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TO: Susan Fisher
Waste Program

FROM: Erin Endsley
Remediation and Redevelopment Program

SUBJECT: Review Comments – Draft Property Redevelopment Plan, Boundary Road Landfill/Lauer I

On behalf of Waste Management of WI, SCS Engineers submitted a draft Property Redevelopment Plan on May 16, 2021 for the Boundary Road Landfill Superfund Site. RR Program staff reviewed the Plan, and the following comments should be incorporated into the coordinated response to SCS/WMWI. The goal of these comments is to provide direction to ensure that the waste exhumation is completed in a manner that is protective, and also to ensure that we will have the information needed to inform a site closure and NPL deletion decision at the completion of the work.

6.1 Soil Classification System and Management Options

- Proposed soil reuse within the proposed landfill footprint will be permitted through the WA Program authority. For contaminated soils proposed for reuse outside of the landfill footprint, a NR 718 Materials Management Plan will be required. The material proposed for reuse will need to meet the sampling criteria outlined in NR 718.12(1)(e) and might need exemptions from the location standards in NR 718.12(1)(c).

6.2.3 Soil Between Bottom of BRL Waste and Eastern Expansion, Southern Unit Subbase

- This section states that the surface sample at each soil boring location will be analyzed for Metals: Lead, VOCs, and PCBs, if field observations of the overlying waste indicate significant quantities of potentially PCB-containing equipment or material. The surficial soil sample should be analyzed for RCRA metals, VOCs (including naphthalene), and PCBs, regardless of field observations. The Waste Characterization Report indicated PCBs in most waste samples, and field observations are not sufficient to determine the presence of PCB contamination.
- Additional soil samples at depth and additional analyses will be determined by the results of the surficial soil sample. In order to define the vertical extent of contamination, additional VOC, metals, and/or PCB analyses might be required.
- The proposed soil sample spacing as depicted on Figure 4 does not appear to include any locations outside the proposed landfill expansion footprint. Soil sampling is needed beneath the entire BRL waste mass footprint, not just within the expansion area footprint.

7.0 Post-Excavation Monitoring

- This section states that construction details for temporary monitoring wells in the proposed footprint will be provided in the Plan of Operation. The Department prefers using NR 141 compliant monitoring wells with filter packs and seals.
- The monitoring frequency is expected to include two rounds at least two months apart, with additional sampling semiannually, until the well is abandoned as removal work proceeds. Please provide additional information on monitoring frequency, including the total number of samples collected per well. Two rounds of data might be insufficient to determine groundwater concentration trends, which is typically part of a case closure evaluation. Analyses include the same parameters required for the BRL groundwater monitoring.

- Include PFAS analysis of groundwater, for the first round of sampling at each well location. The need for additional PFAS evaluation will be determined pending the results of the first round of sampling.

8.3 Waste Removal Documentation Reporting

- A documentation report will be submitted at the end of each phase of waste removal, including soil and groundwater analytical results, boring logs and well forms, and associated information. The DNR recommends that a final construction completion report be prepared and submitted for review. This document should include waste exhumation and site closure documentation, to assist with future site closure and NPL deletion determinations. In particular, this report should include:
 - groundwater and soil data in tabular format
 - figures depicting extent of contamination
 - evaluation of residual contamination, including monitored natural attenuation of groundwater contamination
 - potential for any residual soil contamination to act as an ongoing source for groundwater contamination
 - evaluation of what institutional controls/continuing obligations might be needed/updated post-removal and a long-term stewardship plan for any ICs/COs
 - updated O&M Plan (if needed)
- Additional information on case closure requirements can be found here:
 - Case closure guidance: <https://dnr.wi.gov/files/PDF/pubs/rr/RR606.pdf>
 - Case closure form: <https://dnr.wi.gov/files/PDF/forms/4400/4400-202.pdf>

Other Comments:

- In general, DNR would like to see more detailed information on the groundwater and soil sampling planned, including number of wells/borings, figures depicting locations, and sampling methods and laboratory analysis methods specified.
- If the soil sample results indicate highly contaminated material that could act as an ongoing source to groundwater contamination, the Plan should include contingency planning for excavation of the highly contaminated soils.
- The DNR will issue a separate letter requesting PFAS sampling at the site. This will include more information on what to include in a workplan for DNR review and approval.
- The next five-year review for the site is due September 19, 2022, and planning for the review will begin later this year.

Boundary Road Landfill (BRL) Draft Property Redevelopment Plan
Air Program Comments - June 2020

After reviewing the **4.5.1 Ambient On Site and Off Site** section (see below with edits) of Draft Property Redevelopment Plan with the air program monitoring team, George Volpentesta has the following comments:

1) For the frequency of monitoring, the air program believes language such as “Observations during waste excavation such as odor, the nature of exposed waste or other such circumstances may indicate more frequent or immediate monitoring is needed” be added. See below last bullet **bolded red**. In addition, due to the Department’s concern and public concern over the impact of the waste exhumation on air quality, the air program would like to see the air monitoring performed every 3 days per the 3/6/12-day EPA Sampling Schedule (link: https://www.epa.gov/sites/production/files/2020-11/documents/2021_sampling_schedule.pdf). This schedule would allow the monitoring results to be compared with the existing HAPs monitors in the state to give a method of comparing the air quality around the exhumation site with background levels. See below additions in green

2) The “Additional parameters could be added if observations during waste removal or results of soil testing indicate a potential for ambient air impacts” language currently in plan seems rather ambiguous. The air program recommends they set a benchmark for the soil test results or observations that would trigger additional parameters. See ??? below.

3) The plan says that if air quality samples are below the “ambient air quality standards” they will reduce frequency of collection. Can they identify which air quality standards that they are referring to? Are they referring to federal or state standards for hazardous air pollutants and which ones? The air program is not aware of what standards they could be referring to and suggests they include a link to the standards. See ????? below.

Below is a section copied from the draft redevelopment plan with Air Program additions based on comments above:

4.5.1 Ambient Air On Site and Off Site

During the project, ambient air will be monitored on and off the ORL/BRL property to assess air quality in areas where the public may be present. The proposed ambient air monitoring plan is outlined below and will be modified as needed based on observed results.

- Parameters: VOCs will be the primary air contaminants of concern. Additional parameters could be added if observations during waste removal or results of soil testing indicate a potential for ambient air impacts. ???
- Sampling and analysis methods: VOC samples will be collected using a personal air sampling pump. Weather conditions will be recorded for the site or for the closest

weather station, including temperature, precipitation, barometric pressure, pressure trend, wind speed and wind direction. Samples will not be collected when the wind speed is greater than 15 mph. The location and day/time of collection of each sample will be recorded.

- Locations: For each sampling event, the sampler will select monitoring locations as follows, based on the wind direction, active waste removal areas and other observations:
 - Upwind – One location upwind of the ORL and BRL facilities.
 - On Site – One location in the public access areas of ORL, downwind from the waste removal area if possible; otherwise in a public access area near the waste removal area. For example, if the wind is blowing from the south, the sample could be collected in the scale area. If the wind is blowing from the north, there are no on-site public access areas downwind from the waste removal area, so a nearby upwind or cross-wind location would be used.
 - Off Site Downwind – Two locations beyond the BRL/ORL property limits and downwind from the waste removal area at locations chosen considering the wind direction and locations of streets, residences, or other places where people are likely to be present.
- Frequency: Air monitoring will be performed every 3 days per the EPA Sampling Schedule (https://www.epa.gov/sites/production/files/2020-11/documents/2021_sampling_schedule.pdf) for at least the first 6 weeks of waste excavation. **Observations during waste excavation such as odor, the nature of exposed waste or other such circumstances may indicate more frequent or immediate monitoring is needed.** If all results are below ambient air quality standards ????, the sampling frequency may be decreased to every 12 days.

Boundary Road Landfill (BRL) Draft Property Redevelopment Plan
Solid Waste Program Comments - June 2020

1. General comment: 7.9 acres with 54,500 cyd of waste in 4 different areas outside proposed S Unit expansion landfill footprint. For areas of BRL waste outside the expansion landfill footprint need to discuss details of exhumation and testing as indicated in our comments on specific sections below.
2. Section 1.1. (and 8.0): References to the “amended” plan being a condition of the plan of operation and other references dictating the DNR’s approval process for modifications should be removed. Once the plan is approved, any changes to the plan would be considered a plan modification requiring prior written approval. The DNR understands the need for minor field modifications and has processes for responding to changes in field conditions should they occur. The plan should not dictate DNR’s plan modification approval process or that all changes would be handled as field modifications
3. Section 1.2.: States 12-acres of asphalt. Confirm acreage of waste below asphalt; previous submittals indicate 6.9 acres of waste on east side of BRL outside the proposed landfill footprint. Also provide details on other material placed between waste and asphalt. Also discuss deposition of asphalt and other materials removed from above waste. Also discuss volume and source of material for backfill for areas of the BRL outside the proposed landfill footprint.
4. Section 2.2.: States: ‘If documentation of source of contamination is unavailable..’ What documentation of sources of contamination are available to WM?
5. Section 3.1.: States: ‘BRL waste will be removed, and then fine-grained soil fill will be placed’, What is minimum depth of soil below waste proposed to be removed for BRL waste areas both inside and outside the proposed landfill footprint.
6. Section 4.2.:
 - a. What is BRL waste removal timeline for areas outside proposed landfill footprint?
 - b. Provide additional detail with respect to waste excavation activities such as depth and slopes and address stability of the waste mass during excavation.
 - c. Daily cover or alternate daily cover (e.g. tarps when appropriate) should be applied over the excavated waste at the end of each day, unless an exemption is requested/granted for specific circumstances.
 - d. Intermediate cover should also be placed/maintained on any external slopes during waste removal, unless contact water on external slopes will be captured/managed as leachate. Intermediate cover should be vegetated if exposed for greater than one construction season.
7. Section 4.3.1: States: ‘Suspicious waste must be = >20 cubic yards to investigate’. See Hazardous Waste Program comment #12 on this issue that indicates 5 cubic yards may be a recoverable volume of waste.
8. Section 4.3.2: States: ‘Comingle BRL waste with incoming waste’, this may not be the case for Orchard North-South #3360, since all waste presently disposed at the East Expansion landfill. Please explain BRL waste disposal method at #3360. May need a plan modification for #3360 to accept BRL waste at this landfill.

9. Section 4.3.4: Clarify the circumstances and/or the type of wastes that the contractor will attempt to salvage, if any.
10. Section 4.3.5:
 - a. Clarify how suspicious waste will be identified. Will there be a technician on-site at all times monitoring the excavation or does the plan rely on the excavator operator? Who will be making the observations or detecting the odors (e.g. solvent waste)? What protections will be in place for the workers monitoring the excavation?
 - b. States: 'and containers greater than 50 gallons in capacity will be segregated', what will be done with non-empty containers less than 50 gallons?
 - c. The plan says stockpiles awaiting characterization "may" be covered depending on type of wastes. All waste stockpiles should be covered pending characterization unless approved by the department for specific circumstances.
 - d. States: 'Bulk suspicious waste tested...based on field observations.' Please provide details on field observation that would trigger additional testing.
11. Section 4.5.1: Does the weekly air monitoring for at least the first 6 weeks of waste exhumation apply to each sequence of waste exhumation?
12. Section 4.5.2 This section implies site safety/air monitoring will be left up to each contractor. Will there be an overall health and safety plan for the project, one was mentioned earlier? An overall site health and safety plan should be submitted with the property redevelopment plan.
13. Section 4.6.: The primary strategies for odor control seem to be winter months, daily/intermediate cover, and the gas collection system. However, other sections discuss that exhumation may extend beyond winter and the gas collection system will be phased out. Please elaborate on odor control monitoring and measures. Also explain under what circumstance waste exhumation may occur outside winter months.
14. Section 6.0.:
 - a. States: 'BRL soil testing limited to VOCs unless field observations indicate a significant likelihood that other contaminants are present.'" Need to indicate specific VOCs test? Need to expand on what type of field observations would trigger what type of additional testing. See RR attached memo for additional testing for soils below the BRL waste.
 - b. Clarify that Type 2 soils are above the residual contaminant levels (RCLs) based on protection of ground water, but not for industrial direct contact to be consistent with the results from initial testing of grading layer soils. Soils that are above both the RCLs based on groundwater and industrial direct contact warrant a separate category because there may be some additional limitations.
 - c. Grading layer Type 2 soils and underlying soils should not be presumed to be managed in the same manner. Underlying soils with higher levels of contaminants may or may not be suitable for use as cover soils, especially considering they could include PCB concentrations up to 50 parts per million (ppm). The underlying soils with levels above groundwater and direct contact RCLs warrant a separate category and discussion of management options.
 - d. Type 2 soils should not be used within the liner area for daily and intermediate cover if odors detected.

- e. Underlying soils would not be suitable for Type 1 uses outside of the landfill, unless extensive testing (including additional parameters) is performed beyond what is proposed to ensure soils are “clean” and not impacted by the wide range of contaminants that could come from a landfill and department concurrence is obtained.
- f. Need WA approval to use Type 3 soils outside the waste limits, even if covered.
- g. Need WA approval to use Type 2 soil as barrier layer soil in final cover.

15. Section 6.2.2:

- a. Please provide previous test results for the soil used in the grading layer that were completed following treatment of the soils if available.
- b. States: ‘Soil berms or masses within the waste, Type 1 or 3 or, default to Type 2 w/out testing’. Soil within waste not considered for Type 1 and will need to be tested and will need our concurrence for Type 3 designation.
- c. What would trigger a total constituent concentration test for a soil berm or mass within the waste?

16. Section 6.2.3:

- a. What minimum depth of soil below waste that will be excavated in areas within the proposed landfill footprint and outside the proposed landfill footprint?
- b. Based on Waste Characterization Report soil sampling should be obtained below locations of known significant contaminants and more frequent sampling in area of known or suspected significant contaminants? (? i.e., area of waste paint disposal, areas of suspicious waste, areas where waste tested hazardous, areas exhibiting significant solvent-like or other contaminant odors).
- c. Soil and groundwater sampling locations below BRL waste outside the expansion footprint should be included in Figure 4.
- d. What minimum depth of soil below waste will be sample in area where the Southern Unit subbase grades are above waste depth (backfill required) and areas outside S Unit landfill footprint?
- e. Section 6.1 on Page 18 (see above #14a) states; ‘Only VOCs tested unless field observations indicate significant likely hood other contaminants present. Additional testing needed refer to attached RR memo item 6.2.3.
- f. Designate stockpile areas on a plan sheet for Type 1, 2 and 3 soils.
- g. Please note that the WA program continues evaluating groundwater at the site as part of its on-going feasibility review, including arsenic exceedances in groundwater. It may behoove WMWI to consider this while going about its sampling activities (should the project proceed).

17. Section 8.3: The report to be prepared at the end of each phase should include the amount of each “Type” of soil excavated, including the end uses or final disposition.

**Review of SCS Engineers' April 16, 2021, report titled
"Draft Property Redevelopment Plan Boundary Road Landfill/Lauer I Menomonee Falls, Wisconsin"
by Mike Ellenbecker**

- This review focuses on sections 2 and 4.
- 54 FR 36592, 36597; September 1, 1989 is a citation to the federal register
- A RO followed by a set of numbers is a reference to an EPA guidance document. To access this document go to <https://rcrapublic.epa.gov/rcraonline/>.

Section 2.2

- 1. "Therefore, at the time of disposal, none of the BRL wastes were either listed or characteristic hazardous wastes."**

Hazardous wastes are subject to Subtitle C controls only when they are actively managed (57 FR 37298). EPA defines active management as physically disturbing accumulated wastes within a management unit or disposing of additional hazardous wastes in existing units containing previously disposed wastes (54 FR 36592, 36597; September 1, 1989).

Hazardous wastes listings apply retroactively to wastes that are land disposed prior to the effective date of the hazardous waste's listings (57 FR 37284, 37298; August 18, 1992). **All wastes meeting the listing description are hazardous regardless of when they were disposed.** The time at which a waste was disposed does not affect whether or not it meets the listing description (53 FR 31138, 31147; August 17, 1988). This does not mean that such wastes must be exhumed for proper treatment.

- 2. "In general, the evaluation of bulk waste or soil identified as potentially hazardous will be based on Toxicity Characteristic Leaching Procedure (TCLP) analysis, unless there are field observations indicating that another hazardous characteristic is present (i.e., ignitability, corrosivity, or reactivity)."**

The evaluation of bulk wastes or soils that are **identified as potentially hazardous must fully meet the hazardous waste determination requirements in s. NR 662.011 Wis. Admin. Code. Waste characterization does not stop at the determination of ignitability, corrosivity, or reactivity.**

- 3. "Similarly, an intact container of industrial waste, such as a 55-gallon drum, can only be determined to contain a listed hazardous waste if the source and/or generating process can be conclusively documented to meet the definition of a specific hazardous waste listing. As noted above, neither the ROD nor the WDNR file information reviewed by SCS identified any specific listed hazardous wastes as having been disposed in BRL. In the landfill environment, with wastes disposed of a minimum of 50 years ago, it is unlikely that industrial wastes can be identified as listed hazardous wastes. Therefore, if an intact container of waste is encountered, the hazardous waste determination will be based on the characteristics of the industrial waste (i.e., toxicity, ignitability, corrosivity, or reactivity)."**

Even though there may be no records showing if a listed hazardous waste was disposed of. A listing determination can be made based on the **container's labeling** and the contents of the container. For example: A 55-gallon drum with paint stains is excavated with a label stating "waste paint solvents". Sampling of the drum showed 30% toluene. Based on this information the drum is likely a F005 listed hazardous waste. Based on the above it would be irresponsible to say (not keeping with the good faith determination) that the information on the sources of the contamination is unavailable or inconclusive. The civil burden standard needed to show a a listed hazardous waste is a

preponderance of evidence. This standard is met if the proposition is more likely to be true than not true. In other words, the standard is satisfied if there is greater than 50 percent chance that the proposition is true.

4. “In situ soil would be classified as a hazardous waste only if it exceeds a TCLP limit when excavated, because that is when the waste is generated.”

Would in situ soil include soils used as daily cover?
How would you classify foundry?

5. “Wastes in intact drums or containers will be evaluated for a hazardous waste determination as described in Section 4.3.5 and will be managed as hazardous wastes, if appropriate.”

Please explain **what is considered an intact container**. Under RCRA an intact container is a container that is **capable of holding at least 75% of its original holding capacity** (57 FR 37225; August 18, 1992, RO 13638, and RO 14675). Under RCRA container also include pumps, thermometers, manometers, batteries, and ampuls (RO 14685).

6. “Intact electrical transformers will also be segregated, characterized and managed in accordance with the Toxic Substances Control Act (TSCA) requirements and Ch. NR 157, Wis. Admin. Code, if appropriate.”

Electrical transformers may also a chlorinated solvent like tetrachloroethene. These chlorinated solvents were used to flush and clean the transformer of PCBs. Therefore these electrical transformers should also be **evaluated under RCRA**.

Section 2.3

7. If treating waste in tanks, containers or containment buildings to meet an LDR treatment standard, **then a waste analysis plan (WAP) is required per** s. NR 668.07(1)(e) Wis. Admin. Code.

Section 2.3.2

8. “Due to the unknown volume of waste and/or soil that may require treatment prior to disposal, WMWI will request approval of a remediation variance to allow ex situ treatment in a pile within the BRL footprint or within the ORL lined area.”

A part of the remediation variance approval that may be granted under 670.079, **the department will use substantive requirements of subchapter L of chapter NR 664. Subchapter L deals with the management of waste piles.**

Section 2.3.2

9. “Waste can also be treated in-situ within an AOC without triggering generation.”

The concept of “placement” is important because placement of hazardous waste into a landfill or other land-based unit is considered land disposal, which triggers the land disposal restrictions, and may trigger other RCRA requirements including permitting, closure, and post closure. Placement does not occur when waste is consolidated within an AOC, when it is treated in situ, or when it is left in place. **Placement does occur, and additional RCRA requirements may be triggered, when wastes are moved from one AOC to another (e.g., for consolidation) or when waste is actively managed (e.g., treated ex situ) within or outside the AOC and returned to the land.** EPA does not generally consider a drum (i.e., container) placed within an AOC to form a container storage area, because a drum is not in itself a hazardous waste management unit as defined by s. 260.10. Thus, if waste is placed into a drum which remain within the AOC and which are not placed into a separate storage or treatment area, such placement would not be considered a unit distinct from the AOC itself. As a

result, removal of waste from the drum and redeposition within the AOC would not constitute land disposal (RO 11954 and 11597)

Section 4.3.1

10. **“For this project, suspicious waste is defined as the following: ... Intact, non-empty drums or containers that are at least 50 gallons in capacity.”**

Please explain why containerized suspicious waste is limited to containers that are at least 50 gallons in capacity. Generators also managed waste in 5-gallon, 10-gallon, 20-gallon and 30-gallon containers. The department would recommend that containers of 5 gallons or more in volume be managed as suspicious wastes.

11. **“For this project, suspicious waste is defined as the following: ... Intact electrical transformers.”**

Please explain why suspicious waste is limited to intact electrical transformers. Non-intact electrical transformers are still capable of hold PCBs.

12. **“For this project, suspicious waste is defined as the following: ... Waste that looks like paint, sludge, or other obvious industrial waste or has an obvious solvent odor, and is present in a significant, recoverable volume (e.g., more than 20 cubic yards).”**

The department want to emphasize that detecting a solvent odor is not to be used as the only indication that the waste might be of industrial origin and that a recoverable volume could also be 5 cubic yards. For example, foundry sand may not have a solvent odor but may contain heavy metals like lead and chromium. Therefore to identify the foundry sand as a suspicious waste the observer must know that the present of sand in an area could indicate that the sand is foundry sand.

13. **“For this project, suspicious waste is defined as the following: ... Soil that has an obvious solvent odor, significant staining, or other field evidence of significant impacts.”**

The department want to emphasize that detecting a solvent odor is not to be used as the only indication that the waste might be of industrial origin

14. **“For this project, suspicious waste is defined as the following: ... Waste or soil in the immediate vicinity of a location where previous waste characterization testing indicated one or more VOC total concentrations exceeding 20 times the TCLP limit or polychlorinated biphenyls (PCBs) above 50 mg/kg (e.g., waste within 5 feet in any direction from the samples collected in borings WC5 and WC6).”**

Why is the 20 times rule only being limited to the TCLP VOCs.

The 20 times rule only works when the waste is a solid.

15. **“Specifically excluded from the definition of suspicious wastes for the BRL waste removal are: ... Waste that presents as sludge or industrial waste without an obvious solvent odor.”**

This statement is contrary to bullet 3 in defining what is a suspicious waste. Again, foundry sand may not have a solvent odor but may contain heavy metals like lead and chromium.

16. **“Specifically excluded from the definition of suspicious wastes for the BRL waste removal are: ... Waste that presents as other solid wastes currently or historically accepted at ORL.”**

Please provide additional information on this statement. It is not clear what is meant by ‘as other solid wastes.’

17. “Waste that is identified as potentially suspicious waste will first be evaluated through field observations or screening. Based on that evaluation, a decision will be made on the need for testing, as described in Section 4.3.5, to determine whether the material is hazardous waste.”

It is the department’s understanding that when a waste is identified as a suspicious waste it was identified as a suspicious waste because of the likelihood of the waste being a hazardous waste or a TSCA waste. If the department’s assumption is correct, then while generator knowledge could be used to declare a suspicious waste a hazardous waste (i.e., overclassify the suspicious waste) **it could not be used to declare a suspicious waste as a nonhazardous waste. This is because the landfill owner/operator or the landfill’s consultants lack the generator knowledge. As such the waste must be tested.** Making a characteristic determination requires collecting a representative sample of the waste (see s. NR 661.0021 – 661.0024. Wis. Admin. Code). The April 16, 2021, report does not describe representative sampling. To assist you in understanding representative sampling the following has been included:

Consider a 55-gallon drum of sludge. To determine the “true concentration” of chromium in the sludge you would need to test the entire contents of the drum. In other words, the 55-gallon drum would be your sample. This would be extremely expensive and is not required under RCRA, because representative sampling – when done correctly – can give you a very close approximation of the true concentration of chromium in the sludge.

Now consider a bag that contains 1,000 marbles: 900 marbles are black, and 100 marbles are white. To characterize the bag, or to know the composition of the black to white marbles in the bag, the absolute minimum number of marbles that would need to be pulled (i.e., a grab sample) from the bag is 10 – assuming that we were able to grab 9 black marbles and 1 white marble. However, the odds are very low that given 10 grabs, one would grab 9 black marbles and 1 white marble.

To determine if a 55-gallon drum of chromium sludge (a solid) is a characteristic hazardous waste for chromium, a generator hires a consultant. The consultant collects 3 grab samples from the top of the drum and places each grab sample into 3 separate collection containers. The consultant then delivers the 3 samples to a state certified lab for analytical testing. The lab then takes 100 grams from each collection container for conducting the TCLP analysis. The consultant then averages the TCLP values to determine if the 55-gallon drum of chromium sludge is a characteristic hazardous waste for chromium. The consultant charged \$500 for their services and \$450 (3 samples at \$150 each) for the TCLP test conducted by the lab. For a total cost of \$950.

Two mistakes were made during the collection of the sample:

- The samples were collected only from the top of the 55-gallon drum which biased the sample results because the sludge in the middle and bottom of the drum had no chance of being sampled.
- Second, the consultant collected too few grab samples. A good rule of thumb to satisfy collecting a representative sample would be to collect at least 30 grab samples throughout the drum.

Making either one of these mistakes, results in failure to collect a representative sample. This is important because every individual in the sampling population must have an equal chance of being sampled.

The above scenario recommends collecting 30 grab samples. However, this does not require you to send in each grab sample for analysis as this would cost \$4,500. Instead these incremental samples, perhaps as little as a tablespoon in volume, are placed into the same sample collection container which results in only one sample container being sent to the lab for analysis. This type of sampling is called Incremental Sampling Methodology or ISM.

ISM is a structured sampling protocol that reduces data variability and increases sample representativeness. The objective of ISM is to obtain **a single sample** for analysis that has an analyte concentration representative of the decision unit (e.g., 55-gallon drum, tank, waste pile). When done properly, ISM significantly improves the reliability and reproducibility of sample data and can minimize well as the time and cost. For more information on incremental sampling go to www.itrcweb.org.

As demonstrated by the marble example, numerous grab samples are needed to account for the waste's heterogeneity. Wastes – especially those wastes that are solids – are often extremely heterogeneous (i.e., highly variable). There are two types of heterogeneity to be concerned with:

- Spatial heterogeneity is how the **waste varies within the unit** (e.g., drum, tank, waste pile),
- Temporal heterogeneity is how the **waste varies over time**. Addressing temporal heterogeneity may require collecting the grab samples over days, week, or even months.

Both spatial heterogeneity and temporal heterogeneity need to be addressed when collecting a representative sample.

The 55-gallon drum of the chromium sludge used in the above scenario only addressed spatial heterogeneity, which is acceptable when determining if the contents of that drum are a hazardous waste. However, the chromium sludge is generated from a wastewater treatment unit's filter press on an ongoing basis and therefore there is likely variability in the chromium sludge generated by the filter press. To make a waste determination on the chromium sludge the sampling will also need to address temporal heterogeneity.

Heterogeneity is significantly more of an issue when dealing with wastes that are a physical solid rather than liquids that are a mixture or a solution. Liquids that are mixtures tend to be much more homogeneous because these liquids are capable of evenly distributing their mixture. Because of this a single grab sample may be used as a representative sample in sampling a drum of liquid when using a drum thief or COLIWASA (Composite Liquid Waste Sampler). When used correctly, these sampling tools are able to collect a representative sample of a liquid with one grab. Although liquids may separate into layers within a drum or tank, sampling to the bottom with the drum thief or COLIWASA will provide a representative sample.

Prior to collecting a representative sample, the generator should develop a sampling and analysis plan using EPA's data quality objectives. The sampling and analysis plan can provide direction to the generator on collecting the correct type, quantity, and quality of data needed to support a waste characterization, so that the waste characterization is scientifically valid and defensible. EPA reference documents and web pages are provided in the Resources and Contact Information section.

Section 4.3.1

18. **"If particularly wet materials are excavated, they will be allowed to drain and/or be mixed with drier waste prior to loading into trucks to prevent the separation of liquids from the waste during**

transportation or placement, unless the disposal of BRL leachate in ORL is approved under the ORL Research, Development and Demonstration (RD&D) Plan.”

If these wet materials are a hazardous waste, then the addition of the material to dry the waste is considered treatment. This treatment may be classified as impermissible dilution under s. NR 668.03 Wis. Admin. Code.

Section 4.3.5

19. “If suspicious waste as defined in Section 4.3.1 is encountered, it will be segregated from the exhumed waste stream for additional characterization, potential on-site treatment and disposal and/or off-site disposal.”

The department strongly recommends that the suspicious waste at this point be managed as if it were a hazardous waste and/or TSCA waste until it is determined that the suspicious waste is not a hazardous waste and TSCA waste. Managing the suspicious waste in this manner helps ensure that the landfill is in compliance with RCRA and TSCA.

20. “Intact, non-empty drums and other containers greater than 50 gallons in capacity will be segregated from the waste and will be staged in the secure storage area.”

See item 10.

21. “Drums or containers will be considered intact if they do not appear to be crushed or perforated by corrosion or previously punctured and can be safely removed from the waste excavation in this intact condition with the mechanized equipment available.

See item 5.

22. Non-intact drums that appear to contain water or leachate (i.e., liquid most likely accumulated after disposal) will be managed as non-suspicious waste and transferred with the surrounding waste to ORL for disposal. Crushed or empty drums will also not be segregated from the waste and will be handled in the same manner as the general excavated waste.”

Please explain the methods that will be used to determine if these drums contain water and/or leachate.

23. “Intact drums and containers segregated from the waste and staged in the secure storage area will be screened in the storage area using a combination of visual observation of physical characteristics and fingerprint analysis. Samples of drum (or other container) contents will be collected for off-site laboratory analysis based on the suspected drum contents consistent with the requirements of the intended disposal facility.”

See item 17.

24. “Suspicious wastes that are bulk wastes rather than drums, containers, or transformers will be characterized and either managed/treated on site and disposed in ORL or disposed of off site.”

If placement occurs (see item 9) and the suspicious waste is a hazardous waste then it is subject to the applicable management requirements of chapter NR 662.

25. “Bulk suspicious waste materials will be tested for total and/or TCLP VOCs and other parameters as needed based on field observations. If total concentrations in mg/kg are less than 20 times the TCLP regulatory limits in mg/l, then TCLP testing is not required because the TCLP limit can be presumed to be met.”

See items 14 and 17.

Section 4.3.6

26. **“Based on the site history, the bulk suspicious materials most likely to be encountered are waste or soils containing high concentrations of VOCs.”**

Please provide the site history showing that materials most likely to be encountered are waste or soils containing high concentrations of VOCs.

27. **“Prior to treatment of bulk suspicious waste or soil, WMWI will submit the proposed treatment approach to the WDNR for concurrence.”**

If a hazardous waste can submit to Mike Ellenbecker.

28. **“The minimum goal of on-site treatment will be to reduce contaminant concentrations to below the TCLP limits, so that it meets the ORL acceptance limits. For disposal, the RCRA LDR treatment standards will also apply. Based on the site history and known site contaminants, characterization to determine whether the LDR treatment standards are met will be limited to VOCs unless pre treatment field observations or laboratory results indicate a significant likelihood that other hazardous constituents (metals or semivolatile compounds) could be present at concentrations exceeding the LDR treatment standards.”**

Hazardous waste **determinations** are based on representative sampling. However, representative sampling is **not used to show if the LDR standard has been met**. Section 668.40(2) states:

- Non D004 through D011 wastewaters, compliance with concentration level standards are based **composite sampling** on maximums for any one day.
- For all nonwastewater and D004 through D011 wastewaters, compliance with concentration level standards is based **on grab sampling**.

To comply with the LDR treatment standard, **no portion of the waste may exceed the standard**. If testing results show that “hot spots” remain, this is evidence that the treatment was not effective and there is noncompliance with the LDR treatment requirements (see 63 FR 28567, May 26, 1998). Note that a well-designed and well-operated treatment system, the treatment standard should be achievable 99% of the time.

29. **“Examples of the applicable treatment standards for characteristic hazardous waste treated for disposal in ORL include the following: ...”**

The 10 X UTS, or 90% reduction only applies to environmental media (e.g., soil, groundwater) and not to the wastes that are excavated.