

Permit Guidance 1	National Pollutant Discharge Elimination System (NPDES); Monitoring Frequency Requirements for Sanitary Discharges	
	Statutory references: ORC 6111.03 Rule references: OAC 3745-33-07	Ohio EPA, Division of Surface Water Revision 0, August 1, 1988 Revision 1, January 20, 1989 Revision 2, July 5, 1994 Revision 3, September 3, 1999 Revision 4, November 8, 2010 Revision 5, July 18, 2018
This internal guidance does not affect the requirements found in the referenced rule or statute.		

Purpose

To outline the approach used to determine monitoring requirements for sanitary discharges when issuing a new NPDES permit or when renewing an existing permit.

Background

Self-monitoring is a critical part of the NPDES program. It provides data to document compliance with permit limits and to aid in plant operations. It also builds a data base that can be used when designing plant improvements or planning water quality studies on the receiving streams.

Monitoring requirements are based on the average dry weather design flow of the treatment plant. The requirements may be adjusted on a case-by-case basis based on certain factors such as: the type of treatment system and the effectiveness of the operation and maintenance program, the dilution available in the receiving stream and the potential for the discharge to cause violations of water quality standards, the actual discharge volume of an under-loaded treatment plant, and the relevance of the data to plant operation.

Procedure

Tables 1 - 4 and the accompanying footnotes present the monitoring recommendations for discharges from three types of facilities: public and non-public wastewater treatment plants and sanitary discharges from industrial facilities. The average dry weather design flow of the treatment plant is used to determine the monitoring recommendations.

On a case-by-case basis, monitoring may be necessary for items not listed in this guidance. For example, precipitation and peak hourly influent flow rates at plants impacted by infiltration and inflow; upstream flow at controlled discharge lagoons; whole effluent toxicity; influent metals monitoring at plants without approved pretreatment programs. In cases where additional monitoring is necessary, or when the proposed monitoring requirements are different from those of this guidance, the permit writer should document reasons for the changes.

Cross Reference

Permit Guidance #3 - National Pollutant Discharge Elimination System; Upstream/Downstream Sampling Requirements.

Permit Guidance #11 – National Pollutant Discharge Elimination System; Monitoring and Reporting for Sewage Sludge.

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Table 1. Final Effluent Monitoring Recommendations.

Effluent Parameter	Design Flow (MGD) measuring frequency / sample type						
	Q \geq 10	1 \leq Q<10	.25 \leq Q<1	.1 \leq Q<.25	.050 \leq Q<.1	.01 \leq Q<.050 ¹	Q<.01
Flow	Daily Cont	Daily Cont	Daily Cont	Daily Cont	Daily Cont	Daily E ²	Daily E ²
Temperature	Daily ContMax	Daily ContMax	Daily MG	Daily G	Daily G	1/week G	-- ⁵
Cl Res ^{3,4}	Daily MG	Daily MG	Daily G	Daily G	Daily G	1/2weeks G	1/quarter G
DO	Daily Cont	Daily MG	Daily G	Daily G	1/week G	1/week G	1/quarter G
pH	Daily Cont	Daily MG	Daily G	Daily G	1/week G	1/month G	1/quarter G
SS	3/week C	3/week C	2/week C	2/week C	1/week C	1/month G	1/quarter G
BOD, CBOD ₅	3/week C	3/week C	2/week C	2/week C	1/week C	1/month G	1/quarter G
NH ₃	Daily C	3/week C	2/week C	1/2weeks C	1/2weeks C	1/month G	1/quarter G
TKN ⁶	1/2weeks C	1/month C	1/month C	1/month C	1/2months C	1/quarter G	--
NO ₂ +NO ₃	1/2weeks C	1month C	1/month C	1/month C	1/2months C	1/quarter G	--
Phosphorus	2/week C	1/Week C	1/2weeks C	1/month C	1/month C	1/quarter G	--
Orthophosphate, Dissolved reactive	1/month G	1/month G					
O&G ⁷	1/week G	1/2weeks G	1/month G	1/quarter G	--	--	--
Bacteria ³	Daily G	3/week G	2/week G	1/week G	1/month G	1/month G	1/quarter G
Metals, Free Cyanide ⁸	1/2weeks C	1/month C	1/quarter C	1/6 months C	--	--	--
COD ⁹	--	--	--	--	--	--	--
Dissolved Inorganics (TDS, chloride, sulfate, etc.) ¹⁰	1/week C	1/2 weeks C	1/month C	1/2months C	1/6 months C	—	—
Toxics/ Organics ¹¹	--	--	--	--	--	--	--
Whole Effluent Toxicity ¹²	1/year	1/year	--	--	--	--	--
Turbidity ¹⁴					Daily E	Daily E	1/week E

Table 2. Influent Monitoring Recommendations.

Influent Parameter	Design Flow (MGD) measuring frequency / sample type				
	Q \geq 10	1 \leq Q \leq 10	.25 \leq Q<1	.1 \leq Q<.25	Q<.1
SS, CBOD	3/week C	3/week C	2/week C	1/week C	--
pH	Daily Cont	Daily MG	Daily G	--	--
Metals, Total Cyanide ¹⁵	1/month C	1/month C	1/quarter C	--	--
COD ⁹	--	--	--	--	--
Toxics/Organics ¹⁰	--	--	--	--	--

Table 3. Upstream Monitoring Recommendations¹⁶.

Upstream	Design Flow (MGD) measuring frequency / sample type				
	Q \geq 10	1 \leq Q \leq 10	.25 \leq Q<1	.1 \leq Q<.25	Q<.1
NH ₃	1/month G	1/month G	1/quarter G	1/quarter G	--
Nutrients ¹⁹	1/month G	1/month G	1/quarter G	1/quarter G	--
Bacteria ¹⁷	1/2 weeks G	1/2 weeks G	1/2 weeks G	1/2 weeks G	--
Metals, Free Cyanide	See Permit Guidance #3	See Permit Guidance #3	See Permit Guidance #3	See Permit Guidance #3	--

Table 4. Downstream Monitoring Recommendations¹⁶.

Downstream	Design Flow (MGD) measuring frequency / sample type				
	Q \geq 10	1 \leq Q \leq 10	.25 \leq Q<1	.1 \leq Q<.25	Q<.1
pH	1/month G	1/month G	1/month G	1/quarter G	--
NH ₃	1/month G	1/month G	1/quarter G	1/quarter G	--
Temperature	1/month G	1/month G	1/month G	1/quarter G	--
Hardness ¹⁸	1/month G	1/month G	1/quarter G	1/quarter G	--
Nutrients ¹⁹	1/month G	1/month G	1/quarter G	1/quarter G	--
Bacteria ¹⁷	1/2 weeks G	1/2 weeks G	1/2 weeks G	1/2 weeks G	--
Metals, Free Cyanide	See Permit Guidance #3	See Permit Guidance #3	See Permit Guidance #3	See Permit Guidance #3	--

Sample Type Definitions:

Cont: Continuous measuring device with the critical value reported each day. Critical values are as follows: flow - total flow for day; dissolved oxygen - the minimum analytical result; pH - the minimum and maximum analytical results; total residual chlorine - the maximum analytical result.

E: Estimate.

ContMax: Maximum indicating thermometer.

G: Grab samples collected at such times and locations, and in such a fashion, as to be representative of the facility's overall performance.

MG: Multiple grab. Multiple grab samples should be comprised of at least three grab samples collected at intervals of at least 3 hours during the period that the plant is staffed on each day for sampling. The critical value should be reported. Critical values are as follows: dissolved oxygen - the minimum analytical result; pH - the minimum and maximum analytical results; total residual chlorine - the maximum analytical result; temperature – the maximum result.

C: Composite sample. All facilities larger than 100,000 gallons per day (gpd) should use automatic samplers at the effluent to collect 24-hour flow proportioned composite samples. A composite sampler should also be used for influent sampling by communities with a pretreatment program, particularly when sampling for metals and organics. For plants smaller than 100,000 gpd that do not have automatic samplers, "composite sample" should be defined in Part II of the permit as at least three grab samples proportionate in volume to the sewage flow rate at the time of sampling and collected at intervals of at least 30 minutes but not more than 2 hours during the period that the plant is staffed on each day for sampling.

Footnotes:

1. On a case-by-case basis, the monitoring frequencies for small treatment plants could be reduced if there is a history of compliance with NPDES permit requirements, if good operation and maintenance practices are demonstrated and there is no visual evidence that the plant is contributing to organic or nutrient enrichment in the receiving water.
2. Acceptable methods for estimating daily flow at plants with design flows less than 0.050 MGD are, in order of preference: 1) elapsed time meters on sand filter dosing pumps; 2) elapsed time meters on influent pumps; 3) water use records.
3. Monitoring of chlorine residual and bacteria is necessary only during the summer months (May through October), except Ohio River discharges where year-round monitoring is required.

4. Continuous monitoring of chlorine residual is acceptable as long as: 1) the monitor utilizes an analytical procedure that is approved under 40 CFR 136; 2) the monitor has a method detection limit (MDL; 40 CFR 136, Appendix B) lower than the effluent limit in the permit; and 3) the permittee can document an adequate QA/QC and maintenance program that ensure proper operation of the monitor.
5. Dashes indicate that no monitoring is recommended.
6. Monitoring is recommended for TKN under the following circumstances:
 - when monitoring or limits are needed because of BADCT requirements;
 - when monitoring or limits are required by a TMDL report;
 - for dischargers to stream segments identified as nutrient- or enrichment-impaired in Ohio's Integrated Water Quality Monitoring and Assessment Report;
 - for dischargers to streams designated EWH or CWH;
 - for dischargers to effluent-dominated or effluent-affected streams (downstream 7Q10 dilution $\leq 10:1$);
 - for dischargers in areas of concern for the Gulf of Mexico hypoxia project. This includes the Wabash, Great Miami, Little Miami and Scioto River Basins (mainstem and tributaries), and major dischargers to the Ohio River.
7. The oil and grease monitoring frequency may be reduced if the 95th percentile value of the most recent 2 years of effluent data is less than or equal to 5.0 mg/l. If the data base contains fewer than 20 data points, all reported values should be less than or equal to 5.0 mg/l. Reduced monitoring also may be considered for a plant with tertiary treatment, such as sand filters, and a history of meeting oil and grease limits.
8. Effluent metals generally include cadmium, hexavalent chromium, total chromium, copper, mercury, nickel, lead and zinc. Monitoring of other metals or cyanide should be considered due to water quality concerns or may be necessary based on Reasonable Potential Groupings. If limits for metals or cyanide are included in the permit as an outcome of an RP analysis, the monitoring frequency should be at least 1/month. If no limits are included in the permit, and a metal or cyanide has been recommended as Group 4 under Reasonable Potential, the monitoring frequencies in Table 1 are recommended. If no limits are included in the permit, and a metal or cyanide has been assigned to Groups 1, 2 or 3 under Reasonable Potential, the monitoring frequency can be reduced by one flow category. Cyanide, mercury and hexavalent chromium must be monitored by grab sample. Cyanide and mercury samples shall be analyzed using low level detection methods.
9. Monitoring for COD may be necessary in cases where the permit writer determines a specific need for the data. Frequency should be determined on a case-by-case basis depending on how the data is going to be used.

10. Monitoring for Total Dissolved solids should be increased if there is a concentrated source (water plant or industrial user discharge) that is a significant portion of the effluent TDS load. Monitoring in the permit for TDS should use the reporting code for Residue, Total Filterable, as this is the reporting code that matches up with collected WQ data and references the correct oven temperature for sample preparation. Monitoring for other dissolved parameters that have water quality criteria (such as sulfate or chloride) should be tailored to the specific source(s) contributing to the discharge. Low reasonable potential grouping should be considered for possible deviation from recommended frequencies or the need to monitor.
11. A priority pollutant scan of the influent, effluent, and sludge should be conducted annually at each facility with a pretreatment program and those facilities with a design flow of 1.0 MGD or greater. Monitoring for specific organic compounds may be necessary based on information collected during these scans.
12. This represents the minimum toxicity requirement for all POTWs under OAC 3745-33-07(B)(11). Toxicity testing may be more frequent if required by other parts of OAC 3745-33-07(B) or 40 CFR 132. The annual requirement must be a chronic test requirement if the downstream dilution ratio at 7Q10 is less than 20:1 (this includes Lake Erie direct dischargers); acute testing is sufficient if dilution is 20:1 or more
13. Reserved
14. For small facilities, turbidity will be recorded in severity units in accordance with the following table:

<u>Severity</u>	<u>Turbidity</u>
0	Clear
1	
2	Light Solids
3	
4	Heavy Solids

15. Monitoring for influent metals generally is recommended only at facilities with pretreatment programs. Influent metals generally include cadmium, hexavalent chromium, total chromium, copper, mercury, nickel, lead and zinc. Monitoring at other facilities, or monitoring of other metals or total cyanide may be necessary due to water quality or sludge quality concerns. Any metals in land applied sludge above the limits included in Permit Guidance 11 should be included for influent monitoring. Influent and effluent composite and grab samples should be collected on the same day. Footnotes with references to Part II language should be used to coordinate influent, effluent and downstream monitoring for metals and cyanide.

16. If the ratio of the stream critical flow ($Q_{30,10}$) to effluent flow is greater than 50:1, upstream and downstream monitoring may not be necessary.
17. Instream bacteria sampling should be conducted during the months of June, July, and August using the SWIMS reporting months' code Jun-Aug.
18. Monitoring for hardness should be included in all permits with effluent metals monitoring or limits.
19. Nutrient parameters are TKN, Nitrate/Nitrite-N, and Total Phosphorus. Nutrient samples should be collected on the same day as effluent samples. Footnotes with references to Part II language should be used to coordinate effluent and upstream/downstream monitoring for nutrients. Monitoring for TKN in the upstream/downstream is recommended whenever effluent monitoring for TKN is done under Note 6 above. Upstream/Downstream Nitrate/Nitrite-N and Phosphorus monitoring is recommended for all WWTPs ≥ 0.1 MGD design flow. Upstream/Downstream Nitrate/Nitrite-N and Phosphorus monitoring is recommended for smaller facilities if:
 - effluent monitoring or limits are needed because of Best Available Demonstrated Control Technology (BADCT) requirements or treatment technology requirements from OAC 3745-33-06;
 - effluent monitoring or limits are required by a Total Maximum Daily Load Report;
 - for dischargers to stream segments identified as nutrient- or enrichment-impaired in OEPA's Integrated Water Quality Monitoring and Assessment Report;
 - for dischargers to streams designated EWH or CWH;
 - for dischargers to effluent-dominated or effluent-affected waters (downstream 7Q10 dilution $\leq 10:1$);