

Permit Guidance  <b>2</b>  Final	<b>National Pollutant Discharge Elimination System; Determination of Sampling Frequency Formula for Industrial Waste Discharges</b>	
	Rule reference: OAC 3745-33	Ohio EPA, Division of Surface Water Revision 0, January 30, 1988 (formerly DSW Policy 0100.020)
This internal guidance does not affect the requirements found in the referenced rule or statute.		

**Purpose:** To provide staff guidance in the determination of industrial NPDES permit monitoring requirements. Objectives of this guidance are to ensure that staff:

1. Have adequate data to assess compliance with NPDES permit effluent limitations;
2. Have adequate data to characterize the discharge;
3. Focus monitoring efforts on the more important pollutants and discharges, and the more sensitive waters;
4. Apply this methodology in a consistent fashion state-wide; and
5. Not impose excessive costs on dischargers.

**Procedures:**

It must be emphasized that the paragraphs below set forth a sampling frequency that should be reasonable for most normal situations. Some problems may lead the permit writer to increase the sampling frequency. These would include, but not be limited to, the following:

1. Past history of serious noncompliance with effluent limitations;
2. Past history of much invalid or questionable analytical data being submitted;
3. Extreme scarcity of reliable information on the discharge; and
4. Past history of frequent bypass, spills, etc.

Most Pollutants Limited by NPDES Permits

The effluent flow volume is one of the major factors affecting the receiving stream. It may also reflect the size of the industry and the industry's ability to pay for the analysis. It is assigned the letter "A" in the following formula.

The rate of effluent volume to receiving stream flow indicates the impact of the effluent on the stream. It is assigned the letter "B" in the formula.

The seven day, ten year low flow should be used to compute the ratio. If the Q (7,10) is not available, assume the ratio is 0.10. This is done because most small streams in Ohio for which data probably will not be available have a Q (7,10) of zero or nearly zero. Some sources of data on the low stream flows are listed below under the Cross Reference section.

The "C" factor attempts to reflect the increased difficulty in obtaining a representative sample when there are short-time variations in flow or concentrations. Setting this factor requires considerable knowledge of the discharge. Therefore, assume 20 to 50 percent variability unless there is evidence for a different range.

#### Sampling Frequency Formula

$$SF = A \times B \times C$$

Where SF is the sampling frequency per month,  
A is the effluent flow factor,  
B is the effluent flow to stream flow ratio.  
C is the variability factor.

A: When the effluent flow is:	A is:
>5 MGD	8
1-5 MGD	6
0.2-1 MGD	4
.05-0.2 MGD	2
<0.05 MGD	1
B: When the ratio is:	B is:
>.10	2.0
.01 - .10	1.5
<.01	1.0
C: When the short-time variability is:	C is:
>100% of the mean value	2.0
50% to 100%	1.5
20% to 50%	1.0
< 20%	0.5

The frequencies given by the above formula should be doubled for the following pollutants:

Ammonia  
Chlorine

Those on Page V-3 of NPDES Application Form 2-C

The frequencies given by the above formula should be reduced 50 percent if the discharge consists only of uncontaminated waters such as clean storm and cooling waters (but only chlorinated cooling waters, oil-contaminated cooling waters, etc.). Reduction by 50 percent is also suggested if the only pollutant of interest in the waste stream is inert solids (Example: sand and gravel washer wastes, powdered soapstone used as lubricant, but not coal facilities).

The application of the above rules may result in sampling frequencies that would be inconvenient to schedule. In such cases, the frequencies should be rounded according to the following rounding procedure.

When SF is:	Set at:
20 or more per month	Daily
11 to 19 per month	3 per week
8 to 10 per month	2 per week
4 to 7 per month	1 per week
2 to 3 per week	1 each two weeks
1	Monthly

Entities should not be given frequencies such as '4/month', which allow them to collect all their data in periods favorable to them. The sampling events should be well spread over the month.

The permit should specify either the use of composite samples or grab samples to detect variability of effluent quality during different phases of the plant's operating cycle.

Even for the smallest discharges, sampling frequencies less than monthly are not recommended because dischargers should look at their outfalls at least this often.

#### Pollutants Not Limited

Sometimes pollutants are monitored but not limited because while they are believed to be present in significant amounts, and will probably be limited in the future, Ohio EPA presently lacks sufficient information to determine if limits are necessary. In this case, adhere to the above at a minimum.

Sometimes pollutants are monitored but not limited to because they are not believed to be a problem and Ohio EPA's purpose is to confirm this belief. (Examples: Trace contaminants believed essentially absent from materials being processed, oil that is not believed present in cooling water). Likewise, sometimes an indicator test such as COD may be imposed to confirm the absence of organic pollution. Usually monthly monitoring is appropriate for such purposes.

More frequent monitoring is appropriate if a good enough reason exists. Quarterly monitoring reports are permissible if the pollutant is not of great interest but it is still worthwhile to collect some data on it over a long period of time.

#### Pollutants Limited Only to Meet Federal Requirements

Sometimes a pollutant is either known or strongly believed not to be a problem, and the only reason it is limited is because there is a federal guideline for the pollutant and the industry in question. In order to confirm the absence of the pollutant, monthly monitoring is appropriate until such time as U.S. EPA will authorize either annual monitoring or dropping the pollutant from the permit.

Flow

Flow monitoring should be required at least as often as pollutants above are monitored. The following minimum frequencies are suggested:

<u>Polluted Discharges</u>	<u>Clean Cooling Water</u>	<u>Frequency</u>
Under 1,000 GPD	Under 5,000 GPD	Monthly
1,000-10,000 GPD	5,000-25,000 GPD	Weekly
Over 10,000 GPD	Over 25,000 GPD	Daily

Accurate flow measures are needed for computing compliance with effluent loading limits, for water quality modeling, for assessing the probable environmental effects of discharges. Therefore, adequate assessment of effluent flows is of utmost importance.

Continuous flow monitoring and totalizing is suggested where a permit has mass loading limitations. This or an equally accurate method is also recommended where the discharge may have a significant environmental impact.(Example: Report water volumes pumped for once through power plant condenser cooling water, install flow meter for sizable toxic or oxygen-consuming discharges into small streams.) Also, where accurate flow information is already being collected for other purposes, require it to be reported. (Example: metered city water discharge.)

Portable Manning dippers are not acceptable as permanent means of determining flows. Their use should be limited to temporary situations.

Estimated flows may be reported if the discharge is smaller or insignificant and the estimates are known to be reasonably accurate. (Examples: require installation of a weir or flume; require bucket-and stop watch measurements; report city water purchase plus or minus appropriate allowances; put integrating timers on pumps and use or devise flow versus head curves.)

pH

Recommend daily continuous pH monitoring, and reporting of high and low values for each day, where the pH could fluctuate widely, and where this might cause an environmental impact. (Examples: where high or low pH could harm receiving waters, or where low pH could result in failure to precipitate toxic metals. Part II of the permit may be used to require monthly reporting of the date, extreme value, and length of each excursion, and the total excursion time for the month.

Temperature

Monitoring should be based on environmental impact. Monthly or weekly grabs will often be acceptable. For larger waste flows or smaller receiving streams, weekly or daily maximum indicating thermometer readings is suggested. Continuous recording may be necessary if unusual situations warrant, but this will seldom be the case.

#### Organic Priority Pollutants

Such pollutants are expensive to sample and analyze. Quarterly sampling is appropriate if no significant problem is known or suspected, and the main purpose of the sampling is to confirm this or meet federal requirements. Monthly sampling is appropriate if some problem is known to exist, or strongly suspected, but no great hazard currently exists. Weekly or twice weekly sampling may be appropriate if there is a known serious problem that has or could well have a serious environmental impact or pose a threat to public water supply.

#### Sanitary Waste Flows

Daily monitoring of flow, color, odor, turbidity and residual chlorine is recommended. The Entity should report "AN" on days when facility is not staffed.

Weekly or monthly chlorine monitoring should be acceptable if the wastewater must travel long distances before reaching waters of the state thereby allowing the chlorine to dissipate by the time it reached those waters.

Monitor other parameters monthly if maximum flow is under 10,000 gallons per day, twice monthly otherwise.

#### Intake, Upstream, Downstream, and Raw Influent Monitoring

Monthly monitoring will often suffice. More frequent monitoring may be appropriate if a good enough reason exists, all the way up to daily or continuous monitoring if there is a real need for the data. If net loadings must be computed, or removal efficiencies must be determined, monitor intake water or raw Influent as often as effluent is monitored.

NOTE: In all cases, with no exceptions, a permittee who monitors more often than required by his permit must report the results, provided only that samples are collected, preserved, and analyzed in accordance with approved methods.

**Cross reference**

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

Johnson, DP, and KD Metzker, Low Flow Characteristics of Ohio Streams U.S. Geological Survey Open File Report 81-1195, Columbus, Ohio, 1981

Schwartz, RR, Low Flow Data for Selected Partial Record Stations in Ohio, Supplement to U.S. Geological Survey Open File Report 81-1195, Columbus, Ohio, 1985.

**For more information contact:**

Ohio EPA, Division of Surface Water  
Industrial Permits group leader (614) 644-2001

P:\SHARE\Sts\Guidance\PERMIT\_G\permit2.wpd