Colorado Water Quality Control Division

WATER QUALITY PERMITS

Policies & Procedures

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Approved By:

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Baseline Monitoring Frequency, Sample Type, and Reduced Monitoring Frequency Policy for Industrial and Domestic Wastewater Treatment Facilities

Purpose:

1) To provide guidance to Division personnel on the implementation of the "Monitoring, Recording and Reporting" section of Regulation 61.8(4), *Colorado Discharge Permit System Regulations*, which states:

   "Any discharge authorized by a discharge permit may be subject to such monitoring, record keeping, and reporting requirements as may be reasonably required in writing by the Division, including the requirements concerning the installation, use and maintenance of monitoring equipment or methods in accordance with standard procedures and methods established by the Division."

2) To provide guidance to Division personnel on the review and evaluation of reduced monitoring frequency requests. This policy document should not be interpreted to eliminate or reduce any monitoring requirements under the Biosolids, Reuse, Pretreatment, or Stormwater Programs.

Background:

A previous policy[1] contained sampling frequencies and sample types for domestic facilities, in order to consistently apply monitoring requirements to facilities of similar size. This policy did not consider monitoring for industrial facilities, and did not contain general monitoring requirements for metals and other parameters such as organics.

Also, this policy did not provide guidance for the review and evaluation of reduced monitoring frequency requests. Currently, Division practice has been to grant reductions in monitoring frequency when requested by the permittee, and when the average of the 30-day averages reported by the facility for any given parameter, plus two standard deviations (or minus two standard deviations for parameters such as dissolved oxygen), is less than the permit limitation. In that case, monitoring would typically be reduced by one facility classification size.

The U.S. EPA issued an interim guidance document[2] for performance-based reductions of monitoring frequencies, on April 19, 1996. This document proposed various situations where monitoring could be reduced based on solid performance by wastewater treatment facilities. As concepts from this document are included in this policy, the EPA interim guidance document should be referred to for more specific information.

References:

1) Colorado Water Quality Control Division, Policy Number WQP-13, Sample Frequency and Sample Type, Domestic Wastewater Facilities. August 21, 1989.

2) United State Environmental Protection Agency. Interim Guidance for Performance-Based Reduction of NPDES Permit Monitoring Frequencies. April 19, 1996.

Policy/Procedure:

Sample Frequency and Sample Type

The baseline monitoring frequency and sample types for typical parameters are outlined in Appendices A-D. Appendix A covers surface water discharges from mechanical domestic wastewater treatment facilities. Appendix B covers surface water discharges from domestic lagoon facilities. All industrial surface water discharges are outlined in Appendix C. Appendix D contains requirements for all groundwater discharges.

Where monitoring is required for other parameters (such as organics) the permit writer shall determine the appropriate monitoring frequency on a case-by-case basis. The permit writer should take into account the type of activity producing the discharge, the size of the discharge, and the variability of the discharge.

The sampling frequency baseline for domestic surface water discharges will be established based on the maximum 30-day average flow, which is expected to occur during the permit period. The maximum 30-day average flow will be assumed to be the design capacity of the facility, unless otherwise documented.

For industrial facilities, the sampling frequency baseline is based upon the classification of the facility as a major or minor facility, as well as flow rates. The flow rates for industrial facilities will normally be based upon actual production rates, with a default rate equal to the design capacity of the facility.

Intermittent type discharges, such as construction dewatering or batch type discharges are not subject to this policy. Monitoring frequencies for these types of discharges will be determined as assigned in either the general permit, or by the permit writer in the case of an individual permit. Also, reduced monitoring frequencies will typically not be allowed under the short term type discharges of an intermittent discharge.

Exceptions to the policy will not generally be made. Where an entity can show that laboratory facilities are not available to run a required test, where results cannot be obtained at the required frequency due to physical constraints, or where the entity can show that extreme economic hardship would result from compliance with this policy, the Division may substitute an alternative requirement.

Monitoring results for all facilities will normally be required to be submitted on a monthly basis.

Reductions in Monitoring Frequency

The Division shall review and evaluate all requests for reduced monitoring frequencies based upon the requirements provided below. A facility must meet **all** of these requirements to be eligible for performance-based reductions in monitoring. At the time of permit renewal, the facility will be re-evaluated against these criteria to determine if monitoring reductions will continue. If during the permit term, a facility no longer meets all of these requirements, the permit may be reopened to increase the monitoring frequency.

Ambient Water Quality Monitoring – Ambient water quality data collected by permitted entities that meets appropriate QA/QC criteria provides valuable information to support permit development, the assessment of water bodies to determine whether water quality standards are being attained, and development of TMDLs. Where a permitted entity elects to perform in-stream ambient water quality monitoring, in recognition of the value of these monitoring efforts, the Division will generally give favorable consideration to reductions in permit monitoring requirements on a case by case basis. Such determination will be made upon review of an existing or proposed ambient water quality monitoring program, entry of the data in a database (STORET or its replacement) that is accessible by the public, qualitative and/or spacial relation to other ambient water quality monitoring programs and monitoring stations (USGS, WQCD), and the compliance record of the requesting entity. Where a group of entities is proposing a joint program, and reduction in monitoring cannot be granted to one entity due to compliance issues or the need to ensure that monitoring is representative, the "credit" for that entity can be granted to another entity in the group, as appropriate.

1) Requirements for Performance-Based Reductions in Monitoring

a) Facility Enforcement History

i) Criminal Actions – Any facility which has had an individual criminally convicted under any Federal or State environmental statute, of falsifying monitoring data and/or committing violations, *will not receive any reductions in monitoring* for a period of five years. However, if the Division determines that there has been a wholesale change in ownership and/or management, the entity may again become eligible for consideration under this policy sooner than this five-year period.

ii) Civil Judicial Actions – Facilities may be eligible for consideration of reduction of monitoring frequency 2 years after completion of injunctive relief and payment of penalty, assuming that all other requirements of this policy have been met.

iii) Compliance / Consent Orders – A facility that is issued a compliance / consent order, will not be eligible for reduction in monitoring considerations, for the parameter that is addressed under the order, for a period of two years after completion of the requirements set out under the Compliance / Consent Order. A facility may be eligible for reductions in monitoring frequency for other parameters limited in the permit, if the permittee is in compliance with the interim milestones and schedules contained in the permit and in the compliance / consent order.

b) Permit Compliance

i) Effluent Violations – A facility must not have had any effluent violations for the parameter being considered, during the last 2 years.

ii) Other Permit Requirements – A facility must be in compliance with all other permit requirements including monitoring requirements, DMR submittals, compliance schedule interim and final dates, and PQL requirements.

c) Facility Information

i) New Facilities – New facilities will not be eligible for consideration of reduced monitoring frequencies for one full permit term (5 years).

ii) Upgraded Facilities – Any facility which has undergone a major upgrade that changes the operational functions of the facility, will be considered a new facility.

iii) Operations – Performance levels shall be maintained at the level that was used as the basis for granting monitoring reductions.

d) Exceptions to Reduced Monitoring

The Division may elect to maintain baseline monitoring levels or to increase monitoring above the baseline levels in individual situations. This decision may be made for a particular parameter, or for all parameters. Reduced monitoring may not be granted, on a case-by-case basis, in instances such as: discharge to a waterbody containing Threatened or Endangered species, or a waterbody designated as critical; discharge to a segment designated as a drinking water source, with one or more downstream drinking water intakes; discharge to segments on the Division's 303(d) or monitoring and evaluation list; or other reason.

When a parameter is limited by an annual allocation (i.e. control regulation that limits an annual loading such as phosphorus or total dissolved solids), reduced monitoring frequencies will be granted only to the extent that necessary data for such parameter would continue to be generated.

2) Reductions in Monitoring Based on Performance

a) Data - The most recent two years of monthly average effluent data, representative of the current operating conditions, *plus (or minus) two standard deviations*, will be used to calculate the long-term characterization (LTC) discharge concentration. If a facility has been monitoring at a quarterly frequency due to previous reductions in monitoring being granted, the average of the most recent three years of monitoring data *plus two standard deviations*, will be used to determine the LTC. For fecal coliform and e. coli, the *geometric mean plus two standard deviations* shall be used. Reductions in monitoring are shown in Sections C1 and C3 below.

For pH, the average of the maximum values plus two standard deviations shall be used for comparison against the upper limitation. The average of the minimum values minus two standard deviations shall be compared against the lower limitation. Reductions will be granted as shown in Sections 2.C.2 and 2.C.4 below.

In the case of new groundwater discharges which use monitoring wells as the point of compliance, there may be a significant travel time from the discharge point to the monitoring wells. If the Division has reason to believe that the period of record from a monitoring well does not represent the influence from the discharge, the Division may require further monitoring at the baseline level for the purposes of obtaining two years of data from the date that such influence was first noted.

b) Practical Quantitation Limits (PQL) – For the purpose of calculating the LTC, for results that are less than detect, a value of one half the PQL should be included in the calculation. For example, if an individual result is <5, 2.5 will be used in the calculation. If the permit limitation is less than the PQL, a reduction in monitoring will generally not be granted. Current or future updates of Division PQL guidance documents shall be used to determine the appropriate PQL.

c) Determination of Reduction in Monitoring – The LTC, as defined in the preceding paragraphs, will be compared to the permit limitation. *In no instance shall the monitoring frequency for a surface water discharge be less than quarterly, or for a groundwater discharge be less than semi-annually.*

1) Surface Water Discharges (All Parameters Except pH)

i) If the LTC is 75% to 100% of the permit limitation, monitoring requirements may be reduced by one monitoring level of the baseline monitoring frequency.

ii) If the LTC is 50% to 74.9% of the permit limitation, monitoring requirements may be reduced by two monitoring levels of the baseline monitoring frequency.

iii) If the LTC is less than 50% of the permit limitation, monitoring requirements may be reduced by three monitoring levels of the baseline monitoring frequency.

2) Surface Water Discharges – pH

Minimum LTC pH Values (Average – 2 Standard Deviations)	Maximum LTC pH Values (Average + 2 Standard Deviations)			
	> 9.0	8.5 – 9.0	8.0 – 8.4	7.5 – 7.9 (-)
< 6.5	No Reduction	No Reduction	No Reduction	No Reduction
6.5 – 7.0	No Reduction	1 Step Reduction	1 Step Reduction	1 Step Reduction
7.1 – 7.5	No Reduction	1 Step Reduction	2 Step Reduction	2 Step Reduction
7.6 – 8.0 (+)	No Reduction	1 Step Reduction	2 Step Reduction	3 Step Reduction

3) Groundwater Discharges (All Parameters Except pH)

i) If the LTC is more than 75% of the permit limitation, no reduction in monitoring will be granted.

ii) If the LTC is 25% to 74.9% of the permit limitation, monitoring requirements may be reduced by one monitoring level of the baseline monitoring frequency.

iii) If the LTC is less than 25% of the permit limitation, monitoring requirements may be reduced by two monitoring levels of the baseline monitoring frequency.

4) Groundwater Discharges - pH

Minimum LTC pH Values (Average – 2 Standard Deviations)	Maximum LTC pH Values (Average + 2 Standard Deviations)		
	> 8.5	8.0 – 8.5	7.5 – 7.9 (-)
< 6.5	No Reduction	No Reduction	No Reduction
6.5 – 7.0	No Reduction	1 Step Reduction	1 Step Reduction
7.1 – 7.5 (+)	No Reduction	1 Step Reduction	2 Step Reduction

d) Monitoring Level Reductions for All Parameters – Monitoring levels may be reduced as follows:

Baseline Monitoring Level	**1 Level Reduction**	**2 Level Reduction**	**3 Level Reduction**
----------SURFACE WATER DISCHARGES----------			
5x / day	3x / day	Daily	5 days / week
3x / day	Daily	5 days / week	3 days / week
Daily	5 days / week	3 days / week	2 days / week
5 days / week	3 days / week	2 days / week	Weekly
3 days / week	2 days / week	Weekly	2 days / Month
2 days / week	Weekly	2 days / Month	Monthly
Weekly	2 days / Month	Monthly	Quarterly
2 days / Month	Monthly	Quarterly	Quarterly
Monthly	Quarterly	Quarterly	Quarterly
----------GROUNDWATER DISCHARGES----------			
Monthly	Quarterly	Semi-Annually	NA

APPENDIX A

Baseline Monitoring Frequencies for **Domestic Mechanical** Wastewater Facilities Discharging to Surface Waters

Parameter	Frequency of Measurement Based on the Expected Flow (mgd) During the Permit Period						
	0 – 0.25	Over 0.25 – 1.0	Over 1.0 – 2.5	Over 2.5 – 5.0	Over 5.0 – 10.0	Over 10.0	Type of Sample
Influent and Effluent BOD_5	Monthly	Weekly	2x / week	3x / week	5x / week	Daily	Composite **1/**
Influent and Effluent TSS	Monthly	Weekly	2x / week	3x / week	5x / week	Daily	Composite **1/**
Influent and Effluent Flow **2/**	Daily	Daily	Daily	Daily	Daily	Daily	Continuous **3/**
Ammonia, Nitrite, Nitrate or other N	Monthly	Weekly	2x / week	3x / week	5x / week	Daily	Composite **1/**
E. Coli / Fecal Coliform	Monthly	Weekly	2x / week	3x / week	5x / week	Daily	Grab
pH, DO	Weekly	Daily	Daily	Daily	Daily	Daily	Grab or Continuous
Oil and Grease	Weekly	Daily	Daily	Daily	Daily	Daily	Visual **4/**
Total Residual Chlorine	Weekly	3x / week	5x / week	Daily	3x / day	5x / day	Grab or Continuous
Metals, Cyanide, Sulfide, Boron	Monthly	Monthly	Monthly	2x / Month	Weekly	Weekly	Composite **1/**
Phosphorus	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Composite **1/**
TDS (narrative standard based)	Monthly	Monthly	Monthly	2x / Month	Weekly	Weekly	Composite **1/**
TDS (Control Reg based)	Quarterly	Quarterly	Monthly	Monthly	Weekly	Weekly	Composite **1/**
WET	WET testing frequency and reduced monitoring as described in the WET Guidance Document						
Organics **5/**, or Temperature **6/**	Case by Case Basis						Composite **1/**

1/ An effluent grab sample may be allowed where the mechanical facility is followed by a non-aerated pond with a detention time of two days or more. For facilities discharging < 1 mgd, a grab sample may be substituted.

2/ If the mechanical plant is followed by a pond, both influent and effluent flow monitoring are required.

3/ Flow metering devices shall be installed to give representative values of influent and effluent flow with a totalized or recorded flow on the influent and effluent. Continuous monitoring may be accomplished by the use of a potable water meter for small facilities (design flow less than 10,000 gpd) if the potable water is only used for activities which generate wastewater.

2/ If a visible sheen is noted, a grab sample shall be collected, analyzed and reported. Also, where the Division has data (from required sampling in the previous permit, sampling required by the application, or information showing a large expected contribution from commercial/industrial customers), which indicates that the 10 mg/l standard may be violated, a grab sample, at a reasonable frequency, may be required.

5/ Organics may be required on a batch discharge basis, or any other frequency, depending on type of industrial contributors and/or type of discharge.

6/ Temperature may be required on an equally spaced 3 times per day frequency, on a 15-minute interval, or other appropriate frequency. Data may be recorded on a data logger, and downloaded as needed. A backup data logger is recommended.

APPENDIX B

Baseline Monitoring Frequencies for **Domestic Lagoon** Wastewater Facilities Discharging to Surface Water

Parameter	Frequency of Measurement Based on the Expected Flow (mgd) During the Permit Period				
	0 – 0.5	Over 0.5 – 1.0	Over 1.0 – 2.0	Over 2.0	Type of Sample
Influent BOD_5	Monthly	Weekly	2 days / week	3 days / week	Composite
Effluent BOD_5	Monthly	Weekly	2x / week	3 days / week	Grab
Effluent TSS	Monthly	Weekly	2x / week	3 days / week	Grab
Influent Flow **1/**	3 days / week	Daily	Daily	Daily	Continuous **1/**
Effluent Flow **1/**	3 days / week	Daily	Daily	Daily	Continuous / Instantaneous **1/**
Ammonia, Nitrite, Nitrate or other N	Monthly	Weekly	2x / week	3 days / week	Grab
Fecal Coliform / E. Coli	Monthly	Weekly	2x / week	3 days / week	Grab
pH, DO	Weekly	5 days / week	Daily	Daily	Grab or Continuous
Oil and Grease	Weekly	5 days / week	Daily	Daily	Visual **2/**
Total Residual Chlorine	Weekly	5 days / week	Daily	2x / daily	Grab or Continuous
Metals, Cyanide, Sulfide, Boron	Monthly	Monthly	Monthly	2 days / Month	Grab
Phosphorus (Control Reg based)	Monthly	Monthly	Monthly	Monthly	Grab
TDS (narrative standard based)	Monthly	Monthly	Monthly	2 days / Month	Grab
TDS (Control Reg based)	Quarterly	Quarterly	Monthly	Monthly	Grab
WET	WET testing frequency and reduced monitoring as described in the WET Guidance Document				
Organics **3/** Temperature **4/**	Case by Case Basis				Grab

1/ Flow metering devices shall be installed to give representative values of influent and effluent flow with a totalized or recorded flow on the influent, as a minimum requirement. Continuous monitoring may be accomplished by the use of a potable water meter for small facilities (design flow less than 10,000 gpd), if the potable water is only used for activities which generate wastewater.

2/ If a visible sheen is noted, a grab sample shall be collected, analyzed and reported. Also, where the Division has data (from required sampling in the previous permit, sampling required by the application, or information showing a large expected contribution from commercial/industrial customers), which indicates that the 10 mg/l standard may be violated, a grab sample, at a reasonable frequency, may be required.

3/ Organics may be required on a batch discharge basis, or any other frequency, depending on type of industrial contributors and/or type of discharge.

4/ Temperature may be required on an equally spaced 3 times per day frequency, on a 15 minute interval, or other appropriate frequency. Data may be recorded on a data logger, and downloaded as needed. A backup data logger is recommended.

APPENDIX C

Baseline Monitoring Frequencies for **Industrial** Wastewater Facilities
Discharging to Surface Water

Note: Sample types for lagoon facilities will be grab samples. Oil and grease may be conducted by a visual sample, where if a visible sheen is noted, a grab sample shall be collected, analyzed and reported.

For mechanical facilities, composite samples will be required for BOD_5, TSS, ammonia, metals and cyanide, and organics. Grab samples will be required for pH, total residual chlorine, fecal coliform and e. coli. Oil and grease may be sampled as described above.

Parameter	Mining 1/		Manufacturing and other Industry			
			Minor		Major	
	Minor	Major	ELG exists**	No ELG **	ELG exists**	No ELG **
Flow	Continuous **2/**	Continuous **2/**	Continuous	Continuous	Continuous	Continuous
pH, DO, Oil and Grease Total Residual Chlorine	2 days / month **3/**	Weekly **3/**	Daily	3 days / week	Daily	5 days / week
TSS, E. Coli, Fecal Coliform	2 days / month	Weekly	3 days / week	Weekly	5 days / week	3 days / week
Metals and cyanide **4/** Sulfide and Boron	2 days / month	Weekly	Weekly	Monthly	2 days / week	2 days / month
Ammonia Nitrate, Nitrite and TIN, BOD_5	2 days / month	Weekly	3 days / week	Monthly	5 days / week	Weekly
Phosphorus (Control Reg based)	Monthly	Monthly		Monthly		Monthly
TDS (narrative standard based)	2 days / month	Weekly		Monthly		2 days / month
TDS (Control Reg based)	Quarterly	Quarterly		Quarterly		Quarterly
WET	WET testing frequency and reduced monitoring as described in the WET Guidance Document					
Organics **5/** Temperature **6/**	Case by Case Basis					

** Use the appropriate column(s) for determining the monitoring frequency. Note that it does not matter if an ELG is applied (a more stringent water quality standard may be applied in lieu of an ELG) but rather if an ELG exists for the particular facility.

1/ Mining type discharges include coal mining, metal mining, coalbed methane and oil producing type facilities.

2/ Flow may be measured on an instantaneous basis when power is not available on site. Minor facilities would require monthly flow monitoring and major facilities would require 2 days per month flow monitoring.

3/ For oil producing facilities, the oil and grease monitoring should be increased to at least 5x / week.

4/ If mercury is not expected to be present in the discharge, but mercury monitoring is being required for data collection at low-level analysis, monitoring may be set at a quarterly frequency.

5/ Organics may be required on a batch discharge basis, or any other frequency, depending on type of industry and/or type of discharge.

6/ Temperature may be required on an equally spaced 3 times per day frequency, on a 15-minute interval, or other appropriate frequency. Data may be recorded on a data logger, and downloaded as needed. A backup data logger is recommended.

APPENDIX D

Baseline Monitoring Frequencies for Domestic and Industrial Wastewater Facilities Discharging to **Groundwater**

Influent parameters	Frequency	Type of Sample
Flow **1/**	Daily	Continuous
BOD_5, CBOD, TSS	Monthly	Composite

Compliance Point Parameters	Compliance Point Type				
	End of Pipe			Monitoring Well	
	Frequency	Type of Sample		Frequency **5/**	Type of Sample
		Mechanical Facility	Lagoon Facility		
Flow **1/**	Daily	Continuous	Continuous	NA	NA
BOD_5, CBOD	Monthly	Composite	Grab	Monthly	Grab
Total Coliform	Monthly	Grab	Grab	Monthly	Grab
pH	Monthly	Grab	Grab	Monthly	Grab
Oil and Grease	Monthly	Visual **2/**	Visual **2/**	Monthly **3/**	Visual **3/**
Nitrite, Nitrate, TIN, or other N	Monthly	Composite	Grab	Monthly	Grab
Metals and Cyanide	Monthly	Composite	Grab	Monthly	Grab
Phosphorus (Control Reg based)	Monthly	Composite	Grab	Monthly	Grab
Total Dissolved Solids	Monthly	Grab	Grab	Monthly	Grab
Sulfate, Chloride, Total Organic Carbon	Monthly	Grab	Grab	Monthly	Grab
Specific Conductance, Static Water Level, Temperature	NA	NA	NA	Monthly	Field Test
Organics **4/**	Case by Case Basis	Grab	Grab	Case by Case Basis	Grab
Upgradient Monitoring Well Parameters	NA	NA	NA	Monthly	Grab

1/ Flow metering devices shall be installed to give representative values of influent and effluent flow with a totalized or recorded flow on the influent, as a minimum requirement. Continuous monitoring may be accomplished by the use of a potable water meter for small facilities (design flow less than 10,000 gpd), if the potable water is only used for activities which generate wastewater.

2/ If a visible sheen is noted, a grab sample shall be collected, analyzed and reported.

3/ For monitoring well compliance points, oil and grease monitoring shall be conducted in an infiltration lagoon or other point of discharge to groundwater. If a visible sheen is noted, a grab sample shall be collected, analyzed and reported.

4/ Organics may be required on a batch discharge basis, or any other frequency, depending on type of industrial contributors and/or type of discharge.

5/ Monitoring well frequencies may be monthly or quarterly depending on site-specific characteristics of the facility. The Division will determine the appropriate monitoring frequency.