ATTACHMENT II

RCRA - TSCA

WASTE ANALYSIS PLAN

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WASTE ANALYSIS PLAN

1.0 INTRODUCTION:

The following describes the methods that shall be used to manage hazardous waste regulated by the Resource Conservation Recovery Act (RCRA), waste regulated by the Toxic Substance Control Act (TSCA), and waste regulated by the Utah Administrative Code (Utah Amin. Code) R315, Environmental Quality, Solid and Hazardous Waste at the Grassy Mountain Facility, referred to hereafter as GMF or the Facility.

1.1. Overview

This Waste Analysis Plan (WAP) has been developed to meet the requirements of Title 40 Code of Federal Regulation (CFR) § 264.13, 40 CFR §268.7, 40 CFR § 270.14(b), 40 CFR § 761.75, 40 CFR § 61 Subpart M and Utah Rule R315-8-2.4, 40 (c). A copy of this plan and any approved revisions will be kept on file at the Facility and shall be available during compliance inspections.

This plan provides waste management procedures and documents the analyses required to safely treat, store, or dispose of the wastes accepted at the Facility. This plan describes the following:

- The methodology for accepting a generator's waste stream prior to arriving at the Facility;
- The methodology for determining the acceptability of a generator's waste stream – Verification Analysis of Incoming Waste; and
- The methodology of determining whether a RCRA waste stream has been treated to ensure compliance with the applicable land disposal restrictions (LDR), if necessary.

The term "RCRA hazardous waste" refers herein to a waste considered hazardous by the U.S. Environmental Protection Agency (EPA) because it is so defined in RCRA § 1004(5) and the implementing regulations at 40 CFR §§ 261.20 - .24 and 261.30 - .33. A "non-hazardous waste" is a waste not identified as being hazardous according to 40 CFR § 261 and/or applicable State Regulations. The term "TSCA waste" refers herein to a waste regulated by the Toxic Substances Control Act (TSCA). State regulated hazardous wastes are wastes regulated by only the State of Utah, Department of Environmental Quality, Divison of Solid and Hazardous Waste, pursuant to Title R315.

The forms shown within this WAP are typical forms currently used by the Facility. These forms may change as long as they are at a minimum equivalent to the current forms. Factors that would promulgate the development of new forms include changes in the regulations, customer needs, facility operations, company policy or other needs. In addition, these forms or documentation may be received, stored, transmitted and/or retrieved electronically in addition to, or in lieu of, hard (paper) copy.

With regards to this WAP, "suitable laboratory" means the laboratory at the Grassy Mountain Facility, and those described in the definitions in Section 1.2 below.

CHESI strives to maintain compliance with all the applicable regulations. As EPA develops new analytical methods, these methods may be used, if applicable, in demonstrating compliance with the appropriate regulation(s). However, prior to implementing a new analytical method, the Permit would have to be modified in accordance with Permit Condition I.D.3.

The Facility is a RCRA hazardous waste treatment, storage, and disposal facility (TSDF) and will continue to accept (both in bulk and containers) solid, liquid and sludge, as defined by R315-2 (40 CFR § 261), as well as TSCA regulated wastes as defined by 40 CFR § 761_and 40 CFR § 61 Subpart M, and solid, liquid and sludge non-hazardous waste, in both bulk and containers.

The wastes amenable to treatment, storage and disposal units at the Grassy Mountain Facility are generated by a variety of industries. Some of the industries/businesses generating these wastes are listed below:

- Aerospace
- Agriculture
- Asbestos Removal
- Automotive scrap recyclers
- Electronics
- Geothermal
- Laboratories
- Manufacturing
- Machine shops and automotive repair
- Metal finishing and plating
- Military
- Mining
- Municipal wastewater treatment
- Oil production, extraction, transportation, refining, processing and marketing

- Small-quantity generators
- Utilities
- Well drilling
- Site remediation activities
- State and Federal Governmental Agencies
- Transportation
- Service Industries

The facility shall manage the following major waste types:

- Non-hazardous Industrial Waste – solid, sludge, or liquid non-hazardous industrial waste shall be stored, treated, and/or landfill as required by the applicable regulation (e.g., liquid waste would be solidified prior to landfill);
- RCRA Hazardous Waste as defined in R315-2 (40 CFR § 261);
- Wastes Regulated by TSCA regulations at 40 CFR § 761 and 40 CFR § 61 Subpart M (e.g., PCB waste and asbestos); and
- Utah specific regulated wastes as defined in R315-2-10 (e.g., military nerve agents (F999 and P999)).

This WAP establishes necessary sampling methodologies, analytical techniques, and overall procedures for characterization, acceptance, storage, treatment and/or disposal of hazardous and TSCA regulated wastes accepted or generated at the facility.

This WAP establishes the following:

- The parameters for which each hazardous and/or TSCA regulated waste shall be analyzed and the rationale for selection of each parameter.
- The test methods that shall be used to test for these parameters.
- The sampling methods that shall be used to obtain a sample of the waste to be analyzed.
- The frequency with which the initial analysis of the waste shall be reviewed or repeated to ensure that the analysis is accurate and up-to-date.
- The frequency with which the analysis of the waste shall be performed to assure that the wastes or treated wastes are in compliance with the applicable treatment standards set forth in R325-13-1 of of Utah Amin. Code which incorporates 40 CFR § 268.40 - 49, by reference.

The WAP is intended to be the primary reference document for all waste analysis performed in conjunction with operation (and closure) of the facility except for groundwater which is covered by Module VII and its associated attachments. The WAP addresses the following topics:

- Waste characterization, analytical parameters and rationale (Section 2)
- Pre-acceptance procedures (Section 2)
- Incoming load procedures (Section 2)
- Test methods (Section 3)
- Waste sampling (Section 4)
- PCB Waste Management Procedures (Section 5)
- Pre-treatment procedures (Section 6)
- Treatment processes (Section 7)
- Record keeping for waste codes (Section 8)
- Analysis of treated wastes (Section 9)
- Fate of treated wastes (Section 10)
- Quality assurance and quality control (Appendix 1).

A Quality Assurance Plan (QAP) for required waste analysis is included as Appendix 1 of this WAP. The QAP describes the methods and procedures that laboratory personnel use to assure integrity of laboratory data. The QAP contains the specific procedures and practices used within the laboratory in order to ensure that the resulting data are technically sound, statistically valid, and properly documented.

This WAP is supported by Standard Operating Procedures (SOPs) including specific procedures and/or test methods. The SOPs, or test method instructions, are used by laboratory personnel as detailed instructions for performing the necessary procedures. The SOPs are incorporated by reference as part of this WAP. They are required for Utah Certification of the laboratory and shall be followed for compliance with the permit.

This WAP also anticipates that wastes will be generated on-site and will ultimately be accepted for storage and/or treatment at this facility. These wastes shall be subject to the same waste analysis procedures as wastes accepted from off-site sources except for incoming load procedures which are not required for site generated wastes.

1.2. Definitions

The following terms, applied within the WAP, shall have the following meaning:

- Accept, Accepted or Acceptance: When it has been determined that a waste shipment received at the Facility conforms to the approved profile (or all discrepancies have been resolved) and the Facility is willing to accept the waste for treatment, storage, and/or disposal.
- Accuracy: The closeness of a result, or the arithmetic mean of a set of results, to the true, expected, or accepted value.
- Analysis: The term "analysis" means any method by which the value of a particular parameter is determined. These methods may include laboratory procedures specified in this WAP or may rely on knowledge of the waste or the process generating the waste.
- Analyte: The substance, element or compound for which a sample is analyzed to determine its presence or quantity. Also known as an analytical parameter.
- Analytical Method: A quantitative procedure for determining the specific concentration or characteristic of an analyte or analyte group.
- Approve, Approved, or Approval: This term is used in the context of evaluating a profile. Approval of a waste stream profile occurs after all necessary evaluations and analyses have been made and when the generator is notified.
- ARA means the Assistance Regional Administrator of the Office of Partnerships, Regulatory Assistance, EPA Region 8.
- Aragonite: Clean Harbors Aragonite, LLC.
- Audit, performance: A check on the performance of analysts. Sometimes categorized as a quantitative appraisal of quality.
- Audit, system: An on-site inspection or assessment of the laboratory's control system and procedures.
- Bulk Load: The term "Bulk Load" means any individual waste shipment transported to the facility which is too large to be managed through the Container Management Building (e.g. an intermodal container, end-dump truck, tanker truck, railcar, etc.).
- Clean Harbors: Parent corporation of the Grassy Mountain facility.
- Clive: Clean Harbors Clive, LLC.
- Debris - is solid material exceeding a 60 mm (approximately 2-inches) particle size that is intended for disposal and that is a manufactured object; plant, animal matter; or natural geologic material. The following materials are not debris:

a) Any material for which a specific treatment standard is provided in R315-13-1 of of Utah Amin. Code which incoperates Subpart D, Part 268 by reference, namely lead acid batteries, cadmium batteries, and/or air emission residues, as well as intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume.

b) A mixture of debris that has not been treated to the standards provided by R315-13-1 of Utah Amin. Code and other material shall be subject to regulation as debris if the mixture is comprised primarily of debris, by volume, based on visual inspection." Examples include steel plates, pipe, concrete pieces, duct work, empty drums, glass, rocks, and sealed containers/chemical containing equipment such as: cathode ray tubes, non-PCB electrical equipment, animal wastes and parts, asbestos containing material (ACM), Tyvek® suits, rubber booties and gloves, and paper towels and/or mixtures of these.

- Director: Means the Director of the Division of Solid & Hazardous Waste.
- EPA: Means the United States Environmental Protection Agency.
- Generator: Generator or generators authorized representative.
- Generator Knowledge: If generator knowledge is used to make a hazardous waste determination, information shall be available to substantiate the waste evaluation. Below are examples of information that can be used to make the waste evaluation required under R315-5-1.11 of Utah Amin. Code (which incorperates40CFR § 262.11 by reference). Some or all, or other information can be used to make a hazardous waste determination applying generator knowledge.

  1. Generator specific process flow diagram or narrative description of the process generating the waste (should be used in most cases);
  2. Chemical makeup of all ingredients or materials used in the process that generates the waste (should be used in most cases);
  3. List of constituents that the Facility know or have reason to believe are byproducts or side reactions to the process that produces the waste;
  4. Material Safety Data sheets (MSDSs) or Safety Data Sheets (SDS) and/or product labels or substances used in the process that generates the waste;
  5. Data obtained from approved methods of sampling and laboratory analysis of waste generated from the same process using the same ingredients/materials;
  6. Data obtained from literature regarding waste produced from a similar process using the same ingredients and/or materials; and/or

7. Documentation of product specifications of input materials and output products.

- GMF: Clean Harbors Grassy Mountain, LLC Facility. When referring to facility specific test methods, “GMF-“ and “SK-“ as a prefix to the method number can be used interchangeably.
- Hazardous waste: The definition of "hazardous waste" shall be as provided in R315-2-3 of Utah Amin. Code (40 CFR § 261.3).
- Holding Time - The maximum time allowable between time of sampling and time of extraction and analysis, or both.
- Infectious Waste means a solid waste that contains or may reasonably be expected to contain pathogens of sufficient virulence and quantity that exposure to the waste by a susceptible host could result in an infectious disease (Utah Code Annotated Title 19 Section 6 Subsection 102).
- Incoming Load: The term "Incoming Load" refers to a load during the period starting when a waste shipment arrives at the facility through the time when a waste shipment is rejected or accepted. Incoming loads may be placed in a storage unit pending the acceptance procedure.
- Laboratory Manager: The "Laboratory Manager" or however named by certifying agencies, refers to the individual or designee responsible for implementation of the WAP.
- NELAP: Means the National Environmental Laboratory Accreditation Program.
- Non-hazardous waste: "Non-hazardous waste" refers to "solid waste" as defined in R312-2-2 of Utah Amin. Code see also40 CFR § 261.2 which is not also "hazardous waste" as defined in R315-2-3 of Utah Amin. Code (40 CFR § 261.3).
- Parameter: The term "parameter" is a specific material property, such as pH, specific gravity, viscosity, etc.
- Particle size: The largest dimension of a portion of a waste.
- PCB(s): The term "PCB(s)" refers to polychlorinated biphenyls (PCB(s)) or PCB Item(s) as defined in 40 CFR § 761.
- PCB Waste: Means any waste (e.g. mixture of liquid, solid, or sludge etc. or any PCB-containing item) that contains PCBs regulated for disposal under 40 CFR § 761.
- Post-treatment: The period following treatment of a waste is referred to as "Post-treatment"

- Pre-acceptance: The period in which a waste stream's acceptability for storage and treatment at the facility is evaluated, is referred to as "pre-acceptance." This is the same as the Profile Approval Period.
- Precision: The agreement or repeatability of a set of replicate results among themselves or agreement among repeated observations made under the same conditions.
- Pre-treatment: The term "Pre-treatment" refers to the period between acceptance and treatment of the waste.
- Profile: Means the electronic or other document that describes a waste or waste stream.
- Radioactive: A "Radioactive" material shall be any Byproduct or Source Material licensable by the Utah Division of Radiation Control or the NRC, or any waste found to have a count rate as measured one inch from the surface that exceeds background by three times or more.
- Receive or Received: Means when waste passes into the fenced portion of the facility.
- Representative sample: Means a sample exhibiting average properties of the whole waste.
- Suitable Laboratory: A "suitable laboratory" is an analytical laboratory which, after review of its Quality Assurance Plan (QAP), meets the minimum quality assurance requirements as specified in the GMF QAP. Any non-Clean Harbors laboratory must also provide the QA/QC documentation for the analytical results it provides which must include analytical methods used. A Suitable Laboratory is one of the following:
    - A laboratory certified by the State of Utah Bureau of Laboratory Improvement;
    - A NELAP approved lab; or
    - A lab approved by the Director in writing.
- Screening Method: A semi-quantitative procedure for determination of the specific concentration, or characteristic of an analyte or analyte group.
- Waste Stream: Waste stream means a waste that is, or can be, identified as a line item on the Uniform Hazardous Waste Manifest from the same source of generation and delivered with the same load. Identical materials with the same waste profile number, that are listed on separate manifest line items only because of container size or type are considered to be the same waste stream.
- Waste Treatment Stream: Means wastes that exhibit similar characteristics such that

if shipped together, they could be placed on the same line item on the Uniform Hazardous Waste Manifest.

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2.0 WASTE CHARACTERIZATION, ANALYTICAL PARAMETERS AND RATIONALE:

The following sections describe the procedures that are followed for approving a waste stream for management at the facility. This includes the pre-acceptance procedures, incoming load procedures, and procedures for resolving discrepancies that may occur upon receipt of the waste.

2.1. Profile Submission/Review Process

The waste profile evaluation process is used to prescreen waste prior to its acceptance at the Facility. The Profile Evaluation process may be accomplished at this Facility, another CHESI Facility or another location, or upon arrival of the shipment prior to acceptance. To initiate the PE process, the waste generator must submit a Clean Harbor's Waste Material Profile Sheet. The Waste Material Profile Sheet, commonly referred to as the "Profile" must be submitted in paper form or using an electronic format for each new waste stream being considered for management at the Facility. The Profile Form requests information from the generator such as name, address, contact person, EPA ID number, generating process, common name of the waste, DOT shipping name, hazardous class, chemical constituents and concentrations. In addition, the form requests regulatory information such as whether the waste is a regulated radioactive waste, infectious waste, RCRA waste, TSCA waste, or State waste. In addition, the profile shall be signed or electronically signed by the generator or his representative.

The following information may also be required, depending on the type of waste:

- Pertinent chemical and physical data on the example Waste Material Profile Sheet form;
- Land disposal restriction notification and/or certification form(s) for state and/or Federal wastes that are restricted from land disposal.
- A representative sample and chain-of-custody, if required. A representative sample may not be required if the Facility determines that the pre-acceptance documentation provides sufficient information to maintain compliance with permit and operational conditions and obtaining a sample would not aid in the disposal decision process. Waste generators are referred to R315-50-6 of the Utah Admin. Code (40 CFR §261,

Appendix I) for the appropriate sampling procedure. This sample may be obtained upon arrival of the initial shipment of waste prior to acceptance.

- The Facility may need other supporting documentation such as additional analytical results, MSDS, SDS, manufacturer's technical fact sheets, product ingredient listing, etc.
- If the waste is in the form of a lab pack, the generator shall describe the volume and the contents of the container(s). The generator of the lab pack shall supply the appropriate Land Disposal Restriction (LDR) notification/certification form for lab packs.
- For hazardous waste to be treated in stabilization tanks or placed in the Surface Impoundment: a Certification from the Generator that the waste at the point of generation does not contain greater than or equal to 500 parts per million weight (ppmw) volatile organic compounds (VOCs) is required. The Waste Profile Sheet may be used by the generator to make this certification.
- For incinerator residue wastes from Aragonite that are to be treated and/or disposed, the Facility may use the analysis of the waste sampled under the Aragonite WAP in lieu of conducting the analyses identified in Tables C-1 or C-2. A physical description shall be provided so that a visual inspection of the load can be made upon arrival.
- For RCRA listed wastes with constituents of concern having numeric LDR treatment standards (found in R315-13-1 of Utah Admin. Code (which incoperates 40 CFR § 268.48 by reference)) and the generator certifies that the waste meets the numerical treatment standards, the Facility may either perform laboratory analytical tests on a sample of the waste to demonstrate that the waste meets the numerical treatment standard or the waste generator can supply laboratory analytical test results that meets the numerical treatment stanard. Analyses shall be done by a suitable laboratory.
- For TSCA regulated PCBs wastes, the generator shall include a certification that the waste has not been deliberately diluted from an original PCB concentration of >50 ppm or deliberately mixed with soil in order to avoid the incineration requirements of 40 CFR. §761.60(a). The specific source of the waste, waste description, original PCB concentration and other chemical constituents of the waste shall also be reported by the generator.

Samples of the following waste types are not required during the profiling or waste characterization process:

- Lab Packs including, but not limited to, discarded containers of laboratory chemicals, waste, lab equipment, lab clothing, debris from lab spills or clean up, and floor sweepings packed in accordance with R315-8-14.10 of the Utah Admin. Code (40 CFR § 264.316).

- Empty Containers.
- Contaminated trash and debris (i.e. contaminated paper, glass, wood, metal, rubber, plastic, cardboard, etc.).
- Single source emergency spill material from a known source.
- Commercial products or chemicals that are off-specification, outdated, unused, contaminated or banned. This also includes products voluntarily removed from the market place by manufacturer or distributor in response to allegation of adverse health effects associated with product use.
- Asbestos-Containing Waste.
- Beryllium-Containing Waste.
- Waste produced from the demolition, dismantling, or renovation of industrial process equipment or facilities. These may include equipment, crushed drums, disassembled tanks, large construction debris, concrete, wood, etc.
- Debris as defined by R315-13-1 of the Utah Admin.Code, which incorporates 40 CFR Part § 268.2 by reference. These materials shall be visually inspected after receipt but before shipment acceptance in order to ensure that the waste meets the definition of debris.
- Controlled substances regulated by the Federal Government including illegal drugs and/or materials from clandestine labs.
- Materials designated for storage only and subsequent shipment off-site (transfer to another facility).
- Wastes that are visually identifiable through an inspection process (e.g., cathode ray tubes, batteries, fluorescent light tubes, filters, and filter cartridges, wire, tubing, paper products, metal sheeting and parts, crushed glass, piping, etc.).
- Contaminated personnel protective equipment (PPE) – This includes gloves, tyveks, respirator cartridges, clothing, etc.
- On-site generated waste, unless otherwise required. Site-generated wastes include rainwater from collection sumps, rainwater from truck wash sumps, rainwater from trenches, spill clean-ups, etc, as long as these wastes are managed as a hazardous waste.
- PCB Waste such as transformers, capacitors, PPE, wooden planks, concrete, asphalt, rags, empty containers, steel pieces, miscellaneous building debris, etc.

The Waste Material Profile form supplies initial information about the generator's waste generating process/activity, volume and waste characteristics, handling procedures, and shipping information. For restricted wastes, the LDR notification/certification form(s) provide notification and/or certification by the generator or the owner/operator of a treatment facility as to whether the waste is subject to land disposal restrictions specified in R315-13-1 of Utah Admin. Code which incorporates 40 CFR § 268 by reference. LDR forms are not required for unrestricted wastes.

2.2. Profile Approval

The Laboratory Manager or designee shall evaluate the acceptability of each waste stream. This decision to accept or reject a profiled waste stream shall be based upon the following information:

- Waste profile information, analytical (physical and chemical) information, and/or LDR notification/certification information;
- Waste management methods available at the Facility;
- Conditions or limitations of existing permit conditions and regulations;
- Capability to manage the waste in a safe and environmentally sound manner;
- Facility management's technical experience and judgment.

Once a decision has been made, a letter or electronic correspondence (e.g., e-mail, etc.) shall be sent to the generator or agent informing him/her that the waste is acceptable at the facility. The letter or electronic correspondence shall contain the profile or waste identification number. The letter also informs the generator that the waste requires annual re-characterization if any significant changes occur in the waste stream.

2.3. Annual Profile Recertification

A generator's waste profile shall be re-certified annually. For an annual recertification, the generator must certify that the waste generation process has not changed. If the generator indicates that the waste generation has changed, the waste shall be re-profiled.

If the generator notifies the Facility that the waste generation process has changed (e.g., when the raw materials to the process have changed), or, if the Facility has reason to suspect that the waste is in nonconformance with profile documentation, then the generator must reprofile the waste. Facility profiles for site generated wastes are exempt from the annual requirement.

If it is found that a waste arrives at the Facility after the profile has expired and it is found the profile was current when the material was shipped by the generator, then the material may be accepted by the Facility without first obtaining a re-certification since the profile was current at the time of shipment.

2.4. Waste Shipment without Approved Profile

If a waste shipment arrives at the Facility without an approved profile, the Facility may receive the waste, after that the generator is contacted and a Profile is completed to ascertain whether the Facility could accept the waste for management. If such wastes arrive at the Facility, the waste will either remain in the custody of the transporter or be placed into a permitted storage location according to the United States Department of Transportation (DOT) descriptions while pre-acceptance procedures are completed and the profile for the waste is approved and the waste officially accepted. If the waste is placed into storage, the container will be clearly marked with the words "Awaiting Profile Approval."

If the generator can not provide a Waste Profile form in a paper or electronic format or the generator doesn’t have analytical results for the waste, or is not able to characterize the waste by process knowledge, one of the following will then occur:

- Reject the load back to the generator; or
- A sample of the waste shall be obtained, laboratory analysis performed, and the results evaluated. Based on the analytical results one of the following actions shall be taken:
    1. Reject the waste back to the generator;
    2. Reject the waste and send it to an appropriate TSDF; or
    3. Accept the load for management at the Facility and record the waste profile information.

2.5. Waste Verification Process (Fingerprint Analysis)

When a shipment of hazardous and/or TSCA regulated waste arrives at the Facility, the Facility will inspect, sample and analyze the waste as described in this section. The waste acceptance process shall accomplish the following :

1. Identify the chemical and physical waste characteristics of the waste shipment and compare the result to the profile information and manifest information; and
2. To ensure the proper disposition of the waste to treatment, storage, and/or disposal.

At a minimum, the fingerprint analysis shall consist of the parameters listed in Table C-1 and where applicable, Table C-2. For TSCA regulated wastes, the finger print analysis will consist of the parameters listed in Table C-1, C-2 where applicable, and Table C-3. Materials to be transferred off-site without treatment or processing at the Facility are not required to be sampled or analyzed.

2.5.1 Waste Receiving Procedures

Waste receiving procedures shall begin when a shipment of waste arrives at the GMF. Upon arrival, the truck shall be weighed. The receiving staff shall review manifest and accompanying paper work for completeness to verify that the waste has an acceptable profile at the Facility and that the waste codes are listed with the information on the profile. Wastes that are subject to the Land Disposal Restriction contained in R315-13-1 of Utah Admin. Code which incoperates 40 CFR § 268 by reference shall be accompanied with a form or document from the generator (or treater) notifying the Facility of the appropriate treatment standard and all applicable prohibitions which are required to be met. In the event regulations allow for a one-time submittal of the LDR form, submittals will not be required for each shipment of the same waste, as long as the nature of the waste has not changed. If this completeness review shows that information is needed (e.g., waste profile number, waste codes, LDR form, signatures, etc.), the generator shall be contacted. If the generator cannot provide the necessary information, the load shall be rejected.

Waste shipments that have arrived at the Facility are will not be accepted until such time that the Facility makes a final decision regarding waste acceptability. All waste shall be treated

All bulk solid waste loads shall be visually inspected and documented by the receiving staff to verify that the contents of the load conform with the waste description contained on the profile. In addition, all bulk waste loads shall be sampled except for large bulk volumes of the same waste received from one source (e.g., contaminated soil from major remedial action). For these shipments, at least 10 percent of the loads shall be randomly selected, and sampled, and analyzed according to Table C-6.

2.5.2 Incoming Load Sampling

For a single waste stream shipped in multiple containers from a single generator, all containers shall be visually inspected and a minimum of 10% of the total number of containers in the shipment shall be sampled in order to verify that material delivered to the facility have the same characteristics as that identified in the profiling process. Fractions of containers shall be rounded to the next whole number of containers. For wastes contained in multiple containers with a count of less than ten, a minimum of one container shall be sampled. Vacuum or tank type trailers shall be routinely sampled though one of the top ports. For volumes that do not allow sampling throught the top port, the sample may be taken from a valve. A manifested vacuum trailer acid load with a suspected pH of less than 3 may be initially sampled through the valve on the tanker to protect the sampler and the operator from exposure to potentially hazardous fumes. Tank sediments shall be sampled from the bottom of the valve when the material cannot be sampled by other means. If the vacuum truck is compartmentalized, each compartment shall be sampled.

RCRA characteristic (D codes) and listed (F, K, U and P codes) wastes shall be sampled on the initial load, and annually thereafter, to verified the analyses outlined on Table C-1 as well as the applicable analysis of parameters found in Table C-2. RCRA listed wastes, where the generator certifies that a particular chemical meets a treatment standards, shall be analyzed annually to verify the generator certification. Alternatively, the generator may provide laboratory analysis demonstrating that the waste constituent meets the LDR criteria. If GMF is treating the constituents of concern, the verification process may be completed on the treated waste as described in Section 7.2.2 of this Attachment. If there is reason to believe that the characteristics of the waste have changed, then additional analysis listed in Table C-2 may be required. This shall ensure that the wastes or treated wastes are in compliance with the applicable treatment standards set forth in R315-13-1 of Utah Admin. Code which incoporates 40 CFR §§ 268.40 - .49 by reference. Analysis provided by Aragonite, for incinerator residue from the Aragonite incinerator, can be used in lieu of performing analysis required by this Attachment such as incoming load samples and annual recertification samples. A visual verification that the waste matches the profile description shall be made on all loads, as necessary, upon arrival at the facility. If the waste is approved for management at the facility, a unique identification number shall be assigned to the waste stream. This number shall be used to identify the waste through the subsequent stages of the waste management process.

Waste samples shall be collected in accordance with the sampling protocols specified by the most current versions of EPA SW-846 and by the American Society of Testing Materials (ASTM) standards. The methods and equipment used for sampling waste materials may vary with the form and consistency of the waste materials to be sampled.

Sampling of vacuum trucks, tank trucks, or containers (e.g., drums, cartons, buckets, etc.) varies depending on the nature of the waste material. For liquid (flowable) type of materials, the sampling device of choice is a Coliwasa unit, tubing, or other appropriate sampling devices such as weighted bottles or bomb samplers. For solid (non-flowing) wastes that arrive in dump trucks, roll-off bins or containers (e.g., drums, tri-wall boxes, super-sacks, etc.), the device of choice is a scoop or shovel but could include other devices as described in SW-846 or ASTM.

2.5.3 Containers Of Waste That Are Not To Be Opened

Due to the toxicity of the following waste streams, shipments of these waste types are not required to be opened at the Facility provided that the generator furnishes documentation (which may include photographic documentation) and certification that the containers contain no free liquids and that the container(s) are at least 90 percent full.

- Nerve agent residues/wastes from military and chemical agents (e.g. F999 and P999 waste codes)
- Waste containing Beryllium; and
- Any other waste deemed to pose a significant occupational hazard to the Facility employees due to its toxicity. With such waste, appropriate approval must be obtained from the Director or ARA for TSCA regulated wastes.

2.5.4 Waste That Is Not To Be Sampled and Analyzed

The following shipments or types of wastes are not required to be sampled and analyzed by the Facility:

- Lab Packs including, but not limited to, discarded containers of laboratory chemicals, waste, lab equipment, lab clothing, debris for lab spills or clean up, and floor sweepings packed in accordance with R315-14.10 of the Utah Admin. Code (40 CFR § 264.316).
- Empty Containers.
- Contaminated trash and debris (i.e. contaminated paper, glass, wood, metal, rubber, plastic, card board, etc.).
- Single source emergency spill material from a known source.
- Commercial products or chemicals that are off-specification, outdated, unused, contaminated, or banned. This also includes products voluntarily removed from the market place by the manufacturer or distributor in response to allegation of adverse health effects associated with product use.
- Asbestos-containing waste.
- Beryllium-containing waste (for example, from machining operations).
- Wastes that are visually identifiable through an inspection process (e.g., cathode ray tubes, batteries, fluorescent light tubes, filters, and filter cartridges, wire, tubing, paper products, metal sheeting and parts, crushed glass, piping, etc.).

- Waste produced from the demolition, dismantling, or renovation of industrial process equipment or facilities. These may include equipment, building materials, crushed drums, disassembled tanks, large construction debris, concrete, wood, etc.
- Waste from a remedial project in which the sampling and analysis plan was approved by a federal or state agency (e.g., Comprehensive Environmental Response Compensation and Liability Act (CERCLA), or state equivalent or a project funded by one or more potentially responsible parties, etc.) as long as the analysis was conducted by a suitable laboratory.
- On-site generated waste, unless otherwise required. The site-generated wastes include rainwater from collection sumps, rainwater from truck wash sumps, rainwater from trenches, spill clean-ups, etc.
- Debris as defined by R315-13-1 of Utah Admin. Code (40 CFR § 268.2 by reference). These materials shall be visually inspected after receipt but before shipment acceptance in order to ensure that the waste meets the definition of debris.
- Controlled substances regulated by the Federal Government including illegal drugs and/or materials from clandestine labs.
- Materials designated for storage and subsequent shipment off-site (transfer to another facility). If it is determined that the Facility will process a waste previously designated for storage and transfer, the waste shall be sampled and analyzed accordingly, prior to any treatment or disposal activities.
- Contaminated personnel protective equipment (PPE) – this includes, gloves, tyveks, respirators cartridges, clothing, etc.

In addition to these exceptions, the Facility may waive sampling and analysis where the pre-acceptance information is sufficient to ensure compliance with permit conditions and operational constraints of the treatment process; and any one of the following conditions exist:

- Obtaining a sample poses an unnecessary hazard of acute or chronic exposure of Facility employees to carcinogenic, mutagenic, neoplastigenic, teratogenic, or sensitizing materials; or
- A representative sample cannot be reasonably obtained, such as filter cartridges, large pieces of contaminated material (i.e. concrete, metal, wood), or contaminated debris.

2.5.5 Samples Taken at Aragonite or Clive

The analytical results from incoming load samples taken at Aragonite or Clive or other Clean Harbors locations can be used in lieu of taking samples of the waste when it arrives at the

Facility. The analysis shall be performed using methods specified in this Attachment. The results of the analysis can be sent to GMF prior to the arrival of the first shipment or with the first shipment. Example: Aragonite receives a waste and then ships it to GMF for management. When the waste arrives at GMF, it may be accepted without taking additional incoming load samples provided the analytical results conform with the approved profile.

2.5.6

A sample of waste taken by the generator or designee, in the presence of a Clean Harbors employee and sent to a suitable laboratory with chain-of-custody, the analysis of that sample can be used as a pre-acceptance sample and as the incoming load sample. The waste stream shall have an approved profile issued by GMF. The facility taking the samples shall follow the same or more stringent sampling methods as prescribed in this Attachment. In these cases, the shipment shall be inspected for general conformance with the manifest and profile as previously described. The unopened containers will be visually inspected for container integrity. The sampling and analysis of the materials inSection 2.54 above are not required unless requested by the Facility. These materials are not required to be sampled because they present extraordinary health and safety hazards (e.g., asbestos), exhibit unusual or impractical sampling and analytical complications, and /or are of such a nature that their contents are known in sufficient and reliable chemical and physical detail that sampling and analysis is not warranted (e.g., out of date commercial products, waste from a remediation project).

Sample(s) from incoming waste shipments that have arrived at the Facility shall be analyzed for the parameters listed in Table C-1. The Facility may require additional analysis based on the information provided during the profiling process. The decision to perform additional analysis shall be based on the following:

- Profile information;
- Results of the fingerprint analysis;
- Knowledge of the generator and/or the waste generating process;
- Limits on targeted waste management units;
- Conditions and limitations of existing permits and regulations;
- Experience of facility management in determining the need to know more information; and

- Any additional documentation obtained for the waste stream, including information that the waste is subject to the land disposal regulations contained in R315-13-1 of Utah Admin. Code which incorporates 40 CFR § 268 by reference.

Table C-2 lists some of the additional analyses that may be required. The results of the fingerprint analysis or waste verification analysis shall be documented and maintained at the facility. The results may be documented on a paper form or electronically. Once the analysis is complete, the Facility shall review the information and make a decision on whether to accept or reject the incoming waste shipment. Waste verification analysis are not required for wastes that will be transferred to another TSDF.

Once the Facility has reviewed the waste profile, incoming waste shipping documents (e.g. manifest) and the waste verification analysis (fingerprint analysis), a decision shall be made to accept or reject the waste load. This decision shall be based on the following information:

- Manifest information;
- Load inspection;
- Sample comparison, if applicable;
- Analytical results;
- Profile documentation obtained, such as MSDS, product ingredient(s), pre-acceptance analysis, etc.;
- Land disposal restriction notification/certification information;
- Facility management's judgment.

Incoming waste load(s) shall only be accepted for treatment, storage, or disposal on condition that the load information (e.g., the manifest information, load inspection, finger print analysis, etc.) is consistent with the profile information (e.g., waste description, analytical, LDR notification/certification form, etc.).

Incoming waste loads shall be subject to further evaluation if they experience any of the following:

- There is a difference between the quantity or type of waste designated on the manifest or shipping papers and the quantity or type of waste the facility actually receives;
- The manifest contains other incorrect, pertinent information;
- The fingerprint test results are not consistent with the profile information and/or pre-evaluation test data;

- Other incorrect manifest information;
- The load does not match sample description, or the fingerprint results are not consistent with the results contained in the profile.

These loads are considered non-conforming waste loads. In this case, the generator and/or his designee shall be contacted as soon as practical for additional information or to clarify information contained in the waste profile, on the manifest, and/or land disposal restriction notification/certification form, if applicable. Depending on the nature of the information, changes may be made to the manifest at the direction of the generator or his designee, the profile may be amended, or the waste may be recharacterized and a new profile created. The load of waste may be staged in a permitted storage area at the Facility while the Facility is working on clarifying or rectifying the problem with the non-conforming load. The additional information shall be reviewed and the Facility shall make a decision regarding the non-conforming loads acceptability.

2.6. Special TSCA Waste Receiving Procedures

The following are special procedures for receiving TSCA regulated PCB waste. In the case of loads (manifests) of PCB waste in drums or portable tanks, at least 10 percent of the containers in each PCB waste stream (waste profile) shall be sampled prior to final disposal. After the load has been accepted, but before further processing, all PCB waste containers shall be opened for visual inspection for physical appearance. Containers on a manifest that have the same profile, but appear on a different line due to different container type, may be composited prior to analysis, providing the individual samples are similar in physical appearance.

For bulk PCB waste shipments, one in every ten loads of a given PCB waste stream shall be sampled, rather than 10% of the total loads received. Once ten loads have been received (and one of them has been sampled), the count starts over, and at least one of the next ten loads shall be sampled. The sampling crew is responsible for determining whether a given waste stream has been sampled within the last 10 loads. This may be done by either manual (paper) or electronic (computer database) tracking of the number of loads of a particular waste stream that have been received. The samplers shall sample the first load of every day that the waste stream is received and then the 11th ,21st, etc. load if that many are received in one day. , If inconsistencies are documented during the receiving process the sampling frequency shall be increased..

Most PCB-containing equipment, which is received for disposal at the facility, has already been drained and flushed and had sorbent added. However, some PCB containing equipment (transformers and hydraulic equipment) may require draining and/or flushing. Sorbent material shall be added to the equipment prior to disposal. All draining and flushing of equipment shall occur at the PCB Storage Area of the Facility. Upon completion of these processes, the PCB-containing equipment shall be transported to a TSCA-permitted disposal cell.

Drained PCB containing electrical equipment received by the Facility hall be inspected to determine if it has indeed been drained before it is landfilled. All PCB articles on each line item of each manifest shall be opened to check for the presence of free-flowing liquids. For equipment such as transformers, the "opening" will be done by removal of inspection plates or access hatchways, and then visually inspecting the interior area exposed. The inspection shall also verify that a sorbent material has been adequately added to absorb any remaining liquids. A minimum quantity of sorbent, approximately equal to 5% of the fluid capacity of the article, should be present. If liquids are present or if sorbent has not been adequately added to absorb any remaining liquids (> 5% of the fluid capacity of the article), the articles shall be further drained and sorbent added as needed. PCB waste equipment and articles, which are to be drained, shall be taken to the PCB Storage Area, and drained within designated areas, all of which are within secondary containment. Once in place in the drainage location, all valves or petcocks shall be fully opened and allowed to stand open for at least 30 minutes over a Drain Vat. If there are drain plugs or caps, rather than valves, they will be removed to allow drainage to occur. Articles may be inverted, elevated at a slant, rotated, or otherwise moved to enhance drainage out of complex internal geometries. Large transformers without drain plugs or valves shall be drain with the use of a “stinger”. PCB articles shall be allowed to drain until any "stream" or "flow" of liquid has ceased, and only an occasional drip remains. Flushing shall then take place as specified by 40 CFR §761.

Finally, all valves shall be closed and drain plugs replaced, to insure no further dripping or leakage after the PCB article is removed from the drainage area. Sorbents shall be added through the inspection ports, to absorb liquids which may remain in the article, in an amount approximately equal to 5% of the fluid capacity of the article.

Not all PCB articles have inspection ports or drain valves or plugs. For such equipment, such as large, detachable ceramic PCB containing bushings which are known or suspected to contain liquids, other more-destructive means of opening may be employed. All PCB articles which are known or suspected to contain free liquids (except for *de minimis* quantities such as vials) shall be opened by drilling, cracking or breaking a hole in the ceramic with a hammer, or other means to open up cavities which may contain liquids. As stated above, PCB articles shall be allowed to drain for at least 30 minutes, and rotated, inverted, etc. to assist in draining complex geometries. If multiple, isolated cavities are apparent, then multiple openings shall be made. When possible, sorbent shall be added to absorb liquids which could not be drained. The PCB articles will then be routed to the landfill for disposal.

For all PCB articles described above, any free liquids remaining around the drain ports or openings created, which might drip off of the article while in storage, shall be wiped off with absorbent toweling. Those PCB articles which have been forcefully opened, cannot be re-sealed, hence, some long-term weepage from the openings may be unavoidable. In addition, some oil staining of the exterior surface of the articles in the immediate area of the drain ports is considered normal and may remain. Sorbent pads or toweling shall be wrapped or packed around any unsecured openings or valves known to be incompetent, to prevent releases to the environment while present at the facility. Such wrapped articles shall be routed to a landfill cell for disposal within 24 hours after completion of the inspection/draining process, or be stored in a PCB container for disposal. The Facility shall use best efforts to complete the inspection/draining process, including the resolution of disputes with generators, as quickly as practicable.

For those unsecured PCB articles described in the preceding paragraph (e.g., those wrapped or packed with sorbent pads), the 24-hour period allowed for disposal shall be deemed to start when the article is removed from within the secondary containment area within the PCB Storage warehouse. The time and date of removal from secondary containment shall be recorded on the records described below; unless a specific notation is made otherwise, the "time of removal from secondary containment" shall be considered as the time recorded when the article is removed from the PCB Drain Vats.

A record shall be kept indicating the actions taken on each line item (e.g., group of PCB articles), the technician performing those actions, and the date the article(s) was/were handled. Also, the initials of the technician performing the inspection, draining and flushing, etc. of each article shall be placed on each article using indelible markers, prior to transport to the landfill for disposal.

2.7. Waste Containing Asbestos Special Handling Procedures

The handling and disposal of asbestos is regulated under 40 CFR § 61 Subpart M of the Clean Air Act. Specifically, 40 CFR § 61.154 contains requirements for periodic cover, dust control, recordkeeping, fencing, signs, etc. All asbestos-containing PCB wastes are also subject to these requirements. Specific requirements include:

- Posting of specified warning signs on security fences;
- Daily cover (or once each 24-hours if operating continuously) of the asbestos waste, if there are any visible emissions air from the site. Cover shall be non-asbestos-containing material, at least six inches (6") thick, or a sprayed-on resinous material.
- Certain reporting and recordkeeping requirements also apply.

Drummed, bagged or boxed friable asbestos could contain a free liquid from the application of water as wetting agent during asbestos abatement activities of the generator. The purpose of this section is to provide the guidelines for handling a friable asbestos container with obvious free liquids. It is intended to minimize the random or systematic opening of containers of friable asbestos. For regulatory and health and safety considerationscare shall be taken when opening containers of friable asbestos, even when utilizing personal protective equipment (PPE). For any management of containers of friable asbestos at the Facility, employees shall wear the standard Level C PPE. The following procedure shall be used to determine if free liquid is present:

- Loads of containerized friable asbestos shall be visually observed by site samplers or container management unit personnel to ascertain if any of the containers contain free liquids. This means that any bag or box visible to the samplers or container management personnel shall be observed to ascertain if any indication of liquids are present. Wet cardboard on the bottom of boxed waste or "pooled" liquid at the bottom of bagged wastes are examples of visual indications of free liquids in the container.
- If no containers, which can be physically observed for a load, visually indicate the presence of liquids associated with the load, the load will be released to disposal. This includes bagged material received in bulk containers (e.g., dump trucks, roll-off boxes, etc.).
- If any container is identified as "potentially" containing free liquids through visual inspection process described in paragraph 1, the container shall be opened, with care taken to assure no visible emissions occur, and the liquid shall be drained into a drum, spill pan or other collection device. The drained container shall be properly disposed and the liquid shall be analyzed for the applicable tests in Table C-1 to confirm that it is water. A successful confirmation of water will allow the liquid to be solidified and disposed in a TSCA-approved cell. A failed confirmation of water (i.e., specific gravity greater than 1.1 or less than 0.9 or observed oil sheen) shall result in the collected liquid fraction being shipped off-site for alternate disposal.

2.8. Discrepancies

Discrepancies are as defined by R315-8-5.4 of Utah Admin. Code (40 CFR §264.72). There are three basic types of discrepancies, variation in weight, piece count, or type. Discrepancies are as follows:

- For bulk waste (e.g., end dumps, roll-off bins, tank trucks, etc), a discrepancy is when the actual weight of bulk shipments varies more than ± 10% of the weight shown on the manifest;
- For piece count (e.g., containers), a discrepancy is when the number of containers on the load does not match the number of containers listed on the manifest.
- For type (e.g. bulk and containerize waste), a discrepancy is when fingerprint analysis as specified in Table C-1 is not within the tolerance limits specified in Table C-4. Should a particular value or values fall outside of the specified tolerance limits, this shall be considered a load discrepancy and shall require further investigation and/or analyses to resolve the discrepancy. One or more of the following actions may occur to resolve the discrepancy:
    1. The sampling and analytical data are reviewed to verify that they are indeed correct.
    2. Additional analyses can be conducted in order to resolve discrepancies or to re-profile the waste.
    3. The generator or authorized representative is contacted. In cases where the waste is amenable to storage or treatment, the waste may be stored at the facility while the discrepancy is resolved with the generator or authorized representative. This may involve creating a new profile for the waste or updating the existing profile.
- For lab packs, a discrepancy is when there is a piece count issue as noted above or when the contents of lab packs don’t match the contents of the load inventory sheet. At least ten percent of the lab packs for each manifest line item shall be verified with a minimum of one lab pack per manifest. Discrepancies shall be reconciled with the waste generator. If a discrepancy in contents is documented, 100% of the lab packs from the load shall be verified. Lab packs generated on site are not required to follow the verification procedure.

The waste can be accepted if the discrepancy is resolved. The resolution of the discrepancy shall be clearly indicated in the operating record. If the discrepancy is not resolved within 15 days, the Facility will notify, in writing, the Director and the ARA for TSCA regulated wastes.

Waste that cannot be accepted shall either be rejected and returned to the generator or shipped to another facility that can appropriately store, treat, or dispose of the waste. The generator shall be notified if the waste is unacceptable and upon approval the waste shall be manifested off-site to an approved transfer, treatment or disposal facility.

2.9. Transfer Operations

Wastes that are manifested to another facility may be held temporarily (ten days or less, where day one is the first calendar day after arrival and day 10 ends on midnight of the 10th day) at the facility during transit. The waste can be part of a load for which some of the material is destined for GMF. When this material is shipped off-site, the original manifest shall accompany the waste. The 10-day transfer loads shall be documented as part of the operating record.

This differs from wastes that are accepted for storage only and then subsequently shipped to another facility. A new manifest shall be generated by the facility as the generator in this situation.

For waste streams that are at the facility for a maximum of ten days and then shipped to another TSDF there are no requirements for sampling or profile verification. The facility shall comply with the transporter requirements in R315-6 of Utah Admin. Code (Subpart C of 40 CFR § 263) for these wastes. The containers shall be inspected to ensure they are in good condition. The containers shall be segregated from other profiled wastes, clearly identified as 10-day wastes along with the date of arrival. Issues of compatibility shall be handled in the same manner as if on a transport vehicle using shipping paper information.

2.10. Non-Hazardous Waste / Non-RCRA Waste / Non-TSCA Regulated Waste

Non-hazardous waste, non-RCRA waste, non-TSCA regulated waste, household hazardous wastes, and other wastes excluded from regulation or not regulated under RCRA, TSCA, or as defined under R315 of Utah Admin. Code is referred to hereafter as “NH” wastes. Generators of NH wastes shall submit a profile for their waste as described in 2.1. When a shipment of NH waste arrives at the Facility, the Facility shall follow the applicable waste verification procedures specified in Section 2.5. If there is a variation in the weight, count, or type, the Facility shall follow the discrepancy procedures specified in Section 2.8.

2.11. Storage Only Wastes

The Facility may store RCRA and non-hazardous waste for up to one year. PCB waste streams shall be disposed of within one year of the date of removal from service. Wastes intended for storage shall be profiled as described in Section 2.1. Upon arrival, the Facility shall follow the visual inspection portion of the waste verification procedures specified in Section 2.5. If there is a variation in the weight, count or type, the Facility will follow the discrepancy procedures specified in Section 2.8.

3.0 TEST METHODS:

The test methods to measure the parameters discussed throughout this Attachment are currently identified in those listed in Table C-5. Whenever possible these are established methods or modified methods from Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition, US EPA, 1986 and its updates. However, SW-846 does not have methods for all the parameters specified; nor are those methods necessarily the most accurate or sensitive. In these particular cases, other established methods are used, including American Society for Testing and Materials (ASTM); and EPA 600/4-79-020, Methods for Chemical Analysis of Water and Wastes; Standard Methods for Examination of Water and Wastewater, Latest Edition; EPA 40 CFR, 136, App. A Methods; EPA Contract Laboratory Program, Inorganic SOW and Organic SOW Methods. Where other practical methods are not available, methods have been developed. These methods are described in Sections 3.1 through 3.7 of this Attachment.or are described in manufacturer literature. GMF and the suitable laboratories GMF uses are authorized to use the methods and method updates / improvements that the State of Utah Bureau of Laboratory Improvement (BLI) and/or NELAP certify as soon as the request is made to the BLI and/or NELAP for the lab to be certified for that method.

3.1. Ignitability Screen for Sludges (GMF-8b)

The ignitability screen for sludges is determined using a modified version of EPA SW-846 Method 1010. Instead of an actual flash point determination as outlined in the 1010, the sludge is heated in the test cup to 140°F. When the temperature in the cup reaches 140°F, the flame is applied to the sample. A flash/no-flash measurement shall be determined and recorded as positive or negative.

3.2. Ignitability Screen for Liquids, Solids and Sludges (GMF-9401)

The setaflash method is based upon ASTM D3828. This is a flash/no flash screening test suitable for liquids, solids, highly viscous liquids, and sludges. The sample is introduced into the cup of the apparatus by opening the cover and adding the sample. The tester is set and maintained at fixed threshold temperatures. After one (1) minute, a test flame of a specific size is applied and an observation made as to whether or not a flash occurs. A flash/no-flash measurement shall be determined and recorded as positive or negative.

3.3. Waste Compatibility Qualitative Assessment (GMF-12)

As part of the pre-approval procedures, the chemical characteristics (pH, reactivity, flammability, etc.) of waste streams shall be assessed by waste acceptance personnel from the profile, to compare compatibility of the waste with shipping and storage containers. This assessment shall be based on information about the waste, but does not require analytical analyses.

3.4. VOLATILE ORGANIC VAPOR TEST (LEL) (GMF-14)

This is one method that may be used to determine the presence of combustible vapors / volatile organic compounds dissipating from a waste. A positive result (failure) is indicated by a reading of greater than 10% LEL on the instrument. A failure requires that a flash point analysis be performed to test for ignitability if the material is destined for direct land disposal at GMF. If destined for storage or treatment in tanks, the TLV Sniff test (GMF-5) shall also be performed.

To perform the test containers of waste shall be opened enough to insert the probe. The instrument pulls any vapors above the waste into the detectors. The LEL instrument shall be purged so that the gauge on the instrument reads zero prior to testing the subsequent sample.. The container is sampled immediately after opening. The probe inlet shall be placed close to, but not touching, the waste in the container. The result (POS/NEG) shall be documented in the logbook. Care shall be exercised to ensure that drafts are avoided in the area that is being sampled as this can cause a false negative result. The instrument shall be calibrated according to the procedures and at the frequency specified by the manufacturer. It shall be operated according to the instructions provided by the manufacturer. Daily sensitivity checks and continuing sensitivity checks every twentieth sample shall be conducted. The test shall not be run with an instrument that is not functioning correctly.

3.5. Combustible Vapor Test (TLV SNIFF) (GMF-5)

This is another method that may be used to determine the presence of volatile organic compounds dissipating from a waste. A reading of greater than 200 ppm on the instrument (FID, PID and or Catalytic Combustible gas and vapor sensing instrument or equivalent) requires that a flash point analysis be performed to test for ignitability if the material is destined for direct land disposal. A reading of < 500 ppm on the instrument (FID, PID and or Catalytic Combustible gas and vapor sensing instrument or equivalent) is required if the material is destined for storage or treatment in tanks.

To perform the test, the sample container is opened enough to insert the probe and the probe is inserted immediately over the sample. The probe inlet shall be placed within 0.5 cm, but not touching, the waste. Sufficient time shall be allowed to clear the air from the sample line prior to sampling. The result (POS/NEG) shall be documented in the lab record. Care shall be exercised to ensure that drafts are avoided in the area that is being sampled as this can cause a false negative result.

The instrument shall be calibrated according to the procedures and at the frequency specified by the manufacturer. It shall be operated according to the instructions provided by the manufacturer. Daily sensitivity checks and continuing sensitivity checks every twentieth sample shall be conducted.. The test shall not be run with an instrument that is not functioning correctly.

3.6. TLV Sniff / Field (GMF-5-MOD)

This is another method that may be used to determine the presence of volatile organic compounds dissipating from a waste. A reading of greater than 200 ppm on the instrument (FID, PID and or Catalytic Combustible gas and vapor sensing instrument or equivalent) requires that a flash point analysis be performed to test for ignitability if the material is destined for direct land disposal. A reading of < 500 ppm on the instrument (FID, PID and or Catalytic Combustible gas and vapor sensing instrument or equivalent) is required if the material is destined for storage or treatment in tanks.

To perform the test, containers of waste are opened enough to insert the probe. The instrument pulls any vapors above the waste into the detectors. Sufficient time shall be allowed to clear the air from the sample line prior to sampling. The container is sampled immediately after opening. The probe inlet shall be placed close to, but not touching, the waste in the container. The result (POS/NEG) is documented in the logbook. Care shall be exercised to ensure that drafts are avoided in the area that is being sampled as this can cause a false negative result.

The instrument shall be calibrated according to the procedures and at the frequency specified by the manufacturer. It shall be operated according to the instructions provided by the manufacturer. Daily sensitivity checks and continuing sensitivity checks every twentieth sample shall be conducted. The test shall not be run with an instrument that is not functioning correctly.

3.7. Radioactivity Screen (GMF-6 / 9916-mod)

All incoming waste shipments shall be monitored for radioactivity using a count rate meter with a Geiger-Mueller detector or equivalent. The detector shall be operated in accordance with the manufacturer's recommended procedures. Detectors shall be calibrated by the manuafacturer at least annually and after repair.

After a container of waste is opened, the detector window shall be placed within one (1) inch (but not in contact with) of the sample surface until a steady, time weighted count rate is obtained.

Results of surveys are to be recorded in terms of microR/hr. Any waste found to have a reading of three times over background shall not be accepted without receiving authorization from the Division of Radiation Control. A background reading shall be taken for each sampling day and the measurement recorded.

4.0 WASTE SAMPLING METHODOLOGY

This section presents methods to be used to obtain samples of wastes as required by this Attachment and the applicable regulations. These methods shall apply to waste generated off-site as well as facility-generated waste. The specific sampling methods selected are dependent on both the nature of the waste and its location, and shall be decided upon before sampling. In some instances, company personnel may perform sampling at off-site locations (e.g., clean-up projects, off-site generators location, etc.).

4.1. Sampling Locations:

Samples of hazardous and TSCA-regulated waste from incoming waste loads may be collected from a variety of locations throughout the facility or at an off-site location. Waste may be sampled from storage vessels, such as a tank, drum, roll-off box, rail gondola car, rail tank car, pin box, tanker or dump-type truck, etc. or from other locations including containment areas, process equipment, pipes and pumps. Sampling may also occur at the Clive and Aragonite Facilities.

4.2. Sampling Methods

Representative samples shall be taken using methods outlined in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," SW 846, EPA; "Handbook for Sampling and Sample Preservation of Water and Wastewater," (EPA-600/4-82-029); or

"Samplers and Sampling Procedures for Hazardous Waste Streams," (EPA-600/2-80-018); or R315-50-6 of the Utah Admin. Code (40 CFR § 261, Appendix I).

The methods and equipment used for sampling vary with the form and consistency of the waste to be sampled. They also vary depending upon the regulatory requirements for which the testing is done. Where samples are used to identify or confirm the identity of a waste, the appropriate representative sampling techniques, devices, and containers shall be selected from the options presented in R315-50-6 of Utah Admin. Code (40 CFR § 261 Appendix I) or equivalent. Where samples are used to determine compliance with treatment standards expressed in R315-13-1 of Utah Admin. Code which incorporates 40 CFR § 268.40 by reference, after treatment, sampling techniques appropriate to the waste type shall be used.

Sampling accuracy (the closeness of a sample's analytical results compared to the results associated with the waste profile) and sampling precision (the closeness of repeated sample values) are important in determining the quality of the data. From both regulatory and scientific perspectives, the primary objectives of a sampling plan are to collect samples that allow accurate and precise measurements of the chemical properties of the waste. If the chemical measurements are sufficiently accurate and precise, they are considered reliable estimates of the chemical properties of the waste. Statistical techniques for obtaining accurate and precise samples are relatively simple and easy to implement. Sampling accuracy is usually achieved by some form of random sampling. In random sampling, every unit in the population has a theoretically equal chance of being sampled and measured. Consequently, statistics generated by the sample are unbiased (accurate) estimators of true population parameters. In other words, the sample is representative of the population. Where particular types of sampling are indicated by the treatment standards, these shall be used.

4.3. Traceability

Sample traceability for all internal sampling and analysis and shipment of samples to suitable laboratories shall be followed. This involves the documentation of procedures so that a set of data can be traced back through the analyst, to the person performing the sampling, and then to the waste itself. All samples shall receive a unique sample identification number to facilitate this process. See the Quality Assurance Plan (Attachment II-WAP, Appendix 1) sections 5.2 & 5.4 for the requirements for seals and/or chain-of-custody.

4.4. Sampling Personnel

Sampling shall be performed by trained personnel. The Facility Manager or designee shall train sampling personnel and periodically observe their sampling technique to ensure a thorough understanding of sample collection, storage, and transportation practices. The training provided to the sampling personnel shall be incorporated into the operating record.

4.5. Sample Labels

Sample labels shall be used to provide identification of samples. The labels shall be affixed to the containers prior to or at the time of sampling. The labels shall be filled out with the following information:

- sample identification;
- place of collection;
- date of collection;
- person sampling; and
- manifest number & generator name or load number, etc., if applicable.

4.6. Record (Log Book, Unload Work Order, or Equivalent)

All information pertinent to field surveys or sampling shall be recorded and incorporated into the operating record. Sufficient information shall be recorded to allow someone to reconstruct the sampling without reliance on the collector's memory. This record shall include, at a minimum, the following information:

- location of sampling point;
- volume of samples taken;
- date of collection;
- sample identification number;
- person sampling;
- comments or observations;
- sampling methodology
- copy of sampling results

4.7. Sample Preservation:

All samples shall be preserved in accordance with the parameter to be measured, as specified by the analytical method for that parameter. For sample preservation, specific procedures are found in the Quality Assurance Plan. Hazardous waste samples do not require preservation but are subject to holding times.

4.8. Sampling Small Containers:

The term "small container" refers to receptacles designed for transporting materials (e.g., drums and other small receptacles) typically transported on flat beds or vans as opposed to bulk transport containers or stationary tanks. This section addresses sampling of small containers that are of a size that could be stored in the container storage building. COLIWASAs, tubes, shovels, drum thieves, and triers shall be the devices used to sample containers.

The following sampling criteria shall apply to shipments of a single waste stream from the same generator. Ten percent (10%) of the containers, rounding to the next whole number, shall be sampled. Samples of containers with like physical appearance can be composited. Samples of unlike physical appearance can not. All containers in a waste stream, prior to being treated and/or disposed at GMF, shall be opened to verify conformance to the physical appearance of those sampled. Additional samples shall be taken from containers with non-conforming appearance.

Samples shall be taken from locations displaced both vertically and horizontally throughout the waste. For liquids (or liquids with precipitated solids), the sampling person shall use a COLIWASA or equivalent. The sampling device shall be inserted into the container from the top and pushed down slowly until the bottom of the container is reached. The device is sealed to retain the contents. The contents of the sampling device are then transferred to an appropriate sample container, which is labeled with waste identification information. The sampling device may also be stoppered at both ends, wiped dry with a disposable cloth, and then transferred to the lab for analysis.

A trier, thief, shovel, or scoop shall be used to sample containers that are solid in nature. The sampling person shall remove a sample that uniformly represents the waste composition of the container (i.e., all layers and phases shall be represented in the sample). If the contents are solidified, such as concrete, clay, polymerized material, glue, a sample from the top of the container shall be collected.

4.9. Sampling Liquid Tanks:

Typically liquid tanks are sampled from the outlet valve or piping. The valve shall be flushed prior to the sample actually being drawn. The liquid accumulated from the flushing process shall be placed in a bucket and returned to the tank. In addition, other methods for sampling tanks may be used such as a weighted bottle or bomb sampler in order to allow for sampling at various depths.

4.10. Sampling Bulk Containers:

Bulk containers are typically rolloff boxes, dump trucks, tank trucks, rail tank cars, rail gondola cars. Where sampling of bulk loads is required, each container of each load shall be sampled as described below.

Bulk solids in rolloff boxes or dump trucks (or truck and pup) shall be sampled at two locations in the waste container(s). A trier, thief, auger or shovel shall be used in order to draw a sample from at least one foot in depth or the full depth of the waste which ever is less at each location. The samples shall be composited together so that there is one sample which represents that particular bulk solids shipment.

Bulk solids in rail gondola cars shall be sampled at four distinct locations in the waste container. A trier, thief, auger or shovel shall be used in order to draw a sample from at least one foot in depth or the full depth of the waste which ever is less at each location. The samples shall be composited together so that there is one sample which represents that particular bulk solids shipment. This sample shall be used for all rolloff boxes or dump trucks filled from that particular gondola car. Each incoming load from that car will be visually inspected to ensure visual conformance with the incoming load sample. A visual non-conformance will initiate actions to resolve the discrepancy.

Bulk liquids are sampled by using a COLIWASA or similar device which can sample vertical anomalies. Bulk sludges shall be sampled with a device appropriate for the consistency of the material. That may be a COLIWASA, trier, dip tube, or thief, etc. Each compartment of a tanker truck is sampled. Compartment samples from the same generator and waste stream may be composited prior to analysis only if there is no difference in physical appearance.

Tank trucks without man-ways shall be sampled through the valve. The valve shall be flushed prior to the sample actually being drawn. The flushed material shall be managed with the waste.

An exception to the requirement for sampling each load of bulk load shipments will be where multiple bulk loads of a single waste stream are received from a single source (e.g., a major site clean-up of contaminated material or a large volume generator shipping over a short time period). In such cases, all loads shall be inspected for physical appearance. A visual non-conformance will initiate actions to resolve the discrepancy. The Facility shall sample the first load of the day (and then the 11th, 21st, etc.) and analyze for the incoming load parameters.

4.11. Frozen Waste:

Loads may arrive at temperatures which prevent a representative sample from being obtained. Under such circumstances, the wastes will be allowed to warm until such time as sampling can be performed. Sampling can occur at any temperature provided a representative sample can be obtained. A sample shall then be taken and analyzed. Alternatively, and if conditions warrant (e.g., freezing conditions) a sample of PCB waste being delivered to the Facility may be obtained at the point of generation for the purpose of satisfying the requirements of this Attachment. Upon arrival, the load shall be visually inspected for free liquids.

4.12. Other Samples (i.e., Process Equipment, Containment, Sumps, etc.)

The sampling method for waste in and from process equipment (i.e., stabilization tanks), containment and containment sumps, put-piles, etc., will vary with the nature of the waste material but will normally be grab samples as these are typically homogeneous wastes. For grab samples the sampling device of choice shall be a scoop, shovel, bottle, cup or similar device with a container in which to deposit and transport the sample. A dip tube or COLIWASA may also be used to sample sumps.

4.13. Post Treatment Sampling of Waste Treated in Stabilization Tanks

When waste is treated in the stabilization tanks it is mixed with reagents. A sample is then obtained.for LDR conformation analysis. Because of the mixing it is reasonable to approach the pile as a mass with no vertical or horizontal stratification. GMF shall follow the sampling methodology stated in R315-13-1 of Utah Admin. Code, which incorporates 40 CFR § 268.40 (b) by reference, for waste treated at GMF. Any grab sample shall pass the treatment standards before the waste is disposed. When there is any uncertainty in achievement of treatment standards, the Facility wshall follow the procedures for re-sampling in Section 4.13.2 of this Attachment.

4.13.1. Initial Sampling

One grab sample from each batch of treated waste shall be taken. It shall be collected from either the tank after treatment is completed, or during removal from the tank, or from the transport vehicle used to move the waste to the staged "put-pile" location, or immediately after the "put-pile" is placed.

4.13.1.1. Re-Sampling

Wastes treated in the stabilization tanks and staged as "put-piles" to await analytical results, may need resampling for confirmatory (verification) analyses. Resamples shall consist of two grab samples per batch of material placed in the put-pile. If results from the initial sample indicate a failure to meet LDR treatment standards, two resamples shall either be taken to verify the results of the initial sample or the waste shall be retreated. If one or both resamples fail, the waste shall be retreated. If both pass, the Facility will determine that the waste meets treatment standards and may be released for disposal.

4.14. Surface Impoundment

The following describes the collection of liquid and sludge samples from surface impoundments.

4.14.1. Liquid Phase

The representativeness of the samples of the waste in a surface impoundment is dependent on the number of samples collected over the volume of the waste in the impoundment. If the waste stored in the impoundment is a homogeneous mixture (e.g. non-hazardous and/or F039 liquids), the sampling approach will be that of a non-stratified, free-flowing liquid. At a minimum, at least three samples shall be collected, one from near the bottom and one from at least two sides of the impoundment. These samples shall be composited unless stratification is observed and, if present, discrete aliquots shall be taken as grab samples.

4.14.2. Sludge Phase (on the Bottom)

The representativeness of the samples of the sludge at the bottom of the surface impoundment is dependent on the number of samples collected over the volume of the waste in the impoundment.

If there is less than three inches of sludge buildup on the bottom of the impoundment, it may be difficult to get a sample. Under such circumstances, four grab samples taken from the bottom and on each side of the impoundment shall be taken and composited together.

If the buildup is three inches or more, at least four samples shall be taken from the thickest layers of sludge at random locations.

4.15. Leachate from RCRA Leachate Collection Systems:

GMF has determined that it meets the exemption to the air emission standards under R315-8-22 of Utah Admin. Code (Subpart CC in accordance with 40 CFR § 264.1082). The following procedure shall be used to verify the applicability of the exemption.

4.15.1. Frequency

The leachate from each cell shall be analyzed during the 4th quarter to confirm that the Volatile Organics (VO) concentration in the leachate is < 500 ppmw.

4.15.2. Collection and Sampling of Leachate Storage Tanks from Each Individual RCRA Cell

An equal amount of leachate shall be pumped from each leachate sump (all risers) in a given RCRA cell into the portable leachate collection tank. A sample from the portable leachate collection tank shall be collected using a collowasa. The leachate collection tank shall be emptied prior to sampling the following cell. Chain-of-custody procedures shall be used to send the sample to a laboratory for analysis.

4.15.3. Analysis

The waste shall be analyzed in accordance with R315-7-30 of Utah Admin. Code, which incorporates 40 CFR § 265.1084 (a)(3)(iii) by reference. The concentration of VO in the leachate will need to be < 500 ppmw for the Facility to maintain the exemption.

4.16. Water from Wheel Wash Collection Tanks

GMF has determined that it meets the exemption to the air emission standards under R315-8-22 of Utah Admin. Code which incorporates 40 CFR § 264.1082 (Subpart CC). The following procedure is used to verify the applicability of the exemption.

4.16.1. Frequency

Water from the wheel wash tank(s) shall be analyzed annually to confirm that the

VO concentration in the water is < 500 ppm.

4.16.2. Collection and Sampling of Wheel Wash Water

Prior to emptying the Wheel Wash Tank(s), a sample shall be collected and chain-of-custody procedures shall be used to, send the sample to a laboratory for analysis.

4.16.3. Analysis

The waste shall be analyzed in accordance with R315-7-30 of Utah Admin. Code (40 CFR § 265.1084 (a)(3)(iii)). The concentration of VO in the leachate will need to be < 500 ppmw for the Facility to maintain the exemption.

4.17. Sample Disposal

Samples of waste streams shall be disposed in the same fashion as the waste stream itself. Samples received which are unacceptable for management on-site may be returned to the generator (or representative) or sent to an approved facility for disposal. To facilitate this process (sample disposal), samples approved for the same management processes may be consolidated in containers.

4.18. Sampling Apparatus Cleaning

Sampling tools shall be kept clean of materials that will interfere with future analyses. Those analyses being conducted for gross qualification shall be kept free of loose material which would enter the sample, whereas visually clean or new sampling equipment shall be required where the sampling is being performed to determine constituents in the parts per million range.

5.0 PCB WASTE MANAGEMENT PROCEDURES

The following are examples of the types of PCB wastes that can be disposed of in a landfill at the Facility after the receiving process has been finished and a determination has been made to accept the waste:

a. Contaminated debris and/or rags;
b. PCB-contaminated or small PCB capacitors;
c. Drained or drained and flushed PCB hydraulic machines per 40 CFR § 761.60(b)(3);
d. Drained PCB articles per 40 CFR § 761.60(b)(5)(I)(B) and (ii) or containers per 40 CFR § 761.60(c)(1)(ii) and (2); and
e. Flushed PCB transformers per 40 CFR § 761.60(b)(1)(I).
f. Asbestos or asbestos-containing materials contaminated with PCB's.

The following PCB waste types shall be sampled and analyzed as per this Attachment prior to ultimate disposal in the authorized cell:

a. Contaminated soils;
b. All free liquids and sludges contaminated with <500 ppm PCB provided, that those wastes do not contain more than 10% Total Organic Carbon (TOC) prior to solidification. (e.g. Dredged materials, industrial sludges, municipal sewage, and treatment sludges).

The following special PCB wastes include materials from on-site and off-site activities that are not required to be sampled and analized but shall be physically inspected prior to disposal, to verify the contents:

a. Contaminated Trash and Debris - Consisting of rags, clothing, sampling/analysis apparatus, contaminated lab debris, glassware, pallets, etc.
b. "Empty" containers contaminated with PCB's - This applies to a portable container which has been emptied, but which may hold residuals of PCB's. Examples of containers are: portable tanks, drums, barrels, cans, bags, liners, etc. A container shall be determined "empty" according to the criteria specified in R315-2-7 of Utah Admin. Code (40 CFR § 261.7);
c. PCB equipment removed from service provided that adequate information is available from the generator to determine regulatory status (e.g., PCB origin and concentration; manufacturer's status; etc.). Examples: fluorescent light tubes, microwave ovens and

fixtures, electronic equipment, etc.

d. PCB waste produced from the demolition or dismantling of industrial process equipment of facilities contaminated with PCB's. For these exceptions, the generator shall supply the Facility with sufficient chemical and physical characteristics information for proper management of the waste.

Containers requiring storage prior to landfill disposal shall be stored in the container storage area of the drain and flush building at the PCB treatment facility or in an area in compliance with 40 CFR § 761.65. (Wastes which are to be handled at the PCB treatment facility are discussed in Appendix 1 "Other Facilities".) "Staging" of PCB waste is only authorized for a period of 30 calendar days or less in an area permanently designated outside of the TSCA disposal cell. Any waste being staged longer than 30 days shall be moved to the TSCA-approved storage area.

PCB wastes shall be managed in one of the 15 procedures in the following list:

1.	Mineral oil dielectric fluid containing PCBs.	May go to the PCB storage facility on-site for eventual shipment off-site to a suitable facility under 40 CFR § 761.
2.	Kerosene flushing fluid contaminated with PCBs.	May go to the PCB storage facility on-site for eventual shipment off-site to a suitable facility under 40 CFR § 761.
3.	Commercially graded oil contaminated with PCBs.	May go to the PCB storage facility on-site for eventual shipment off-site to a suitable facility under 40 CFR § 761.
4.	Other oils with <500 ppm PCB.	May go to the PCB storage facility on-site for eventual shipment off-site to a suitable facility under 40 CFR § 761.
5.	Flushed PCB transformers, and transformers flushed at the Facility, with original PCB concentration >500 ppm per 40 CFR § 761.60(b)(1)(i).	May go directly to a landfill for disposal after physical appearance is examined and required inspections occur.
6.	Asbestos/PCB-Contaminated Waste.	May go directly to a landfill for disposal after physical appearance is examined and required inspections occur.

7. Contaminated soil, debris and/or rags.	May go directly to a landfill for disposal after physical appearance is examined and required inspections occur.
8. Non-PCB (<50 ppm), PCB-contaminated, or small PCB capacitors.	May go directly to a landfill for disposal after physical appearance is examined and required inspections occur.
9. Drained or drained and flushed PCB hydraulic machines.	May go directly to a landfill for disposal after physical appearance is examined and required inspections occur.
10. Drained PCB articles or containers.	May go directly to a landfill for disposal after physical appearance is examined and required inspections occur. Note, that this does not include transformers, which are addressed Item 5 above.
11. Incidental Liquids <500 ppm PCB concentration (including solidified liquids) (40 CFR § 761.60(a)(3))	Shall be sampled as part of fingerprint analyses prior to acceptance for final disposal at the Facility. Fingerprint analyses (including any confirming additional analyses (i.e., PCB, TOC) shall be performed either in the Grassy Mountain laboratory or in a suitable laboratory. This type of waste shall be evaluated as described in Section 2.0. Aqueous-based liquids having a Specific Gravity of 1.0 ± 0.1, have a less than 10% separable oil phase, and demonstrates a TOC value of less than 10% may be solidified and landfilled. Liquids or sludges containing > 10% TOC, shall be handled as PCB-contaminated oil and and shipped offsite to a facility properly approved to manage PCBs of these types. In addition, if there is evidence to believe that the oil phase was diluted from > 500 ppm PCBs, the waste shall be managed under Item 3, above.
12. Dredged materials, industrial sludges, and municipal sewage treatment sludges.	Shall be sampled as part of fingerprint analyses prior to acceptance for final disposal at the Facility. Fingerprint analyses (including any confirming additional analyses (i.e. PCB, TOC) are performed either in the Grassy Mountain

	laboratory or another suitable laboratory defined in this Attachment.
13. Drained PCB-contaminated electrical equipment.	May go directly to a landfill for disposal after physical appearance is examined and required inspections occur.
14. Sludge-like chemical materials.	Shall be sampled as part of fingerprint analyses prior to acceptance for final disposal at the Facility. Fingerprint analyses (including any confirming additional analyses (i.e. PCB, TOC) will be performed either in the Grassy Mountain laboratory or in another suitable laboratory. This waste shall be evaluted as described in Section 2.0. Aqueous-based liquids having a Specific Gravity of 1.0 ± 0.1, have a less than 10% separable oil phase, and demonstrates a TOC value of less than 10% may be solidified and landfilled. Liquids or sludges containing > 10% TOC, shall be handled as PCB-contaminated oil and and shipped offsite to a facility properly approved to handle PCBs of these types. In addition, if there is evidence to believe that the oil phase was diluted from > 500 ppm PCBs, the waste shall be managed under Item 3, above.
15. Other PCB materials accepted for storage and transferred to off-site facilities.	May go to the PCB Storage Facility or Drum Dock, which are both on-site for eventual shipment off-site to a suitable facility under 40 CFR § 761.

6.0 PRE-TREATMENT PROCEDURES

The following describes the steps that shall be taken before a waste is treated.

6.1. Waste Characterization

The waste shall be profiled and characterized as described in Section 2. To determine the constituents in the waste prior to treatment, the profile and laboratory analytical information shall be used. If the profile analysis and/or annual verification sample analysis, or for debris, or other waste that is not amenable to sampling, generator / GMF knowledge, may be used in lieu of sampling to determine the constituents in the waste prior to treatment. This information shall be used to develop the appropriate treatment recipe. The analyses shall be performed on homogeneous blends of wastes, representative composite samples, or on individual batches.

6.2. Visual Inspection

All containers at the Container Management Building shall be inspected for the presence of free liquids prior to being sent for landfill with the exception of:

- Lab packs; and
- items that are excluded by the Permit or Director authorization.

A waste stream is considered without free liquids if the pre-acceptance description was non-liquid and if the incoming load inspection confirmed this description.

Waste streams that are exempt from visual inspections shall be certified by the generator to not contain free liquids and that the container holding the waste is at least 90% full. In addition, photo documentation of such containers is required.

All storage containers (e.g., shipping containers, overpack containers, etc.) that do not meet one of the conditions above and which contain free liquids shall be either solidified or decanted to remove the free liquids.

6.3. Wastes that do not Require Samples

Section 2.5 contains a list of waste types that are not required to be sampled. The chemical characteristics (those specified on Table C-2) of these waste types shall be determined from the description of the material, container inventory sheets, generating process, generator knowledge, literature searches, and/or good judgement rather than from analysis of a sample.

The method for determining these parameters shall be clearly documented in the operating record.

7.0 TREATMENT PROCESSES

The Facility's treatment processes include solidification, stabilization, oxidation/reduction, debris treatment (microencapsulation and macroencapsulation. The Facility will treat RCRA hazardous waste that contains multiple treatment standards for constituents of concern to the most stringent regulatory or statutory treatment standard. The following describes the treatment processes.

7.1. Solidification

The solidification process shall consist of treating waste containing free liquids with pozzolanic and other appropriate material to assure all free liquids are chemically fixed. This process could also be used to neutralize a waste stream and meet the LDR Technology Standard of "NEUTR and/or DEACT."

Pre-treatment analyses of the wastes is required to determine compatible with the pozzolanic reactant. The analyses shall include the initial analysis, fingerprint analyss and the compatibility testing done prior to treatment. In-process analyses are not required for this treatment. Post-treatment analyses is required to assure that all free liquids have been chemically reacted and the mixture is suitable for final handling or processing. The Paint Filter Test shall be performed in order to verify that the process was effective.

7.2. Stabilization / Oxidation / Reduction, Etc.

The following provides information on the stabilization, oxidiation, reduction treatment processes.

7.2.1. Process Descriptions

A variety of techniques are used by GMF to treat waste to meet LDR numeric and/or technology standards prior to land disposal. These include pH adjustment and buffering, oxidation, reduction, conversion to insoluble salts, and chemically bonding elements to an insoluble matrix. Technology standards that GMF achieves through this process are:

- Chemically "fixing" (i.e. reducing the leachability) inorganic metal component(s) in a given waste (LDR Technology Standard of STABL). This is done by converting the more soluble metal compounds to less soluble compounds and/or combining the metal compounds with reagents which physically bind them. Depending upon the waste stream and its constituents oxidation and/or reduction reactions shall be required to achieve the desired results.
- Oxidizing and/or reducing a waste stream shall be required to reduce total and/or amenable cyanides or sulfides in a waste to below LDR concentration standards.
- Oxidizing a waste stream to achieve the LDR treatment technology standard of “CHOXD” and/or “DEACT”
- Reducing a waste stream to achieve the LDR treatment technology standard of “CHRED”.
- Neutralization: This process could also be used to neutralize a waste stream and meet the LDR Technology Standard of “NEUTR”
- One of the immobilization technologies listed in R315-13-1 of Utah Admin. Code which incorporates, 40 CFR § 268.45 by reference, shall be used to treat hazardous debris.
- Physical sizing of waste, as necessary, is allowed to facilitate stabilization treatment.

The following text outlines the approach that GMF shall adhere to when treating wastes to meet LDR standards:

7.2.2. Frequency and Scope of Testing

The Facility shall use either Option A, Option B or Option C when treating LDR wastes with numeric LDR standards that are destined for Land Disposal:

7.2.2.1 Option A

A suitable laboratory shall analytically test each treated waste batch, selected for this option. The resulting analytical data shall demonstrate that the treated wastes meet all applicable treatment standards specified in R315-13-1 of Utah Admin. Code which, incorporates 40 CFR §§ 268.41, 268.43, 268.48 and/or 268.49 by reference, prior to land disposal of such wastes.

7.2.2.2 Option B

Treatment "recipes" shall be used to establish a ratio between the waste and the material or reagent that is to be used to treat the waste so that the LDR numerical treatment standard is met. These "recipes" shall be recorded in the operating record of the Facility. All wastes treated on-site utilizing Option B shall be treated using the appropriate "recipe". Tier testing shall be used as an expression of the statistical confidence of the application of a particular treatment recipe to a particular waste stream. The waste stream shall be consistent in its chemical and physical properties, and the treatment recipe shall be uniformly effective for Option B to be used.

Minor changes to the established recipe include allowances for moisture/liquid content of the waste or quantities of the treatment reagents used. These shall be within a 25% quantity variance. The exception to this is Cement Kiln Dust, which varies significantly in regards to its effectiveness. All other reagents shall be within 25 percent of the established recipe.

If there is a failure in meeting the treatment standards at any time, the Facility shall return to Tier 1, if on Tier 2 Treatment Verification, or Tier 3a Treatment Verification if on Tier 3 Treatment Verification, on the next load of the same waste stream that arrives at the facility, following documenting the failure to meet the standards. Waste that has been land disposed is not affected by returning to Tier 1 or Tier 3a.

The following procedure and testing frequency shall be followed:

- Tier 1 Treatment Verification

  Each batch of a treatment waste stream treated with the same recipe shall be analytically tested using applicable test method(s). The resulting analytical data must demonstrate that the treated wastes meet all applicable treatment standards specified in R315-13-1 of Utah Admin. Code, which incorporates 40 CFR §§ 268.41, 268.43, 268.48 and/or 268.49 by reference, prior to land disposal of such waste. If the test results from the treatment of nine successive same waste treatment stream batches demonstrates that all nine batches of treated waste meets treatment standards, the Permittee shall be allowed to advance to Tier 2 and test one of every five batches of the same waste treatment stream . The Permittee shall not proceed to Tier 2 until the analytical results of all nine batches are verified and determined to have met the LDR standards. Loads of the same waste stream that arrive at the facility, while waiting for the analytical results from the ninth load to be verified, shall be subject to Tier 1 treatment verification.

If the Permittee has verified 20 consecutive batches of the same waste stream that has been treated with the same recipe, Tier 2 can be omitted, allowing the Permittee to go directly to Tier 3.

- Tier 2 Treatment Verification

Tier 2 shall begin with the 10th load, which is sampled. If the next four batches of the same waste treatment stream are treated with the same recipe, they can be land disposed without testing. The 15th batch shall be sampled and analytically tested using applicable test method(s). The resulting analytical data from this batch shall be required to demonstrate that the treated wastes meet all applicable treatment standards of R315-13-1 of Utah Admin. Code, which incorporates 40 CFR § 268 by reference, prior to land disposal. The next four batches of the same waste treatment stream that are treated with the same recipe, can be land disposed without further testing. The Facility then has the option to proceed to Tier 3. The Facility cannot proceed to Tier 3 until the analytical results of the 15th batch are verified and determined to have met the LDR standards. Loads of the same waste stream that arrive at the Facility, while waiting for the analytical results from the 15th load to be verified, shall be subject to Tier 2 treatment verification.

If the analytical results indicate that any load tested during Tier 2 Treatment Verification failed to meet the standards, the Permittee shall resume Tier 1 Testing, starting at sample one as indicated on Table C-6.

- Tier 3 Treatment Verification

Tier 3 shall begin with the 20th batch being sampled and analytically tested. If the next nine batches of the same waste treatment stream are treated with the same recipe, they can be land disposed without testing. The 30th batch shall be analytically tested using applicable test method(s). The resulting analytical data from this batch shall be required to demonstrate that the treated wastes meet all applicable treatment standards of R315-13-1 of Utah Admin. Code, which incorporates 40 CFR § 268 by reference, prior to land disposal. The next nine batches of the same waste treatment stream that are treated with the same recipe, can be land disposed without further testing.

If the analytical results indicate that any load tested during Tier 3 testing failed to meet the standards, the Facilityshall, at a minimum proceed to Tier 3a Treatment Verification on the next load of the same waste stream that arrives at the Facility. The Facility has the option to return to Tier 1 Treatment Verification procedures in the event of a failure during Tier 3 Treatment Verification.

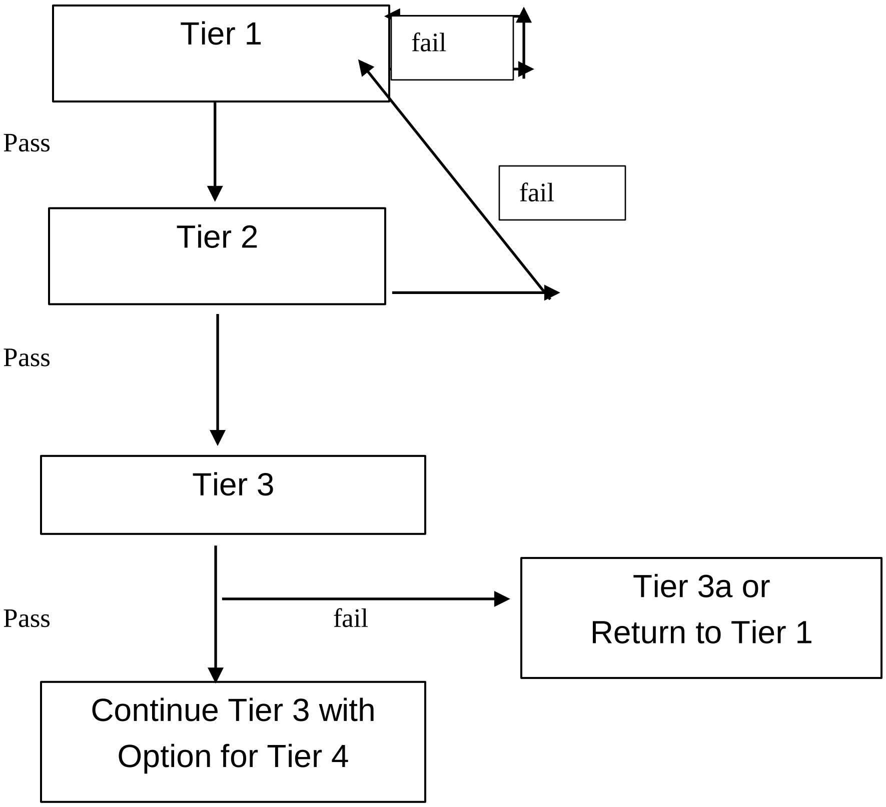
- Tier 3a Treatment Verification

Tier 3a Treatment Verification is an option if a sample tested and analyzed during Tier 3 Treatment Verification fails to meet the standards. Tier 3a shall require that five consecutive samples be obtained and analyzed. If all five samples consecutive samples meet the treatment standards identified in R315-13-1 of Utah Admin. Code, which incorporates 40 CFR § 268 by reference, the Facility may return to Tier 3 treatment Verification.

- Tier 4 Treatment Verification

If a uniform and homogeneous waste treatment stream can be demonstrated as receiving adequate treatment from an established recipe on a consistent basis, a Class 1 permit modification, requiring prior approval may be requested of the Director to further reduce the post treatment verification analysis beyond that of Tier 3. A combination of sutiabile laboratory post treatment analysis and batch testing can be utilized to demonstrate consistency and uniformity to satisfy this request. Typically, a Tier 4 request will allow a reduction to one batch in every 20, although further reductions may be considered and approved by the Director.

Tier Testing Block Flow Diagram



7.2.2.3 Option C

If a total analysis of the waste demonstrates that individual analytes are not present in the waste, or that they are present but at such low concentrations that the appropriate regulatory levels could not possibly be exceeded, the TCLP test is not required. However, the Facility shall provide the total waste analysis and justification of its decision not to run the TCLP test in the operating record.

When a liquid or solid waste stream at the point of generation is above the applicable TCLP treatment standards specified in R315-13-1 of Utah Admin. Code, which incorporates 40 CFR §§ 268.41, 268.43, 268.48 and/or 268.49 by reference, prior to treatment at GMF, but would meet these TCLP treatment standards following the 20:1 dilution that is specified in TCLP Method 1311 , Option C may be used.

Pprior to solidification and land disposal a raw waste sample of the waste stream shall be analyzed for total concentration of each applicable parameter. The maximum leaching potential (MLP) will be calculated from the analytical result, as if the material were 100% solid. If the MLP of the applicable parameters meet the associated treatment standards, then that load and all subsequent loads for that waste stream can be directly land disposed following solidification and passing a Paint Filter Test.

Waste streams that meet applicable treatment standards by calculation of the MLP, shall subsequently be re-verified annually and/or whenever there is reason to believe the waste stream has changed, such as the addition of one or more applicable elements, or a process change at the point of generation, which might cause the concentration of target parameters to become elevated.

If an element's MLP exceeds applicable treatment standards, GMF shall revert to Option A or Option B.

7.3. Treatment of Hazardous Debris

GMF may utilize the following Alternative Treatment Standards for Hazardous Debris contained in R315-13-1 of Utah Admin. Code, which incorporates 40 CFR § 268.45, by reference:

- Any of the "Physical Extraction Technologies" listed in R315-13-1 of Utah Admin. Code which incorporates Table I, A.1.a., b., c., d., and/or 3 of 40 CFR § 268.45, by reference. The procedure for documenting the results of utilizing these standards shall be available upon request;
- Any of the "Immobilization Technologies" listed in R315-13-1 of Utah Admin. Code which, incorporates Table I, C.1., 2., and/or 3 of 40 CFR § 268.45 by reference; or
- Any self-implementing treatment authorized in 40 CFR § 761.79, Decontamination Standards and Procedures, may be used to decontaminate, for PCBs, RCRA wastes containing PCB,sor materials containing PCBs.

7.4. Macroencapsulation

Macroencapsulation (macro), as an alternative treatment standard for hazardous debris, is defined as “the application of surface coating materials such as polymeric organics (e.g., resins and plastics) or use of jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media” (R315-13-1 of Utah Admin. Code which incorporates, 40 CFR § 268.45 Table I, C.1 by reference). The performance standard for macroencapsulation of debris requires that “encapsulating material shall 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 waste, microbes).

This is a technology-based standard, and not a numeric-based standard, so no sampling and analysis are required on waste that meet the definition of hazardous debris.

The GMF is permitted to use two types of macro methods. One involves entombing the waste in a macro vault. The second involves the covering of the waste with a high density polyethylene (HDPE).

7.4.1. Macroencapsulation in a Vault

A macro vault, consisting of a container (e.g. drums and metal boxes, gondola, rolloff box, or intermodal container) or a pit in the cell, is prepared in the landfill cell. As an alternative, concrete forms may be assembled and used as a macro vault. Wood blocks or other material are placed in the macro vault to keep the debris from having contact with the bottom of the vault. As an alternative, a layer of concrete can be placed in the vault and allowed to begin to cure. The hazardous debris waste stream is then loaded into the macroencapsulation vault. Concrete, or other pozzolanic material, is poured into the vault, assuring that void space is minimized. Void space in the waste stream is filled with inert material to help address structural integrity issues. This is accomplished with the use of flowable pozzolanic material. The macro vault shall be created to minimize interior voids or air pockets. The encapsulating material shall have long-term integrity such that potential leaching media within a hazardous waste cell would not cause the encapsulating material to deteriorate. Waste shall not protrude through the surface of the macro vault. A macroencapsulated waste shall have the macro material (concrete/pozzolanic material) present and apparent upon surficial visual inspection at the point of disposal. A minimum exterior coating thickness of one inch is required. Corrective action is required for any macro vault that is found to lack structural integrity prior to disposal in a lift.

7.4.2. Macroencapsulation with Inert Jacket

The method utilized by the GMF shall require that a geomembrane liner be welded around the debris waste. This will typically be employed with pipe and large manufactured items around which a jacket can be custom fitted. A minimum of 40 mil high density polyethylene geomembrane shall be used.

In order to assure that the waste is consistent with the Clean Harbors profile, waste streams macroencapsulated utilizing this method shall be previously inspected by a Clean Harbors representative. The encapsulation can occur off-site or at the GMF, as long as the waste has been inspected for:

1. Verification with consistency with the waste profile description
2. That there are no free liquids in the waste
3. And that void space shall be minimized within the inert jacket.

As an alternative, the generator of the waste shall certify that the above criteria have been met. This data shall be incorporated into the operating record.

8.0 RECORD KEEPING FOR WASTE CODES

When waste is profiled to be stored and/or treated at GMF, the waste codes shall be reviewed to determine the applicability of storing, treating and/or disposing of that waste at GMF. When waste arrives at GMF waste codes assigned to the waste via manifest and LDR forms shall be compared with those on the profile to ensure that the codes and LDR standards that have not been met and are associated with the shipment continue to be those that the facility can manage.

Most waste at GMF is contained and managed in discrete containers prior to disposal and much of it meets treatment standards prior to being received. Beyond profiling and receiving procedures, tracking codes of waste already meeting treatment standards is not required. If, however, the waste needs to be treated prior to disposal, GMF shall track codes in the treatment vessels to ensure that all standards are being met.

8.1. Waste Code Record Keeping for Storage and/or Treatment Vessels

There are two cumulative storage and/or treatment units that shall require tracking of waste codes. These are:

- Leachate Tanks; and
- Stabilization Tanks.

8.1.1. Wheel Wash Collection Tank

The wheel wash collection tank contains the rinse water from washing trucks after they have exited the landfill. This water shall either be solidified and landfilled or sent to Aragonite for incineration.

8.1.2. Leachate Storage Tanks

These tanks routinely store leachate from the RCRA landfills. Other site water from sumps and containment and groundwater monitoring activities shall be collected solidified and placed into a RCRA landfills or sent to Aragonite for incineration. Other < 500 ppmw VOC water may be stored in these tanks with waste codes other than that for leachate. If that occurred, section 8.1 of this Attachement shall be used for waste code tracking for those tanks.

8.1.3. Stabilization Tanks

These tanks shall be used only for treating wastes. Each waste may carry different waste codes. Each time the tank is emptied (all material is removed that can be removed with the trackhoe or equivalent) all RCRA or State waste codes shall be considered to be removed.

No waste code tracking shall be required unless more than one waste, with different waste codes, is being treated at the same time.

If the facility accepts and treats TSCA/RCRA waste, the tanks in which treatment occurred shall be emptied and determined to meet the definition of empty for RCRA purposes and by triple-rinsing with a suitable solvent for TSCA purposes. The third and final rinseate shall be tested and confirmed to be < 2 ppm to be considered clean for TSCA purposes. Alternatively, the surfaces shall be wipe sampled and confirmed to be < 10 ug/100 cm^2 to be considered clean.

8.1.4. Storage/Treatment Vessel Waste Code Tracking Procedure

Specific record keeping requirements shall be necessary for cumulative vessels to account for the wastes remaining when the vessel is refilled with wastes carrying additional waste codes. Waste codes shall be tracked in cumulative vessels by the following procedure.

8.1.5. Waste Code Tracking / Removal Procedure for Cumulative Tanks

When a new batch of compatible waste is added to the tank, the waste codes associated with this new waste shall be added to those waste codes already associated with tank. The tank shall accumulate waste codes until the codes are removed (the vessel is emptied) or all waste codes that the facility can accept for disposal are associated with that vessel. For RCRA only waste streams the Stablization Tanks will be considered empty when all the waste has been removed by normal means (e.g. the trackhoe). When the vessel is emptied, as decribed in this section, no waste codes remain in that vessel.

If batches with different waste codes are mixed, the LDR standards for all the waste codes in the batch shall be met prior to disposal.

If the vessel is used for TSCA/RCRA waste, the vessels shall accumulate the TSCA /RCRA codes by contact until either emptied by the RCRA definition by triple-rinsing or with a suitable solvent for TSCA purposes. The third and final rinseate shall be tested and confirmed to be < 2 ppm to be considered clean for TSCA purposes. Alternatively, the surfaces shall be wipe sampled and confirmed to be < 10 ug/100 cm^2 to be considered clean.

9.0 ANALYSIS OF TREATED WASTE:

A suitable laboratoryshall perform the analysis of the treated wastes. The treated wastes shall be tested for all LDR constituents with numeric standards and UHCs as appropriate for the waste codes in the waste that did not meet treatment standards prior to treatment.

10.0 FATE OF TREATED WASTES:

Treated wastes can be temporarily (six months or less) "put" onto a liner (put-pile) within a hazardous waste landfill cell or in a container while awaiting laboratory (verification) analyses. The liner shall be visible on all sides of the waste so as to prevent commingling with the waste in the landfill and other put-piles. Such wastes shall be labeled with a tracking number and located in such a manner that allows complete retrieval of the waste should the waste analyses subsequently determine that the waste does not meet the treatment standards of R315-13-1 of Utah Admin. Code, which incorporates 40 CFR § 268 by reference. Wastes making up a put-pile shall be disposed within one year of receipt at GMF and no more than 250 put-piles can be in existence at one time.

11.0 WASTE CODE RECORD KEEPING OF DISPOSED WASTE

The GMF shall comply with R315-8-14.4 (40 CFR § 264.309) by maintaining records that contains the following information. The information shall be presented with the use of a diagram or map of each cell, and contain on the diagram (or map) the following: The information shall be maintained in the operating record may include tabulated supporting data. The following is the minimum information required:

A description and the quantity of each hazardous waste received (including manifest number) and the methods and dates of treatment and disposal.

The location of each hazardous waste disposed of at the facility.

TABLES

Table C-1
Pre-acceptance, Storage and Verification (Fingerprint) Analyses When Sampling is Required

Parameter	Rationale for Selection
Physical Description	Shall be used to determine the general characteristics of the waste stream. This facilitates subjective comparison of the load sample with the approved profile.
pH Screen	Shall be required of all aqueous waste streams, it is used to indicate the corrosivity of the waste to ensure proper storage of the waste. It is also used as a parameter to compare the load sample to the approved profile.
Water Reactivity Screen	Shall be used to determine whether the waste has a potential to react with water to generate heat, flammable gases, or other products. Ensures prohibited waste is not accepted for storage or treatment unless approved by the Director. It is also used as a parameter to compare the load sample to the approved profile.
Reactive Sulfides Screen	Shall be used to indicate whether the waste produces hydrogen sulfide upon acidification below pH 2. It is also used as a parameter to compare the load sample to the approved profile. Only run on wastes that have a pH > 2.0. Waste containing total releasable sulfide with concentrations less than 500 ppm are considered non-reactive. Not applicable to azide waste streams, or others as approved by the Director.
*Ignitability / VOC Screen (TLV Sniff or equivalent)	Shall be used to indicate the fire-producing potential of the waste, and to indicate whether the waste might be a RCRA ignitable waste or regulated as flammable or combustible by the US DOT. This test can be applied to all waste liquids, semi-solids or solids. The screen shall be supplemented with the flash point test for those materials exceeding 200 ppm if they are destined for land disposal. Shall not be required if ignitability test is performed. If < 500 ppm, the waste may be processed. If not, the reading shall be resolved with the generator or rejected. Shall not be required for wastes destined for incineration if the waste is treated as ignitable waste.
*LEL / VOC Screen	Shall be used in lieu of the TLV Sniff. VOC Screen or the TLV sniff or equivalent, shall be used for all wastes which are not required to be sampled but that will be treated in the stabilization system or stored in a tank. GMF generated waste is excluded from this requirement. VOC Screen shall be used to detect volatile organics in the waste. A reading of > 10% LEL shall require the TLV Sniff test be performed on the waste. If < 500 ppm, the waste may be processed. If not, the reading shall be resolved with the

Table C-1 **Pre-acceptance, Storage and Verification (Fingerprint) Analyses** **When Sampling is Required**	
	generator or rejected.
Reactive Cyanides Screen	Shall indicate whether the waste produces hydrogen cyanide upon acidification below a pH of 2. It shall also be used as a parameter to compare the load sample to the approved profile. Shall be run on wastes that have a pH > 2.0. Wastes containing total releasable cyanide with concentrations less than 250 ppm are considered non-reactive. Not applicable to azide waste streams, or others as approved by the Director.
Oxidizer Screen	Is a general qualitative test that shall be used to determine whether a waste is an oxidizer. Oxidizers have the potential to react with a wide range of waste streams and therefore often need to be segregated. It shall also be used as a parameter to compare the load sample to the approved profile. Shall only be preformed on wastes that have a pH > 2.0.
Radioactivity Screen	Shall be used to help identify prohibited wastes. It shall also used as a parameter to compare the load sample to the approved profile.
Specific Gravity	Shall be used for liquids to compare the load sample to the approved profile.
Waste Compatibility Qualitative Assessment	Shall be part of the profile approval procedures, the chemical characteristics (pH, corrosivity of non-aqueous wastes, reactivity, flammability, etc.) of waste streams shall be assessed by waste acceptance personnel. This assessment shall be based on information about the waste, not necessarily on any analyses.
Supplemental Discretionary Analyses (SDAs)	Shall be used when GMF determines that additional analysis is required to properly manage waste. Table C-2

Table C-2
Treatment & Supplemental Analysis

Parameter	Rationale for Selection
RCRA Metals (As, Ba, Be, Cd, Cr, Pb, Hg, Ni, Ag, Sb, Se, Tl, Va, Zn)	Analysis of one or more of these metals maybe required in order to demonstrate compliance with LDR standards.
Ignitability	Indicates the fire-producing potential of the waste and determines whether the waste is RCRA ignitable. It is also used as a parameter to compare the load sample to the approved profile.
Reactive Cyanide (Releasable)	Ensures waste is handled safely and determines if treatment may be required
Reactive Sulfide (Releasable)	Ensures waste is handled safely and determines if treatment may be required
Total Cyanide	May be required to demonstrate compliance with LDR standards.
Amenable Cyanide	May be required to demonstrate compliance with LDR standards.
No Free Liquids by Paint Filter	Analysis is necessary to ensure free liquids are not placed into the landfill
Specific Organic Analysis	Gas chromatography and gas chromatography/mass spectrometry may be used to identify and quantify specific regulated organic compounds, i.e. listed waste constituents of concern, characteristic wastes, etc.) when the generator is unaware of waste stream's composition.
HOC Screen	Used to detect the presence of Halogenated Organic Compounds or leachable Halogenated Organic Compounds (HOC) that might adversely affect the cell liner. Any one of the three SK methods found in Appendix 4 shall be used.
PCB Analysis	May be used to determine if PCBs are present in liquids, except leachate or water, (visible sheen or oil layer fractions) at less than 500 ppm and therefore,

Table C-2 Treatment & Supplemental Analysis	
	amenable to solidification and ultimate landfill. It is one of the two “Organic Analyses” required for determining the acceptability of these PCB wastes.
Total Organic Carbon (TOC) Analysis (for PCB liquids < 500 ppm)	May be used to determine if a liquid, except for leachate and water, contains organic compounds in concentrations which would allow solidification of waste prior to landfilling. Liquids or sludges containing <10% TOC must be solidified prior to landfilling or may be shipped off-site for disposal. Liquid or sludges containing ≥10% TOC cannot be managed at the Facility.

Table C-3

Specific PCB Waste Type of Analyses

PCB Waste Type	Analyses Run
1. Contaminated debris/trash, etc. (including demolition materials)	Physical Appearance
2. Empty containers, tanks, drums, barrels, liners, etc.	Physical Appearance
3. PCB Containminated or small capacitors*	Physical Appearance
4. Drained or drained and flushed PCB hydraulic machines.	Physical Appearance
5. Drained PCB Articles or containers and article containers/electrical equipment.	Physical Appearance
6. Flushed PCB transformers.	Physical Appearance
7. Contaminated soil or sludges (e.g., dredged materials, industial sludges, municipal sewage, treatment sludgees) which DO NOT require organic analyses per this WAP.	Physical Appearance pH TLV SNIFF Specific Gravity Reactive Cyanides(1) Reactive Sulfides(1) PCB Concentration(2) Leachable TOC (Total Organic Carbon)(2) Paint Filter Liquids Test (PLFT)(3)
8. Liquids (leachate, tire wash water, ground water, etc.) fron onsite TSCA operations and liquids for which organic analyses (other than	Physical Appearance pH TLV SNIFF Specific Gravity Reactive Cyanides(1) Reactive Sulfides(1)

Table C-3

Specific PCB Waste Type of Analyses

	PCB Concentration(2) Leachable TOC (Total Organic Carbon)(2) Paint Filter Liquids Test (PLFT)(4)

NOTES:

(1) Reactive Cyanides Screen shall be run to indicate whether the PCB waste produces hydrogen cyanide upon acidification below pH 2. It is not required if the pH of the waste is less than 6, or if the waste is not water-soluble, or if the waste is not aqueous. Reactive Sulfides Screen shall be run to indicate whether the PCB waste produces hydrogen sulfide upon acidification below pH 2. It is not required if the pH of the waste is less than 6, or if the waste is not water-soluble, or if the waste is not aqueous.

(2) If the liquid is water with no visual indication of oil being present, the PCB concentration need not be determined. If a phase separation is indicated, the oil shall be analyzed for PCB concentration however the water is not required to be analyzed; any free oil phase shall be removed and handled separately as aPCB-contaminated oil. If there is doubt as to whether the liquid is water, a specific gravity test shall be conducted on the liquid. If the specific gravity is not 1.0 within +/- 0.10 accuracy, the waste profile sheet shall be reviewed and a determination as to the type of liquid shall be made.

(3) If there is doubt as to the presence or absence of free liquids via the physical appearance determination, then the PFLT shall be run.

(4) PFLT Test is run to determine if solidified materials are suitable for TSCA landfill management (disposal).

(5) If the liquids appear to be an oil/water emulsion, water/soil slurry or suspension, or a similar aqueous-based liquid, both the specific gravity test and a TOC or PCB test shall be conducted. Liquids which have a specific Gravity of 1.0 ± 0.1; which also contain less than 10% TOC or < 50 ppm PCB; may be approved for solidification and landfill. Any liquids outside of these parameters shallbe handled separately as PCB contaminated oil.

*Defined as < 100 inches^3 in size, or between 100 inches^3 and 200 inches^3 in size and weighing less than 9 lbs.

Table C-4
Methods and Tolerance Limits

Parameter Limits	Tolerance
Physical Description	Shall be consistent with profile.
Specific Gravity	± 20%
pH Screen	± 3 pH units, as long the profile pH is >2 and < 12.5. If the profile pH is < 2 or > 12.5, the incoming load sample must be the same.
TLV-Sniff	If > 200 ppm, and destined for landfill, flash point shall be conducted. If TLV-Sniff is <200, the flashpoint is considered > 140°F and it may be disposed in landfill. Shall be < 500 ppm if destined for storage or treatment in tanks.
Water Reactivity Screen	No tolerance; load samples must agree with profile
Reactive Sulfides Screen	Shall be consistent with profile [1, 2]
Reactive Cyanides Screen	Shall be consistent with profile [1, 3]
Ignitability	Shall be consistent with profile, i.e. if profile is reported as being >140°F it must test >140°F.
Radioactivity Screen	No tolerance; load samples shall be less than 40 microR/hr over background unless authorization is obtained as described in the Prohibited Materials section of this Attachment. No explanation is required for wastes profiled with a positive radioactive screen and arriving with a negative screen.
Oxidizer Screen	Shall be consistent with profile. [1]
HOC Screen or Specific Analysis of those chemicals in Appendix 3 of this WAP	The limit shall be 1000 ppm HOCs or equivalent leachable HOCs by either method. If the screen shows > 1000 ppm or equivalent leachable HOC, the specific Appendix 3 analysis shall be used to determine if the waste contains > 1000 ppm of those compounds or the equivalent that are leachable. If it does, the

Table C-4 **Methods and Tolerance Limits**	
	waste shall either be retreated until it no longer contains >1000 ppm of these compounds or the equivalent leachable HOCs or it will not be land disposed at GMF.

Notes:

1. For negative to positive results, the generator shall be contacted for a qualitative explanation of the difference. The answer shall be documented in the facility operating record.
2. If this material is to be disposed of directly into the landfill, an increase above 500 ppm for Sulfide shall require explanation, further analysis or, potentially, different handling.
3. If this material is to be disposed of directly into the landfill, an increase above 250 ppm for CN shall require explanation, further analysis or, potentially, different handling.

Table C-5
Analytical Parameters and Associated Methods

PARAMETER	METHOD NUMBER	REFERENCE
*Acid-Base Partition Cleanup	3650	(1)
*Acid Digestion of Sediments, Sludges, and Soils	3050	(1)
*Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by Flame Atomic Absorption Spectroscopy or Inductively Coupled Plasma Spectroscopy	3010 3010-MOD	(1)
*Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by Furnace Atomic Absorption Spectroscopy	3020	(1)
*Alumina Column Cleanup	3610	(1)
*Aluminum (AA)	7020	(1)
*Aluminum (ICP)	6010	(1)
*Antimony (ICP)	6010	(1)
*Antimony (AA)	7040 7041	(1) (1)
*Aromatic and Halogenated Volatile Organics	8021	(1)
*Arsenic (ICP)	6010	(1)
*Arsenic (AA)	7060 7061	(1) (1)

Table C-5
Analytical Parameters and Associated Methods

PARAMETER	METHOD NUMBER	REFERENCE
*Ash	D482	(2)
*Atomic Absorption Spectroscopy	7000	(1)
*Barium (ICP)	6010	(1)
*Barium (AA)	7080 7081	(1) (1)
*Beryllium (ICP)	6010	(1)
*Beryllium (AA)	7090 7091	(1) (1)
*Bromide	9056	(1)
Bulk Density, Solids	D5057	(2)
*Cadmium (ICP)	6010	(1)
*Cadmium (AA)	7130 7131	(1) (1)
*Calcium (ICP)	6010	(1)
*Calcium (AA)	7140	(1)
*Carbamate pesticides (LCMS)	8321	(1)
*Chloride	9253	(1)
*Chloride (Ion Chromatography)	9056	(1)

Table C-5
Analytical Parameters and Associated Methods

PARAMETER	METHOD NUMBER	REFERENCE
*Chlorinated Herbicides	8151 8151-MOD	(1) (1)
*Chromium (ICP)	6010	(1)
*Chromium (AA)	7190 7191	(1) (1)
*Cobalt (ICP)	6010	(1)
*Cobalt (AA)	7201	(1)
*Copper (ICP)	6010	(1)
*Copper (AA)	7210 7211	(1) (1)
*Continuous Liquid-Liquid Extraction	3520	(1)
* Dithiocarbamates as Ziram, total	630 and 630-MOD / Modified CDFA Procedure	(3) and (12)
*Fluoride (Ion Chromatography)	9056	(1)
*Fluoride	340.2 5050 D3987	(3) (1) (2)
*Florisil Column Cleanup	3620	(1)
*Gas Chromatography	8000	(1)

Table C-5 **Analytical Parameters and Associated Methods**		
PARAMETER	**METHOD NUMBER**	**REFERENCE**
*Gas Chromatography/Mass Spectrometry for Volatile Organics	8260	(1)
*Gas Chromatography/Mass Spectrometry for Semi-volatile Organics	8270	(1)
*Gel-Permeation Cleanup (GPC)	3640	(1)
*Halogenated Volatile Organics	8010 8021	(1) (1)
*Headspace	3810	(1)
*Heat of Combustion (BTU)	D240 D240-MOD 5050	(2) (2) (1)
HOC Screen (Oil, Soil, Water)	9078	(1)
HOC Screen (Oil)	D-5384, 9077	(2), (1)
*HOC Screen	22 a*/b 9022 9023	(4) (1) (1)
*Ion Chromatography	9056	(1)
Ignitability , Setaflash	D3828	(2)
Ignitability , Penske Martin, actual flashpoint	1010	(1)
Ignitability Liquid, actual flashpoint, no	1020	(1)

Table C-5
Analytical Parameters and Associated Methods

PARAMETER	METHOD NUMBER	REFERENCE
suspended solids		
Ignitability Liquid, at 140°F, no suspended solids	8b	(4)
Ignitability Liquid or Solids, room temperature	D4982	(2)
Ignitability Sludge, at 140°F	8b	(4)
*Iron (AA)	7380 7381	(1) (1)
*Iron (ICP)	6010	(1)
*Lead (ICP)	6010	(1)
*Lead (AA)	7420 7421	(1) (1)
LEL	14	(4)
Liquids, Sludge Compatibility (see note 3)	D5058	(2)
*Magnesium (ICP)	6010	(1)
*Magnesium (AA)	7450	(1)
*Manganese (ICP)	6010	(1)
*Manganese (AA)	7460 7461	(1) (1)
*Mercury Cold Vapor (AA)	7470	(1)

Table C-5 **Analytical Parameters and Associated Methods**		
PARAMETER	**METHOD NUMBER**	**REFERENCE**
	7471	(1)
*Microwave Assisted Acid Digestion of Aqueous Samples and Extracts	3015	(1)
*Microwave Assisted Acid Digestion of Sediments, Sludges, Soils and Oils	3051	(1)
*Moisture (organic liquids)	D1533	(2)
*Moisture (Inorganics)	2540	(5)
*Molybdenum (ICP)	6010	(1)
*Molybdenum (AA)	7480 7481	(1) (1)
*Nickel (ICP)	6010	(1)
*Nickel (AA)	7520	(1)
*Total Kjeldahl Nitrogen	D3590	(2)
*Nitrate/Nitrite Ion Chromatography	9056	(1)
*Nitrogen, Total	7.025-7.031	(7)
*Nonhalogenated Volatile Organics	8015	(1)
*Organic Extraction and Sample Preparation	3500	(1)
*Organochlorine Pesticides	8081	(1)

Table C-5
Analytical Parameters and Associated Methods

PARAMETER	METHOD NUMBER	REFERENCE
*Organophosphorus Compounds by Capillary Column GC	8141	(1)
Oxidizer Screen	D4981	(2)
Paint Filter	9095	(1)
*PCDD	8280 8290	(1) (1)
*PCDF	8280 8290	(1) (1)
*PCBs	8081 8082	(1) (1)
*PCB and Pesticides (GC/MS)	680	(6)
*PCB Wipes	5503	(8)
pH Screen	D4980	(2)
pH Electrometric	9040	(1)
pH Paper	9041	(1)
pH Waste	9045	(1)
pH Solids	9045	(1)
Physical Description	D4979	(2)

Table C-5
Analytical Parameters and Associated Methods

PARAMETER	METHOD NUMBER	REFERENCE
*Potassium (ICP)	6010	(1)
*Potassium (AA)	7610	(1)
*Purge-and-Trap	5030	(1)
Radioactivity Screen	6 / 9916 MOD	(4)
Reactive Cyanide Screen (see note 2)	D5049	(2)
Reactive Sulfide Screen Confirmation (see note 2)	D4978	(2)
*Cyanide (Releasable)	Chapter 7, Sec. 7.3.3.2	(1)
*Sulfide (Releasable)	Chapter 7 Sec. 7.3.4.2	(1)
*Selenium (ICP)	6010	(1)
*Selenium (AA)	7740 7741	(1) (1)
*Separatory Funnel Liq-Liq Extraction	3510	(1)
*Silica Gel Cleanup	3630	(1)
*Silver (ICP)	6010	(1)
*Silver (AA)	7760 7761	(1) (1)

Table C-5
Analytical Parameters and Associated Methods

PARAMETER	METHOD NUMBER	REFERENCE
*Sodium (ICP)	6010	(1)
*Sodium (AA)	7770	(1)
Solids Compatibility (see note 3)	N/A D5058	(9) (2)
*Sonication Extraction	3550	(1)
*Soxhlet Extraction	3540	(1)
Specific Conductance	120.1	(3)
Specific Gravity Specific Gravity/ Bulk Density	D1429 D5057	(2) (2)
*Sulfides	9030 9031 9034* 376.1	(1) (1) (1) (3)
*Sulfate Ion Chromatography	9056	(1)
*Sulfur	D2784 D1266	(2) (2)
*Sulfur Cleanup	3660	(1)
*Sulfuric Acid Cleanup	3665	(1)
*Thallium (ICP)	6010	(1)
*Thallium (AA)	7841	(1)

Table C-5
Analytical Parameters and Associated Methods

PARAMETER	METHOD NUMBER	REFERENCE
	7840	(1)
*Tin (ICP)	6010	(1)
*TCLP	1311	(1)
TLV Sniff	5 5-MOD	(4)
*Total and Amenable Cyanide (Distillation)	9010	(1)
*Total and Amenable Cyanide (Colorimetric, Automated UV)	9012	(1)
*Titrimetric and Manual Spectrophotometric Determinative Methods for Cyanide	9014	(1)
*Total Organic Carbon	9060	(1)
*Total Halogen	5050 9253 9056 9212	(1) (1)
*Vanadium (ICP)	6010	(1)
*Vanadium (AA)	7910 7911	(1) (1)
*Viscosity	D2983	(2)
*Volatile Organic Compounds	21 25	(10) (10)

Table C-5

Analytical Parameters and Associated Methods

PARAMETER	METHOD NUMBER	REFERENCE
	All Listed	(11)
Waste Compatibility Qualitative Assessment	12	(4)
*Waste Dilution	3580	(1)
Water Reactivity Screen (see note 1)	D5058	(2)
*Zinc (ICP)	6010	(1)
*Zinc (AA)	7950 7951	(1) (1)

* *typically conducted at an off-site laboratory*

TABLE C-5

ANALYTICAL PARAMETERS AND ASSOCIATED METHODS

(1) Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846 [3rd Edition (November, 1986), with current updates
(2) American Society for Testing and Materials
(3) Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020
(4) Facility Methods, not based on any standard method.
(5) Standard Methods for the Examination of Water and Wastewater, Latest Edition, APHA, WEF
(6) Alford-Steven, A.; Eichelberger, J.W. and Budde W.L. Method 680. Determination of Pesticides and PCBs in Water and Soil/Sediment by Gas Chromatography/Mass Spectrometry. Physical and Chemical Methods Branch. Environmental Monitoring and Support Laboratory Office of Research and Development. U.S. EPA, Cincinnati, Ohio 45268. November 1985.
(7) Association of Official Analytical Chemists, 14th Edition
(8) National Institute for Occupational Safety and Health
(9) A Method for Determining the Compatibility of Hazardous Wastes, EPA-600/2-80-076, April, 1980
(10) 40 CFR § 60 Appendix A

(11) 40 CFR § 265.1085 (c)

(12) Method 630 is for liquids. Method 630-MOD / Modified CDFA (California Department of Food and Agriculture) Procedure was developed for solids. Both rely on the fact that when dithiocarbamates are acidified, carbon disulfide is released. Method 630 is a colorimetric method while 630-MOD / Modified CDFA Procedure analyzes the headspace by gas chromatography using a FPD detector. Currently GMF could only find one commercial lab in the USA that analyzes for total dithiocarbamates in solids. That lab is E.M.A. Inc. (Environmental Micro Analysis) located in Woodland, CA. The modified method is theirs.

NOTES:

1. A significant temperature change as stated in paragraph 24.8 of ASTM method D5058-90 is defined as ≥15°C. The test does not apply to wastes already in contact with excess water, nor is a waste water reactive if the heat generation is due solely to a strong acid/base reaction as verified by pH analysis or heat of solution, i.e. lime is not water reactive. Occurrence of the reactions listed in paragraph 24.4 of ASTM method D5058-90 result in failure of the water reactivity test, except that formations of precipitates or emulsions are considered failures only if the ability to mix and pump the resulting liquids is impaired.
2. The test is not required for wastes with pH < 2.
3. A temperature rise as stated in paragraph 11.8 of ASTM method D5058-90 is defined as ≥ 15°C. Occurrence of the reactions listed in paragraph 11.7 of ASTM method D5058-90 result in failure of the compatibility test, except that formations of layers, precipitation, emulsification, or increases in viscosity are considered failures only if the ability to manage the resulting liquids is impaired.

TABLE C-6

Tier Testing Sampling Frequency

Tier No.	Batch No.	Testing? Y/N	
1	1	Y	
	2	Y	
	3	Y	
	4	Y	
	5	Y	
	6	Y	
	7	Y	
	8	Y	
	9	Y	
2	10	Y	
	11	N	
	12	N	
	13	N	
	14	N	
	15	Y	
	16	N	
	17	N	
	18	N	
	19	N	
3	20	Y	
	21	N	
	22	N	

Tier No.	Batch No.	Testing? Y/N	
	23	N	
	24	N	
	25	N	
	26	N	
	27	N	
	28	N	
	29	N	
	30	Y	
	31-39	N	
	40	Y	
	41-49	N	

EXHIBITS

Example Waste Material Profile
(this form is subject to change)

WASTE MATERIAL PROFILE SHEET

Clean Harbors Profile No. CH639323

A. GENERAL INFORMATION

GENERATOR EPA ID #/REGISTRATION #	*UTD991301748*	GENERATOR NAME:	*Clean Harbors Grassy Mountain LLC*
GENERATOR CODE (Assigned by Clean Harbors)	*GM*	CITY *Grantsville*	STATE/PROVINCE *UT* ZIP/POSTAL CODE *84029*
ADDRESS *3 Miles East 7 Miles North of Knolls Exit 41 off I-80*		PHONE:	
CUSTOMER CODE (Assigned by Clean Harbors)	*GM*	CUSTOMER NAME:	*Clean Harbors Grassy Mountain LLC*
ADDRESS *3 Miles East 7 Miles North of Knolls Exit 41 off I-8*		CITY *Grantsville*	STATE/PROVINCE *UT* ZIP/POSTAL CODE *84029*

B. WASTE DESCRIPTION

WASTE DESCRIPTION:

PROCESS GENERATING WASTE:

IS THIS WASTE CONTAINED IN SMALL PACKAGING CONTAINED WITHIN A LARGER SHIPPING CONTAINER ?

C. PHYSICAL PROPERTIES (at 25C or 77F)

PHYSICAL STATE
- SOLID WITHOUT FREE LIQUID
- POWDER
- MONOLITHIC SOLID
- LIQUID WITH NO SOLIDS
- LIQUID/SOLID MIXTURE
  - % FREE LIQUID
  - % SETTLED SOLID
  - % TOTAL SUSPENDED SOLID
- SLUDGE
- GAS/AEROSOL

NUMBER OF PHASES/LAYERS

1 2 3

% BY VOLUME (Approx.)		
	TOP	*0.00*
	MIDDLE	*0.00*
	BOTTOM	*0.00*

VISCOSITY (If liquid present)
- 1 - 100 (e.g. Water)
- 101 - 500 (e.g. Motor Oil)
- 501 - 10,000 (e.g. Molasses)
- > 10,000

COLOR

ODOR
- NONE
- MILD
- STRONG

Describe:

BOILING POINT °F (°C)
- <= 95 (<=35)
- 95 - 100 (35-38)
- 101 - 129 (38-54)
- >= 130 (>54)

MELTING POINT °F (°C)
- < 140 (<60)
- 140-200 (60-93)
- > 200 (>93)

TOTAL ORGANIC CARBON
- <= 1%
- 1-9%
- >= 10%

FLASH POINT °F (°C)
- < 73 (<23)
- 73 - 100 (23-38)
- 101 -140 (38-60)
- 141 -200 (60-93)
- > 200 (>93)

pH
- <= 2
- 2.1 - 6.9
- 7 (Neutral)
- 7.1 - 12.4
- >= 12.5

SPECIFIC GRAVITY
- < 0.8 (e.g. Gasoline)
- 0.8-1.0 (e.g. Ethanol)
- 1.0 (e.g. Water)
- 1.0-1.2 (e.g. Antifreeze)
- > 1.2 (e.g. Methylene Chloride)

ASH
- < 0.1
- 0.1 - 1.0
- 1.1 - 5.0
- 5.1 - 20.0
- > 20
- Unknown

BTU/LB (MJ/kg)
- < 2,000 (<4.6)
- 2,000-5,000 (4.6-11.6)
- 5,000-10,000 (11.6-23.2)
- > 10,000 (>23.2)

Actual:

D. COMPOSITION (List the complete composition of the waste, include any inert components and/or debris. Ranges for individual components are acceptable. If a trade name is used, please supply an MSDS. Please do not use abbreviations.)

CHEMICAL	MIN	--	MAX	UOM

DOES THIS WASTE CONTAIN ANY HEAVY GAUGE METAL DEBRIS OR OTHER LARGE OBJECTS (EX., METAL PLATE OR PIPING >1/4" THICK OR >12" LONG, METAL REINFORCED HOSE >12" LONG, METAL WIRE >12" LONG, METAL VALVES, PIPE FITTINGS, CONCRETE REINFORCING BAR OR PIECES OF CONCRETE >3")?	YES	NO
If yes, describe, including dimensions:		
DOES THIS WASTE CONTAIN ANY METALS IN POWDERED OR OTHER FINELY DIVIDED FORM?	YES	NO
DOES THIS WASTE CONTAIN OR HAS IT CONTACTED ANY OF THE FOLLOWING; ANIMAL WASTES, HUMAN BLOOD, BLOOD PRODUCTS, BODY FLUIDS, MICROBIOLOGICAL WASTE, PATHOLOGICAL WASTE, HUMAN OR ANIMAL DERIVED SERUMS OR PROTEINS OR ANY OTHER POTENTIALLY INFECTIOUS MATERIAL?	YES	NO
I acknowledge that this waste material is neither infectious nor does it contain any organism known to be a threat to human health. This certification is based on my knowledge of the material. Select the answer below that applies:		
The waste was never exposed to potentially infectious material.	YES	NO
Chemical disinfection or some other form of sterilization has been applied to the waste.	YES	NO
I ACKNOWLEDGE THAT THIS PROFILE MEETS THE CLEAN HARBORS BATTERY PACKAGING REQUIREMENTS.	YES	NO
I ACKNOWLEDGE THAT MY FRIABLE ASBESTOS WASTE IS DOUBLE BAGGED AND WETTED.	YES	NO

SPECIFY THE SOURCE CODE ASSOCIATED WITH THE WASTE.

SPECIFY THE FORM CODE ASSOCIATED WITH THE WASTE.

F. REGULATORY STATUS

YES NO USEPA HAZARDOUS WASTE?

YES NO DO ANY STATE WASTE CODES APPLY?

Texas Waste Code

YES NO DO ANY CANADIAN PROVINCIAL WASTE CODES APPLY?

YES NO IS THIS WASTE PROHIBITED FROM LAND DISPOSAL WITHOUT FURTHER TREATMENT PER 40 CFR PART 268?

LDR CATEGORY:
VARIANCE INFO:

YES NO IS THIS A UNIVERSAL WASTE?

YES NO IS THE GENERATOR OF THE WASTE CLASSIFIED AS CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR (CESQG)?

YES NO IS THIS MATERIAL GOING TO BE MANAGED AS A RCRA EXEMPT COMMERCIAL PRODUCT, WHICH IS FUEL (40 CFR 261.2 (C)(2)(II))?

YES NO DOES TREATMENT OF THIS WASTE GENERATE A F006 OR F019 SLUDGE?

YES NO IS THIS WASTE STREAM SUBJECT TO THE INORGANIC METAL BEARING WASTE PROHIBITION FOUND AT 40 CFR 268.3(C)?

YES NO DOES THIS WASTE CONTAIN VOC'S IN CONCENTRATIONS >=500 PPM?

YES NO DOES THE WASTE CONTAIN GREATER THAN 20% OF ORGANIC CONSTITUENTS WITH A VAPOR PRESSURE >= .3KPA (.044 PSIA)?

YES NO DOES THIS WASTE CONTAIN AN ORGANIC CONSTITUENT WHICH IN ITS PURE FORM HAS A VAPOR PRESSURE > 77 KPA (11.2 PSIA)?

YES NO IS THIS CERCLA REGULATED (SUPERFUND) WASTE ?

YES NO IS THE WASTE SUBJECT TO ONE OF THE FOLLOWING NESHAP RULES?

Hazardous Organic NESHAP (HON) rule (subpart G) Pharmaceuticals production (subpart GGG)

YES NO IF THIS IS A US EPA HAZARDOUS WASTE, DOES THIS WASTE STREAM CONTAIN BENZENE?

YES NO Does the waste stream come from a facility with one of the SIC codes listed under benzene NESHAP or is this waste regulated under the benzene NESHAP rules because the original source of the waste is from a chemical manufacturing, coke by-product recovery, or petroleum refinery process?

YES NO Is the generating source of this waste stream a facility with Total Annual Benzene (TAB) >10 Mg/year?

What is the TAB quantity for your facility? Megagram/year (1 Mg = 2,200 lbs)

The basis for this determination is: Knowledge of the Waste Or Test Data Knowledge Testing

Describe the knowledge :

G. DOT/TDG INFORMATION

DOT/TDG PROPER SHIPPING NAME:

H. TRANSPORTATION REQUIREMENTS

ESTIMATED SHIPMENT FREQUENCY ONE TIME WEEKLY MONTHLY QUARTERLY YEARLY OTHER

CONTAINERIZED	BULK LIQUID	BULK SOLID
0-0 CONTAINERS/SHIPMENT	GALLONS/SHIPMENT: *0 Min -0 Max* GAL.	SHIPMENT UOM: TON YARD
STORAGE CAPACITY:		TONS/YARDS/SHIPMENT: *0 Min - 0 Max*
CONTAINER TYPE:		
CUBIC YARD BOX PALLET		
TOTE TANK DRUM		
OTHER:		
DRUM SIZE:		

I. SPECIAL REQUEST

COMMENTS OR REQUESTS:

GENERATOR'S CERTIFICATION

I certify that I am authorized to execute this document as an authorized agent. I hereby certify that all information submitted in this and attached documents is correct to the best of my knowledge. I also certify that any samples submitted are representative of the actual waste. If Clean Harbors discovers a discrepancy during the approval process, Generator grants Clean Harbors the authority to amend the profile, as Clean Harbors deems necessary, to reflect the discrepancy.

AUTHORIZED SIGNATURE	NAME (PRINT)	TITLE	DATE

APPENDICES

Appendix 1

Quality Assurance Plan FOR Clean Harbors Grassy Mountain, LLC.

INDUSTRIAL AND HAZARDOUS WASTE FACILITY

(Modifications to this QAP are considered to be a class 1 modification to the permit and may be made without prior approval of the Director if the changes are necessary to stay current with the most recent SW-846 methods or comply with Utah BLI requirements. A copy of the modified QAP will be provided to the Director within seven days of making the changes.)

LABORATORY / TECHNICAL MANAGER	DATE

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Quality Assurance Plan

TABLE OF CONTENTS

SECTION PAGE

FIGURES AND TABLES

1.0 QAP DESCRIPTION

This manual is the written document that identifies the policies, organizational objectives, functional objectives, and specific quality activities designed to achieve the quality goals desired for operation of the laboratory. This manual describes, in a reasonably systematic way, the measures the laboratory employs to implement the quality assurance program. It is intended to be flexible and adaptable to changes in the methods, techniques, and personnel.

Data of unknown quality is useless. It is this premise which management bases its stance on quality control.

Data of good quality does not just happen. Quality control must be an integral part of day to day operations. It relies on each individual within the program to make data quality his/her primary objective.

The goal is to produce high quality data so that good decision making can occur. This Quality Assurance Plan is designed to ensure that all data generated are complete, precise, and accurate. Data quality will be documented.

There are three (3) primary areas where data quality is of concern. These are as follows:

- Waste Approval
- Waste Acceptance
- Treatment Residue Monitoring

The objective of the first area is to examine the chemical and physical properties of a particular waste stream and determine if the facility is capable of accepting the material under its permit conditions.

The second area is a quality control check to determine that the waste being accepted at the facility is indeed the same waste, which was previously approved. A waste's compatibility with other wastes already being stored at the facility is also assessed.

The last area concerns demonstrating that wastes treated at the facility meet the requirements of the Land Disposal Restrictions prior to land disposal.

This plan does not affect analyses that may be performed to assist in determining treatment recipes.

1.1 PURPOSE

The purposes of this Quality Assurance Plan is to ensure that all information, data, and resulting decisions compiled under a specific task are technically sound, statistically valid, properly documented and are adequate to meet the requirements for which they are performed. Quality Assurance is the program or structure within an organization that plans, designs, and monitors the QA procedures and affirms the data quality in reports.

Quality Control is the mechanism or activities through which Quality Assurance achieves its goals. This is accomplished through a program, which defines the frequency and methods of checks, audits, and reviews necessary to identify problems and dictate corrective action.

1.2 SCOPE

The Quality Assurance Plan encompasses the entire measurement system from initial sampling to the final reporting and interpretation of results. This QAP is for the GMF laboratory. Data generated by Suitable Laboratories for GMF must meet the requirements of this QAP.

1.3 OBJECTIVE

This Quality Assurance Plan is designed to produce accurate and reliable data. In order to accomplish this objective, the following criteria must be achieved:

- All procedures and practices shall be accepted by the client and/or regulatory agency.

- A continuing program shall be developed to monitor the performance of the program.

- A mechanism shall be developed for correcting problems, which are determined by the monitoring assessment.

2.0 LABORATORY ORGANIZATION AND RESPONSIBILITY

The organizational structure of the laboratory is shown in Figure 2.1.

The initial step in any Quality Assurance Plan begins with the people involved. In addition to the organizational chart, descriptions of those individuals involved in Quality Assurance and their responsibilities are included.

2.1 QUALITY CONTROL MANAGER

The Quality Control Manager is responsible for identifying quality problems, to recommend and provide solutions, and to verify the implementation of the solutions. The duties include:

- developing mechanisms to carry out QA/QC objectives;
- administration of quality control procedures;
- implementation of corrective action(s); and
- maintenance of QA/QC records.

2.2 LABORATORY MANAGER

The Laboratory Manager is responsible for the daily operation and management of the laboratory. The manager's duties include:

- management of laboratory personnel;
- oversee and coordinate instrument and equipment maintenance;
- review of work procedures and daily laboratory practices;
- work scheduling;
- record keeping;
- training of laboratory personnel; and
- responsible for the administration of Quality Control at his/her respective laboratory.

2.3 LABORATORY SUPERVISOR

The Laboratory Supervisor supervises the daily operation and management of the laboratory. The supervisor's duties include:

- management of chemists and technicians;
- oversee and coordinate instrument and equipment maintenance;

- review of work procedures and daily laboratory practices;
- work scheduling;
- record keeping;
- training of laboratory personnel; and
- responsible for the administration of quality control at his/her respective laboratory.

2.4 CHEMIST

The Chemist's duties as they relate to QA/QC are as follows:

- recommendations for technical decisions;
- evaluating and reviewing test procedures;
- reviewing and signing laboratory reports;
- ensuring that results are accurate and reproducible;
- calculations and interpretations of test results;
- equipment and instrument calibration and operation; and
- sample preparation and analysis.

2.5 LABORATORY TECHNICIANS

The laboratory technicians duties as they relate to QA/QC are as follows:

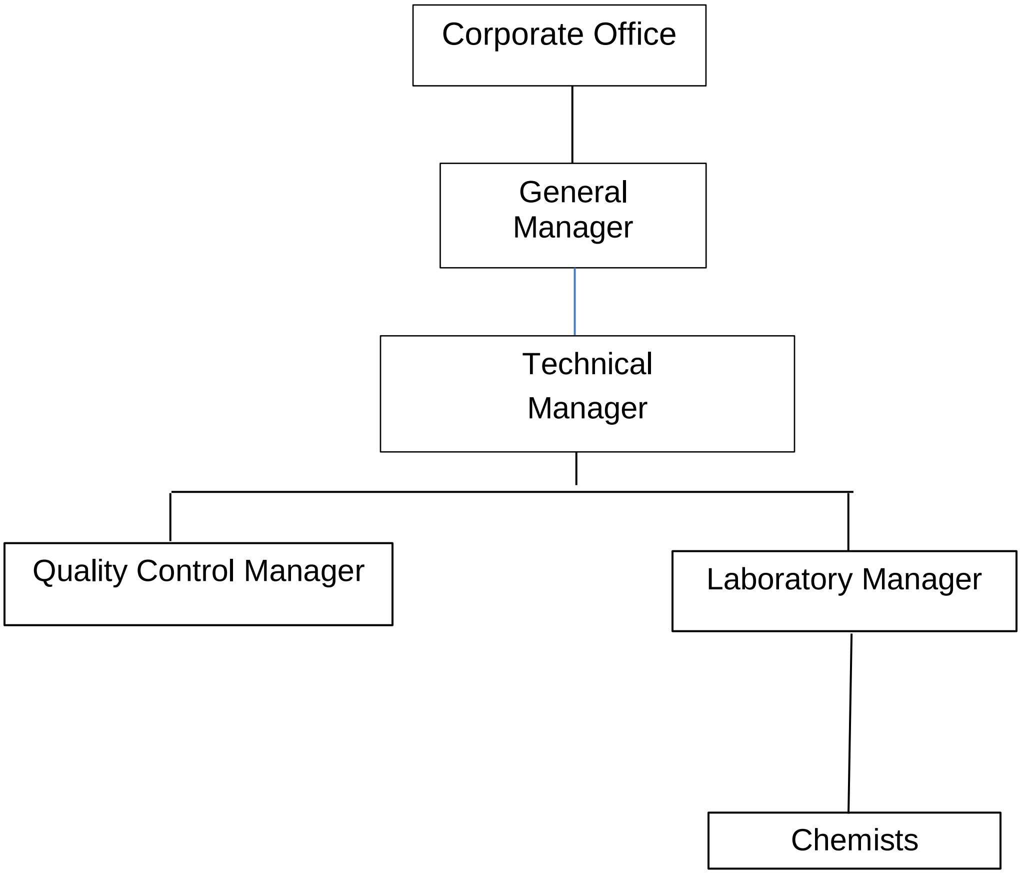
- performing sample preparations and analysis;
- maintaining a clean and safe working environment;
- making recommendations to supervisors regarding analysis or QA/QC performances;
- performing QA/QC analysis; and
- reviewing and signing laboratory reports.

2.6 SAMPLING TECHNICIANS

Sampling technicians are specially trained personnel responsible for sampling containers, vessels, tanks, and process streams. These people may be chemists, engineers, laboratory technicians, or operations personnel. They all have specialized training in sampling QA/QC techniques including the use of various sampling apparatus, sample site selection, sampling methodologies, and chain of custody procedures.

The Facility Manageror designee interacts with the sampling technicians to assure understanding of selection, collection, storage, transportation, and documentation practices.

Figure 2.1



Note: The facility may use personnel from another facility to fulfill any of the positions listed above. For example, the Technical Manager, Lab Manager and Quality Control Manager may be Clean Harbors from other location employees while functioning in these same capacities for Grassy Mountain. Depending upon the operations being performed at the facility, only the General Manager, Lab Manager and QC positions must be filled to maintain an operating laboratory. For a functioning laboratory, the person performing the Laboratory Supervisor function, must be stationed at the facility.

3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT IN TERMS PRECISION, ACCURACY, COMPLETENESS, AND COMPARABILITY.

Data Quality objectives are defined as follows:

- Precision - is the measure of agreement of a set of replicate results among themselves. Precision is assessed by means of duplicate/replicate sample analysis.
- Accuracy - is the nearness of a result or the mean (X) of a set of results to the true value or an established laboratory mean. Accuracy is assessed by means of reference samples and percent recoveries.
- Completeness - is the measure of the amount of valid data derived from a system of measurement as compared to the amount of data which was expected to be obtained.

3.1 ACCURACY

Using one or more of the following techniques generates accuracy information for quantitative measurements:

Calibration Checks
Calibration checks determine the acceptability of a calibration. The limits are method specified.

Calibration Check Standards are used as continuing checks for organic analysis. The equation for the Calibration Check Standard is:
% Recovery = 100(result/true value)

Calibration Verification Standards (CVS) are second-source standards (a different lot from those used for generating a calibration curve) to check the accuracy of the calibration curve. The equation for the CVS is:
% Recovery = 100(result/true value)

Method Accuracy Checks

Method Accuracy checks determine the acceptability of a batch of samples that have been subjected to a preparation step (i.e., digestion, extraction, combustion, etc.). The limits are method specified or statistically generated. The means and limits are tracked by generating statistical data. Statistically generated data must also meet the method-specified range, if there is one, to be used to demonstrate method accuracy. If the Method Accuracy check does not fall within the control limit, the batch is rejected and rerun for the failed constituent(s).

Control Limit = method / QAP specified
or
mean ±3sd

Laboratory Control Sample (LCS) consists of an aliquot of clean (control) matrix and is the same weight or volume as the sample matrix. The LCS is spiked with the same analytes at the same concentrations as the matrix spike. When the results of the matrix spike analysis indicate a potential problem due to the sample matrix itself, the LCS results are used to verify that the laboratory can perform the analysis in a clean matrix, thus validating the laboratory's analytical process.

Control Blank Spikes (CBS) are blanks that are spiked with the constituents being analyzed.

Matrix Accuracy Checks

Matrix Spikes (MS) are samples that are spiked with the constituents being analyzed. They are only used as method accuracy checks when the matrix has demonstrated a lack of interference in the analysis.

% Matrix Spike Recovery = 100(Sample Spike Result-Sample Amount)/Spike Amount

3.2 PRECISION

Performing a Matrix Duplicate (MD) or a Matrix Spike Duplicate (MSD), as specified by methodology generates precision information for quantitative measurements. The results of the duplication are compared to the initial accuracy check. The limits are method specified or statistically generated. As appropriate, the means and limits are tracked by generating statistical data. Statistically generated data must also meet the method specified control limit, if there is one, to be used to demonstrate precision. All precision outliers must be explained in the permanent laboratory record.

Control Limit = Method / QAP specified
or
Upper Control Limit

Laboratory Control Sample Duplicate (LCSD), or *Control Blank Spike Duplicates* (CBSD) are analyzed by the same procedure as the initial method accuracy check.

Matrix Spike Duplicates (MSD) are samples that are spiked with the constituents being analyzed. They are only used as precision checks when the matrix has demonstrated a lack of interference in the analysis.

Method Specified Limits for precision are compared to results generated by either:
Relative Percent Difference (RPD) = 100(Range of Results/Average of Results)
or
Coefficient of Variation (CV) = 100(standard deviation/mean)

Upper Control Range Limits are generated by historical statistical techniques.
Upper Control Range Limit = Mean of Ranges x (D_2/d_2)

where: Range = absolute difference between replicates

D_2 = 99% confidence upper limit (equivalent to ±3sd) on a population mean of replicate averages (when n=2, D_2=3.686).

d_2 = factor that converts a range into a standard deviation between replicates (when n=2, d_2=1.128).

Source of D_2 and d_2: ASTM Manual, *Quality Control of Materials.*

3.3 METHOD PREPARATION CHECKS

When a method preparation check is outside the prescribed limits, a notation, or *flag*, is documented in the final report. The limits are listed in Table 3.1.

Matrix Spikes (MS) are samples that are spiked with the constituents being analyzed. The results are compared to method specified limits or statistically generated limits for a determination of preparation efficiency.

Matrix Spike Duplicates (MSD) are the same as Matrix Spikes. The results are compared to the initial *Matrix Spike* result for a determination of the precision of preparation efficiency.

Surrogates are constituents that are not commonly found in the natural environment or in commercial waste products. They are added to the sample at the beginning of the preparation step. In organic chromatographic analysis, they are clearly distinguishable from target compounds. They are somewhat less susceptible to inferences and are used as an additional determination of preparation efficiency. The strategy used for evaluating surrogate recovery is as follows:

A. If the surrogate recovery falls outside the ±3sd limits, and review of the chromatography does not indicate matrix interference, the analyst must:

(1) Rerun the extract.

If the result is within the limits, the analysis is finished.

If the result is still outside the limits, the sample must be re-extracted once and rerun on the instrument. If the result is within the limits, the analysis is finished. If it continues to fall outside the limits, the analysis is finished and the final report must be flagged (matrix interference can be assumed).

OR

(2) Re-extract the sample and rerun on the instrument.

If the result is within the limits, the analysis is finished. If it continues to fall outside the limits, the analysis is finished and the final report must be flagged (matrix interference can be assumed).

3.4 COMPLETENESS

A data package is considered complete when the following applicable items are finished:

- All appropriate logbooks contain all essential information;
- Data validation has been performed;
- Data files contain raw data, completed data validation forms, and all worksheets that document acceptable accuracy, and precision; and,
- Final results are placed into the laboratory record, LIMS or paper copies.

TABLE 3.1
ACCURACY, PRECISION, METHOD PREPARATION: OBJECTIVES AND LIMITS
*ICP Metals, AA Metals, Hg (CVAA), Cyanide, Reactive Sulfide

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
ICP Metals (Totals and TCLP)	Calibration Verification Standard	90-110%	Control Blank Spike	75-125%	NA	NA	Matrix Spike	75 - 125%	Matrix Spike Duplicates	RPD<20
	Continuing Calibration Blanks	<3 IDL or Ave of 2 or more repeated results <3 sd of background mean					Post-Digestion Spike	75-125%		
	Interelement Interference	As specified by method					TCLP Matrix Spike	>50%^{1}		
AA Metals	Calibration Verification Standard	90-110%	Control Blank Spike (after initial)	80-120%	NA	NA	Matrix Spike	80-120%	Matrix Spike Duplicates	RPD<20
Hg	Calibration Verification Standard	90-110%	Control Blank Spike (after initial)	80-120%	NA	NA	Matrix Spike TCLP Matrix Spike	80-120% >50%^{1}	Matrix Spike Duplicates	RPD<20
Reactiv	NA	NA	Control	75-125%	NA	NA	NA	NA	Sample	<20%

Analysis	**Calibration Checks**	**Limits**	**Method Accuracy Checks**	**Limits**	**Method Precision Checks**	**Limits**	**Method Preparation Check (Efficiency)**	**Limits**	**Method Preparation Check (Precision)**	**Limits**
e Sulfide			standard						Duplicate	RPD
Cyanide	High and Low Calibration Verification Standards	Titrametric--N/A Colorometric - 85-115%	Control Blank Spike	85-115%	NA	NA	Matrix Spike	85-115%	Sample Duplicate	<20% RPD

[1] Perform Method of Standard Additions when (1) the recovery of the spike TCLP extract is <50% and the unspiked extract does not exceed the regulatory level,
or (2) the concentration of the metal in the extract is within 20% of the appropriate regulatory level.

ACCURACY, PRECISION, METHOD PREPARATION: OBJECTIVES AND LIMITS

TABLE 3.1 (Cont.)

GCMS VOLATILES

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
GCMS Volatiles	Initial BFB Tuning	As per Table 4, (8260)	Control Blank Spike (5 MS Compounds)	±3sd	Control Blank Spike Duplicate	<Upper Range Limit	Matrix Spike (5 MS Compounds)	±3sd	Matrix Spike Duplicates	<Upper Range Limit
	Continuing Calibration Compounds	RF RSD <30	OR		OR		Surrogates (3)	±3sd	N/A	N/A
	System Performance Check Compounds	Min RRF 0.10 (0.30 for CBZ, TetCE)	Matrix Spike (5 MS Compounds)	±3sd	Matrix Spike Duplicate	<Upper Range Limit				
	Daily SPCC	0.10 (0.30 for CBZ, TetCE)								
	CCC	<25% difference from initial								
	Internal Standard EICP	As required by 8260								

ACCURACY, PRECISION, METHOD PREPARATION: OBJECTIVES AND LIMITS

TABLE 3.1 (Cont.)

GCMS SEMIVOLATILES

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
GCMS Semi-volatiles	Initial DFTPP Tuning	As per Table 3, (8270A)	Control Blank Spike (11 MS Compounds)	±3sd	Control Blank Spike Duplicate	<Upper Range Limit	Matrix Spike (11 MS Compounds)	±3sd	Matrix Spike Duplicates	<Upper Range Limit
	Continuing Calibration Compounds	RF RSD <30	OR		OR		Surrogates (6)	±3sd	N/A	N/A
	System Performance Check Compounds	Min RRF 0.050	Matrix Spike (11 MS Compounds)	±3sd	Matrix Spike Duplicate	<Upper Range Limit				
	Daily SPCC	Min RRF 0.050								
	CCC	<30% difference from initial								
	Internal Standard EICP	As required by 8270								

ACCURACY, PRECISION, METHOD PREPARATION: OBJECTIVES AND LIMITS

TABLE 3.1 (Cont.) **PESTICIDES, PCBs, HOMOLOGS**

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
Pesticides	Initial Calibration Factor (External Std Method)	RSD<20	Control Blank Spike (6MS Compounds)	±3sd	Control Blank Spike Duplicate	<Upper Range Limit	Matrix Spike (6 MS Compounds)	±3sd	Matrix Spike Duplicates	<Upper Range Limit
			OR		OR		Surrogates	±3sd	N/A	N/A
	Response Factor (Internal Std Method)	RSD<20	Matrix Spike (6 MS Compounds)	±3sd	Matrix Spike Duplicate	<Upper Range Limit				
	4,4'-DDT and Endrin Breakdown	<15%								
	Daily Continuing Calibration Compounds	85-115% (or ave of all 85-115%)								
PCBs	Initial Calibration Factor (External Std Method)	RSD<20	Laboratory Control Sample	±3sd	Laboratory Control Sample Duplicate	<Upper Range Limit	Matrix Spike	±3sd	Matrix Spike Duplicates	<Upper Range Limit
			OR		OR		Surrogates	±3sd	N/A	N/A
	Daily Continuing Calibration Compounds	85-115%	Matrix Spike	±3sd	Matrix Spike Duplicate	<Upper Range Limit				

ACCURACY, PRECISION, METHOD PREPARATION: OBJECTIVES AND LIMITS
HERBICIDES, METHANOL

TABLE 3.1 (Cont.)

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
Herbicides	Initial Calibration Factor (External Std Method) Daily Continuing Calibration Compounds	RSD<20 85-115%	Control Blank Spike (3 MS Compounds) OR Matrix Spike (3 MS Compounds)	±3sd ±3sd	Control Blank Spike Duplicate OR Matrix Spike Duplicate	<Upper Range Limit <Upper Range Limit	Matrix Spike (3 MS Compounds) Surrogates	±3sd ±3sd	Matrix Spike Duplicates N/A	<Upper Range Limit N/A
Methanol & Other GC Volatiles	Initial Calibration Factor (External Std Method) Daily Continuing Calibration Compounds	RSD<20 85-115%	Control Blank Spike OR Matrix Spike	±3sd ±3sd	Control Blank Spike Duplicate OR Matrix Spike Duplicate	<Upper Range Limit <Upper Range Limit	Matrix Spike Surrogates	±3sd ±3sd	Matrix Spike Duplicates N/A	<Upper Range Limit N/A

ACCURACY, PRECISION, METHOD PREPARATION: OBJECTIVES AND LIMITS

TABLE 3.1 (Cont.)

DIOXINS/FURANS (LOW RESOLUTION)

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
Dioxins/Furans (Low Resolution)	Initial Relative Response Factor	RSD<15 Triplicate injections of each level.	N/A	N/A	N/A	N/A	Internal to Recovery Standard	40-120%	N/A	N/A
	Initial Tuning Isotopic Ratio Measurements w/ Column Performance Check Mixture	As per 8280 Table 3								
	Valley Percent Resolution for 2,3,7,8-TCDD and 1,2,3,4-TCDD	<25								
	Daily/Continuing Mid-level Check Standard	±30% of the Initial Calibration RRFs								
	Daily Tuning Same as Initial Tuning	Same as Initial Tuning								

ACCURACY, PRECISION, METHOD PREPARATION: OBJECTIVES AND LIMITS
DIOXINS/FURANS (HIGH RESOLUTION)

TABLE 3.1 (Cont.)

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
Dioxins/ Furans (High Resolution)	Initial Relative Response Factor 17 unlabeled 9 labeled Initial Tuning Isotopic Ratio Measurements for 17 unlabeled 11 labeled Valley Percent Resolution for Column Performance Check Standard Valley Percent PFK m/z 304.09824 & TCDF m/z 303.9016 Daily/Continuing	RSD<20 RSD<30 As per 8290 Table 8 <25 <10 ±20% ±30% of the Initial Calibration RRFs Same as	N/A	N/A	N/A	N/A	Internal to Recovery Standard	40-135%	Matrix Spikes and Matrix Spike Duplicates Unspiked Duplicates	RPD<20 RPD<25

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
	High Resolution Calibration Compound-3 17 unlabeled 9 labeled Daily Tuning Same as Initial Tuning End Cal Check HRCC-3 17 unlabeled 9 labeled	Initial Tuning RPD<25 RPD<35 of the previous 12hr HRCC-3 Check								

TABLE 3.1 (Cont.)

ACCURACY, PRECISION, METHOD PREPARATION: OBJECTIVES AND LIMITS
WET CHEMISTRY

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
Heat ofCombustion (BTU)	Initial Generate an EE value with 6 runs of	Results must be within 56 BTU/lb of	Laboratory Control Sample	±200 BTU/lb or ±3sd of	Laboratory Control Sample Duplicate	Within 56 BTU/lb	N/A	N/A	N/A	N/A

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
	benzoic acid on two non-consecutive days Daily Benzoic Acid	each other 11373 BTU/lb ±56		historical mean (use the more stringent)		of initial LCS run or <upper Range Limit (use the more stringent)				
Chloride (for Total Halogens)	Calibration Verification Standard	90-110%	Laboratory Control Sample	±3 sd of historical mean	Laboratory Control Sample Duplicate	<Upper Range Limit	Matrix Spike	±3sd	Matrix Spike Duplicates	<Upper Range Limit
Setaflash Ignitability	n-Butanol OR p-Xylene	98°F ±2 81°F ±2	Select a compound with a flashpoint near 140°F	Pass/Fail	N/A	N/A	N/A	N/A	N/A	N/A
Pensky-Marten Ignitability	p-Xylene OR per method D93	81°F ±2 per method D93	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Percent Moisture: ***Evaporation***	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Duplicate	RPD<10

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
Karl Fischer	Hydranal	90-110%	N/A	N/A	N/A	N/A	N/A	N/A	Duplicate	RPD<10

TABLE 3.1 (Cont.)

ACCURACY, PRECISION, METHOD PREPARATION: OBJECTIVES AND LIMITS
Wet Chemistry

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
Percent Ash	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Duplicate	RPD<10
Fluoride (from Combustate)	Calibration Verification Standard	90-110%	Laboratory Control Sample	±3sd of historical mean	Laboratory Control Sample Duplicate	<Upper Range Limit	Matrix Spike	±3sd	Matrix Spike Duplicates	<Upper Range Limit
Viscosity	Calibration Verification Standard	90-110%	N/A	N/A	N/A	N/A	N/A	N/A	Duplicate	RPD<10
Specific Gravity / Bulk Density	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Duplicate	RPD<10
pH:										

Analysis	Calibration Checks	Limits	Method Accuracy Checks	Limits	Method Precision Checks	Limits	Method Preparation Check (Efficiency)	Limits	Method Preparation Check (Precision)	Limits
Water	pH Buffers appropriate for waste being tested	N/A	Calibration Verification Standard	±0.05 pH Units	N/A	N/A	N/A	N/A	Duplicates on all water samples	±0.1 pH Units
pH Paper Screen	Check each lot against NIST traceable buffer	± 1 color increment	N/A	N/A	N/A	N/A	N/A	N/A	Duplicate per batch	±1 color increment
pH Paper	Check each lot against NIST traceable buffer	± 1 color increment	N/A	N/A	N/A	N/A	N/A	N/A	Duplicate on all samples	±1 color increment on narrow range paper
Waste	pH Buffers appropriate for waste being tested	N/A	Calibration Verification Standard	±0.05 pH Units	N/A	N/A	N/A	N/A	Duplicate per batch	±0.1 pH Units
Solids	pH Buffers appropriate for waste being tested	N/A	Calibration Verification Standard	±0.05 pH Units	N/A	N/A	N/A	N/A	Duplicate per batch	±0.1 pH Units

4.0 SAMPLING PROCEDURES

A comprehensive program is essential in order to ensure that all samples taken are appropriate for the analysis being performed, that the analysis is complete and accurate, and that the final reports contain sufficient information to achieve their intended purpose. That purpose is primarily the safe and efficient treatment and disposal of hazardous waste.

Waste samples do not require preservation but are subject to holding times. The analytical methods included in this Quality Assurance Plan refer to the optimum means of preservation. Since the chemical make-up of certain samples can alter the effectiveness of the sample preservation measures, all samples are analyzed as soon as possible after sampling and before the maximum recommended holding time has expired.

Table 4-1 indicates the parameter of interest, appropriate container, preservation, and maximum holding times for samples of various matrix types. A copy of this table may be sent to generators to assist them in properly preserving the integrity of samples sent to laboratories for analysis.

4.1 SAMPLE COLLECTION

The first step in any analysis is the collection of the sample. A wide range of techniques and sampling devices are utilized to sample waste materials in containers, tanks, and process streams.

The sampling methodology is determined by the sampling strategy employed. Sampling may be representative, composite, grab or surface area depending on sample strategy. The methods and equipment used for sampling waste material vary with the form and consistency of the waste materials, and by the type and purpose of the testing.. The following sampling procedures may be utilized for the following types of materials:

Extremely viscous liquids.	ASTM D140;SW846
Crushed or powdered material	ASTM D346;SW846
Soil or rock-like material	ASTM D420;SW846
Soil-like material	ASTM 1452;SW846
Fly-ash-like material.	ASTM D2234;SW846
Stratified liquids	EPA-600/2-80-018;SW846

Table 4.1
SAMPLING CONTAINERS, PRESERVATION, AND HOLDING TIMES

MATRIX	ANALYSIS	CONTAINER	PRESERVATION *	MAXIMUM HOLDING TIME
Solids, Organic Liquids, Sludges	Semi-Volatile Organics	Glass	4°C	Extraction: 14 Days Extract: 40 Days
	Volatile Organics	VOA Vial / (Glass) **	4°C	14 Days
	ICP Metals	Glass, Plastic	4°C	6 Months
	Mercury	Glass, Plastic	4°C	Extraction: 28 Days Extract: 28 Days
	Cyanide	Glass, Plastic	4°C	14 Days
	Wet Chemistry and Fingerprint	Glass, Plastic	4°C	6 months
Aqueous Liquids	Semi-Volatile Organics	Glass	4°C	Extraction: 7 Days Extract: 40 Days
	Volatile Organics	VOA Vial / (Glass) **	4°C	14 Days
	ICP Metals	Glass, Plastic	4°C, HNO_3 to pH<2	6 Months
	Mercury	Glass, Plastic	4°C, $HNO_3$to pH<2	38 Days w/Glass 13 Days w/Plastic
	Cyanide	Glass, Plastic	4°C, NaOH to pH>12	14 Days
	Wet Chemistry and Fingerprint	Glass, Plastic	4°C	6 months

* Hazardous Waste Samples Require No Preservation (Sources: SW-846 Volume II, Chapter 9, Page NINE-71, Paragraph 5., and Paul White, USEPA Method and Information Exchange (703) 676-4690.)

** Glass for Hazardous Waste samples only.

4.2 SAMPLING SMALL CONTAINERS

See Section 4.8 of the main body of the Waste Analysis Plan

4.3 SAMPLING LIQUID TANKS

See Section 4.9 of the main body of the Waste Analysis Plan

4.4 SAMPLING BULK WASTE

See Section 4.10 of the main body of the Waste Analysis Plan

4.5 SAMPLING SURFACES

The 40 CFR § 761.123 contains standardized EPA procedures for taking PCB surface wipe samples. The definition constitutes the minimum requirements for an appropriate wipe testing protocol. A standard size template (10 cm X 10 cm) is used to identify the sampling area; the wiping media is an all collection gauze pad which has been saturated with hexane. The wipe is performed quickly once the gauze is exposed to air.

4.6 FROZEN WASTE:

See Section 4.11 of the main body of the Waste Analysis Plan

4.7 OTHER SAMPLES, i.e., PROCESS EQUIPMENT, CONTAINMENT, SUMPS, ETC.:

See Section 4.12 of the main body of the Waste Analysis Plan

5.0 TRACEABILITY

The facility routinely follows sample traceability for all internal sampling and analysis. This involves the documentation of procedures so that a set of data can be traced back through the analyst, to the person performing the sampling, and then to the waste itself. All samples receive a unique sample identification number to facilitate this process.

Should Chain-of-Custody be warranted, i.e., shipping samples off-site, then procedures in Section 5.4, Chain-of-Custody are followed:

In order to trace sample possession from the time of collection, a traceability record is filled out and accompanies the sample. The record contains the following information:

- sample ID;
- signature of the collector;
- date collected;
- waste type;
- signature of persons involved;
- inclusive date of possession; and
- cross reference to manifest (if applicable).

5.1 SAMPLE LABELS

Sample labels are necessary to prevent misidentification of samples. The labels are gummed and affixed to the containers prior to or at the time of sampling. The labels are filled out at the time of collection.

5.2 SAMPLE SEALS

Sample seals are used to detect any tampering during shipment for samples sent off site. The seals are initialed, dated, and then affixed to the sample containers or shipping containers before the samples leave the custody of the lab. Sample seals are not necessary for samples taken onsite at the facility and sent to the onsite laboratory or if being transported by GMF personnel or the personnel from the laboratory that is going to perform the analysis. They are required for Chain-of-Custody events where Clean Harbors personnel are not transporting the samples.

5.3 SAMPLING RECORD

All information pertinent to field surveys or sampling is recorded in a record. Since sampling situations vary widely, no set of rules can be given as to the extent of information that must be entered in the record. However, sufficient information is recorded to allow someone to reconstruct the sampling without reliance on the collector's memory. This record includes at a minimum the following information:

- location of sampling point;
- volume of samples taken;
- date of collection;
- sample identification number;
- person sampling;
- comments or observations;
- sampling methodology

5.4 CHAIN-OF-CUSTODY

Sample chain-of-custody is maintained as required by the client or regulatory agency. A chain-of-custody is used to ensure the data from sample collection to data reporting is legally defensible. This includes the ability to trace the possession and handling of samples from the time of collection through analysis and final disposition.

The components of the chain-of-custody include the following: sample seals, a log, and chain-of-custody record. The procedures for their use are described in further detail.

A sample is considered to be under a person's custody if:

- it is in a person's physical possession;
- in view of the person after possession has taken place;
- secured by that person so that undetected tampering with the sample cannot occur; or
- secured by that person in an area which is restricted to authorized personnel.

Upon receipt of the sample(s) in the laboratory they are entered into the sample receipt log. All chain-of-custody samples are directed to the sample custodian. The shipping containers and sample bottles are inspected for proper seals and labels. The contents of the containers are then checked against the chain-of-custody record. The chain-of-custody record may include but is not limited to the following:

- Sampler Signature
- Date Sampled
- Sample ID
- Type of sample, i.e. composite or grab
- Number of Containers
- A place for comments
- Blocks for the person relinquishing the sample to sign, print his/her name, and put the date and time the sample was relinquished.
- Blocks for the person receiving the sample to sign, print his/her name, and put the date and time the sample was received.

If the chain-of-custody information is complete and the integrity of the samples has not been broken, each sample is assigned an unique identification number. If the information on the chain-of-custody record is not complete, the sample custodian shall contact the appropriate facility personnel to obtain the missing information, and a unique identification number is assigned. All problem resolutions will be documented in the sample receipt log.

The samples are then put into storage to await analysis. Maximum holding times for the samples are described in Section 6 of this Quality Assurance Plan.

6.0 CALIBRATION PROCEDURES AND FREQUENCIES

All instruments are calibrated in accordance with the appropriate analytical method. The methods commonly utilized are referenced in Section 9.1. These methods cite the appropriate calibration procedures and frequencies. In addition, all instruments are calibrated in accordance with the manufacturer's procedures.

Prior to the analysis of samples, instruments are either calibrated or their calibrations verified. Calibration curves of signal response versus concentration are generated on each applicable analytical instrument.

Calibrations are evaluated using calibration check standards. Should this sample fall outside of acceptable limits as specified by the method, the instrument is recalibrated. Table 8.1 summaries instrument calibration procedures and frequencies.

Sources of reference materials include the National Bureau of Standards, and reputable commercial vendors. PCB reference materials will be obtained from EPA’s reference laboratory or from a suitable chemical supply firm such as Supelco, Foxboro, Radian, or ULTRA Scientific.

TABLE 6.1
SUMMARY OF
CALIBRATION PROCEDURES AND FREQUENCIES

Instrument	Standards	Frequency
GC	Mid-level Standard	Daily and every 10th sample.
	5-7 Standards	Recalibration if CVS is greater than 15% of expected value.
GC/MS	Mid-level Standard	Daily
	5-7 Standards	Recalibration if CCC* is greater than 30% for semi-volatiles and 25% for volatiles.
	Mass Calibration (GC/MS tuning)	Every 12 hours.
ICP	Calibration Verification Standard (CVS)	Beginning and end of analytical run and every 10th sample.
	3-5 Standards	Recalibration if CVS not within ± 10% of expected value.
AAS	3-5 Standards	Analysis of standards at the beginning of an analytical run.

* CCC = Continuing Calibration Check

7.0 ANALYTICAL METHODS

The analytical methods used are listed in Section 3 of the Waste Analysis Plan.

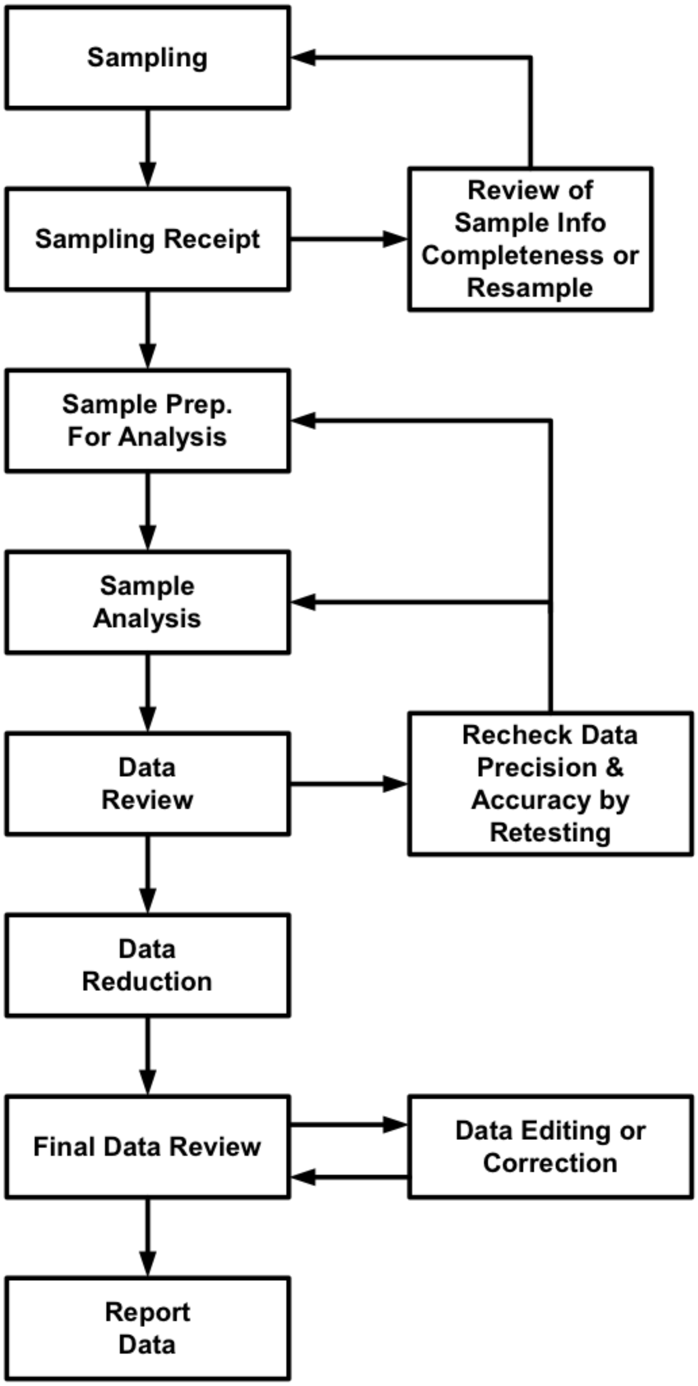
8.0 DATA REDUCTION, VALIDATION, AND REPORTING

Data reduction procedures are designed to include several levels of data review. Data validation begins with the person generating data. The chemist or analyst makes the initial calculations and records the results. Each section supervisor or designee is then responsible for reviewing data and as well as 10% of hand calculations generated by their respective group.

Discrepancies and/or errors are corrected or referred back to the chemist or analyst performing the analysis. If necessary, the samples are reprepared and reanalyzed.

Figure 8.1 depicts the data reporting scheme.

FIGURE 8.1 DATA REPORTING



8.1 DATA REDUCTION

Raw data from chromatographs, spectrometers, recorders, and physical measurements are reduced to yield concentrations of the analytes of interest. All data reduction is performed in accordance with the applicable method as referenced in section 9.0.

Data reduction, which is not computerized, is recorded in ink on worksheets or in lab notebooks.

8.2 DATA VALIDATION

All data are validated prior to being disseminated from the laboratory. The data are reviewed for both editorial and technical validity.

The editorial review consists of a check for typographical, transpositional, and omissional errors. This review also includes a review of any text which may accompany the data.

The technical review consists of a check to see that all precision, accuracy, and detection limit requirements have been met. In addition, the data are also reviewed for completeness and representativeness.

8.3 DATA REPORTING

Once data have been reviewed and all requirements for completeness, representativeness, precision, accuracy, and limits of detection have been met, results are reported to the client.

Typically, only the final reduced data is reported. All QC data, calculations, chromatograms, etc., which support the reported data are retained in the laboratory records.

9.0 INTERNAL QUALITY CONTROL CHECKS

A minimum level of quality control is maintained as described in Chapter 1 "Quality Control," SW-846.

Table 3.1 describes the quality control strategies for each analysis. A glossary of terms is listed in Section 11.2.

9.1 FIELD QUALITY CONTROL

The procedures that are used in the field to ensure data quality include:

- The use of accepted sampling techniques.
- The justification and documentation of any field action contrary to accepted or specified techniques.
- The documentation of activities, such as container preparation, instrument calibration, etc.
- The documentation of field measurement Quality Control Data.
- The documentation of field activities.
- The documentation of post-field activities including sample shipment and receipt,

equipment check in, and de-briefing.
- The generation of Quality Control Samples, including duplicates.

9.2 ANALYTICAL QUALITY CONTROL

The procedures used in the laboratory to ensure analytical data quality include:

Duplicate Spike - is analyzed (when applicable) with every analytical batch or once in ten samples, which ever is more frequent. Analytes stipulated by the method applicable regulations, or agreement with the client, are spiked into the sample. Selection of the sample to be spiked and/or split depends on the information required and the variety of conditions within a typical matrix. In some situations, requirements of the site being sampled may dictate that the person sampling select a sample to be spiked and split based on a pre-visit evaluation or on-site inspection. This does not preclude the laboratory's spiking a sample of its own selection. In most cases, the laboratory will select the sample to be spiked. The laboratory's selection is based on the attempt to determine the extent of matrix bias or interference on the analyte recovery and sample to sample precision.

Blanks - accompany each batch of samples and are carried through the entire analytical procedure.

Surrogate Standards - are spiked into samples according to the appropriate analytical methods. Surrogate spike recoveries will fall within the control limits set to be in accordance with the procedures specified in the method.

Check Samples - containing a representative subset of the analytes of interest are used to evaluate equipment performance.

Clean-Ups - are used to eliminate interferences in organic extracts. All associated QC samples must undergo the same procedures as field samples.

Column-Check Sample - is used to verify column performance. The elution pattern is reconfirmed after activating or de-activating a batch of absorbent.

Instrument Adjustment - requirements and procedures are instrument and method specific. Analytical instrumentation is tuned and aligned in accordance with requirements which are specific to the instrumentation procedures employed.

Calibration - is performed in accordance with the manufactures' requirements and the procedures specified in the applicable method.

9.3 SPECIFIC REQUIREMENTS FOR INORGANIC ANALYSIS

Standard curves used in the determination of inorganic analytes are prepared as follows.

Standard curves derived from data consisting of one reagent blank and at least one additional concentration are prepared for each analyte. The response for each prepared standard is based upon the average of three replicate readings of each standard. Sample results must fall within the concentration range of the standard curve. If the results of the verification are not within ±10% for ICP and 10% for Atomic Absorption of the original standard curve, a reference standard is employed to determine if the discrepancy is with the standard or with the instrument.

New standards are prepared on a quarterly basis. All data used in drawing or describing the curve are indicated on the curve or its description and a record is made of this verification.

Standard deviations and relative standard deviations are calculated from the absolute recovery of analytes from the spike sample duplicates.

9.4 SPECIFIC REQUIREMENTS FOR ORGANIC ANALYSIS

The following requirements are applied to the analysis of samples by gas chromatography, liquid chromatography and gas chromatography/mass spectrometry.

The calibration of each instrument is verified at frequencies specified in the methods. Standard curves are prepared as specified in the methods.

The tune of each GC/MS system used for the determination of organic analytes is checked with 4-bromofluorobenzene (BFB) for determinations of volatiles and with decafluorotriphenylphosphine (DFTPP) for determination of semi-volatiles. The required ion abundance criteria are met before determination of any analytes.

If the system does not meet the required specification for one or more of the required ions, the instrument is retuned and rechecked before proceeding with sample analysis. The tune performance check criteria are achieved daily or for each 12 hour operation period, whichever is more frequent.

The background subtraction is straightforward and designed only to eliminate column bleed or instrument background. Background subtraction actions resulting in spectral distortions for the sole purpose of meeting special requirements are contrary to the objectives of Quality Assurance and are unacceptable.

For determinations by HPLC or GC, the instrument calibration is verified as specified in the methods.

10.0 PROFICIENCY TESTING AND SYSTEM AUDITS

The laboratory is subject to both internal and external audits, in order to monitor the capability and performance of the total measurement systems.

The systems audit consists of evaluation of all components of the measurement system to determine their proper selection and use. This audit includes a careful evaluation of both field and laboratory quality control procedures. System audits are normally performed prior to or shortly after a new system has been implemented. Performance audits are then performed on a routine basis, at least semi-annually, during the lifetime or continuing operation of the system.

10.1 INTERNAL AND EXTERNAL PROFICIENCY TESTING

The laboratories participate in blind round robin tests with other laboratories who perform environmental analysis when available. If round robins are available more frequently than semi-annually, participation is only required semi-annually.

A set of blind samples are split among the laboratories. This helps management evaluate the precision and accuracy of its own laboratories, as well as provide information about the amount of inter-laboratory deviation which can be associated with a particular method. If the laboratory fails a proficiency testing audit, a corrective action plan will be generated and corrective action taken as described in Section 14 of this QAP.

For samples that are reported for certification purposes, the following rules apply:

The laboratory shallfollow the proficiency testing provider's instructions for preparing the proficiency testing sample and shall analyze the proficiency testing sample as if it were a client sample.

The following are strictly prohibited:

- performing multiple analyses (replicates, duplicates) which are not normally performed in the course of analysis of routine samples;
- averaging the results of multiple analyses for reporting when not specifically required by the method;

The laboratory shall not:

- discuss the results of a proficiency testing audit with any other laboratory until after the deadline for receipt of results by the proficiency testing provider;

The laboratory shall maintain a copy of all proficiency testing records, including analytical worksheets.

The Technical Manager of the laboratory shall sign and retain an attestation statement stating that the certified laboratory followed the proficiency testing provider's instructions for preparing the proficiency testing sample and analyzed the proficiency testing sample as if it were a client sample.

The laboratory staff shall be trained on the proper handling of proficiency testing sample.

10.2 INTERNAL SYSTEM AUDITS

Internal audits are performed on a semi-annual basis. The audit is conducted by the Quality Control Manager under the direction of the Facility Manager or designee. The audit report is due 30 days following the conclusion of the audit.

The audit evaluates the system from the receipt of samples to the reporting of results. Specific areas which are addressed include: sample flow through the lab, sample storage, sample preparation, analysis, data reduction, data reporting, QC samples, logbooks, and raw data storage.

11.0 PREVENTATIVE MAINTENANCE

The laboratories are equipped and maintained to provide the best conditions possible for performing laboratory analysis. Equipment which has become obsolete by the advancement of technology is replaced or upgraded. All equipment is inspected regularly to ensure that it is in proper working order.

Equipment is maintained in accordance with the manufacturer's recommendations. All major pieces of equipment are covered by service contracts from the manufacturer. Whenever possible, an inventory of spare parts which typically need replacement is maintained, this includes such compounds as septa, GC columns, ion volumes, torches, regulators, and so forth.

Table 13.1 lists pieces of equipment or components which are routinely maintained, the frequency at which they are serviced and the type of maintenance performed.

TABLE 11.1
MAINTENANCE SCHEDULE

EQUIPMENT COMPONENT	**MAINTENANCE PERFORMED**	**FREQUENCY**
Gas Chromatographs		
septa	replace	as required
column	replace/condition	as required
syringes	replace	as required
inlet liner (tube)	clean/replace	as required
ELCD (HALL)	leak check	as required
Ni catalyst	replace/condition	as required
solvent resin	replace	as required
ECD	wipe test leak check factory clean/recondition	semi-annually as required as required
PID	leak check	as required
lamp	replace	as required
FID	leak check	as required
jets	clean	as required
ICP		
nebulizer	clean/replace	as required
pump tubing	replace	as required
air filters	clean	as required
torch	clean/replace	as required
MERCURY ANALYZER		
drying tube desiccant	replace	daily
sample tubing	replace	twice/week
stannous chloride tubing	replace	as required
drain tubing	replace	as required
lamp	replace	as required
optics	clean	as required
CALORIMETER		
bombs	calibration/certification	after 500 firings
tubing	check/replace	daily
COMPRESSED GASES		
fittings	leak checks	as required
traps	replace	as required

12.0 CORRECTIVE ACTION

Quality Control procedures are designed to identify the need for corrective action. Most corrective actions are performed by the chemists doing the analysis, and are usually as simple as recalibrating an instrument should the instrument check sample be out of its acceptable range. Most corrective actions are found in methods, standard operating manuals, and instrument manuals.

Corrective actions may also be initiated as a result of various Quality Assurance activities, including:

1) performance audits,
2) system audits,
3) laboratory or interfield comparison studies,
4) program audits, and
5) final review of data reports

Corrective action reports shall be sent to the Laboratory Manager for review and implementation.

The standard approach for corrective action consists of the following:

1) define the problem,
2) determine the cause(s) of the problem,
3) determine possible solutions to the problem,
4) implement the corrective action, and
5) verify that the corrective action is effective.

All employees are encouraged to bring to their supervisor's attention any problem or practice which they feel may effect data quality.

13.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

The Quality Control Manager is responsible for reporting to the laboratory manager on the performance of measurement systems and data quality. The Laboratory and Facility Manager reviews and returns the report. These reports include:

1) Assessment of measurement data accuracy, precision, and completeness.
2) Results of performance audits.
3) Results of system audits.
4) Significant Quality Assurance problems and recommended solutions.

Appendix 2

Approved Waste Code List

Appendix 2 - Approved Waste Code List

EPA Waste Code List (See Note 1)	Module III (Containers) May store these wastes CONTAINERS (See Notes 2, 5)	Module IV (Tanks) May store these wastes STORAGE TANKS (See Notes 2, 4, 5)	Module IV (Tanks) May treat these wastes STABILIZATION TANKS (See Notes 2, 4, 5)	Module VI (Landfills) May dispose these wastes LANDFILLS (See Notes 3, 5)
D001	D001	D001	D001	D001
D002	D002	D002	D002	D002
D003	D003	D003	D003	D003
D004	D004	D004	D004	D004
D005	D005	D005	D005	D005
D006	D006	D006	D006	D006
D007	D007	D007	D007	D007
D008	D008	D008	D008	D008
D009	D009	D009	D009	D009
D010	D010	D010	D010	D010
D011	D011	D011	D011	D011
D012	D012	D012	D012	D012
D013	D013	D013	D013	D013
D014	D014	D014	D014	D014
D015	D015	D015	D015	D015
D016	D016	D016	D016	D016
D017	D017	D017	D017	D017
D018	D018	D018	D018	D018

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
D019	D019	D019	D019	D019
D020	D020	D020	D020	D020
D021	D021	D021	D021	D021
D022	D022	D022	D022	D022
D023	D023	D023	D023	D023
D024	D024	D024	D024	D024
D025	D025	D025	D025	D025
D026	D026	D026	D026	D026
D027	D027	D027	D027	D027
D028	D028	D028	D028	D028
D029	D029	D029	D029	D029
D030	D030	D030	D030	D030
D031	D031	D031	D031	D031
D032	D032	D032	D032	D032
D033	D033	D033	D033	D033
D034	D034	D034	D034	D034
D035	D035	D035	D035	D035
D036	D036	D036	D036	D036
D037	D037	D037	D037	D037
D038	D038	D038	D038	D038
D039	D039	D039	D039	D039
D040	D040	D040	D040	D040
D041	D041	D041	D041	D041
D042	D042	D042	D042	D042
D043	D043	D043	D043	D043

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
F001	F001	F001	F001	F001
F002	F002	F002	F002	F002
F003	F003	F003	F003	F003
F004	F004	F004	F004	F004
F005	F005	F005	F005	F005
F006	F006	F006	F006	F006
F007	F007	F007	F007	F007
F008	F008	F008	F008	F008
F009	F009	F009	F009	F009
F010	F010	F010	F010	F010
F011	F011	F011	F011	F011
F012	F012	F012	F012	F012
F019	F019	F019	F019	F019
F020	F020	F020*	F020*	F020*
F021	F021	F021*	F021*	F021*
F022	F022	F022*	F022*	F022*
F023	F023	F023*	F023*	F023*
F024	F024	F024	F024	F024
F025	F025	F025	F025	F025*
F026	F026	F026*	F026*	F026*
F027	F027	F027*	F027*	F027*
F028	F028	F028*	F028*	F028*
F032	F032	F032	F032	F032
F034	F034	F034	F034	F034

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
F035	F035	F035	F035	F035
F037	F037	F037	F037	F037
F038	F038	F038	F038	F038
F039	F039	F039	F039	F039
	F999	F999	F999	F999
K001	K001	K001	K001	K001
K002	K002	K002	K002	K002
K003	K003	K003	K003	K003
K004	K004	K004	K004	K004
K005	K005	K005	K005	K005
K006	K006	K006	K006	K006
K007	K007	K007	K007	K007
K008	K008	K008	K008	K008
K009	K009	K009	K009	K009
K010	K010	K010	K010	K010
K011	K011	K011	K011	K011
K013	K013	K013	K013	K013
K014	K014	K014	K014	K014
K015	K015	K015	K015	K015
K016	K016	K016	K016	K016
K017	K017	K017	K017	K017
K018	K018	K018	K018	K018
K019	K019	K019	K019	K019
K020	K020	K020	K020	K020

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
K021	K021	K021	K021	K021
K022	K022	K022	K022	K022
K023	K023	K023	K023	K023
K024	K024	K024	K024	K024
K025	K025	K025	K025	K025
K026	K026	K026	K026	K026
K027	K027	K027	K027	K027
K028	K028	K028	K028	K028
K029	K029	K029	K029	K029
K030	K030	K030	K030	K030
K031	K031	K031	K031	K031
K032	K032	K032	K032	K032
K033	K033	K033	K033	K033
K034	K034	K034	K034	K034
K035	K035	K035	K035	K035
K036	K036	K036	K036	K036
K037	K037	K037	K037	K037
K038	K038	K038	K038	K038
K039	K039	K039	K039	K039
K040	K040	K040	K040	K040
K041	K041	K041	K041	K041
K042	K042	K042	K042	K042
K043	K043	K043	K043	K043
K044	K044	K044	K044	K044
K045	K045	K045	K045	K045

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
K046	K046	K046	K046	K046
K047	K047	K047	K047	K047
K048	K048	K048	K048	K048
K049	K049	K049	K049	K049
K050	K050	K050	K050	K050
K051	K051	K051	K051	K051
K052	K052	K052	K052	K052
K060	K060	K060	K060	K060
K061	K061	K061	K061	K061
K062	K062	K062	K062	K062
K069	K069	K069	K069	K069
K071	K071	K071	K071	K071
K073	K073	K073	K073	K073
K083	K083	K083	K083	K083
K084	K084	K084	K084	K084
K085	K085	K085	K085	K085
K086	K086	K086	K086	K086
K087	K087	K087	K087	K087
K088	K088	K088	K088	K088
K093	K093	K093	K093	K093
K094	K094	K094	K094	K094
K095	K095	K095	K095	K095
K096	K096	K096	K096	K096
K097	K097	K097	K097	K097
K098	K098	K098	K098	K098

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
K099	K099	K099	K099	K099
K100	K100	K100	K100	K100
K101	K101	K101	K101	K101
K102	K102	K102	K102	K102
K103	K103	K103	K103	K103
K104	K104	K104	K104	K104
K105	K105	K105	K105	K105
K106	K106	K106	K106	K106
K107	K107	K107	K107	K107
K108	K108	K108	K108	K108
K109	K109	K109	K109	K109
K110	K110	K110	K110	K110
K111	K111	K111	K111	K111
K112	K112	K112	K112	K112
K113	K113	K113	K113	K113
K114	K114	K114	K114	K114
K115	K115	K115	K115	K115
K116	K116	K116	K116	K116
K117	K117	K117	K117	K117
K118	K118	K118	K118	K118
K123	K123	K123	K123	K123
K124	K124	K124	K124	K124
K125	K125	K125	K125	K125
K126	K126	K126	K126	K126
K131	K131	K131	K131	K131

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
K132	K132	K132	K132	K132
K136	K136	K136	K136	K136
K140	K140	K140	K140	K140
K141	K141	K141	K141	K141
K142	K142	K142	K142	K142
K143	K143	K143	K143	K143
K144	K144	K144	K144	K144
K145	K145	K145	K145	K145
K147	K147	K147	K147	K147
K148	K148	K148	K148	K148
K149	K149	K149	K149	K149
K150	K150	K150	K150	K150
K151	K151	K151	K151	K151
K156	K156	K156	K156	K156
K157	K157	K157	K157	K157
K158	K158	K158	K158	K158
K159	K159	K159	K159	K159
K161	K161	K161	K161	K161
K169	K169	K169	K169	K169
K170	K170	K170	K170	K170
K171	K171	K171	K171	K171
K172	K172	K172	K172	K172
P001	P001	P001	P001	P001
P002	P002	P002	P002	P002

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
P003	P003	P003	P003	P003
P004	P004	P004	P004	P004
P005	P005	P005	P005	P005
P006	P006	P006	P006	P006
P007	P007	P007	P007	P007
P008	P008	P008	P008	P008
P009	P009	P009	P009	P009
P010	P010	P010	P010	P010
P011	P011	P011	P011	P011
P012	P012	P012	P012	P012
P013	P013	P013	P013	P013
P014	P014	P014	P014	P014
P015	P015	P015	P015	P015
P016	P016	P016	P016	P016
P017	P017	P017	P017	P017
P018	P018	P018	P018	P018
P020	P020	P020	P020	P020
P021	P021	P021	P021	P021
P022	P022	P022	P022	P022
P023	P023	P023	P023	P023
P024	P024	P024	P024	P024
P026	P026	P026	P026	P026
P027	P027	P027	P027	P027
P028	P028	P028	P028	P028
P029	P029	P029	P029	P029

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
P030	P030	P030	P030	P030
P031	P031	P031	P031	P031
P033	P033	P033	P033	P033
P034	P034	P034	P034	P034
P036	P036	P036	P036	P036
P037	P037	P037	P037	P037
P038	P038	P038	P038	P038
P039	P039	P039	P039	P039
P040	P040	P040	P040	P040
P041	P041	P041	P041	P041
P042	P042	P042	P042	P042
P043	P043	P043	P043	P043
P044	P044	P044	P044	P044
P045	P045	P045	P045	P045
P046	P046	P046	P046	P046
P047	P047	P047	P047	P047
P048	P048	P048	P048	P048
P049	P049	P049	P049	P049
P050	P050	P050	P050	P050
P051	P051	P051	P051	P051
P054	P054	P054	P054	P054
P056	P056	P056	P056	P056
P057	P057	P057	P057	P057
P058	P058	P058	P058	P058
P059	P059	P059	P059	P059

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
P060	P060	P060	P060	P060
P062	P062	P062	P062	P062
P063	P063	P063	P063	P063
P064	P064	P064	P064	P064
P065	P065	P065	P065	P065
P066	P066	P066	P066	P066
P067	P067	P067	P067	P067
P068	P068	P068	P068	P068
P069	P069	P069	P069	P069
P070	P070	P070	P070	P070
P071	P071	P071	P071	P071
P072	P072	P072	P072	P072
P073	P073	P073	P073	P073
P074	P074	P074	P074	P074
P075	P075	P075	P075	P075
P076	P076	P076	P076	P076
P077	P077	P077	P077	P077
P078	P078	P078	P078	P078
P081	P081	P081	P081	P081
P082	P082	P082	P082	P082
P084	P084	P084	P084	P084
P085	P085	P085	P085	P085
P087	P087	P087	P087	P087
P088	P088	P088	P088	P088
P089	P089	P089	P089	P089

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
P092	P092	P092	P092	P092
P093	P093	P093	P093	P093
P094	P094	P094	P094	P094
P095	P095	P095	P095	P095
P096	P096	P096	P096	P096
P097	P097	P097	P097	P097
P098	P098	P098	P098	P098
P099	P099	P099	P099	P099
P101	P101	P101	P101	P101
P102	P102	P102	P102	P102
P103	P103	P103	P103	P103
P104	P104	P104	P104	P104
P105	P105	P105	P105	P105
P106	P106	P106	P106	P106
P108	P108	P108	P108	P108
P109	P109	P109	P109	P109
P110	P110	P110	P110	P110
P111	P111	P111	P111	P111
P112	P112	P112	P112	P112
P113	P113	P113	P113	P113
P114	P114	P114	P114	P114
P115	P115	P115	P115	P115
P116	P116	P116	P116	P116
P118	P118	P118	P118	P118
P119	P119	P119	P119	P119

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
P120	P120	P120	P120	P120
P121	P121	P121	P121	P121
P122	P122	P122	P122	P122
P123	P123	P123	P123	P123
P127	P127	P127	P127	P127
P128	P128	P128	P128	P128
P185	P185	P185	P185	P185
P188	P188	P188	P188	P188
P189	P189	P189	P189	P189
P190	P190	P190	P190	P190
P191	P191	P191	P191	P191
P192	P192	P192	P192	P192
P194	P194	P194	P194	P194
P196	P196	P196	P196	P196
P197	P197	P197	P197	P197
P198	P198	P198	P198	P198
P199	P199	P199	P199	P199
P201	P201	P201	P201	P201
P202	P202	P202	P202	P202
P203	P203	P203	P203	P203
P204	P204	P204	P204	P204
P205	P205	P205	P205	P205
	P999 w/F999	P999 w/F999	P999 w/F999	P999 w/F999
PCBs	PCBs	PCBs[1]	PCBs[1]	PCBs[1]

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
U001	U001	U001	U001	U001
U002	U002	U002	U002	U002
U003	U003	U003	U003	U003
U004	U004	U004	U004	U004
U005	U005	U005	U005	U005
U006	U006	U006	U006	U006
U007	U007	U007	U007	U007
U008	U008	U008	U008	U008
U009	U009	U009	U009	U009
U010	U010	U010	U010	U010
U011	U011	U011	U011	U011
U012	U012	U012	U012	U012
U014	U014	U014	U014	U014
U015	U015	U015	U015	U015
U016	U016	U016	U016	U016
U017	U017	U017	U017	U017
U018	U018	U018	U018	U018
U019	U019	U019	U019	U019
U020	U020	U020	U020	U020
U021	U021	U021	U021	U021
U022	U022	U022	U022	U022
U023	U023	U023	U023	U023
U024	U024	U024	U024	U024
U025	U025	U025	U025	U025
U026	U026	U026	U026	U026

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
U027	U027	U027	U027	U027
U028	U028	U028	U028	U028
U029	U029	U029	U029	U029
U030	U030	U030	U030	U030
U031	U031	U031	U031	U031
U032	U032	U032	U032	U032
U033	U033	U033	U033	U033
U034	U034	U034	U034	U034
U035	U035	U035	U035	U035
U036	U036	U036	U036	U036
U037	U037	U037	U037	U037
U038	U038	U038	U038	U038
U039	U039	U039	U039	U039
U041	U041	U041	U041	U041
U042	U042	U042	U042	U042
U043	U043	U043	U043	U043
U044	U044	U044	U044	U044
U045	U045	U045	U045	U045
U046	U046	U046	U046	U046
U047	U047	U047	U047	U047
U048	U048	U048	U048	U048
U049	U049	U049	U049	U049
U050	U050	U050	U050	U050
U051	U051	U051	U051	U051
U052	U052	U052	U052	U052

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
U053	U053	U053	U053	U053
U055	U055	U055	U055	U055
U056	U056	U056	U056	U056
U057	U057	U057	U057	U057
U058	U058	U058	U058	U058
U059	U059	U059	U059	U059
U060	U060	U060	U060	U060
U061	U061	U061	U061	U061
U062	U062	U062	U062	U062
U063	U063	U063	U063	U063
U064	U064	U064	U064	U064
U066	U066	U066	U066	U066
U067	U067	U067	U067	U067
U068	U068	U068	U068	U068
U069	U069	U069	U069	U069
U070	U070	U070	U070	U070
U071	U071	U071	U071	U071
U072	U072	U072	U072	U072
U073	U073	U073	U073	U073
U074	U074	U074	U074	U074
U075	U075	U075	U075	U075
U076	U076	U076	U076	U076
U077	U077	U077	U077	U077
U078	U078	U078	U078	U078
U079	U079	U079	U079	U079

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
U080	U080	U080	U080	U080
U081	U081	U081	U081	U081
U082	U082	U082	U082	U082
U083	U083	U083	U083	U083
U084	U084	U084	U084	U084
U085	U085	U085	U085	U085
U086	U086	U086	U086	U086
U087	U087	U087	U087	U087
U088	U088	U088	U088	U088
U089	U089	U089	U089	U089
U090	U090	U090	U090	U090
U091	U091	U091	U091	U091
U092	U092	U092	U092	U092
U093	U093	U093	U093	U093
U094	U094	U094	U094	U094
U095	U095	U095	U095	U095
U096	U096	U096	U096	U096
U097	U097	U097	U097	U097
U098	U098	U098	U098	U098
U099	U099	U099	U099	U099
U101	U101	U101	U101	U101
U102	U102	U102	U102	U102
U103	U103	U103	U103	U103
U105	U105	U105	U105	U105
U106	U106	U106	U106	U106

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
U107	U107	U107	U107	U107
U108	U108	U108	U108	U108
U109	U109	U109	U109	U109
U110	U110	U110	U110	U110
U111	U111	U111	U111	U111
U112	U112	U112	U112	U112
U113	U113	U113	U113	U113
U114	U114	U114	U114	U114
U115	U115	U115	U115	U115
U116	U116	U116	U116	U116
U117	U117	U117	U117	U117
U118	U118	U118	U118	U118
U119	U119	U119	U119	U119
U120	U120	U120	U120	U120
U121	U121	U121	U121	U121
U122	U122	U122	U122	U122
U123	U123	U123	U123	U123
U124	U124	U124	U124	U124
U125	U125	U125	U125	U125
U126	U126	U126	U126	U126
U127	U127	U127	U127	U127
U128	U128	U128	U128	U128
U129	U129	U129	U129	U129
U130	U130	U130	U130	U130
U131	U131	U131	U131	U131

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
U132	U132	U132	U132	U132
U133	U133	U133	U133	U133
U134	U134	U134	U134	U134
U135	U135	U135	U135	U135
U136	U136	U136	U136	U136
U137	U137	U137	U137	U137
U138	U138	U138	U138	U138
U140	U140	U140	U140	U140
U141	U141	U141	U141	U141
U142	U142	U142	U142	U142
U143	U143	U143	U143	U143
U144	U144	U144	U144	U144
U145	U145	U145	U145	U145
U146	U146	U146	U146	U146
U147	U147	U147	U147	U147
U148	U148	U148	U148	U148
U149	U149	U149	U149	U149
U150	U150	U150	U150	U150
U151	U151	U151	U151	U151
U152	U152	U152	U152	U152
U153	U153	U153	U153	U153
U154	U154	U154	U154	U154
U155	U155	U155	U155	U155
U156	U156	U156	U156	U156
U157	U157	U157	U157	U157

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
U158	U158	U158	U158	U158
U159	U159	U159	U159	U159
U160	U160	U160	U160	U160
U161	U161	U161	U161	U161
U162	U162	U162	U162	U162
U163	U163	U163	U163	U163
U164	U164	U164	U164	U164
U165	U165	U165	U165	U165
U166	U166	U166	U166	U166
U167	U167	U167	U167	U167
U168	U168	U168	U168	U168
U169	U169	U169	U169	U169
U170	U170	U170	U170	U170
U171	U171	U171	U171	U171
U172	U172	U172	U172	U172
U173	U173	U173	U173	U173
U174	U174	U174	U174	U174
U176	U176	U176	U176	U176
U177	U177	U177	U177	U177
U178	U178	U178	U178	U178
U179	U179	U179	U179	U179
U180	U180	U180	U180	U180
U181	U181	U181	U181	U181
U182	U182	U182	U182	U182
U183	U183	U183	U183	U183

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
U184	U184	U184	U184	U184
U185	U185	U185	U185	U185
U186	U186	U186	U186	U186
U187	U187	U187	U187	U187
U188	U188	U188	U188	U188
U189	U189	U189	U189	U189
U190	U190	U190	U190	U190
U191	U191	U191	U191	U191
U192	U192	U192	U192	U192
U193	U193	U193	U193	U193
U194	U194	U194	U194	U194
U196	U196	U196	U196	U196
U197	U197	U197	U197	U197
U200	U200	U200	U200	U200
U201	U201	U201	U201	U201
U202	U202	U202	U202	U202
U203	U203	U203	U203	U203
U204	U204	U204	U204	U204
U205	U205	U205	U205	U205
U206	U206	U206	U206	U206
U207	U207	U207	U207	U207
U208	U208	U208	U208	U208
U209	U209	U209	U209	U209
U210	U210	U210	U210	U210
U211	U211	U211	U211	U211

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
U213	U213	U213	U213	U213
U214	U214	U214	U214	U214
U215	U215	U215	U215	U215
U216	U216	U216	U216	U216
U217	U217	U217	U217	U217
U218	U218	U218	U218	U218
U219	U219	U219	U219	U219
U220	U220	U220	U220	U220
U221	U221	U221	U221	U221
U222	U222	U222	U222	U222
U223	U223	U223	U223	U223
U225	U225	U225	U225	U225
U226	U226	U226	U226	U226
U227	U227	U227	U227	U227
U228	U228	U228	U228	U228
U234	U234	U234	U234	U234
U235	U235	U235	U235	U235
U236	U236	U236	U236	U236
U237	U237	U237	U237	U237
U238	U238	U238	U238	U238
U239	U239	U239	U239	U239
U240	U240	U240	U240	U240
U243	U243	U243	U243	U243
U244	U244	U244	U244	U244
U246	U246	U246	U246	U246

EPA Waste Code List	Module III (Containers) May store these wastes	Module IV (Tanks) May store these wastes	Module IV (Tanks) May treat these wastes	Module VI (Landfills) May dispose these wastes
U247	U247	U247	U247	U247
U248	U248	U248	U248	U248
U249	U249	U249	U249	U249
U271	U271	U271	U271	U271
U278	U278	U278	U278	U278
U279	U279	U279	U279	U279
U280	U280	U280	U280	U280
U328	U328	U328	U328	U328
U353	U353	U353	U353	U353
U359	U359	U359	U359	U359
U364	U364	U364	U364	U364
U367	U367	U367	U367	U367
U372	U372	U372	U372	U372
U373	U373	U373	U373	U373
U387	U387	U387	U387	U387
U389	U389	U389	U389	U389
U394	U394	U394	U394	U394
U395	U395	U395	U395	U395
U404	U404	U404	U404	U404
U408	U408	U408	U408	U408
U409	U409	U409	U409	U409
U410	U410	U410	U410	U410
U411	U411	U411	U411	U411

NOTES

1. "EPA LIST" (Column 1) are all EPA Waste Codes found in 40 CFR § 261.
2. Must meet Condition II.D.7. of this permit and other conditions of this WAP for storage of waste and the waste must be compatible with storage vessel materials of construction.
3. Must meet LDR Standards (40 CFR § 268) or Approved Variances.
4. The volatile organics in the waste must be < 500 ppm per subpart CC method or GMF/Generator knowledge.
5. For the dioxin wastes marked with an "*", refer to the Supplemental Waste Management Plan, Attachment II-8, and Condition II.D.7.

Appendix 3

Halogenated Organic Compounds of Concern

ANALYTE	CAS Number	Analysis Method
VOLATILE ORGANICS		
Bromodichloromethane	75-27-4	SW-846 8260B
Bromoform (Tribromomethane)	75-25-2	SW-846 8260B
Bromomethane	74-83-9	SW-846 8260B
Carbon tetrachloride	56-23-5	SW-846 8260B
Chlorobenzene	108-90-7	SW-846 8260B
2-Chloro-1,3-butadiene (Chloroprene)	126-99-8	SW-846 8260B
Chloroethane	75-00-3	SW-846 8260B
2-chloroethyl vinyl ether	110-75-3	SW-846 8260B
Chloroform	67-66-3	SW-846 8260B
Chloromethane	74-87-3	SW-846 8260B
3-Chloropropene (Allyl Chloride)	107-05-1	SW-846 8260B
Dibromochloromethane	124-48-1	SW-846 8260B
1,2-Dibromo-3-chloropropane	96-12-8	SW-846 8260B or 8270C
1,2-Dibromoethane	106-93-4	SW-846 8260B
Dibromomethane (methylene bromide)	74-95-3	SW-846 8260B
trans-1,4-Dichloro-2-butene	110-57-6	SW-846 8260B
Dichlorodifluoromethane	75-71-8	SW-846 8260B
1,1-Dichloroethane	75-34-3	SW-846 8260B
1,2-Dichloroethane	107-06-2	SW-846 8260B
trans-1,2-Dichloroethene	156-60-5	SW-846 8260B
1,1-Dichloroethene	75-35-4	SW-846 8260B

ANALYTE	CAS Number	Analysis Method
1,2-Dichloropropane	78-87-5	SW-846 8260B
cis-1,3-Dichloropropene	10061-01-5	SW-846 8260B
trans-1,3-Dichloropropene	10061-02-6	SW-846 8260B
Methyl iodide (Iodomethane)	74-88-4	SW-846 8260B
Methylene chloride (Dichloromethane)	75-09-2	SW-846 8260B
Pentachloroethane	76-01-7	SW-846 8260B or 8270C
1,1,1,2-Tetrachloroethane	630-20-6	SW-846 8260B
1,1,2,2-Tetrachloroethane	79-34-5	SW-846 8260B
Tetrachloroethene	127-18-4	SW-846 8260B
1,1,1-Trichloroethane	71-55-6	SW-846 8260B
1,1,2-Trichloroethane	79-00-5	SW-846 8260B
Trichloroethene	79-01-6	SW-846 8260B
Trichlorofluoromethane	75-69-4	SW-846 8260B
1,2,3-Trichloropropane	96-18-4	SW-846 8260B
Vinyl chloride	75-01-4	SW-846 8260B
SEMIVOLATILE COMPOUNDS (ACID/BASE/NEUTRAL EXTRACTABLES)		
bis(2-Chloroethoxy)methane	111-91-1	SW-846 8270C
bis(2-Chloroethyl) ether	111-44-4	SW-846 8270C
bis(2-Chloroisopropyl) ether (2,2'-oxybis(1-Chloropropane))	108-60-1	SW-846 8270C
p-Chloroaniline	106-47-8	SW-846 8270C
Chlorobenzilate	510-15-6	SW-846 8270C
4-Chloro-3-methylphenol (p-Chloro-m-cresol)	59-50-7	SW-846 8270C

ANALYTE	CAS Number	Analysis Method
2-Chloronaphthalene	91-58-7	SW-846 8270C
2-Chlorophenol	95-57-8	SW-846 8270C
3-Chloropropionitrile		
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	SW-846 8270C
1,3-Dichlorobenzene (m-Dichlorobenzene)	541-73-1	SW-846 8270C
1,4-Dichlorobenzene (p-Dichlorobenzene)	106-46-7	SW-846 8270C
3,3'-Dichlorobenzidine	91-94-1	SW-846 8270C
2,4-Dichlorophenol	120-83-2	SW-846 8270C
2,6-Dichlorophenol	87-65-0	SW-846 8270C
Hexachlorobenzene	118-74-1	SW-846 8270C
Hexachlorobutadiene	87-68-3	SW-846 8270C
Hexachlorocyclopentadiene	77-47-4	SW-846 8270C
Hexachloroethane	67-72-1	SW-846 8270C
Hexachlorophene	70-30-4	SW-846 8270C
Hexachloropropene	1888-71-7	SW-846 8270C
4,4-Methylinebis(2-chloroaniline)		
Isodrin	465-73-6	SW-846 8270C
Pentachlorobenzene	608-93-5	SW-846 8270C
Pentachloronitrobenzene	82-68-8	SW-846 8270C
Pentachlorophenol	87-86-5	SW-846 8270C
Pronamide	23950-58-5	SW-846 8270C
1,2,4,5-Tetrachlorobenzene	95-94-3	SW-846 8270C
2,3,4,6-Tetrachlorophenol	58-90-2	SW-846 8270C

ANALYTE	CAS Number	Analysis Method
1,2,4-Trichlorobenzene	120-82-1	SW-846 8270C
2,4,5-Trichlorophenol	95-95-4	SW-846 8270C
2,4,6-Trichlorophenol	88-06-2	SW-846 8270C
Tris(2,3-dibromopropyl)phosphate		
ORGANOCHLORINE PESTICIDES & PCBs		
Aldrin	309-00-2	SW-846 8081A or 8270
Hexachlorocyclohexane alpha-BHC	319-84-6	SW-846 8081A or 8250
Hexachlorocyclohexane beta-BHC	319-85-7	SW-846 8081A or 8250
Hexachlorocyclohexane delta-BHC	319-86-8	SW-846 8081A or 8250
Hexachlorocyclohexane gamma-BHC (Lindane)	58-89-9	SW-846 8081A or 8250
Chlordane	57-74-9	SW-846 8081A or 8250
4,4'-DDD	72-54-8	SW-846 8081A or 8270
4,4'-DDE	72-55-9	SW-846 8081A or 8270
4,4'-DDT	50-29-3	SW-846 8081A or 8270
Dieldrin	60-57-1	SW-846 8081A or 8270
alpha-Endosulfan (Endosulfan I)	959-98-8	SW-846 8081A or 8270
beta-Endosulfan (Endosulfan II)	33213-65-9	SW-846 8081A
Endrin	72-20-8	SW-846 8081A or 8270
Endrin aldehyde	7421-93-4	SW-846 8081A or 8270
Heptachlor	76-44-8	SW-846 8081A or 8270
Heptachlor epoxide	1024-57-3	SW-846 8081A or 8270
Kepone	143-50-0	SW-846 8270C
Methoxychlor	72-43-5	SW-846 8081A or 8270

ANALYTE	CAS Number	Analysis Method
PCB-1016	12674-11-2	SW-846 8082
PCB-1221	11104-28-2	SW-846 8082
PCB-1232	11141-16-5	SW-846 8082
PCB-1242	53469-21-9	SW-846 8082
PCB-1248	12672-29-6	SW-846 8082
PCB-1254	11097-69-1	SW-846 8082
PCB-1260	11096-82-5	SW-846 8082
Toxaphene	8001-35-2	SW-846 8081A or 8250
Phenoxyacetic acid herbicides *		
2,4-Dichlorophenoxy acetic acid (2,4-D)	94-75-7	SW-846 8151A
2,4,5-T	93-76-5	SW-846 8151A
2,4,5-TP (Silvex)	93-72-1	SW-846 8151A

* When constituent specific analysis is conducted, these only have to be quantified if the waste stream is non-incinerator residue and contains one or more of these compounds and/or carries a K042 or K043 waste code.

Appendix 4

HOC Screen

Appendix 4

HOC Screen

HOC SCREEN (Lab Test with a. ECD or b. Electrometric Detection) (SK-22 a / b)

SCOPE

This method describes the preparation and analysis of samples for Halogenated Organic Compounds (HOC*s*) at the Grassy Mountain Landfill Facility. HOC listed compounds are specified in Appendix 3 of this WAP.

INTRODUCTION

GMF uses this method to screen wastes that will be land disposed for the presence of chemicals that may be incompatible with the landfill liner in organic halide concentrations above 1000 ppm or equivalent TCLP levels. It may also be used to determine total organic halide concentrations or equivalent TCLP halide concentrations.

SK-22a This method provides sample extraction and gas chromatographic conditions for the detection of halogenated organic compounds in waste samples. A 0.5 µl to 2 µl aliquot of the extract is injected into the gas chromatograph (GC) and compounds in the GC effluent are detected by an electron capture detector (ECD). A temperature program is used in the gas chromatograph to separate the HOC target compounds from the internal standard compound, decachlorobiphenyl (DCB).

SK-22b Alternatively, following the sample extraction (Steps 3.1 – 3.8 of SK-22a), the HOC screen may be conducted by converting the halogenated compounds in the extract to inorganic halide; the inorganic halide ions are extracted into an aqueous buffer solution; and the chloride content is measured using an ion specific chloride electrode. Conversion to inorganic halide, and measurement of chloride content is conducted using a Dexsil L2000 Analyzer (or equivalent) for chlorinated organics. Subsequent to extraction method SK-22b is based on EPA Method 9078.

Extraction is conducted using the same reagents and equipment for both methods SK-22a and SK-22b. Different matrix spike standards and calibration standards are used to suit the different instrumentation.

SK-22a APPARATUS AND MATERIALS

1.1 Gas chromatograph

1.1.1 Gas Chromatograph - Analytical system complete with gas chromatograph suitable for cool on-column or split-splitless injections and all required accessories (including detector, analytical columns, data collection and storage device, gases, syringes, *etc*.).

1.1.2 Column - capillary column, 25 or 30 meters in length (either 0.25 mm or 0.32 mm ID), DB-5 or DB-5MS (J&W Scientific or equivalent).

1.1.3 Detector - Electron capture detector (ECD).

1.2 Volumetric flasks - 2 ml, class A (Note: 3 ml, 4 ml, or 5 ml volumetric flasks may be used in place of the 2 ml flask, but the amount of internal standard added shall be adjusted to account for the increased extract volume).

1.3 Balance - Analytical, capable of weighing 0.01 g.

1.4 Syringe - 2.5 ml or 5 ml, gas tight.

1.5 Microsyringe - 250 µl or 500 µl, gas tight.

1.6 Glass scintillation vials - 20 ml, with Teflon or aluminum foil-lined screw-cap.

1.7 Spatula - stainless steel or Teflon coated.

1.8 Vials and caps - 2 ml for GC autosampler.

1.9 Disposable pipets - Pasteur.

1.10 Centrifuge - capable of spinning at 2000 rpm.

1.11 Dispenser, digital bottle top - Brinkmann Inc., Cat No. 50-03-530-1 or equivalent.

SK-22a REAGENTS

2.1 Internal standard solution - Decachlorobiphenyl at a nominal concentration of 100 mg/l in acetone.

2.2 HOC matrix spike standard - HOC standard in acetone at a total HOC concentration of 500 mg/l (this standard may also contain hexane and/or methanol as necessary to dissolve all of the selected HOC compounds). The HOC matrix spike standard should contain the same compounds used to prepare the calibration standards (step 2.3).

2.3 Calibration standards - HOC standards at a minimum of five concentration levels in isooctane (add acetone and/or methanol as necessary to dissolve all of the selected HOC compounds). One of the concentration levels shall be at a concentration near, but above the method detection limit. The remaining concentration levels define the working range of the GC. This standard contains from 10 to 15 HOC compounds including three or more compounds selected from the Volatiles list, four or more compounds from the Semivolatiles list, one or more compounds from the Organochlorine Pesticides list, and one or more PCB compounds as provided in Appendix 3. For example, the following compounds were used to prepare the calibration and matrix spike information provided in Tables 1 to 3:

2.3.1 Hexachloroethane,
2.3.2 Hexachlorobutadiene,
2.3.3 Hexachlorocyclopentadiene,
2.3.4 Hexachlorobenzene,
2.3.5 3,3' Dichlorobenzidine,
2.3.6 1,2 Dichloroethene
2.3.7 Bromodichloromethane,
2.3.8 1,2,3 Trichloropropane,
2.3.9 Aldrin,
2.3.10 Dieldrin,
2.3.11 Decachlorobiphenyl (internal standard).

2.4 Daily calibration check standard - Identical to the mid-level calibration standard (section 2.3 above). Prepare fresh calibration check standards every 14 days at a minimum. Maintain the calibration check standards in sealed vials at 4º ± 2º C. Standards may equilibrate at room temperature (usually between 60º and 80ºF) and be maintained in sealed autosampler vials at room temperature while the standard is being prepared, loaded or analyzed.

2.5 Tune standard - Pentachlorophenol at a nominal concentration of 5 mg/l in methanol.

2.6 Sodium sulfate - Anhydrous, granular.

2.7 Extraction Solvent #1 - 2,2,4-Trimethyl-pentane (isooctane, pesticide quality or equivalent)

2.8 Extraction Solvent #2 - Methanol (pesticide quality or equivalent).

SK-22a / b SAMPLE PREPARATION PROCEDURE

3.1 If TCLP has been approved for analytical comparison and the intent is to analyze a TCLP extract of the waste, use SW-846 Method 1311, section 7.2, to obtain that extract.

3.2 Place a 20 ml glass scintillation vial onto the balance and tare the balance to read 0.00 ± 0.05 grams.

3.3 Place approximately 1 gram of the waste or TCLP waste extract sample (Step 3.1) or blank matrix into the glass scintillation vial and record the sample weight to within 0.01 grams. A larger sample weight may be used provided the weight is accurately recorded. The sample matrix may be solid, liquid, solid/liquid, or sludge.

3.4 Add approximately 1-2 grams of anhydrous sodium sulfate to the glass scintillation vial. If the waste sample is primarily liquid, add additional sodium sulfate to produce a sludge or a sodium sulfate-sample slurry.

3.5 For the method blank and waste samples, add 10.0 ml of isooctane to the sample using a bottle top dispenser or another appropriate delivery device.

3.6 For matrix spike samples, add 1.0 ml of the HOC matrix spike standard followed by 9.0 ml of isooctane. Add the HOC matrix spike standard using a 2.5 ml or 5 ml syringe or bottle top dispenser and add the isooctane in a manner analogous to the solvent addition in section 3.4.

3.7 Cap the glass scintillation vial and vigorously shake the contents for 2 minutes. Use a robotic shaker (Wrist action shaker, Burrell Inc., Model 75 or equivalent device) or a vortex mixer to shake the vials. Indicate in the sample preparation log occurrences in which samples are mixed by hand, otherwise use the robotic shaker to perform this task.

3.8 Centrifuge the sample and the extract liquid in the glass scintillation vial at approximately 2000 RPM for 5-10 minutes.

SK-22a

3.8 Transfer 2.0 ml of the supernatant into a 2 ml volumetric flask, class A. Larger volumes may be used provided that the final volume is known and accurately recorded.

3.9 Using a 250 µl or 500 µl syringe or equivalent, add 100 µl of the internal standard solution (section 2.1) to the volumetric flask (the resulting volume is 2.1 ml). If an extract volume larger than 2 ml was used in step 3.8, increase the amount of internal standard accordingly (*i.e.*, add 50 µl of the internal standard solution for each 1 ml extract volume).

3.10 Cap the volumetric flask and mix the contents. Mixing is achieved by inverting the volumetric flask numerous times (*i.e.*, invert the volumetric flask 10 or more times to assure adequate mixing of the flask contents) or by using a high speed mechanical mixer (Vortex Genie 2, VWR Scientific, or equivalent). Documentation detailing the number of times in which each volumetric flask is inverted is not required.

3.11 Fill a 2 ml GC autosampler vial with the extract liquid and internal standard mixture and cap the vial. The sample extract may be stored in the sealed autosampler vial under refrigeration at 4º± 2 ºC for up to 14 days prior to GC analysis. Samples may equilibrate at room temperature (usually between 60º and 80 ºF) and be maintained in sealed autosampler vials at room temperature while the sample is being prepared, loaded or analyzed.

Methanol Extraction: Wastes that are known (from generator knowledge or some other means) to contain halogenated phenols may be subjected to the methanol extraction (steps 3.12 through 3.19). Use this option as an additional analysis when requested by the facility manager or his/her designee (*e.g.*, laboratory manager, group leader, *etc*.). If the additional analysis is not specifically requested, proceed to section 8 of this SOP.

3.12 Decant the remaining isooctane from each of the sample vial(s) into an appropriate waste container.

3.13 Add 10.0 ml of methanol to the same sample container(s), referred to in step 3.12, in a manner analogous to section 3.4.

3.14 Cap the glass scintillation vial and vigorously shake the contents for 2 minutes (see section 3.6 above).

3.15 Centrifuge the sample and the methanol extract liquid in the glass scintillation vial at approximately 2000 RPM for 5-10 minutes.

3.16 Transfer 5.0 ml of the supernatant into a 5 ml volumetric flask, class A. Extract volumes smaller than 5 ml may be used provided that the final volume is known and accurately recorded.

3.17 Using a 500 µl syringe or equivalent, add 250 µl of the internal standard solution (section 2.1) to the volumetric flask (the resulting volume is 5.25 ml). If an extract volume smaller than 5 ml was used in step 3.16, decrease the amount of internal standard accordingly (*i.e.*, add 50 µl of the internal standard solution for each 1 ml extract volume).

3.18 Cap the volumetric flask and mix the contents (see section 3.10 above).

3.19 Fill a 2 ml GC autosampler vial with the extract liquid and internal standard mixture and cap the vial. The sample extract may be stored in the sealed autosampler vial at 4 ºC ± 2 ºC for up to 14 days prior to GC analysis. Samples may equilibrate at room temperature (usually between 60º and 80 ºF) and be maintained in sealed autosampler vials at room temperature while the sample is being prepared, loaded or analyzed.

SK-22a PROCEDURE AND CALCULATIONS

4.1 Gas chromatography operating conditions

4.1.1 Operate the GC in either splitless injection mode or cool on-column injection mode. See the Hewlett Packard GC reference manual for details. If the splitless mode is selected, install a clean injector port liner as recommended by the instrument manufacturer for splitless operation (Restek Corp., Cat No 20796 or equivalent). For cool on-column injections, a 0.53 mm ID guard column is recommended (Restek Corp., Cat No 10045 or equivalent).

4.1.2 Install a low-bleed injection port septum (Supelco, Inc., Cat No. 2-0654 or equivalent). Replace the septum whenever the conditions of section 9.1.2 are not obtained.

4.1.3 Carrier gas - Set the helium gas flow between 2 and 10 ml/min. Adjust the column flow so that DCB elutes within 25 minutes of injection.

4.1.4 Make-up gas - Set the nitrogen flow to 75 ± 25 ml/min.

4.1.5 If splitless injection is selected, set the injection port temperature at a constant temperature in the range of 200º and 250ºC, inclusive. If cool on-column injection is selected, injection port temperatures may range from ambient to 280 ºC, inclusive. Temperature programming of the cool on-column injection port allows the extract to be deposited onto the GC column at lower temperatures (less than 150 º C) and the final temperature may be ramped above 150 º C in order to drive the least volatile compounds out of the injection port area.

4.1.6 Detector - Set the detector temperature at a constant temperature of 280º ± 30 ºC. Calibration of the temperature monitoring thermocouple (or other similar device) is not a requirement of this procedure.

4.1.7 Program the oven temperature to hold at 100º C for 1 minute; then increase at a rate of 30º C/min to a final temperature of 280º C and hold for 8 minutes. Modifications to the oven temperature protocol are allowable in order to produce clear chromatographic resolution between the internal standard and the HOC analytes, provided it is accurately documented. In addition, it may be necessary to sustain the oven temperature at 280 º C longer than 8 minutes in order for all of the analytes to elute from the column prior to the next injection.

4.2 Calibration - Refer to SW-846 method 8000 for calibration techniques and response factor calculations.

4.2.1 Calibration must take place using the same sample introduction method (*e.g.*, oven temperature program, injection port temperature, detector temperature, GC column, *etc*.) used to analyze actual samples.

4.2.2 Each calibration standard shall contain an internal standard compound at a concentration that produces a signal near the mid-range for the ECD response. For example, a 1-µl injection should produce a mid-range response at an internal standard concentration of about 5 mg/l (Note: instrument response may vary with time and between ECDs). Calculate the HOC response factor for each calibration standard as follows:

$$RF = (A_s C_{is})/(A_{is} C_s)$$

where:

A_s = Total HOC area (excluding the area of the internal standard and isooctane blank).

A_{is} = Area of the internal standard.

C_{is} = Concentration of the internal standard, mg/l.

C_s = Total HOC concentration of the calibration standard, mg/l.

1.1.3. Calculate the mean response factor value, RF_x, as follows:

RFi

$$RFx=\sum_{n}^{i}\frac{\quad}{n}$$

where:

n = the number of calibration levels.
RF_i = the response factor for each calibration level.

4.3 Gas chromatographic analysis

4.3.1 For each day of analysis, inject blank isooctane to establish the instrument baseline and determine any column contamination that may interfere with HOC quantitation (inject blank methanol when the methanol extraction is used).

4.3.2 Inject the tune standard (section 2.5) and check the resulting area against historical results (two standard deviations below the average of pentachlorophenol areas). If the pentachlorophenol area value is less than this control limit value, perform column maintenance as needed to rejuvenate instrumental performance. For splitless injections, maintenance may include replacing the septum and/or GC insert liner and/or replacing the gold plated column seal and/or trimming 3 to 9 inches from the head of the analytical column (the end attached to the injection port during operation) and/or replacing the analytical column. For cool on-column injections, maintenance may include replacing the septum and/or guard column and/or trimming 3 to 9 inches from the head of the analytical column and/or replacing the analytical column.

4.3.3 Prior to the analysis of actual samples, verify the instrument calibration by injecting the mid-level calibration standard onto the GC. Calculate the response factor (RF_c) for the standard as outlined in step 4.2.2 above. If the RF_c value varies from the predicted response (RF_x) by more than ± 15%, perform maintenance as outlined above in section 4.3.1 and reinject the mid-level standard. If the RF_c value continues to exceed the ± 15% criteria, prepare a fresh mid-level continuing calibration standard or new calibration curve.

4.3.4 The HOC concentration is calculated from the total area of all peaks excluding the internal standard area and any area associated with background, the methanol blank, the isooctane blank or instrument noise. Determine the total HOC concentration in a sample as follows:

Concentration (mg/kg) = $(A_s C_{is} D)/(A_{is} RF_x W_s)$

Where:

D = Equivalent dilution volume, 10.5 ml, provided that no additional dilution was performed.

W_s = Weight of the composite sample, g.

A_s, C_{is}, A_{is}, and RF_x are defined above.

4.3.5 The total HOC concentration is the sum of the HOC concentration in the isooctane extract plus 1.25 times the HOC concentration in the methanol extract if the additional analysis option is used. Otherwise, the total HOC concentration is the HOC concentration in the isooctane extract. (Should there be a limit to the value of the interference that can be subtracted? egc

4.3.6 If the total HOC concentration for a sample is less than 1000 mg/kg and a response for a peak exceeds the detector quantitation limit, prepare a dilution of the sample extract with the appropriate solvent (either isooctane or methanol depending upon which extract liquid contained the truncated peak). Add additional DCB to the sample such that the final concentration of the internal standard is moderately consistent (*i.e.*, accurate sample concentrations are obtainable with the DCB concentration held between 2 mg/kg and 8 mg/kg) among all sample injections (see section 4.2.2 above).

4.3.7 If the total HOC concentration of the sample is less than 1000 mg/kg and exceeds the linear range of the system, dilute the sample as outlined above in section 4.3.6.

4.3.8 Any sample having a total HOC concentration equal to or more than 1000 mg/kgor equivalent TCLP value shall be extracted and analyzed for the specific chemicals in Appendix 3 of the WAP, unless the Grassy Mountain Facility elects to treat the waste or reject it.

SK-22a QUALITY CONTROL

5.1 Before analyzing any samples, the criteria outlined in Step 7.4.3 of SW-846 method 8000 must be met. Failure to meet the criteria in section 5.1.1 of this SOP shall require re-running the initial calibration, whereas failure to meet the criteria outlined in 5.1.2 may result in re-running the initial calibration or the preparation and injection of a fresh daily calibration standard.

5.1.1 Section 7.4.3.3 of method 8000 requires that the RF_x is constant (< 20% RSD) when comparing calibration factors.

5.1.2 Section 7.4.3.4 of method 8000 sets a limit of ± 15% difference when comparing daily HOC response versus the initial HOC response (see section 4.3.2 of this SOP).

5.2 Analyze matrix spikes of samples at a minimum frequency of 10% (1 for every 10 samples). If the total HOC recovery fails the acceptance criteria, X ± 2s (where X is the average and s is the standard deviation of historical data), take corrective actions. Update control limits monthly at a minimum.

5.2.1 Corrective actions

5.2.1.1 Check the sample preparation records and associated calculations for errors.

5.2.1.2 If the unspiked sample contains HOC*s*, subtract the unspiked sample concentration from the HOC concentration detected in the spiked sample.

5.2.1.3 Analyze the daily calibration check standard to ensure that the GC/ECD is operating within normal parameters. If the response factor criteria are not met, take the corrective actions specified in section 4.3.2 and reanalyze the affected samples.

5.2.1.4 If none of the aforementioned actions lead to the elucidation of the problem, matrix interference forces are probable. If the results of the MS AND MSD confirm each other matrix interference are confirmed. If they do not confirm, freshly prepare the samples and matrix spikes from the associated batch to confirm the presence of a matrix interferant.

5.3 Analyze duplicate matrix spike samples at a minimum frequency of 10% (1 for every 10 samples). If the % RPD fails the acceptance criteria, X ± 2s (where X is the average % RPD value and s is the standard deviation value of historical data), take corrective actions. Update control limits monthly at a minimum.

5.4 Analyze a method blank with each sample batch or 1 blank for every 10 unspiked samples. Add about 1 gram of blank sand to the scintillation vial and conduct the extraction process as outlined in section 3 above.

5.4.1 Method blank evaluation criteria - Section 2.3 of this SOP states that one of the calibration standards is at a concentration near, but above the method detection limit. If the total HOC area (A_s as defined in section 4.2.2 above) in the method blank does not exceed the total area in the least concentrated HOC calibration standard, the method blank contamination is acceptable.

SK-22a METHOD PERFORMANCE

6.1 In a single laboratory, the average recoveries and standard deviations presented in Table 1 were obtained using GC/ECD techniques. Three replicate samples were spiked near the total HOC concentration of 500 mg/kg. A wide variety of sample matrices were studied. One of the test samples was primarily liquid (Sump Solids), one of the matrices was an organic sludge (Refinery Waste) and one of the samples contained both solids and liquid (Plating Sludge) at a ratio of about 9:1 respectively. The other samples were solids of various origins. All extractions were performed on composite samples containing liquids and/or solids that were consistent with the total sample composition.

6.2 Detection Limits - the method detection limits vary with each individual Appendix 3 listed compound. The detection limit for each Appendix 3 listed analyte has not yet been established. However, the initial studies indicate that Aroclors (PCBs) and other multi-component analytes may be detected at a concentration of 2 mg/kg while individual HOC compounds are usually observed at a concentration of 1 mg/kg.

6.3 The accuracy and precision of this method may be adversely influenced by the sample matrix. However, in a single laboratory, accuracy was determined within ± 15% of the theoretical value (Table 1) and precision was found within ± 5% (Table 3). Precision was determined by injecting a standard containing 25 mg/kg total HOC content. The standard was prepared in isooctane and contained each of the compounds listed in step 2.3 above at a concentration of 2.5 mg/kg each.

6.4 The data obtained during this study (Tables 1,2 and 3) were obtained using a calibration range that spanned from total HOC concentrations of 0.5 to 50 mg/kg, inclusive.