# FEEDSTREAM ANALYSIS PLAN (FAP)
# FOR THE
# 32 BUILDING INCINERATOR

**The Dow Chemical Company**
**Michigan Operations Incineration Complex**
**Midland Michigan**

**August 2, 2017**
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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| APC | Air pollution control |
| AQD | Air Quality Division |
| AWFCO | Automatic waste feed cut-off |
| CMS | Continuous monitoring system |
| CPT | Comprehensive performance test |
| FAP | Feedstream Analysis Plan |
| HWC MACT | Hazardous waste combustor maximum achievable control technology |
| LVM | Low-volatile metals |
| MDEQ | Michigan Department of Environmental Quality |
| MTEC | Maximum theoretical emission concentration |
| PCC | Process control computer |
| QA/QC | Quality assurance/quality control |
| RCRA | Resource Conservation Recovery Act |
| SCC | Secondary combustion chamber |
| SVM | Semi-volatile metals |
| GWCF | Dow's Generator Waste Characterization Form |
| WCS | Dow's Computer Based Waste Characterization System |

# 1.0 Introduction

The Dow Chemical Company's Midland, Michigan manufacturing site currently operates one rotary kiln incinerator equipped with air pollution control. Hazardous waste management activities occur at this site and are regulated under Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, Part 111 and the Federal Resource Conservation and Recovery Act (RCRA) found at 40 CFR Parts 260 through 270. This incinerator is designed, operated and maintained to meet the emission standards of the hazardous waste combustor maximum achievable control technology (HWC MACT) rule in 40 CFR 63 Subpart EEE, The incineration system consists of a rotary kiln, secondary combustion chamber (SCC), quench chamber, air pollution control (APC) train, induced draft fans and the exhaust stack.

Pursuant to the HWC MACT provisions in 40 CFR 63.1209(c), affected facilities must analyze each feedstream in order to document compliance with the applicable feed rate limits. Provisions in 40 CFR 63.1209(c)(2) and requirements in Dow's Renewable Operating Permit, (MI-ROP-A4033-2017, EU32Incinerator-S1, IX.4.E) issued by the Michigan Department of Environmental Quality (MDEQ) require affected facilities to develop and implement a Feedstream Analysis Plan (FAP). This FAP is developed to ensure that all data used in determining compliance are unbiased, precise, and representative of the waste. As specified in §63.1209(c)(2)(i) through (vi) the plan must specify at a minimum:

1) Parameters to be analyzed in each feedstream
2) Method(s) of analysis
3) Use of analysis to document compliance
4) Test methods used to obtain the analyses
5) Sampling methods used to obtain a representative sample
6) Frequency to review or repeat the initial analysis

Dow's permit requires that the FAP describe, at a minimum, the methods for determining compliance with parameters identified in Table 1-1. In addition, this FAP must be implemented and maintained as part of the operating record.

The information presented in this document addresses the required content for a FAP as specified in §63.1209(c)(2)(i) through (vi). This FAP addresses the parameters that will ensure compliance with Dow's Renewable Operating Permit, (MI-ROP-A4033-2017, EU32Incinerator-S1, II.4 Feed Rate Limit Table) and HWC MACT operating parameter limits. This document is organized as follows:

- Section 2 provides a description of the feedstreams and the process of managing those feedstreams
- Section 3 presents the approach to demonstrating compliance with constituent feed rate limits
- Section 4 provides details of feedstream sampling including reference methods
- Section 5 addresses the analytical test methods and provides the test methods
- Section 6 presents the frequency of analysis that will be maintained to insure compliance with the constituent feed rate and emission limits.

# 2.0 32 Building Incinerator Feedstreams

This section of the FAP provides descriptions on the types of waste feedstreams, fuels used in combustion, and any other streams which may be fed to the 32 Building incinerator. An overview is also provided on the management of the streams prior to being transferred to the rotary kiln.

# 2.1 Waste Feedstreams

The incineration complex manages hazardous and non-hazardous wastes as well as low-level radionuclide waste, which is treated under a license from the U.S. Nuclear Regulatory Commission. The physical state of the wastes managed can be solid, liquid, semi-solid, vent streams, or contained gases in either bulk or packaged form. Both liquid and solid wastes are fed to the rotary kiln; liquid waste and gaseous vent streams are fed to the secondary combustion chamber. Waste fed to the incinerator includes:

- Bulk solids
- Wastewater Treatment Plant dried solids
- Containerized solids (i.e., packs)
- Bulk liquids directly incinerated from the transport container
- Contained gases directly incinerated from the transport container (typically trucks and/or cylinders)
- Liquids from waste storage tanks
- Gaseous vent streams

These wastes are generalized into categories as defined below:

- Direct burn
- Bulk Solids
- Packroom
- Cold Tar
- Hot Tar

## 2.1.1 Solids

Solid wastes are composed of WWTP dried solids, packaged wastes, and bulk solids.

- Wastewater Treatment Plant dried solids consist of bio-mass, soil and other inorganic material. Wastewater Treatment Plant dried solids are airveyed from the point of generation (1005 Building) and are fed into the kiln either through a screw auger or via the feed chute.

- Packaged waste comes in several forms (e.g., lab packs, absorbents, activated carbon, sludges from process filters and water treatment, contaminated dirt and sand, empty containers, powders, and strong oxidizers). Packs and drums are received at the pack building where they are unloaded and accumulated for placement on the pack conveyor system. The container feed rate can be adjusted on the process control computer.

- Bulk Solid wastes can consist of dirt, absorbents, cellulosics and latex polymers and wastewater treatment solids/sludges. Bulk solids are received in a hopper. At the bottom of the hopper a volumetric metering conveyor allows varying amounts of material to fall onto a variable speed closed conveyor that moves this material into the feed chute. The chute extends through the front face where the containers and solids enter the kiln. Feed rate is controlled by varying the speed of the bulk solids system volumetric conveyor.

### 2.1.2 Liquids

Liquid wastes are received at the facility in a variety of container sizes and may be transferred directly from their unloading spot to the incinerator or to storage tanks. Liquid wastes managed at the incinerator may be flammable or combustible, and have heats of combustion varying up to approximately 22,000 Btu/lb.

Liquid waste streams at the incineration complex are either incinerated directly from the transport vehicle to an incinerator nozzle or from the incinerator's waste storage tank system.

### 2.1.3 Vapors

The displaced vapors from the tanks and direct burn vessels are transferred to the incinerator system or to the activated carbon adsorption system if the incinerator is down for maintenance. The 1005 building vent is also directed to the incinerator via the combustion air.

## 2.2 Non-Waste Feedstreams

Non-waste feedstreams that can be fed to the kiln or SCC include:

- Natural gas
- Fuel oil
- Service water
- Ambient air

Natural gas is used in the rotary kiln and SCC dual-fuel and tri-fuel burners as primary auxiliary fuel. Fuel oil is a secondary auxiliary fuel and is also used for deslagging the kiln. Service water is introduced to the SCC through a steam-atomized aqueous waste feed lance. Air or steam is used to atomize liquid wastes.

## 2.3 Feedstream Management

Due to the complexity of the manufacturing and research activities carried out at the Midland Site, a wide variety of waste materials in various forms are generated on-site and off-site and managed at the incineration complex. Prior to managing a waste stream at the incineration complex, sufficient information is obtained from the generator to enable Environmental Operations personnel to determine the suitable method of treatment and details of the chemical and physical nature of the waste. To ensure that each waste stream is managed, treated, and disposed of in an appropriate manner, every waste generated in the Michigan Operations and every waste accepted from off-site locations must be characterized.

In order to streamline the characterization process for the wide variety of wastes handled, a computer based waste characterization system is used to characterize each hazardous and non-hazardous waste stream. The information is collected through use of Dow's Generator Waste Characterization Form (GWCF) via Dow's computer based waste characterization system. The Waste Characterization System (WCS) is updated frequently as new information or wastes are evaluated, or as existing wastes are no longer generated.

The WCS requires that the generator of the waste identify the chemical composition of their waste either by process knowledge or by direct analytical methods. Both the concentration range and average are entered into the WCS for each constituent in the waste stream. In addition the generator must identify the maximum concentration of any materials with feed rate limits specified in Renewable Operating Permit, (MI-ROP-A4033-2017, EU32Incinerator-S1, II.4 Feed Rate Limit Table). This maximum concentration will be used to establish the waste feed rate. Additional information provided by the generator identifies if a waste is characteristically hazardous (ignitable, corrosive, reactive, or toxic), or if it meets the definition of one of the RCRA listed hazardous wastes (F, K, P, and U lists). Information is also provided identifying if a waste is hazardous as defined under Michigan Act 451 Part 111 (toxic or Michigan S and U lists). The generator provides information about the waste using process knowledge or analysis of the waste. Waste profiles are reviewed by the waste characterization office for completeness prior to acceptance.

If sufficient data exists to ensure the appropriate treatment procedures can be implemented safely, additional analyses will not be performed. In cases where insufficient data is submitted by a waste generator, or additional information is deemed necessary, the generator will be notified and required to provide additional data and/or analysis of waste.

An example copy of the GWCF is provided in Appendix A. The information in this form shown on Appendix A is representative of the data required in the generator waste characterization form. These forms are updated as necessary. The WCS information for the wastes currently managed at the incineration complex are maintained at Environmental Operations.

# 3.0 Compliance with Constituent Feed Rate Limits

The HWC MACT prescribes that 12-hour rolling average (12-HRA) feed rate limits be established for the following MACT constituents:

- ash
- chlorine/chloride,
- mercury,
- semi-volatile metals (SVM) - cadmium and lead
- low volatile metals (LVM) - arsenic, beryllium, and chromium.

Dow's Renewable Operating Permit, (MI-ROP-A4033-2017, EU32Incinerator-S1, II.4 Feed Rate Limit Table) requires 1-hour, 8-hour, 12-hour, and 24-hour rolling average feed rate limits be established for other constituents and operating parameters as identified in Table 3-1.

The HWC MACT provisions in §63.1209(c)(4) state that *"to comply with the applicable feed rate limits of this section, you must monitor and record feed rates as follows:*

*(i) Determine and record the value of the parameter for each feedstream by sampling and analysis or other method;*

*(ii) Determine and record the mass or volume flowrate of each feedstream by a CMS.....and;*

*(iii) Calculate and record the mass feed rate of the parameter per unit time"*

Facilities are therefore required to configure their automated process control and data acquisition systems to calculate the appropriate rolling averages for each regulated constituent. Each minute the system compares the calculated rolling average value to the feed rate limit for that constituent, and for certain parameters, initiates an automatic waste feed cut-off (AWFCO) if the calculated value reaches a setpoint prior to or at the limit. Data demonstrating compliance with this requirement for the previous 5 years must be maintained in the operating record.

The purpose of this rigorous method of accounting for constituents in all feedstreams is to ensure that facilities do not feed any of these constituents in excess of their respective limits.

## 3.1 Feed Rate Limits

Dow has demonstrated compliance with the HWC MACT and MDEQ emission limits by conducting a comprehensive performance test (CPT). Feed rate limits have been established based on the more conservative of either the feed rate demonstrated during the CPT or the limit specified in the (MI-ROP-A4033-2017, EU32Incinerator-S1, II.4 Feed Rate Limit Table).

For purposes of compliance with these established constituent feed rate limits, the feedstream characteristics data and the feed rate of each stream will be used to calculate the feed rate of each regulated constituent.

# 3.2 Methodology for Determining Compliance with Constituent Feed Rate Limits

As identified above, the total feed rate of the regulated constituents must be continuously monitored, and data demonstrating compliance with these feed rate limits must be generated, recorded and stored according to both HWC MACT regulations and MDEQ. This will be accomplished by the process computer which continuously monitors the flow rate of each feedstream that may contain these constituents and multiplies that flow rate by the constituent concentration. The constituent feed rate in a particular feedstream can be calculated using the following general equation:

$$CFR_i = FR * C_i / 10^6$$

Where: $CFR_i$ = Constituent feed rate in a feedstream (lb/hr) [one-minute average]

FR = Feedstream feed rate (lb/hr) [one-minute average]

$C_i$ = Mass concentration of constituent ($mg_i$ / $kg_{feed}$)["analysis of record"]

i = Regulated constituent

The total feed rate of each constituent is summed across all feedstreams. The feed rate of SVM is determined from the combined quantities of cadmium and lead in all feedstreams; the feed rate of LVM is determined from the combined quantities of arsenic, beryllium and chromium. The constituent feed rate values determined from the one-minute values are used to calculate 1-hour, 8-hour, 12-hour, and 24-hour rolling averages as shown in the equation below:

$$RA = \frac{\sum_{n=1}^{i} CFR_i}{i}$$

Where:

RA = rolling average

i = number of minutes in the averaging time period (e.g., 1-hour = 60 minutes; 12-hour = 720 minutes, etc.)

The rolling average calculation is frozen while the source is not operating and during periods of intermittent operation consistent with the requirements of 40 CFR 63.1209(b)(5)(ii) and (iii).

Compliance with the feed rate limits of each regulated constituent will be accomplished by comparing the computed rolling average (every minute) to the respective constituent feed rate limit values. Rolling averages will be calculated automatically whenever the incineration system is in operation.

According to the provisions in §63.1209(c)(5), Dow is not required to monitor levels of metals or chlorine in process air (ambient air), natural gas, or feedstreams from vapor recovery systems (vent streams) to document compliance with feed rate limits provided that they document in the CPT Plan expected levels of the constituent in the feedstream and account for those assumed feed rate levels in documenting compliance with feed rate limits. As documented in the CPT Plan, insignificant levels of regulated constituents are expected in the natural gas, process air and vent streams. The 1005 building vent stream is routed to the incinerator with the combustion air. The MACT constituent of concern within this vent stream would be chlorine; however it is expected to be an insignificant incremental addition to the total chlorine feed. The incinerator AWFCO limit for chlorine has been conservatively adjusted down 200 lb/hr to account for all vent streams.

The constituent concentrations will be determined for specified feedstreams according to procedures described in Section 4. For each regulated constituent, the concentration used will be from the WCS and will be updated based on the most recent process knowledge or results from analysis.

The analysis of record values will be entered into the Process Information Management System (PIMS). The Process Control Computer (PCC) and PIMS will perform all feed rate calculations including the rolling averages. This data will be retained for 5 years.

For specific feed rate limits identified in MI-ROP-A4033-2017, EU32Incinerator-S1, II.4 Feed Rate Limit Table, the PCC/PIMS will compare the appropriate constituent rolling average values to the feed rate setpoint. If the rolling average concentration is greater than the rolling average feed rate setpoint, the PCC/PIMS will send a signal to stop the feed of hazardous waste. The data will be stored in the PCC/PIMS for recording and reporting.

Rolling averages will be calculated and compared to the Air Permit for those feed rate limits not subject to AWFCO requirements. If a feed rate limit rolling average approaches the permitted limit, an audible alarm will notify the operator to perform corrective action before the permit limit is exceeded. The data will be stored in the PCC/PIMS for recording and reporting.

For some regulated constituents, the feed rate limit can not possibly be exceeded based on insignificant quantities in the feedstreams and physical limits on the maximum possible feed rate of waste streams. Compliance with the feed rate limits of these constituents will be accomplished by determining a maximum 1-hour, 8-hour, 12-hour, or 24-hour flowrate and the maximum concentration of the constituent. The PCC/PIMS system will compare actual flowrate to the maximum set point. If the applicable average is reached then the PCC/PIMS will send a signal to either 1) sound an alarm to notify the operator or 2) stop the feed of hazardous waste for those feed rate limits regulated by AWFCO requirements.

## 3.3 Methodology for Determining Compliance with Organic Compound Feed Rate Limit

MI-ROP-A4033-2017, EU32Incinerator-S1, II.4 Feed Rate Limit Table restricts the feed rate of each organic compound to a 1-hour rolling average of 11,000 lbs/hr. It is impractical to collect and record one-minute and 1-hour rolling average feed rate data for each organic compound given the very large number of organic compounds that are or could be fed to 32 Incinerator. There are other permit and physical restrictions that make this record keeping unnecessary to document compliance with this limit. These limits are explained in the following sections.

## 3.3.1 BTU Limit

MI-ROP-A4033-2017, EU32Incinerator-S1, II.4 Feed Rate Limit Table restricts the maximum heat output of the total feed rate to 32 Incinerator to 130 MM BTU/hr. Any organic compound with a heat of combustion greater than 11,818 BTU/lb (130 MM BTU/hr ÷ 11,000 lbs/hr) would cause 32 Incinerator to reach the BTU limit before it would reach the organic compound feed rate limit. Therefore, compliance with the BTU limit demonstrates compliance with the organic feed rate limit for all aliphatic (ex. 1,3-butadiene) and aromatic (ex. styrene) hydrocarbons and other organic compounds that primarily consist of carbon and hydrogen.

## 3.3.2 Chlorine Feed Rate Limit

MI-ROP-A4033-2017, EU32Incinerator-S1, III.4 AWFCO Table restricts the maximum chlorine and chloride feed rate to 32 Incinerator to 5,538 lbs/hr. Any organic compound with a chlorine content greater than 53% (5,838 lb/hr ÷ 11,000 lbs/hr) would cause 32 Incinerator to reach the chlorine limit before it would reach the organic compound feed rate limit. Therefore, compliance with the chlorine limit demonstrates compliance with the organic feed rate limit for all chlorinated organic compounds that are greater than 53% chlorine by weight (ex. methylene chloride).

## 3.3.3 Container Waste Feed Capacity Limits

Organic waste is primarily fed to the incinerator from tanks, rail cars, trucks, dinos, dempsters and packs. Limited quantities of organic compounds can also be fed to the incinerator through bulk solids, WWTP solids and vent feeds systems. Each of these systems has dedicated unloading equipment that has physical capacity restrictions. Approximate waste feed capacities for each feed system are listed in Table 3-1.

**Table 3-1 Maximum Waste Feed Capacity by System**

**32 Building Incinerator**
**Midland, MI Facility, Dow Chemical Company**

| Feed System | Waste Feed Capacity [1] |
|---|---|
| Tank Farm | 10,000 lbs/hr |
| Rail Car | 10,000 lbs/hr |
| Trucks | 12,500 lbs/hr |
| Dino | 2,500 lbs/hr |
| Dempster | 2,500 lbs/hr |
| Pack Line | 6,000 lbs/hr |
| Bulk Solids | 8,000 lbs/hr |
| WWTP Solids | 8,000 lbs/hr |
| Vent System | 200 lbs/hr |

1 It is not possible to feed all systems at capacity simultaneously.

In order for a single organic compound to have the potential to be fed at greater than 11,000 lbs/hr it generally would need to be present in multiple different waste streams and container types. Due to the diverse nature of the wastes handled at 32 Incinerator many organic compounds are sent to the incinerator from a single source in a single container type. This physically prevents these compounds from being fed to the incinerator in excess of 11,000 lbs/hr.

Vent streams will not be included in the evaluation for determining compliance with the 11,000 lbs/hr organic feed rate limit annual review due to the deminimus quantities of a specific compound in the vent streams

## 3.3.4 Waste Supply Limit

As indicated in Table 3-1 the truck waste feed system has a capacity of 12,500 lbs/hr. Organic compounds that are processed in trucks at greater than 88% (11,000 lbs/hr ÷ 12,500 lbs/hr) concentration have the potential to exceed 11,000 lbs/hr. Most waste streams do not contain this high a concentration of a single organic compound. 32 Incinerator does receive a limited number of waste streams in trucks that exceed 88% concentration of a single organic compound. However, to exceed the 11,000 lbs/hr there would need to be the equivalent of 5 truckloads (greater than 200,000 lbs) of one of these waste streams at the incinerator simultaneously. The current quantities of these waste streams that are generated will not allow this quantity of waste to accumulate at the incinerator even after taking into account generator storage (90 days maximum) and incinerator complex storage practices. Fewer truckloads of these waste streams in combination with waste in other types of containers with significant levels of the same organic compound have also been evaluated for the potential to exceed 11,000 lbs/hr. There is no combination of current waste streams sent to the incinerator that will exceed the 11,000 lbs/hr limit.

### 3.3.5 Maximum Waste Feed Rate Limits

MI-ROP-A4033-2017, EU32Incinerator-S1, II.4 Feed Rate Limit Table and/or the HWC MACT Notification of Compliance restricts maximum total pumpable feed rate to kiln and SCC to 21,569 lbs/hr, maximum solid waste feed to 21,500 lbs/hr and maximum total waste feed rate to the incinerator to 35,538. Only organic compounds that appear in liquid waste streams at greater than 51% (11,000 lbs/hr ÷ 21,569 lbs/hr) concentration, solid waste streams at greater than 51% (11,000 lbs/hr ÷ 21,500 lbs/hr) concentration or in liquid and solid waste streams at greater than 31% (11,000 lbs/hr ÷ 35,538 lbs/hr) concentration could possibly exceed the 11,000 lb/hr organic compound feed rate limit. This eliminates from consideration a large number of organic compounds that appear in waste streams at relatively low levels.

### 3.3.6 Evaluation of Specific Organic Compounds

Table 3-2 lists the organic compounds that appear in waste streams at greater than 31% concentration and are incinerated in sufficient volume to be evaluated for the potential to exceed 11,000 lbs./hr feed rate. The feed rate control as described in sections 3.3.1 to 3.3.4 that limits organic feed rate to less than 11,000 lbs./hr is listed in the table.

### 3.3.7 Evaluation of Changes to Waste Streams

Waste streams are evaluated annually for the potential to cause an organic compound to be fed to the incinerator in excess of 11,000 lbs./hr using the process outlined in this Section. If an organic compound is identified as having the potential to exceed the 11,000 lbs./hr feed rate limit the following actions will be taken:

(1) Update table 3-2 of the plan to include the organic compound.
(2) If necessary (i.e., heat of combustion is not greater than 11,818 BTU/lb, chlorine content is not greater than 53%, etc.), the 1-hour rolling average feed rate for the specific organic compound will be calculated and recorded as described in section 3.2 of the plan.

Any updates to the plan will be submitted to the AQD District Supervisor for review and approval.

## Table 3-2 Organic Compounds in Waste Streams above 31% Concentration

### 32 Building Incinerator
### Midland, MI Facility, Dow Chemical Company

| Compound | Feed Rate Control |
|---|---|
| Acetic Acid | Container Waste Feed Capacity Limit [1] |
| Acetic Acid: Anhydride | Container Waste Feed Capacity Limit [1] |
| Acetone | Heat of combustion greater than 11,818 btu/lb |
| Acetonitrile | Heat of combustion greater than 11,818 btu/lb |
| Acrylonitrile | Heat of combustion greater than 11,818 btu/lb |
| 3-BUTEN-2-ONE: 1;1;1-TRIFLUORO-4-(1-PYRROLIDINYL)- | Heat of combustion greater than 11,818 btu/lb |
| Chloroacetyl Chloride | Chlorine content greater than 53% |
| Chlorophenol | Container Waste Feed Capacity Limit [1] |
| Chlorobenzene | Heat of combustion greater than 11,818 btu/lb |
| 2-chloropropane | Container Waste Feed Capacity Limit [1] |
| Cyclohexanone | Heat of combustion greater than 11,818 btu/lb |
| Decanes | Heat of combustion greater than 11,818 btu/lb |
| DEG | Waste Supply Limit [2] |
| Diphenyl Oxide | Heat of combustion greater than 11,818 btu/lb |
| Dow Corning Alkoxysilane | Container Waste Feed Capacity Limit [1] |
| Dichloropropane | Waste Supply Limit [2] |
| Diethyl Benzene | Heat of combustion greater than 11,818 btu/lb |
| Dimethyl Formamide | Container Waste Feed Capacity Limit [1] |
| Dimethyl Ether | Heat of combustion greater than 11,818 btu/lb |
| Dowanol DPH | Heat of combustion greater than 11,818 btu/lb |
| Dowanol TMAT | Heat of combustion greater than 11,818 btu/lb |
| 1;2-Ethanediamine; Monohydrochloride | Waste Supply Limit [2] |
| 1,2-Ethanediol | Container Waste Feed Capacity Limit [1] |
| Ethanol | Waste Supply Limit [2] |
| Ethyl Acetate | Container Waste Feed Capacity Limit [1] |
| Ethyl Benzene | Heat of combustion greater than 11,818 btu/lb |
| Glycol Ethers | Container Waste Feed Capacity Limit [1] |
| Heptane | Heat of combustion greater than 11,818 btu/lb |
| Hexamethyldisilazane | Container Waste Feed Capacity Limit [1] |
| Hydrocarbon Oils | Heat of combustion greater than 11,818 btu/lb |
| Isooctane | Heat of combustion greater than 11,818 btu/lb |
| Isopropyl Alcohol | Heat of combustion greater than 11,818 btu/lb |
| Kerosene | Heat of combustion greater than 11,818 btu/lb |
| Methanol | Waste Supply Limit [2] |
| Methyl Ethyl Ketone | Heat of combustion greater than 11,818 btu/lb |
| Methylene Chloride | Chlorine content greater than 53% |
| Mineral oil | Heat of combustion greater than 11,818 btu/lb |
| Naphtha | Heat of combustion greater than 11,818 btu/lb |
| 2-Octanol | Waste Supply Limit [2] |
| Perchloroethylene | Chlorine content greater than 53% |

**Table 3-2 (Continued)**

| | |
|---|---|
| Pentachloropyridine | Container Waste Feed Capacity Limit 1 |
| 1-Propene | Heat of combustion greater than 11,818 btu/lb |
| 2-Propenenitrile | Heat of combustion greater than 11,818 btu/lb |
| Pyridone | Waste Supply Limit 2 |
| 'Siloxanes and Silicones; Di-Methyl | Container Waste Feed Capacity Limit 1 |
| Styrene | Heat of combustion greater than 11,818 btu/lb |
| Tars | Heat of combustion greater than 11,818 btu/lb |
| 1,1,1,2 Tetrachloroethane | Chlorine content greater than 53% |
| Tetrahydrofuran | Heat of combustion greater than 11,818 btu/lb |
| Toluene | Heat of combustion greater than 11,818 btu/lb |
| 2,4,6-Trichlorophenol | Waste Supply Limit [2] |
| Trichloropropylsilane | Chlorine content greater than 53% |
| Triethylamine | Heat of combustion greater than 11,818 btu/lb |
| Trimethylbenzene | Heat of combustion greater than 11,818 btu/lb |
| Vinylidene Chloride | Chlorine content greater than 53% |
| Xylene | Heat of combustion greater than 11,818 btu/lb |

1 Container Waste Feed Capacity Limit is described in Section 3.3.3

2 Waste Supply Limit is described in Section 3.3.4

# 4.0 Feedstream Sampling and Analytical Methods

## 4.1 Approach

As identified in Section 2.2, the WCS is used to characterize each waste stream and information on each stream is entered into a dynamic database. Information on the feedstreams is reviewed on a routine basis to obtain the information needed to store and blend waste at the feed tank farm and to treat wastes in the incineration system. A running mass balance will be maintained on the blended waste feed tanks. When the generator's process knowledge is sufficient to characterize the waste, actual analyses of waste may not be conducted. The WCS is updated frequently as new information or wastes are evaluated, or as existing wastes are no longer generated.

An annual review will be performed on the waste streams identified in the database that were incinerated in the prior year. Sampling of major streams (>250,000 lbs/yr) will be performed if the stream is expected to be valid for the next 12 operating months and has not been sampled in the prior three years. The review will also look at streams which contain a sufficient quantity of regulated constituents to exceed mass input limits as defined by MI-ROP-A4033-2017, EU32Incinerator-S1, II.4 Feed Rate Limit Table by looking at the method of feed and the maximum concentration for feed rate restricted chemicals. If it is determined that a mass input limit could be exceeded given a reasonable feed rate, then the stream will be reviewed further by looking at other variables such as the total amount of waste generated in a year or by looking at any recent analytical results (prior 3 years). If there is still a chance that these streams could exceed a mass input limit, then the stream may be analyzed. Sampled streams will be analyzed for ash, total chlorine, chlorides, specific metals, heating value, and viscosity. Process knowledge will be used to determine if additional component testing for items listed on MI-ROP-A4033-2017, EU32Incinerator-S1, II.4 Feed Rate Limit Table or organic nitrogen is required.

For waste streams that were incinerated at 250,000 pounds or more in the past year, analytical data will be maintained or collected. As stated previously, any streams without actual analytical analysis will still have sound process knowledge to show what constituents are present in these waste streams. Process knowledge is used as a viable technique and is based on known inputs and outputs of the processes. Records will be maintained in the operating record to identify which streams are sampled based on this quantitative approach. If audit results indicate analyses are outside of a given WCS range, the WCS will be updated as appropriate. Additional analyses may be required as part of this plan.

## 4.2 Sampling methods

Due to the large number of different types of waste received at the Michigan Operations Incineration Complex, the methods and equipment used for sampling wastes will vary with the form and consistency of the material to be sampled. The sampling methods used may be those referenced in R 299.9212(7) [40 CFR 261 Appendix I]. Where appropriate, equivalent methods may be used, or standard methods may be modified to adapt to actual process conditions and waste conditions.

## 4.3 Analytical Test Methods

The selection of the analytical method depends upon sample matrix, the detection level, the specificity required, and other variables that must be determined on a case-by-case basis.

The appropriate testing methods used will be those described in the latest edition of SW-846 "Test Methods for Evaluating Solid Waste", U.S. EPA, or other equivalent methods. The actual method used for analysis will be specified in the report.

The following resources or test methods may be used as appropriate to determine waste characteristics:

1) Chemical Composition can be determined by:
   a) Process knowledge
   b) Spectroscopic analysis
   c) Gas Chromatography, method 8000* through 8151* inclusive*
   d) Gas Chromatography, Mass Spectroscopy, method 8260 through 8290 or as appropriate
   e) Other appropriate methods

2) Heat of Combustion can be determined by:
   a) Process knowledge
   b) Determined by oxygen bomb calorimeter procedures
   c) Other appropriate methods

3) Halogen content may be determined by a variety of methods dependent on specific properties such as:
   a) Process knowledge
   b) Typical chlorine analysis methods as described in Encyclopedia of Industrial Chemical Analysis, Volume 9
   c) Bromine analysis as described in Encyclopedia of Industrial Chemical Analysis, Volume 8
   d) Other appropriate methods

4) Sulfur content can be determined by:
   a) Process knowledge
   b) The test methods described in Encyclopedia of Industrial Chemical Analysis, Volume 18, page 360
   c) Other appropriate methods

5) Metals content can be determined by:
   a) Process knowledge
   b) Atomic absorption Spectrographic method number *7420, *7421, *7470, *7471
   c) Other appropriate methods

* Test methods for Evaluating Solid Waste, published by U.S. EPA, SW-846, Latest Edition.

## 4.4 Project Quality Assurance Plan

The appropriate quality assurance/quality control procedures as specified in the SW-846 methods will be followed. The goal of the quality assurance process is to insure that the information and data is technically appropriate, statistically valid, and properly documented. The quality assurance process provides the highest quality data possible or needed, within the constraints of the existing methods, sample matrix, and informational needs. The amount of quality assurance review that is needed may vary depending on the complexity of analyses required for the waste management method or regulatory program.

The quality control procedures are used to estimate and evaluate the reliability of the analytical data and to determine the necessity or the effect of corrective action on sampling, storage, shipping and analytical procedures. Inaccuracies can result from many causes, including unanticipated matrix effects, equipment malfunctions, and operator error. These factors are minimized through the use of quality control procedures by means of precision, accuracy, method detection limit studies, recovery determination, and other quantifiable and qualitative indicators.

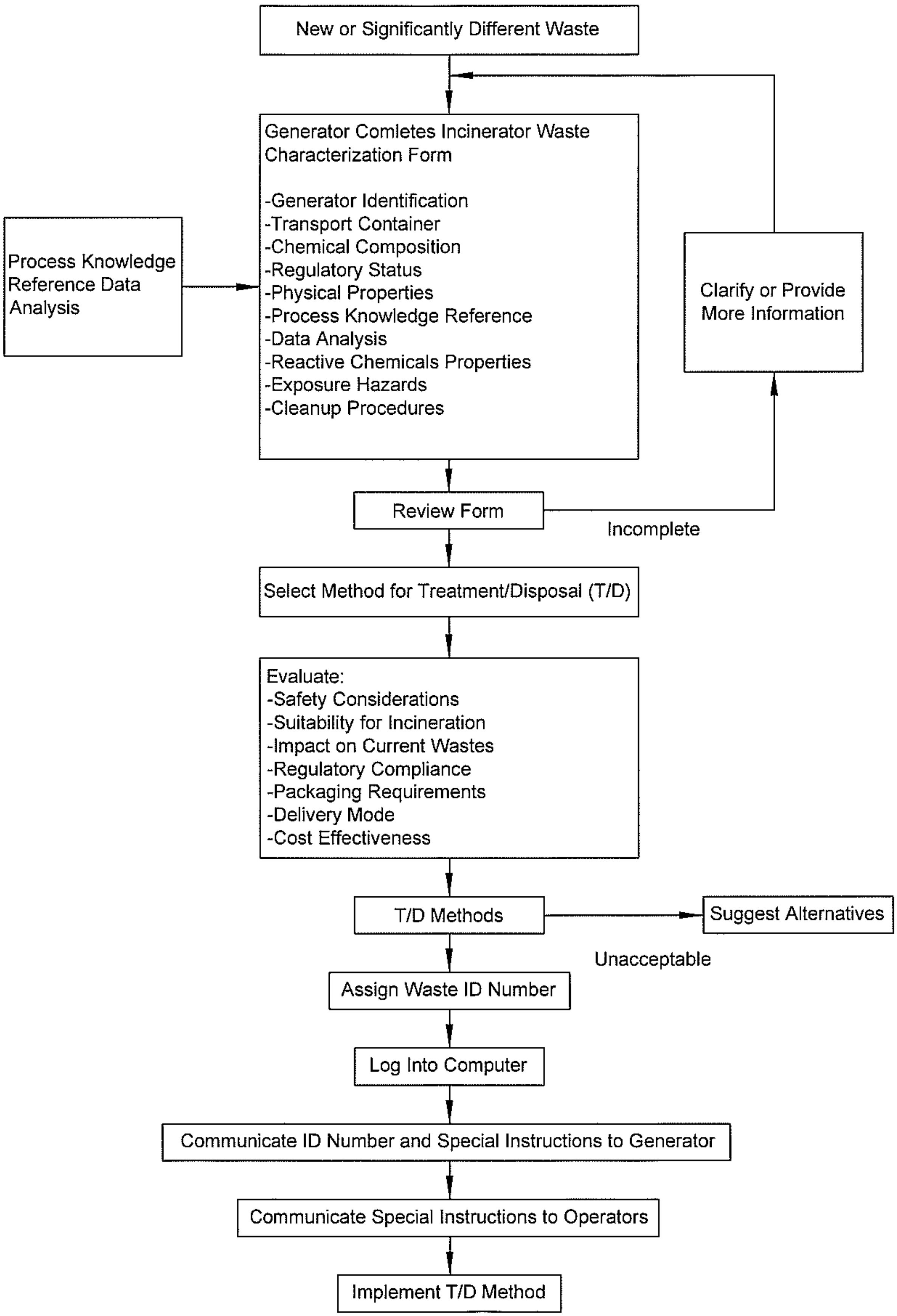
# 5.0 Frequency of Analysis

It has been and will continue to be standard practice at Dow for the generator to re-characterize their waste streams whenever a process modification results in the waste falling outside of its current waste characterization parameters. The waste will be considered a new waste and will be reviewed before the new waste will be incinerated according to the Logic Diagram for Treatment and Disposal of Hazardous Waste at the Incineration Complex described in Figure 5-1. All other waste characterizations will be reviewed for completeness, changes and obsolescence by the generator at least once every five years.

The facility will perform a review of the data obtained from each sampling event. The WCF will be updated incorporating the most recent analytical results as appropriate.

Figure 5-1

Logic Diagram for Treatment and Disposal of Hazardous Waste at the Incineration Complex



# Dow Waste Characterization Form - Example

The Dow Waste Characterization Form consists of a series of subject matter forms. The subject matter forms are used and included only when they are applicable to a individual waste stream. Not all subject matter forms will be applicable for every waste stream. Dow utilizes an electronic system in order for generators to complete the GWCF. If information is not pertinent to a particular stream, then pages on the detailed GWCF are currently printed with blanks. In order to reduce the amount of blank paper printed needlessly, one improvement that has been applied to the GWCF is that the generator will be able to print the Profile Summary Report, which includes only the applicable information. A list of the subject matter form names and a brief overview of their content is given below.

| Form Name | Included For: | Length | Signature? |
|---|---|---|---|
| Submittal Form | All wastes | 1 page | Yes |
| Profile Summary Report | All wastes | 3-6 pages | No |
| LDR Forms listed below: | Hazardous wastes only | | |
| • LDR Off-site shipments | Wastes sent to Dow from off-site | 1 page | No |
| • LDR Appendix IV Lab Pack Certification | RCRA Hazardous Lab Packs only | 1 page | Yes |
| • LDR Notification | RCRA Hazardous wastes | 1-2 pages | Yes |
| • LDR Certification | RCRA Hazardous with land disposal | 1 page | Yes |
| • LDR Attachment 1 | RCRA Hazardous with RCRA F codes | 1 | No |
| • LDR Attachment 2 (UHCs/UTS) | RCRA Hazardous with RCRA D codes | 10 pages | No |

Examples of each form are included below.

EXAMPLE OF SUBMITTAL FORM

<< Back to Home

## THE DOW CHEMICAL COMPANY UNIVERSAL WASTE CHARACTERIZATION

**** Waste Profile Number: 132742-000**
**** Tracking ID: 62213**

### A .GENERATOR INFORMATION

1. Company Name: b. Phone:
2. Street Address:
3. Generator EPA ID #:
4. Contact Name: b. Dow ID # :
5. Plant Site/Name/OPN:
6. DOWFAS Account # (15 digits):

### B .GENERAL INFORMATION

1. Waste Title (80 char):

### C .RECEIVER INFORMATION

1. Proposed location that waste will be sent to (Enter 'New' in last column if this is not an update of an existing profile):

**GENERATOR/CONTACT PERSON CERTIFICATION**
**(MUST be trained in RCRA management)**

I certify that, based on process knowledge, laboratory analysis, or my inquiry of those individuals immediately responsible for obtaining this information, the information on this form is true, accurate and complete, I am aware that significant penalties (including the possibility of fine and imprisonment) may be assessed for knowingly causing the improper classification and/or disposal of wastes.

| | | | | | |
|---|---|---|---|---|---|
| Name(printed): | | | | Master #: | |
| Title: | | Bldg # : | | Telephone # : | |
| Signature(original): | | | | Date: | |

EXAMPLE OF PROFILE SUMMARY REPORT

<< Back to Home

THE DOW CHEMICAL COMPANY WASTE CHARACTERIZATION Summary

** Waste Profile Number: Example WPN

** Tracking ID:

## A .GENERATOR INFORMATION

1. a. Contact Name: b. Dow ID #

c. Contact Building #: d. Telephone #: e. Fax #:

2. Waste is from a. Plant Site/Name/OPN:

b. Control Rm. Telephone #: c. Waste pick-up location:

3. DOWFAS Account # (15 digits) 4. Need Date:

## B .GENERAL INFORMATION

1. Waste Title (80 char):

2. US DOT Waste Description

3. a. Waste Source

4. a. Anticipated frequency b. Expected generation rate

c. Quantity currently in inventory d. Storage capacity:

5. Container Information

| Category | Type of Container | Material of Construction of Container | Capacity of Container |
|---|---|---|---|
| | | | |
| | | | |

6. Primary Determination Method

Process Knowledge:

## C .RECEIVER INFORMATION

| Site | EMU Description | Package Type | Max. Apprv. Wt. | Unload Desig. | Recharge Category | Prim. |
|---|---|---|---|---|---|---|
| | | | | | | |

## D .WASTE COMPOSITION

Composition Type: ORIGINAL INPUT BY USER

| Component Name | CAS Number | DR Number | Concentration Range with units (% WT, PPM, etc) | | | Aver. Conc. | Additive | Detrm. Meth. |
|---|---|---|---|---|---|---|---|---|
| | | | | to | | | | |
| | | | | to | | | | |
| | | | | to | | | | |
| | | | | | TOTAL: | 100 +/- 0.5% | | |

Composition Type: THEORETICAL COMPOSITION AFTER BREAKDOWN

| Component Name | CAS Number | DR Number | Concentration Range with units (% WT, PPM, etc) | | | Aver. Conc. | Additive | Detrm. Meth. |
|---|---|---|---|---|---|---|---|---|
| | | | | to | | | | |
| | | | | to | | | | |
| | | | | to | | | | |
| | | | | | TOTAL: | 100 +/- 0.5%% | | |

## E .PHYSICAL CHARACTERISTICS

1. **Physical state of waste as generated:**

2. **Physical state of waste as shipped:**

3. **Specific properties.** DM = Determination Method (i.e. Analytical, Process Knowledge, Best Engineering Judgement, Calculated). Only the properties applicable to a given waste stream will be completed.

| Property | Avg. | Unit | Calc. Avg. | Unit | Text Value/Cmnt | DM |
|---|---|---|---|---|---|---|
| 1,2-DICHLOROETHANE | | | | | | |
| 2-PROPENEAMINE | | | | | | |
| 2-PROPENEAMINE POLYMERS | | | | | | |
| ALUMINUM NITRIDE | | | | | | |
| ANTIMONY CONTENT | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| ARSENIC CONTENT | | | | | |
| ASH | | | | | |
| BERYLLIUM CONTENT | | | | | |
| BIS CHLOROMETHYL ETHER | | | | | |
| BROMINE CONTENT | | | | | |
| CADMIUM CONTENT | | | | | |
| CARBON CONTENT | | | | | |
| CHLORINE CONTENT | | | | | |
| CHROMIUM CONTENT | | | | | |
| CHROMIUM VI CONTENT | | | | | |
| COBALT CONTENT | | | | | |
| COPPER CONTENT | | | | | |
| DENSITY | | | | | |
| ETHANOL | | | | | |
| FLASHPOINT | | | | | |
| FLUORINE CONTENT | | | | | |
| HEAT OF COMBUSTION | | | | | |
| HYDRAZINE | | | | | |
| HYDROGEN CONTENT | | | | | |
| IODINE CONTENT | | | | | |
| LEAD CONTENT | | | | | |
| LITHIUM CONTENT | | | | | |
| MANGANESE CONTENT | | | | | |
| MERCURY CONTENT | | | | | |
| METHANOL | | | | | |
| MOLES OF H+ | | | | | |
| NICKEL CONTENT | | | | | |
| NITROGEN CONTENT | | | | | |
| OXYGEN CONTENT | | | | | |
| PCB | | | | | |
| PH | | | | | |
| PHOSPHOROUS CONTENT | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| PLATINUM CONTENT | | | | | |
| POTASSIUM CONTENT | | | | | |
| QUINOLINE | | | | | |
| SILVER CONTENT | | | | | |
| SODIUM CONTENT | | | | | |
| SULFUR CONTENT | | | | | |
| SULFURIC ACID CONTENT | | | | | |
| TETRACHLOROSILANE | | | | | |
| THALLIUM CONTENT | | | | | |
| TOLUENE | | | | | |
| TOTAL DISSOLVED SOLIDS | | | | | |
| TOTAL ORGANIC CARBON | | | | | |
| VINYL CHLORIDE | | | | | |
| ZINC CONTENT | | | | | |

4. **Reactive Chemical Properties**

**Handling Indicators:**

**Explanations:**

5. **Safety and Exposure Hazard**

**Explanations:**

Applicable safety and exposure hazards would appear here.

**Handling**

| Type | PPE to wear in normal handling situations will be listed here (i.e. monogoggles, gloves, etc) |
|---|---|
| | |
| | |
| | |

**Spill**

| Type | PPE to wear in spill situations will be listed here (i.e. monogoggles, gloves, etc) |
|---|---|
| | |
| | |

| | |
|---|---|
| | |

Cartridge Type:

Others:

Absorbents - USE:

Additional absorbents to USE:

Absorbents - AVOID:

Additional absorbents to AVOID:

How is the waste handled at the manufacturing plant? List any special precautions or procedures:

Other precautions:

7. Have there been any known problems with treating this waste in the past?

Reference Codes

**Profile** (if no codes listed, none apply)

| Refr. Code Type | Refr. Code | Description | Confirmed |
|---|---|---|---|
| EPA SOURCE CODES | G Code | | |

**Substance** (If no RCRA Codes appear below then the waste is not RCRA Hazardous; If blank, no codes apply) The codes shown below are examples of the type of codes that would appear in this section.

| Refr. Code Type | Refr. Code | Description | Confirmed |
|---|---|---|---|
| APPLICABLE REGULATIONS | RCRA HAZ | | |
| APPLICABLE REGULATIONS | TSCA 5E | | |
| MICHIGAN ACT 451 PART 121 REGULATED NON-HAZARDOUS WASTE | L Codes | | |
| RCRA Hazard Waste Codes | D Codes | | |
| RCRA Hazard Waste Codes | F Codes | | |
| RCRA Hazard Waste Codes | U Codes | | |
| RCRA Hazard Waste Codes | P Codes | | |

| | | | |
| --- | --- | --- | --- |
| RCRA Hazard Waste Codes | K Codes | | |

**Receiver** (If no codes listed, none apply)

| Receiver | Refr. Code | Description | Confirmed |
| --- | --- | --- | --- |
| | | | |
| | | | |

**Comments**

**Profile**

| Comment Type | Comment |
| --- | --- |
| | |

**Substance**

| Comment Type | Comment |
| --- | --- |
| | |
| | |
| | |

# EXAMPLE OF LDR OFF-SITE SHIPMENTS FORM

## A. LDR OFF-SITE SHIPMENTS

1. If the waste is to be transported to an off-site facility, complete the following generator information and send the applicable LDR Worksheet Sections and Attachments with the *initial* shipment of the waste

   Name: ______________________ Phone ____________

   Company: ______________________ EPA ID # ____________

   Address: ______________________

2. The waste identified on the accompanying ____________ (name of State) Hazardous Waste Manifest Number ____________ : ☐ does/ ☐ does not meet the applicable LDR treatment standards.

3. The waste will be shipped to the following treatment, storage, or disposal unit or facility:

   ☐ **Rotary Kiln** Dow Location ______________________

   ☐ **Permitted Storage** Dow Location ______________________

   ☐ **Landfill** Dow Location ______________________

   ☐ **Other Company**

   **Facility Name** ______________________

   **Location** ______________________

   **Note:** Use the forms provided by the outsite company for Waste Characterization and Land Disposal Restriction documentation rather than this LDR Worksheet unless the company does not have available forms.

EXAMPLE OF LAB PACK CERTIFICATION FORM

**THE DOW CHEMICAL COMPANY**
**APPENDIX IV LAB PACK CERTIFICATION**

** For help on using Lab Packs, see guidance from the Main Form, Section D.

*Complete this form only if the pack contains waste having at least one RCRA Hazardous Waste Number*

Name: ____________________ Phone ________
Company: ____________________ EPA ID # ________
Address: ____________________
____________________

The waste identified on the accompanying ____________ (name of State) Hazardous Waste Manifest Number ____________ (off-site shipments only) is an Appendix IV lab pack containing the following EPA Hazardous waste number(s) and will be incinerated at:

☐ Rotary Kiln Dow Location

☐ Other Company Name and Location ____________________

____________________

____________________

☐ This lab pack does not contain any constituents found in 40 CFR Part 268, Appendix IV

| Chemical Name | *EPA Hazardous Waste Number* | Quantity & Units |
|---|---|---|
| | | |

The wastes do not meet the treatment standards specified in 268, Subpart D. The alternate lab pack treatment standards under 268.48(c) will be used. As required by 40 CFR 268.7, the following certification is made:

> I certify under penalty of law that I personally have examined and am familiar with the waste and that the lab pack contains only wastes that have not been excluded under Appendix IV to 40 CFR Part 268 and that this lab pack will be sent to a combustion facility in compliance with the alternative treatment standards for lab packs at 40 CFR 268.49(c). I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.

Authorized signature: ____________________ Date: ____________
Printed or Typed Name: ____________________ Title: ____________

EXAMPLE OF LDR NOTIFICATION

**C. LAND DISPOSAL RESTRICTION NOTIFICATION**

This waste is subject to Land disposal Restrictions under 40 CFR 268. Attach Waste Analysis, if available.

1. This waste ☐ requires treatment to meet the LDR requirements. *Do not complete Section E.*

   ☐ meets the treatment standards or has been treated by the LDR specified technology. *(Complete Section E, LDR Certification, in addition to the other sections.)*

2. This waste meets the definition of a: ☐ Wastewater ☐ Non-wastewater.

*A wastewater is a waste that contains <1% by weight Total Suspended Solids AND <1% by weight Total Organic Carbon*

3. The information applicable to this waste is identified below. Check off at least one of the applicable boxes below. If you do not know which box(es) to check, consult the Approver.

   a. ☐ The waste is not restricted because there is no land disposal (or land disposal of waste treatment residues, e.g., ash).

   b. ☐ The waste is a F001-F005 spent solvent. Complete the LDR Attachment 1 to specify the applicable constituents.

   c. ☐ The waste is F039 multi-source leachate. Complete the LDR Attachment 2 to specify the constituents present in the waste.[a]

   d. ☐ The waste is an EPA listed hazardous waste (other than F001-F005, F039) as determined in Section A.4 of the RCRA Assessment Worksheet. Copy the EPA hazardous waste numbers to Section D of this LDR worksheet.

   e. ☐ This is a RCRA hazardous wastewater that is treated in a elementary neutralization system, wastewater treatment system, is discharged through an NPDES outfall, and/or is sent to a Publicly Owned Treatment Works, which are all subject to the Clean Water Act. Subsequent to generation, the wastewater becomes exempt from further RCRA regulation because it is managed as specified at 40 CFR 261.4(a)(2). Copy the EPA hazardous waste numbers from Section A and B of the RCRA Assessment Worksheet.to Section D of this LDR worksheet. [This is the One-time Notice to File Pursuant to 40 CFR 268.7(a)(7)].

   f. ☐ The waste is characteristically hazardous (D001-D043) as determined in specified in Section B of the RCRA Assessment Worksheet. Copy the EPA hazardous waste numbers to Section D of this LDR worksheet. Complete the LDR Attachment 2 for the Underlying Hazardous Constituents present in the waste.[a,b] Specify any applicable Subcategories for these characteristic wastes in Section D of this LDR Worksheet. (Refer to LDR Treatment Standards Table)

   g. ☐ The waste is RCRA-hazardous debris that will be or has been treated via alternative treatment technologies. Copy the applicable EPA hazard codes (D,K,F,P,U) associated with the debris to Section D of the LDR worksheet. Attachments 1 and 2 do not need to be filled out. **Contact the Approver before checking this box.**

   h. ☐ This waste is soil contaminated with RCRA-hazardous waste for which the Alternative LDR Treatment Standards for Soil of 40 CFR 268.49 (see Soil Alternative Concentration Limits) will be used. **Contact the Approver before checking this box.** If the Alternative LDR Treatment Standards for Soil are not going to be used, then treat the contaminated soil as any other RCRA-hazardous waste.

[a] LDR Attachment 2 is not required for Freeport on-site generators who send this waste to the B-33 Rotary Kiln Incinerator. For other situations where the waste will be monitored for all constituents, there is no need to specify them. Consult the Approver if you have questions.

[b] LDR Attachment 2 is not required for the following Subcategories:

D001 ignitable wastes that are incinerated or recovered,
D003 reaactive cyanides or sulfides,
D006 cadmium batteries,
D008 lead acid batteries,
D009 high mercury organic wastes, and
D009 high mercury inorganic wastes.

**D. EPA HAZARDOUS WASTE NUMBER(S) AND SUBCATEGORY IDENTIFICATION**

Refer to the guidance document (use the hyperlink above) or LDR Treatment Standards Table for help in determining the applicable Subcategories.

| **EPA Hazardous Waste Number** | **Subcategory (if applicable)** | **EPA Hazardous Waste Number** | **Subcategory (if applicable)** |
|---|---|---|---|
| *(RCRA codes appear here)* | | | |
| | | ) | |
| | | | |

Authorized signature: ______________________ Date: ______________________

Printed or Typed Name: ______________________ Title: ______________________

EXAMPLE OF LDR CERTIFICATION

## E. LAND DISPOSAL RESTRICTION CERTIFICATION

This section can only be completed if the waste meets the applicable LDR treatment standards or has been treated according to waste specific technology for the EPA Hazardous Waste Numbers listed in Section D (see LDR Treatment Standards Table), *and* is going directly to land disposal. **IF THE WASTE IS NOT GOING DIRECTLY TO LANDFILL, DO NOT COMPLETE THIS SECTION.** As required by 40 CFR 268.7, the following applicable certification(s) are made for this restricted waste:

| | |
|---|---|
| 1. | ☐ Waste or contaminated soil which meets treatment standards without prior treatment:<br><br>I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR 268 Subpart D. I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment. |
| 2. | ☐ Waste which now meets treatment standards after treatment or has been treated by a specified technology (e.g., combustion, carbon adsorption, etc.):<br>I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification. Based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the treatment standards specified in 40 CFR 268.40 without impermissible dilution of the prohibited waste. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment. |
| 3. | ☐ The waste is debris and was treated by a technology listed in Table I of 40 CFR 268.45. List the Alternative Treatment Method used for treating the debris ______________________.<br>**Contact the Approver before checking this box.**<br>I certify under penalty of law that the debris has been treated in accordance with the requirements of 40 CFR 268.45. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment. |
| 4. | ☐ Wastes that are characteristic only (D001-D043) that have been decharacterized and are to be sent to a non-hazardous landfill. **Contact the Approver before checking this box.**<br>I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic and that underlying hazardous constituents, as defined in 268.2(I) have been treated on-site to meet the Universal Treatment Standards. I am aware there are significant penalties for submitting false certification, including the possibility of fine and imprisonment. |

Authorized signature: ______________________ Date: ______________________

Printed or Typed Name: ______________________ Title: ______________________

EXAMPLE OF LDR ATTACHMENT 1 – F LIST

**THE DOW CHEMICAL COMPANY**

**LDR ATTACHMENT 1 (F-LIST)**

(Mark all applicable EPA Hazardous Waste Numbers and Constituents of Concern)

| EPA Hazardous Waste Number | Hazardous Waste Description | Constituents of Concern |
|---|---|---|
| ☐ F001 | Spent halogenated solvents used in degreasing and still bottoms from the recovery of these spent solvents and spent solvents mixtures. | ☐ Carbon tetrachloride |
| | | ☐ Methylene chloride |
| | | ☐ Tetrachloroethylene |
| | | ☐ 1,1,1 -Trichloroethane |
| | | ☐ Trichloroethylene |
| | | ☐ 1,1,2-Trichloro-1,2,2-trifluoroethane |
| | | ☐ Trichlorofluoromethane |
| ☐ F002 | Spent halogenated solvents and still bottoms from the recovery of these spent solvents and spent solvent mixtures. | ☐ Chlorobenzene |
| | | ☐ o-Dichlorobenzene |
| | | ☐ Methylene chloride |
| | | ☐ Tetrachloroethylene |
| | | ☐ 1,1,1 -Trichloroethane |
| | | ☐ 1,1,2-Trichloroethane |
| | | ☐ Trichloroethylene |
| | | ☐ 1,1,2-Trichloro-1,2,2-trifluoroethane |
| | | ☐ Trichlorofluoromethane |
| ☐ F003 Subcategory | Spent non- Halogenated solvents and still bottoms from the recovery of these spent solvents and spent solvent mixtures. | ☐ Acetone |
| | | ☐ n-Butyl alcohol |
| | | ☐ Cyclohexanone |
| | | ☐ Ethyl acetate |
| | | ☐ Ethyl benzene |
| | | ☐ Ethyl ether |
| | | ☐ Methanol |
| | | ☐ Methyl isobutyl ketone |
| | | ☐ Xylene |
| ☐ F003 and /or F005 Subcategory | Spent non- halogenated solvents containing **only** one or more of the following: carbon disulfide, and cyclohexanone, and/or methanol | ☐ Carbon disulfide |
| | | ☐ Cyclohexanone |
| | | ☐ Methanol |
| ☐ F004 | Spent non-halogenated solvents and still bottoms from the recovery of these spent solvents and spent solvent mixtures. | ☐ Cresols (m and p isomers) |
| | | ☐ Nitrobenzene |
| | | ☐ o-Cresol |
| | | ☐ Cresol (mixed isomers) |
| ☐ F005 Subcategory | Spent non- halogenated solvents and still bottoms from the recovery of these spent solvents and spent solvent mixtures. | ☐ Benzene |
| | | ☐ Carbon disulfide |
| | | ☐ 2-Ethoxyethanol |
| | | ☐ Isobutanol |

| | | |
|---|---|---|
| | | ☐ Methyl ethyl ketone |
| | | ☐ 2-Nitropropane |
| | | ☐ Pyridine |
| | | ☐ Toluene |
| ☐ F005 Subcategory | Spent non- halogenated solvents : 2-Nitropropane only | ☐ 2-Nitropropane |
| ☐ F005 Subcategory | Spent non- halogenated solvents : 2-Ethoxyethanol only | ☐ 2-Ethoxyethanol |

**THE DOW CHEMICAL COMPANY**

**LDR ATTACHMENT 2 (Underlying Hazardous Constituents / Universal Treatment Standards)**

(Mark all applicable Constituents of Concern.)

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| **I. Organic Constituents:** | | | |
| ☐ Acenaphthene | 83-32-9 | 0.059 | 3.4 |
| ☐ Acenaphthylene | 208-96-8 | 0.059 | 3.4 |
| ☐ Acetone | 67-64-1 | 0.28 | 160 |
| ☐ Acetonitrile | 75-05-8 | 5.6 | 38 |
| ☐ Acetophenone | 96-86-2 | 0.010 | 9.7 |
| ☐ 2-Acetylaminofluorene | 53-96-3 | 0.059 | 140 |
| ☐ Acrolein | 107-02-8 | 0.29 | NA |
| ☐ Acrylamide[1] | 79-06-1 | 19 | 23 |
| ☐ Acrylonitrile | 107-13-1 | 0.24 | 84 |
| ☐ Aldicarb sulfone[1] | 1646-88-4 | 0.056 | 0.28 |
| ☐ Aldrin | 309-00-2 | 0.021 | 0.066 |
| ☐ 4-Aminobiphenyl | 92-67-1 | 0.13 | NA |
| ☐ Aniline | 62-53-3 | 0.81 | 14 |
| ☐ o-Anisidine (2-methoxyaniline) | 90-04-0 | 0.01 | 0.66 |
| ☐ Anthracene | 120-12-7 | 0.059 | 3.4 |
| ☐ Aramite | 140-57-8 | 0.36 | NA |
| ☐ Barban[1] | 101-27-9 | 0.056 | 1.4 |
| ☐ Bendiocarb[1] | 22781-23-3 | 0.056 | 1.4 |
| ☐ Benomyl[1] | 17804-35-2 | 0.056 | 1.4 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| ☐ Benz(a)anthracene | 56-55-3 | 0.059 | 3.4 |
| ☐ Benzal chloride[1] | 98-87-3 | 0.055 | 6.0 |
| ☐ Benzene | 71-43-2 | 0.14 | 10 |
| ☐ Benzo(b)fluoranthene (difficult to distinguish from benzo(k)fluoranthene) | 205-99-2 | 0.11 | 6.8 |
| ☐ Benzo(k)fluoranthene (difficult to distinguish from benzo(b)fluoranthene) | 207-08-9 | 0.11 | 6.8 |
| ☐ Benzo(g,h,i)perylene | 191-24-2 | 0.0055 | 1.8 |
| ☐ Benzo(a)pyrene | 50-32-8 | 0.061 | 3.4 |
| ☐ alpha-BHC | 319-84-6 | 0.00014 | 0.066 |
| ☐ beta-BHC | 319-85-7 | 0.00014 | 0.066 |
| ☐ delta-BHC | 319-86-8 | 0.023 | 0.066 |
| ☐ gamma-BHC | 58-89-9 | 0.0017 | 0.066 |
| ☐ Bromodichloromethane | 75-27-4 | 0.35 | 15 |
| ☐ Methyl bromide (Bromomethane) | 74-83-9 | 0.11 | 15 |
| ☐ 4-Bromophenyl phenyl ether | 101-55-3 | 0.055 | 15 |
| ☐ n-Butyl alcohol | 71-36-3 | 5.6 | 2.6 |
| ☐ Butyl benzyl phthalate | 85-68-7 | 0.017 | 28 |
| ☐ Butylate[1] | 2008-41-5 | 0.042 | 1.4 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| 2-sec-Butyl-4,6-dinitrophenol (Dinoseb) | 88-85-7 | 0.066 | 2.5 |
| Carbaryl[1] | 63-25-2 | 0.006 | 0.14 |
| Carbenzadim[1] | 10605-21-7 | 0.056 | 1.4 |
| Carbofuran[1] | 1563-66-2 | 0.006 | 0.14 |
| Carbofuran phenol[1] | 1563-38-8 | 0.056 | 1.4 |
| Carbon disulfide | 75-15-0 | 3.8 | 4.8 mg/l TCLP |
| Carbon tetrachloride | 56-23-5 | 0.057 | 6.0 |
| Carbosulfan[1] | 55285-14-8 | 0.028 | 1.4 |
| Chlordane (alpha and gamma isomers) [1] | 57-74-9 | 0.0033 | 0.26 |
| p-Chloroaniline | 106-47-8 | 0.46 | 16 |
| Chlorobenzene | 108-90-7 | 0.057 | 6.0 |
| Chlorobenzilate | 510-15-6 | 0.10 | NA |
| 2-Chloro-1,3-butadiene | 126-99-8 | 0.057 | 0.28 |
| Chlorodibromomethane | 124-48-1 | 0.057 | 15 |
| Chloroethane | 75-00-3 | 0.27 | 6.0 |
| bis(2-Chloroethoxy)methane | 111-91-1 | 0.036 | 7.2 |
| bis(2-Chloroethyl)ether | 111-44-4 | 0.033 | 6.0 |
| 2-Chloroethyl vinyl ether[1] | 110-75-8 | 0.062 | NA |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| Chloroform | 67-66-3 | 0.046 | 6.0 |
| bis(2-Chloroisopropyl)ether | 39638-32-9 | 0.055 | 7.2 |
| p-Chloro-m-cresol | 59-50-7 | 0.018 | 14 |
| Chloromethane (Methyl chloride) | 74-87-3 | 0.19 | 30 |
| 2-Chloronaphthalene | 91-58-7 | 0.055 | 5.6 |
| 2-Chlorophenol | 95-57-8 | 0.044 | 5.7 |
| 3-Chloropropylene | 107-05-1 | 0.036 | 30 |
| Chrysene | 218-01-9 | 0.059 | 3.4 |
| p-Cresidine | 120-71-8 | 0.01 | 0.66 |
| o-Cresol | 95-48-7 | 0.11 | 5.6 |
| m-Cresol (difficult to distinguish from p-cresol) | 108-39-4 | 0.77 | 5.6 |
| p-Cresol (difficult to distinguish from m-cresol) | 106-44-5 | 0.77 | 5.6 |
| m-Cumenyl methylcarbamate[1] | 64-00-6 | 0.056 | 1.4 |
| Cyclohexanone | 108-94-1 | 0.36 | 0.75 mg/l TCLP |
| o,p'-DDD | 53-19-0 | 0.023 | 0.087 |
| p,p'-DDD | 72-54-8 | 0.023 | 0.087 |
| o,p'-DDE | 3424-82-6 | 0.031 | 0.087 |
| p,p'-DDE | 72-55-9 | 0.031 | 0.087 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| o,p'-DDT | 789-02-6 | 0.0039 | 0.087 |
| p,p'-DDT | 50-29-3 | 0.0039 | 0.087 |
| Dibenz(a,h)anthracene | 53-70-3 | 0.055 | 8.2 |
| Dibenz(a,e)pyrene | 192-65-4 | 0.061 | NA |
| 1,2-Dibromo-3-chloropropane | 96-12-8 | 0.11 | 15 |
| Ethylene dibromide (1,2-Dibromoethane) | 106-93-4 | 0.028 | 15 |
| Dibromomethane | 74-95-3 | 0.11 | 15 |
| m-Dichlorobenzene | 541-73-1 | 0.036 | 6.0 |
| o-Dichlorobenzene | 95-50-1 | 0.088 | 6.0 |
| p-Dichlorobenzene | 106-46-7 | 0.090 | 6.0 |
| Dichlorodifluoromethane | 75-71-8 | 0.23 | 7.2 |
| 1,1-Dichloroethane | 75-34-3 | 0.059 | 6.0 |
| 1,2-Dichloroethane | 107-06-2 | 0.21 | 6.0 |
| 1,1-Dichloroethylene | 75-35-4 | 0.025 | 6.0 |
| trans-1,2-Dichloroethylene | 156-60-5 | 0.054 | 30 |
| 2,4-Dichlorophenol | 120-83-2 | 0.044 | 14 |
| 2,6-Dichlorophenol | 87-65-0 | 0.044 | 14 |
| 2,4-D (2,4-Dichlorophenoxyacetic acid) | 94-75-7 | 0.72 | 10 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| 1,2-Dichloropropane | 78-87-5 | 0.85 | 18 |
| cis-1,3-Dichloropropylene | 10061-01-5 | 0.036 | 18 |
| trans-1,3-Dichloropropylene | 10061-02-6 | 0.036 | 18 |
| Dieldrin | 60-57-1 | 0.017 | 0.13 |
| Diethyl phthalate | 84-66-2 | 0.20 | 28 |
| 2,4-Dimethylaniline (2,4-xylidine) | 95-68-1 | 0.01 | 0.66 |
| 2,4-Dimethyl phenol | 105-67-9 | 0.036 | 14 |
| Dimethyl phthalate | 131-11-3 | 0.047 | 28 |
| Di-n-butyl phthalate | 84-74-2 | 0.057 | 28 |
| 1,4-Dinitrobenzene | 100-25-4 | 0.32 | 2.3 |
| 4,6-Dinitro-o-cresol | 534-52-1 | 0.28 | 160 |
| 2,4-Dinitrophenol | 51-28-5 | 0.12 | 160 |
| 2,4-Dinitrotoluene | 121-14-2 | 0.32 | 140 |
| 2,6-Dinitrotoluene | 606-20-2 | 0.55 | 28 |
| Di-n-octyl phthalate | 117-84-0 | 0.017 | 28 |
| p-Dimethylaminoazobenzene[1] | 60-11-7 | 0.13 | NA |
| Di-n-propylnitrosamine | 621-64-7 | 0.40 | 14 |
| 1,4-Dioxane | 123-91-1 | 12.0 | 170 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| Diphenylamine (difficult to distinguish from diphenylnitrosamine) | 122-39-4 | 0.92 | 13 |
| Diphenylnitrosamine (difficult to distinguish from diphenylamine) | 86-30-6 | 0.92 | 13 |
| 1,2-Diphenylhydrazine | 122-66-7 | 0.087 | NA |
| Disulfoton | 298-04-4 | 0.017 | 6.2 |
| Dithiocarbamates (total) [1] | 137-30-4 | 0.028 | 28 |
| Endosulfan I | 939-98-8 | 0.023 | 0.066 |
| Endosulfan II | 33213-65-9 | 0.029 | 0.13 |
| Endosulfan sulfate | 1031-07-8 | 0.029 | 0.13 |
| Endrin | 72-20-8 | 0.0028 | 0.13 |
| Endrin aldehyde | 7421-93-4 | 0.025 | 0.13 |
| EPTC[1] | 759-94-4 | 0.042 | 1.4 |
| Ethyl acetate | 141-78-6 | 0.34 | 33 |
| Ethyl benzene | 100-41-4 | 0.057 | 10 |
| Ethyl cyanide (Propanenitrile) | 107-12-0 | 0.24 | 360 |
| Ethyl ether | 60-29-7 | 0.12 | 160 |
| Ethyl methacrylate | 97-63-2 | 0.14 | 160 |
| Ethylene oxide | 75-21-8 | 0.12 | NA |
| bis(2-Ethylhexyl) phthalate | 117-81-7 | 0.28 | 28 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| Famphur | 52-85-7 | 0.017 | 15 |
| Fluoranthene | 206-44-0 | 0.068 | 3.4 |
| Fluorene | 86-73-7 | 0.059 | 3.4 |
| Formetanate hydrochloride[1] | 23422-53-9 | 0.056 | 1.4 |
| Heptachlor | 76-44-8 | 0.0012 | 0.066 |
| Heptachlor epoxide | 1024-57-3 | 0.016 | 0.066 |
| 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD) | 35822-46-9 | 0.000035 | 0.0025 |
| 1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF) | 67562-39-4 | 0.000035 | 0.0025 |
| 1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF) | 55673-89-7 | 0.000035 | 0.0025 |
| Hexachlorobenzene | 118-74-1 | 0.055 | 10 |
| Hexachlorobutadiene | 87-68-3 | 0.055 | 5.6 |
| Hexachlorocyclopentadiene | 77-47-4 | 0.057 | 2.4 |
| Hexachloroethane | 67-72-1 | 0.055 | 30 |
| Hexachloropropylene | 1888-71-7 | 0.035 | 30 |
| HxCDDs (All Hexachlorodibenzo-p-dioxins) | NA | 0.000063 | 0.001 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| ☐ HxCDFs (All Hexachlorodibenzofurans) | NA | 0.000063 | 0.001 |
| ☐ Indeno (1,2,3-c,d) pyrene | 193-39-5 | 0.0055 | 3.4 |
| ☐ Iodomethane | 74-88-4 | 0.19 | 65 |
| ☐ Isobutyl alcohol | 78-83-1 | 5.6 | 170 |
| ☐ Isodrin | 465-73-6 | 0.021 | 0.066 |
| ☐ Isosafrole | 120-58-1 | 0.081 | 2.6 |
| ☐ Kepone | 143-50-8 | 0.0011 | 0.13 |
| ☐ Methacrylonitrile | 126-98-7 | 0.24 | 84 |
| ☐ Methanol | 67-56-1 | 5.6 | 0.75 mg/l TCLP |
| ☐ Methapyrilene | 91-80-5 | 0.081 | 1.5 |
| ☐ Methiocarb[1] | 2032-65-7 | 0.056 | 1.4 |
| ☐ Methomyl[1] | 16752-77-5 | 0.028 | 0.14 |
| ☐ Methoxychlor | 72-43-5 | 0.25 | 0.18 |
| ☐ Methyl ethyl ketone | 78-93-3 | 0.28 | 36 |
| ☐ Methyl isobutyl ketone | 108-10-1 | 0.14 | 33 |
| ☐ Methyl methacrylate | 80-62-6 | 0.14 | 160 |
| ☐ Methyl methansulfonate | 66-27-3 | 0.018 | NA |
| ☐ Methyl parathion | 298-00-0 | 0.014 | 4.6 |
| ☐ 3-Methylcholanthrene | 56-49-5 | 0.0055 | 15 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| ☐ 4.4-Methylene bis(2-chloroaniline) | 101-14-4 | 0.50 | 30 |
| ☐ Methylene chloride | 75-09-2 | 0.089 | 30 |
| ☐ Metolcarb[1] | 1129-41-5 | 0.056 | 1.4 |
| ☐ Mexacarbate[1] | 315-18-4 | 0.056 | 1.4 |
| ☐ Molinate[1] | 2212-67-1 | 0.003 | 1.4 |
| ☐ Naphthalene | 91-20-3 | 0.059 | 5.6 |
| ☐ 2-Naphthylamine | 91-59-8 | 0.52 | NA |
| ☐ o-Nitroaniline [1] | 88-74-4 | 0.27 | 14 |
| ☐ p-Nitroaniline | 100-01-6 | 0.028 | 28 |
| ☐ Nitrobenzene | 98-95-3 | 0.068 | 14 |
| ☐ 5-Nitro-o-toluidine | 99-55-8 | 0.32 | 28 |
| ☐ o-Nitrophenol[1] | 88-75-5 | 0.028 | 13 |
| ☐ p-Nitrophenol | 100-02-7 | 0.12 | 29 |
| ☐ N-Nitrosodiethylamine | 55-18-5 | 0.40 | 28 |
| ☐ N-Nitrosodimethylamine | 62-75-9 | 0.40 | 2.3 |
| ☐ N-Nitroso-di-n-butylamine | 924-16-3 | 0.40 | 17 |
| ☐ N-Nitrosomethylethylamine | 10595-95-6 | 0.40 | 2.3 |
| ☐ N-Nitrosomorpholine | 59-89-2 | 0.40 | 2.3 |
| ☐ N-Nitrosopiperidine | 100-75-4 | 0.013 | 35 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| ☐ N-Nitrosopyrrolidine | 930-55-2 | 0.013 | 35 |
| ☐ 1,2,3,4,6,7,8,9-Octochlorodibenzo-p-dioxin (OCDD) | 3268-87-9 | 0.000063 | 0.005 |
| ☐ 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF) | 39001-02-0 | 0.000063 | 0.005 |
| ☐ Oxamyl[1] | 23135-22-0 | 0.056 | 0.28 |
| ☐ Parathion | 56-38-2 | 0.014 | 4.6 |
| ☐ Total PCBs (sum of all PCB isomers, or all Aroclors) | 1336-36-3 | 0.10 | 10 |
| ☐ Pebulate[1] | 1114-71-2 | 0.042 | 1.4 |
| ☐ Pentachlorobenzene | 608-93-5 | 0.055 | 10 |
| ☐ PeCDDs (All Pentachlorodibenzo-p-dioxins) | NA | 0.000063 | 0.001 |
| ☐ PeCDFs (All Pentachlorodibenzofurans) | NA | 0.000035 | 0.001 |
| ☐ Pentachloroethane [1] | 76-01-7 | 0.055 | 6.0 |
| ☐ Pentachloronitrobenzene | 82-68-8 | 0.055 | 4.8 |
| ☐ Pentachlorophenol | 87-86-5 | 0.089 | 7.4 |
| ☐ Phenacetin | 62-44-2 | 0.081 | 16 |
| ☐ Phenanthrene | 85-01-8 | 0.059 | 5.6 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| ☐ Phenol | 108-95-2 | 0.039 | 6.2 |
| ☐ 1,3-Phenylenediamine | 108-45-2 | 0.01 | 0.66 |
| ☐ Phorate | 298-02-2 | 0.021 | 4.6 |
| ☐ Phthalic acid [1] | 100-21-0 | 0.055 | 28 |
| ☐ Phthalic anhydride | 85-44-9 | 0.055 | 28 |
| ☐ Physostigmine[1] | 57-47-6 | 0.056 | 1.4 |
| ☐ Physostigmine salicylate[1] | 57-64-7 | 0.056 | 1.4 |
| ☐ Promecarb[1] | 2631-37-0 | 0.056 | 1.4 |
| ☐ Pronamide | 23950-58-5 | 0.093 | 1.5 |
| ☐ Propham[1] | 122-42-9 | 0.056 | 1.4 |
| ☐ Propoxur[1] | 114-26-1 | 0.056 | 1.4 |
| ☐ Prosulfocarb[1] | 52888-80-9 | 0.042 | 1.4 |
| ☐ Pyrene | 129-00-0 | 0.067 | 8.2 |
| ☐ Pyridine | 110-86-1 | 0.014 | 16 |
| ☐ Safrole | 94-59-7 | 0.081 | 22 |
| ☐ Silvex (2,4,5-TP) | 93-72-1 | 0.72 | 7.9 |
| ☐ 1,2,4,5-Tetrachlorobenzene | 95-94-3 | 0.055 | 14 |
| ☐ TCDDs (All Tetrachlorodibenzo-p-dioxins) | NA | 0.000063 | 0.001 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| ☐ TCDFs (All Tetrachlorodibenzofurans) | NA | 0.000063 | 0.001 |
| ☐ 1,1,1,2-Tetrachloroethane | 630-20-6 | 0.057 | 6.0 |
| ☐ 1,1,2,2-Tetrachloroethane | 79-34-6 | 0.057 | 6.0 |
| ☐ Tetrachloroethylene | 127-18-4 | 0.056 | 6.0 |
| ☐ 2,3,4,6-Tetrachlorophenol | 58-90-2 | 0.030 | 7.4 |
| ☐ Thiodicarb[1] | 59669-26-0 | 0.019 | 1.4 |
| ☐ Thiophanate-methyl[1] | 23564-05-8 | 0.056 | 1.4 |
| ☐ Toluene | 108-88-3 | 0.080 | 10 |
| ☐ Toxaphene | 8001-35-2 | 0.0095 | 2.6 |
| ☐ Triallate[1] | 2303-17-5 | 0.042 | 1.4 |
| ☐ Tribromomethane/Bromoform | 75-25-2 | 0.63 | 15 |
| ☐ 1,2,4-Trichlorobenzene | 120-82-1 | 0.055 | 19 |
| ☐ 1,1,1-Trichloroethane | 71-55-6 | 0.054 | 6.0 |
| ☐ 1,1,2-Trichloroethane | 79-00-5 | 0.054 | 6.0 |
| ☐ Trichloroethylene | 79-01-6 | 0.054 | 6.0 |
| ☐ Trichloromonofluoromethane | 75-69-4 | 0.020 | 30 |
| ☐ 2,4,5-Trichlorophenol | 95-95-4 | 0.18 | 7.4 |
| ☐ 2,4,6-Trichlorophenol | 88-06-2 | 0.035 | 7.4 |

| Regulated constituent--common name | CAS No. | Wastewater Standard in mg/L | Non-Wastewater Standard in mg/kg |
|---|---|---|---|
| ☐ 2,4,5-T (2,4,5-Trichlorophenoxyacetic acid) | 93-76-5 | 0.72 | 7.9 |
| ☐ 1,2,3-Trichloropropane | 96-18-4 | 0.85 | 30 |
| ☐ 1,1,2-Trichloro-1,2,2-trifluoroethane | 76-13-1 | 0.057 | 30 |
| ☐ Triethylamine[1] | 101-44-8 | 0.081 | 1.5 |
| ☐ tris-(2,3-Dibromopropyl)phosphate | 126-72-7 | 0.11 | 0.10 |
| ☐ Vernolate[1] | 1929-77-7 | 0.042 | 1.4 |
| ☐ Vinyl chloride | 75-01-4 | 0.27 | 6.0 |
| ☐ Xylenes-mixed isomers (sum of o-,m-, and p-xylene concentrations) | 1330-20-7 | 0.32 | 30 |

Please note on the last page of this attachment that there are two sets of UTS limits for metals.

- Column 4 is to be used for waste being disposed of in states that have not adopted the revised UTS metals limits.
- Column 5 can be used in states that have adopted these new metals standards. These states include Texas, Michigan, and Louisiana.

More information on the metals LDR limits is provided in http://ehs.intranet.dow.com/rmec/GuidanceLinks/ solidwaste.htm - Regional

| II. Inorganic Constituents: | CAS Number | Wastewater Standard in mg/L | Non-Wastewater Standard for States that have not adopted LDR changes | Non-Wastewater Standard for States that have adopted LDR changes |
|---|---|---|---|---|
| ☐ Antimony | 7440-36-0 | 1.9 | 2.1 mg/l TCLP | 1.15 mg/l TCLP |
| ☐ Arsenic | 7440-38-2 | 1.4 | 5.0 mg/l TCLP | 5.0 mg/l TCLP |
| ☐ Barium | 7440-39-3 | 1.2 | 7.6 mg/l TCLP | 21 mg/l TCLP |
| ☐ Beryllium | 7440-41-7 | 0.82 | 0.014 mg/l TCLP | 1.22 mg/l TCLP |
| ☐ Cadmium | 7440-43-9 | 0.69 | 0.11 mg/l TCLP | 0.11 mg/l TCLP |
| ☐ Chromium (Total) | 7440-47-3 | 2.77 | 0.6 mg/l TCLP | 0.6 mg/l TCLP |
| ☐ Cyanides (Total) | 57-12-5 | 1.2 | 590 mg/l | 590 mg/l |
| ☐ Cyanides (Amenable) | 57-12-5 | 0.86 | 30mg/l | 30 mg/l |
| ☐ Fluoride [2] | 16984-48-8 | 35 | NA | NA |
| ☐ Lead | 7439-92-1 | 0.69 | 0.37 mg/l TCLP | 0.75 mg/l TCLP |
| ☐ Mercury--Nonwastewater from Retort[1] | 7439-97-6 | NA | 0.20 mg/l TCLP | 0.20 mg/l TCLP |
| ☐ Mercury--All Others | 7439-97-6 | 0.15 | 0.025 mg/l TCLP | 0.025 mg/l TCLP |
| ☐ Nickel | 7440-02-0 | 3.98 | 5.0 mg/l TCLP | 11 mg/l TCLP |
| ☐ Selenium[2] | 7782-49-2 | 0.82 | 0.16 mg/l TCLP | 5.7 mg/l TCLP |
| ☐ Silver | 7440-22-4 | 0.43 | 0.14 mg/l TCLP | 0.14 mg/l TCLP |
| ☐ Sulfide[2] | 8496-25-8 | 14 | NA | NA |
| ☐ Thallium | 7440-28-0 | 1.4 | 0.078 mg/l TCLP | 0.2 mg/l TCLP |
| ☐ Vanadium[2] | 7440-62-2 | 4.3 | 0.23 mg/l TCLP | 1.6 mg/l TCLP |
| ☐ Zinc[3] | 7440-66-6 | 2.61 | 4.3 mg/l TCLP | 4.3 mg/l TCLP |

[1] Not applicable to F039 wastes
[2] Not an underlying hazardous constituent. Only applicable to F039 wastes
[3] Not an underlying hazardous constituent.