TREATMENT OF HAZARDOUS WASTE BY GENERATORS

GUIDANCE DOCUMENT

Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment

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Purpose of this Guidance

This is intended as general guidance for generators of hazardous waste and is meant to assist in compliance with the hazardous waste regulations. The guidance is not meant to modify or replace the promulgated regulations which undergo periodic revisions. In the event of a conflict between this guidance and promulgated regulations, the regulations govern. Some portions of the hazardous waste regulations are complex and this guidance does not go into details of these complex situations. If a regulatory situations is not described in the guidance or clarification is desired, an official interpretation of a specific hazardous waste regulation can be requested by writing to the Hazardous Materials and Waste Management Division at the address provided in Section 4.0 of this document.

We would appreciate any comments or suggestions for making improvements in future editions. Suggestions or comments can be sent to the address provided in Section 4.0.

This guidance document has been edited to reflect modifications to the Colorado Hazardous Waste Regulations 6 CCR 1007-3 that expanded mercury-containing thermostats to include other mercury-containing devices and added hazardous electronic devices/components and mercury-containing lamp wastes to the Universal Waste Rule [Part 273], added alternative soil treatment standards to the Land Disposal Restrictions [Section 268.49], and added a special form of RCRA permit called a Remedial Action Plan (RAP) for remediation wastes [Section 100.27]. This document has also been reformatted to improve accessibility in Portable Document Format (PDF).

Minor corrections were also made to the example in the back.

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1.0 INTRODUCTION

In general, treatment of hazardous waste requires that a hazardous waste permit be received before the treatment can be done. "Treatment" covers a broad spectrum of activities, almost anything that can be done to a hazardous waste prior to disposal. The regulatory definition states:

> ***"Treatment"*** *when used in connection with an operation involved in hazardous waste management, means any method, technique, or process, including neutralization or incineration, designed to change the physical, chemical, or biological character or composition of a hazardous waste, so as to neutralize such waste or to render such waste less hazardous, safer for transport, amenable for recovery or reuse, amenable for storage, or reduced in volume.* [6 CCR 1007-3 Section 260.10]

Fortunately, under a limited set of circumstances, generators are allowed to treat their own hazardous wastes without first going through the complex regulatory process of getting a hazardous waste permit. The broadness of this definition, though, creates many areas of confusion about when a hazardous waste treatment permit is required and when a particular activity is excepted from requiring a treatment permit.

Part of the confusion stems from the fact that there is a continuum from when a permit is definitely required to when a permit is definitely not required. Evaluating whether a hazardous waste treatment permit is required before a generator can treat their own hazardous wastes may require detailed process review and reference to EPA background documents, regulatory preambles, Colorado Hazardous Waste Statute Title 25 Article 15 and/or Colorado Hazardous Waste Regulations 6 CCR 1007-3. If you need assistance in this process, you can request an interpretation regarding the need for a hazardous waste treatment permit in writing by providing detailed waste and process information to the Hazardous Materials and Waste Management Division of the Colorado Department of Public Health and Environment (the Department). Contact information is included in Section 4 of this document.

This document is intended to be used as "plain English" guidance to provide a brief description of the options available to generators of hazardous waste who would like to treat their own wastes. Unless otherwise noted, all regulatory citations in this document refer to the Colorado Hazardous Waste Regulations. The information in this document is by no means a complete representation of U.S. Environmental Protection Agency's (EPA) or the Department's regulations or policies. This document is not intended and cannot be relied upon to create any rights, substantive or procedural, enforceable by any party in litigation with Colorado.

2.0 EXCEPTIONS TO THE PERMIT REQUIREMENT

The Colorado Hazardous Waste Regulations provide specific exceptions to the requirement for obtaining a hazardous waste treatment permit in Sections 100.10, 261.4, 261.5, 261.6 and Part 267. In addition, exceptions for hazardous wastes that are recycled in specific ways are included in the requirements for recyclable materials in Section 261.6.

The exceptions from the hazardous waste treatment permit requirements include:

(1) Generators adding absorbent material to waste in a container and generators adding waste to absorbent material in a container, provided that these actions occur at the time waste is first placed in the container. [6 CCR 1007-3 Section 100.10(a)(9)]

(2) Owners and operators of elementary neutralization units. [6 CCR 1007-3 Section 100.10(a)(6)]

(3) Owners and operators of wastewater treatment units. [6 CCR 1007-3 Section 100.10(a)(6)]

(4) Owners and operators of totally enclosed treatment facilities. [6 CCR 1007-3 Section 100.10(a)(5)]

(5) Conditionally Exempt Small Quantity Generators treating their own hazardous wastes. [6 CCR 1007-3 Section 261.5] In addition, persons who own or operate facilities solely for the treatment of hazardous waste from Conditionally Exempt Small Quantity Generators. [6 CCR 1007-3 Section 100.10(a)(3)]

(6) Persons recycling certain hazardous wastes in specific ways. [6 CCR 1007-3 Section 261.6]

(7) Persons conducting treatability studies to determine the appropriateness of potential treatment processes. [6 CCR 1007-3 Section 261.4(e)]

(8) Persons managing certain batteries, pesticides, mercury thermostats, and aerosol cans under the Universal Waste Rule, 6 CCR 1007-3 Part 273. [6 CCR 1007-3 Section 100.10 (a)(14)]

2.1 Adding Absorbent to Container [6 CCR 1007-3 Section 100.10(a)(9)]

Generators that add absorbent material to waste in a container and those that add waste to absorbent material in a container are exempt from obtaining a Resource Conservation and Recovery Act (RCRA) treatment permit as long as certain conditions are met. First of all, the waste must be compatible with the container and the container must be in good condition. The generator must also take precautions to prevent dangerous reactions when managing ignitable, reactive, or incompatible wastes. Although the timing of when the waste or absorbent is added is clearly stated in the rule *(at the time waste is first placed in the container*), the Department doesn't place a lot of emphasis on when these actions occur. Absorbent can be added at any time.

Absorbent is used to solidify and absorb free liquids most often to make the waste safer for transportation and more acceptable for land disposal, not to chemically fix or change the character of the waste. For example, paint often separates into the solid portion at the bottom of the container with the liquid fraction at the top. Absorbents are frequently added to take up the liquids and make the waste more acceptable for land disposal.

2.2 Elementary Neutralization [6 CCR 1007-3 Section 100.10(a)(6)]

*"**Elementary Neutralization unit**" means a device which:*

(1) Is used for neutralizing wastes that are hazardous only because they exhibit the corrosivity characteristic defined in § 261.22, or are listed in Subpart D of Part 261 of these regulations only for this reason; and

(2) Meets the definition of tank, tank system, container, transport vehicle, or vessel in § 260.10 of these regulations. [6 CCR 1007-3 Section 260.10]

A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste is either aqueous and has a pH # 2 or ∃ 12.5 or it is a liquid and corrodes steel under specific conditions. [6 CCR 1007-3 Section 261.22]

The exemption for elementary neutralization units is very narrow in scope and is limited to wastes that are **only** hazardous for the corrosivity characteristic. It does not apply to wastes that exhibit any of the other characteristics of ignitability, reactivity, or toxicity, or to wastes that are listed in Subpart D for any other reason besides just corrosivity.

Wastes treated in an elementary neutralization unit must also be treated for all "underlying hazardous constituents" unless the waste is otherwise exempt from the Land Disposal Restrictions of 6 CCR 1007-3 Part 268. Underlying hazardous constituents are constituents present in the waste that themselves don't cause the waste to be a hazardous waste, but may still be harmful to human health. The Land Disposal Restrictions (LDR) and underlying hazardous constituents are discussed in more detail in Section 3.1 of this document.

Recordkeeping requirements:

Hazardous waste handlers that treat corrosive-only hazardous waste in an elementary neutralization unit must submit a one-time notification and certification to the Department, with a copy placed in the generator's and/or treater's files that is kept for at least three years. [6 CCR 1007-3 Section 268.9(d)] The notification must be updated on an annual basis if the process or operation generating the waste changes. The notification must include a description of the waste as initially generated including all applicable waste codes, treatability group(s), and underlying hazardous constituents (UHC). If all UHCs were successfully treated and monitored, there is no need to list them on the notification. The certification must be signed by the facility's authorized representative and must certify either that the waste meets the universal treatment standards or that further treatment is necessary to meet these standards. [6 CCR 1007-3 Section 268.7] If further treatment is necessary, a copy of the notification must accompany the initial shipment to the treatment facility. Adequate documentation of the determination that the waste is a restricted waste subject to the Land Disposal Restrictions must also be maintained in the generator's files.

2.3 Wastewater Treatment Units [6 CCR 1007-3 Section 100.10(a)(6)]

The Colorado Hazardous Waste Regulations exempt owners and operators of "wastewater treatment units" (WWTU) from state RCRA permitting requirements. The Hazardous Materials and Waste Management Division has developed a single policy regarding the applicability of the

WWTU exclusion based on a series of policies and interpretations provided by EPA. The Division's policy includes factors that may prevent a wastewater treatment facility from being eligible for exclusion.

> ***"Wastewater treatment unit"*** *means a device which:*
>
> *(1) Is part of a wastewater treatment facility that is subject to regulation under either Section 402 or Section 307(b) of the Clean Water Act; and*
>
> *(2) Receives and treats or stores an influent wastewater that is a hazardous waste as defined in § 261.3 of these regulations, or that generates and accumulates a wastewater treatment sludge that is a hazardous waste as defined in § 261.3 of these regulations; and*
>
> *(3) Meets the definition of tank or tank system in § 260.10 of these regulations*. [6 CCR 1007-3 Section 260.10]

All three of these requirements must be met for a facility to qualify for the WWTU exclusion.

The first requirement limits the exemption to units which are part of a wastewater treatment facility subject to regulation under a National Pollution Discharge Elimination System (NPDES) permit, a Colorado Discharge Permit System (CDPS) permit issued by the Water Quality Control Division of CDPHE, or which are part of a wastewater treatment facility subject to regulation under the Clean Water Act (CWA) pretreatment requirements. The CWA pretreatment requirements apply to dischargers to publicly owned treatment works (POTWs) and the POTWs themselves.

Whether or not a unit is "part of a wastewater treatment facility" will be determined by the Hazardous Materials and Waste Management Division (the Division) on a case-by-case basis. Generally, the unit must be in the immediate vicinity of the main structures and/or point(s) of discharge of the wastewater treatment facility, and the unit must be directly involved in the actual treatment or storage of the wastewater. The WWTU may receive wastes, including hazardous wastes if it is a designated facility, from offsite or other onsite facilities.

The second requirement allows facilities eligible for the exclusion to receive and treat or store a wastewater that is hazardous waste, or generate, accumulate, treat and store a wastewater treatment sludge that is a hazardous waste. However, the WWTU may not receive a WWTU sludge from offsite which is a hazardous waste, unless the facility has interim status or received a RCRA permit for treatment or storage of that waste type in specific units.

For the purpose of determining treatability group under the Land Disposal Restrictions, wastewater is defined as . . .*wastes that contain less than 1% total organic carbon (TOC) and less than 1% by weight total suspended solids (TSS)* [6 CCR 1007-3 Section 268.2(f)], with certain exceptions for K011, K013, K014, K103, and K104 wastes. Wastes which do not meet the criteria for wastewaters are defined as "nonwastewaters." [6 CCR 1007-3 Section 268.2(d)]

The Division believes that this definition is appropriate for TOC, but unnecessarily restricts TSS for application to the WWTU exclusion. Most WWTU's are designed to remove solids as an integral part of the treatment process, producing a wastewater treatment sludge.

EPA guidance regarding the WWTU exemption refers to "wastewater" as being substantially water containing a few percent contaminants at most. While this definition does not provide a specific quantifiable limit on wastewater, it is interpreted by the Division to refer to wastes which are predominantly water as opposed to concentrated chemical solutions or non-aqueous wastes. The Division's interpretation agrees with guidance obtained from EPA.

It is apparent that EPA hazardous waste codes alone are not adequate to determine if a hazardous waste being treated in a wastewater treatment facility is a "wastewater." However, waste codes will provide information on the constituents or characteristics of the waste.

The Division has determined that certain criteria must be met for a hazardous waste to qualify as a "wastewater," whether generated onsite or offsite. Generators wishing to utilize the WWTU exemption and treat their own wastes in an onsite WWTU must be able to demonstrate that these conditions are met:

1) Water content of the waste must be at least 90% by weight.

2) Total Organic Carbon (TOC) of the waste must be less than 1%.

3) Flash point of any phase of the waste must be above 140 degrees F.

4) The waste must not have any phase which would cause the waste to exhibit the characteristic of reactivity.

5) Any facility utilizing the WWTU exemption must be able to demonstrate compliance with the above criteria through records of hazardous waste determination, waste characterization or analysis.

6) Thermal treatment is not an exempt treatment process unless specifically approved by the Division in writing.

In addition to these criteria, if a wastewater treatment facility receives hazardous waste from offsite sources, the WWTU must be part of a designated facility for the WWTU exclusion to apply. "Designated facility" means a hazardous waste treatment, storage, or disposal facility which (1) has received a permit (or interim status) in accordance with the notification and permitting requirements of the Colorado hazardous waste regulations, (2) has received a permit (or interim status) from another state authorized by EPA, or (3) is a facility that recycles recyclable materials without storing them prior to recycling or that recovers precious metals from recyclable materials and (4) that has been designated on the manifest by the generator. [6 CCR 1007-3 Section 260.10]

Other prohibitions on waste composition or operation of a WWTU claiming the exclusion may be implemented by the Division on a case-by-case basis in order to protect human health and the

environment. Exceptions to the above prohibitions will be determined by the Division on a case-by-case basis. For example, a higher TOC level may be allowed for treatment of an oily wastestream in a biological treatment plant.

A Publicly Owned Treatment Works (POTW) may accept hazardous wastes for treatment if the POTW complies with the permit by rule requirements in 6 CCR 1007-3 Section 100.21(c).

Many wastewater treatment facilities generate a sludge. In the case where the sludge is a hazardous waste, storage or treatment of the sludge in the WWTU is exempt from permitting requirements provided that the facility has appropriate management techniques for the resulting waste type. For example, should the WWTU sludge exhibit the characteristic of reactivity (D003), the facility must manage the waste accordingly. Failure to do so jeopardizes the exclusion. Disposal of the sludge is not exempt from permitting requirements.

The third requirement is that the unit must meet the definition of a tank or tank system. *"Tank" means a stationary device designed to contain an accumulation of hazardous waste which is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) which provide structural support. "Tank system" means a hazardous waste storage or treatment tank and its associated ancillary equipment and containment system.* [6 CCR 1007-3 Section 260.10]

Tanks which manage wastewater or wastewater treatment sludge must be a dedicated part of the WWTU. A sludge drier attached to a WWTU may qualify as part of the tank system. A thermal sludge drier attached to a WWTU would not be included unless specifically approved by the Division in writing. Filter presses are considered an integral part of the wastewater treatment process and are therefore included in the WWTU exemption, even though they don't typically look like a tank. The WWTU exemption does not apply to accumulation tanks which are used to store or treat a wastewater prior to shipment (either on a part-time or full-time basis) to off-site facilities for further management rather than manage it in an on-site wastewater treatment facility.

If a WWTU is known to be leaking to the environment, then appropriate enforcement action can be taken for illegal disposal of hazardous wastes. The owner/operator may then be required to repair or close the tank system and initiate corrective actions addressing the contamination.

The Division and EPA consider hazardous wastes managed in a WWTU to be hazardous wastes throughout the process, unless it meets an exclusion other than the WWTU exclusion. The WWTU exclusion applies to the unit, the waste itself is not exempt. Waste that is discharged in compliance with a National Pollutant Discharge Elimination System (NPDES) permit is no longer regulated as a hazardous waste. Waste that is discharged to a publicly owned treatment works (POTW) is a hazardous waste until it mixes with domestic sewage. In most cases, this occurs when the waste enters the sewer line owned by the POTW. This distinction only becomes important if the waste leaks out of the sewer pipe prior to mixing with domestic sewage. The waste generator would then be required to repair the sewer line and initiate appropriate corrective action.

It should be noted that WWTU's which qualify for the exemption may be subject to certain generator requirements of 6 CCR 1007-3 Part 262. These requirements include the hazardous

waste determination for wastes generated by the WWTU. Wastewater treatment sludges produced by the WWTU which are hazardous wastes and are removed from the WWTU for further management, and WWTU effluent which may be unacceptable for discharge under the Clean Water Act provisions, must be managed in accordance with the Colorado hazardous waste regulations. Treatment of wastewater treatment sludge is not included in the WWTU exemption. A WWTU sludge resulting from treatment of listed waste remains a listed waste after treatment. A sludge produced from treatment of characteristic waste which no longer exhibits characteristics of a hazardous waste after treatment would no longer be a hazardous waste.

More information on the wastewater treatment unit policy can be found in the "Guide to Implementing the Division's Wastewater Treatment Unit Policy," which is available on our website or from the Division. Contact information is provided in Section 4.0 of this document.

2.4 Totally Enclosed Treatment Facilities [6 CCR 1007-3 Section 100.10(a)(5)]

> ***"Totally enclosed treatment facility"*** *means a facility for the treatment of hazardous waste which is directly connected to an industrial production process and which is constructed and operated in a manner which prevents the release of any hazardous waste or any constituent thereof into the environment during treatment. An example is a pipe in which waste acid is neutralized.* [6 CCR 1007-3 Section 260.10]

This very narrow exemption from the RCRA permitting requirements applies where treatment occurs as part of an entirely piped process or other comparable enclosed means of conveyance, meaning the process does not require any human intervention to occur and in which there are no outlets to ambient air, which is rare. Totally enclosed treatment facilities are mostly seen in chemical production processes. As used in this definition, "facility" refers to the treatment unit, and not to the whole building or site where the treatment occurs. A totally enclosed treatment facility is different from closed-loop recycling units. Although both totally enclosed treatment facilities and closed-loop recycling units require that the entire process is completed as part of a piped process requiring no human intervention, closed-loop recycling units may have openings to ambient air such as air vents. Refer to the CDPHE Hazardous Waste Recycling Guidance Document listed in Section 5 of this document for information on closed-loop recycling units.

2.5 Conditionally Exempt Small Quantity Generators [6 CCR 1007-3 Sections 100.10(a)(3), 261.5]

A conditionally exempt small quantity generator of hazardous waste (CESQG) is one that generates no more than 100 kilograms (about 220 pounds or 25 gallons) of hazardous waste and no more than 1 kilogram (about 2.2 pounds) of acutely hazardous waste in any calendar month. A CESQG can accumulate up to 1000 kilograms of hazardous waste and no more than 1 kilogram of acutely hazardous waste on site at any one time. These limits are not average values of waste generated or stored, but are maximum amounts generated in any calendar month and cumulative amounts stored at any one time. If these limits are exceeded, the generator must meet all generator requirements for the newly appropriate generator category. For further discussion of generator requirements, refer to the "Guide to Generator Requirements of the Colorado Hazardous Waste Regulations" listed in Section 5.0 of this document.

As long as these limits are not exceeded, CESQG wastes are subject to reduced management requirements. Every generator must identify all hazardous wastes that they generate in order to determine their appropriate generator category, but CESQGs do not need to obtain an EPA identification number, use the hazardous waste manifest form (though many use it as a good management tool) or utilize hazardous waste transporters. In addition, as long as the wastes are stored safely, CESQGs have no time limit on how long they can store their hazardous wastes on site (only a maximum quantity limit), therefore allowing them to accumulate enough waste to make it more cost-effective for disposal. **Although the Colorado hazardous waste regulations do not require CESQGs to have written spill plans or formal training requirements, it is in the generator's best interest to provide sufficient training for their employees so that they can effectively and safely do their jobs and respond promptly to any spill situation.** Note that other regulatory programs, such as the Occupational Safety and Health Administration (OSHA), may have more specific requirements for these facilities.

A CESQG can either treat its own hazardous waste onsite (no treatment permit or notification required) or ensure delivery of that hazardous waste to a facility that is authorized to accept it. If the waste is a characteristic-only waste, it may be disposed of in a municipal solid waste landfill after it has been successfully treated to remove the characteristic(s). Since CESQGs are not subject to the Land Disposal Restrictions of 6 CCR 1007-3 Part 268, the CESQG need only treat the waste for the characteristic and need not treat all of the underlying constituents. If the waste is a listed hazardous waste, it must be disposed of at a permitted hazardous waste disposal facility or sent out of state to a facility that is authorized to accept CESQG wastes.

Generator status is determined on a site-specific basis, and each individual facility is responsible for determining their generator category. A large facility, which may be a small or large quantity generator itself, can have multiple satellite plants that are each conditionally exempt generators. The large facility can accumulate and manage wastes from its satellite plants as CESQG waste. Adequate records should be maintained to document the source(s) of the waste.

Persons who own or operate facilities solely for the treatment, storage, or disposal of CESQG waste do not need to obtain a hazardous waste permit for these activities [6 CCR 1007-3 Section 100.10(a)(3)], though other regulations do apply, primarily the Colorado Solid Waste Regulations 6 CCR 1007-2. While the hazardous waste regulations allow untreated CESQG wastes to be disposed of in a permitted Subtitle D solid waste landfill, there are no solid waste landfills approved by the state to dispose of hazardous waste, even from CESQGs. And unlike the federal regulations, Colorado regulations prohibit a CESQG from disposing of hazardous waste onsite.

A few counties have developed innovative self-supporting, fee-based business technical assistance programs to help CESQGs in their jurisdiction dispose of their wastes properly. CESQG wastes from multiple facilities are consolidated and sent offsite for disposal, making it more cost-effective for all participants. Staff are available to provide technical assistance to all businesses in the county, though they can only accept wastes for consolidation from the CESQG business community in their jurisdiction.

2.6 Recycling [6 CCR 1007-3 Section 261.6]

A material is recycled if it is used, reused, or reclaimed. These three terms have specific regulatory definitions. A material is reclaimed if it is processed to recover a usable product or if it is regenerated (e.g., regeneration of spent solvents). A material is used or reused if it is either employed as an ingredient in an industrial process to make a product (e.g., distillation bottoms from one process used as feedstock in another process) or if it is employed as an effective substitute for a commercial product (e.g., spent pickle liquor used as a sludge conditioner in wastewater treatment), without being reclaimed first.

When a material is recycled, its regulatory classification depends on two factors: what type of material is being recycled and what type of recycling is occurring. Some wastes that are recycled fall out of regulation as hazardous waste completely, and some just fall out of the requirement to obtain a treatment permit. This is covered in more detail in the CDPHE Recycling Guidance Document listed in the references in Section 5 of this document.

Unless otherwise subject to special requirements, generators of recyclable materials that are solid and hazardous wastes are subject to the same regulations as other generators of hazardous waste. The recycling exemption applies to the recycling unit itself, not the waste in it. **Therefore, if the waste is stored prior to recycling, all applicable storage requirements and quantity limitations apply.** If the waste is hazardous waste before it is put into the recycling unit, it is hazardous waste while it's in the unit. Whether it is hazardous waste after recycling depends on the unit and the waste. For example, regenerated solvents may no longer be hazardous wastes after recycling, but the sludges generated in the process may be. Exemptions for hazardous waste treatment permits for recycling of hazardous waste are included in the specific requirements for recyclable materials outlined in 6 CCR 1007-3 Section 261.6 and Part 267.

2.7 Treatability Studies [6 CCR 1007-3 Section 261.4(e), (f)]

> ***"Treatability Study"*** *means a study in which a hazardous waste is subjected to a treatment process to determine:*
> *(1) Whether the waste is amenable to the treatment process,*
> *(2) what pretreatment (if any) is required,*
> *(3) the optimal process conditions needed to achieve the desired treatment,*
> *(4) the efficiency of a treatment process for a specific waste or wastes, or*
> *(5) the characteristics and volumes of residuals from a particular treatment process.*
>
> *Also included in this definition for the purpose of the § 261.4(e) and (f) exemptions are liner compatibility, corrosion, and other material compatibility studies and toxicological and health effects studies. A "treatability study" is not a means to commercially treat or dispose of hazardous waste.* [6 CCR 1007-3 Section 260.10]

The Colorado Hazardous Waste Regulations Section 261.4(e) conditionally exempt persons who generate or collect samples for the sole purpose of conducting treatability studies from the requirements of Parts 261 through 263 (identification of hazardous waste, standards for generators, and standards for transporters) and the notification requirements of Part 99. In

addition, the generator need not include treatability samples in the waste quantity calculations for determination of generator status as long as certain packaging, quantity limitation, and record-keeping requirements are met and the samples are shipped to an authorized lab or testing facility.

6 CCR 1007-3 Section 261.4(f) conditionally exempts both the treatability samples and the laboratories conducting such treatability studies from the requirements in 6 CCR 1007-3 Parts 261 through 268 (identification of hazardous waste, standards for generators, standards for transporters, standards for permitted and interim status treatment, storage, and disposal facilities (TSDF) , financial assurance, standards for specific wastes and management facilities, and the Land Disposal Restrictions), Part 100 (permitting), and the notification requirements of Part 99 as long as certain provisions specified are met. These provisions include notifications to the Division, obtaining an EPA identification number, quantity limitations, storage requirements, employee training requirements, recordkeeping requirements, and proper management and disposal of unused samples or treatment residues.

Treatability studies are not intended to be used for normal generator treatment activities but are meant to be one-time testing of methods and equipment. They may be done at cleanup and corrective action sites using a mobile treatment unit or samples may be sent to an offsite lab to determine if a treatment process would work.

2.8 Universal Waste Rule [6 CCR 1007-3 Part 273]

The Colorado Hazardous Waste Commission has adopted reduced management practices under the Universal Waste Rule for batteries (excluding lead-acid), certain pesticides, certain mercury-containing devices, aerosol cans containing hazardous waste, hazardous mercury-containing lamp wastes and hazardous electronic devices and components. Generators may choose to manage these wastes as universal wastes under the Colorado Hazardous Waste Regulations Part 273 or continue to manage them under the full requirements of Parts 260-268, 99 and 100.

The universal waste rule was designed to streamline the regulatory process and encourage recycling. The primary benefits of managing a universal waste in Colorado are that the waste can be shipped without a hazardous waste manifest, the waste can be shipped by common carrier instead of by a hazardous waste transporter, the waste does not count toward the monthly total of hazardous waste in determining the generator category, the storage time limits are less restrictive, and specific treatment activities done by the universal waste handler do not require a hazardous waste treatment permit. Other states may have different requirements for wastes that are managed as universal wastes in Colorado. If shipping these wastes out of Colorado, the universal waste handler should always confirm the regulatory status of the waste in the destination state and in all intervening states the waste will travel through.

A universal waste handler may:

- discharge batteries to remove the electric charge, regenerate used batteries, disassemble batteries or battery packs into individual batteries or cells, remove batteries from consumer products, or remove electrolyte from batteries, as long as the casing of each individual battery cell is not breached and remains intact and closed. Cells may be opened to remove electrolyte but must be immediately closed after removal. [6 CCR 1007-3 Section 273.13(a), 273.33(a)]

- remove mercury ampules or drain elemental mercury from universal waste mercury-containing devices. [6 CCR 1007-3 Section 273.13(c), 273.33(c)]

- puncture universal waste aerosol cans to remove and collect the contents of the aerosol cans. [6 CCR 1007-3 Section 273.13(d), 273.33(d)]

- crush universal waste lamps in properly designed and operated crushing units. [6 CCR 1007-3 Section 273.13(e), 273.33(e)]

- disassemble waste electronic devices and components. [6 CCR 1007-3 Section 273.13(f), 273.33(f)]

These activities must be done in a manner to prevent releases of regulated wastes, and any releases that do occur must be contained and cleaned up immediately. Employees need to be thoroughly familiar with the proper procedures and waste handling techniques relevant to their level of responsibility. The handler must make a hazardous waste determination on the separated components and manage them accordingly. For example, at the point the material is removed from a punctured aerosol can, the removed material is considered a hazardous waste and must be managed in accordance with all hazardous waste regulations. This newly generated waste must be included in the generator status determination and all applicable generator requirements must be met. Once the cans have been emptied, they can be managed as a RCRA empty container. As long as the aerosol can did not contain an acutely hazardous waste, the can may either be recycled as scrap metal or disposed of as solid waste. Refer to appropriate sections of 6 CCR 1007-3 Part 273 for management of wastes generated during allowed treatment of universal wastes.

3.0 GENERATOR TREATMENT

There are two additional ways generators may treat their own waste without going through the entire RCRA permitting process. Generators treating their own waste only to meet the land disposal restrictions (LDR) are not required to obtain a treatment permit. However, additional requirements must be complied with such as a detailed waste analysis plan (WAP) and additional recordkeeping requirements. Generators may also treat their own waste under the permit by rule provisions of 6 CCR 1007-3 Section 100.21(d). This requires, among other things, a waste analysis plan and notification to the Department of this activity at least thirty days prior to beginning the treatment process.

3.1 Land Disposal Restrictions (LDR) [6 CCR 1007-3 Part 268.7]

The land disposal restrictions (LDR) require that a hazardous waste must be treated or meet specified levels for hazardous constituents before being disposed of on the land. [6 CCR 1007-3 Part 268] This is called the disposal prohibition. Instead of requiring barriers to separate hazardous contaminants from groundwater like much of the other RCRA requirements, LDR requires that hazardous wastes undergo fundamental physical or chemical changes so that they pose less of a threat to groundwater. For example, many of the chemicals capable of contaminating groundwater are organic compounds. Incineration or burning can destroy these organic compounds, usually breaking them down into less dangerous by-products like carbon

dioxide and water. Thus, incineration of organic-bearing hazardous wastes can protect groundwater by destroying organic contaminants before they have a chance to enter underground water supplies. The obvious advantage of such hazardous waste treatment is that it provides a more permanent and lasting form of groundwater protection than does simple hazardous waste containment.

Not all types of contaminants found in hazardous wastes can be destroyed. In particular, metal elements are common toxic contaminants that cannot be broken down through combustion. Treatment techniques other than incineration, however, can be used for such wastes. For example, through a process called stabilization or immobilization, metal contaminants can be chemically and physically bound into the wastes that contain them. Although this process does not reduce the overall concentration of toxic metals in a hazardous waste, it does immobilize these constituents, making them less likely to leach from the waste. Reducing the mobility or leachability of hazardous constituents in a waste is thus another means of permanently achieving LDRs groundwater protection goal.

Generators are required to classify their solid wastes as soon as they are subject to regulation in order to ensure that hazardous wastes will always be safely managed. Since the land disposal restrictions apply additional limits to the ways in which waste may be managed, it is necessary to immediately determine if a hazardous waste is subject to LDR. Generators must, therefore, fully characterize their wastes at the point of generation to determine if their hazardous waste is subject to LDR [6 CCR 1007-3 Section 262.11]. Six items must be determined at the point of generation:

1. Is the waste a hazardous waste? [6 CCR 1007-3 Section 262.11]

2. What hazardous waste codes apply? Remember that there may be more than one applicable waste code. [6 CCR 1007-3 Sections 261.20 and 261.30]

3. What subcategory, if any, applies for each waste code? [6 CCR 1007-3 Section 268.40]

4. Is the waste a wastewater or nonwastewater? [6 CCR 1007-3 Section 268.2 (d) & (f)]

For which constituents of concern must each waste code be analyzed? (i.e. either underlying hazardous constituents for characteristic wastes or all regulated hazardous constituents for the applicable listed waste code).

What is the required treatment method and/or treatment standard for the applicable waste codes? [6 CCR 1007-3 Section 268.40]

Refer to the Colorado hazardous waste regulations 6 CCR 1007-3, the CDPHE “Solid Waste Definition and Solid and Hazardous Waste Exclusions Guidance Document” and the “Hazardous Waste Identification Guidance Document” referenced in Section 5 of this document for further information on making the hazardous waste determination.

If a waste is restricted at the point of generation, all 6 CCR 1007-3 Part 268 requirements continue to apply to the waste, even if it is subsequently de-characterized or excluded from the

definition of hazardous or solid waste. LDR requirements apply to the waste prior to treatment, and must be met after treatment is completed. LDR treatment must occur in accumulation tanks or containers or in a containment building.

Generators that are accumulating hazardous wastes must have certain procedures and paperwork in place. [6 CCR 1007-3 Part 262] If the generator chooses to begin treating their own waste to meet the LDR, they must modify their contingency plan, training plan, security plan, etc. to reflect the change in process required for treatment to meet the LDR. There are also increased requirements for recordkeeping and the waste analysis plan. [6 CCR 1007-3 Part 268]

Generators may partially treat a waste to meet an LDR standard without treating the waste for all LDR standards. Generators must be explicit about why the waste was treated and they must have met at least one treatment standard. Partially treated wastes can then be sent to a permitted treatment, storage, or disposal facility (TSDF) for further management.

3.1.1 Exclusions

While the LDR program generally applies to all persons who generate, transport, treat, store, or dispose of a restricted hazardous waste, there are exclusions to the applicability of 6 CCR 1007-3 Part 268. The following hazardous wastes are not subject to the requirements of LDR [6 CCR 1007-3 Section 268.1(e)]:

- waste generated by conditionally exempt small quantity generators (CESQG).
- waste pesticide and container residues disposed of by farmers on their own land [6 CCR 1007-3 Section 262.70].
- newly identified or listed hazardous wastes for which EPA has yet to develop land disposal treatment standards.
- certain low volume releases, known as de minimis losses [6 CCR 1007-3 Section 268.1(e)(4)], or laboratory chemicals that are mixed with a facility's wastewater and are discharged under the regulation of the Clean Water Act (CWA).

Wastes meeting any of these descriptions may continue to be land disposed without being subject to the LDR. Restrictions may be placed on disposal of these wastes by other regulatory programs, however, including the Colorado solid waste regulations [6 CCR 1007-2], air quality regulations and water quality regulations.

Other restricted hazardous wastes must be managed in compliance with all requirements of 6 CCR 1007-3 Part 268 unless explicitly exempted by another part of the RCRA program.

3.1.2 Listed Hazardous Waste Treatment Standards

LDR requires that a hazardous waste be adequately treated to fundamentally change the threat posed by the waste before it is land disposed. The rules governing how different hazardous wastes must be treated are known as treatment standards, which are simply instructions on how a hazardous waste should be treated. Each waste code has one or more specific treatment

standards listed in 6 CCR 1007-3 Part 268 Subpart D. These treatment standards can be expressed as either numeric concentration levels for hazardous constituents or as a required technology. Once a waste has been restricted and issued a treatment standard, the waste may be land disposed in a RCRA C hazardous waste landfill only after it meets the appropriate treatment standard. The Department may grant a variance, extension, or exclusion to allow alternative waste management methods on a case-by-case basis.

3.1.2.1 Treatment Standards

EPA conducted extensive research into available treatment technologies. Of all the proven, available technologies, the one that best minimized the mobility and/or toxicity of hazardous constituents was designated as the Best Demonstrated Available Technology (BDAT) for that waste. EPA then established waste code-specific treatment standards based on the performance of the BDAT. These treatment standards were expressed as either concentration levels or specified technologies.

For concentration-based treatment standards, the BDAT was used to determine the appropriate level of treatment for each hazardous constituent commonly found in the waste, but treatment is not limited to the BDAT used to establish the treatment standard. Generators may use any method or technology (except for impermissible dilution) to meet the treatment standard. After treatment, waste analysis or application of knowledge must be used to determine if the applicable concentration-based standards in 6 CCR 1007-3 Section 268.40 have been met.

When a treatment standard is a specified technology, that technology must be used, unless it can be demonstrated that an alternative method can achieve a level of performance equivalent to the required technology. Whenever possible, numeric treatment standards were developed in order to stimulate innovation and development of alternative treatment technologies.

Since the physical and chemical composition of a waste significantly impacts the effectiveness of a given treatment technology, the treatment standard for each waste code was divided into two categories: wastewaters and nonwastewaters. These two categories are based on the percentages of total organic carbon (TOC) and total suspended solids (TSS) present in a waste, since these factors commonly impact the effectiveness of treatment methods. Wastewaters are wastes that contain less than 1% by weight TOC and less than 1% by weight TSS. [6 CCR 1007-3 Section 268.2(f)] Nonwastewaters are wastes that do not meet these criteria.

The treatment standards for hazardous wastes were originally presented in multiple tables, but for ease of use and consistency, a single consolidated table has replaced them. If a waste has been restricted from land disposal, the treatment standard for both wastewaters and nonwastewaters can be found in 6 CCR 1007-3 Section 268.40 Table of Treatment Standards for Hazardous Wastes. There are three types of treatment standards:

1. Constituent concentrations in mg/kg of the waste.

2. Constituent concentrations in an extract of the waste expressed in mg/l.

3. Treatment standards expressed as specified technologies and represented by a five-letter code (described in 6 CCR 1007-3 Section 268.42).

Numeric standards are commonly expressed in mg/kg when the BDAT is a destruction or extraction technology such as incineration. Compliance with these treatment standards is measured by analyzing a representative sample of the waste for the total concentration of each hazardous constituent identified in the treatment standard, and comparing it to the level given for the waste code.

Treatment standards given in mg/l are also concentration-based standards. In wastewaters, compliance is demonstrated by comparing the concentration of hazardous constituents found in a composite sample of the waste with the regulatory level. For nonwastewaters, an extract that reflects the potential of hazardous constituents to leach from the waste must first be prepared. The waste meets the treatment standard if the concentration of regulated constituents in the liquid extract are below the regulatory levels given for the waste code. The Toxicity Characteristic Leaching Procedure (TCLP) is used to obtain the waste extract.

6 CCR 1007-3 Section 268.40 Table of Treatment Standards for Hazardous Wastes also prescribes treatment standards expressed as specified technologies for certain wastes. These wastes must be treated using the specified technology unless a variance is granted (see Section 3.1.7 of this guidance). Once a listed hazardous waste has been successfully treated to meet the applicable treatment standards, it may be land disposed in a RCRA Subtitle C landfill.

Table 1 in 6 CCR 1007-3 Section 268.42 provides fuller descriptions that elaborate on the five letter codes used in 6 CCR 1007-3 Section 268.40. Examples include deactivation (DEACT) and incineration (INCIN). In most cases, once treated by the required technology, wastes can be land disposed without being tested. There are, however, some exceptions. For example, all F024 wastes must be incinerated. Following incineration, the remaining residues must then also meet the concentration levels specified in 6 CCR 1007-3 Section 268.40. If the treatment residues are in a different treatability group (i.e. wastewater or nonwastewater), then the residues must also meet those treatment standards before land disposal.

3.1.2.2 Universal Treatment Standards

Use of the best demonstrated available technology (BDAT) to set treatment standards for hazardous wastes gave rise to an unintended consequence: the numeric treatment standard applied to an individual hazardous constituent could vary depending on the performance of the BDAT on each listed or characteristic wastestream that was evaluated. To simplify the LDR program and eliminate this lack of consistency between standards, the range of numeric standards applied to each hazardous constituent found in restricted hazardous wastes was evaluated. Based on the range, a single numeric value was assigned to each constituent for its respective wastewater and nonwastewater forms. A consolidated list of each constituent and its treatment standards (wastewater and nonwastewater) can be found in 6 CCR 1007-3 Section 268.48 and is known as the "universal treatment standards" (UTS). The values assigned to hazardous constituents in the UTS were then used to adjust numeric levels found in the treatment standards table of 6 CCR 1007-3 Section 268.40 Table of Treatment Standards for Hazardous Wastes. Applying these universal treatment standards has not changed the hazardous constituents that must be treated in a particular waste, as only the numeric standards were amended. As a result, a common constituent found in multiple, different wastes will carry the same numeric treatment level.

When determining what UTS apply to a listed waste, generators are not required to analyze for or treat all 257 constituents in the universal treatment standards, just the regulated constituents included under the applicable waste codes found in the table of treatment standards in 6 CCR 1007-3 Section 268.40.

Recordkeeping Requirements - Generators:

Generators managing wastes that are subject to LDR have certain notification, certification, waste analysis, and recordkeeping requirements under 6 CCR 1007-3 Section 268.7. Much like a hazardous waste manifest, the LDR notification and certification paperwork helps hazardous waste handlers and regulatory agencies ensure that wastes are properly managed. Generators must determine if their hazardous waste is subject to LDR at the point of generation. They may make this determination by testing or applying knowledge. Acceptable knowledge includes process knowledge and the facility's records of analysis performed. Process knowledge can include detailed published or documented waste analysis data or studies conducted on hazardous waste generated by processes similar to that which generated the waste. Adequate documentation of this determination must be maintained in the generator's files.

If a generator's waste already meets applicable treatment standards, the generator must send a one-time notification to the TSDF. This notice accompanies the manifest and must include the following information:

- EPA hazardous waste code(s).
- Identification of the waste as a wastewater or nonwastewater.
- Manifest number associated with the initial waste shipment.
- Waste analysis data (if available).
- For certain wastes, any additional hazardous constituents present in the waste.

The generator must also submit a signed certification stating that the waste meets the required treatment standards. [6 CCR 1007-3 Section 268.7(a)(3)] Subsequent notification and certification are not required if the waste and the receiving facility remain the same.

If the waste is subject to LDR and does not meet applicable treatment standards, the generator must send the one-time notification described above and include a statement that the waste does not meet the LDR. [6 CCR 1007-3 Section 268.7(a)(2)] Subsequent notification is not required if the waste and the receiving facility remain the same.

If a generator's waste qualifies for an exemption from a treatment standard, the generator must submit notification similar to that described above, except that it must also identify the date that the waste will become subject to LDR prohibitions. [6 CCR 1007-3 Section 268.7(a)(4)] Copies of all notifications and certifications must be kept in the generator's files for at least three years from the date the waste was last sent to the treatment or disposal facility. [6 CCR 1007-3 Section 268.7(a)(8)] Retaining this paperwork allows the Department to track wastes subject to the land disposal restrictions and to ensure that those wastes receive proper treatment prior to disposal.

Generators may treat hazardous waste in accumulation tanks, containers, or containment buildings provided the units are in compliance with certain standards applicable to treatment, storage, and disposal facilities (TSDF) [6 CCR 1007-3 Section 262.34]. Generators are required to prepare a waste analysis plan (WAP) when treating wastes to meet LDR. [6 CCR 1007-3 Section 268.7(a)(5)]

Recordkeeping Requirements - Treatment Facilities:

If a treatment facility ships treated hazardous waste off-site for disposal, they must send a one-time notification to the disposal facility with the initial shipment of the treated waste. The notification must include a description of the waste including hazardous waste codes, manifest number of the initial shipment, any available waste analysis data, identification as a wastewater or nonwastewater, and a statement that the waste is subject to the LDR. The treater must also send a signed certification that the waste meets the treatment standards. Subsequent notification or certification is not required unless the treatment residue changes or the receiving facility changes.

If a treatment facility ships partially treated waste to another facility for further treatment, then the recordkeeping and paperwork requirements for generators must be met.

The treatment facility must maintain copies of all incoming notifications and certifications received from the generator and all subsequent notifications and certifications on the treated waste in their files for at least three years. [6 CCR 1007-3 Section 268.7(b)]

Recordkeeping Requirements - Disposal Facilities:

Disposal facilities must test all incoming wastes or residues in accordance with their waste analysis plan to ensure that they meet applicable treatment standards. The disposal facility must maintain on-site records of all notifications and certifications received with waste shipments. These records should be maintained indefinitely in the disposal facility's files.

3.1.2.3 Other Prohibitions

In addition to prohibiting the land disposal of wastes that do not meet treatment standards, the LDR program includes two other important prohibitions. One forbids the storage of wastes as a substitute for meeting the required treatment standards. The other prohibits the dilution of wastes as a substitute for legitimate treatment.

The storage prohibition was developed in order to prevent waste from being stored as a way of avoiding treatment requirements. [6 CCR 1007-3 Section 268.50] This section forbids the storage of waste subject to a treatment standard unless the waste is being stored in order to accumulate such quantities as are necessary to facilitate proper recycling, treatment, or disposal. Storage must be consistent with all requirements appropriate to the generator category.

Dilution of wastes as a substitute for appropriate treatment is generally prohibited, although there are a few exceptions. [6 CCR 1007-3 Section 268.3] 1) Dilution as a necessary part of a legitimate waste treatment process is allowed. 2) Dilution is inherent in some types of legitimate waste handling, such as the aggregation of similar wastes to facilitate subsequent

treatment. As a general rule, if aggregated wastes are all legitimately amenable to the same treatment, and this treatment is used for the aggregated wastes, the aggregation step does not constitute impermissible dilution. 3) Certain characteristic wastes that are managed in Clean Water Act-regulated treatment systems can be diluted to meet treatment standards. [6 CCR 1007-3 Section 268.3(b)] 4) Certain characteristic wastes may be diluted to render them nonhazardous before disposal in a deep injection well regulated under the Safe Drinking Water Act. [6 CCR 1007-3 Section 268.19(c)(3)] The dilution prohibition was developed to ensure that the concentration-based treatment standards were met by appropriate treatment methods that reduce the mobility and toxicity of the hazardous constituents.

It is not permissible to partially treat a waste or dilute it only to change the applicable treatment standard. This is referred to as "category switching." Category switching does not include technologies that are designed to separate wastewaters from nonwastewaters, such as filtration or centrifugation. The separated wastes must comply with the applicable treatment standards for each category of the waste, however.

3.1.3 Characteristic Hazardous Waste Treatment Standards

Just like listed wastes, restricted characteristic wastes must also meet treatment standards before they are eligible for land disposal. Special requirements have been established regarding wastes that exhibit a characteristic. [6 CCR 1007-3 Section 268.9] Since the land disposal restrictions attach at the point of generation, treatment standards applicable to characteristic wastes cannot be circumvented by simply removing the characteristic. The waste must also be treated to meet numeric concentration levels for any constituents present in the wastes above the universal treatment standard levels. These constituents are known as "underlying hazardous constituents" (UHC) because they require treatment to meet LDR standards, but nonetheless do not themselves cause the waste to exhibit a characteristic. [6 CCR 1007-3 Section 268.9 (a)]

"Underlying hazardous constituent" means any constituent listed in 6 CCR 1007-3 Section 268.48, Table UTS - Universal Treatment Standards (except fluoride, vanadium, and zinc) which can reasonably be expected to be present at the point of generation of the hazardous waste, at a concentration above the constituent-specific UTS treatment standard. [6 CCR 1007-3 Section 268.2(I)]

The determination of what can reasonably be expected to be present at the point of generation can be based on the generator's knowledge of the raw materials used, the process, and the potential reaction products of the process, or on results of one-time analysis for the entire list of constituents in 6 CCR 1007-3 Section 268.48. The U.S. EPA recommends that the generator specifically consider all constituents that have been determined to be present by means of site characterization, risk assessment, and/or waste characterization data or that have historically been associated with similar sites. The generator should also consider known or potential breakdown products of wastes that may have been disposed of or released at their site. Professionally responsible judgment and common sense are important in this process.

The underlying hazardous constituents must be treated to meet the organic, inorganic, and metal universal treatment standards before the waste can be disposed. Wastes subject to treatment for underlying hazardous constituents are easily identified since their treatment standards in 6 CCR 1007-3 Section 268.40 require that they comply with the characteristic level "and meet Section

268.48 standards." Once a characteristic-only hazardous waste is both decharacterized and treated to meet standards that applied at the point of generation, the waste may be land disposed in a RCRA Subtitle D solid waste landfill.

Recordkeeping requirements:

While characteristic wastes are subject to the standard notification requirements of 6 CCR 1007-3 Section 268.7, there are special provisions for characteristic-only wastes from which the characteristic has been removed. A one-time notification and certification must be sent to the Department with a copy placed in the generator's or treater's files and kept for at least three years. [6 CCR 1007-3 Section 268.9(d)] The notification must be updated on an annual basis if the process or operation generating the waste changes or if the Subtitle D facility is changed. No notification needs to be submitted to the Subtitle D facility. The notification must include the name and address of the Subtitle D facility receiving the treated waste and a description of the waste as initially generated including all applicable waste codes, treatability group(s), and UHCs. If all UHCs were successfully treated and monitored, there is no need to list them on the notification. The certification must be signed by the facility's authorized representative and must certify either that the waste meets the universal treatment standards or that further treatment is necessary to meet these standards. [6 CCR 1007-3 Section 268.7] If further treatment is necessary, a copy of the notification must accompany the initial shipment to the treatment facility. Adequate documentation of the determination that the waste is a restricted waste must also be maintained in the generator's files. See Appendix I for an example of this notification.

3.1.3.1 Characteristic Hazardous Wastes Managed in CWA or SDWA Units

Wastes that are managed in systems subject to regulation under the Clean Water Act (CWA) or in Safe Drinking Water Act (SDWA) Class I injection wells are not required to be treated to the universal treatment standards. They generally need only be decharacterized before entering the system. "Decharacterized" in this case means removal of the characteristic by any means, including dilution. [6 CCR 1007-3 Section 268.3(b)] The U.S. EPA felt that the Clean Water Act and the Safe Drinking Water Act already provided adequate protection of human health and the environment.

Recordkeeping requirements:

Characteristic-only hazardous wastes that are managed in a CWA system or SDWA Class I injection well are effectively exempt from LDR requirements after a one-time notification is placed in the facility files. [6 CCR 1007-3 Section 268.7(a)(7)] The notification must document generation of the waste, subsequent exemption from RCRA Subtitle C regulation, and final disposition. There is no requirement to send notification to the Hazardous Materials and Waste Management Division.

3.1.4 Listed and Characteristic Hazardous Waste Treatment Standards

As a general principle, a hazardous waste must meet all applicable treatment standards to be eligible for land disposal. For purposes of LDR, a generator with a listed hazardous waste must

determine if the waste also exhibits any hazardous waste characteristics. [Section 262.11(c)] If the listed waste also exhibits a characteristic of hazardous waste, the treatment standard for both waste codes must be met. An exception occurs, however, when the treatment standard for the listed waste specifically includes a standard for the constituent that causes the waste to exhibit the characteristic. In that case, compliance with the treatment standard for the listed waste will satisfy both requirements, as the standard for the listed waste will operate in lieu of the treatment standard for the characteristic waste code. Once the waste has been successfully treated to meet applicable treatment standards, it can then be disposed of in a Subtitle C landfill.

Recordkeeping requirements:

The record keeping requirements are the same as those for listed hazardous wastes except that the notification should include a list of underlying hazardous constituents. If all UHCs were successfully treated and monitored, there is no need to list them on the notification.

3.1.5 Alternative Treatment Standards

In addition to waste code- or site-specific exception procedures, a number of broad alternative treatment standards were developed that facilities may choose to use in lieu of meeting the waste code-specific treatment standards. These alternative treatment standards are only available for certain forms of restricted wastes.

3.1.5.1 Lab Pack Wastes [6 CCR 1007-3 Section 268.7(a)(9)]

Laboratories commonly generate small volumes of many different listed and characteristic wastes. Rather than manage all these disparate wastes individually, laboratories commonly take advantage of regulatory provisions that allow them to overpack many small containers of hazardous waste into a larger drum. These containers are known as lab packs, and they have been given an alternative treatment standard (combustion) that allows generators to apply one treatment standard for the entire lab pack rather than applying the treatment standard for each individual waste code contained within the lab pack. [6 CCR 1007-3 Section 268.42(c)] The primary condition for application of this alternative, however, is that the lab pack may not contain any of the heavy metal-bearing waste codes identified in 6 CCR 1007-3 Part 268, Appendix IV.

Recordkeeping Requirements

Generators using the alternative treatment standard for lab packs must send a one-time notification to the treatment facility along with the initial shipment of waste. The notification must include the hazardous waste codes and manifest number of the initial shipment. The generator must also send a one-time certification that the lab pack does not contain wastes excluded under Appendix IV of 6 CCR 1007-3 Part 268 and that the lab pack will be sent to a permitted incinerator. Subsequent notification and certification is not required unless the wastes in the lab pack change or the receiving facility changes.

Copies of all notifications and certifications must be kept in the generator's files. All supporting data used to make the determination that the waste was restricted and subject to LDR must also be retained in the generator's files. If the generator determines that they are managing a

restricted waste that is excluded from the definition of solid or hazardous waste or exempt from hazardous waste regulation under 6 CCR 1007-3 Sections 261.2 through 261.6 subsequent to the point of generation, they must place a one-time notice stating the generation, subsequent exclusion or exemption, and the disposition of the waste in the generator's files.

3.1.5.2 Debris

Debris means solid material exceeding a 60 mm particle size that is intended for disposal and that is a manufactured object, plant or animal matter, or natural geologic material. The following materials are not debris: any material for which a specific treatment standard is provided in Subpart D, 6 CCR 1007-3 Part 268 (lead acid batteries, cadmium batteries, and radioactive lead solids); process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges, or air emission residues; and intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume. Hazardous debris means debris that contains a hazardous waste listed in Subpart D of 6 CCR 1007-3 Part 261, or that exhibits a characteristic of hazardous waste identified in Subpart C of 6 CCR 1007-3 Part 261. [6 CCR 1007-3 Section 268.2 (g) (h)] This definition of debris also excludes any material with specific treatment standards provided in Subpart D of 6 CCR 1007-3 Part 268.

6 CCR 1007-3 Section 268.45 contains alternate treatment standards for debris. These alternative standards were developed because materials such as rocks, bricks, and industrial equipment (known generically as debris) contaminated with hazardous waste may not be amenable to the waste code-specific treatment standards in 6 CCR 1007-3 Section 268.40. 6 CCR 1007-3 Section 268.45 allows an owner/operator to choose among three types of treatment technologies, based on the type of debris and the waste with which it is contaminated:

1. Alternative treatment standards which can be divided into three categories: extraction, destruction, or immobilization technologies. When using an alternate debris treatment standard, the waste handler must ensure that the treatment process meets the design and operating requirements established in 6 CCR 1007-3 Section 268.45, and that they treat for each contaminant, or hazardous constituent, subject to treatment. In order to be eligible for land disposal, the debris must meet the specified performance standards in Table 1 of 6 CCR 1007-3 Section 268.45. For example, a contaminated boulder which is sandblasted to remove surface contamination must be treated to a "clean debris surface" and at least 0.6 centimeters of the surface layer of the boulder must be removed.

2. Treat debris to meet the existing treatment standards for the waste(s) contaminating the debris. Because of the derived-from rule, debris contaminated with listed waste still carries the listed code after treatment.

3. Continue to manage the debris in accordance with the contained-in policy. Under this policy, debris is not considered hazardous if the Division has determined on a case-by-case basis that the debris no longer "contains" a hazardous waste.

Debris must be treated in an accumulation tank or container or a containment building. If treated hazardous debris does not exhibit any characteristic following treatment with an extraction (e.g., sandblasting) or destruction (e.g., incineration) technology, it is eligible for land disposal and can be disposed of as nonhazardous in a Subtitle D solid waste landfill or simply returned to the

environment. [6 CCR 1007-3 Section 261.3(f)] Note, however, that if hazardous debris is treated with an immobilization technology (e.g., macroencapsulation), it must be disposed in a Subtitle C disposal unit.

Mixtures containing more than one type of debris or more than one contaminant must be treated to meet the treatment standards for each contaminant and each type of debris. Treatment residues must be separated from the debris and are subject to the treatment standards for the waste contaminating the debris.

Recordkeeping Requirements

If the generator or treater uses an alternative treatment standard of extraction or destruction, they must send a one-time notification to the Department that includes the name and address of the Subtitle D facility receiving the treated waste. The notification must also include a description of the waste as it was initially generated, including applicable waste codes and the technology used to treat the debris. Since these wastes are no longer hazardous, paperwork need not be sent to the RCRA Subtitle D disposal facility.

The generator must maintain on-site files that track all inspections, evaluations and analyses of treated debris used to determine if the treated debris meets the treatment standards, information about key operating parameters of the treatment unit, copies of all notifications and certifications that the debris has been treated to meet the alternative treatment standards. Subsequent notification and certification is not required to be sent to the Department unless the treatment or disposal facility receiving the debris changes, the treatment technology used is changed, or if a different type of debris is treated. All on-site files must be maintained for at least three years.

If the alternative standard of immobilization is used or the waste meets the existing treatment standards for the contaminant, the recordkeeping requirements are the same as in Section 3.1.2.2 of this document.

3.1.5.3 Soil Contaminated with a Hazardous Waste

Remediation of hazardous waste sites will often produce contaminated soil that, like debris, must be managed as a hazardous waste if it contains a listed waste or if it exhibits a characteristic. Land disposal of hazardous soils is generally prohibited unless such soils have been treated to meet the waste code-specific treatment standards developed for the hazardous waste (i.e., the same treatment standard the waste would have to meet if it was newly generated rather than found in the soil matrix). Yet these remediation wastes, due to either their large volume or unique characteristics, are not always amenable to the same type of treatment. Phase IV of the LDR Rule allowed generators to either treat the contaminated soil to the same treatment standards as the hazardous waste with which it was contaminated or they may treat the soil to meet the alternative treatment standards in 40 CFR Section 268.49. The alternative treatment standard for contaminated soil is less stringent than previous RCRA requirements, so the Colorado Hazardous Waste Commission had to adopt state analogues to 40 CFR 268.49 for the rules to be effective in Colorado. These changes were incorporated into 6 CCR 1007-3 Part 268.49 in late 1999.

The alternative soil treatment standards require that all constituents subject to treatment present in the soil at 10 times the UTS level or higher be treated to reduce the concentration by 90%. Generators treating contaminated soils using the alternative soil treatment standards are not required to treat the soil to less than 10 times the UTS or beyond normal background levels. Alternatively, they can use risk-based analysis to make a site-specific determination for appropriate soil cleanup levels. [6 CCR 1007-3 Section 268.44(h-m)] This risk-based variance is only for contaminated soils, and does not apply to other environmental media or remediation wastes.

Soils contaminated with characteristic-only hazardous wastes that are treated to meet the standards appropriate for the characteristic waste are no longer subject to RCRA Subtitle C regulation and may be disposed of at a RCRA Subtitle D solid waste landfill. Soils contaminated with listed hazardous wastes must still be disposed of at a RCRA Subtitle C hazardous waste disposal facility unless the Department has determined that the treated soils no longer "contain" hazardous waste and do not exhibit any characteristics of hazardous waste.

Petroleum contaminated soils resulting from releases from regulated underground storage tanks are not subject to the treatment standards for organic toxicity characteristic (TC) wastes (D018-D043 only) because they are currently exempt from RCRA Subtitle C regulation when regulated under 40 CFR Part 280. This exemption does not apply to waste codes D004-D017, however, so if the petroleum-contaminated soil fails TCLP for one of those waste codes, the soil is subject to all of the LDR requirements including the treatment standards. Petroleum contamination resulting from a release from an aboveground storage tank is not exempt and all LDR requirements apply to the contaminated soils.

Generators have the same recordkeeping requirements as defined in 6 CCR 1007-3 Section 268.7. A one-time notification must be sent with the initial shipment of contaminated soil to each treatment, storage or disposal facility (TSDF) receiving the waste. If the Department has determined that the treated soil no longer "contains" hazardous waste, the generator must prepare a one-time notice of the determination and maintain the notice and all supporting information in the facility files for at least 3 years.

Soil and debris that are contaminated with polychlorinated biphenyls (PCBs) are generally regulated under the Toxic Substances Control Act (TSCA) and must be treated to the standards presented in 40 CFR Part 761. Materials that are contaminated with both hazardous waste and PCBs are regulated under both RCRA and TSCA regulations and must meet the more stringent requirements if there is a conflict.

3.1.6 LDR Applicability and Remediation Wastes

In order to ensure that site cleanups and remediation are conducted in a timely and cost-effective fashion, special standards for the management of certain remediation wastes have been developed. Corrective action management units (CAMUs), temporary units (TUs), and staging piles are allowed to manage remediation waste generated during a site cleanup. To facilitate the cleanup process, the regulations effectively waive the requirement that wastes managed in CAMUs, TUs, or staging piles meet LDR requirements prior to storage or disposal on the land. [6 CCR 1007-3 Sections 264.552, 264.553, 264.554] In addition, a special form of RCRA

permit called a Remedial Action Plan (RAP) may be approved for treatment, storage, or disposal of hazardous remediation wastes at a remediation waste site. [6 CCR 1007-3 Section 100.27]

3.1.7 Variances and Exemptions from LDR

It isn't always possible or practical for a waste to meet its respective LDR treatment standard, either because of the nature of the waste itself or because of outside factors. Generators or treaters can petition for a variance or exemption from a required treatment standard by submitting a petition to the Administrator of U.S. EPA, who reviews the petition and, after considering public comments, makes the final determination.

3.1.7.1 Treatability Variance

There are two types of variances from a treatment standard: Treatability Variances, used for numerical standards; and Determination of Equivalent Treatment (DET), used for technology-specific treatment standards.

A facility may submit a petition to the EPA Administrator requesting a Treatability Variance demonstrating that the chemical and/or physical properties of their waste differs significantly from the waste evaluated by EPA in developing the standard and that the waste can't be treated to meet that standard. The treater may also request a Treatability Variance if the treatment standard is feasible, but not practical from a technical standpoint. For example, even though it would be technically possible to treat a waste, it may be impractical if it means expensive treatment of large amounts of mildly contaminated media. [6 CCR 1007-3 Section 268.44]

The owner or operator of a TSDF may request a Determination of Equivalent Treatment if they can demonstrate to EPA's satisfaction that an alternative method will achieve an equivalent level of treatment and be as protective of human health and the environment. This request may be based on new technology or new analytical methods developed to characterize the waste. [6 CCR 1007-3 Section 268.42(b)]

3.1.7.2 Capacity Variance

The EPA Administrator may also grant a National Capacity Variance if there is inadequate treatment and disposal capacity for newly identified hazardous wastes. If inadequate capacity exists, the Administrator can grant up to a two year extension on the prohibition. These wastes can be land disposed in a Subtitle C facility without first meeting the treatment standards. If adequate capacity is lacking on a regional or local scale, the Administrator may grant a case-by-case extension to the effective date for newly listed wastes. These can be granted for up to one year and can be renewed for one additional year.

3.1.7.3 No Migration Variance

Hazardous wastes can be land disposed in a unit without meeting the LDR treatment standards if the petitioner can demonstrate with reasonable certainty that there will be no migration of hazardous constituents from the disposal unit or injection zone for as long as the waste remains hazardous. The petition must include a monitoring plan and if the owner or operator of the facility determines that there has been migration of hazardous constituents, they must immediately suspend operations and notify EPA. This type of variance is granted for up to ten years and is specific to the waste stream and disposal unit. [6 CCR 1007-3 Section 268.6]

3.1.7.4 Treatment Surface Impoundment Exemption

Management of liquids in surface impoundments often serves as a means of treatment when particulates settle to the bottom of the impoundment and form potentially hazardous sludges. The impoundment must meet the design requirements for permitted or interim status surface impoundments, and treatment residues or sludges that don't meet the treatment standards or prohibition levels must be removed from the unit at least annually. [6 CCR 1007-3 Sections 264.13 and 265.13] The owner or operator of the facility is required to develop and follow a waste analysis plan to describe the procedures that will be completed to obtain detailed chemical and physical analysis of the waste. The owner or operator must submit written certification to the Department that the requirements for this exemption have been met. [6 CCR 1007-3 Section 268.4(a)] A copy of the certification and waste analysis plan should also be placed in the facility files. This type of exception is fairly rare.

3.2 Permit by Rule [6 CCR 1007-3 Section 100.10(a)(14)]

Permit by rule allows treatment by generators of hazardous wastes in tanks or containers without a hazardous waste treatment permit under certain conditions [6 CCR 1007-3 Section 100.21 (d)]. Prior to this rule, generators were often required to obtain a treatment permit in order to treat their own hazardous waste onsite. This permitting process was often lengthy and expensive. Rather than go through the permitting process, most generators chose to ship their waste offsite without the benefit of first reducing the quantity or toxicity of their wastes. This resulted in more waste transported offsite to commercial treatment or disposal facilities, and greater costs to generators. Permit by rule allows generators to treat certain wastes in order to reduce their volume or toxicity, or to increase the ability to recycle or reclaim the wastes prior to shipping them offsite. This decreased environmental and health risks as well as costs to ship and process the wastes. Federal regulations do not explicitly allow generator treatment without a RCRA permit, but EPA interpretation and guidance allow limited generator treatment. The Colorado Hazardous Waste Commission chose to clarify and standardize the requirements under which generator treatment would be allowed without obtaining a treatment permit. Permit by rule was intended to address many generator treatment situations in a fairly straightforward manner with reduced paperwork requirements. The permit by rule provisions will most often be used for physical treatment of hazardous wastes and when the waste is not intended for land disposal. The provisions for treatment to meet land disposal restrictions should cover most instances where chemical treatment is used.

A generator can treat its own waste under the permit by rule provisions if the generator treats the waste in accumulation tanks or containers and is treating the waste to make it more suitable for recycling or reclamation or to reduce its volume or toxicity. The generator must notify the Department at least 30 days before treatment activity begins and must comply with the generator requirements of 6 CCR 1007-3 Part 262 as well as the requirements for ignitable, reactive, or incompatible wastes in 6 CCR 1007-3 Section 265.17. The generator must supply a copy of the waste analysis plan when they notify the Division of their planned activity.
Because of the inherent dangers of fire, explosion, or evolution of toxic gases involved in thermal treatment and treatment of reactive waste, these are excluded from permit by rule and treatment is subject to full RCRA permitting requirements.

There is often a question of when a permit by rule is needed, and when the "treatment" is simply a normal part of the process. One distinction is whether the treatment is an integral part of the process that generates the waste or something that's being done for another reason. This is often hard to distinguish by definition, so examples will be used to illustrate the difference.

Physical treatment (crushing or compacting) is often covered by permit by rule because the act of crushing or compacting an item reduces its volume, thus meeting the definition of treatment. Physical treatment is not something done to meet the LDR, however. The circumstances of why or how the item was crushed or compacted can affect the need for a permit by rule. For example, some processes require the use of small autosampler vials containing solvents. Normal laboratory procedure is to use a vial crusher to separate the remaining solvent from the inert glass and cap. Crushing the vial in this context would not require a permit by rule if 1) the vial crushing unit is an integral part of the laboratory process; 2) the vial crushing unit is used at or near the point of generation of the vials; 3) a hazardous waste determination is made for all wastes generated from the process; and 4) a written procedure on how to safely use the unit is developed and implemented. The use of a fluorescent lamp crusher, on the other hand, would require a permit by rule unless the lamps are managed as universal wastes under 6 CCR 1007-3 Part 273. The lamp crusher is not an integral part of the process that generates the waste fluorescent lamps. An example of a permit by rule notification letter for fluorescent lamp crushing as managed under Parts 260-268, 99 and 100 is included in Appendix II.

If you need assistance in determining if your process requires a permit by rule or has other permitting requirements, you can request a written interpretation on the treatment of your waste by providing detailed process information to the Hazardous Materials and Waste Management Division of the Colorado Department of Public Health and Environment at the address provided in Section 4.0 of this document.

3.3 Waste Analysis Plan

Generators that treat their hazardous waste using a permit by rule or that are treating their waste to meet the land disposal restrictions are required to have a written waste analysis plan (WAP). The LDR requirements greatly increased the importance of proper waste analysis in order to ensure that all treatment standards are met in a consistent and safe manner prior to land disposal of the waste. Generators of hazardous waste are required to determine if their waste is restricted from land disposal and must notify any subsequent facilities that treat, store, or dispose of the waste of the waste's LDR status. If a generator treats their waste, then the generator is also responsible for establishing that the treatment standards have been met and subsequent facilities are notified of the waste's LDR status.

The WAP is used to document the procedures used to obtain representative samples and to conduct detailed chemical and physical analysis of the samples. It is also used to document any special handling procedures for the waste and must contain all information necessary for proper treatment of the waste in accordance with the requirements of the Land Disposal Restrictions (see Appendices III and IV). Development of the waste analysis plan allows the generator to analyze different treatment options, provides for reliable waste identification, promotes consistency in waste analysis, treatment, and disposal independent of changes in personnel, ensures adequate personnel training, provides for appropriate spill response, ensures waste compatibility with treatment, and demonstrates compliance with hazardous waste requirements.

The written waste analysis plan must be maintained in the facility files and be available for inspection by regulators. Records of any test results, waste analyses, and hazardous waste determinations must be kept for at least three years from the date the waste was last sent to on-site or off-site treatment, storage, or disposal. If the generator treats their own waste under a permit by rule, then a copy of the waste analysis plan must accompany the notification to the Department.

The waste analysis plan has six key elements:

1. Facility description.
2. Selecting waste analysis parameters.
3. Selecting sampling procedures.
4. Selecting a laboratory and testing and analytical methods.
5. Selecting waste re-evaluation frequencies.
6. Special procedural requirements.

3.3.1 Facility Description

The facility description section must provide sufficient information in order to understand the processes and activities that generate or are used to manage the waste, what hazardous wastes are generated, and descriptions of the hazardous waste management units. This information may be in the form of diagrams, schematics, or narrative descriptions. For example, when describing waste management units, the generator should provide a physical description of the unit, the location of the unit within the facility, a description of wastes managed in the unit, methods of waste handling or management, considerations for making sure the unit is operating safely and correctly, and information on what wastes or handling techniques shouldn't be used with the unit.

3.3.2 Selecting Waste Analysis Parameters

Waste analysis parameters should be selected to represent those characteristics necessary for safe and effective waste management. Specific parameters need to be selected to ensure that the wastes generated are accurately identified and to ensure that all applicable LDR requirements are met. This is especially important when managing incompatible wastes to prevent undesirable reactions. Proper waste analysis is crucial in making sure the process and equipment can handle the waste to be treated. Considerations include the type and volume of waste, treatment method, location of the unit, and how the unit is constructed. The waste analysis plan provides the rationale for selection of each parameter.

3.3.3 Selecting Sampling Procedures

Waste streams must be sampled and handled to preserve the original physical form and composition of the waste. Contamination or changes in concentration of the parameters to be analyzed for need to be prevented. In order to maximize data accuracy, minimize errors, and

coordinate sampling activities, the sampling procedures section should include a description of the sampling and analysis objectives, a description of the type of samples to be collected, how sample locations will be selected, the number of samples to be obtained, how frequently the samples should be taken, and proper collection and handling techniques. These parameters should be selected based on the physical and chemical properties of the waste. The generator needs to ensure that sufficient quality assurance/quality control (QA/QC) measures are in place in order to demonstrate that the data is technically sound, statistically valid, and properly documented. A representative sample may be obtained using one of the methods described in Appendix I of 6 CCR 1007-3 Part 261 or an equivalent sampling method. Examples of acceptable methods include ASTM standards, SW-846, and manufacturer specifications.

3.3.4 Selecting a Laboratory and Analytical Methods

The laboratory used to analyze the waste samples should have a comprehensive QA/QC program and an effective data management system to ensure the proper collection and quality of the data. The laboratory should also be able to demonstrate their analytical expertise in the techniques and methods required for accurate sample analysis. The analytical methods chosen must be adequate to effectively prepare the samples for analysis and to make a sufficient analytical determination for the waste.

3.3.5 Selecting Waste Re-evaluation Frequencies

The generator must plan to repeat the waste analysis procedure as frequently as necessary to ensure that it is accurate and up to date. At a minimum, this should occur when the process that generates the waste changes or if the generator is notified by a subsequent waste management facility that their characterization of the waste doesn't match the pre-approved specifications or accompanying paperwork. A better approach is for the generator to plan to re-evaluate the waste on a regular basis.

3.3.6 Special Procedural Requirements

The waste analysis plan should be designed to ensure that the waste handler has sufficient knowledge of the waste to manage it safely. Procedural requirements necessary to handle specific waste streams must be provided, including clear instructions for identifying and managing ignitable, reactive, and incompatible wastes.

4.0 CONTACT INFORMATION

24-hour Emergency Response Line		(877) 518-5608
***New* state-wide toll-free**		
Colorado Department of Public Health and Environment		(303) 692-2000
(CDPHE)	toll-free	(800) 886-7689
Hazardous Materials and Waste Management Division		(303) 692-3300
(HMWMD)	toll-free	(888) 569-1831
HMWMD Technical Assistance Line		(303) 692-3320
	toll-free	(888) 569-1831 ext. 3320

CDPHE Website	http://www.cdphe.state.co.us/
HMWMD Website	http://www.cdphe.state.co.us/hm/
Downloadable Regulations	http://www.cdphe.state.co.us/regulate.asp
HMWMD Internet e-mail	comments.hmwmd@state.co.us

Other Phone Numbers:

National Response Center	(800) 424-8802
RCRA/Superfund Hotline	(800) 424-9346

Send questions in writing to:

Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division
Technical Assistance
4300 Cherry Creek Drive South
Denver, CO 80246-1530

OR

FAX (303) 759-5355

Please provide as much detail as possible regarding your question and the waste or process to which it applies.

5.0 RELATED REFERENCES

These documents are available on our website or by contacting the HMWMD technical assistance line.

Colorado Hazardous Waste Statute Title 25 Article 15 Part 101 et seq CRS 1992, as amended.

Colorado Hazardous Waste Regulations 6 CCR 1007-3.

Colorado Regulations Pertaining to Solid Waste Disposal Sites and Facilities 6 CCR 1007-2.

"CDPHE Hazardous Waste Identification Guidance Document," September 1998.

"CDPHE Solid Waste Definition and Solid and Hazardous Waste Exclusions Guidance Document," September 1998.

"CDPHE Hazardous Waste Recycling Guidance Document," January 1999.

"Guide to Generator Requirements of the Colorado Hazardous Waste Regulations," October 2001.

"Personnel Training for Large Quantity Generators of Hazardous Waste," March 1997.

"Personnel Training & Emergency Response/Preparedness and Prevention for Small Quantity Generators," April 1998.

"Preparedness and Prevention Contingency Plan Emergency Procedures for Large Quantity Generators of Hazardous Waste," March 1997.

"Satellite Accumulation for Small and Large Quantity Generators of Hazardous Waste," February 1998.

"Interim Final Policy and Guidance on Management of Investigation Derived Wastes (IDW) at RCRA Facilities."

"Interim Final Policy and Guidance on Risk Assessments for Corrective Action at RCRA Facilities," November 1993.

"Guide to Implementing the Division's Wastewater Treatment Unit Policy (includes the 6/91 policy)," January 2000.

Other references

"Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste: A Guidance Manual," April 1994, United States Environmental Protection Agency, EPA 530-R-94-024.

"RCRA Land Disposal Restrictions: A Guide to Compliance 1998 Edition," The Hazardous Waste Consultant, Volume 16 Issue 5, August/September 1998, Elsevier Science Inc., Joseph J. Bernosky, Associate Editor.

APPENDIX I Sample LDR Notification/Certification

LDR Notification And Certification That A Characteristic-Only Hazardous Waste Has Been Treated To Render It No Longer Hazardous

Generator's Name and Mailing Address	EPA ID No.
	Generator's Phone ( )
	Initial Manifest Number
	☐ Initial Notification
	☐ Updated Notification

Waste description as initially generated (including name, waste codes, treatability group, and underlying hazardous constituents)	Method of treatment (elementary neutralization, deactivation, combustion, etc.)	Total Quantity

Wastewater Treatment Authority or Subtitle D Landfill Name and Address	County

Subtitle D Landfill Owner Name and Address (if applicable)

Hazardous Waste Treatment Facility Name and Address (if further treatment needed)

Generator Certification:

☐ I certify under penalty of law that the waste has been treated in accordance with the requirements of § 268.40 to remove the hazardous characteristic, and that underlying hazardous constituents, as defined in § 268.2, have been treated on-site to meet the § 268.48 Universal Treatment Standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

☐ I certify under penalty of law that the waste has been treated in accordance with the requirements of § 268.40 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Printed/Typed Name	Signature	Date

This is a suggested reporting format. Any notification/certification containing these elements may be used. A copy of this or similar notification and certification must be placed in the generator's and/or treater's files and a copy sent to CDPHE. The notification and certification must be updated when the process or operation generating the waste changes or if the disposal facility receiving the waste changes.

Mail notification/certification to: Gary Baughman, Colorado Department of Public Health and Environment, HMWMD-B2, 4300 Cherry Creek Drive South, Denver, CO 80246-1530

APPENDIX II Permit by Rule Notification Example

Mr. Fred Dowsett
Colorado Department of Health
4300 Cherry Creek Dr. S.
HMWMD-HWC-B2
Denver, CO 80222-1530

(This notification reproduced for illustration purposes)

March 17, 1993

Subject: Generator Notification of Treatment
EPA Identification #

Dear Mr. Dowsett,

This letter is being submitted to the Section Chief of Monitoring & Enforcement as designated by the Director of the Hazardous Waste Division and in accordance with the Code of Colorado Regulations, Title 6, Part 100, Section 100.21, to serve as notification of intent to treat waste in a ninety day container.

In an effort to reduce the volume, shipping and disposal costs of fluorescent lights a Prodeva Fluorescent Tube Crusher has been purchased. This unit mounts onto the top of a 55-gallon open top metal drum. A metal funnel approximately 2.5 feet long and 3 inches in diameter, the mouth of which is covered with a rubber gasket slit crosswise, provides the opening into which the fluorescent tubes are fed. An electric motor energizes the rotating chain that crushes the tubes and which is used underneath the funnel. Fluorescent tubes are fed into the funnel one at a time, crushed and discharged into the 55-gallon metal drum upon which the crusher is mounted.

The unit is equipped with a filtering system to remove dust and to absorb mercury vapors that are generated. The first filter is a 2 inch thick pleated air filter effective for removing dust from the air flow which is 50% efficient for 2.0 micron size particles. The second filter is a 12 inch deep pleated high density filter which is 98% efficient for 2.0 micron size particles and 80% - 85% efficient for 1.0 micron size particles. The third and last filter is a special filter composed of activated carbon impregnated with iodine to absorb mercury vapor. Air discharged through this system will meet the "Adopted Values" approved by the A.C.G.I.H. (American Conference of Governmental Industrial Hygienists) for mercury vapor. Filters will

be changed in accordance with the manufacturer's recommendations and handled and disposed of as mercury contaminated waste.

The task of operating the fluorescent tube crusher has been assigned to one employee, the Hazardous Waste Technician. Personal protective equipment will be worn initially that includes a tyvek suit, rubber gloves, and a full face respirator with mercury cartridges. Monitoring for levels of mercury in the room in which the crushing process will take place as well as personal monitoring of the technician will be performed by a Certified Industrial Hygienist. Monitoring will be conducted using the recommended NIOSH Test Method Number 6009, and the specified test equipment which includes solid sorbent tubes and personal sampling pumps. Mercury vapor levels will be kept below the A.C.G.I.H. threshold limit values and OSHA's limit for air contaminants.

Enclosed is a copy of the analytical results for the determination of TCLP metals and total mercury performed on the fluorescent light tubes by .

The process of crushing the fluorescent tubes which is deemed as "treatment" is scheduled to begin April 16th and every two months thereafter. This is the only notification that will be provided for this activity unless the State chooses to require notification every two months. If this is the case or if there are any questions concerning this letter of notification please contact me by telephone at .

Sincerely,

Safety Engineer

Results and Discussion

Project #

Two waste samples were received on August 25, 1993, for the determination of TCLP Metals and total mercury. The samples were analyzed according to the protocols described in US EPA SW-846, Test Methods for Evaluating Solid Waste, 3rd Ed. The Toxicity Characteristic Leaching Procedure (TCLP) was performed according to Method 1311.

Quality Control (QC) results are reported for another client's samples which were prepared and analyzed with these samples. Sample information for the QC samples is withheld to maintain client confidentiality.

The total mercury result for sample (your ID Fluorescent Lamp) was found to be greater than 20mg/L. A more definitive quantitation could not be determined due to the quantity of mercury in the sample and the requirements of the analytical method.

TCLP Metals

Client:
Client Sample ID: Fluorescent Lamps
Lab Sample ID: Sample Type: TCLP Leachate
Date Sampled : 08/25/93 Date Received: 08/25/93
TCLP Preparation: 08/25/93

Analyte	Result	Reporting Limit	Units	Method	Date Analyzed
Arsenic	<	0.5	mg/L	6010	08/31/93
Barium	5.4	5	mg/L	6010	08/27/93
Cadmium	<	0.1	mg/L	6010	08/27/93
Chromium	<	0.1	mg/L	6010	08/27/93
Lead	<	0.5	mg/L	6010	08/31/93
Mercury	0.85	0.02	mg/L	7470	09/07/93
Selenium	<	0.5	mg/L	6010	08/27/93
Silver	<	0.1	mg/L	6010	08/27/93

< = Analyte not detected at or above the listed reporting limit.

APPENDIX III Waste Analysis Plan Example

WASTE ANALYSIS PLAN EXAMPLE
Generator Treating to Meet LDR Treatment Standards

This waste analysis plan example is designed to assist generators who are treating their waste to meet the Land Disposal Restriction (LDR) treatment standards in accumulation tanks, containers, or containment buildings and therefore are required to develop a waste analysis plan (WAP) as per Colorado Hazardous Waste Regulations 6 CCR 1007-3 Section 268.7(a)(5). While generators who treat waste in exempt units, such as elementary neutralization units, are not specifically required to develop and maintain a WAP, many such generators will elect to develop a WAP as a practical precautionary measure. Developing a voluntary WAP will assist the generator in fully characterizing the properties and physical/chemical makeup of the waste. In addition, following a detailed WAP will assist generators in monitoring for any underlying hazardous constituents in their ignitable (D001) or corrosive (D002) wastes. In the following example, Thompson Manufacturing elects to follow the generator requirements in 6 CCR 1007-3 Section 262.34 for the elementary neutralization unit, and thus chooses to develop and follow a voluntary WAP, although this is not specifically required. ***This example waste analysis plan provides more detail than is necessary to meet the LDR requirements, which require the generator to include only hazardous wastes that will be treated on site. The generator may elect to develop a more detailed plan such as this example to assist employees in properly managing other on-site wastes.***

This example was modified from example waste analysis plans provided in "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste - A Guidance Manual", US EPA publication EPA 530-R-94-024. For simplicity, only sample language is provided under each heading.

I. FACILITY DESCRIPTION

A. Description of Facility Processes and Activities

Thompson Manufacturing, Inc. is a semiconductor manufacturing company that produces small glass and metal electronic components used to make various models of toy dolls and trucks. There are three processes that generate wastes, as follows:

- Operation A: Clean Room Operations
- Operation B: Parts Preparation
- Operation C: Painting

These three processes and the wastes that they generate are illustrated in Figure 1, and described below:

Operation A: Clean Room Operations involve processing small glass parts by etching these parts with hydrofluoric acid (HF) jet guns, making indentations and holes in the parts in accordance with the manufacturing design criteria.

Operation B: Parts Preparation involves three activities: (1) electroplating chromium onto nickel parts, (2) machining the parts into desired shapes and lengths, and (3) parts drying. Electroplating involves taking small nickel metal parts and dipping them in acid solutions containing chromium and running an electric current through the solution, thereby allowing the chromium to become plated onto the nickel parts. Electroplating generates waste acids that are sent to the wastewater treatment facility that discharges under an NPDES permit. The parts are removed from the plating baths and sent to parts cutting. The parts are cut into desired shapes and lengths using lathes and other heavy machinery. Machining activities generate waste cutting oils. Finally, the

metal parts are dried by dipping the parts into solvent baths and allowing the parts to dry in the air drying chambers. Parts drying activities generate waste solvents.

Operation C: Painting involves the formulation of various grade paints for industrial applications. The paint is a water reducible paint containing 5% organics. Off-specification paints and sludge process residues are removed daily and placed into dedicated waste drums. Piping and paint mixing basins associated with the process are cleaned weekly with acetone.

Wastewaters are piped directly to the on-site wastewater treatment facility, which discharges under an NPDES permit. Hydrofluoric (HF) acid waste generated during glass etching processes in Operation A will be transferred from the satellite accumulation area regulated under 6 CCR 1007-3 Section 262.34(c) to an on-site treatment tank apparatus in compliance with the accumulation provisions of 6 CCR 1007-3 Section 262.34(a). Neutralization of the acid wastes will be conducted in a 200-gallon polyethylene tank and will be conducted within the 90-day accumulation period for large quantity generators. As a result, Thompson Manufacturing is not required to obtain a hazardous waste treatment, storage, and disposal permit provided that: 1) treatment activities are limited to 6 CCR 1007-3 Section 262.34 accumulation tanks, containers, or containment building or an exempt unit such as an elementary neutralization unit or wastewater treatment unit; and 2) treatment of hazardous wastes is accomplished within the 90-day allowable accumulation period.

The wastes from operations B and C are collected in 55-gallon accumulation drums located in the process area. The drums are prelabeled so that operators will place the wastes in the correct drum. Each day these drums are collected and transferred to the temporary container storage area where wastes are staged prior to shipment off site. Upon receipt at the container storage area, a random number of drums are inspected against the waste profile data that has been developed for each wastestream to see if the waste appears to match the description on the waste profile sheet. A sample of this waste profile sheet is provided in Table 1.

B. Identification/EPA Classification and Quantities of Hazardous Wastes Generated

Laboratory analysis has indicated that the concentration of many constituents of the waste (e.g., trichlorofluoromethane, CN, Cd, Cr, Pb, Ni, acetone, and Hg) as provided in column 7 of Table 2 exceed LDR treatment standards provided in column 8. Consequently, these wastes will be sent offsite, with appropriate LDR notification, for treatment and disposal.

The identification/EPA classification of hazardous wastes (e.g., glass etching wastes) is provided in Table 3. Thompson treats the HF acid waste on site using neutralization to pH 7.1 to meet LDR treatment standards.

C. Description of Hazardous Waste Management Units

The temporary drum storage capabilities for Thompson Manufacturing are limited by the amount of space available for holding drums and the spill containment capacity of the area. Approximately twenty, 55-gallon drums may be maintained on site in the storage area at any given time, in one of the three containment areas. The storage pad consists of a lined concrete slab with three spill containment areas of 60 gallons each (more than 10 percent of the total capacity of the seven drums that can be stored in each area, but equal to the capacity of one drum). One compartment shall be used exclusively for incompatible wastes, another for electroplating wastewater treatment sludges (F006), and the remaining compartment for the solvent (F002, F003) and waste paint residues (D008, D009). The storage area is sheltered and maintained at 60 degrees Fahrenheit to minimize waste storage problems associated with climatic variations. Daily inspections of the storage area are conducted to ensure that container integrity is maintained.

The 55-gallon drums are used to contain the hazardous wastes generated from Thompson Manufacturing's parts preparation and painting operations. For each respective operation, Department of Transportation (DOT) specification drums were selected based on the physical and chemical properties of the wastes to be managed. Specifically, DOT specification 17E closed head and DOT specification 17C open head drums are used to store

liquid (solvents, corrosives) and solid (F006, toxic paint sludges) wastestreams, respectively. For noncorrosive wastestreams, including toxic metals and solvents, metal drums are used for temporary waste accumulation. Conversely, acid wastes generated from glass etching and electroplating are stored in polyethylene drums to minimize risks of rupture or leakage. Incompatible wastes will be separated by a containment wall to prevent mixing if drums leak or break.

The central accumulation tank apparatus used by Thompson Manufacturing is schematically depicted in Figure 2. Tank construction consists of steel-reinforced polyethylene with special resistance to highly corrosive materials, both acidic and alkaline. The tank is equipped with inlet and outlet piping as well as a large top port for tank maintenance and waste sampling. Additionally, the tank has sludge removal ports that can be easily accessed to remove any precipitation sludges arising from neutralization activities. Ancillary pumping and mixing equipment is constructed of corrosion-resistant materials, primarily polyethylene.

HF acid waste from clean room operations is stored in accordance with the satellite accumulation provision of 6 CCR 1007-3 Section 262.34(c) in 25-gallon polyethylene DOT 17E closed head drums. When approximately 20 gallons of waste are accumulated, the drum is transferred by dolly to the facility's central accumulation tank. The waste is pumped into the accumulation tank using a low horsepower portable liquid pump inert to corrosive materials. The transfer area has a cement berm, coated with an epoxy that is resistant to HF acid, capable of containing 100 gallons. The addition of waste to the central accumulation storage tank is recorded according to date, time, and volume in the operating log for the tank. Through the use of this operating document, Thompson tracks the amount of waste being accumulated and the relative time on site to ensure that the 90-day accumulation period is not exceeded.

When the central accumulation tank has reached 50% capacity (approximately every 45 days), neutralization of the corrosive waste is initiated. Facility personnel create an alkaline slurry (pH of approximately 11-12) amenable to pumping by mixing 50 gallons of water with one-half drum of caustic soda in a 100-gallon polyethylene mixing basin. This alkaline slurry is pumped into the accumulation tank at a constant rate of 0.5 gallons per minute. Neutralization is monitored with a corrosion-resistant combination pH meter/agitator. Addition of the alkaline slurry is continued until the pH of the waste in the accumulation tank reaches and maintains equilibrium at a pH of 7. Subsequent to neutralization, duplicate grab samples are taken from the accumulation tank, one through the top sampling port and another through the discharge outlet sampling port. After a 24- to 36-hour waiting period to allow for sample analysis, wastewaters are discharged to an on-site wastewater storage tank if a pH of 7 +/- 0.5 is maintained and no other hazardous characteristics are exhibited. The volume and date of waste discharge is recorded in the operating record for the central accumulation tank.

A detailed facility engineering drawing of these processes is provided [Note: A facility drawing is not included in this sample WAP].

II. SELECTING WASTE ANALYSIS PARAMETERS

A. Criteria and Rationale for Parameter Selection

Since our facility's operating constraints are only physical (the amount of available waste storage and spill containment capacity), the waste analysis parameters that must be measured are those associated with confirming the identification/classification and compatibility of the wastes.

To facilitate waste identification and parameter selection, we have reviewed 6 CCR 1007-3 Part 261, Appendix VII - Basis for Listing Hazardous Wastes (i.e., F002, F003, F006, D002, D008, and D009) -- for the hazardous wastes generated by Thompson Manufacturing. The results of this evaluation were cross-referenced with chemical analyses of the wastes performed by an independent laboratory (Buchanan Laboratory) to identify our wastes and the parameters, and the associated rationale, necessary to ensure proper waste management.

Based on our in-depth knowledge of the raw materials and physical/chemical processes of each of Thompson Manufacturing's activities, as well as analytical results, the parameters that were selected to confirm accurate

waste identification (including those identified in 6 CCR 1007-3 Part 261 Appendix VIII, hazardous constituents) for each hazardous waste are illustrated in column 7 of Table 2. Table 4 presents the rationale for select parameters. To ensure complete characterization of listed wastes for compliance with the LDR regulations, knowledge of the process, and where necessary, testing has been used to determine if the hazardous wastes exhibit any of the four characteristics (i.e., ignitability, corrosivity, reactivity, and toxicity characteristic (TC)). Results of these characteristic determinations also provide the necessary information to verify that appropriate compatibilities are maintained during waste storage.

The wastes generated by Thompson Manufacturing must be amenable to safe storage in 55-gallon drums for up to 90 days. The wastes we generate meet this criterion because: 1) the storage drums were selected to be compatible with each respective wastestream that we generated, and 2) our manufacturing processes yield wastestreams that exhibit minimal variability in composition.

HF acid wastes generated by Thompson Manufacturing must be amenable to safe accumulation in tank storage for a 90-day period. Because of the uniform concentration and monophasic nature of these wastes, the primary waste analysis parameter of concern is corrosivity. As a result, pH measurements are taken during all facets of waste handling to ensure that facility personnel handle these wastes in a safe manner (HF acid is particularly dangerous to the health and safety of employees who handle the wastes) and recognize potential compatibility concerns. To supplement testing data, we have researched the corrosive properties associated with HF acid and have selected tank and handling materials capable of ensuring its proper containment, thereby protecting personnel and the environment.

Aside from corrosive waste concerns, Thompson's treatment processes result in the generation of salt precipitates that are formed during acid neutralization. These precipitates have been tested and do no exhibit any hazardous waste characteristics. Thompson removes all precipitates from the central accumulation tanks for analysis once every 90 days for measurements against the hazardous characteristics contained in 6 CCR 1007-3 Section 262.21-.24. When applicable, Thompson sends the precipitates off-site for treatment for underlying hazardous constituents.

Since the operating limitations associated with Thompson Manufacturing's short-term waste storage are primarily the compatibility of HF acid with the tank materials and ancillary equipment, the rationale for the selection of waste analysis parameters were based on the regulatory responsibility to ensure accurate waste classification and safe storage. To this end, a combination of our process knowledge and analytical testing yielded the inventory of hazardous constituents that must be verified to confirm the accuracy and consistency of Thompson Manufacturing's waste classification. Table 5 provides an overview of the parameters selected and the rationale for selection.

B. Special Parameter Selection Requirements

As stated previously under the facility description portion of this WAP, each type of wastestream (e.g., corrosive, spent solvent) will only be accumulated with wastes of identical process origin. However, since incompatibilities may arise from mixing corrosives with cyanide-bearing F006 wastes, separate color-coded waste drums will be used as a precautionary measure to ensure that corrosives are isolated. In addition, a short-turn-around-time cyanide test (see sample analysis testing procedures below) will be performed for each batch of F006 waste to be transferred to the on-site storage area. Any F006 waste exhibiting a cyanide concentration of greater than 150 mg/kg will be stored in a special isolated area until off-site shipment can be arranged. This additional safety measure will minimize the potential for interaction between the cyanide-bearing waste and other possibly incompatible materials in the event of a structural failure or spill.

No special requirements are associated with quantifying the degree of corrosivity and related hazards during each phase of HF acid handling at the facility, including treatment activities.

III. SELECTING SAMPLING PROCEDURES

A. Sampling Strategies and Equipment

We sample one drum per wastestream from process areas B and C since: 1) we generate relatively small volumes of waste, and 2) the waste has a very low potential for varying in composition within each process area, as verified through historical analysis. Specific waste sampling methods, equipment, and sample handling procedures to be used for each of Thompson Manufacturing's wastes are illustrated in Table 6.

We sample HF acid wastes emanating from Thompson clean room operations at four different locations: 1) at satellite accumulation; 2) prior to transfer to the central storage/treatment tank; 3) in the accumulation tank after treatment has been achieved; and 4) immediately prior to discharge to the facility's on-site wastewater storage tank. Due to the low potential for phase separation and the uniformity of the acid waste as identified through extensive testing and historical records, random grab samples are used to characterize HF acid wastestreams (both treated and untreated). Refer to Table 6 for specific waste sampling methods, equipment, and sample handling procedures for HF acid waste.

B. Sample Preservation and Storage

Samples of spent solvents, paint sludges, and electroplating wastewater treatment sludge will be stores in 250 ml amber glass containers with Teflon-lined caps at four degrees Celsius prior to analysis. There are no sample preservation requirements associated with the HF acid treatment process because all analyses are conducted immediately.

C. Sampling QA/QC Procedures

All sampling conducted for the purpose of characterizing wastes generated by Thompson Manufacturing will use appropriate QA/QC procedures, including chain-of-custody from sample collection through delivery to the analytical laboratory, and compatible storage containers. Additionally Thompson Manufacturing will limit the number of personnel who perform sampling to two individuals to ensure the highest levels of consistency and accuracy. Both individuals receive annual training in the proper use of sampling and analysis equipment identified in Table 6 and Table 7.

D. Health and Safety Protocols

During all sampling activities, precautions will be taken to ensure that drums do not expel gases and/or pressurized liquids. All personnel will be properly trained in safety and handling techniques.

IV. SELECTING A LABORATORY AND LABORATORY TESTING AND ANALYTICAL METHODS

A. Selecting a Laboratory

We have selected Buchanan Laboratory to perform all of the detailed quantitative chemical analyses specified in our WAP. In particular, this laboratory has:

- A comprehensive QA/QC program
- Technical analytical expertise
- An effective information system.

B. Selecting Treating and Analytical Methods

The selection of analytical testing methods for the wastestreams generated by Thompson Manufacturing was

based on the following considerations:

- Physical state of the waste (e.g., viscous sludge)
- Analytes of interest (e.g., acetone)
- Characteristic of interest (e.g., corrosivity)
- Required pH range
- Required detection limits (e.g., regulatory thresholds)
- Information requirements (e.g., verify compliance with LDR treatment standards, waste classification).

Collectively, these factors contributed to the selection of the testing/analytical procedures designated in Table 7. In the event that Thompsons becomes subject to new regulatory requirements, additional testing methodologies will be incorporated into Table 7 as appropriate.

V. SELECTING WASTE RE-EVALUATION FREQUENCIES

In accordance with the requirements of the off-site TSDFs used to treat and/or dispose of our hazardous wastes, semi-annual samples will be taken from each process at Thompson Manufacturing for the purposes of conducting comprehensive physical and chemical analyses. This information will be used to determine the appropriateness of current waste handling, storage, and characterization regimes. Specifically, these wastes will be subjected to the appropriate tests (several of these are specified in Table 7). For example, samples from the glass etching process will be subjected to the appropriate physical and chemical tests for fluoride and metals.

VI. SPECIAL PROCEDURAL REQUIREMENTS

A. Procedures for Receiving Wastes from Off-site Generators

Since Thompson Manufacturing does not receive wastes from off-site generators, no procedures are applicable to the receipt of off-site wastes.

B. Procedures for Ignitable, Reactive, and Incompatible Wastes

Thompson Manufacturing has instituted a rigorous analytical program to provide information concerning a waste's ignitability, reactivity, or incompatibility prior to treatment. Specifically, wastes are evaluated against applicable hazardous waste characteristics to determine the presence of potentially ignitable, reactive, or incompatible wastes that may damage the treatment process and/or associated facilities/personnel. Ignitability data will be obtained by using process knowledge and the appropriate Setaflash open or closed cup apparatus for the given liquid hazardous waste. Potential reactivity characteristics will be assessed through the use of process knowledge and, for cyanide containing wastes, by applying EPA SW-846 Method 7.3.3.2 to determine the amount of free cyanides released when the waste is exposed to pH conditions of 2.0. Any wastes identified as having a potential to liberate greater than 150 mg/kg of cyanide will be segregated from all other wastes and stored in a specially bermed drum storage cell.

In addition to determining whether wastes designated for treatment exhibit hazardous characteristics, such as reactivity, wastes may be subject to a compatibility evaluation. This evaluation uses the procedures delineated in the EPA document entitled "Design and Development of a Hazardous Waste Reactivity Testing Protocol," February 1984, EPA 600/2-84-057. These test procedures are used to classify wastes based on gross chemical composition for designation according to specific reactivity groups. A flowchart representing the procedures to classify the waste as acid, base, oxidizing, reducing, reactive, and primarily organic or inorganic is shown in Figure 3.

The results of the testing procedures yield reactivity group designations (See Figure 4). These designations are subsequently used in the compatibility matrix in Figure 4 to determine the potential effects of mixing the waste with wastes of other reactivity groupings likely to be encountered. In cases where incompatibility is indicated

(or compatibility cannot be proven), the waste will be handled as incompatible and will be ineligible for common storage. We will maintain this type of information for each wastestream generated.

C. Procedures to Ensure Compliance With LDR Requirements

Solid wastes may require off-site treatment if they are determined to be listed wastes (e.g., F006) or if they exhibit hazardous characteristics. In accordance with the LDR regulations of 6 CCR 1007-3 Section 268, wastes shipped off site may need to be analyzed to determine whether the waste meets the applicable LDR treatment standards contained in Part 268, Subpart D. Testing will be conducted only to certify that the waste meets LDR treatment standards. If it is known that the wastes do not meet applicable LDR treatment standards based on process knowledge, no testing is necessary. Each waste for which a treatment standard has been set will be evaluated for the applicable parameters in Subpart D. All analytical results completed in support of LDR requirement will be retained within the facility operating record.

Wastes resulting from facility operations that exceed applicable LDR treatment standards will be sent off site to a permitted treatment facility. LDR notifications will be supplied with the shipment of waste with the information required under 6 CCR 1007-3 Section 268.7. In addition to the LDR notification, any additional data for the wastestream (e.g., Waste Profile Sheet, analytical data) will be provided to the designated treatment facility.

All wastes, if any, that are determined through analysis to meet treatment standards as specified in 6 CCR 1007-3 Part 268, Subpart D will be land disposed in a permitted Subtitle C facility without further treatment. An LDR certification, including all analytical records to support the certification, will be prepared and accompany the shipment of waste to the receiving facility.

Since Thompson is treating hazardous waste in tanks regulated under 6 CCR 1007-3 Section 262.34 to meet applicable LDR treatment standards, this WAP serves to document the facility's procedures for complying with the LDR rules. Specifically, Sections I-V described the procedures for obtaining representative samples of HF acid wastestreams, both before and after treatment. The results of pre-treatment waste analysis will determine the specific treatment process requirement, including Ca(OH)2 addition and treatment time, necessary to appropriately deactivate HF acid wastes to meet the LDR treatment standards in 6 CCR 1007-3 Section 268, Subpart D. The results of post-treatment waste analysis will determine whether the hazardous characteristic (i.e., corrosivity) has been removed.

In addition to the development of a WAP, Thompson will prepare appropriate LDR notifications and certifications for waste treated on site or sent to an off-site TSDF. Records of this documentation, including waste analysis plan and testing results, will be maintained in onsite records for a minimum of five years.

TABLE 1
Example Waste Profile Sheet *

1. WASTE PROFILE #:_____

EPA Facility ID#:_____

DO NOT LEAVE BLANK SPACES. PLEASE SUBMIT THIS FORM TYPE-WRITTEN.

I. GENERATOR INFORMATION

2. Generator Name:_____ 3. EPA ID #:_____

4. Mailing Address:_____

5. Plant Address:_____

6. Business Contact:_____ Phone #:_____

7. Technical Contact:_____ Phone #:_____

The following information is required to comply with 6 CCR 1007-3 Part 264/265.13 General Waste Analysis.

II. GENERAL WASTE INFORMATION

8. Waste Material Name:_____ 9. Generator Code:_____ (Optional)

10. Describe process that generates waste:_____ 11. SIC Code:_____

12. Is your company the original generator of the waste? No Yes If not, provide the name of the original generator:_____

13. If this waste is a still bottom, are you the original generator of the feed stock? No Yes

14. Rate of Generation:_____ Current accumulation: Drums_____ Bulk_____ (Gal.)

15. Check all types of containerization for which you request quotation.

_____ 55-Gallon Steel Drum (SC)
_____ 30-Gallon Steel Drum
_____ 85-Gallon Steel Drum (Without inside container)
_____ 85-Gallon Salvage Drum (With fiber or steel drums inside)
_____ Palletized small containers
Overall dimensions of material on pallet: _____ X _____ X _____ (High)
Dimensions of pallet only: _____ X _____ (High)
What are the small containers on the pallet? _____ (1 qt. Bottles, 8 oz. Aerosol Cans, etc.)

_____ 55-Gallon Fiber Drum
_____ 5-Gallon Pail
_____ Bulk (For bulk shipments, waste must be <5000 cps)
_____ Other (Specify)

III. WASTE STREAM CHEMICAL COMPOSITION**

16.

COMPONENTS INCLUDING 6 CCR 1007-3 PART 261 APPENDIX VII HAZARDOUS CONSTITUENTS	CONCENTRATION RANGE (UNITS)	AVERAGE % MUST TOTAL 100%	T.V. (if published) ACGIH	OSHA
_____	___ to ____	_____	_____	_____
_____	___ to ____	_____	_____	_____
_____	___ to ____	_____	_____	_____
_____	___ to ____	_____	_____	_____
_____	___ to ____	_____	_____	_____
_____	___ to ____	_____	_____	_____

- If applicable, this Waste Profile Sheet is a new revision of a previously submitted Waste Profile Sheet dated _____.
Attach to this Form any additional information which must be know to treat, store, or dispose of the waste in accordance with 6 CCR 1007-3 Part 264/265.13, including but not limited to data developed under 6 CCR 1007-3 Part 261, Laboratory Analysis Technical Publications or Material Safety Data Sheets.

** 6 CCR 1007-3 Part 261 Appendix VIII constituents should be identified for combustion facilities, even if not present in high enough concentrations to significantly contribute to the 100% composition.

WASTE PROFILE #:_____

IV. SPECIFIC ANALYSIS OF WASTE

17. Method used to obtain a representative sample of the analyzed waste (e.g., grab, composite, etc.) Sampling methods are described in 6 CCR 1007-3 Part 261 Appendix I.
Generator's Knowledge & MSDS
In completing the next two items, do not leave blanks. If specific element is not present, indicate "None".

18.

Organic Bound	CONCENTRATION RANGE	AVERAGE
Sulfur	_____ to _____	_____
Chlorine	_____ to _____	_____
Fluorine	_____ to _____	_____
Bromine	_____ to _____	_____
Iodine	_____ to _____	_____
Nitrogen	_____ to _____	_____
Phosphorus	_____ to _____	_____

(Base % WT on Molecular Structure)

19. Metals (Actual Content)

Arsenic	_____ ppm	Mercury	_____ ppm
Barium	_____ ppm	Nickel	_____ ppm
Cadmium	_____ ppm	Selenium	_____ ppm
Chromium	_____ ppm	Silver	_____ ppm
Lead	_____ ppm	Thallium	_____ ppm
Aluminum	_____ %	Silicon	_____ %
Magnesium	_____ %	Sodium	_____ %

20. Does this waste contain PCBs?
No Yes. If yes, give the concentration regardless of amount and attach supporting documentation:
_____ ppm

21. Does this waste contain insecticides, pesticides, herbicides, or rodenticides?
No Yes. If yes, identify each in the space below and the concentrations:
_____ ppm
_____ ppm
(Include Safety Data Sheets for each)

22. Does this waste contain Dioxin? No Yes

23. Does this waste contain free cyanide >250 ppm?
No Yes

24. Does this waste contain free sulfide >250 ppm?
No Yes

V. TOXICITY

25. Check Applicable Data
_____ Eye Explain _____
_____ Inhalation Explain _____
_____ Dermal Explain _____
_____ Ingestion Explain _____
_____ Other Explain _____
_____ Carcinogen (suspected or known) Explain
_____

VI. PHYSICAL PROPERTIES

26. Physical state at 70 deg F (Circle)

Liquid Semisolid Solid

Slurry Sludge Gas

Viscosity at 70 deg F _____CPS

27. Is material pumpable? No Yes
Varies (Explain):_____
28. Is waste multi-layered? No Yes
If yes, please describe and quantify each layer:
1. (Top) _____ %
2. _____ %
3. _____ %
29. Dissolved Solids: _____ % WT
30. Suspended Solids: _____ % WT
31. BTU Value/lbs: _____
32. Ash Content (% by WT): _____
33. Flash Point: _____ deg F
34. Vapor Pressure at 70 deg F: _____
35. Specific Gravity: _____
36. pH: _____
37. Corrosivity: _____ mpy
38. Color: _____

VII. REACTIVITY AND STABILITY

39. What is the Reactivity Group Number for this waste?_____
In accordance with "Design and Development of Hazardous Waste Reactivity Testing Protocol," EPA Document No. EPA-600/2-84-057, February 1984.

40. Is this material stable? No Yes
If no, explain: _____
_____
_____
_____
_____

41. Is this material shock sensitive? No Yes
If yes, explain: _____
_____
_____
_____

WASTE PROFILE #:_____

VIII. EPA INFORMATION

42. Is this waste hazardous as defined by 6 CCR 1007-3 Part 261? No Yes

If yes, list the applicable EPA Hazardous Waste Number(s) and explain why you have assigned the number(s). For example, if you assign D001, the reason for selection is that the flash point is less than 140 deg F. If you assign F002, the reason for selection may be that the waste is the still bottom from the recovery of methylene chloride:

EPA Hazardous Waste Number(s)	Reason for Selection
_____	_____
_____	_____
_____	_____

43. If the answer to #42 is yes, list CERCLA reportable quantities, found in 40 CFR §302.4:

_____
_____
_____
_____
_____
_____
_____
_____

44. If the waste is not hazardous as defined by federal regulations but is hazardous as defined by state regulations in which the waste was generated, please provide the state hazardous waste number(s). Also provide any state hazardous numbers that are not included in the federal regulations:

State Hazardous Waste Number(s)	Reason for Selection
_____	_____
_____	_____
_____	_____

IX. SAMPLING INFORMATION

45. Sample source (e.g., drum, lagoon, pond, tank, vat, etc.): _____

Date Sampled: _____ Sampler's Name/Company: _____

46. Generator's Agent Supervising Sampling: _____ 47. ☐ No sample required (Provide rationale)

X. LAND DISPOSAL RESTRICTIONS INFORMATION

48. Identify <u>all</u> characteristic and listed EPA hazardous waste numbers that apply (as defined by 6 CCR 1007-3 Part 261). For each waste number, identify the subcategory (as applicable, check none, or write in the description from 6 CCR 1007-3 Sections 268.41, 268.42, and 268.43).

REF #	A. EPA HAZARDOUS WASTE CODE(S)	B. SUBCATEGORY ENTER THE SUBCATEGORY DESCRIPTION IF NOT APPLICABLE CHECK NONE		C. APPLICABLE TREATMENT STANDARDS			D. HOW MUST THE WASTE BE MANAGED? ENTER THE APPROPRIATE LETTER (A-D) FROM BELOW
				PERFORMANCE- BASED (CHECK AS APPLICABLE)		SPECIFIED TECHNOLOGY IF APPLICABLE ENTER THE § 268.42 TABLE 1 TREATMENT CODE(S)	
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42	
1							
2							
3							
4							
5							
6							

To list additional EPA waste numbers and categories, use additional page and check here: _____

Management under the land disposal restrictions:

A. RESTRICTED WASTE REQUIRES TREATMENT? □ No □ Yes

B.1. RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS? □ No □ Yes Method _____

B.2. RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY) □ No □ Yes Method _____

B.3. GOOD FAITH ANALYTICAL CERTIFICATION FOR INCINERATED ORGANICS? □ No □ Yes Method _____

C. RESTRICTED WASTE SUBJECT TO A VARIANCE? □ No □ Yes Date/Type _____

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT? □ No □ Yes

IX. DOT INFORMATION

In accordance with the Department of Transportation 49 CFR Parts 171 through 177, complete the following:

49. DOT Proper Shipping Name: _____

50. DOT Hazard Class: _____

51. DOT UN or NA Number: _____

52. Container Label(s): _____
(For containers of 110 gallons or less)
Additional Description: _____

53. Placards: _____

Generator's hazardous waste shipments must also comply with the labeling requirements of 6 CCR 1007-3 Part 262.

54. Is this waste a soil and/or debris? No: _____ Yes, Soil: _____ Yes, Debris: _____ Yes, Both: _____

55. COMPLETE ONLY FOR WASTES INTENDED FOR FUELS OR INCINERATION		56. RECLAMATION, FUELS OR INCINERATION PARAMETERS (Provide if information is available)	
	TOTAL		RANGE
Antimony as Sb	_____ ppm	A. Heat Value (BTU/lb.)	_____ _____
Beryllium as Be	_____ ppm	B. Water:	_____
Potassium as K	_____ ppm	C. Viscosity (cps):	_____ @ _____deg F _____ 100 deg F _____ 150 deg F
Sodium as Na	_____ ppm		
Bromine as Br	_____ *ppm/%	D. Ash:	_____ %
Chlorine as Cl	_____ *ppm/%	E. Settleable solids:	_____ %
Fluorine as F	_____ *ppm/%	F. Vapor Pressure @ STP (mm/Hg):	_____
Sulfur as S	_____ *ppm/%	G. Is this waste a pumpable liquid?	□ No □ Yes
		H. Can waste be heated to improve flow?	□ No □ Yes
* Indicate ppm or %.		I. Is this waste soluble in water?	□ No □ Yes
		J. Particle size: Will the solid portion of this waste pass Through a 1/8-inch screen:	□ No □ Yes

57. Special Handling Information _____
_____

WASTE PROFILE#: _____

ACCOUNTABILITY STATEMENT

58. I hereby certify that all information submitted in this and all attached documents contains true and accurate description of this waste. Any sample submitted is representative as define in 6 CCR 1007-3 Part 261 Appendix I or by using an equivalent method. All relevant information regarding known or suspected hazards in the possession of the generator has been disclosed. I authorize (_____) to obtain a sample from any waste shipment for purposes of recertification.

_____	_____	_____
Authorized Signature	Printed (or typed) Name and Title	Date

TABLE 2
Thompson Manufacturing, Inc.
Identification/EPA Classification of Hazardous Wastes Generated

1	2	3	4	5		6	7	8
WASTES GENERATED	PROCESS GENERATING THE WASTE	BASIS FOR HAZARD CLASSIFICATION	EPA WASTE CODE	HAZARDOUS PROPERTIES OF WASTES	LDR		CHEMICAL ANALYSIS[1]	LDR TREATMENT	
					NWW	WW	Original Waste	Treatment Standard[2]	Designated Treatment Facility
Solvent waste	Parts preparation	Knowledge/testing	F002	Toxic	X		45% Trichloro-fluoromethane	33	Sparky Incinerator
Wastewater treatment sludge	Electroplating	Knowledge/testing	F006	Toxic, potentially reactive	X			CN (total)[3]	Solid Stabilization
							CN 170	CN (amenable)[4]	
							Cd 210	Cd 0.066	
							Cr 1,500	Cr 5.2	
							Pb 580	Pb 0.51	
							Ni 1,100	Ni 0.32	
							Ag <DL[5]	Ag 0.072	
Paint cleanup solvent waste	Painting process	Knowledge/testing	F003	Ignitable	X		Pure Acetone	160	Sparky Incinerator
Paint sludge	Painting Process	Testing	D008, D009	Toxic	X		Pb 460	Pb 5	Solid Stabilization
							Hg 120	Hg 0.2	
Glass etching waste	Clean room operation	Testing	D002	Highly corrosive pH - 1.2		X	35% HF pH - 1.2	Deactivation	Neutralize Corrosive

1 Represents the highest values detected in 50 samples. The values reported for metals are for the TCLP extract in mg/l. The values reported for other parameters are from total waste analysis in mg/kg.

2 This standard must be achieved to meet LDR treatment standards, if applicable. The LDR treatment standards for metals are for the constituent concentrations in the TCLP extract of the waste in mg/l. All other standards are the concentration in the total waste analysis in mg/kg.

3 LDR treatment standard value for F006 in WWTP sludge is 590 mg/kg.

4 LDR treatment standard value for F006 in WWTP sludge is 30 mg/kg.

5 DL = Detection Limit (0.01 mg/l).

TABLE 3
Thompson Manufacturing, Inc.
Identification/EPA Classification of Hazardous Wastes Treated in Tanks

1	2	3	4	5	6		7		8	
WASTE GENERATED	PROCESS GENERATING THE WASTE	BASIS FOR HAZARD CLASSIFICATION	EPA WASTE CODE	HAZARDOUS PROPERTIES OF WASTE	LDR		CHEMICAL ANALYSIS[1]		LDR TREATMENT	
					NWW	WW	Original Waste	Post Treatment	Treatment Standard[2]	On-Site Treatment
Glass etching acid waste	Clean room operation	Testing	D002	Highly corrosive pH = 1.2		X	35% HF pH = 1.2	pH = 7.1	Deactivation	Thompson Mfg, Inc., as described in Section I.C

[1] Represents the highest values detected in 50 samples.
[2] This is the standard that must be achieved to meet LDR treatment standards.

TABLE 4
Thompson Manufacturing, Inc.
Examples of Criteria and Rationale for Selected Parameters for Wastes Generated

WASTE	WASTE PARAMETER(S)	RATIONALE FOR SELECTION
D002 (Hydrofluoric acid)	- Corrosivity (pH and steel degradation test)	Used to determine compatible sampling and storage equipment
F006 (Wastewater Treatment Sludge)	- Free Cyanides	Used to determine reactivity group number and levels of cyanides in wastes. (Wastes with >150 ppm cyanide will be stored separately from all other wastes).
	- Metals (Ag, Cd, Cr, Ni, Pb)	Used to verify conformance with applicable treatment standards.

TABLE 5
Thompson Manufacturing, Inc.
Criteria and Rationale for Selected Parameters for HF Neutralization Process

WASTE	WASTE PARAMETER(S)	RATIONALE FOR SELECTION
D002 (Hydrofluoric acid)	- Hydrofluoric acid concentration	Used to determine relative quantities of neutralizing agent needed to treat waste properly
	- pH - Corrosivity towards steel	Used to determine appropriate and compatible sampling, monitoring and storage equipment (tanks and containers)
Neutralized Acid Wastewaters	- pH	Used to determine acceptability of neutralized wastewaters for discharge from treatment tank to storage tank.

TABLE 6
Thompson Manufacturing, Inc.
Examples of Waste Sampling Methods, Equipment, and Procedures[1]

WASTE DESCRIPTION	SAMPLE COLLECTION METHOD	SAMPLING EQUIPMENT	SAMPLE PRESERVATION AND STORAGE
Hydrofluoric Acid Waste (D002)	Specific drums to be sampled will be selected using the sampling method for containers as described in SW-846, Section 9.2.3 (grab samples taken)	Polyethylene Collwasa (inert to hydrofluoric acid)	None required, immediate analysis conducted. Storage in polyethylene or polypropylene containers with polyterphenyl outer bag.
Spent Solvents (F002, F003)	Specific drums to be sampled will be selected using the sampling method for containers as described in SW-846, Section 9.2.3 (grab samples taken)	Glass Collwasa (inert to chlorinated organics)	Storage in 250 ml amber glass containers with Teflon-lined caps at 4 degrees Celsius prior to analysis
Paint Sludges (D008, D009)	Specific drums to be sampled will be selected using the sampling method for containers as described in SW-846, Section 9.2.3 (grab samples taken)	Glass dipper (due to high viscosity, semi-solid physical nature of the waste)	Storage in 250 ml amber glass containers with Teflon-lined caps at 4 degrees Celsius prior to analysis
Electroplating Wastewater Treatment Sludge (F006)	Specific drums to be sampled will be selected using the sampling method for containers as described in SW-846, Section 9.2.3 (grab samples taken)	Glass dipper (due to high viscosity, semi-solid physical nature of the waste)	Storage in 250 ml amber glass containers with Teflon-lined caps at 4 degrees Celsius prior to analysis

[1] Residues from sampling and analysis are subject to the waste identification requirements of 6 CCR 1007-3 Section 262.11 (hazardous waste determination), and depending on that determination may be subject to LDR requirements.

TABLE 7
Thompson Manufacturing, Inc.
Examples of Testing/Analytical Methods for Wastes Generated

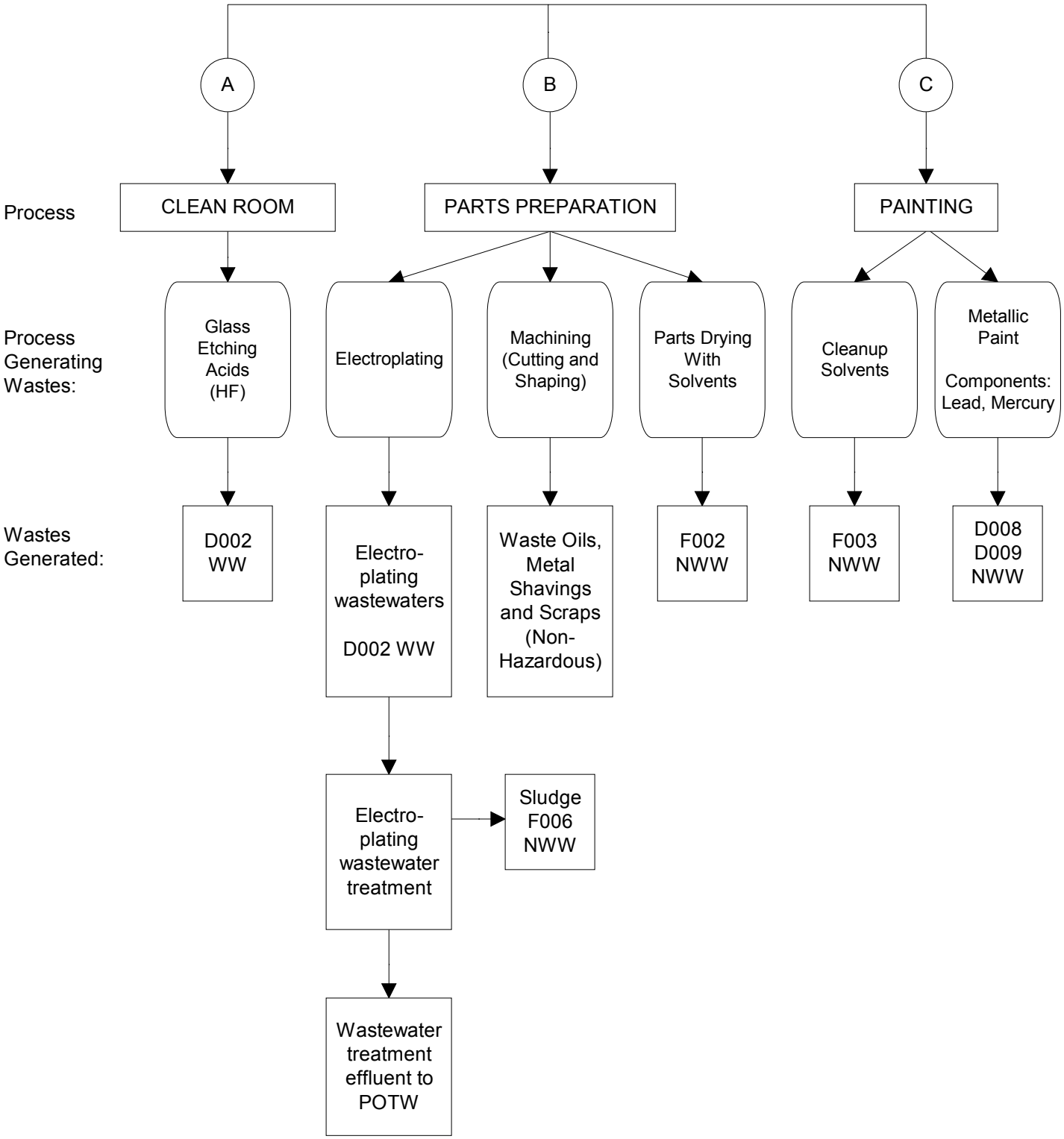
WASTE DESCRIPTION	SAMPLE EXTRACTION/ PREPARATION METHOD	TESTING/ANALYTICAL METHOD
Hydrofluoric Acid (D002)	N/A	• Corrosivity [add excess Ca(OH)2 to demonstrate ppt of CaF2 followed by method 9041A - pH paper]
Spent Solvents (F002, F003)	SW-846, Method 5030 as incorporated into SW-846, Method 8240	• ASTM - D891, Method A for specific gravity[2] • ASTM Method D-3278 for ignitability • SW-846, Method 8240 for acetone and methylene chloride
Paint Sludges (D008, D009)	Toxicity Characteristic Leaching Procedure (TCLP) (SW-846, Method 1311 followed by SW-846, Method 3010 for lead only)	• SW-846, Method 6010 for lead, 7470 for mercury
Electroplating Wastewater Treatment Sludge (F006)	Initial analysis of reactivity (cyanide) using SW-846, Section 7.3.3.2.[1] If the waste does not meet the definition of reactivity, SW-846 Method 3050 is used to prepare samples for metals analysis.	• SW-846, Method 6010 for lead; SW-846, Method 7421 issued for cadmium, chromium, nickel, and silver

[1] F006 waste samples are tested for reactivity because if any samples exhibit the characteristic of reactivity, they are subject to special handling procedures (containment laboratories) to ensure minimal employee exposure to toxic fumes during metals analysis.

[2] Specific gravity is measured to ensure that wastes are monophasic. Column differentiation in a graduated cylinder is a better approach to assess multi phasic wastes containing organic solvents.

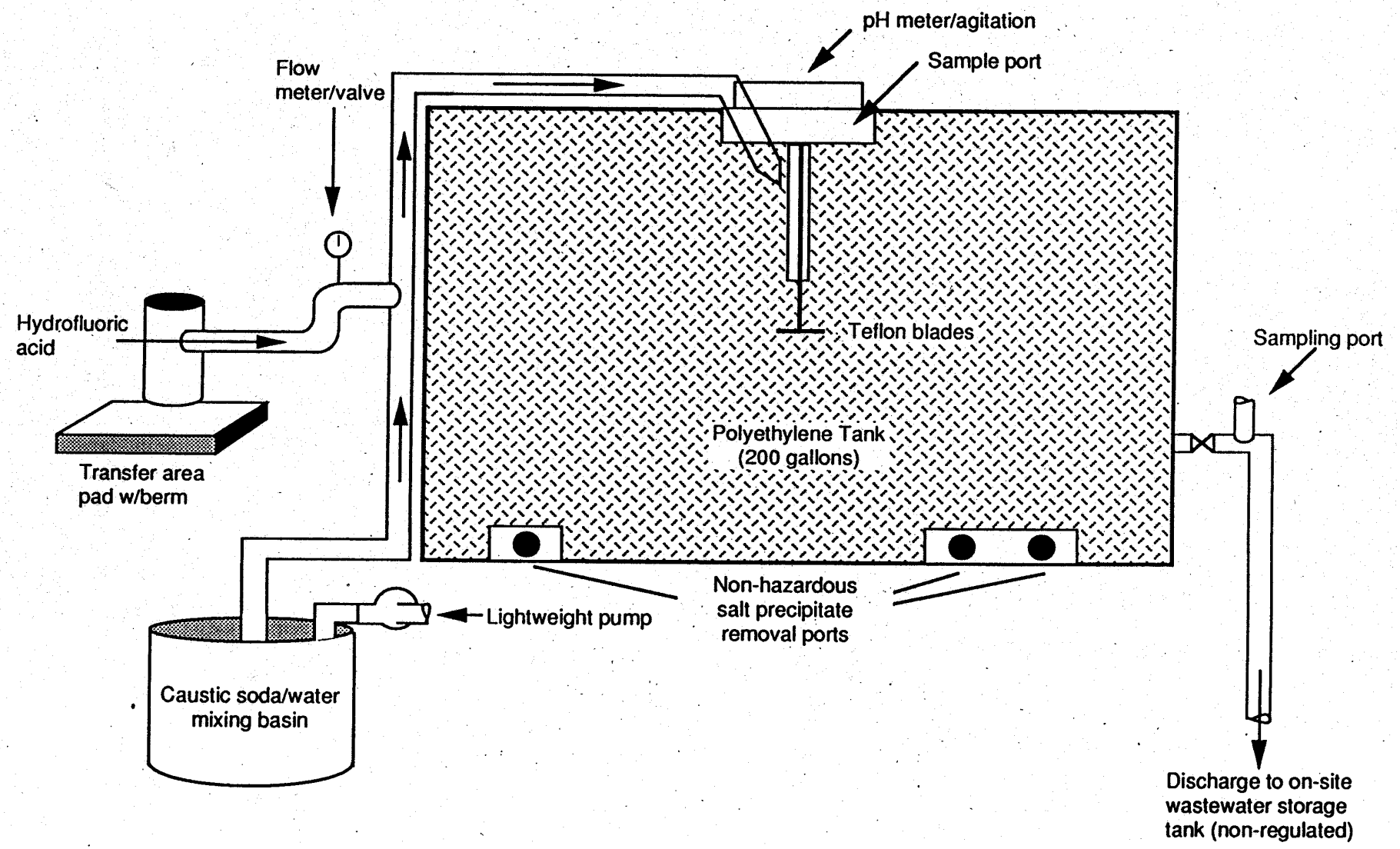
Note: antidotes for hydrofluoric acid and cyanide should be available on site when working with these chemicals.

FIGURE 1
Thompson Manufacturing, Inc.
Waste Generation Scenario



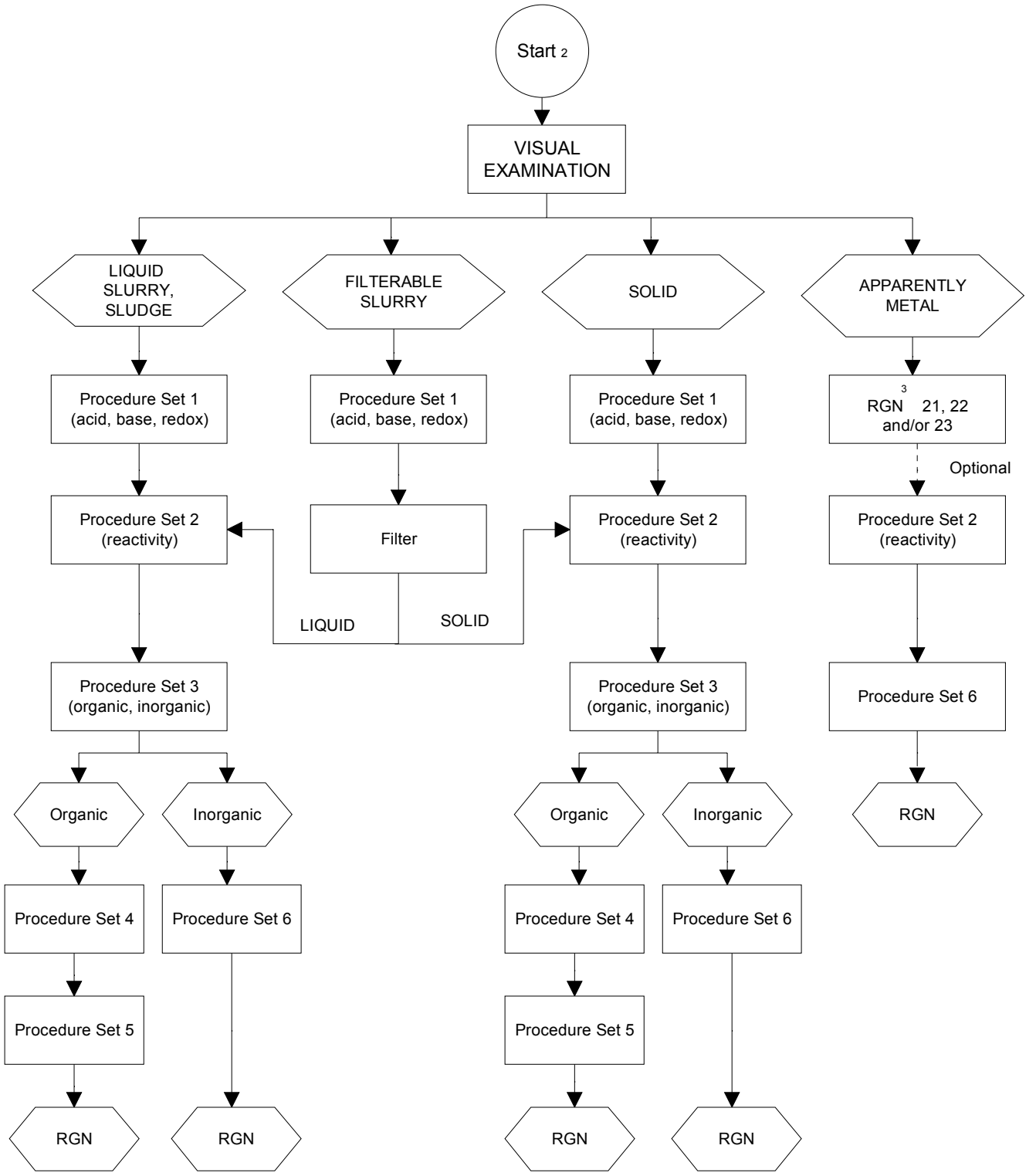
WW = Wastewater
NWW = Nonwastewater
POTW = Publically Owned Treatement Works

FIGURE 2
Sample WAP - Treatment Tank Apparatus
(Description Of Hazardous Waste Management Unit) [1]



[1] Note that all storage and mixing tanks will be contained within a bermed area to contain a release in the event of tank failure.

FIGURE 3
Sequence of Procedures Sets for Determining Reactivity Group [1]



[1] Procedure sets are identified in EPA's "Design and Development of a Hazardous Waste Reactivity Testing Protocol" (EPA 600/2-84-057, February 1984).

[2] Based upon its knowledge of the waste, a generator may only need to use parts of the following sequence to confirm the generator's knowledge of the material.

[3] RGN = Reactivity Group Number

FIGURE 4
Reactivity Group Designation And Waste Compatibility [1] Matrix

Reactivity Group No.	Reactivity Group Name
1	Acids, Mineral, Nonoxidizing
2	Acids, Mineral, Oxidizing
3	Acids, Organic
4	Alcohols and Glycols
5	Aldehydes
6	Amides
7	Amines, Aliphatic and Aromatic
8	Azo Compounds, Diazo Compounds, and Hydrazines
9	Carbamates
10	Caustics
11	Cyanides
12	Dithiocarbamates
13	Esters
14	Ethers
15	Fluorides, Inorganic
16	Hydrocarbons, Aromatic
17	Halogenated Organics
18	Isocyanates
19	Keytones
20	Mercaptans and Other Organic Sulfides
21	Metals, Alkali and Alkaline Earth, Elemental
22	Metals, Other Elemental & Alloys as Powders, Vapors or Sponges
23	Metals, Other Elemental & Alloys as Sheets, Rods, Drops, Moldings, etc.
24	Metals and Metal Compounds, Toxic
25	Nitrides
26	Nitriles
27	Nitro Compounds, Organic
28	Hydrocarbons, Aliphatic Unsaturated
29	Hydrocarbons, Aliphatic Saturated
30	Peroxides and Hydroperoxides, Organic
31	Phenols and Cresols
32	Organophosphates, Phosphothioates, Phosphodithioates
33	Sulfides, Inorganic
34	Epoxides
101	Combustibles and Flammable Materials, Miscellaneous
102	Explosives
103	Polymentable Compounds
104	Oxidizing Agents, Strong
105	Reducing Agents, Strong
106	Water and Mixtures Containing Water
107	Water Reactive Substances

Reactivity Code	Consequences
H	Heat Generation
F	Fire
G	Innocuous
GT	Toxic gas generation
GF	Flammable gas generation
E	Explosion
P	Violent polymerization
S	Solubilization of toxic substances
U	May be hazardous but unknown

Example:

H
F
GT

Heat generation, fire, and toxic gas generation

EXTREMELY REACTIVE! DO NOT MIX WITH ANY CHEMICAL OR WASTE MATERIAL! EXTREMELY REACTIVE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 101 102 103 104 105 106 107

[1] Determine the reactivity group numbers of the waste groups being evaluated. Locate the higher number using the left column "Reactivity Group No." and locate the other number on the stair-stepped columns on the right. Locate the square at the intersection of the two group numbers, then consult the legend to match the reactivity code(s) with the consequences.

APPENDIX IV Waste Analysis Plan Checklist

WASTE ANALYSIS PLAN CHECKLIST
Modified from US EPA Publication EPA 530-R-94-024

	Yes	No	Comments
1. Facility Description			
a. Are all processes that generate hazardous waste identified?			
b. Is sufficient information provided for each process to confirm that all hazardous wastes are identified?			
c. Have all hazardous waste management units been identified?			
d. Are descriptions of all hazardous waste management units provided?			
e. Have all hazardous and solid wastes been identified for each unit?			
f. Have the methods of waste management (e.g., stabilization) been described for each unit?			
g. Are process design limitations defined for each hazardous waste management unit?			
h. Have operational acceptance limits been established for each hazardous waste management unit?			
i. Are procedures in place to determine whether wastes are outside of their respective acceptance ranges?			
j. Do operational acceptance limits include applicable regulatory restrictions?			
2. Selecting Waste Parameters			
a. Are parameters for waste analysis identified (and, if applicable, included in the WAP)?			
b. Does the WAP identify a rationale for the selection of each waste analysis parameter?			
c. Does the WAP include parameters for the special waste analysis requirements in 6 CCR 1007-3 Part 264/265.17, 264/265.314, 264/265.341, 264/265.1034(d), and 266.102(b), if applicable?			

WAP Checklist (continued)

	Yes	No	Comments
d. Have operational acceptance limits been defined as they relate to waste properties and processes?			
e. Do operational acceptance limits include regulatory restrictions?			
f. Do waste analysis parameters address applicable operational acceptance limits?			
3. Selecting Sampling Procedures			
a. Has the number of sampling locations been identified?			
b. Are sampling procedures for each waste type identified?			
c. Are descriptions and justifications provided for any modified or non-standard procedures, as approved by CDPHE?			
d. Have decontamination procedures for sampling equipment been developed?			
e. Have sampling strategy techniques (e.g., grab, composite) been specified?			
f. Are procedures for sampling multi-phase wastes (if applicable) addressed?			
g. Has all sampling equipment been identified?			
h. Have the number and types of sampling containers been specified?			
i. Have sample preservation techniques been specified?			
j. Are sampling quality assurance and quality control procedures identified?			
k. Are proper packing and shipping procedures documented?			
l. Have procedures for the maintenance of all sampling equipment been documented?			
m. Are the precision and accuracy of sampling equipment stipulated?			
n. Are health and safety procedures for the protection of sampling personnel specified?			

WAP Checklist (continued)

	Yes	No	Comments
4. Selecting a Laboratory and Laboratory Testing and Analytical Methods			
a. Are laboratory and analytical methods specified for each waste managed at the facility? If not, is other information (i.e., acceptable knowledge) used to demonstrate waste analysis?			
b. Has a rationale been specified for each analytical and test method?			
c. Do the selected analytical methods meet all regulatory requirements for the identification of each hazardous waste (e.g., each hazardous waste characteristic)?			
d. Are descriptions and justifications provided for any modified or non-standard methods, as approved by CDPHE?			
e. Have chain-of-custody procedures for samples been specified (if necessary)?			
f. Does the laboratory have an adequate QA/QC program?			
g. Have QA/QC procedures for each analytical procedure been identified?			
5. Selecting Waste Re-Evaluation Frequencies			
a. Have site-specific criteria for waste re-evaluations been specified?			
b. Is re-evaluation accomplished with adequate frequency?			
c. Are mechanisms in place for re-evaluating the sampling program each time the waste-generating processes change?			
d. Do the re-evaluation procedures specify criteria for the acceptance of wastes received from off-site generators?			
e. Do you notify off-site facilities (i.e., treatment, storage, and/or disposal facilities) of changes in waste characterizations due to process changes or other factors?			

WAP Checklist (continued)

	Yes	No	Comments
6. Special Procedural Requirements, Where Applicable			
a. Are procedures in place to verify the sources of the information provided from off-site generators or TSDFs (if applicable)?			
b. Have criteria been established for the pre-acceptance procedures of wastes based on information from off-site generators or TSDFs?			
c. Are procedures for waste inspections in place?			
d. Have fingerprint analysis parameters been developed?			
e. Have criteria been established for the acceptance of wastes based on the results of fingerprint analysis?			
f. Is there a methodology for identifying ignitable, incompatible, or reactive wastes?			
g. Are procedures in place to conduct testing to determine whether wastes are incompatible with each hazardous waste management unit on site?			
h. Have all wastes restricted under the LDRs been identified?			
i. Are procedures in place to ensure that wastes meet applicable LDR treatment standards prior to land disposal?			