Quality Assurance Project Plan

NPDES Wastewater Monitoring

**Permittee**

**Month Year**

**Quality Assurance Project Plan**

**Version X.X**

This Quality Assurance Project Plan was prepared by:

Contact:

**Approval Sheet**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Prepared By: |  |  | Date |  |
|  | XXX, Facility Responsible Official  |  |  |
| Approved By: |  |  | Date |  |
|  | XXX, Facility Quality Assurance Officer |  |  |

Disclaimer

This template is provided as a tool to help permittees develop their own Quality Assurance Project Plan (QAPP) in order to fulfill the requirements of their NPDES permit. Utilizing this template is not required. However, this QAPP contains all of the elements required by the NPDES permit. Should you choose not to use this template, please verify that your QAPP contains all elements required in the facility’s NPDES permit and that the QAPP is providing the internal guidance the facility needs.

**Table of Contents**

[1. Project Management 4](#_Toc22826436)

[1.1. Distribution List 4](#_Toc22826437)

[1.2. Acronyms 4](#_Toc22826438)

[1.3. Definitions 5](#_Toc22826439)

[1.4. Project/Task Organization 5](#_Toc22826440)

[1.5. Problem Definition/Background 6](#_Toc22826441)

[1.6. Project Task/Description 6](#_Toc22826442)

[1.7. Quality Objectives and Criteria for Measurement of Data 6](#_Toc22826443)

[1.7.1 Precision 7](#_Toc22826444)

[1.7.2 Accuracy/Bias 7](#_Toc22826445)

[1.7.3 Sensitivity 8](#_Toc22826446)

[1.7.4 Significant Figures 8](#_Toc22826447)

[1.7.5 Representativeness 8](#_Toc22826448)

[1.7.6 Comparability 9](#_Toc22826449)

[1.7.7 Completeness 9](#_Toc22826450)

[1.8. Special Training and Certification 9](#_Toc22826451)

[1.9. Records 9](#_Toc22826452)

[1.9.1 Analytical Reports 10](#_Toc22826453)

[1.9.2 Field Documentation 10](#_Toc22826454)

[2. Data Generation and Acquisition 10](#_Toc22826455)

[2.1. Sampling Process Design 10](#_Toc22826456)

[2.2. Sampling Methods 11](#_Toc22826457)

[2.3. Sample Handling and Custody Procedures 12](#_Toc22826458)

[2.4. Analytical Methods 12](#_Toc22826459)

[2.5. Quality Control 13](#_Toc22826460)

[2.5.1 Location: 14](#_Toc22826461)

[2.6. Instrument/Equipment Testing, Inspection, and Maintenance 14](#_Toc22826462)

[2.7. Instrument Calibration and Frequency 14](#_Toc22826463)

[2.8. Inspection/Acceptance of Supplies and Consumables 14](#_Toc22826464)

[2.9. Data Management 14](#_Toc22826465)

[3. Assessment and Oversight 16](#_Toc22826479)

[3.1. Assessment and Response Actions 16](#_Toc22826480)

[3.2. Reports 16](#_Toc22826481)

[4. Data Validation and Usability 17](#_Toc22826482)

[4.1. Data Review, Verification and Validation 17](#_Toc22826483)

[4.2. Reconciliation with User Requirements 18](#_Toc22826484)

[5. Revision History 18](#_Toc22826485)

**List of Tables**

[Table 1. Distribution List 4](#_Toc22308493)

[Table 2. Project/Task Responsibilities 5](#_Toc22308494)

[Table 3. Summary of sampling locations 11](#_Toc22308495)

[Table 4. Summary of sampling parameters 12](#_Toc22308496)

[Table 5. Summary of analytical parameters and methods 12](#_Toc22308497)

[Table 6. Revision History 18](#_Toc22308498)

**List of Figures**

[Figure 1. Sampling Map 11](#_Toc36124955)

# Project Management

## Distribution List

This QAPP must be kept on file by the permittee and must be provided to Oregon DEQ upon request. Those on this distribution list should be notified of all deviations from the procedures of this QAPP, including potential modifications.

Table 1. Distribution List

| Name | Title | Phone | Email |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

## Acronyms

CCV Continuing Calibration Verification

CFR Code of Federal Regulations

COC Chain of Custody

DEQ Oregon Department of Environmental Quality (Oregon DEQ)

DQO Data Quality Objective

EPA Environmental Protection Agency

HUC Hydrologic Unit Code

ICV Initial Calibration Verification

LCS Laboratory Control Sample

LIMS Laboratory Information Management System

LOQ Limit of Quantitation

LPM Laboratory Project Manager

MB Method Blank

MS Matrix Spike

NPDES National Pollutant Discharge Elimination System

PM Project Manager

QA Quality Assurance

QAO Quality Assurance Officer

QC Quality Control

QAPP Quality Assurance Project Plan

QC Quality Control

QMP Quality Management Plan

SOP Standard Operating Procedure

## References

U.S. Environmental Protection Agency, 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process.* (EPA QA/G-4). EPA/240/B-06/001.

US. Environmental Protection Agency, 2007. *Solution to Analytical Chemistry Problems with Clean Water Act Methods*. EPA 821-R-07-002

Oregon Department of Environmental Quality, 2012. *Use of Significant Figures and Rounding Conventions in Water Quality Permitting.* DEQ11-WQ-050 Rev 1.3.

## Definitions

The permittee should include in this section any definitions of terms that have specific meanings in the context of this QAPP. This should especially be done for terms that may have alternative conventional meanings.

**Sampling Event**: A group of samples collected and/or shipped under a single Chain of Custody (COC); by an individual or individual sampling team (usually a single day’s sampling activity).

**Reference Material**: A material or substance that is sufficiently homogenous, stable, and well established to be used for calibration of an instrument or assessment of a method.

**Metadata**: A set of data that describes and gives information about other data (e.g. collection date or sample location)

## Task Organization

In this section the permittee should include duties and responsibilities for the key individuals responsible for water quality monitoring required by the NPDES permit. The roles and duties provided as part of this template can be modified, and may be assigned to additional individuals.

Key duties and responsibilities are listed below:

Facility Responsible Official – FRO

* Responsible for the implementation of permit and certification requirements.

Facility Quality Assurance Officer - FQAO

* Responsible for QA/QC of all self-monitoring required under the permit.
* Responsible for water quality analysis, including sampling and shipping of samples to third-party laboratories
* Responsible for QA/QC of water quality analyses under federal and state certification.

Table 2. Task Responsibilities

| **Name** | **Project Title** | **Responsibility** |
| --- | --- | --- |
|  | Facility Responsible Official |  |
|  | Facility Quality Assurance Officer  |  |
|  |  |  |
|  |  |  |
|  |  |  |

## Background Information

The Clean Water Act requires point source surface water dischargers obtain a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES permit will describe what discharges are allowed to surface water, monitoring and data reporting requirements, and other provisions as deemed necessary to protect receiving waters. Monitoring conducted as part of permit compliance must be conducted in a manner that complies with Federal Regulations (40 CFR Part 136) and the requirements of the NPDES Permit. This QAPP ensures that data collected and analyzed under an NPDES permit are valid and verifiable and can be used to satsisfy the requirements of the permit.

The permittee should add facility specific language here, including operation scenarios at facility, types of permits the facility holds, description of current monitoring at the facility, description of discharge outfall(s), and waterbody(ies) to which the permittee discharges. Permittee may refer to the permit fact sheet for facility specific language in lieu of a description within the QAPP.

## Task Description

This section should describe the things to be sampled. Include influent, effluent, receiving water, solids, etc. List the sample locations, parameters, frequencies, and sample methods. A tabular format may be best if the permittee has many locations and parameters. The permittee may reference their permit in lieu of a detailed description. In that case, please reference the specific permit section.

This should also designate which parameters will be analyzed by the facility and which parameters will be analyzed by third party laboratories. If possible, please list which third party laboratories will be utilized and for which parameter(s).

The laboratory specified by the permittee will perform the standard tests required by this permit. See the DMR and other sampling requirements in the permit for the parameters, sample locations, sample frequency, and sample type for all self-monitoring required by the permit.

Outline sampling location and frequency here as part of the monitoring plan. Additional monitoring outside of permit requirements can also be outlined here.

## Quality Objectives and Criteria for Measurement of Data

To be acceptable for use environmental data must meet established QC control limits. This section defines criteria for measuring or estimating the potential error of monitoring results and how to interpret the QC data as it applies to the reported environmental data.

EPA’s Guidance for the Data Quality Objectives Process (QA/G-4, EPA 2006) defines two sources of error: Sampling Error (Field Variability) and Measurement Error (Measurement Variability), which each contribute to the total error.

Sampling (field) error – This error is influenced by the inherent variability of the pollutant over geographic space and time, the sample collection design, and the number of samples. It is usually impractical to measure the entire space, and limited sampling may miss some features of the natural variation of the measurement. Sampling design error occurs when the sampling design does not capture the complete variability within the environment, to the extent appropriate for making conclusions. Sampling design error can lead to random error (i.e., variability or imprecision) and systematic error (bias) in estimates of pollutant concentrations.

Measurement error – This error is the result of imperfections in the measurement and analysis system. Random and systematic measurement errors are introduced in the measurement process during sample collection, sample handling, sample preparation, sample analysis, data reduction, transmission, and storage.

**Specific QA Objectives are:**

Collect a sufficient number of samples, sample duplicates, and field blanks to evaluate the sampling and measurement error.

Analyze a sufficient number of QC Standards, blanks and duplicate samples in the Laboratory environment to effectively evaluate results against numerical QA goals established for precision and accuracy.

Implement sampling techniques in such a manner that the analytical results are representative of the media and conditions being sampled.

Evaluate Data quality through the use of these Data Quality Indicators:

* Precision
* Accuracy/Bias
* Sensitivity
* Representativeness
* Comparability
* Completeness

Table 5 in section 2.4 lists precision and accuracy control limits for each parameter of concern.

### Precision

Precision is estimated by measuring the variability of duplicate measurements. The best estimate of precision is the comparison of duplicate samples, both field duplicates and lab duplicates Field duplicates help to pinpoint variability in sampling, while lab duplicates help to pinpoint analytical variability. The variability in the results obtained from duplicate samples is the sum of the sampling and analytical variability (measurement error).

Permittee to define general control limits here. As an example: “In general the control limit for duplicate samples collected in the field are +/-30% RPD for samples >5 times the Limit of Quantitation (LOQ) or +/- 2x the LOQ for the difference between replicates when the concentrations are <5 times the LOQ. These are generalized limits and should be changed depending on the type of samples being compared However, third party laboratories may define different control limits.”

### Accuracy/Bias

Accuracy is a measure of the error between reported test results and the true sample concentration. This error, called “bias” is made up of the two types of error, sampling error and measurement error. Accuracy is estimated by measuring the bias of measurement error, even though bias is due to both systematic error in sampling and measurement variability.

Systematic error attributable to sampling design must be minimized by following the procedures described in section 2. This will generally result in acceptable levels of bias.

To minimize bias, all instruments must be calibrated using appropriate reference materials. The accuracy of these materials must be documented and maintained by the permittee and any third party laboratories. The instrument’s response to the reference material (initial calibration) shall also be documented and must fall within method control limits. Immediately following the initial calibration a second source standard must be used to verify the accuracy of the calibration reference material. This must be done every time after the initial calibration.

Laboratory Control Samples (LCS) prepared with each batch of samples will be used to estimate accuracy. Where applicable (for example, VOC analysis), matrix spikes will be used in conjunction with the LCS to estimate the accuracy of measurement error.

### Sensitivity

The analytical methods used must be sufficiently sensitive to determine compliance with permit limits. Analytical results should be reported to the Method Detection Limit (40 CFR 136, Appendix B) when possible. At minimum, the data will be reported to the specified Quantitation Limit (QL) listed in the permit. These QLs have been determined to be sufficiently sensitive by Oregon DEQ. The permit lists the parameters of interest for this facility and the target QL for each parameter.

If matrix interference or other analytical issue prevents the data from being reported to the sufficiently sensitive QL, the permittee will work with the permittee’s lab and Oregon DEQ to demonstrate the matrix effects according to procedures described in EPA’s “Solutions to Analytical Chemistry Problems with Clean Water Act Methods,” March 2007.

Blank results must be less than the QL for each analyte listed in the permit. Laboratory Method Blanks (MB) must be prepared along with each LCS. See 40 CFR 136.7 for further guidance on establishing appropriate MB criteria. MB results will be used to assess the sensitivity of the method. If corrective action measures fail to resolve MB errors, results batched with the MB will be flagged with the appropriate data qualifier when reported.

### Significant Figures and Rounding

Calculations must be made following Oregon DEQ’s guidance documents for significant figures and for rounding (<https://www.oregon.gov/deq/wq/wqpermits/Pages/NPDES-Individual-Permit-Templates.aspx>, see document “[Use of Significant Figures and Rounding Conventions in Water Quality Permitting](https://www.oregon.gov/deq/Filtered%20Library/SigFigsIMD.pdf)”), unless directed otherwise by Oregon DEQ.

### Representativeness

Representativeness is a qualitative term used to determine whether measurements are made and physical samples are collected in such a manner that the resulting data appropriately reflects the media and phenomenon measured or studied.

Representativeness is controlled by using well defined sampling and sample handling SOPs. Standard sampling procedures must be designed so that results are representative of the matrix being sampled. Sample handling protocols for storage, preservation, and transportation must be developed to preserve the representativeness of the collected samples. Proper documentation will establish that protocols have been followed and sample identification and sample integrity assured. If it is determined that sample integrity has been compromised, data must be flagged with the appropriate data qualifier. These documentation protocols are often included in a laboratories Chain of Custody or Sample Handling procedures.

Sample locations will be referenced to latitude and longitude using a GPS device. In-stream samples should be collected at or near the center of the stream channel where the water is well mixed and representative of the ambient conditions. For every sample, the date and time at which measurements are made will be recorded, as well as the physical samples collected and method of collection (e.g. grab, 24-Hr composite). All efforts will be made to confirm the accuracy of this sample metadata. In-stream samples will be collected at a location that is free of the influence of the confluence of tributaries or point source discharges.

Quality analytical measurements with poor field duplicate precision may point to sampling problems or heterogeneous samples and thus not representative of ambient conditions. To ensure the representative data quality indicator is correct, field duplicates must be collected within 15 minutes and 15 meters of each other, where the sample matrix is assumed to be homogeneous. Evaluation of field duplicate, lab duplicate, and accuracy data will provide information if there is error in the hypothesis that the sample is homogeneous. If field duplicate data exceeds precision limits but lab duplicate and accuracy data is acceptable, the sampling design may be in error and the data may not represent the environmental conditions for which it was collected. If field duplicate data indicates representativeness is acceptable, data users may assume other project data meet representativeness objectives.

### Comparability

To ensure data will be comparable to similar environmental data collected at other facilities, procedures for sampling, sample handling, and sample analysis will be documented and written to comply with 40 CFR 136. The permittee and any third party laboratories should follow the analytical methods cited in Table 5, which are promulgated methods in 40 CFR Part 136 and the sampling procedures described in section 2.

### Completeness

It is expected that samples will be collected from all sites described in this QAPP unless seasonal-related events or safety issues prevent sampling. Oregon DEQ may require re-sampling to obtain more information of qualified data.

## Special Training and Certification

Facility laboratory personnel will be trained in sampling methods, sample handling, chain-of-custody, sample transport, and field and laboratory measurements. The Project Manager (PM) and/or the Quality Assurance Officer (QAO) are responsible for the training of staff who perform sampling, sample handling, and analysis activities. Records will be kept on file of these training activities and may be reviewed by Oregon DEQ.

## Records

Field logbooks, notebooks and/or data sheets will be filled out using waterproof or weather resistant ink and should not be erased. Changes must be made by crossing out errors with a single ~~strikethrough~~, initial/date, and adding correct information. Logbooks should be bound with numbered pages.

Laboratory data results must be recorded on laboratory data sheets, bench sheets and/or in laboratory logbooks for each sampling event. These records as well as control charts, logbook records of equipment maintenance records, calibration and quality control checks, such as preparation and use of standard solutions, inventory of supplies and consumables, check in of equipment, equipment parts, and chemicals should be kept on file at the laboratory.

Any procedural or equipment problems must be recorded along with data results. Any deviation from this QAPP must be noted. Additional sampling and analyses should be performed when results fall outside the specified range and when DQO’s are not met. Data results submitted to Oregon DEQ will include information on field and/or laboratory QA/QC problems and corrective actions.

Chain-of-Custody or Transmission forms will be kept with the sample transport, and will accompany data results sent to Oregon DEQ when requested.

Training records and data review records will be kept on file in the facility’s laboratory and will be available on request by Oregon DEQ.

All records and documents must be kept according to the schedule specified in the permit at the Facility’s laboratory and are available to EPA and Oregon DEQ for inspection at any time. Records may be kept either in hard-copy or in electronic format.

Permittee may further specify facility specific record keeping information here. Examples of topics to include could be location of files (whether physical location or computer network file to store scanned copies in), naming conventions for electronic files, when to scan hard-copies into electronic folders, retention schedules (beyond those mandated by permit), and/or method of record disposal and who is authorized to dispose of/delete records.

### Analytical Reports

Permittees must submit data to Oregon DEQ as required by the facility permit.

Note: for minor permittees that only measure a handful of parameters on-premesis for compliance purposes (e.g. temperature, pH, BOD) a full analytical report may not be necessary and the text below may not apply. However, these permittees must still find a way to document the QA/QC results in a way that can be easily reviewed by those on the distribution list specified in Section 1.1. An example of this may be a form or spreadsheet that contains all applicable QA/QC info along with the analyte results for a given week.

Electronic versions of the final laboratory analytical reports must be e-mailed to the distribution List specified in Section 1.1 in a Portable Document Format (PDF).

Analytical reports must contain sufficient information to unambiguously link sample collection information to the group of analytical parameters. The following elements should be addressed in the report (when applicable):

* COC Documentation
* Holding Times
* Method Detection Limits
* Blank Analysis
	+ Field (Trip and Equipment)
	+ Method
* Quality Control
	+ Spike Recovery
	+ Field Duplicates
	+ Laboratory Duplicates
* Data Use and Limitations

**NOTE**: Include tables or narratives that clearly identify all data where DQOs were not met and a discussion of the significance of each case. Data flags must be used to qualify data that does not meet quality requirements to indicate potential bias. Qualifying flags must be clearly defined in the laboratory report.

### Field Documentation

The sampling team uses the COC/field data sheets to document the record of significant events, observations, and measurements during field investigations. This record may include water level data, field measurements, personnel, significant weather observations, and physical conditions should they exist. All entries in the COC/field data sheets should be signed and dated. The COC/field data sheets will be kept as a permanent record and must be maintained in accordance with the schedule specified in the facilities’ permit.

# Data Generation and Acquisition

## Sampling Process Design

Permittee will outline all sampling locations. Permittee will outline the frequency with which equipment blanks and field duplicate samples will be collected.

All samples must be collected in the appropriate sample containers, preserved as identified in the appropriate reference methods. Samples must also arrive at the analytical laboratory within the appropriate sample holding times, with the appropriate documentation, and under the appropriate sample transport conditions. In cases where an external analytical laboratory analyzes samples for the permittee, the external lab assumes no responsibility for the quality of data resulting from samples that were collected, shipped, or stored under inappropriate conditions.

The locations and media to be sampled are summarized in Table 3

A permittee can also include a map of sampling locations to supplement the table if desired.

Table 3. Summary of sampling locations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Description** | **Lat/Long** | **Sample media** | **No. of Samples** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

## Sampling Methods

Samples and measurements taken as required by the permit must be representative of the volume and nature of the monitored discharge. When a sample is collected using a sample line, a volume of water equal to at least ten times the volume of the sample line will first be discharged through the line to clear it of standing water and possible contamination. If there is no discharge line port, the sampler may take the sample from the final effluent chamber at the designated sample location, taking all safety and contamination-prevention precautions.

Where site locations safely allow, receiving water samples should be collected from the center of the main channel, at a depth of one meter. This ensures a sample representative of environmental conditions.

Permittee will fill in additional sampling methodology and identification as necessary.

Samples will be identified as “composite,” “grab,” or “24-hr sample” on COC forms and in field logbooks and field data sheets.

**Grab Samples**

Grab samples are discrete samples taken at one location and time. Depending on the analyte of interest there may be volume, sample collection, or sample preservation requirements (see Table 4). Consult the analytical method (see Table 5) or third-party laboratory for proper collection and preservation requirements for each analyte.

**Composite Samples (for Volatile Organic Compounds, Total Cyanide, and Free Cyanide)**

Composite samples must consist of six **discrete** grab samples (not less than 40 mL each) over the operating day at intervals of at least one hour. The samples may be analyzed separately or composited. If analyzed separately, the analytical results for all samples must be averaged for reporting purposes. If composited, they must be composited in the laboratory at the time of analysis in a manner that maintains the integrity of the samples. Refer to the permit to confirm analytes that must be collected as a composite.

The sample time to be listed on the COC and sample bottle will be the time of the final sample composite portion.

**24-hour Composite**

A 24-hour sample must consist of a minimum of four grab samples over the course of 24 hours. Samples may be discrete grabs or composited via autosampler. Sample aliquots can either be of equal volume or flow proportional (specified in permit).

The sample collection time listed on the COC and sample bottle with be the time of the final sample composite portion, or the time when the compositing period ends.

**Cleaning**

All sampling equipment and sample containers must be cleaned prior to use, according to the equipment specifications or the analytical method. Sampling equipment cleaning will be performed in accordance with established SOPs.

Permittee to include general cleaning instructions or reference to cleaning SOP here. Example language:

“All glassware and plasticware cleaned in the facility’s laboratory will use the following procedure unless otherwise noted.

1. Wash glassware and plasticware with phosphate-free detergent and rinse with tap water.

 2. Rinse with 10% hydrochloric acid (HCl).

3. Rinse four times with deionized water.”

## Sample Handling and Custody Procedures

Sample handling, preservation, and holding times will follow those approved by EPA in 40 CFR 136.3. Sample container, minimum sample volume, preservation, and maximum storage requirements for each parameter are listed in Table 4 below. When samples are transferred to an outside contracted laboratory, Chain of Custody (COC) forms must be filled out and must accompany the samples. When samples are transferred between facilities, such transfer will be indicated on the form with signature, date and time of transfer. The COC must remain with the samples, sealed inside the cooler, until receipt by the contracted laboratory. Samples and sample containers must be maintained in a secure environment, from the time the bottles leave the facility until the time the samples are received at thelaboratory. Contracted laboratories will maintain custody of bottles and samples using their normal custody procedures.

A summary of the sampling containers, preservation requirements, and holding times is presented in Table 4.

Table 4. Summary of sampling parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Sample Type** | **Container** | **Preservation** | **Holding Time** |
|  |  |  |  |  |
|  |  |  |  |  |

## Analytical Methods

Pollutants of concern for this project are listed in the permit. All laboratories involved with compliance monitoring for this facility must make analytical SOPs available upon request. The laboratories’ analytical SOPs must cite EPA-approved methods as found in 40 CFR Part 136.3 or in its subsequent revisions.

A summary of the analytical parameters, the analytical methods used, and their precision and accuracy values is provided in Table 5.

Table 5. Summary of analytical parameters and methods

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample Type** | **Analytical Parameters** | **Reference Method** | **Precision (RPD)** | **Accuracy** |
| **MS** | **LCS** | **CCV** | **ICV** |
| Effluent & Influent | Flow |  | N/A | N/A | N/A | N/A | N/A |
| Effluent & Influent | Temperature | 2550 B | ± 0.5 | N/A | N/A | N/A | ≤ ± 0.5 |
| Effluent | Turbidity | SM 2130 B | ± 20% | N/A | N/A | ±10% | ±10% |
| Effluent | Escherichia Coli (E.Coli) | SM 9223B | 0.6 (log) | N/A | Positive Confirmation | N/A | N/A |
| Effluent | Enterococcus | SM 9222 D | 0.6 (log) | N/A | Positive Confirmation | N/A | N/A |
| Effluent | Bacteria - Total Coliform only | SM 9222 D | 0.6 (log) | N/A | Positive Confirmation | N/A | N/A |
| Effluent | Total Suspended Solids | 2540 D | ± 20% | N/A | ± 20% | N/A | N/A |
| Effluent | Turbidity | 180.1/2130 B | ± 20% | N/A | ± 10% | ± 10% | ± 10% |
| Effluent & Influent | pH | 150.2/4500-pH B | ± 0.2 pH | N/A | ± 0.1 pH | ± 0.2pH | ± 0.1 pH |
| Effluent | Ammonia | EPA 350.1 | ± 20% | ± 20% | ± 10% | ± 10% | ± 10% |
| Effluent | Nitrate/Nitrite | 353.2/4500NO3F | ± 10% | ± 20% | ± 10% | ± 10% | ± 10% |
| Effluent | Total Kjeldahl Nitrogen | 4500NorgD | ± 20% | ± 20% | ± 20% | ± 10% | ± 10% |
| Effluent | Biochemical Oxygen Demand,5 Day | 5210 B | ± 10% | N/A | ± 15% | N/A | N/A |
| Effluent | Chlorine, Total Residual | 4500CL G | ± 20% | NA | ± 10% | NA | ± 10% |
| Effluent | Orthophosphate | 4500P E | ± 10% | ± 20% | ± 10% | ± 10% | ± 10% |
| Effluent | Total Phosphorus | 4500P E | ± 10% | ± 20% | ± 10% | ± 10% | ± 10% |

## Quality Control

The permittee will define a quality control plan here. This plan must include the frequency with which field duplicates, equipment blanks and laboratory duplicates will be taken, and also discuss how these quality control measures will be grouped, or “batched.” A batch defines which samples are associated with specific QC samples (Example: samples taken over a one week period have one field duplicate or one equipment blank associated with them, if the equipment blank or field duplicate falls outside of QC criteria for a parameter that week, then all results within the batch for that parameter are qualified or “flagged.”)

Example Language:

“At least once during every month that samples are taken, the Facility Quality Assurance officer (FQAO) will ensure that a duplicate analysis is performed for all parameters analyzed that month, and one equipment blank. Samples taken between the 15th of the current month and the 15th of the following month will be considered a batch. Variation of duplicate values for each parameter must not exceed the range of precision and accuracy discussed in Table 5 above. Any problems found with data collected must be noted on the data sheets, results, and in laboratory logbooks. The FQAO initials any changes to data.

With the knowledge of an unacceptable error in the QC measurement (as defined in Table 5 above), environmental samples within the QC batch must either be reprocessed (if possible) after improvements are made to minimize the observed error, or the data must be flagged as not meeting the quality control standard. If more than one of the same QC is performed in the batch only the environmental data preceding the failed QC must be qualified (flagged). Batch QC control limits are summarized in Table 5.”

All monitoring performance evaluation results (e.g. Performance Testing (PT) results) are required and must be maintained at the facility and made available for review by Oregon DEQ upon request.

### Location:

All environmental data generated from samples collected at a station may be flagged based on observations made by the sampling team and supporting data. The sampling station should appear to be indicative of normal homogeneous ambient conditions. Access to the sample location within the stream should not be impaired. The sampling team will note on their field sheet if an obstacle prevents collecting the sample at the specified location and time.

## Instrument/Equipment Testing, Inspection, and Maintenance

All analytical equipment must be maintained and inspected in accordance with the analytical method’s SOPs, and/or the manufacturer’s recommendations.

The laboratories will keep maintenance logs on all analytical equipment. Laboratories are expected to conduct routine maintenance procedures and follow the manufacture’s advice. Personnel conducting peer review will find it helpful to use maintenance logs during corrective action procedures.

## Instrument Calibration and Frequency

All analytical and field equipment will be calibrated in accordance with the procedures test method SOPs.

If instruments can not be calibrated as required, the analyst will flag data as appropriate.

## Inspection/Acceptance of Supplies and Consumables

The FQAO will be responsible for maintaining records of traceability for all reagents and standards. The FQAO must validate the usability of standards and reagents upon receipt and when expiration dates are exceeded. In some cases, useability analysis is prescribed in specific methods or in other published methods. If solutions, standards, reagents, or other consumables have surpassed their expiration dates, they must not be used unless their useability is confirmed.

Expiration dates are not to supersece manufacturer’s labeled expiration dates. Expiration dates for stock or working solutions will be clearly labeled on bottles and justification for expiration date frequency will be documented in method SOPs.

##  Data Management

Data will be entered onto field data sheets, bench sheets, and into laboratory logbooks. The FQAO or appointed designee will submit data to DEQ based on requirements outlined in the permit. The following is a list of data information records that are kept available at the facility’s laboratory for Oregon DEQ review upon request:

* Training Records
* Field equipment and chemicals maintenance, cleaning and calibration records
* Field logbooks and/or field data sheets
* COC forms
* Laboratory equipment and reagents maintenance, cleaning and calibration records
* Laboratory bench sheets, control charts
* Laboratory SOPs
* Records of QA/QC problems and corrective actions (field and/or laboratory)
* Laboratory data QC records
* Duplicate, split sample, performance evaluation records and other QA/QC control records (field and laboratory)
* Assessment records, such as Proficiency Test results
* Data review, verification and validation records

Whenever possible data results will be entered electronically and transferred electronically to avoid transcription errors.

# Assessment and Oversight

## Assessment and Response Actions

The FQAO will ensure that the field and laboratory forms are complete. Approximately 10% of the data sheets or logbook entries with the DMR entries should be inspected for inaccuracies. If any errors are found the FQAO will verify correct entry by comparing another 10% of the data sheets.

Should the sampling staff, laboratory personnel or FQAO find errors in sampling or analysis, the FQAO will notify the FRO and the party responsible for the error or deficiency, and will recommend methods of correcting the deficiency. The responsible party will then take action to correct the problem and will report corrections to the FQAO and FRO. See above for how this information is recorded and reported

The FQAO will monitor the duplicate sampling and analysis activities and will review these results. The FQAO will keep these assessment records available for review by Oregon DEQ.

Additionally, the facility is inspected and/or audited regularly by Oregon DEQ or EPA.

## Reports

The data reporting schedule is specified in the permit. Monitoring results are summarized on the Discharge Monitoring Report (DMR’s), included in the permit and are submitted to Oregon DEQ each month. Refer to permit for the reporting schedule for Tier I/Tier II monitoring and Copper BLM/Aluminum BLM monitoring (if applicable).

Any improvements to QA and/or QC will be implemented as necessary. Records of changes will be available for Oregon DEQ review.

# Data Validation and Usability

The FQAO will perform at least quarterly quality checks of data to detect correctable problems. Any problems noted will be immediately brought to the attention of the FRO. Items to be checked include data sheets, logbooks, data entry, Discharge Monitoring Reports (DMR’s), calibration logs, and custody/transmission forms.

Questions to be considered during these quality checks include:

• Were correct methods used?

• Were holding times met?

• Were accuracy and precision within data quality objectives?

• Were significant figures and reporting limits correct?

 • Were lab qualifiers provided and explanations and corrective actions taken if there were anomalies in the data?

• Was the data package as a whole for each sampling event complete?

Permittee to include data acceptance/rejection criteria

## Data Review, Verification and Validation

The FQAO will check the accuracy and precision of data to ensure that data quality objectives are being met and that the program conforms to CFR 136.7 and the conditions outlined in the permit

Data sheets and/or logbooks must be completely filled out and signed at the time of sampling and analysis. The FQAO will review data sheets and/or logbooks for accuracy, precision, missing or illegible information, errors in calculation and values outside the expected range.

Permittee will add any language here concerning specific actions to be taken by the FQAO or specified designee as part of review. This may include such actions as “FQAO or designee will initial each data package upon review. Any questionable data will be brought to the attention of the field and/or laboratory personnel for resolution. The FQAO will initial any changes made to the data, and any action taken as a result of the data review will be specifically recorded on the data sheet. Data will then be entered into the monitoring data system, which is designed to flag any values that fall outside of the expected range for each parameter.”

When data quality indicators do not meet specifications (see Table 5) the cause of the failure will be evaluated. If the cause is equipment failure, calibration and maintenance procedures will be reassessed and improved. If the problem is procedural error, the FQAO will review methods used. If accuracy and precision goals are frequently not being met, QC procedures will be reviewed and, subject to Oregon DEQ approval, may be revised.

The FQAO or appointed designee will review and initial equipment maintenance logs, sample custody forms and equipment/supply inventory and inspection forms on a quarterly basis.

Verification of data accuracy will be made by the FQAO during quarterly quality control checks, replicate analysis and split sampling checks. The FQAO during the quarterly review process will make calculations and determinations for precision and completeness. Results of accuracy, precision, and completeness calculations will be kept on file at the laboratory.

## Reconciliation with User Requirements

Problems with quality sampling and analysis will be discussed with Oregon DEQ to ensure that permit requirements and QAPP data quality objectives are met. Modifications to monitoring required by permit will require modifications to the approved QAPP.

# Revision History

Table 6. Revision History

| Revision | Date | Changes | Editor |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |