



HAZARDOUS WASTE & HEALTHCARE: Engineering Wastes

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Industrial Division

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MPCA #1.01; Step 1: Evaluate Waste

<http://www.pca.state.mn.us/publications/w-hw1-01.pdf>

The “10 Steps to Hazardous Waste Compliance”

- 1. Evaluate Waste;
Determine Generator Size
- 2. Get a Generator
Identification Number
- 3. Get a License;
Pay a Fee
- 4. Containerize Waste;
Label the Containers
- 5. Accumulate and Store
Waste Properly
- 6. Transport and Dispose of
Hazardous Waste Correctly
- 7. Manifest Shipments of
Hazardous Waste
- 8. Plan for Emergencies
- 9. Train Employees
- 10. Keep Records

MPCA; Hazardous Waste Factsheets Page

<http://www.pca.state.mn.us/waste/pubs/business.html>

Step 1

Evaluate Waste

MPCA #1.01; Step 1: Evaluate Waste; Determine Generator Size
<http://www.pca.state.mn.us/publications/w-hw1-01.pdf>

Exempt – “RCRA Empty” Containers

- All waste that can be removed by normal means has been

AND



- (lesser of...)

- <1 inch residue remains
OR
- < 3% residue by weight remains
(container < 110 gallons)
OR
- Less than 0.3% residue by weight remains
(container > 110 gallons)

EXCEPT THAT...

MPCA #4.16; Managing Empty Containers

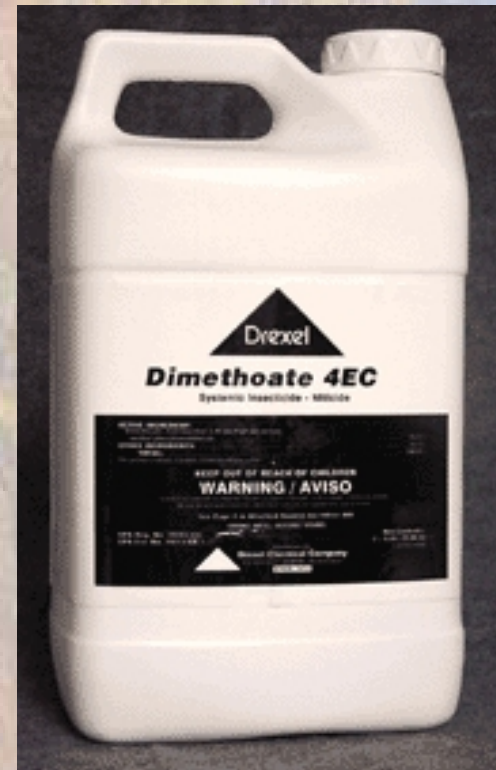
<http://www.pca.state.mn.us/publications/4-16.pdf>

Exempt – RCRA “Empty” Containers

- Acute hazardous waste
 - P-Listed waste (*mostly*)
 - Containers must be triple-rinsed
 - ☒ and the rinsate managed as hazardous waste

OR

- Entire container managed as hazardous waste



Exempt – Pesticide Containers*



- ... **when managed under FIFRA*
- Pesticide containers, including:
 - pesticides
 - herbicides
 - fungicides
- may be triple-rinsed and the rinsate applied as per label



Exempt – “Empty” Aerosol Containers

- Exempt when at or near atmospheric pressure
 - Do **NOT** vent to dispose

AND

- All product removable by normal means has been
 - defective containers may be returned as exempt products



Engineering Listed Wastes: F-List

- **F list:** nonspecific sources (many solvents)



MPCA #2.00; F List of Hazardous Waste

<http://www.pca.state.mn.us/publications/w-hw2-00.pdf>



Engineering Listed Wastes: K-List

- **F list:** nonspecific sources (many solvents)
- **K list:** specific sources specific processes
 - Healthcare providers are not listed K-List waste generators

NONE



Engineering Listed Wastes: P-List

- **F list:** nonspecific sources (many solvents)
 - **K list:** specific sources specific processes
 - **P list:** unused products, acute hazardous waste
all containers, waste
spill residues
- ☐ ✓ if the listed waste was the sole active ingredient of the product



MPCA #2.02; P-listed/Acute Hazardous Wastes

<http://www.pca.state.mn.us/publications/w-hw2-02.pdf>



Engineering Listed Wastes: U-List

- **F list:** nonspecific sources (many solvents)
 - **K list:** specific sources specific processes
 - **P list:** unused products, containers, acute hazardous waste spill residues
 - **U list:** unused products, toxic hazardous waste spill residues
- ✓ if the listed waste was the sole active ingredient of the product



MPCA #2.03; U-listed Hazardous Wastes

<http://www.pca.state.mn.us/publications/w-hw2-03.pdf>



Engineering Characteristic Wastes

- **Ignitable:** flash point $< 140^{\circ}\text{F}$, $\geq 24\%$ alcohol



MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>



Engineering Characteristic Wastes

- **Ignitable:** flash point < 140°F, ≥24% alcohol
- **Oxidizer:** supplies oxygen to a reaction



MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>



Pharmaceutical Characteristic Wastes

- **Ignitable:** flash point < 140°F, ≥24% alcohol
- **Oxidizer:** supplies oxygen to a reaction
- **Corrosive:** pH ≤ 2 or pH ≥ 12.5



MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>



Engineering Characteristic Wastes

- **Ignitable:** flash point < 140°F, ≥24% alcohol
- **Oxidizer:** supplies oxygen to a reaction
- **Corrosive:** pH ≤ 2 or pH ≥ 12.5
- **Reactive:** unstable, explosive, reacts violently with water



MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>



Engineering Characteristic Wastes

- **Ignitable:** flash point $< 140^{\circ}\text{F}$ $\geq 24\%$ alcohol,
- **Oxidizer:** supplies oxygen to a reaction
- **Corrosive:** $\text{pH} \leq 2$ or $\text{pH} \geq 12.5$
- **Reactive:** unstable, explosive, reacts violently with water
- **Toxic:** specific contaminants above limits



D005
Barium



Pre-1991 Latex Paint
D009
Mercury



D026
Cresol

MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>



Evaluate your waste — Where to start?

■ By analysis:

- Test the waste OR
- Send a sample to a commercial testing laboratory
 - ☒ Some hazardous waste transporters will perform testing
- Keep ALL documentation used in evaluation whether sample is hazardous or non-hazardous



Evaluate your waste — Where to Start?

■ By knowledge: MSDS/Prescription Information

Key Information

- ❑ Chemical name
- ❑ Hazardous ingredients
- ❑ Physical data
- ❑ Fire and explosion data
- ❑ Spill or leak procedures
- ❑ Manufacturer Contact

*Remember the MSDS is NOT
the end of the process for evaluation*



Evaluate your waste — Knowledge

■ MSDS:



□ OSHA document

⊗ Listing on MSDS only required if ingredient $\geq 1\%$

⊗ $1\% = 10,000$ ppm

⊗ Contaminants may be hazardous at 0.2 ppm

□ MSDS not required to include hazardous *waste* status

□ Wastes can be 'hazardous waste' under RCRA without being 'hazardous chemicals' under OSHA

OSHA; 29 CFR 1910.1200 (g)(2)(i)(C)(1)

http://www.access.gpo.gov/nara/cfr/waisidx_03/29cfr1910a_03.html



Evaluate your waste — Knowledge

■ Basics for evaluation by knowledge:

- Must be based on documented information
 - ☒ Manufacturer certification
 - ☒ Government agency certification (FDA/mercury)
 - ☒ MSDS, RTECS, ToxNet, ChemFinder, etc.
- If performed by third-party, generator must have documented rationale for evaluation result
- Keep ALL documentation used in evaluation whether waste is hazardous or non-hazardous



MPCA; Healthcare Hazardous Waste Links

<http://www.pca.state.mn.us/industry/healthcare.html>

Evaluate your waste — Knowledge

■ *Recommended* order:

- Lists
- Characteristics



Evaluate your waste — Knowledge

■ *Recommended order*

□ Lists:

- ☒ P-List
- ☒ U-List
- ☒ F-List (solvents)



Knowledge - Characteristics

■ *Recommended* order

□ Characteristics:

- Reactivity
- Corrosivity
- Ignitability
- Oxidizers
- Toxicity



Evaluate your waste — Knowledge

■ Key Points

□ Recommended Process

- ☒ Start at the top and work down
- ☒ Remember:
 - ☒ P-List and U-List apply only to **UNUSED** products
 - ☒ Characteristics apply ***everywhere/all the time***
- ☒ Once a waste is determined/assumed to be hazardous, you may stop evaluating the waste
- ☒ *Transporters may require a full waste profile*



MPCA #1.01; Step 1: Evaluate Waste

<http://www.pca.state.mn.us/publications/w-hw1-01.pdf>



Not Evaluating your waste

- A generator *may* forgo evaluation of a waste ***IF*** the generator:
 - assumes the waste is hazardous; **AND**
 - fully manages the waste as hazardous; **AND**
 - counts the waste in its generator size; **AND**
 - reports the waste as hazardous



Step 1

Evaluate Waste

- Putting It All Together:

- Basic Engineering Waste Evaluation

MPCA #1.01; Step 1: Evaluate Waste; Determine Generator Size

<http://www.pca.state.mn.us/publications/w-hw1-01.pdf>

Evaluate your waste — Knowledge

- Putting it all together (Example #1):
 - Waste used BWT0100 Boiler Scale Inhibitor



MPCA #1.01; Step 1: Evaluate Waste

<http://www.pca.state.mn.us/publications/w-hw1-01.pdf>

Evaluate your waste — Knowledge

- Putting it all together (Example #1):
 - Waste used BWT0100 Boiler Scale Inhibitor
 - ☒ Active ingredients not F-Listed, P-Listed, U-Listed



MPCA #2.00; F List of Hazardous Waste

<http://www.pca.state.mn.us/publications/w-hw2-00.pdf>

Evaluate your waste — Knowledge

- Putting it all together (Example #1):
 - Waste used BWT0100 Boiler Scale Inhibitor
 - ☒ Active ingredients not F-Listed, P-Listed, U-Listed
 - ☒ Not Ignitable, Oxidizer, Reactive, Toxic
 - ☒ Product pH 13.0+



MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>

Evaluate your waste — Knowledge

■ Putting it all together (Example #1):

- Waste **used** BWT0100 Boiler Scale Inhibitor
 - ☒ Active ingredients not F-Listed, P-Listed, U-Listed
 - ☒ Not Ignitable, Oxidizer, Reactive, Toxic
 - ☒ Product pH 13.0+
 - ☒ Use as labeled will result in pH of 10.5-11.5



MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>

Evaluate your waste — Knowledge

■ Putting it all together (Example #1):

□ Waste **used** BWT0100 Boiler Scale Inhibitor

☒ Active ingredients not F-Listed, P-Listed, U-Listed

☒ Not Ignitable, Oxidizer, Reactive, Toxic

☒ Product pH 13.0+

☒ Use as labeled will result in pH of 10.5-11.5

★ This waste is non-hazardous after use as labeled.

★ The POTW must still be **notified** before sewerage this waste.



MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>

Evaluate your waste...

- Putting it all together: (Example #2)
 - Waste used Formaldehyde 37%



MPCA #1.01; Step 1: Evaluate Waste

<http://www.pca.state.mn.us/publications/w-hw1-01.pdf>

Evaluate your waste...

- Putting it all together: (Example #2)
 - Waste used Formaldehyde 37%
 - ☒ Formaldehyde is U122



MPCA #2.03; U-listed Hazardous Wastes

<http://www.pca.state.mn.us/publications/w-hw2-03.pdf>

Evaluate your waste...

- Putting it all together: (Example #2)
 - Waste **used** Formaldehyde 37%
 - ☒ Formaldehyde is U122
 - ☒ Used, so not a U-Listed hazardous waste



Evaluate your waste...

- Putting it all together: (Example #2)
 - Waste used Formaldehyde 37%
 - ☒ Formaldehyde is U122
 - ☒ Used, so not a U-Listed hazardous waste
 - ☒ Labeled Corrosive



MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>

Evaluate your waste...

■ Putting it all together: (Example #2)

□ Waste used Formaldehyde 37%

☒ Formaldehyde is U122

☒ Used, so not a U-Listed hazardous waste

☒ Labeled Corrosive

☒ pH is 2.8, so not a RCRA Corrosive hazardous waste

☒ Not Ignitable, Oxidizer, Reactive, or Toxic



Evaluate your waste...

■ Putting it all together: (Example #2)

□ Waste used Formaldehyde 37%

☒ Formaldehyde is U122

☒ Used, so not a U-Listed hazardous waste

☒ Labeled Corrosive

☒ pH is 2.8, so not a RCRA Corrosive hazardous waste

☒ Not Ignitable, Oxidizer, Reactive, or Toxic

☒ This waste is non-hazardous.



Evaluate your waste...

■ Putting it all together: (Example #2)

□ Waste used Formaldehyde 37%

☒ Formaldehyde is U122

☒ Used, so not a U-Listed hazardous waste

☒ Labeled Corrosive

☒ pH is 2.8, so not a RCRA Corrosive hazardous waste

☒ Not Ignitable, Oxidizer, Reactive, or Toxic

☒ This waste is non-hazardous.

☒ *What if the formaldehyde was unused?*



Evaluate your waste...

- Putting it all together: (Example #3)
 - Waste used Baralyme carbon dioxide absorbent



MPCA #1.01; Step 1: Evaluate Waste

<http://www.pca.state.mn.us/publications/w-hw1-01.pdf>

Evaluate your waste...

- Putting it all together: (Example #3)

- Waste used Baralyme carbon dioxide absorbent

- ☒ Active ingredients not F-Listed, P-Listed, U-Listed



MPCA #2.02; P-listed/Acute Hazardous Wastes

<http://www.pca.state.mn.us/publications/w-hw2-02.pdf>



Evaluate your waste...

■ Putting it all together: (Example #3)

□ Waste used Baralyme carbon dioxide absorbent

- ☒ Active ingredients not F-Listed, P-Listed, U-Listed
- ☒ Not Ignitable, Oxidizer, Reactive, Corrosive
- ☒ Contains approximately 8.8% barium w/w



MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>

Evaluate your waste...

■ Putting it all together: (Example #3)

□ Waste used Baralyme carbon dioxide absorbent

☒ Active ingredients not F-Listed, P-Listed, U-Listed

☒ Not Ignitable, Oxidizer, Reactive, Corrosive

☒ Contains approximately 8.8% barium w/w

☒ 8.8% equals 88,000 parts per million (solid)

★ 'worst-case' 1:20 analytical dilution applied



Evaluate your waste...

■ Putting it all together: (Example #3)

□ Waste used Baralyme carbon dioxide absorbent

☒ Active ingredients not F-Listed, P-Listed, U-Listed

☒ Not Ignitable, Oxidizer, Reactive, Corrosive

☒ Contains approximately 8.8% barium w/w

☒ 8.8% equals 88,000 parts per million (solid)

★ 'worst-case' 1:20 analytical dilution applied

★ potential leachate = 4,400ppm barium

★ Toxicity Characteristic threshold = 100ppm

☒ This is a Toxic hazardous waste!



MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>



Evaluate your waste...

■ Putting it all together: (Example #3)

□ Waste used Baralyme carbon dioxide absorbent

☒ Active ingredients not F-Listed, P-Listed, U-Listed

☒ Not Ignitable, Oxidizer, Reactive, Corrosive

☒ Contains approximately 8.8% barium w/w

☒ 8.8% equals 88,000 parts per million (solid)

★ 'worst-case' 1:20 analytical dilution applied

★ potential leachate = 4,400ppm barium

★ Toxicity Characteristic threshold = 100ppm

☒ This is a Toxic hazardous waste!

★ ***Does it matter that the waste is used?***



MPCA #2.04; Characteristic Wastes

<http://www.pca.state.mn.us/publications/w-hw2-04.pdf>



Evaluate your waste...

- Putting it all together: (Example #4)
 - Depleted intraosseous needle power driver



MPCA #1.01; Step 1: Evaluate Waste

<http://www.pca.state.mn.us/publications/w-hw1-01.pdf>

Evaluate your waste...

- Putting it all together: (Example #4)
 - Depleted intraosseous needle power driver
 - ☒ Contains integral nonrechargeable Lithium-Ion battery
 - ☒ Lithium is not F-Listed, P-Listed, U-Listed



MPCA #2.03; U-listed Hazardous Wastes

<http://www.pca.state.mn.us/publications/w-hw2-03.pdf>

Evaluate your waste...

■ Putting it all together: (Example #4)

- Depleted intraosseous needle power driver
 - ☒ Contains integral nonrechargeable Lithium-Ion battery
 - ☒ Lithium is not F-Listed, P-Listed, U-Listed
 - ☒ Not Ignitable, Oxidizer, Corrosive, Toxic
 - ☒ Lithium battery is Reactive



MPCA #4.05; Managing Dry-cell Batteries

<http://www.pca.state.mn.us/publications/w-hw4-05.pdf>

Evaluate your waste...

■ Putting it all together: (Example #4)

- Depleted intraosseous needle power driver
 - ⊗ Contains integral nonrechargeable Lithium-Ion battery
 - ⊗ Lithium is not F-Listed, P-Listed, U-Listed
 - ⊗ Not Ignitable, Oxidizer, Corrosive, Toxic
 - ⊗ Lithium battery is Reactive
 - ⊗ This item is a hazardous waste! *



HCWH; Battery Round-Ups: Get Charged!

http://www.noharm.org/library/docs/Going_Green_Batter_Roundups_-_Get_Charged.pdf



Evaluate your waste...

■ Putting it all together: (Example #4)

□ Depleted intraosseous needle power driver

- ☒ Contains integral nonrechargeable Lithium-Ion battery
- ☒ Lithium is not F-Listed, P-Listed, U-Listed
- ☒ Not Ignitable, Oxidizer, Corrosive, Toxic
- ☒ Lithium battery is Reactive
 - ☒ This item is a hazardous waste! *
 - ☒ **...but may be managed as a Universal Waste*



Compliance Resources



Electronic copies of this presentation and all other MPCA Healthcare Hazardous Waste Presentations available at no cost





Questions?

Contact your State Regulatory Agency *First!*

Contact your EPA Regional Office for
federal interpretation questions.

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