containing Water**

| | |
|---|---|
| None listed | Characteristic wastes only |

**RGN-17: Halogenated Organics**

| | |
|---|---|
| D012 | Endrin (1,2,3,4,10,10-hexachloro-l,7-epoxy-1,4,4a,5,6,7,8, 8a-octahydro-l, 4-endo, endo-5,8-dimethano-naphthalene) |
| D013 | Lindane (1,2,3,4,5,6-hexachlorocyclohexane, gamma isomer) |
| D016 | 2,4-D {2,4-dichlorophenoxyacetic acid)[b] |
| F001 | Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-tri-chloroethane, carbon tetrachloride, chlorinated fluorocarbons |
| F002 | Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloro-:-ethane, chlorobenzene, 1,l,2-trichloro-1 ,2,2-trifluoroethane, orthodichlorobenzene, trichlorofluoromethane |
| F024 | Chloromethane, dichlorom(;':thane, trichloromethane, carbon tetrachloride, chloroethylene, 1,1-dichloroethane, 1,2-dichloroethane, trans-1-2-dichloroethylene, 1,1-dichloroethylene, 1,1,!-trichloroethane, 1,1,2-trichloroethane, trichloroethylene, • 1,1,1,2-tetra-chloroethane, 1,1,2,2- . tetrachloroethane, tetrachloroethylene, pentachloroethane, hexachloroethane, allyl chloride (3-chloropropene), dichloropropane, dichloropropene, 2- \ chloro-1,3-butadiene, hexachloro-1 ,3-butadiene, hexachlorocyclopentadiene, hexachlorocyclohexane, benzene, chlorobenzene, dichlorobenzenes, 1,2,4-trichlorobenzene, tetrachlorobenzene, pentachlorobenzene, hexachlorobenzene, toluene, naphthalene. |
| K001 | Pentachlorophenoi[b] |
| K015 | Benzyl chloride, chlorobenzene, toluene, benzotrichloride |
| K016 | Carbon t.etrachloride |
| K017 | Epichlorohydrin |
| K018 | Ethyl chloride |
| K019 | Ethylene dichloride |
| K020 | Ethylene dichloride, 1,1,1-trichloroethane, 1,1,2-trichioroethane, tetrachloroethanes (1,1,2,2-tetrachloroethane and 1,1,1,2-tetrachloroethane), trichloroethylene, tetrachloroethylene, carbon tetrachloride, chloroform, vinyl chloride, vinyldene chloride |
| K021 | Fluoromethanes[b] |
| K028 | 1,1,1-trichloroethane |
| K029 | 1,1,1-trichloroethane |
| K030 | Trichloroethylene and perchloroethylene |

| | |
|---|---|
| K032 | Chlordane |
| K033 | Chlordane |
| K043 | 2,6-dichlorophenoV2,4- D[b] |
| K073 | Chlorinated hydrocarbons |
| K085 | Chlorobenzenes |
| K095 | 1,1,1-trichloroethane |
| K096 | 1,1,1-trichloroethane |
| K097 | Chlordane |
| K099 | 2,4-D[b] |
| K105 | Chlorobenzenes |
| P004 | Aldrin |
| P023 | Chloroacetaldehyde[b] |
| P037 | Dieldrin |
| P050 | Endosulfan[b] |
| P051 | Endrin |
| P059 | Heptachlor |
| U017 | Benzal chloride |
| U023 | Benzotrichloride |
| U025 | Dichloroethyl ethe |
| U029 | Bromomethane |
| U036 | Chlordane, technical |
| U037 | Chlorobenzene |
| U04 | Vinyl chloride |
| U044 | Chloroform |
| U045 | Chloromethane |
| U046 | Chloromethyl methyl ether |
| U049 | 4-chloro-o-toluidine, hydrochloride[b] |
| U060 | DDD |
| U061 | DDT |
| U066 | 1,2-dibromo-3-chloropropane |
| U067 | 1,2-dibromo ethane |
| U068 | Methylene bromide |
| U070 | o-dichlorobenzene |
| U071 | m-dichlorobenzene |
| U072 | p-dichlorobenzene |
| U073 | 3,3'-dichlorobenzidine[b] |
| U075 | Dichlorodifluoromethane |
| U077 | Ethylene dichloride |
| U078 | 1,1-dichloroethylene |
| U079 | 1,2-dichloroethylene |
| U080 | Dichloromethane |
| U081 | 2,4-dichlorophenol[b] |
| U082 | 2,6-dichlorophenol[b] |

| | |
|---|---|
| U083 | 1,2-dichloropropane |
| U084 | 1,3-dichloropropane |
| U121 | Trichlorofluoromethane |
| U127 | Hexachlorobenzene |
| U138 | Methyl iodide |
| Ul56 | Methyl chlorocarbonate[b] |
| U183 | Pentachlorobenzene |
| U184 | Pentachloroethene |
| U207 | 1,2,4,5-tetrachlorobenzene |
| U208 | 1,1,1,2-tetrachloroethane |
| U209 | 1,1,2,2-tetrachloroethane |
| U210 | Tetrachloroethylene |
| U211 | Carbon tetrachloride |
| U212 | 2,3,4,6-tetrachlorophenol[b] |
| U225 | Bromoform |
| U226 | 1,1,1-trichloroethane |
| U227 | 1,1,2-trichloroethane |
| U228 | Trichloroethylene |
| U242 | Pentachlorophenol[b] |
| U359 | Ethylene glyc9l monoethyl ether[b] |

**RGN-19: Ketones**

| | |
|---|---|
| F005 | Methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, toluene 1 |
| K022 | Acetone[b] |
| U002 | Acetone |
| U004 | Acetophenone |
| U057 | Cyclohexanone |
| U159 | Methyl ethyl ketone |
| U161 | Methyl isobutyl ketone |
| U197 | p-benzoquinone |

**RGN-28: Hydrocarbons, Aliphatic. Unsaturated**

| | |
|---|---|
| K009 | Ethylene[b] |
| K010 | Ethylene[b] |

**RGN-34: Epoxides**

| | |
|---|---|
| K017 | Epichlorohydrin |
| U115 | Ethelene oxide |

**RGN-103: Polymerizable Compounds**

| | |
|---|---|
| K020 | Ethylene dichloride, 1,1,!-trichloroethane, 1,1,2-trichloroethane, tetrachloroethanes (1,1,2,2.:.tetrachloroethane and 1,1,1,2-tetrachloroethane ), trichloroethylene, tetrachloroethylene, carbon tetrachloride, chloroform, vinyl. chloride, vinyldene chloride |

| | |
|---|---|
| P003 | Acroldnb |
| P054 | Aziridine (ethylenime) |
| U008 | Acrylic acid |
| U009 | Acrylonitrile |
| U043 | Vinyl Chloride |
| U113 | Ethyl acrylate |
| U115 | I thelene oxide |
| U162 | Methyl methacrylate |

## Group G

**RGN-9: Carbamates**

| | |
|---|---|
| P066 | Methomyl[b] |
| P070 | Aldicarb[b] |

**RGN-12: Dithiocarbamates**

| | |
|---|---|
| U244 | Thiram |

## Group H

**RGN-21: Metals. Alkali and Alkaline Earth. Elemental**

| | |
|---|---|
| D005 | Barium |

**RGN-22: Metals. Other Elemental & Alloys as Form Powders. Vapors, or Sponges**

| | |
|---|---|
| F006 | Cadmium, hexavalent chromium, nickel, cyanide (complexed) |

[a] Reactivity groups, established in the USEPA guidance document "A Method for Determining the Compatibility ofHazardous Wastes" (EPA-600/2-80-076), are identified by a reactivity group number (RGN).

[b] These USEPA wastes, listed under multiple RGNs, appear in more than one USEI compatibility group. Compatibility group determination by a laboratory chemist is based on actual waste stream composition and, if necessary, physical compatibility testing.