Generator LDR Requirements & Waste Stabilization
ASTSWMO’s Joint Hazardous Waste & Materials Management Training Conference
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History of the LDR Program

• During the passage of the Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) in 1984, Congress added the LDR program to the RCRA framework.

• HSWA required EPA to promulgate LDR treatment standards by May 8, 1990, for all wastes listed or identified as hazardous at the time of the amendments.
  – Solvents and dioxins: high volume solvents and toxic.
  – California list: liquid hazardous wastes containing certain toxic constituents or exhibiting certain properties (e.g., cyanides, PCBs, HOCs, and metals).
  – First Third Rule: high-volume, high-hazard hazard wastes.
  – Second Third Rule: hazardous waste between first and third.
History of the LDR Program

- For new hazardous wastes identified or listed after HSWA, EPA was required to promulgate treatment standards within six months of the date that the listing or identification became final.
  - EPA did not meet the six month time frame and was sued by the Environmental Defense Fund (EDF).
History of the LDR Program

• In a separate court action, EPA was also sued by Chemical Waste Management (CWM v EPA) on the LDR treatment standards for characteristic wastes established in the Third rule.
  – In that case, the court ruled that characteristic wastes must be treated to address the possible existence of underlying hazardous constituents (UHCs).
History of the LDR Program

• These two court cases had a massive impact on the LDR program that resulted in:
  – establishing an aggressive schedule for completion of outstanding LDR treatment standards
  – forcing EPA to reconsider existing treatment standards for characteristic wastes.

• In response to these two court decisions, EPA promulgated four different rulemakings (or phases: I, II, III, and IV) between 1991 and 1998.
History of the LDR Program

• Phase 1:
  – Finalized the alternative treatment standards for hazardous debris.

• Phase 2:
  – Consolidated the existing treatment standards into §268.40.
  – Created the Universal Treatment Standards (UTS).
  – Promulgated treatment standards for toxicity characteristic organic wastes, coke by-products, and chlorotoluenes.
History of the LDR Program

• Phase 3:
  – Modified treatment standards for reactive wastes and decharacterized wastewaters.
  – Promulgated new treatment standards for carbamate wastes and spent aluminum potliners.

• Phase 4:
  – Promulgated treatment standards for the wood preserving wastes.
  – Streamlined the LDR notification requirements.
  – Finalized treatment standards for several metal wastes and certain newly identified mineral processing wastes.
  – Revised the universal treatment standards for twelve metal constituents.
  – Created a new treatability group, soil, and established soils specific alternative treatment standards.
Restricted vs. Prohibited

• Two terms frequently used in reference to wastes subject to the LDR are restricted and prohibited.
  – Restricted wastes are hazardous wastes subject to the LDR program.
    • Until the effective date, restricted waste do not have to be treated to meet the LDR treatment standards, however, it can only be disposed in a landfill unit meeting the minimum technological requirements of 268.5(h)(2).
  – Prohibited wastes have an EPA established treatment standard that is in effect.
    • Prohibited wastes are a subset of restricted wastes. Once the effective date has passed, LDR treatment standards must be met before the waste can be disposed on the land unless the waste is eligible for a variance, extension, or exemption.

• All current hazardous wastes now have treatment standards that are in effect, therefore all hazardous waste are prohibited from land disposal.
Who Needs to Comply with the LDR Requirements

- TSDs – yes*
- LQGs – yes
- SQGs – yes
- VSQGs – no, provided waste is sent to a permitted facility (e.g., TSD, subtitle D landfill, recycler)
- Transporters – no, provided waste codes are not being changed from bulking operations
- Universal waste handlers – no
- Universal waste transporters – no
- Universal waste destination facilities – yes*

* The facility would not need to comply with the LDR standards if the facility only treated hazardous waste or universal waste from VSQGs. If the facility treated hazardous waste or universal waste from VSQGs, SQGs, and LQGs and the wastes is mixed into one container or tank, then the LDR treatment standards apply.
What Triggers the LDR Requirements?

• LDRs are triggered if a generator’s hazardous waste or residues from treating the generator’s hazardous waste will ultimately be disposed in a land disposal unit.
  – “Land disposal” means placement in or on the land, except in a corrective action management unit or staging pile, and includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, salt dome formation, salt bed formation, underground mine or cave, or placement in a concrete vault, or bunker intended for disposal purposes.

• When does placement occur for remediation waste (RO 11954)?
  – Consolidated from different Area of Contaminations (AOCs) into a single AOC
  – Moved outside of an AOC (e.g., storage, treatment) and returned to the same of different AOC
  – Excavated from an AOC, placed in a separate unit (e.g., container, tank) that is within the AOC and redeposited into the same AOC
  – Placement does not occur when
    • Treated in situ
    • Capped in place
    • Processed within an AOC
Hazardous Wastes that are not Subject to the LDR Requirements

Under s. 268(e) the following hazardous waste are not subject to any provisions of part 268

• Hazardous waste generated by VSQGs
• Hazardous waste pesticides that a farmer disposes of pursuant to s. 262.70
• Hazardous waste in which EPA has not promulgated land disposal prohibitions or treatment standards.
• De minimis losses of characteristic hazardous wastes to wastewaters are not considered to be prohibited wastes and are defined as losses from normal material handling operations (e.g., spills from the unloading or transfer of materials from bins or other containers, leaks from pipes, valves or other devices used to transfer materials).
• Universal waste handlers and universal waste transporters
Hazardous Wastes that are not Subject to the LDR Requirements

- Hazardous waste remediation wastes that are managed in:
  - Corrective Action Management units (CAMUs) (ss 264.551 & 264.552).
  - CAMU-eligible hazardous waste in off-site hazardous waste landfills (s. 264.555).
  - Hazardous wastes that are manage in temporary staging piles (264.554).
  - AOCs (RO 11954, 11970, 13442, & 14112).

- Hazardous waste wastewaters managed in pipes and tanks prior to being discharged under NPDES or to sewer line leading to a POTW are not subject to LDR treatment requirements.
  - Cannot be conveyed by earthen ditches or managed in a surface impoundment
  - A one time LDR notice must be kept in the facility’s file (s. 268.7(a)(7)).
One Time Notice Under s. 268.7(a)(7)

If a generator determines that he is managing a prohibited waste that is excluded from the definition of hazardous or solid waste or is exempted from Subtitle C regulation under 40 CFR 261.2 through 261.6 subsequent to the point of generation (including deactivated characteristic hazardous wastes managed in wastewater treatment systems subject to the Clean Water Act (CWA) as specified at 40 CFR 261.4(a)(2) or that are CWA-equivalent, or are managed in an underground injection well regulated by the SDWA), he must place a one-time notice describing such generation, subsequent exclusion from the definition of hazardous or solid waste or exemption from RCRA Subtitle C regulation, and the disposition of the waste, in the facility’s on-site files.
What are the Generator’s LDR Responsibilities?

• The generator of a solid waste is required to determine if that waste is a hazardous waste and if a hazardous waste assign the proper waste code(s).
  – Only wastes that are hazardous waste at the Point of Generation (POG) are subject to the LDR program.
    • EPA has clarified that generators can determine each waste code applicable to a hazardous waste [in order to determine the applicable treatment standard(s)] at the same time as they make hazardous waste determinations.
  – LDR requirements (e.g., paperwork, dilution prohibition, storage) attach to a hazardous waste at its POG. The practical implication of this arrangement is that after a waste is generated, it must meet treatment standards prior to land disposal.
    • Even if a hazardous waste is rendered nonhazardous subsequent to the POG, the treatment standards attached at the POG and must be satisfied prior to land disposal.
    • D001 treatment example.
What are the Generator’s LDR Responsibilities?

• The generator must determine if they will manage the hazardous waste in a manner that triggers compliance with the LDR treatment standards.
  – Placement in a land disposal unit.
  – Hazardous waste wastewaters managed in pipes and tanks prior to being discharged under NPDES or a POTW are not subject to LDR treatment requirements.
  – Hazardous waste from remediation.
  – Hazardous waste from VSQGs.
What are the Generator’s LDR Responsibilities?

- The generator determines if the waste falls into any "subcategories" established under the LDR program. Only a few wastes have subcategories.
  - The generator can assign this responsibility to the TSD facility under s. 268.7(a)(1)

<table>
<thead>
<tr>
<th>Waste code</th>
<th>Waste description and treatment/Regulatory subcategory(^1)</th>
<th>Regulated hazardous constituent</th>
<th>Wastewaters Concentration in mg/L(^3); or Technology Code(^4)</th>
<th>Nonwastewaters Concentration in mg/kg(^5) unless noted as &quot;mg/L TCLP&quot;; or Technology Code(^4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D001 (^9)</td>
<td>Ignitable Characteristic Wastes, except for the s. NR 661.21 (1) (a) High TOC Subcategory.</td>
<td>NA</td>
<td>D-EACT and meet s. NR 668.48 standards(^8); or RORGS; or CMBST</td>
<td>RORGS; CMBST; or POLYM</td>
</tr>
<tr>
<td></td>
<td>High TOC Ignitable Characteristic Liquids Subcategory based on s. NR 661.21 (1) (a) – Greater than or equal to 10% total organic carbon. (Note: This subcategory consists of nonwastewaters only.)</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>D002 (^9)</td>
<td>Corrosive Characteristic Wastes.</td>
<td>NA</td>
<td>D-EACT and meet s. NR 668.48 standards(^8)</td>
<td></td>
</tr>
</tbody>
</table>
What are the Generator’s LDR Responsibilities?

- The generator classifies the waste according to its treatability group (i.e., wastewater or nonwastewater).

<table>
<thead>
<tr>
<th>Waste code</th>
<th>Waste description and treatment/Regulatory subcategory</th>
<th>Regulated hazardous constituent</th>
<th>Wastewaters</th>
<th>Nonwastewaters</th>
</tr>
</thead>
<tbody>
<tr>
<td>D001 ⁹</td>
<td>Ignitable Characteristic Wastes, except for the s. NR 661.21 (1) (a) High TOC Subcategory.</td>
<td>NA</td>
<td>D东亚CT and meet s. NR 668.48 standards; or RORGS; or CMBST</td>
<td>RORGS; CMBST; or POLYM</td>
</tr>
<tr>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>D002 ⁹</td>
<td>Corrosive Characteristic Wastes.</td>
<td>NA</td>
<td>D东亚CT and meet s. NR 668.48 standards</td>
<td>D东亚CT and meet s. NR 668.48 standards</td>
</tr>
</tbody>
</table>
What are the Generator’s Responsibilities?

- The generator determines if a specified treatment method (e.g., combustion) applies to the waste. If a specified method is identified, the method attaches to the waste at the point of generation and continues in force until the waste is treated by that method.
  - A practical implication of this provision is that mixing different hazardous wastes may have unanticipated consequences. For example, if a waste having only concentration-based treatment standards is mixed with a waste having "combustion“ as the specified method, the entire mixture must now be combusted prior to land disposal.

<table>
<thead>
<tr>
<th>Waste code</th>
<th>Waste description and treatment/Regulatory subcategory¹</th>
<th>Regulated hazardous constituent</th>
<th>Wastewaters Concentration in mg/L³; or Technology Code⁴</th>
<th>Nonwastewaters Concentration in mg/kg⁸ unless noted as “mg/L TCLP”; or Technology Code⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>D001 ⁹</td>
<td>Ignitble Characteristic Wastes, except for the s. NR 661.21 (1) (a) High TOC Subcategory.</td>
<td>NA</td>
<td>DEACT and meet s. NR 668.48 standards³; or RORGS; or CMBST</td>
<td>RORGS; CMBST; or POLYM</td>
</tr>
<tr>
<td></td>
<td>High TOC Ignitable Characteristic Liquids Subcategory based on s. NR 661.21 (1) (a) – Greater than or equal to 10% total organic carbon. (Note: This subcategory consists of nonwastewaters only.)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>D002 ⁹</td>
<td>Corrosive Characteristic Wastes.</td>
<td>NA</td>
<td>DEACT and meet s. NR 668.48 standards³</td>
<td>DEACT and meet s. NR 668.48 standards³</td>
</tr>
</tbody>
</table>
What are the Generator’s LDR Responsibilities?

• The generator must identified the Underlying Hazardous Constituents* (UHCs) for characteristic wastes. Except for:
  – High-TOC waste treated by CMBST, RORGS, or POLYM. (s. 268.9(a))
  – Decharacterized wastewaters that are being managed in a CWA or CWA equivalent system or injected into a class 1 injection well regulated under the Safe Water Drinking Act (SWDA) (April 8, 1996; 61 FR 15661).
    • CWA equivalent treatment means biological treatment for organics, alkaline chlorination or ferrous sulfate precipitation for cyanide, precipitation/ sedimentation for metals, reduction of hexavalent chromium, or other treatment technology that can be demonstrated to perform equally or better than these technologies.
  – D003 reactive cyanides having a concentration based standard do not require treatment of UHCs (April 8, 1996; 61 FR 15568).
  – Hazardous waste that has a specified treatment method (September 19, 1994; 59 FR 47988).
    • Even though certain D001, D002, and D003 nonwastewaters have DEACT as a treatment method they are required to meet UTSSs.
  – Lab pack containing characteristic hazardous wastes (D001 to D008, and D010 to D043)
  – Based on ss 268.7(a), 268.9(a), and 268.40(e) UHCs need to be identified on the LDR form even for waste that do not require their treatment.

* “Underlying hazardous constituent” means any constituent listed in s. NR 668.48, Table UTS—Universal Treatment Standards, except fluoride (K088), selenium, sulfides (K171), vanadium(K1717 & K172), and zinc (K061), which can reasonably be expected to be present at the point of generation of the hazardous waste at a concentration above the constituent– specific UTS treatment standards.
What are the Generator’s LDR Responsibilities?

• The generator needs to determine if an alternative treatment standards applies:
  – Hazardous waste soils may be treated by the alternative standards under s. 268.49.
    • Ten times UTS concentration
    • 90% reduction from initial concentration
  – Hazardous waste debris may be treated by the alternative standards under s. 268.45.
    • Physical Extraction: abrasive blasting, scarification, grinding and planning, high pressure steam and water sprays
    • Chemical Extraction or destruction: chemical or electrolytic oxidation, chemical reduction
    • Thermal Extraction: high temperature metals recovery
    • Biological Destruction: biodegradation of organic or nonmetallic inorganic compounds
    • Thermal destruction: Treatment in an incinerator or BIF
    • Immobilization: macroencapsulation, microencapsulation, sealing
    • Residue from the treatment of hazardous debris is subject to the waste−specific treatment standards provided in 268.40
  – Lab packs may be treated by the alternative standards under s. 268.42(c) WAC.
    • Small quantities of commercial chemical products (P and U listed hazardous waste)
    • Must be incinerated
    • Cannot contain the following: D009, F019, K003, K004, K005, K006, K062, K071, K100, K106, P010, P011, P012, P076, P078, U134, U151
What are the Generator’s LDR Responsibilities?

• The generator complies with the dilution prohibition
  – An easy way to meet the concertation based standards in 268.40 is to dilute the hazardous waste – usually not allowed.
  – Section 268.3 prohibits dilution as a substitute for adequate treatment to achieve compliance with the LDR requirements.
  – Some examples of when dilution is permitted:
    • Hazardous waste is being disposed in a no-migration unit. A no-migration unit is a unit from which there will be no migration of hazardous constituents for as long as the waste placed in the unit remains hazardous. Examples: salt domes, monofill landfill located in an arid area that has no groundwater recharge, and underground injection wells.
    • Hazardous waste is placed in a land disposal unit that has an approved no migration petition.
    • F003, K047, U002 or characteristic waste (except High TOC D001, D003 reactive cyanide, or D012–D017 wastewater) being sent to a Class I SDWA underground or to a CWA
    • or CWA-equivalent system.
    • Hazardous waste that does not have a treatment standard that is in effect
What are the Generator’s LDR Responsibilities?

- The generator prepares the proper LDR paperwork
- If the waste or contaminated soil does not meet the applicable treatment standard, then, the generator shall send a one-time written notice to each treatment or storage facility receiving the waste with the initial waste shipment, and shall place a copy in the generator’s file (s. 268.7(a)(2)).
  
  - Review the initial LDR form for to determine compliance with the above.
  - Discuss with generator that the initial LDR forms should be placed with the waste determination and not with the hazardous waste manifests.
  - Discuss with the generator that multiple LDR forms for the same hazardous waste going to the same TSD facility should be avoided – leads to confusion.
## What are the Generator’s LDR Responsibilities?

<table>
<thead>
<tr>
<th>Required Information</th>
<th>268.7(a)(2) Does not Meet Treatment Standards</th>
<th>268.7(a)(3) Meets Treatment Standards</th>
<th>268.7(a)(4) Not Required to Meet Treatment Standards</th>
<th>268.7(a)(9) Lab Pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EPA hazardous waste numbers and manifest number of first shipment.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2. Statement: this waste is not prohibited from land disposal</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3. The waste is subject to the LDRs. The constituents of concern for EPA hazardous</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>waste numbers F001 through F005 and F039 waste, and underlying hazardous constituents</td>
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<td></td>
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<td></td>
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<tr>
<td>in characteristic waste, unless the waste will be treated and monitored for all</td>
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<td></td>
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<tr>
<td>constituents. If all constituents will be treated and monitored, there is no need</td>
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<td></td>
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<tr>
<td>to put them all on the LDR notice</td>
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<td></td>
</tr>
<tr>
<td>4. The notice must include the applicable wastewater/ nonwastewater category</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(see ss. NR 668.02(4) and (6)) and subdivisions made within a waste code based on</td>
<td></td>
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<tr>
<td>waste-specific criteria (such as D003 reactive cyanide)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Waste analysis data (when available)</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>6. Date the waste is subject to the prohibition</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>7. For hazardous debris, when treating with the alternative treatment technologies</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>provided by s. NR 668.45: the contaminants subject to treatment, as described in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>s. NR 668.45(2); and an indication that these contaminants are being treated to comply</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with s. NR 668.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. For contaminated soil subject to LDRs as provided in s. 668.49(1), the constituents</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>subject to treatment as described in s. 668.49(4), and the following statement:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This contaminated soil (does/does not) contain listed hazardous waste and (does/does</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>not) exhibit a characteristic of hazardous waste and (is subject to/complies with)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the soil treatment standards as provided by s. 668.49(3) or the universal treatment</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>standards</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. A certification is needed (see applicable subsection for exact wording)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
### What are the Generator’s LDR Responsibilities?

<table>
<thead>
<tr>
<th>Required Information</th>
<th>268.7(a)(2) Does not Meet Treatment Standards</th>
<th>268.7(a)(3) Meets Treatment Standards</th>
<th>268.7(a)(4) Not Required to Meet Treatment Standards</th>
<th>268.7(a)(9) Lab Pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EPA hazardous waste numbers and manifest number of first shipment.</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>2. Statement: this waste is not prohibited from land disposal</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3. The waste is subject to the LDRs. The constituents of concern for EPA hazardous waste numbers F001 through F005 and F039 waste, and underlying hazardous constituents in characteristic waste, unless the waste will be treated and monitored for all constituents. If all constituents will be treated and monitored, there is no need to put them all on the LDR notice</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The notice must include the applicable wastewater/ nonwastewater category (see ss. 268.2(d) and (f) and subdivisions made within a waste code based on waste-specific criteria (such as D003 reactive cyanide)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Waste analysis data (when available)</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>6. Date the waste is subject to the prohibition</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>7. For hazardous debris, when treating with the alternative treatment technologies provided by s. 268.45: the contaminants subject to treatment, as described in s. 268.45(b); and an indication that these contaminants are being treated to comply with s. 268.45</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>8. For contaminated soil subject to LDRs as provided in s. 268.49(a), the constituents subject to treatment as described in s. 268.49(d, and the following statement: This contaminated soil (does/does not) contain listed hazardous waste and (does/does not) exhibit a characteristic of hazardous waste and (is subject to/complies with) the soil treatment standards as provided by s. 268.49(c) or the universal treatment standards</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. A certification is needed (see applicable subsection for exact wording)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
What are the Generator’s LDR Responsibilities?

EPA hazardous waste numbers and manifest number of first shipment.

- If the treatment standard for a listed waste addresses the constituent causing the waste to exhibit the characteristic, only the listed waste (and treatment standard) applies.

- If the treatment standard for a listed waste does not address the constituent causing the waste to exhibit the characteristic, both the listed waste and characteristic waste codes (and treatment standard) applies.
### What are the Generator’s LDR Responsibilities?

**F037 and D018**

<table>
<thead>
<tr>
<th>Compound</th>
<th>Concentration 1</th>
<th>Concentration 2</th>
<th>Concentration 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acenaphthene</td>
<td>83–32–9</td>
<td>0.059</td>
<td>NA</td>
</tr>
<tr>
<td>Anthracene</td>
<td>120–12–7</td>
<td>0.059</td>
<td>3.4</td>
</tr>
<tr>
<td>Benzene</td>
<td>71–43–2</td>
<td>0.14</td>
<td>10</td>
</tr>
<tr>
<td>Benz(a)anthracene</td>
<td>56–55–3</td>
<td>0.059</td>
<td>3.4</td>
</tr>
<tr>
<td>Benzo(a)pyrene</td>
<td>50–32–8</td>
<td>0.061</td>
<td>3.4</td>
</tr>
<tr>
<td>bis(2–Ethylhexyl) phthalate</td>
<td>117–81–7</td>
<td>0.28</td>
<td>28</td>
</tr>
<tr>
<td>Chrysene</td>
<td>218–01–9</td>
<td>0.059</td>
<td>3.4</td>
</tr>
<tr>
<td>Di–n–butyl phthalate</td>
<td>84–74–2</td>
<td>0.057</td>
<td>28</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>100–41–4</td>
<td>0.057</td>
<td>10</td>
</tr>
<tr>
<td>Fluorene</td>
<td>86–73–7</td>
<td>0.059</td>
<td>NA</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>91–20–3</td>
<td>0.059</td>
<td>5.6</td>
</tr>
</tbody>
</table>

**Petroleum refinery primary oil/water/solids separation sludge**—Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in: oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non–contact once–through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in s. NR 661.31 (2) (b) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing.
What are the Generator’s LDR Responsibilities?

F003, F005, and D001

<table>
<thead>
<tr>
<th>Waste code</th>
<th>Waste description and treatment/Regulatory subcategory</th>
<th>Regulated hazardous constituent</th>
<th>Wastewaters Concentration in mg/L; or Technology Code</th>
<th>Nonwastewaters Concentration in mg/kg unless noted as “mg/L TCLP”; or Technology Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>F001, F002, F003, F004, &amp; F005</td>
<td>F001, F002, F003, F004 and/or F005 solvent wastes that contain any combination of one or more of the following spent solvents: acetone, benzene, n-butyl alcohol, carbon disulfide, carbon tetrachloride, chlorinated fluorocarbons, chlorobenzene, o-cresol, m-cresol, p-cresol, cyclohexanone, o-dichlorobenzene, 2-ethoxyethanol, ethyl acetate, ethyl benzene, ethyl ether, isobutyl alcohol, methanol, methylene chloride, methyl ethyl ketone, methyl isobutyl ketone, nitrobenzene, 2-nitropropane, pyridine, tetrachloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, trichloroethylene, trichlorofluoromethane, and/or xylene[s except as specifically noted in other subcategories]. See further details of these listings in s. NR 661.31.</td>
<td>Acetone</td>
<td>67–64–1</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Benzene</td>
<td>71–43–2</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n-Butyl alcohol</td>
<td>71–36–3</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carbon disulfide</td>
<td>75–15–0</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carbon tetrachloride</td>
<td>56–23–5</td>
<td>0.057</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chlorobenzene</td>
<td>108–90–7</td>
<td>0.057</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o-Cresol</td>
<td>95–48–7</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>m-Cresol(difficult to distinguish from p-cresol)</td>
<td>108–39–4</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p-Cresol(difficult to distinguish from</td>
<td>106–44–5</td>
<td>0.77</td>
</tr>
</tbody>
</table>
# What are the Generator’s LDR Responsibilities?

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What are the Generator’s LDR Responsibilities?

Statement: this waste is not prohibited from land disposal

- The waste or soil qualifies for an exemption
  - **National Capacity Variance:** If there is inadequate capacity for certain waste codes, EPA may grant a nationwide extension of the prohibition deadline for up to two years. A waste that is subject to a national capacity variance, does not need to comply with the BDAT treatment standards, but is “restricted” and if it is going to be disposed in a landfill or surface impoundment, it can only be disposed of in a unit that meets the minimum technology requirements (MTRs).
  - **Case-by-Case Extension:** Regional or local conditions may create a lack of adequate treatment capacity in a particular area. In this situation, EPA may extend the effective date of a treatment standard on a case-by-case basis. EPA grants case-by-case extensions for one year.
  - **Disposal in a no-migration unit:** If hazardous waste has no chance to migrate from a disposal unit it does not matter if the hazardous waste has been treated to meet the LDR standard. Underground injection wells or mines.
What are the Generator’s LDR Responsibilities?

– **Variance from the Treatment Standard:** Under certain circumstances, generators or TSDFs may petition the Agency for a variance from using a required technology or from meeting a concentration-based treatment standard. EPA established this variance from a treatment standard to account for those wastes for which applicable treatment standards are unachievable or inappropriate.

– **Variance for an Equivalent Treatment Method:** Generally, waste handlers must treat waste to which EPA has assigned a technology-based treatment standard using that method of treatment prior to disposal. A person may, however, submit an application to the implementing agency demonstrating that an alternative treatment method can achieve a performance equivalent to that of the specified treatment standard and can protect human health and the environment.

– **Treatment in a Surface Impoundment:** Since management of wastes in surface impoundments is considered land disposal, even though the waste is not permanently disposed in the unit, such generation and placement of hazardous sludges on the land without prior treatment would normally be inconsistent with LDR's disposal prohibition. Waste handlers may treat hazardous waste in surface impoundments without first meeting treatment standards provided that
  – the surface impoundment meets certain technological requirements,
  – the treatment residues that do not meet applicable standards are removed from the impoundment annually, and
  – the removed residues are not managed in another surface impoundment.
## What are the Generator’s LDR Responsibilities?

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The constituents of concern for EPA hazardous waste numbers F001 through F005 and F039 waste,

What does “constituents of concern” mean?
• Refers to all constituents for which the waste is regulated, and may comprise both the “regulated hazardous constituents” and the “underlying hazardous constituents” of 268.48.
  – For F001 to F005 there are approximately 36 regulated hazardous constituents
  – Note that there are four subcategories for F001 – F005
and underlying hazardous constituents in characteristic waste, unless the waste will be treated and monitored for all constituents. If all constituents will be treated and monitored, there is no need to put them all on the LDR notice.

- UHCs that are reasonably expected to be in the waste.
- UHCs for characteristic wastes do not need to be identified for:
  - High-TOC waste treated by CMBST, RORGS, or POLYM.
  - Decharacterized wastewaters that are being managed in a CWA or CWA equivalent system or injected into a class 1 injection well regulated under the Safe Water Drinking Act (SWDA).
  - D003 reactive cyanides having a concentration based standard do not require treatment of UHCs.
  - Hazardous waste that has a specified treatment method.
  - Lab pack containing characteristic hazardous wastes

### Shipment EPA Waste Codes (from 40 CFR 268.40)

<table>
<thead>
<tr>
<th>Code 1</th>
<th>Code 2</th>
<th>Code 3</th>
<th>Code 4</th>
<th>Code 5</th>
</tr>
</thead>
</table>

**UHC's (Underlying Hazardous Constituents 40 CFR 268.48)?**

- [ ] Yes  
- [ ] No

If yes, list:

### Does a subcategory apply per 40 CFR 268.40?

- [ ] Yes  
- [ ] No

If yes, list:
## What are the Generator’s LDR Responsibilities?

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<td>5. Waste analysis data (when available)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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The notice must include the applicable wastewater/ nonwastewater category (see ss. 268.2(d) and (f) and subdivisions made within a waste code based on waste-specific criteria (such as D003 reactive cyanide).

<table>
<thead>
<tr>
<th>Waste is a:</th>
<th>Wastewater (&lt;1% TSS and TOC)</th>
<th>Non-wastewater</th>
<th>Debris</th>
</tr>
</thead>
</table>

Notification Frequency: | One Time | Periodic with End-Start Date |

***PLEASE REFER TO INSTRUCTIONS FOR IMPORTANT INFORMATION AND CODES FOR UHC’S AND CERTIFICATION***

COMPLETE ALL APPLICABLE ITEMS.

<table>
<thead>
<tr>
<th>LINE NO.</th>
<th>APPROVAL NO.</th>
<th>EPA WASTE NO.(S)</th>
<th>NWW</th>
<th>WW</th>
<th>SUBCAT.</th>
<th>UHC’S</th>
<th>CERT.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>X</td>
<td>X</td>
<td>X</td>
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What are the Generator’s LDR Responsibilities?

Waste analysis data (when available)

- Section 262.11 requires a generator to make a waste determination.
- Section 262.40(d) for LQGs and s. 262.193(a)(2) for SQGs requires a generator to keep records of any test results, waste analyses or other determinations made in accordance with s. 262.11 for at least 3 years from the date that the waste was last sent to on-site or off-site treatment, storage or disposal.
- Therefore the initial LDR form should always have the waste analysis data

2. Is waste analysis information attached?  [ ] Yes  [ ] Not available

[ ] See Profile for analysis (if any).
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What are the Generator’s LDR Responsibilities?

Date the waste is subject to the prohibition
• The date of the hazardous waste’s treatment standard, variance, or extension.

C. Waste is newly listed or newly identified.
D. Restricted waste is exempt from the Land Disposal Restrictions. Check the reason below and write in the date the waste is subject to prohibitions [40 CFR 268.7(a)(4)].
   □ The waste has been granted a Site-Specific Variance. __________________________
   □ The waste has been given a Case-by-Case Extension. __________________________
   □ The waste is subject to a National Capacity Variance. __________________________
E. Restricted waste has been pretreated to remove the hazardous characteristic and requires treatment of underlying hazardous constituents.
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What are the Generator’s LDR Responsibilities?

For hazardous debris, when treating with the alternative treatment technologies provided by s. 268.45: the contaminants subject to treatment, as described in s. 268.45(2); and an indication that these contaminants are being treated to comply with s. 268.45

• Hazardous debris is defined as: a solid material exceeding a 60 mm particle size that is intended for disposal and that is a manufactured object; or plant or animal matter; or natural geologic material.

• Alternative treatment includes:
  • Physical Extraction: abrasive blasting, scarification, grinding and planning, high pressure steam and water sprays
  • Chemical Extraction or destruction: chemical or electrolytic oxidation, chemical reduction
  • Thermal Extraction: high temperature metals recovery
  • Biological Destruction: biodegradation of organic or nonmetallic inorganic compounds
  • Thermal destruction: Treatment in an incinerator or BIF
  • Immobilization: macroencapsulation, microencapsulation, sealing

B. THIS HAZARDOUS DEBRIS IS SUBJECT TO THE ALTERNATIVE TREATMENT STANDARDS OF 40 CFR 268.45.

F. □ Hazardous Debris Subject To Treatment (40 CFR 268.45)
   This hazardous debris identified above must be treated to the alternative treatment standards in 40 CFR 268.45.
# What are the Generator’s LDR Responsibilities?

<table>
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<tr>
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• Soil contaminated with listed hazardous waste must comply with the LDR treatment standard unless the soil was contaminated before the LDR standards applied to the listed waste and a no-longer-contains determination has been obtained from the agency at the POG (excavation) of the soil.

S. THIS CONTAMINATED SOIL DOES / DOES NOT CONTAIN LISTED HAZARDOUS WASTE AND DOES / DOES NOT EXHIBIT A CHARACTERISTIC OF HAZARDOUS WASTE AND IS SUBJECT TO / COMPLIES WITH THE SOIL TREATMENT STANDARDS AS PROVIDED BY 268.49(c) OR THE UNIVERSAL TREATMENT STANDARDS.

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 and believe that it has been maintained and operated properly so as to comply with treatment standards specified in 40 CFR 268.49 without impermissible dilution of the prohibited wastes. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.
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What are the Generator’s LDR Responsibilities?

A certification is needed (see applicable subsection for exact wording)

• Certification needed for when waste or contaminated soil meets the treatment standards at the original POG.
• Certification needed for lab packs when using the alternative treatment standard.

☐ Alternative Treatment Standard Lab Pack

Manifest Line No. ____________________________

☐ 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 269 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 268.42(c). I am aware that there are significant penalties for submitting a false certification, including the possibility of fine or imprisonment.
Treating to Meet the LDR Standards

• Generators may treat their hazardous wastes to meet one or more applicable LDR treatment standards without obtaining a hazardous waste permit.
  – Generators may partially treat a waste to meet an LDR standard without treating the waste for all applicable LDR standards. Partially treated wastes must be sent to a permitted facility for additional treatment to meet the rest of the standards before disposal can occur.

• The permit exemption for generator treatment only extends to treatment activities that share the same standards as storage (i.e., the treatment must occur in tanks, containers, or containment buildings).
  – The standards for thermal treatment are different than generator storage requirements because of the inherent dangers of fire, explosion, or evolution of toxic gases; therefore, thermal treatment may not be performed without a hazardous waste permit.

• Generator needs to develop a Waste Analysis Plan (WAP).
TSD Case Study:
LDR Issues Regarding Waste Stabilization
What is Best Demonstrated Available Technology (BDAT)

• A treatment technology is considered ‘best’ if its performance is statistically better than that of other treatment technologies.
  – In the case of multiple ‘best’ treatment technologies, the least stringent, especially for wastes judged most difficult to treat, was selected as the basis for the numerical LDR treatment standard.

• In defining ‘best’, EPA considers only the effectiveness of treatment - the degree to which hazardous constituents in the waste are removed, immobilized, or destroyed.
  – Economic factors are not considered when determining whether a treatment is BDAT.
What is Best Demonstrated Available Technology (BDAT)

• A treatment technology is considered to have been ‘demonstrated’ for a particular waste if it is in full-scale commercial operation for treatment of that waste or a similar waste.
What is Best Demonstrated Available Technology (BDAT)

- A treatment technology is considered ‘available’ if it is not experimental or emerging.
- Available treatment technologies must be commercially available and provide **substantial treatment**.
  - To be considered commercially available, the technology may be either a common technology in universal use (e.g., neutralization or incineration), or a proprietary or patented process that can be purchased or licensed from the proprietor or that is commercially available at a facility offering use of the technology for a fee.
  - To be considered as providing ‘substantial treatment’, a technology must, consistent with the language in the Hazardous and Solid Waste Amendments (HSWA) to RCRA, "**substantially diminish the toxicity**" of a waste or "substantially reduce the likelihood of migration of hazardous constituents" from the waste (section 3004(m)).
What is Best Demonstrated Available Technology (BDAT)

• The BDAT approach to developing LDR treatment standards ensures that performance standards are achievable in practice using available technology, but it does not specifically mandate the use of any particular technology in order to comply with the standard.

• Therefore, hazardous waste treatment facilities are free to use any treatment method they choose, as long as the results can achieve the LDR treatment standard calculated from data derived from the BDAT technology.
Stabilization as a BDAT

• Stabilization has been shown to be BDAT for the treatment of hazardous wastes containing certain types of metals.

• In 1996, during the development of Universal Treatment Standards (UTS) for metal-bearing wastes, Rollins Environmental Inc. (Rollins) located in Denver, Colorado was able to demonstrate to EPA that their stabilization technology was a BDAT for at least five of the eight RCRA metal constituents.
Stabilization as a BDAT

- As discussed in EPA’s site visit report located in the Phase IV rulemaking docket, Rollins received and treated metal-bearing waste from across the county.
- These metal-bearing wastes did not contain organic constituents and were less than 1% liquid.
- According to the site visit report, prior to treatment, the waste underwent size reduction using a hammer mill and shredder.
Stabilization as a BDAT

• Rollins reported that it took 20-30 minutes to add the treatment reagents, and then another 45 to 60 minutes to mix the reagents using a backhoe.
• Rollins reported that only 2-3% of the treated batches failed to meet the applicable LDR standard at the time.
• Rollins reported that batches failing the LDR treatment standard were retreated.
• Rollins further stated that any metal-bearing waste could be treated using their stabilization technology, except for selenium – selenium is extremely difficult to treat.
Stabilization as a BDAT

• Rollins was able to treat percent levels of lead and did not have any trouble meeting the proposed UTS of 0.37 mg/L. The current concentration based LDR standard for lead is 0.75 mg/l.

• In fact, Rollins often achieved treatment levels an order of magnitude lower than the proposed UTS level.

• Although Rollins reported that they had developed more than twelve treatment formulations, Rollins stated that they relied on five principle formulations to treat the majority of hazardous waste.

• The primary stabilization agent reagent was Portland cement.

• Rollins typically adds 20 to 25% Portland cement and a variable amount of water to get the bulking factor between 1.2 and 1.25.
Calculations of the UTS

• The final step in setting an LDR treatment standard is to define the maximum acceptable constituent levels in treatment residuals for the selected BDAT-list constituents for a particular waste treatability group, based on the performance of the BDAT technology.

• This is done by multiplying the average treatment value observed in the acceptable available data by a factor known as the "variability factor."
Calculations of the UTS

• Only data developed at **well-designed and well-operated systems** are used to calculate the treatment standard.

• Parts or all of the available data sets may be discarded on a case-by-case basis.
  
  – For instance, if the residence time for a waste during a particular test run was substantially shorter than the planned value, EPA might conclude that the system was not properly operated during that run and would discard the associated treatment results in calculating average treatment efficiencies.
Calculations of the UTS

• The variability factor used to calculate the treatment standard takes into account that even well-designed and well-operated treatment systems will experience some fluctuations in performance.
• These fluctuations may result from inherent mechanical limitations in treatment control systems, treatability variations caused by changing influent loads, unavoidable variations in procedures for collecting treated samples, or variations in sample analysis.
• Setting treatment standards using a variability factor should therefore not be viewed as a relaxation of section 3004(m)'s requirements, but rather is a response to normal variations in treatment processes.
Calculations of the UTS

• As a practical matter, facilities will have to be designed to meet an average level of performance that is more stringent than the standard in order to ensure continuous compliance with the standard.

• EPA calculates the variability factor for each selected constituent of concern using the statistical methods described in Appendix A of the 1988 BDAT Methodology document.

• The equation is the same as that used for the development of numerous regulations in the Effluent Guidelines Program under the Clean Water Act.
Calculations of the UTS

- It sets the standard at the upper 99th percentile value concentration of the constituent expected in the treatment residual, using the mean and standard deviation calculated from the acceptable available data and assuming that performance varies log normally.
- There is an additional step in the calculation of the treatment standards in those instances where the ANOVA test shows that more than one technology achieves a level of performance that represents BDAT.
- In such instances, EPA first averages the mean performance value for each treatment technology for each constituent of concern, and then multiplies that value by the highest variability factor among the technologies considered.
Calculations of the UTS

• This ensures that all BDAT technologies used as the basis of the treatment standard will achieve full compliance. Figure (1) below graphically summarizes the High Temperature Metal Recovery (HTMR) and Stabilization data sets used in the calculation of the cadmium LDR treatment standard.
WAP Audits by EPA

• In the last three years, EPA Region 5 has audited ten treatment, storage, and disposal (TSD) facility WAPs – including the facility in this case study.

• EPA’s review of the WAPs from the ten TSD facilities showed several common issues:
  – Six of the 10 WAPs included sampling strategies for LDR determinations, which may not be robust enough to document LDR compliance.
  – Four of the 10 TSD facilities used stabilization technology to meet LDR treatment standards.
  – Four TSDs using stabilization to meet the LDR standards were found to have failed LDR in treated loads, which had been designated as passing by the facility.
  – Failure rates for batches sampled during the inspections ranged from 25% to 100%.
WAP Audits by EPA

- In addition, over the last several years, EPA’s NEIC has conducted inspections nationwide of another six TSD stabilization facilities.
- These inspections showed that 80% of the TSD stabilization facilities failed or are alleged to have failed to meet the LDR treatment standards for waste treated through stabilization.
  - Some of the facilities inspected by EPA have incorporated permit modifications to address the concerns raised by EPA’s inspections.
- EPA has concerns regarding these high failure rates as they likely predict similar failures at other facilities using stabilization to treat hazardous waste.
Facility History

• The facility is adjacent to several landfills.
• In 1975, the site began repairing lugger boxes and roll-off boxes at the site in support of their adjacent landfilling operations
• In 1978, the facility began to solidify liquid non-hazardous wastes prior to disposal in the adjacent landfills.
• In 1988, a Part B permit was obtained to store up to 400 drums of hazardous waste.
• In 1991, the facility began stabilizing hazardous wastes onsite and increased the permitted storage capacity at the facility to 800 drums.
• In 1993, the waste stabilization unit was enclosed within a building and a 48-unit bulk storage area was completed.
• In December 2012, WDNR receives the Part B application.
  – In Wisconsin it is a 10 year permit
  – Facility now on third part B permit
• In January 2014, WDNR determines Part B application is complete.
• In March 2014, WDNR issues the approval and license
Waste Stabilization Building

- The waste stabilization building is an enclosed, steel framed building, constructed with a sheet metal roof and sheet metal siding. The waste stabilization building is approximately 100 feet wide by one 160 feet long by 42 feet high.
- The north end of the container storage building has 4 large doors to accommodate truck loading and unloading operations.
- As part of the stabilization treatment process, the facility has a license to store the equivalent of four 20-cubic yard roll-off boxes within the containment of the Stabilization building.
- The waste stabilization building operates under negative pressure generated by the dust collection system. Make up air is supplied through louvers in the building walls.
Waste Stabilization

- Stabilization treatment limit is 109,500 tons a year.
- The waste stabilization unit consist of a steel bin (12 feet by 23 feet by 4 feet – 40 yards) placed inside a concrete pit located below grade.
- The waste stabilization treatment unit is a chemical/physical process, which stabilizes waste by immobilizing its hazardous constituents.
- The majority of wastes treated in the waste stabilization treatment unit are inorganic materials that are characteristically hazardous (e.g., arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).
Waste Stabilization

• The chemical portion of the process involves the addition of an agent, generally cement, pozzolon, phosphates, or other bonding materials to the waste stream.
  – Chemical oxidizing and/or reducing agents are employed as required for the effective treatment of the waste.

• The physical portion of the process involves mixing of the materials, resulting in the physical/chemical change that occurs during curing.
Why did WDNR look at Stabilization?

- Only one TSD on Wisconsin treats a hazardous waste to meet the LDR requirements using a non-specified LDR technology.
- 2014 NOV regarding a ‘treated’ D009 hazardous waste going to a subtitle D Landfill. This is at least the second time that stabilization waste that failed TCLP have been sent to a subtitle D Landfill.
- Comments received on May 7, 2015, from Christopher Lambesis, Environmental Scientist for EPA, regarding the facility’s WAP.
- Annual hazardous waste stabilization reports show repeated failures of failing to initially treat hazardous waste to meet the LDR standards.
Why did WDNR look at Stabilization?

- Review of facility's 2016 waste stabilization report showed that 22.3% (88 loads out of 395) of the treated loads failed their first treatment.
  - This is seven to eleven times higher than the failure rate reported by Rollins.
- This leads to a question on why the facility's stabilization has significantly higher failure rates.
  - Is it due to shorter mixing times
  - using less reagents
  - reagents being added to quickly
  - different type of Portland cement
  - inexperienced operators
  - improperly sized mixing equipment
  - the interference of organics or other constituents with the stabilization process
  - variations in moisture content
  - heterogeneities within a batch of waste
  - aiming for the ‘LDR limit’ instead of using BDAT
  - some other reason(s)
LDR Background

• When making a waste determination a representative or statistical approach is used when determining if a waste is a hazardous waste.

• The LDR requirements specifically require all non-wastewater and D004 – D011 wastewaters to be grab samples when determining if the LDR treatment requirements have been met. This is required under s. 268.40(b)(4) and s. 268.48(a).

• When determining if the LDR requirements have been met all parts of the waste must be treated. In other words, you cannot average out the hot spots as you would in making a waste determination (May 26, 1998; 63 FR 28567).
LDR Background

- June 23, 1989 Federal Register (54 FR 26605)
  - The Agency recognizes that there are certain variabilities inherent to every treatment system as well as a certain amount of variability in the characteristics of the wastes.
  - In the calculation of the treatment standards, the Agency accounts for these by multiplying the mean of the concentration of the constituents to be regulated by a correction factor known as the variability factor.
  - This factor is derived utilizing a quantitative procedure that determines the statistical 99th percentile for the treatment standard.
  - **This results in the establishment of a treatment standard that is believed to be achievable 99 percent of the time by a well-designed, well-operated system.**
  - The Agency establishes the treatment standards based on the analysis of grab samples
    - It is normally easier and more expeditious for EPA to enforce on the basis of grab samples.
    - grab samples normally reflect maximum process variability, and thus would reasonably characterize the ranges of treatment system performance.
First LDR sampling event

- WDNR sampled three roll-off boxes that the facility identified as meeting the LDR standard.
- Two samples were collected from each roll-off box.
- Under direction of the WDNR, facility employees in full face respirators and Tyvek did the actual sample collection.
- Sampling results showed that 1 of the 3 roll off boxes failed to meet the LDR standard.
  - Arsenic was at 13.5 mg/l the LDR limit is 5 mg/l
Second LDR sampling event

- WDNR sampled five roll-off boxes that were identified as meeting the LDR standard.
- Three samples (ends and middle of roll-off box) from each roll-off box were collected.
- Under direction of the WDNR, facility employees in full face respirators and Tyvek did the actual sample collection.
- Sampling results showed that 1 of the 5 roll off boxes failed to meet the LDR standard.
  - Chromium was at .71 mg/l the LDR limit is .60 mg/l
  - Chromium was at .599 mg/l the LDR limit is .60 mg/l
LDR Sampling Conclusions

• WDNR’s sampling prevented two roll-off boxes that were intended for land disposal from being land disposed in a subtitle D landfill.

• Eight random roll-off boxes that were selected for sampling on two sampling events.
  – Two to Three grab samples were pulled from each roll off box
  – Each sampling event had a failed roll-off box
  – Two of these roll-off boxes were found to not meet the LDR standard
    • Arsenic was at 13.5 mg/l the LDR limit is 5 mg/l
    • Chromium was at .71 mg/l the LDR limit is .60 mg/l
  – One of the roll-off boxes was just below the LDR standard
    • Chromium was at .599 mg/l the LDR limit is .60 mg/l

• How confident are we in the facility's ability to meet the LDR requirements?
Underlying Hazardous Constituents

- Section 268.9(a) requires the initial generator to identify all UHCs that can reasonably be expected to be present at the point of generation of the hazardous waste at a concentration above the constituent-specific Universal Treatment Standards (UTSs).
  - The generator's failure to identify the UHCs directly affects facility’s ability to properly treat the hazardous waste to the correct UTSs.

- A generator's LDR notification forms stated that no Underlying Hazardous Constituents (UHCs) are present; however, the department’s analytical results showed chromium present at .466 mg/l in the treated COS Catalyst production waste stream.
  - Since .466 mg/l is the treated chromium value, it would not be unreasonable to expect that the untreated chromium value was above .6 mg/l.

- WDNR holds the facility accountable for meeting all LDR standards - even if the UHCs were not identified on the generator’s LDR notification form.
Notice of Noncompliance

- Sampling was done in June and July of 2015.
- A NON was issued to the facility in July 2016.
  - Alleged violations for not following their Part B
    - “will conduct post-treatment analysis on the residue as needed to ensure that the process continues to be effective in meeting the treatment standards…”
    - “Treated waste is analyzed after it has been loaded into roll-off containers or dump trailers to verify that the required chemical and physical properties have been achieved by the treatment process.”
    - “The wastes and reagents must be brought into intimate contact to achieve proper stabilization. This may be accomplished by the use of a pug mill mixer. This continuous rotating shaft mixer provides a high shear blending of wastes and reagents.”
Notice of Noncompliance

– Alleged violations for not following their approval
  • Condition 58: “?????? shall segregate wastes, which fail to meet the applicable treatment standard, from other wastes until treated again. ???? may only dispose of these wastes after demonstrating the waste meets the applicable LDR treatment standard.”

– Area of concern
  • Condition 59: “?????? shall not place the treated wastes in a landfill for disposal until it has been demonstrated that the applicable land disposal restrictions are met by the treated waste....”

• Meeting with the facility in September 2016
  – WDNR asked for a minimum of 3 grabs per container and submit a plan modification to improve the WAP.
  – Facility estimated that it would cost an additional $80 to $100 for the additional two samples.

• Email to facility in October 2016
  – WDNR has concerns on facility’s ability to ensure that all parts of the treated hazardous waste meet the LDR standard.
  – Facility should consider the following in their class 1 plan modification request to the department:
New Improved WAP

- Received the plan modification for the WAP in December 2016
  - Was not a redline version of the previous WAP
  - WAP referred to two books
    - The Application of Solidification/Stabilization to Waste Materials – Means and et al.
    - Chemical Fixation and Solidification of Hazardous Waste.
- Facility made several small changes
  - Typos
  - Included 3 grabs
  - WDNR comments on improving the WAP.
- WAP sent to EPA for comment
  - EPA Region 5 and EPA headquarters made extensive comments – a big thanks for their excellent work.
- Letter send to the facility in June 29, 2017
  - 20 pages, provided background on BDAT and UTS
  - WAP comments consisted of pages 6 through 20
- Meeting with the facility to discuss comments on July 27, 2017
- Facility is planning to redo their entire WAP from scratch and will incorporate elements of the TSD WAP guide.
- WDNR is conducting lab audits for all of the TSDs in Wisconsin.
- **Facility has been very cooperative through the entire process.**