
Waste Characterization Workshop



Christine Grossman
DEQ, Office of Environmental Assistance
517-284-6860 or grossmanc@michigan.gov

Waste Characterization Reference Book – [Table of Contents](#)

- Chapter 1 - [Waste Characterization Regulations](#)
- Chapter 2 - [Waste Characterization Questions, Records Examples](#)
- Chapter 3 - [Interpretive Memos & Letters](#)
- Chapter 4 - [LDR Resources](#)
- Chapter 5 - [Hazardous Waste Variance & Delisting](#)
- Chapter 6 - [Sampling & Analysis](#)
- Chapter 7 - [Subpart CC](#)
- Chapter 8 - [Remediation Waste](#)
- Chapter 9 - [Used Oil](#)
- Chapter 10 - [Solid Waste Characterization](#)
- Chapter 11 - [Landfill Waste Acceptance](#)
- Chapter 12 - [Online Resources](#)

Workshop Agenda

- Hazardous Waste Characterization
- Liquid Industrial Waste Characterization
- Solid Waste Characterization
- Facilitated Waste Characterization Breakout
- Product Substitution Stories and Tips
- Landfill Waste Acceptance

DEQ Highlights

- Generator:
 - Responsible for characterization
 - Most familiar with waste and changes
 - Must coordinate with purchasing and disposal facility
- Michigan:
 - Implements Part 111 regulations, not RCRA
 - Not adopted EPA Definition of Solid Waste (DSW) changes establishing RCRA hazardous secondary materials
 - Not adopted EPA disposable wipes rule
 - DSW and disposable wipes will expected to be evaluated at next rulemaking

Hazardous Waste Characterization

Kevin Berghuis

Drug and Laboratory Disposal

269-685-9824, ext. 224 or kberghuis@dld-inc.com

The Common Question

- “Is my waste a hazardous waste regulated under Part 111 of Act 451 and the corresponding RCRA provisions?”

Hazardous Waste Determination

- Rule 302 (40 CFR 262.11)
- “A person who generates a waste as defined in R 299.9202 shall determine if that waste is a hazardous waste...”

- Answer the following:
 - Is the waste excluded (full or partial) - See Rule 204, 205, 207, 228, 206, 231, 831, and 40 CFR 261.4
 - Is the waste a listed waste - See Rules 213, 214, and 40 CFR 261.30
 - Is the waste a characteristic waste - See Rule 212 and 40 CFR 261.20

What is a Solid Waste? (Rule 202 and corresponding federal regulations under 40 CFR 261.2)

- “A solid waste is any discarded material that is not excluded under Rule 204 (40 CFR 261.4(a))...”
- A solid waste includes solids, liquids, semisolids, or gaseous materials
- A discarded material is...
 - Any material which is:
 - Abandoned
 - Recycled
 - Considered inherently waste-like
 - A military munition
- Abandoned materials are abandoned by being:
 - Disposed
 - Burned or incinerated; or
 - Accumulated, stored, or treated before being disposed of, burned, or incinerated

Point of Origination (Rule 203(2))

- The point of origination is when a material is first considered a waste subject to regulation
- The point of origination is when a material is “discarded” and the waste ...
 - First meets a listing in Rule 213 or 214 OR
 - Is mixed with listed hazardous waste or severely toxic hazardous waste OR
 - First exhibits a characteristic in Rule 212

Hazardous Waste Determination, Answer the Following:

- Is the waste excluded (full or partial) - See Rule 204, 205, 207, 228, 206, 231, 831, and 40 CFR 261.4
- Is the waste a listed waste - See Rules 213, 214, and 40 CFR 261.30
- Is the waste a characteristic waste - See Rule 212 and 40 CFR 261.20

Is the Waste Excluded?

- Three possible ways:
 - It is excluded from the definition of a solid waste
 - It is excluded from the definition of a hazardous waste
 - It is partially excluded and must be managed to meet a special rule (e.g. universal waste, recyclable material, CRT Rule or precious metals)

Solid Waste Exclusions

- Rule 204(1) (40 CFR 261.4(a))
- More than two dozen exclusions

Common Solid Waste Exclusions

- POTW approved discharges (Rule 204(1)(b))
- Secondary materials reclaimed and returned to original process (Rule 204(1)(h))
- Scrap Metal (Rule 204(1)(p))
- Shredded circuit boards (Rule 204(1)(a))
- Comparable fuels (Rule 204(1)(w))
- CRTs (Rule 204(1)(z))

Hazardous Waste Exclusions

- Rule 204(2) & (3) (40 CFR 261.4(b))
- More than one dozen exclusions

Common Hazardous Waste Exclusions

- Mining overburden (Rule 204(2)(c))
- Waste from exploration, development, or production of crude, natural gas, or geothermal energy (Rule 204(2)(e))
- Petroleum contaminated media from an approved UST clean-up (Rule 204(2)(l))
- Materials in product tank (Rule 204(3)(a))

Is Waste a Listed Hazardous Waste? Rules 213 and 214 (40 CFR 261.30)

- Listings are a narrative description of a specific type of waste
- Only the knowledge of the process that generated the waste is needed to determine if the waste is listed
- EPA criteria for listing include:
 - Toxic listed wastes
 - Acutely hazardous wastes
 - Characteristic wastes

Listed Hazardous Waste Hazard Codes

- Toxic Waste = (T)
- Acute Hazardous Waste = (H)
- Ignitable Waste = (I)
- Corrosive Waste = (C)
- Reactive Waste = (R)
- Toxicity Characteristic Waste = (E)

Four Types of Listed Hazardous Waste Codes

- "F-Listed" Codes
- "K-Listed" Codes
- "P-Listed" Codes
- "U-Listed" Codes

Rule 213(1)(a)Table 203a (40 CFR 261.31)

- Includes hazardous wastes from non-specific sources
- Hazardous waste codes F001 – F039
- Seven manufacturing or industrial processes create the categories of F-Listed wastes

"F-Listed" Categories

- Spent solvent wastes (F001 - F005)
- Electroplating and other metal finishing operations (F006 - F012 and F019)
- Dioxin-bearing waste (F020 – F023 and F026 – F028)
- Wastes from the production of certain chlorinated aliphatic hydrocarbons (F024 and F025)
- Wastes from wood preserving (F032, F034, and F035)
- Petroleum refinery wastewater treatment sludges (F037 and F038)
- Multisource leachate (F039)

Spent Solvent Wastes

- Includes 31 specific halogenated and non-halogenated organic solvents
- The organic solvent must be spent and must have been used for its "solvent properties"
- Includes the still bottoms from the recovery of these spent solvents
- F001 - Spent halogenated solvents used in degreasing
- F002 - Spent halogenated solvents
- F003 to F005 - Spent non-halogenated solvents

F001, F002, F004, and F005 Spent Solvents include...

- Mixtures and blends containing, before use, a total of 10% or more by volume of one or more of any of the solvents listed in F001, F002, F004, or F005
- Spent Solvent Wastes

F003 Spent Solvents Include...

- Mixtures and blends containing, before use, only the solvents listed in F003
- Mixtures and blends containing, before use, one or more of the solvents listed in F003 and a total of 10% or more by volume of one or more of any of the solvents listed in F001, F002, F004, and F005

Spent Solvent Wastes - Key information and Knowledge

- "Spent" and "solvent properties"
- Names of the solvents
- Before use concentration for each of the solvents
- 10% or more concentration
- Aggregate of one or more of the solvents

Example #1

- Before use concentration mixture:
 - 5% Methylene Chloride (F002)
 - 3% Nitrobenzene (F004)
 - 2% Toluene (F005)
 - 90% Water
- Spent solvent is F002, F004, and F005

Example #2

- Before-use concentration mixture:
 - 5% Tetrachloroethylene (F002)
 - 3% Acetone (F003)
 - 7% Isobutanol (F005)
 - 85% Water
- Spent Solvent is F002, F003, and F005

“K-Listed” Waste Codes

- Rule 213(1)(b), Table 204a (40 CFR 261.32)
- Includes hazardous wastes from specific sources
- More than 100 K-Listed waste codes
- Detailed descriptions of wastes generated from specific industries

“K-Listed” Waste Codes

- Two primary questions to ask:
 - Is the facility listed as one of the industries that generate K-Listed wastes?
 - Does the waste match one of the specific K-List waste descriptions?
- K-Listed Industries:
 - Wood Preservation
 - Inorganic Pigments
 - Organic Chemicals
 - Inorganic Chemicals
 - Pesticides
 - Explosives
 - Petroleum Refining
 - Iron and Steel
 - Primary Aluminum
 - Secondary Lead
 - Veterinary Pharmaceuticals
 - Ink Formulation
 - Coking
- K005 - Wastewater treatment sludge from the production of chrome green pigments
- K101 - Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds

Discarded Commercial Chemical Products

- Rule 214, Tables 205a, 205b, 205c (40 CFR 261.33)
- Includes discarded commercial chemical products, off-specification products, container and spill residues
- Listed product not meeting customer specifications or contaminated with another material, requiring disposal
- Designated as hazardous wastes when discarded or intended to be discarded
- Includes commercial chemicals with listed material as sole “active” ingredient, not all materials containing listed commercial chemical product
- Includes commercial chemical product or manufacturing chemical intermediate
- Commercially pure grade of chemical
- Technical grade of chemical
- Sole active ingredient

Discarded Commercial Chemical Products

- Includes three lists of generic chemical names:
 - Table 205a (40 CFR 261.33(e))
 - P-Listed waste - ALL acutely hazardous!
 - Tables 205b (federal) (40 CFR 261.33(f))

- U-Listed wastes (federal)
 - Table 205c (state)
 - U-Listed wastes (Michigan only)
- Includes all commercial chemical products and manufacturing chemical intermediates having one of the generic chemical names
- Includes off-specification products
- Includes residues and spill cleanup debris
- The P-listing and U-Listings only applies to unused and discarded commercial chemical products

Characteristic Hazardous Waste

- Waste that exhibits properties that can cause death or injury to humans or lead to ecological damage
- Characteristics are detectable using a standardized test method or by applying general knowledge of the waste properties
- Four Characteristics
 - Ignitability (D001)
 - Corrosivity (D002)
 - Reactivity (D003)
 - Toxicity (D004 – D043)

Ignitability D001 Characteristic

- Rule 212(1)(a) (40 CFR 261.21)
- Wastes that can readily catch fire and sustain combustion
- Includes both liquids and non-liquids

Four Properties of Ignitability

- Liquids, other than an aqueous solution containing less than 24% alcohol by volume, with a flash point $<140^{\circ}$ F
 - Aqueous: $\geq 50\%$ water by weight
 - Alcohol exclusion: $<24\%$ by volume
 - Flash point test: ASTM standard
- Non-Liquids that can spontaneously catch fire and burn vigorously and persistently
- Ignitable compressed gases (DOT regulations)
- Oxidizers (DOT regulations)

Corrosivity D002 Characteristic

- Rule 212(2) (40 CFR 261.22)
- Wastes that are highly acidic or highly basic
- Wastes that can readily corrode or dissolve flesh, metal, or other materials
- Two Properties of Corrosivity
 - Aqueous waste with $\text{pH} \leq 2$ or ≥ 12.5
 - Liquids that corrode steel at a rate of greater than 0.25 inches per year
- Test if waste contains sufficient water to perform pH test

Reactivity D003 Characteristic

- Rule 212(3) (40 CFR 261.23)
- Wastes that readily explode or undergo violent reactions or react to release toxic gases or fumes
- Narrative criteria to define a reactive waste
- Eight Properties of Reactivity
- Normally unstable and undergoes violent change without detonating
- Reacts violently with water
- Forms potentially explosive mixtures with water

Eight Properties of Reactivity

- Produces toxic gases, vapors, or fumes when mixed with water
- Cyanide- or Sulfide-bearing waste that releases toxic gases when exposed to pH conditions between 2 and 12.5
- Is a forbidden DOT explosive
- Eight Properties of Reactivity
- Capable of detonation or explosive reaction if subjected to a strong initiating force or if heated under confinement
- Is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure

Toxicity Characteristic

- Rule 212(4) (40 CFR 261.24)
- D004 – D043 Waste Codes
- EPA identified 40 toxic compounds and elements known to have leached into the groundwater after being disposed of in landfills
- Eight elemental metals (D004-D011)
- Eight pesticides and herbicides (D012-D017, D020, and D031)
- Twenty-four non-halogenated and halogenated organic compounds (D018, D019, D021-D030, and D032-D043)
- EPA designed a laboratory procedure to replicate the leaching process that occurs when wastes are buried in a landfill
- EPA established threshold regulatory levels for each toxic compound and element
- EPA Designated Laboratory Procedure

Toxicity Characteristic Leaching Procedure (TCLP)

- Reduce the size of the waste by grinding
- Add an acid to the grindings to create a leachate
- Analyze the leachate and determine the concentration levels
- Evaluate the concentration levels against the regulatory levels

20 Times Rule

- TCLP allows use of total constituent analysis in lieu of TCLP for solids
- For solid sample, divide total results by 20 and compare to TCLP limit in Table 201a
- For semi-solid, see EPA formula in reference book

Mixture Rule

- Rule 203(1)(c) (40 CFR 261.3(a)(2)(iv))
- Any mixture consisting of a listed hazardous waste (F-, K-, U-, and P-Listed) and any other solid waste is still considered to be hazardous waste

Derived From Rule

- Rule 203(3) (40 CFR 261.3(c)(2)(i))
- Any waste generated from the treatment, storage, or disposal of a hazardous waste is also a hazardous waste

Land Disposal Restrictions (LDR)

- Rule 311 (40 CFR 268)
- Requires treatment of hazardous waste prior to disposal
- Minimize the long-term threat posed to human health and the environment

Land Disposal Restrictions (LDR) Responsibilities

- Identify the hazardous waste codes for each waste
- Determine the treatment standards for each waste code
- Identify any underlying hazardous constituents (UHC)

Review Hazardous Waste Codes

- Hazardous only due to listed waste codes (F, K, P, and U)
- Hazardous only due to characteristic waste Codes (D)
- Hazardous due to both listed and characteristic waste codes\

Determine the LDR Treatment Standards

- Treatment standards for hazardous wastes in 40 CFR 268.40 table
- Listed by hazardous waste code
- Standards for wastewaters and non-wastewaters forms of each hazardous waste

Wastewater vs Non-wastewater

- Wastewater - Waste containing <1% by weight total organic carbon (TOC) and <1% by weight of total suspended solids (TSS)
- Non-wastewater – Aren't wastewaters or waste containing > 1% by weight total organic carbon (TOC) and > 1% by weight of total suspended solids (TSS)

What Are the Treatment Standards?

- Three types of treatment standards:
 - Total Concentration (mg/kg)
 - TCLP Results (mg/l TCLP)
 - Technology Standards (letter codes)

Technology Standards

- 40 CFR 268.42 provides treatment code key
- Treatment Standards that require a specific treatment technology
- Expressed as a five-letter code like:
 - INCIN = Incineration
 - NEUTR = Neutralization

Underlying Hazardous Constituents (UHCs)

- Listed in the universal treatment standards in 40 CFR 268.48 table
- Applicable to all wastes that carry a characteristic hazardous waste code (D-Codes)
- The UHCs are not what causes the waste to exhibit a characteristic

Definition of UHCs

- 40 CFR 268.2(i)
- Any constituent listed in the Universal Treatment Standard table found in 40 CFR 268.48 which can reasonably be expected to be present at the point of generation of the hazardous waste at concentrations above the constituent specific treatment standards

Questions to Ask About Waste with UHCs

- Does the waste carry a characteristic hazardous waste code (D-Code)?
- Does the treatment standard for the D-Code at the 40 CFR 268.40 table specify “and meet 268.48 standards”?
- Are the concentrations of the UHCs “reasonably expected” to be above the treated standard levels?

LDR Notifications

- 40 CFR 268.7
- LQGs and SQGs must determine if the waste requires treatment before land disposal
- LQGs and SQGs must provide notice of LDR information for the initial waste shipment to each off-site TSD
- LDR Notifications
- LDR notification must include:
 - Manifest document number
 - EPA hazardous waste numbers
 - Treatment standards
- There is no standard EPA notification form for the LDR notice

Hazardous Waste Determination

- Who is responsible?
- Completion of waste surveys and waste characterizations
- Analytical testing versus generator knowledge

Representative Waste Sampling

- What is a “Representative Sample?”
- 40 CFR 260.10 – EPA definitions
- “A sample of a universe or whole which can be expected to exhibit the average properties of the universe or whole”

How to Obtain a Representative Sample

- Use EPA-approved sampling protocols
- 40 CFR 261, Appendix I
- Methods and equipment vary based on the form and consistency of the waste
- ASTM standards

What is Being Sampled?

- Extremely viscous liquids
- Crushed or powdered materials

- Containerized liquid waste
- Liquid wastes in pits, ponds, lagoons, and similar reservoirs

Subpart CC

- Generally requires sampling to verify LQGs are < 500 ppmv and not subject
- Only simple processes using 1 or 2 volatile organic products in consistent ratios can use calculations to determine ppmv
- See reference book for calculations and testing details

Liquid Industrial Waste Characterization

Kerry Puzio

Terra Contracting

269-375-9595 or kpuzio@terracontracting.net

Technical Definition of Liquid Industrial Waste

- Per Part 121, MCL 324.12101(n) "[l]iquid industrial waste" means any brine, by-duct, industrial wastewater, leachate, off-specification commercial chemical product, sludge, sanitary sewer clean-out residue, storm sewer clean-out residue, grease trap clean-out residue, spill residue, used oil, or other liquid waste that is produced by, is incident to, or results from industrial, commercial, or governmental activity or any other activity or enterprise determined to be liquid by method 9095 (paint filter liquids test) ...
- Per Part 121, MCL 324.12101(n), liquid industrial waste does not include any of the following:
 - Hazardous waste regulated and required to be manifested under part 111
 - Septage waste regulated under part 117
 - Medical waste regulated under part 138 of the public health code...
 - A discharge to the waters of the state in accordance with a permit, order, or rule under part 31
 - A liquid generated by a household
 - A liquid regulated under 1982 PA 239, MCL 287.651 to 287.683 (vegetable and animal fats managed under Bodies of Dead Animals Act)
- Per Part 121, MCL 324.12102a, the following are not liquid industrial wastes when managed as specified:
 - A liquid fully contained inside a manufactured article, until the liquid is removed or the manufactured equipment is discarded...
 - An off-specification fuel, including a gasoline blendstock when....
 - A material that is used or reused as an effective substitute...
 - A used oil that is directly burned to recover energy or used to produce a fuel if all of the following requirements are met...
 - Food processing residuals as defined in section 11503, or site-separated material or source-separated material approved by the department under part 115, that, to produce biogas, will be decomposed in a controlled manner under anaerobic conditions using a closed system that complies with part 55
 - liquid or a sludge and associated liquid authorized to be applied to land under part 31 or 115

Simple Definition of Liquid Industrial Waste

- Non-hazardous waste that contains free liquids is a liquid industrial waste
 - Used oils and coolants/
 - Grease traps
 - Catch basin waste
 - Weak acidic or caustic cleaners
 - Floor drain and sump waste
 - Part 111 exempted liquids (CESQG waste, recycled gas, etc.)
 - Food processing wastewaters
- Any liquids that are not subject to hazardous waste regulation which cannot be handled by the wastewater treatment plant or sent to an on-site treatment and disposal system.

Why Have a LIW Statute?

- Michigan is one of a few states that have a separate law for non-hazardous liquid wastes
- Most states regulate LIW under their solid waste regulations
- Michigan's LIW law
 - Provides better tracking of waste
 - Requires use of permitted/registered LIW transporter
 - Has goal of protecting our fresh water, the Great Lakes

- Per a well schooled waste inspector...
“The state of Michigan lies completely within the watershed containing 20% of the world's fresh water.”

CESQG

- Exempt from certain hazardous waste regulations
- Not exempt from LIW statute
- Waste must still be managed by a licensed LIW designated facility
- LIW must be hauled by a permitted and registered LIW transporter with spill insurance

Used Oil - Topics

- What is a Used Oil?
- Oil Testing
- Rebuttable Presumption
- Chlorinated Paraffins
- Specification Used Oil
- PCB's
- Waste Segregation
- Transportation of Mixed Loads

Used Oil – Part 111

- Under Part 111, used oil is
“any oil which has been refined from crude oil, or any synthetic oil, which has been used and as a result of use, is contaminated with physical or chemical impurities” and includes:
 - Used motor oils
 - Used hydraulic oils
 - Used transmission & brake fluids
 - All synthetic oils
 - Spent quench oils
 - Spent gear oils
 - Non-PCB transformer oils
 - Oil-water mixtures if sufficient oil exists for recycling
- Under Part 111, used oil does NOT include petroleum based products that were not designed to function as lubricating agents or other protective applications
- Under Part 111, used oil does NOT include:
 - Fuels (Gasoline, Diesel, Fuel Oils)
 - PCB oils (subject to TSCA)
 - Mineral spirits
 - Certain test/calibration fluids
 - Animal fat or vegetable based oil
- Used oil is subject to management standards under Parts 111, 121, and 167 of the Michigan Natural Resource and Environmental Protection Act
- Part 111 and 121 both establish hazardous waste and liquid industrial management standards for the used oil
- Part 167 requires that the used oil be recycled

Used Oil – Common Tests

- Total Halogens - Used for testing used oils for chlorine, fluorine, bromine, etc. to determine if a “presumed” hazardous waste
- Used oil test for halogens using SW-846 or equipment like “Chlor-D-Tect”

Used Oil - Part 111, Rules 109(p), 203(1)(e), and 809)

- Used oil generally does not include used oil containing > 1000 PPM halogens
- Used oil with > 1000 PPM halogens is a presumed listed hazardous waste unless sufficient characterization data can be presented to “rebut the presumption” that the halogens are present from mixing used oil with a listed hazardous waste (chlorinated solvents)
- “Rebutting the presumption” is complicated for transporters & processors accepting used oil from multiple sources and most will not accept used oil > 1000 PPM halogens
- Total halogens are usually tested using SW 846 or using on-site testing equipment like “Chlor-D-Tect”
- If used oil contains > 1000 PPM halogens, it is presumed to have been mixed with listed halogenated hazardous waste unless rebutted
- Can also use knowledge of waste to characterize, if feasible, but adequate documentation is required

- Transporter usually tests oil prior to pick-up to verify LIW regulatory status
- Generators should request and maintain copies of relevant test on file
- If > 1000 PPM halogens present, additional, costly testing is required to “rebut” whether used oil was mixed with hazardous waste:
 - Analyze for all halogenated Appendix VIII constituent and
 - if > 100 PPM used oil fails and must be managed as a hazardous waste
- **CONCLUSION:** Do not mix used oil with other wastes to facilitate required recycling and avoid being required to manage the mixture as a hazardous waste

Rebuttable Presumption

- EPA/DEQ has discretion in determining what concentration is a “significant concentration” prompting rebuttal
- RCRA does not contain regulatory threshold for each halogenated hazardous constituent likely in used oil
- Generally look for concentrations less than 100 ppm for common hazardous halogenated constituents per Federal Register preamble

Chlorinated Paraffins:

- Typically have a total organic halogen content of 4,000 ppm or more but can be recycled through a tolling agreement per Part 111, Rule 203(1)(e)(i)
- Not as valuable as non-chlorinated used oil

Specification Used Oil

Specification Used Oil:

Heating Value	17,000 BTU/Lb.
Arsenic	< 5.0 ppm
Cadmium	<2.0 ppm
Chromium	<10 ppm
Lead	<100 ppm
Sulfur	< 1.0 %, Typical
Total Halogens	<1,000 ppm

PCB's

- Polychlorinated biphenyls must be < 1 ppm for specification used oil blending use
- 1 ppm is detection limit for PCBs in oil using SW-846 Method 8082
- Oil from certain sources or areas require verification analysis

Other Common LIW

- Milk/food processing waste
- Grease trap waste
- Investigation derived waste (IDW)
- Contaminated stormwater/groundwater

Milk/Food Processing Waste

- Off-Specification Food Product
 - SDS
 - BOD content
 - Anaerobic digestion
- Production Facility
 - Production area sumps
 - Contaminated with product
- Consumer Quantities – Part 115, Rule 430(d)
 - Only lawful if comparable to household

Grease Trap Waste

- Restaurants and Commercial Kitchens
 - Rendering pursuant to MDARD Bodies of Dead Animals Act
 - Liquid industrial waste solidification and landfill
 - Non-waste if follow 12102a(n) exclusion and solid waste on-farm anaerobic digestion memo

Investigation Derived Waste (IDW)

- Common IDW:
 - Drill Tailings

- Monitoring Well Purge Water
 - Decontamination Water
- Use investigation details to identify constituents of concern
- Analyze samples for constituents of concern to determine handling/disposal requirements

Handling IDW

- Presume hazardous waste pending analytical verification:
 - Place in closed tanks/containers
 - Labeled
 - Protected from weather, fire, physical damage and vandals
- Analytical typically done simultaneously

Contaminated Ground/Storm Water

- Characterize using historical data and testing
- Petroleum contaminated media from an approved UST remediation that fail for D016 – D043 are excluded from hazardous waste regulation under Rule 204(2)(l)
- The exclusion does not apply to an AST remediation
- Disposal options may include:
 - On-site pump and treat
 - Discharge to local wastewater treatment
 - Surface water or groundwater discharge permit
 - Off-site disposal
- Storm water may require stormwater management plan

Example #1

- Non-empty aerosol brake cleaner cans with the following before use constituent concentrations:
 - Acetone 45% - 55%
 - Toluene 25% to 35%
 - Methanol 10% to 20%
 - Carbon Dioxide 5% - 10%
- Unused solvent is not a spent solvent
- Solvent aerosol is an ignitable D001 hazardous waste
- Apply D003 reactive hazardous waste code if aerosol is capable of detonation or explosive reaction if subjected to a strong initiating source or heated under confinement

Example #2

- Dirty solvent removed from a degreasing tank for disposal/recycling with the following before use constituent concentrations:
 - Acetone 45% - 55%
 - Toluene 25% to 35%
 - Methanol 10% to 20%
- Spent Solvent is F003 and F005 listed hazardous waste

Example #3

- Expired nicotine patches (smoking cessation aids) discarded because they cannot be lawfully administered to a patient or sold as a product
- This is an unused raw material commercial chemical product containing a sole active ingredient listed in Part 111 Table 205a
- Unused patches are a P075 acutely toxic hazardous waste
- Pharmaceutical may be managed as a universal waste in Michigan.

Example 4

- Collected stormwater runoff and groundwater from a closed gas station underground storage tank (UST) farm removal.
- Stormwater with gasoline contains benzene, toluene, ethylbenzene, and xylene.
- Benzene Is found in Table 201a
- Media is presumed hazardous for benzene and D018
- Petroleum contaminated media from a UST remediation is excluded from definition of hazardous waste
- Wastewater is a liquid industrial waste

Solid Waste Characterization
Duane Roskoskey
DEQ, OWMRP, Lansing
517-582-3445

Solid Waste Regulation

- Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended
- Michigan's Solid Waste Management Act Administrative Rules
- Subtitle D of the federal Resource Conservation and Recovery Act of 1976, as amended

How Materials Are Excluded from Solid Waste Regulation

- Statutory Exclusion
 - Solid Waste Definition
 - Inert Material
 - Site Separated Recyclable Material
 - Beneficial Use By-products
 - Diverted Wastes
- Rule Exclusion
 - Petition for Exemption 118a
 - DEQ Approved Exclusion

Statutory Excluded Materials Part 115, Section 11506(1)

- Foundry or steel mill slag
- Garbage that is composted or land applied
- Coal bottom ash used as cold weather road abrasive
- Stamp sands used as cold weather road abrasive
- Non-hazardous secondary material approved for combustion under 40 CFR Part 241
- Scrap metal
- Human body waste
- Medical waste
- Manures and bedding
- Liquid waste
- Land application under an Agricultural Use Agreement
- Coal ash
- Materials land applied under the Generally Accepted Agricultural Management Practices
- Inert material
- Site separated recyclable material
- Diverted waste

Inert Materials Part 115, Section 11504(2)

- Rocks
- Trees, stumps, or similar land clearing debris
- Uncontaminated soil or dredge material
- Construction brick, masonry, pavement, or broken concrete
- Asphalt pavement or concrete pavement

Site Separated Recyclable Materials Part 115, Section 11506(6)

- Glass, metal, wood, paper, plastic, etc.
- Scrap wood, rail road ties, tires, or paint solids used as fuel
- Drywall or FGD used to produce drywall
- Shingles used for fuel or to produce hot mix asphalt
- Utility poles used for poles or posts
- Rail road ties used for landscaping
- Recovered paint solids used as fuel
- Municipal solid waste incinerator ash used for landfill alternate daily cover

Site Separated Recyclable Materials Part 115, Section 11506(6) & 11553(9)

- Concrete Grinding Slurry
- Asphalt Shingle
- Drywall
- Ethanol Syrup
- Fish Waste
- Scrap Wood
- On Farm Anaerobic Digestion
- Water Softening Lime
- Tires
- Manure, Paunch, and Pen Waste

Beneficial Use By-Products Part 115, Sections 11502(8), 11551, 11551a, 11552, and 11553

- Cement or Lime Kiln Dust Collected Air Contaminants
- Coal or Wood Bottom Ash
- Coal or Wood Combustion Collected Air Contaminants
- Dewatered Concrete Grinding Sludge
Flue Gas Desulfurization Collected Air Contaminants
- Foundry Sand
- Lime Softening Residuals
- Mixed Wood Ash
- Pulp and Paper Mill Ash
- Pulp and Paper Mill Material
- Soils Washed or Removed from Sugar Beets
- Spent Media from Sandblasting
- Stamp Sands

Beneficial Use By-Product Use Options

- Beneficial Use 1 - Use as aggregate, road material, or building material if it will be bonded or encapsulated by cement, limes, or asphalt
- Beneficial Use 2 - Use as construction fill, road base, soil stabilizer, or road shoulder material
- Beneficial Use 3 - Application of material as fertilizer, a soil conditioner under Part 85, or a liming material under 1955 PA 162
- Beneficial Use 4 - Use to stabilize, neutralize, or treat waste, including wastewater, sludge, or hazardous substances or to serve as landfill construction material
- Beneficial Use 5 – Use of foundry sand and organic material to manufacture soil

Beneficial Use Matrix

- See Page 10-5 of Reference Book

Analytical Requirements

- Listed Beneficial Use By-Products
- Listed Inert Materials
 - Soil and Sediment
 - Construction Brick, Masonry, Pavement, and Broken Concrete
 - Listed Source Separated Materials
- Materials Approved by the DEQ
 - Agricultural Use Approvals
 - Beneficial Use By-Products
 - Inert Materials
 - Source Separated Materials
 - Low-Hazard Industrial Waste

Foundry Sand Example

- Asphalt or concrete – non-hazardous using testing or knowledge
- Fill under impervious surface – must leach less than 20 times Part 201 Health Based Drinking criteria
- Land applied – must meet cumulative pollutant loading rate
- Remediate or treat waste - non-hazardous using testing or knowledge
- Soil blend – must test for 10 metals (i.e. antimony, cobalt, copper, iron, lead, manganese, molybdenum, nickel, thallium, and zinc), benzene, formaldehyde, phenol, and trichloroethylene

Diverted Wastes Part 115, Section 11521b

- Diverted waste means a waste that is:
 - commonly generated by households
 - can lawfully be disposed of at a licensed sanitary landfill or municipal solid waste incinerator
 - is separated from other waste
 - is being diverted to an environmentally preferred management option

Diverted Wastes Part 115, Section 11521b

- Hazardous material generated by a CESQG
- Liquid waste
- Pharmaceuticals
- Electronics
- Batteries
- Sharps
- Light bulbs
- Pesticides
- Thermostats, switches, thermometers, or other mercury containing devices

Waste Diversion Center Requirements

- Must be managed by trained personnel
- Must control releases to the environment
- Must have secure overnight storage
- May store material up to 1 year
- Must keep appropriate records
- Material must be sent to another waste diversion center, a recycling facility, or a disposal facility

Landfill Waste Acceptance

Cathy Hardy

Waste Management

chardy@wm.com

Special Waste Program Purpose

- Comply with permits/regulations
- Prevent acceptance of reactive waste (e.g. quicklime, aluminum dross)
- Protect human health and environment
- Prevent acceptance of prohibited materials

Special Waste is Waste that May Contain:

- Materials prohibited by license
- Waste subject to other regulation
- Waste unsuitable for site operations
- Waste requiring special handling

Special Waste Examples

- Waste with low levels of radioactivity or PCBs
- Remediation waste (soil, groundwater); industrial process waste
- Excluded hazardous wastes like:
 - UST petroleum contaminated soil
 - Natural gas production media and debris
 - Fossil Fuel burning combustion wastes

Prohibited Waste Examples

- Hazardous Waste
- Asbestos
- TSCA/PCB Waste
- Batteries
- Radioactive Waste

- Medical Waste
- Appliances/CFCs
- Cylinders/Aerosols
- Used Oil
- Bulk Liquids
- Raw Sewage
- Scrap Tires
- Yard Clippings
- Beverage Containers
- Empty Drums

Waste Profiling

- Pre-Acceptance Screening
- Pre-Acceptance Screening
- Generator completes a waste profile:
 - Provides a basic snapshot of waste detailing analytical results, regulatory information, DOT shipping information, etc.
 - Requires generator certification of accuracy and that the material does not contain regulated PCB's, regulated hazardous waste or other regulated waste

Example Waste Profile

- Waste Screening Records
- Typical records required include:
 - SDS'
 - Lab reports
 - Waste/process description
 - Process flow diagram
 - Sampling protocol
 - State or federal approval/notification
 - State/federal delisting or exemption citation

Analytical Data - Pre-screening data may include:

- Final lab report - Not preliminary
- Lab reports vs tables – Varies based on facility and generator
- TCLP – May be required to assess release of contaminants to leachate

Technical Review

- Final screening for identifying unacceptable waste
- Specialist reviews profile and additional supporting data
- Considerations include landfill conditions, worker health and safety, landfill long term liabilities
- Approval granted if data verifies meets state/federal regulations, facility license, and landfill considerations
- Profile information is entered/stored in data system for tracking
- Profile approval form/number issued to generator
- Profile expiration established where applicable

Special Waste Shipment Records

- Some regulations require manifests or waste shipment records (asbestos, bulk liquids)
- Some facilities require waste manifests for special waste tracking/verification purposes

Gate Screening

- Relies upon on-line waste tracking system
- Profile number entered
- Generator information verified
- Approval/expiration date verified
- Special operators instructions shared
- Physical description of the waste verified
- Shipment inspected to confirm the waste matches the profile/approval
- Shipping papers or manifests reviewed/completed
- Non-conforming, unapproved and expired special waste shipments are sent to a staging area until a profile is approved

- Shipment is rejected if nonconforming with the federal/state regulations, license, and landfill procedure

Waste Unloading

- Visual monitoring verifies conforming load
- If non-conforming load, unloading ceases and waste is isolated
- Transporter is detained
- Customer is notified
- Waste is returned to the customer

Reasons for Landfill Delays

- Expired profile
- Shipment not profiled
- Shipment does not conform with profile
- Incomplete paperwork
- Shipment does not conform with county plan
- Profile approval granted by another landfill

Special Waste Recommendations

- Contact the disposal facility in advance
- Identify their waste acceptance requirements
- Be as descriptive as possible on waste profile form
- Include all documentation used to characterize with waste profile form
- Recognize facility license waste analysis plan requires additional testing of landfill, which landfill requires of the generator
- Be prepared to cite regulatory exemption for waste originating from a listed hazardous waste source
- Be prepared to provide delisting or variance approval documents issued by the DEQ

Renewal Requirements

- Profiles have expiration dates to re-evaluate the waste and consider process/chemical changes
- Verifies previously submitted profile data remains representative
- Protects landfill and generator from liabilities associated with oversights

Points to Remember

- Do not discard the waste until proper characterization has been determined
- Know your disposal facility acceptance requirements, prohibitions and handling capabilities
- Generators are responsible for identifying any waste changes and notifying the disposal facility

Cradle to Grave Generator Responsibility

- Generators are responsible for their waste from the point of generation to disposal and beyond
- Keep good records and be prepared for federal/state inspections with all of your waste characterization/profiling supporting data
- Do not rely on information provided to the landfill for acceptance determination; the landfill relies on the you
- Be prepared to discuss and demonstrate why you classified a waste the way you did
- Think ahead and don't throw waste in the trash until it is has been characterized