

SUPPORTING DOCUMENT FOR PERMIT MONITORING
FREQUENCY DETERMINATION

Prepared by:

NPDES Section
Water Quality Bureau
Environmental Services Division
Iowa Department of Natural Resources

August 2008

TABLE OF CONTENTS

Introduction

Monitoring Frequency Determination for Direct Dischargers

- A. Pollutant Groups
- B. Potential
- C. Effluent Flow vs. Stream Flow
- D. Monitoring Frequency Conclusion

Monitoring Frequency Determination for Industrial Contributors

Pollutants Not Listed

Physio-Chemical Pollutants and Non-Pollutant Parameters

Appendix A: Pollutant Categories

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

Appendix C: Monitoring Frequency Flow Charts

INTRODUCTION

This support 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. The frequency of monitoring is determined using the tables in IAC 567 Chapter 63. In addition, IAC 567 – 63.3(2) requires “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, complexity of the treatment process, 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.

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(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 Table I, Criteria for Chemical Constituents, 567 IAC 61, Water Quality Standards, effective June 11, 2008. Pollutant groups were based on the numeric criteria for the Warm Water Type I (B(WW-1)) use designation. In the absence of a B(WW-1) use designation, the numeric criteria for 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 criteria in micrograms per liter.

Table 1. Pollutant Group based on 567 IAC 61.

Pollutant Group	Water Quality Standard in $\mu\text{g/L}$
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, 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 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. The following equation will be used to determine this frequency:

Equation 1. Potential.

$$\frac{D}{N} \cdot 100 = F$$

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

D = number of data points that are equal to or above 0.50 times the proposed limit from the WLA^{1,2} (mass or concentration)

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

¹To 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.

²For data that has been reported as “no detection”, the detection level will be used.

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.

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 stream flow will be compared on a percentage basis. 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.

$$\frac{\text{Average Effluent Flow}^3}{1\text{Q10 Flow}} \cdot 100 = \% \text{ of Effluent Flow to Stream Flow}$$

³The 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.

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 POTWs will be based on the above described determination model with the exception of effluent flow vs. stream 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. 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.

Table 2. Pollutant Group based on pollutant toxicity.

Pollutant Group	$\frac{1}{2}$ the LC50 or NOEC ⁴ $\mu\text{g/L}$
1	≥ 1000
2	200 – 999
3	50 – 199
4	11 - 49
5	≤ 10

⁴In 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, 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

Barium
Bromoform
Chlorobenzene
Chloroform
1,1-Dichloroethylene
Ethylbenzene
Fluoride
Iron
Hexachlorocyclopentadiene
Nitrate as N
Nitrate + Nitrite as N
Nitrite as N
Oil & Grease*
Total Nitrogen
Total Dissolved Solids
Total Suspended Solids*
Xylenes, Total

Group 2

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

Group 3

Chlorodibromomethane
para-Dichlorobenzene
Dichlorobromomethane
cis-1,2-Dichloroethylene
1,2-trans-Dichloroethylene
1,2-Dichloropropane
2,4-D
Endothall
Methoxychlor
Nickel
Phenols
Styrene
Toluene
1,2,4-Trichlorobenzene
1,1,1,-Trichloroethane
Trichloroethylene (TCE)
Trihalomethanes (total)
Zinc

Group 4

Carbofuran
Carbon Tetrachloride
Chromium
Diquat
Di(2-ethylhexyl)phthalate
Tetrachloroethylene
Total Residual Chlorine
Vinyl Chloride

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)
Endosulfan
Endrin
Ethylene dibromide
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Lead
gamma-BHC (Lindane)
Mercury
Parathion
Pentachlorophenol (PCP)
Polychlorinated Biphenyls (PCBs)
Polynuclear Aromatic Hydrocarbons (PAHs)
Selenium
Silver
2,4,5-TP (Silvex)
Simazine
Thallium
Toxaphene
1,1,2-Trichloroethane

*Pollutants that do not have a QWS

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.

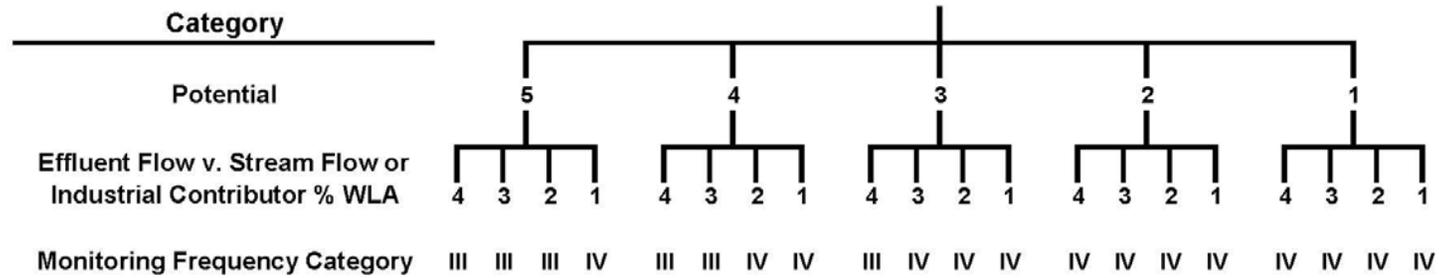
Effluent Flow vs. 1Q10 Stream Flow	Category
<10% of 1Q10	1
10-25% of 1Q10	2
25-50% of 1Q10	3
>50% of 1Q10	4

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

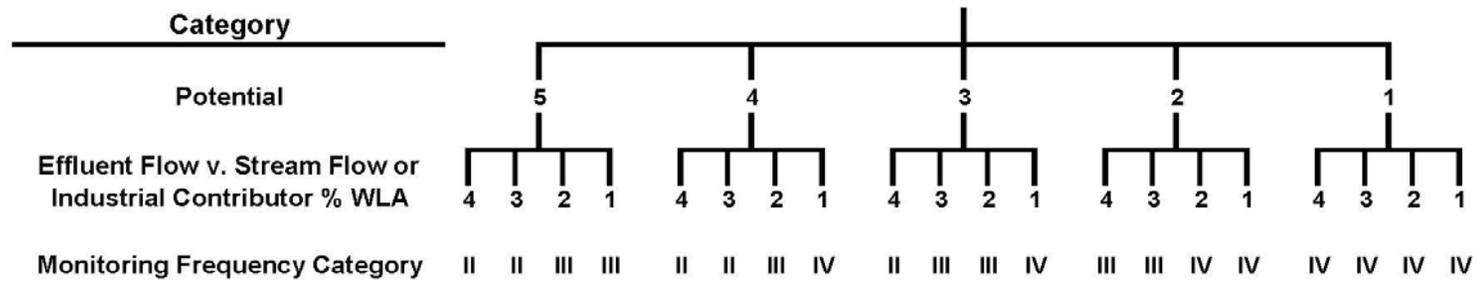
Pollutant Group 1



Monitoring Frequency	Monitoring Frequency Category
Greater than Biweekly	I
Biweekly - Weekly	II
Bimonthly - Monthly	III
Quarterly or Biannually	IV

Appendix C - Monitoring Frequency Flow Charts

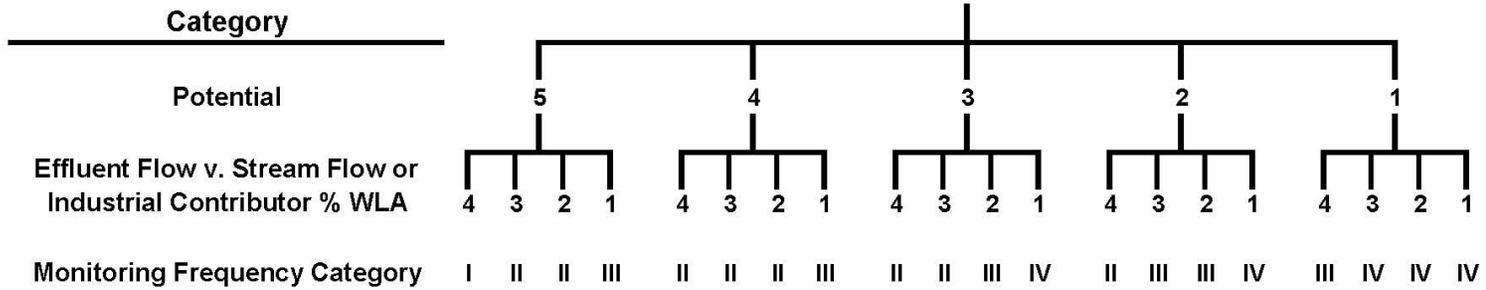
Pollutant Group 2



Monitoring Frequency	Monitoring Frequency Category
Greater than Biweekly	I
Biweekly - Weekly	II
Bimonthly - Monthly	III
Quarterly or Biannually	IV

Appendix C - Monitoring Frequency Flow Charts

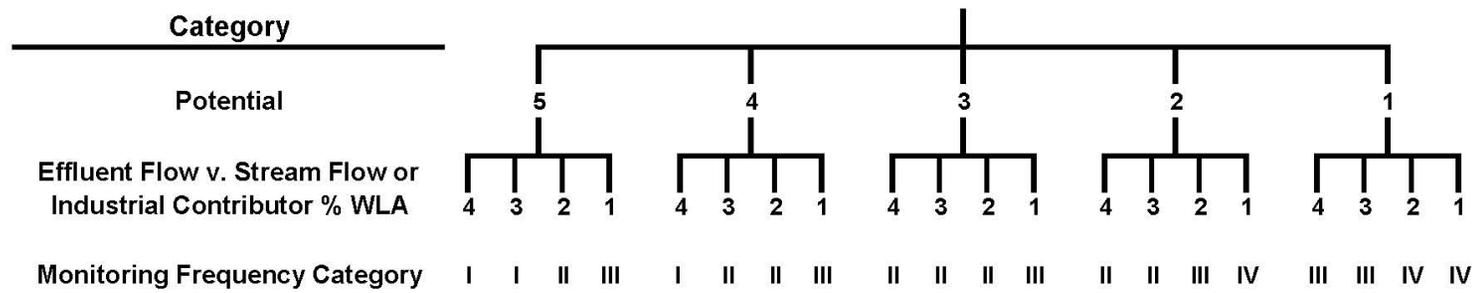
Pollutant Group 3



Monitoring Frequency	Monitoring Frequency Category
Greater than Biweekly	I
Biweekly - Weekly	II
Bimonthly - Monthly	III
Quarterly or Biannually	IV

Appendix C - Monitoring Frequency Flow Charts

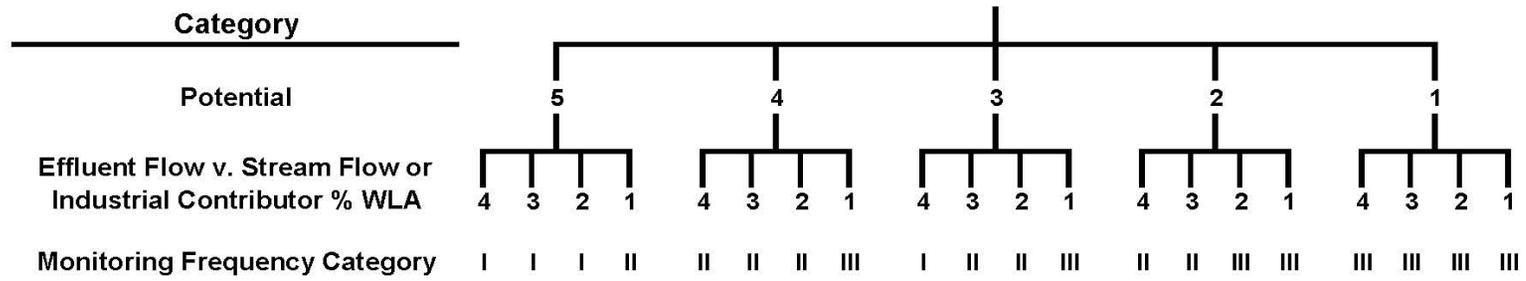
Pollutant Group 4



Monitoring Frequency	Monitoring Frequency Category
Greater than Biweekly	I
Biweekly - Weekly	II
Bimonthly - Monthly	III
Quarterly or Biannually	IV

Appendix C - Monitoring Frequency Flow Charts

Pollutant Group 5



Monitoring Frequency	Monitoring Frequency Category
Greater than Biweekly	I
Biweekly - Weekly	II
Bimonthly - Monthly	III
Quarterly or Biannually	IV