SUPPORTING DOCUMENT FOR PERMIT MONITORING FREQUENCY DETERMINATION

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INTRODUCTION

This supporting document supplements IAC 567 - Chapter 63 Monitoring, Analytical, and Reporting Requirements. The subject discussed in this document is monitoring frequencies in wastewater permits.

All National Pollutant Discharge Elimination System (NPDES) permits require monitoring of regulated pollutants. For organic waste dischargers, the~~The~~ frequency of monitoring is determined using the tables in IAC 567 Chapter 63. For inorganic waste dischargers ~~In addition~~, IAC 567 – 63.3(2) requires the monitoring frequency to be determined~~"Self-monitoring requirements to be incorporated in the operation permit for the discharge of a pollutant not addressed in (the monitoring tables) shall be determined~~ "on a case-by-case evaluation of the ~~potential~~ impact of the discharge on the receiving stream, ~~potential for~~ toxic or deleterious effects of ~~the discharge~~wastewaters, complexity of the treatment process, history of noncompliance~~variability in waste stream pollutant concentrations,~~ or any other factor which requires strict control to meet the effluent limitations of the permit." The following support document describes the method by which the above rule will be implemented for inorganic waste dischargers, significant industrial users (SIUs), and any additional monitoring required for organic waste dischargers not covered in the Chapter 63 tables.

Final determination of the specific monitoring frequency to be used in an NPDES permit will be left to the permit writer's discretion. Permit writers may deviate from this document for reasons including, but not limited to, rare discharges, batch discharges, effluent limitation guidelines for pollutants not expected to be present at the facility, high flow rivers that result in less frequent monitoring than necessary to confirm proper treatment, pollutants with no applicable toxicity endpoints, consistent pollutant concentrations, and highly variable pollutant concentrations.

MONITORING FREQUENCY DETERMINATION FOR DIRECT DISCHARGERS

The following stepwise process will be used to determine the monitoring frequency for individual pollutants covered by IAC 567 – 63.3(1)-(3)~~63.3(2)~~. The permit writer is responsible for determining the pollutant group category for each pollutant to be monitored, the frequency at which each pollutant will be discharged at a concentration equal to or greater than fifty (50) percent of the proposed limit and the percentage of effluent flow to stream flow. This information will be used to determine the monitoring frequency category.

A. Pollutant Groups: Appendix A lists pollutants ~~by group based~~shown in Table I, Criteria for Chemical Constituents, 567 IAC Chapter 61, Water Quality Standards, effective ~~June 11, 2008~~ July 24, 2019, and other pollutants commonly listed in NPDES permits. Pollutant groups ~~were~~ are based on the numeric acute criterion~~a~~ for the Warm Water Type I (B(WW-1)) use designation. In the absence of an acute criterion for a B(WW-1) use designation, the ~~numeric~~ highest value for either the chronic criterion~~a~~ ~~for~~ or the Human Health - Fish (HH) or Drinking Water (C) use designations were used for the purpose of pollutant groups. The following table shows the definition of each pollutant group based on the numeric criterion~~a~~ in micrograms per liter.

Table 1. Pollutant Group based on 567 IAC Chapter 61.

Pollutant Group	Water Quality ~~Standard~~ Criterion in µg/L
1	≥1000
2	200 – 999
3	50 – 199
4	11 – 49
5	≤10

Each pollutant group has a corresponding number. This number relates to the first row of the monitoring frequency flow chart found in Appendix C. In the absence of a ~~Water Quality Standard~~numeric criterion, a pollutant will be assigned to a group based on the toxicity of the pollutant (see "Pollutants Not Listed in Appendix A" below).

B. Potential: Potential[1] is defined as the frequency at which the pollutant has been or could be discharged at a concentration that is equal to or greater than fifty (50) percent of the ~~proposed~~ maximum concentration limit included in the proposed permit. The following equation will be used to determine this frequency:

Equation 1. Potential~~.~~

$$\frac{D}{N} \text{ ~~.~~ x } 100 = F$$

Where:

N = Total number of daily monitoring data points from the previous five years

D = number of data points that are equal to or above 0.50 times the ~~proposed~~ maximum concentration limit from the ~~WLA[1,2] (mass or concentration)~~proposed permit

F = Frequency at which the pollutant has been or can be expected to be discharged at greater than fifty percent of the proposed limit

[1]When determining~~To determine~~ potential for industrial contributors, D = number of monitoring data points from the industrial contributor~~,~~ that are equal to or above 0.50 times the proposed concentration limit from the treatment agreement.

[2]For data that has been reported as "no detection", the detection level will be used. Permit writers should use Best Professional Judgement to determine monitoring frequencies whenever the limit is less than the detection level of the most sensitive test method (e.g. total residual chlorine).

For the determination of potential where less than ten (10) data points are available for analysis, the potential category will automatically be category five (5). After the permittee has submitted more than ten sample results, the permit may be reopened to reduce monitoring based on the procedure outlined in this document.

[1] The methods for determining "potential" as defined in this supporting document are different from the methods used when making a "reasonable potential determination".

The calculated frequency will be used to determine the potential category in Table A of Appendix B. Each category has a corresponding number 1 to 5. This will be used in the second row of the monitoring frequency flow chart in Appendix C.

C. Effluent Flow vs. Stream Flow: The average effluent flow versus the 1Q10 stream flow will be compared on a percentage basis using Equation 2 below. Average effluent flow means the average dry weather (ADW) flow in million gallons per day (MGD) or the average flow in MGD used in the most recent wasteload allocation (WLA), which is typically based on actual flow monitoring data. For new facilities, the ADW or proposed average effluent flow in MGD will be used. ~~Specifically, the comparison will be made between the proposed or actual average effluent flow to the 1Q10 stream flow which will be determined by using the following equation~~:

Equation 2. Effluent Flow vs. Stream Flow~~.~~

$$\frac{\text{Average Effluent Flow (in MGD)} \times 1.55^{3}}{\text{1Q10 Flow (cfs)}} \times 100 = \% \text{ of Effluent Flow to Stream Flow}$$

~~[3]The conversion factor for million gallons per day to cubic feet per second is 1.55~~

The calculated percentage of effluent flow vs. stream flow will be used to determine the category in Table B of Appendix B. Each category has a corresponding number 1 to 4. This will be used in the third row of the monitoring frequency flow chart in Appendix C. The category is automatically 4 when the 1Q10 flow is zero.

D. Monitoring Frequency Conclusion: After the permit writer has followed the above steps and applied the corresponding categories to the monitoring frequency flow charts in Appendix C, the result will be a roman numeral of I – IV. The roman numeral will correspond to a monitoring frequency category that will assist the permit writer in determining the appropriate monitoring frequency for an NPDES permit. ~~Final determination of the specific frequency to be used in an NPDES permit will be left to the permit writer's discretion and any circumstances not accounted for in the previous steps.~~

MONITORING FREQUENCY DETERMINATION FOR INDIRECT DISCHARGERS (SIGNIFICANT INDUSTRIAL USERS)

Monitoring frequencies for significant industrial users (SIUs) of publicly-owned treatment works (POTWs) will be based on the above described determination model with the following exception: the SIU pollutant percentage of the wasteload allocation (WLA) limit will be used in lieu of effluent flow vs. stream flow. The SIU pollutant percentage of the WLA limit will be calculated as follows:

Equation 3~~1~~, SIU pollutant percentage of WLA limit*

$$\frac{\text{(SIU load/8.34/ADW)}}{\text{WLA}} \times 100 = \text{SIU pollutant percentage of WLA limit}$$

Where:

SIU load = Total average load of an individual pollutant from all industrial users found in approved treatment agreements** (in lbs/day)

ADW = Average Dry Weather design flow of the POTW** (in MGD)

WLA = Average limit from the WLA (in mg/L)

*This equation conservatively assumes 100% pass-through of non-compatible pollutants. The equation may be modified to account for removal within the POTW if a removal percentage is provided by the POTW.

**When available, monitoring data may be used in lieu of treatment agreement limits and ADW design flow.

~~The permit writer will compare the loadings from all of the SIUs to the calculated wasteload allocation (WLA) limits to determine if a reasonable potential exists for any pollutant to pass through the POTW in excess of the WLA limit. This will be done by determining the industrial loadings to the POTW and using the Average Dry Weather (ADW) design flow of the POTW to calculate the concentration of each pollutant at the headworks of the POTW. Conservatively assuming 100% pass-through of non-compatible pollutants, the concentration of a pollutant at the headworks of the POTW can be used to calculate the percent of the WLA limit {(Concentration at headworks/WLA)*100 = Percent WLA limit}.~~ The percentage found will be used to determine the category in Table C of Appendix B in place of effluent flow vs. stream flow. Each category has a corresponding number 1 to 4. This number will be used in the third row of the monitoring frequency flow chart in Appendix C.

POLLUTANTS NOT LISTED IN APPENDIX A

The pollutants not already placed into groups will be evaluated on a case-by-case basis to determine the toxicity of the pollutant to aquatic life found in warm, fresh water. The EPA ECOTOX website will be used to gather information about pollutant toxicity. This data can be found at www.epa.gov/ecotox/ using the aquatic toxicity search feature. The pollutant group will be determined based on the magnitude of the No Observed Effect Concentration (NOEC) for the pollutant (in ug/L). If a NOEC value is not available, then the pollutant group will be determined using half of the LC50 value (ug/L). The LC50 value represents the concentration that is lethal for fifty percent of the test group.

Table 2. Pollutant Group based on pollutant toxicity.

Pollutant Group	½ the LC50 or NOEC[4] µg/L
1	≥1000
2	200 – 999
3	50 – 199
4	11 - 49
5	≤10

[4]~~In cases where both the LC50 and NOEC are available, the NOEC will be used to determine the pollutant group.~~

PHYSIOCHEMICAL POLLUTANTS AND NON-POLLUTANT PARAMETERS

In cases where the monitoring of physiochemical parameters, such as pH, dissolved oxygen, temperature or flow, is to be included in the NPDES permit, the permit writer will require monitoring at a frequency that is at least as frequent as the most frequently monitored pollutant, but no less than once per month. Monitoring for these parameters may be more frequent depending on any other extraneous factors that would require strict control.

Appendix A – Pollutant Groups

Group 1
Ammonia
Barium
BETX
BOD/CBOD
Bromoform
Chloride
Chlorobenzene
Chloroform
1,1-Dichloroethylene
1,2-trans-Dicholoroethylene
Ethylbenzene
Fluoride
Iron
Hexachlorocyclopentadiene
MTBE
Nitrate as N
Nitrate + Nitrite as N
Nitrite as N
Oil & Grease~~*~~
Organic N
Phenols
Sulfate
Toluene
Total Nitrogen
Total Phosphorus
Total Suspended Solids~~*~~ ~~Total Dissolved Solids~~
1,1,1-Trichloroethane
Trichloroethylene (TCE)
Xylenes, Total

Group 2
Aluminum
Antimony
Arsenic
Benzene ~~Chloride~~
Dalapon
o-Dichlorobenzene
1,2-Dichloroethane
Di(2-ethylhexyl)adipate
Glyphosphate
Nickel
Oxamyl (Vydate)
Picloram
Zinc

Group 3
Chlorodibromomethane
para-Dichlorobenzene
Dichlorobromomethane
cis-1,2-Dicholoroethylene ~~1,2-trans-Dicholoroethylene~~
1,2-Dichloropropane
2,4-D
Endothall
Lead

Group 3 (Cont.)
Methoxychlor ~~Nickel~~ ~~Phenols~~
Styrene ~~Toluene~~
1,2,4-Trichlorobenzene ~~1,1,1, Trichloroethane~~
Trihalomethanes (total) ~~Trichloroethylene (TCE)~~ ~~Zinc~~

Group 4
Carbofuran
Carbon Tetrachloride
Copper
Chromium
Cyanide
Diquat
bis~~Di~~(2-ethylhexyl)phthalate
Polynuclear Aromatic Hydrocarbons (PAHs)
Selenium
Tetrachloroethylene
Total Residual Chlorine

Group 5
Alachor
Aldrin ~~Antimony~~
Asbestos
Atrazine
Benzo(a)Pyrene
Beryllium
Cadmium
Chlordane
Chloropyrifos ~~Copper~~ ~~Cyanide~~
4,4-DDT
Dibromochloropropane
3,3-Dichlorobenzidine
Dichloromethane
Dieldrin
Dinoseb
2,3,7,8-TCDD (Dioxin)
4,4-DDT
Endosulfan
Endrin
Ethylene dibromide
Heptachlor
Heptachlor epoxide
Hexachlorobenzene ~~Lead~~
gamma-BHC (Lindane)
Mercury
Parathion
Pentachlorophenol (PCP)
Polychlorinated Biphenyls (PCBs)
Silver ~~Polynuclear Aromatic Hydrocarbons (PAHs)~~
2,4,5-TP (Silvex) ~~Selenium~~
Simazine
Thallium
Toxaphene
1,1,2-Trichloroethane

~~*Pollutants that do not have a WQS~~

Appendix B – Potential, Effluent Flow vs. Stream Flow, and Percentage of WLA Limit Categories

Table A. Potential.

Potential	Category
< 5 %	1
6 – 10 %	2
11 – 20 %	3
21 – 50 %	4
> 50 %	5

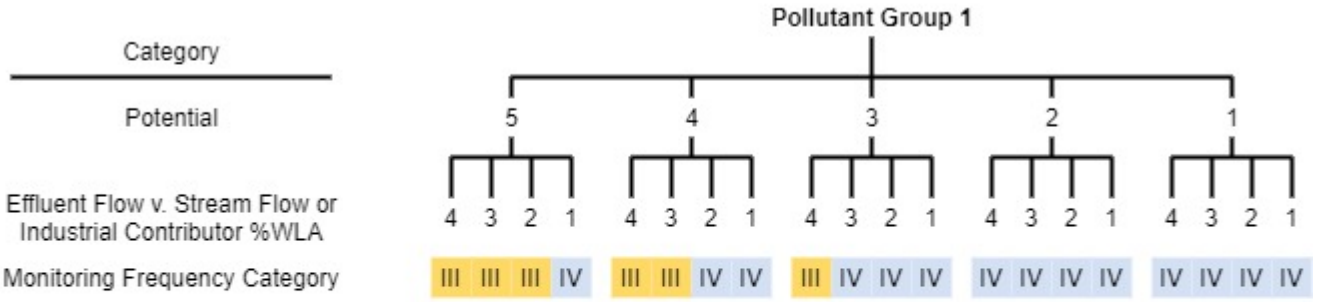
Table B. Effluent Flow vs. Stream Flow.

Effluent Flow vs. 1Q10 Stream Flow	Category
<10% of 1Q10	1
10-25% of 1Q10	2
25-50% of 1Q10	3
>50% of 1Q10	4

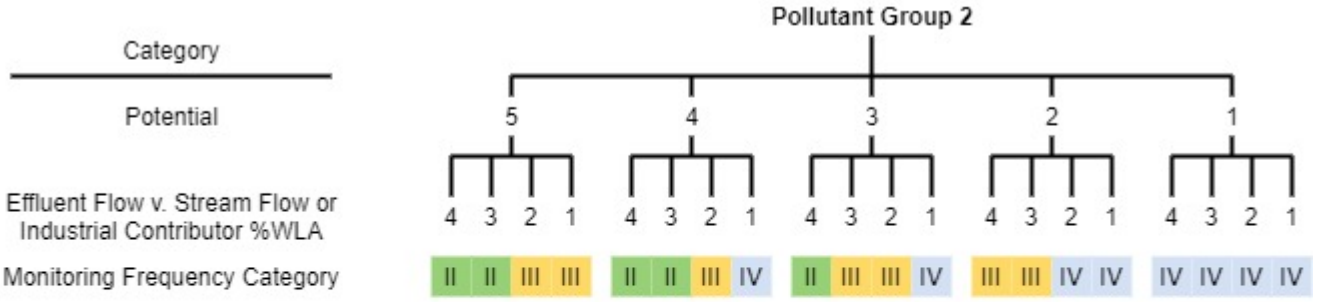
Table C. SIU Pollutant Percentage of WLA Limit.

% of WLA limit	Category
<10% of WLA limit	1
10-25% of WLA limit	2
25-50% of WLA limit	3
>50% of WLA limit	4

Appendix C - Monitoring Frequency Flow Charts



Monitoring Frequency Category	Monitoring Frequency
I	Greater than 2/week
II	2/week - 1/week
III	1/2 weeks - 1/month
IV	1/3 months - 1/year



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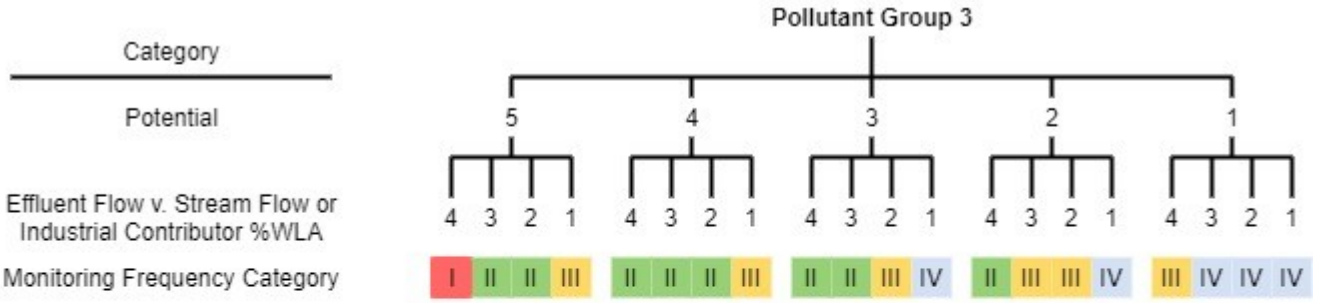

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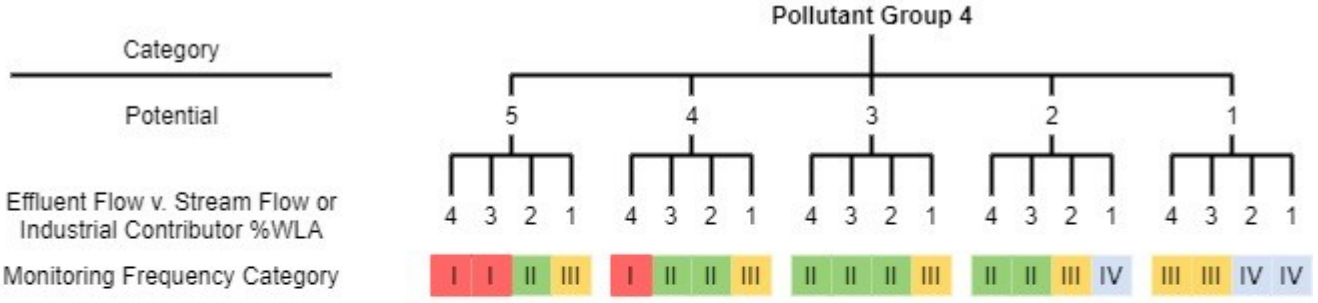

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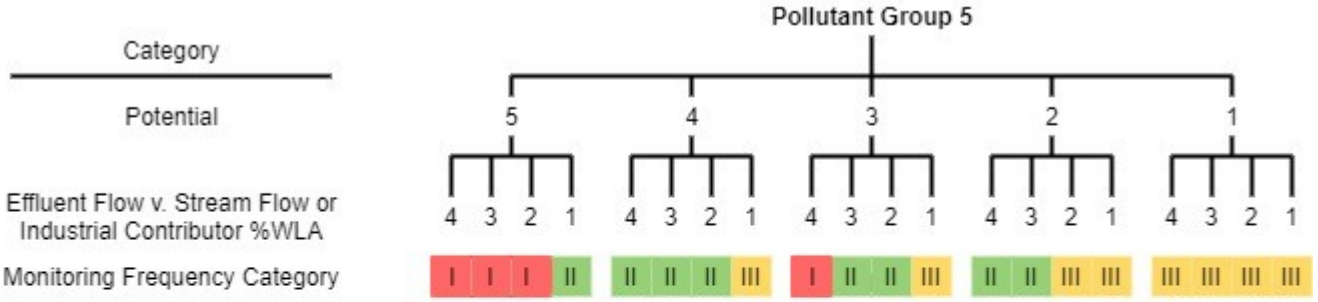

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