



## C&DD Leachate Sampling and Analysis Rules

*The following is offered as a basic description to aid the owner or operator of a C&DD facility in complying with the C&DD landfill leachate sampling and analysis OAC Rules 3745-400-20 and 3745-400-21.*

**Step 1: Determine which requirements of OAC Rule 3745-400-20 apply to the C&DD facility. There are two distinct requirements contained in this rule:**

Paragraph (A) of OAC 3745-400-20 contains leachate sampling and analysis requirements.

Paragraph (B) of OAC 3745-400-20 contains additional ground water monitoring requirements.

Determining whether the leachate sampling and analysis requirements in paragraph (A) of OAC 3745-400-20 apply to the C&DD facility.

- Has the facility been conducting annual leachate sampling in previous license years? Since 1996, OAC Rule 3745-400-11(R) has required annual leachate sampling of all C&DD facilities that have a leachate collection system.
- Has the facility constructed a leachate collection system in any portion of the limits of debris placement? Since 1996, OAC Rule 3745-400-07(A)(2) and OAC Rule 3745-400-07(F) have required the facility construction design plan to include a leachate collection system designed to allow access for obtaining leachate samples.

If the answer to either of the above is yes, then the leachate sampling and analysis requirements in paragraph (A) of OAC Rule 3745-400-20 and OAC Rule 3745-400-21 apply to the facility.

*Note that paragraph (A) of OAC Rule 3745-400-20 does not apply to those C&DD facilities initially licensed in 1997 that have not yet been required to construct a leachate collection system in any portion of the limits of debris placement. Since the initial 1997 license, all ALDA of these facilities would either have contained debris as of September 30, 1996, or contained debris placed without a recompacted soil liner prior to January 1, 1999 [Reference to OAC 3745-400-07(C)(2)]. Since the initial 1997 license year, these facilities would have not identified new ALDA in subsequent license years requiring construction of a leachate collection system.*

Determining whether additional ground water monitoring requirements in paragraph (B) of OAC 3745-400-20 applies to the C&DD facility.

- Any C&DD facility with a ground water monitoring system but no leachate collection system used for leachate sampling and analysis under paragraph (A) of OAC 3745-400-20 is required by OAC 3745-400-20(B)(3) to monitor ground water for the parameters listed in OAC Rule 3745-400-21.

This would include those C&DD facilities initially licensed in 1997 that do have a ground water monitoring system but have not yet been required to construct a leachate collection system in any portion of the limits of debris placement.

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- Any C&DD facility with a ground water monitoring system and a leachate collection system that is required to monitor ground water for parameters that have been detected in the facility's leachate in accordance with paragraph (A) of OAC Rule 3745-400-20.

If the facility meets either of the above criteria, then the additional ground water monitoring requirements paragraph (B) of OAC Rule 3745-400-20 and OAC Rule 3745-400-21 apply to the facility.

*Note that paragraph (B) of OAC Rule 3745-400-20 does not apply to any C&DD facility that is not required to monitor ground water. This includes any facility that has demonstrated in a site characterization report that a ground water monitoring system is not required under paragraph (B) of OAC Rule 3745-400-09.*

### **Step 2: Develop a leachate sampling and analysis plan.**

The owner or operator of a C&DD facility subject to these rules must develop and comply with a leachate sampling and analysis plan. This plan describes the equipment, procedures, and techniques that will be used to sample and analyze leachate under the rule. The sample collection, preservation, and handling methods must provide for the collection and analysis of representative leachate samples, and the plan must also include forms to document that collection and analysis.

Some key points regarding the leachate sampling and analysis plan:

- This plan is not required to be submitted to or approved by the licensing authority.
- The plan should be maintained on-site and available to Ohio EPA or the licensing authority upon request.
- The plan needs to be completed before sampling leachate under OAC Rule 3745-400-20.
- The plan must be followed when sampling leachate required by OAC Rule 3745-400-20.

### **Step 3: Identify the location and number of sump risers or other access points that can be used for collecting leachate samples from areas of the facility containing disposed material.**

### **Step 4: Determine frequency of sampling**

The owner or operator of a C&DD facility should carefully consider how to schedule sampling of sump risers or other access points to comply with minimum annual and applicable quarterly sampling frequencies while ensuring that each sump riser or other access point is sampled at least once over a five year period. As new sump risers or other access points are constructed or leachate recirculation is conducted in another portion of the facility, the owner or operator should consider how this may alter the sampling schedule.

### **If no leachate recirculation has occurred after January 1, 2013:**

Each year, the owner or operator must sample at least one sump or access point location. Over a period of five years, the owner or operator will need to sample each sump and access point location at least once. The owner or operator has some choices to make during this five year span when all sumps must be sampled at least once.

- If there are more than five sumps and access points, the owner or operator can choose which years multiple sump locations will be sampled. However, at least one leachate sample must be taken each year.
- If there are fewer than five sumps and access points, the owner or operator must sample a minimum of one sump or access point location each year. Even if a single sump or access point location is sampled more than once over five years, the statute specifies annual leachate sampling.

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- Sampling must occur each year throughout operations, closure, and post-closure care.

### **If leachate recirculation has occurred after January 1, 2013:**

- If leachate is recirculated through the facility sampling must be performed at least quarterly.
- Starting in 2013, and each year of operation, closure, and post-closure afterwards, at least one representative leachate sample must be taken quarterly from each sump and access point location capable of collecting leachate from areas of the facility where leachate is recirculated.
- Discontinuing leachate recirculation does not end the requirement to sample locations where leachate is recirculated. The flow of recirculated leachate may take an undetermined amount of time to reach the sampling locations.
- As the owner or operator chooses to recirculate leachate in a new area, at least one representative leachate sample must be taken quarterly from each sump and access point location capable of collecting leachate from that new area.
- Sampling must occur each year throughout operations, closure, and post-closure care.
- Over a period of five years, the owner or operator will need to have sampled each sump and access point location at least once over a five year period. While the quarterly sampling of sumps and access point locations capable of collecting recirculated leachate might fulfill or exceed the minimum of at least one sampling each year, the owner or operator must have sampled all sump or access point locations at least once during a five year period.

### **Step 5: Conduct required leachate sampling and analysis.**

Leachate sampling and analysis must occur in 2013 and each following year throughout operations, closure, and post-closure. Conduct sampling and analysis in accordance with the leachate sampling and analysis plan at sampling locations designated by the owner or operator. The rule does not specify at what time of year the sampling is to be done or whether sampling of multiple sumps or access points need to be taken during the same timeframe.

### **Step 6: Submit sampling and analysis results.**

The owner or operator must submit the sampling and analysis results (leachate report) not later than seventy-five days after each leachate sampling event to the Ohio EPA and the licensing authority. The rule specifies the contents of the leachate report.

### **Step 7: Detection of a parameter listed in OAC Rule 3745-400-21 triggers owner or operator obligation to monitor ground water wells for detected parameter.**

OAC Rule 3745-400-20(B) addresses the requirement to monitor ground water for parameters that have been detected in the facility's leachate. The detected parameter would be sampled at all ground water monitoring wells at the C&DD facility and analyzed as part of the next regularly scheduled ground water monitoring event in accordance with OAC 3745-400-10.

Continue to sample and analyze the detected OAC Rule 3745-400-21 parameter in all future ground water sampling events. This parameter has become a required parameter for all future ground water monitoring.

### **Step 8: Continue to conduct required leachate sampling and analysis for all of the leachate parameters listed in OAC Rule 3745-400-21.**

## C&DD Leachate Sampling and Analysis Rules

<u>Column 1: Leachate Sampling Parameters</u>	CAS RN:	<u>Column 2: Annual Ground Water Monitoring Parameters</u>
pH		Temperature
Temperature		Specific conductance
Specific conductance		Turbidity
Turbidity		Chemical oxygen demand
		Bicarbonate/carbonate
		Phosphorous
<b>Metals and cyanide</b>		
<i>The metals shall be total metals and include all species in leachate that contain the element. Therefore, leachate samples shall not be filtered and laboratory analysis shall be for <u>total metals</u>.</i>		<i>The sampling and analysis procedures narrative of the OAC 3745-400-10(B) report is to identify if the metals sampled in ground water have been filtered.</i>
1) Aluminum	7429-90-5	
2) Antimony	7440-36-0	
3) Arsenic	7440-38-2	
4) Barium	7440-39-3	
5) Beryllium	7440-41-7	
6) Cadmium	7440-43-9	
7) Chromium	7440-47-3	
8) Copper	7440-50-8	
9) Cyanide (free)	57-12-5	
10) Lead	7439-92-1	Lead
11) Mercury	7439-97-6	
12) Nickel	7440-02-0	
13) Selenium	7782-49-2	
14) Strontium	7440-24-6	
15) Thallium	7440-28-0	
16) Vanadium	7440-62-2	
17) Zinc	7440-66-6	Zinc
18) Ammonia	7664-41-7	Ammonia
<b>Inorganic water quality parameters</b>		
19) Calcium	7440-70-2	Calcium
20) Chloride	16887-00-6	Chloride
21) Magnesium	7439-95-4	Magnesium
22) Potassium	7440-09-7	Potassium
23) Sodium	7440-23-5	Sodium
24) Sulfate	14808-79-8	Sulfate
25) Boron	7440-42-8	
26) Iron	7439-89-6	Iron
27) Manganese	7439-96-5	Manganese
28) Nitrate/Nitrite		Nitrate/Nitrite
29) pH		pH
30) Total alkalinity		

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31) Total dissolved solids		
<b>Volatile organic compounds</b>		
32) Acetone; 2-Propanone	67-64-1	
33) Benzene	71-43-2	
34) Bromodichloromethane; Dibromochloromethane	75-27-4	
35) Carbon disulfide	75-15-0	
36) Carbon tetrachloride; Tetrachloromethane	56-23-5	
37) Chlorobenzene	108-90-7	
38) Chloroethane; Ethyl chloride	75-00-3	
39) Chloroform; Trichloromethane	67-66-3	
40) 2-Chlorotoluene	95-49-8	
41) 4-Chlorotoluene	106-43-4	
42) o-Dichlorobenzene; 1,2-Dichlorobenzene	95-50-1	
43) p-Dichlorobenzene; 1,4-Dichlorobenzene	106-46-7	
44) Dichlorodifluoromethane; CFC-12	75-71-8	
45) 1,1-Dichloroethane; Ethylidene chloride	75-34-3	
46) 1,2-Dichloroethane; Ethylene dichloride	107-06-2	
47) 1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride	75-35-4	
48) cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	156-59-2	
49) trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene	156-60-5	
50) 1,2-Dichloropropane; Propylene dichloride	78-87-5	
51) 1,1-Dichloropropene; 1,1-Dichloro-1-propene	563-58-6	
52) Ethylbenzene	100-41-4	
53) 2-Hexanone; Methyl butyl ketone	591-78-6	
54) Isopropylbenzene; Cumene	98-82-8	
55) 4-Isopropyltoluene; p-Isopropyltoluene	99-87-6	
56) Methyl chloride; Chloromethane	74-87-3	
57) Methyl ethyl ketone; MEK; 2-Butanone	78-93-3	
58) 4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1	
59) Methylene chloride; Dichloromethane	75-09-2	
60) N-Butylbenzene	104-51-8	
61) N-Propylbenzene	103-65-1	
62) Naphthalene	91-20-3	
63) Sec-Butylbenzene	135-98-8	
64) Styrene; Ethenylbenzene	100-42-5	
65) Tert-Butylbenzene	98-06-6	
66) 1,1,1,2-Tetrachloroethane	630-20-6	
67) Tetrachloroethylene; Tetrachloroethene; Perchloroethylene	127-18-4	
68) Toluene; Methylbenzene	108-88-3	
69) 1,2,3-Trichlorobenzene	87-61-6	
70) 1,2,4-Trichlorobenzene	120-82-1	

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71) 1,1,1-Trichloroethane; Methylchloroform	71-55-6	
72) Trichloroethylene; Trichloroethene	79-01-6	
73) Trichlorofluoromethane; CFC-11	75-69-4	
74) 1,2,4-Trimethylbenzene	95-63-6	
75) 1,3,5-Trimethylbenzene	108-67-8	
76) Vinyl chloride; Chloroethene	75-01-4	
77) Xylene (total); Dimethylbenzene <i>Note: Xylene (total): Where "total" is entered, all species in leachate that contain this element are included. This entry includes o-xylene (CAS RN 96-47-6), m-xylene (CAS RN 108-38-3), p-xylene (CAS RN 106-42-3), and unspecified xylenes (dimethylbenzenes) (CAS RN 1330-20-7).</i>		