THE CITY AND BOROUGH OF JUNEAU

MENDENHALL WASTEWATER TREATMENT PLANT
JUNEAU-DOUGLAS TREATMENT PLANT
AUKE BAY TREATMENT PLANT
SALMON CREEK WATER FILTRATION PLANT

Permit No.: AK0022951, AK0023213, AKG572000, and AKG380000
Quality Assurance Project Plan

Prepared by:
City and Borough of Juneau
Wastewater Utility
2009 Radcliffe Road
Juneau, AK 99801

Revisions:
July 2001
July 2004
May 2006
April 2008
January 2010
May 2014
November 2015
July 2016

A. PROJECT MANAGEMENT

A.1 TITLE AND APPROVAL

Mendenhall Wastewater Treatment Plant (MWWTP), Juneau-Douglas Wastewater Treatment Plant (JDTP), Auke Bay Wastewater Treatment Plant (ABTP), and Salmon Creek Water Filtration Plant (SCWFP) Quality Assurance Project Plan (QAPP) for Water Quality Monitoring Sampling and Analysis Activities

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ABTP	Auke Bay Wastewater Treatment Facility
ADEC	Alaska Department of Conservation
APDES	Alaska Pollutant Discharge Elimination System
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BOD_5	Biochemical Oxygen Demand (5 day test)
CBJ	City and Borough of Juneau
COC	Chain of Custody
CSO	Combined Sewer Overflow
DMR	Discharge Monitoring Report
DMRQA	Discharge Monitoring Report Quality Assurance
DO	Dissolved Oxygen
DOW	Department of Water
DQA	Data Quality Assessment
EPA	U. S. Environmental Protection Agency
JDTP	Juneau-Douglas Wastewater Treatment Plant
MDL	Method Detection Limit
MGD	Million Gallons per Day
mg/Kg	milligrams per kilogram
mg/L	milligrams per liter
ML	Minimum Level
MS	Matrix Spike
MWWTP	Mendenhall Wastewater Treatment Plant
NIST	National Institute of Standards and Technology
NTU	Nephelometric Turbidity Units
PE	Performance Evaluation

PQL	Practical Quantification Limit
QA	Quality Assurance
QAM	Quality Assurance Manual
QAPP	Quality Assurance Project Plan
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference
SCWFP	Salmon Creek Water Filtration Plant
SOP	Standard Operating Procedure
SM	Standard Methods
TSS	Total Suspended Solids
µg/L	microgram per liter
WW	Wastewater

A.2 DISTRIBUTION LIST

The distribution list shown in Table 1 designates the names and contact information for those individuals who receive copies of the approved MWWTP, JDTP, ABTP, and SCWFP QAPP and subsequent revisions.

TABLE 1 - MWWTP, JDTP, ABTP, and SCWFP QAPP Distribution List

NAME	POSITION	AGENCY	DIVISION/ BRANCH/ SECTION	CONTACT INFORMATION
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A.3 PROJECT TASK/ORGANIZATION

Duties and responsibilities of key individuals are listed below:

CBJ Staff

- **Engineering & Public Works Director:** Roger Healy is Director of the Engineering & Public Works Department for the City and Borough of Juneau. The Wastewater Utility is a division of the CBJ Engineering & Public Works Department, therefore ultimate authority for the Division resides with the Public Works Director.

- **Utilities Superintendent:** Samantha Stoughtenger is the Utilities Superintendent for the City and Borough of Juneau. She oversees the administration, supervision, and budget decisions for the Water and Wastewater Utilities. Additionally, she ensures that sampling methods and data quality are adequate to meet the objectives of the QAPP.

- **Utilities Production & Treatment Manager:** The Utilities Production & Treatment Manager for the City and Borough of Juneau manages and guides staff in the planning, finances, and operations of Wastewater and Water Treatment. Additionally, he oversees the Senior Wastewater and Water Treatment Operators in the effective analysis and control of wastewater and water treatment as well as compliance sampling and reporting.

- **Senior Wastewater Utility Operators:** Grieko Tempel and James Westcott are the Wastewater Treatment Plants Senior Operators for the CBJ MWWTP and JDTP. Catherine Carlson is the Wastewater Treatment Plant Operator for the CBJ ABTP. They are responsible for implementing APDES sampling requirements, coordinating field sampling efforts, evaluating analytical laboratory and field collection sample results, reviewing DMRs and reporting monitoring results to the ADEC, following QA/QC procedures described in the QAPP, implementing corrective actions to the sampling and analytical procedures, directing plant operators, and reporting to the Utilities Treatment and Production Manager.

- **Senior Water Utility Operators:** Evan Champion is the acting Water Treatment Senior Operators for the CBJ SCWFP. He is responsible for implementing APDES sampling requirements, coordinating field sampling efforts, evaluating analytical laboratory and field collection sample results, reviewing DMRs and reporting monitoring results to the ADEC, following QA/QC procedures described in the QAPP, implementing corrective actions to the sampling and analytical procedures, directing plant operators, and reporting to the Utilities Treatment and Production Manager.

- **Instrumentation Technician:** Tim Geib serves as the Wastewater Treatment Plant Instrumentation Technician for CBJ. He specifies new sampling instrumentation, installs sampling equipment, develops in-house QA/QC procedures and SOPs for monitoring/sampling equipment, trains staff on proper use of instrumentation, and troubleshoots malfunctioning instrumentation.

- **Wastewater and Water Treatment Plant Operators:** There are five Wastewater Treatment Plant Operators at the MWWTP, three at JDTP, one at ABTP, and two Water Treatment Plant Operators at SCWFP who preform field sample collection and analysis duties (see Figure 1). Qualification and training of personnel is required to comply with the State of Alaska Operator Certification program. Operators receive training on collecting samples, reviewing and evaluating analytical laboratory results, and reporting data to comply with APDES requirements.

ADEC Staff

- **ADEC APDES Permitting:** The ADEC Permitting reviews information and data from MWWTP, JDTP, ABTP, and SCWFP to ensure the plants are in compliance with the APDES permit.
- **ADEC Technical Services Program:** The ADEC Technical Services division is responsible for approval of the QAPP and review of the system data to meet the quality goals.

Changes in Utilities Division staff may be made if circumstances dictate. The Utilities Superintendent will be advised of any such changes and the Senior WW Plant Operators or WW Plant Operator will amend this QAPP to reflect such changes.

Shown in Figure 1 is an organizational chart for the CBJ management direction and APDES data reporting.

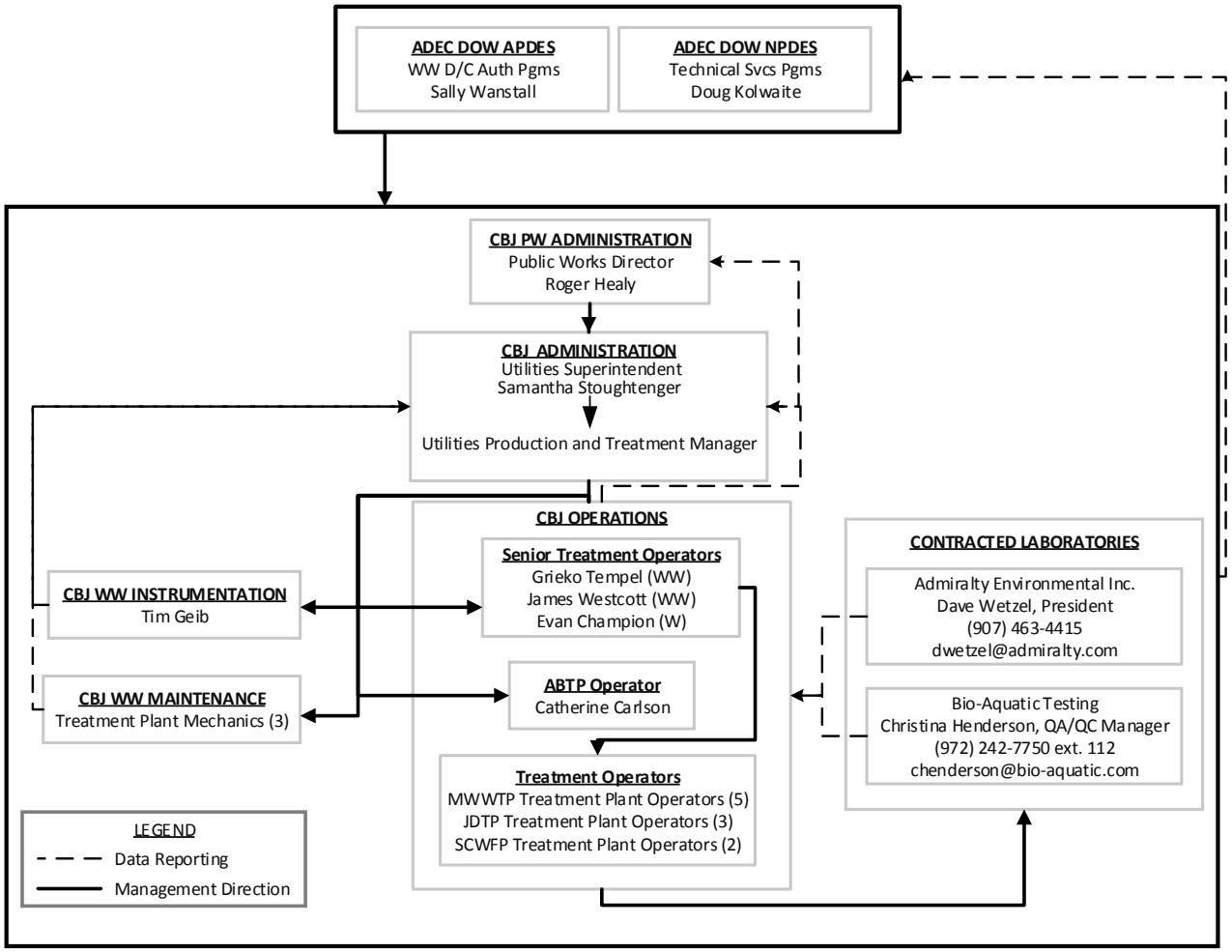


FIGURE 1 - Org Chart for MWWTP, JDTP, ABTP and SCWFP Management Direction and APDES Data Reporting

A.4 BACKGROUND AND PROJECT OBJECTIVES

The City and Borough of Juneau (CBJ) Utilities Division owns and operates a series of wastewater treatment plants that service roughly 33,000 citizens in the Juneau-Douglas vicinity. This Quality Assurance Project Plan (QAPP) will examine sample collection and data reporting for the Mendenhall Wastewater Treatment Plant, the Juneau-Douglas Treatment Plant, and the Auke Bay Treatment Plant as well as wastewater discharges from the Salmon Creek Water Filtration Plant. CBJ Utilities staff collects and analyzes grab samples for the following parameters: pH, temperature, total residual chlorine, turbidity, and dissolved oxygen from these treatment plants and total residual chlorine at ABTP and SCWFP. The remainder of the water quality suite is sent to contracted laboratories for analysis.

A.4.1A MWWTP Background

The Mendenhall Wastewater Treatment Plant (MWWTP) was constructed in the 1970's. It is located roughly seven miles north of downtown Juneau at 2009 Radcliffe Road, Juneau, AK, 99801 (shown on Figure 2). The original activated biofilter plant was upgraded to a sequencing batch reactor facility in 1989; a plant site plan has been included in Appendix A. MWWTP discharges treated wastewater effluent through a diffuser system to the Mendenhall River at latitude 58° 21' 48" N and longitude 134° 20' 08" W under APDES Permit No. AK0022951 (included as Appendix A) and is subject to the requirements of the Clean Water Act (33 U.S.C.) and an Alaska Pollutant Discharge Elimination System permit (18 AAC 83).

FIGURE 2 - MWWTP Vicinity Map

A.4.1B JDTP Background

The Juneau-Douglas Wastewater Treatment Plant (JDTP) was constructed in the early 1970's. It is located approximately two miles south of downtown Juneau at 1540 Thane Road, Juneau, AK, 99801 (shown on Figure 3). The plant is a conventional flow-through activated sludge treatment plant; a plant site plan has been included in Appendix B. JDTP discharges treated wastewater effluent directly to the Gastineau Channel at latitude 58° 17' 02" N and longitude 134° 23' 13" W under APDES Permit No. AK0023213 (included in Appendix B) and is subject to the requirements of the Clean Water Act (33 U.S.C.) and an Alaska Pollutant Discharge Elimination System permit (18 AAC 83). Additionally, JDTP has been permitted for an occasional combined sewer overflow (CSO) as a result of a high tide or precipitation event.

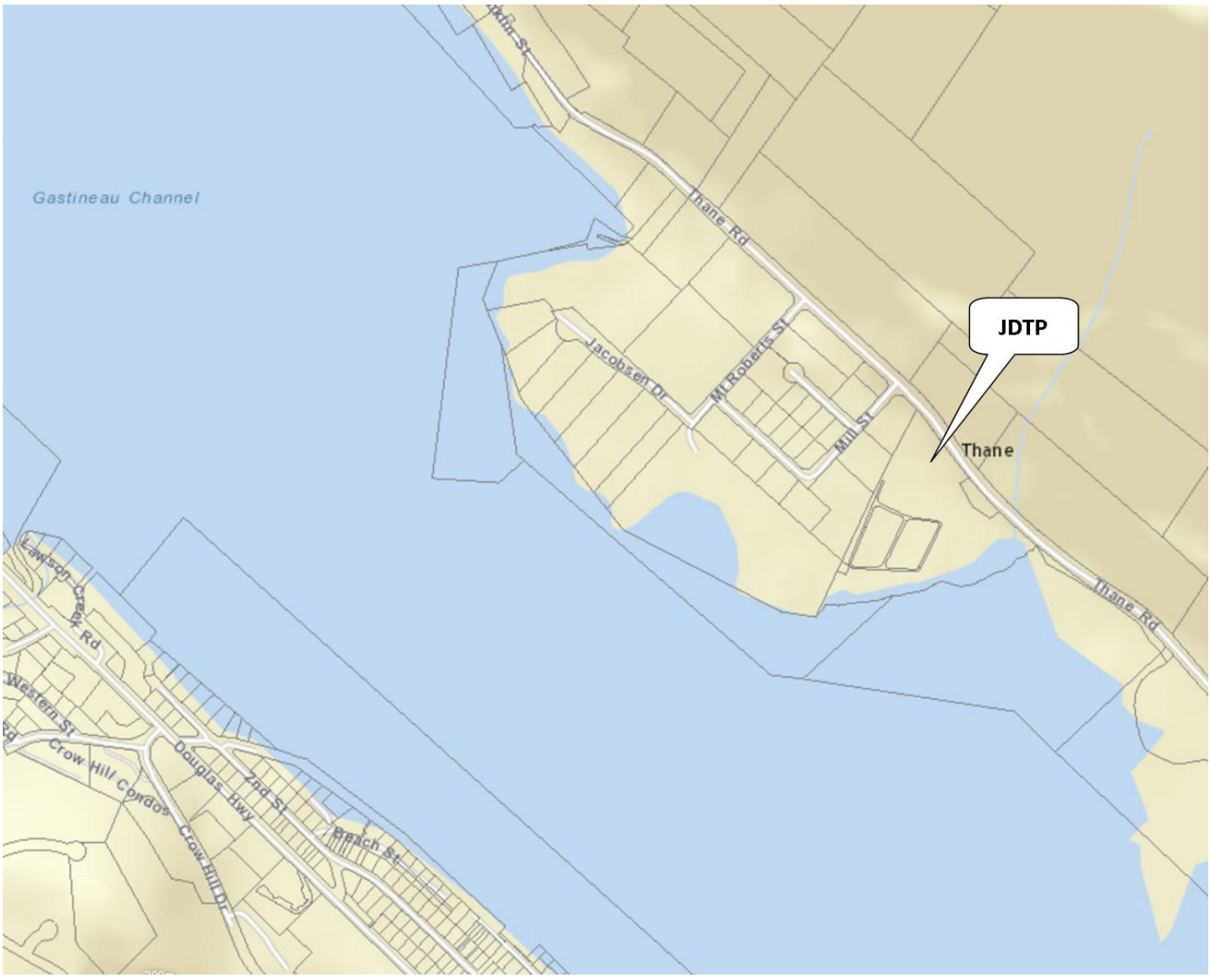


FIGURE 3 - JDTP Vicinity Map

A.4.1C ABTP Background

The Auke Bay Treatment Plant (ABTP) was constructed in the 1970's. It is located roughly ten miles north of downtown Juneau at 11825 Glacier Highway, Juneau, AK, 99801 (shown on Figure 4). The plant is an activated sludge secondary treatment package plant; a plant site plan has been included in Appendix C. ABTP discharges treated wastewater effluent directly to the Auke Bay at latitude 58° 23' 5" N and longitude 134° 38' 54" W under APDES General Permit No. AKG572000 (included in Appendix C) and is subject to the requirements of the Clean Water Act (33 U.S.C.) and anAlaska Pollutant Discharge Elimination System permit (18 AAC 83). The ADEC Facility Assigned Authorization Number for ABTP is AKG572004.

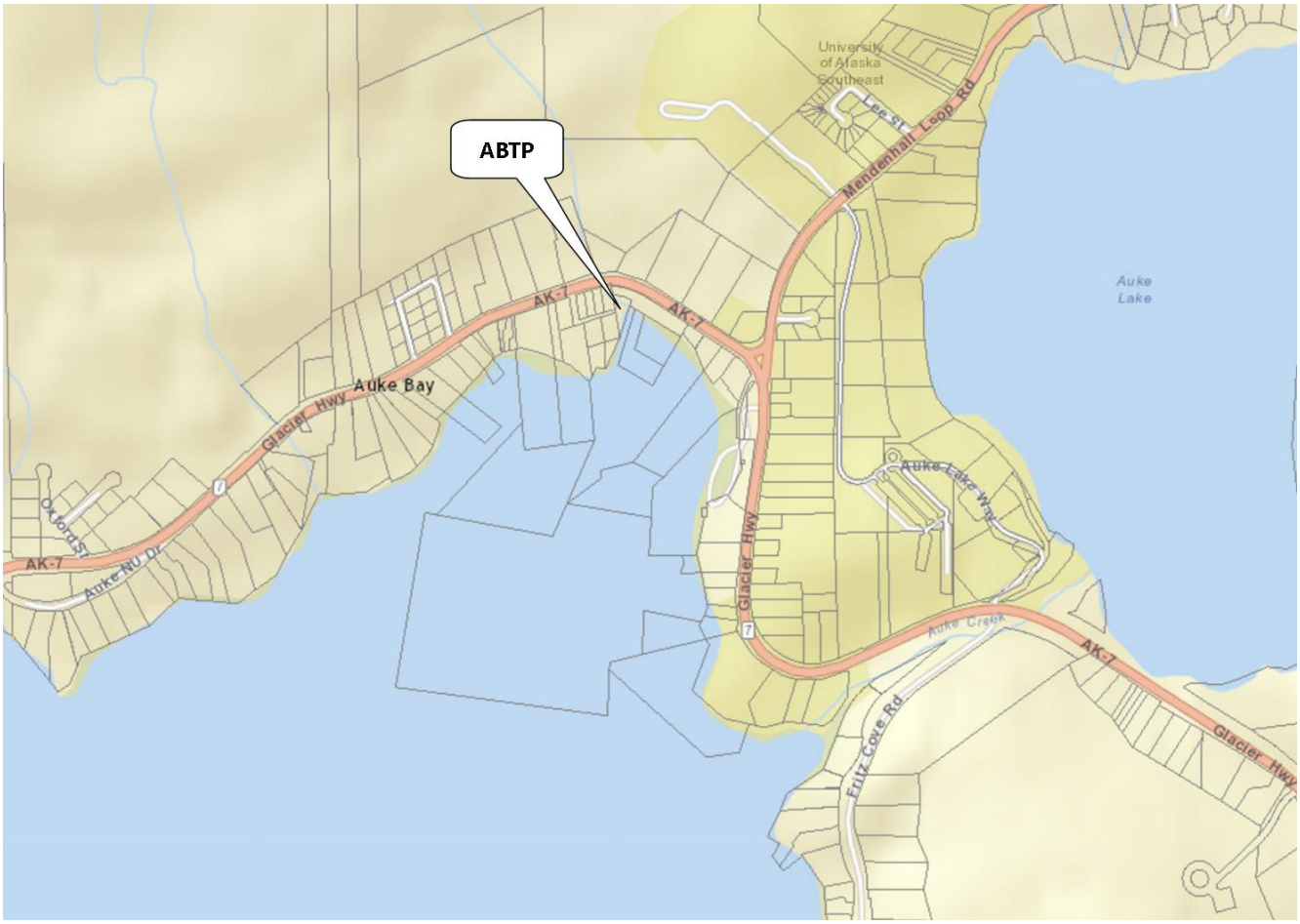


FIGURE 4 - ABTP Vicinity Map

A.4.1D SCWFP Background

The Salmon Creek Water Filtration Plant (SCWFP) was constructed in 2016. It is located approximately three miles north of downtown Juneau at 2770 Egan Drive (Figure 5). The plant is a membrane water filtration plant; a site plan has been included in Appendix D. SCWFP discharges air scrub, enhance flux maintenance, and chemical clean-in-place effluent to a storm sewer that discharges into Gastineau Channel under APDES General Permit No. AKG380000 (included in Appendix D) and is subject to the requirements of the Clean Water Act (33 U.S.C.) and an Alaska Pollutant Discharge Elimination System permit (18 AAC 83). The ADEC Facility Assigned Authorization Number for SCWFP is AKG380005.

FIGURE 5 - SCWFP Vicinity Map

A.5 PROJECT DESCRIPTION AND SCHEDULE

A.5.1 Project Description

This Quality Assurance Project Plan (QAPP) for MWWTP, JDTP, ABTP, and SCWFP has been prepared for use in compliance with Alaska Pollutant Discharge Elimination System (APDES) Permits AK0022951, AK0023213, AKG572000, and AKG380000, respectively. The QAPP describes the quality assurance (QA) and quality control (QC) procedures that will be employed during routine plant operations to ensure that data is generated to fulfill requirements of the APDES permit to be accurate, precise, complete, and representative. QA/QC procedures in this document will govern sample collection efforts, sample custody documentation, on-site and off-site analyzes, data management, and record handling.

A.5.2A MWWTP Monitoring Requirements

The MWWTP APDES permit requires sampling of the plant influent, plant effluent, and receiving water body (at the boundary of the 100 meter mixing zone both upstream and downstream sides of the discharge), as shown in Figure 6. Effluent toxicity testing is also conducted at the plant effluent location. Additional maps of the area can be found in Appendix A.

FIGURE 6 - MWWTP Site Sampling Map

MWWTP APDES general water quality parameter monitoring requirements and effluent limits are listed in Table 2a. Shown in Table 2b are the MWWTP effluent discharged receiving waters monitoring requirements. MWWTP permit reissuance requirements for samples that must be collected three times within four and one-half years after the effective date of the permit are shown in Table 2c.

TABLE 2a - MWWTP Monitoring Requirements and Effluent Limits

Parameter	Units	Effluent Limits[a]				Monitoring Requirements[b]		
		Minimum Daily	Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Flow	MGD	---	report	---	4.9	effluent	continuous	recording
Dissolved Oxygen	mg/L	Report	---	---	report	effluent	1/month	grab
Temperature	°C	---	report	---	report	effluent	1/month	grab
BOD_5	mg/L	---	30	45	60	effluent	2/month	24-hr composite
	lb/day	---	1226	1829	2452			
	mg/L	---	report	---	---	influent	2/month	24-hr composite
	% removal	85	See Permit AK0022951 Part 1.4.5			effluent vs influent	1/month	calculation
TSS	mg/L	---	30	45	60	effluent	2/month	24-hr composite
	lb/day	---	1226	1829	2452			
	mg/L	---	report	---	---	influent	2/month	24-hr composite
	% removal	85	See Permit AK0022951 Part 1.4.5			effluent vs influent	1/month	calculation
pH (Nov 1 - Jun 30)	s.u.	6.5	---	---	8.5	effluent	5/week	grab
(Jul 1 - Oct 31)	s.u.	6.3	---	---	8.5	effluent	5/week	grab
Fecal Coliform Bacteria (Nov 1- Apr 30)	FC/100 mL[c]	---	112[d]	168[d]	224[e]	effluent	2/week	grab
(May 1- Oct 31)	FC/100 mL[c]	---	200[d]	400[d]	800[e]	effluent	1/week	grab
Total Ammonia as N (Nov 1 - Apr 30)	mg/L	---	28.5	---	40.5	effluent	1/month	24-hr composite
	lb/day	---	1165	---	1655			calculation
(Jun 1 - Oct 31)	mg/L	---	report	---	Report	effluent	1/month	24-hr composite
Copper[f] (Nov 1 - Apr 30)	µg/L	---	86.7	---	187.0	effluent	1/month	24-hr composite
	lb/day	---	3.54	---	7.63			calculation
(May 1 - Oct 31)	µg/L	---	44.5	---	95.8	effluent	1/month	24-hr composite
	lb/day	---	1.82	---	3.92			calculation
Lead[f]	µg/L	---	report	---	report	effluent	3/year[g]	24-hr composite
Silver[f]	µg/L	---	report	---	report	effluent	3/year[g]	24-hr composite
Zinc[f]	µg/L	---	report	---	report	effluent	3/year[g]	24-hr composite
Whole Effluent Toxicity (Nov 1 - Apr 30)	TU_c	---	5.1	---	report	effluent	1/year	24-hr composite
(May 1 - Oct 31)	TU_c	---	report	---	report	effluent	1/year	24-hr composite
Hardness	mg/L as $CaCO_3$	---	report	---	report	effluent	1/month	24-hr composite
Alkalinity	mg/L as $CaCO_3$	---	report	---	report	effluent	1/quarter[h]	24-hr composite
Floating Solids/Visible Foam	visual	---	See Permit AK0022951 Part 1.2.4			effluent	1/month	visual

Notes:

a. Effluent samples must be collected after the last treatment unit prior to discharge.
b. Influent and effluent samples must be collected during the same 24-hour period.
c. FC/100 mL = colonies of fecal coliform bacteria (FC) per 100 mL.
d. All fecal coliform bacteria average results must be reported as the geometric mean.
e. Not more than 10 percent of samples may exceed the daily maximum limit.
f. Metals monitoring in the effluent must be analyzed for and reported as total recoverable metal.
g. Lead, silver and zinc must be sampled at least once during each of the following periods each year: January through April, May through August, and September through December. Results must be submitted with the April, August, and December DMRs.
h. Quarters are defined as January - March, April - June, July - September, and October - December. Results must be submitted with the DMR for the last month of the quarter.

TABLE 2b - MWWTP Effluent Discharged Receiving Waters Monitoring Requirements

Parameter	Units	Sampling Location	Sampling Frequency	Sample Type	Reporting Limit
Temperature	^{o}C	upstream and downstream	1/month	grab	---
Fecal coliform [a]	FC/100 mL	upstream and downstream	1/month	grab	1.0
Total Ammonia as N	mg/L	upstream and downstream	4/year [b]	grab	0.05
pH	s.u.	upstream and downstream	1/month	grab	---
Copper [c]	µg/L	upstream and downstream	2/year [d]	grab	2.0
Lead [c]	µg/L	upstream	2/year [d]	grab	2.0
Hardness	mg/L as $CaCO_3$	upstream and downstream	1/month	grab	10
Dissolved oxygen	mg/L	upstream and downstream	1/month	grab	---
Alkalinity	mg/L as $CaCO_3$	upstream	1/month	grab	10

Notes:

a. All mixing zone fecal coliform bacteria average results must be reported as geometric means.
b. Sampling must occur at least twice during each of the following time periods: November through April; and May through October.
c. Analysis values for copper and lead must be as dissolved metal.
d. Sampling must occur at least once during each of the following: May 1 through October 31; and November 1 through April 30.

TABLE 2c - MWWTP Additional Effluent Monitoring for Permit Reissuance

Parameter	Units	Sample Location	Sample Frequency	Sample Type
Total Ammonia as N	mg/L	effluent	3x/4.5 years	24-hr composite
Dissolved Oxygen	mg/L	effluent	3x/4.5 years	grab
Nitrate Plus Nitrite Nitrogen	mg/L	effluent	3x/4.5 years	24-hr composite
Total Kjeldahl Nitrogen	mg/L	effluent	3x/4.5 years	24-hr composite
Oil and Grease	mg/L	effluent	3x/4.5 years	grab
Total Phosphorous	mg/L	effluent	3x/4.5 years	24-hr composite
Total Dissolved Solids	mg/L	effluent	3x/4.5 years	24-hr composite
Expanded Effluent Testing	varies	effluent	3x/4.5 years	---

A.5.2B JDTP Monitoring Requirements

The JDTP APDES permit requires sampling of the plant influent, plant effluent, and two locations in the receiving water body, as shown in Figure 7. The two receiving water body sample locations represent the chronic mixing zone (a circle with a radius of 83 m, centered on the outfall line) and the ambient waters (greater than 83 m from the end of the outfall). Effluent toxicity testing is also conducted at the plant effluent location. Additional maps of the sampling locations can be found in Appendix B. The following are the permitted CSO diversions for JDTP:

- High School Diversion Structure # N-11 at Sta "AE" 2+82 1' Rt near the intersection of Glacier Avenue and Highland Drive
- Sealaska Diversion Structure # N-11.2 at Sta "C" intersection of Marine Way and South Seward Street
- Diversion Structure # N-15.1 at Water's edge, approximately at the intersection of Front Street and Dock Street in Douglas

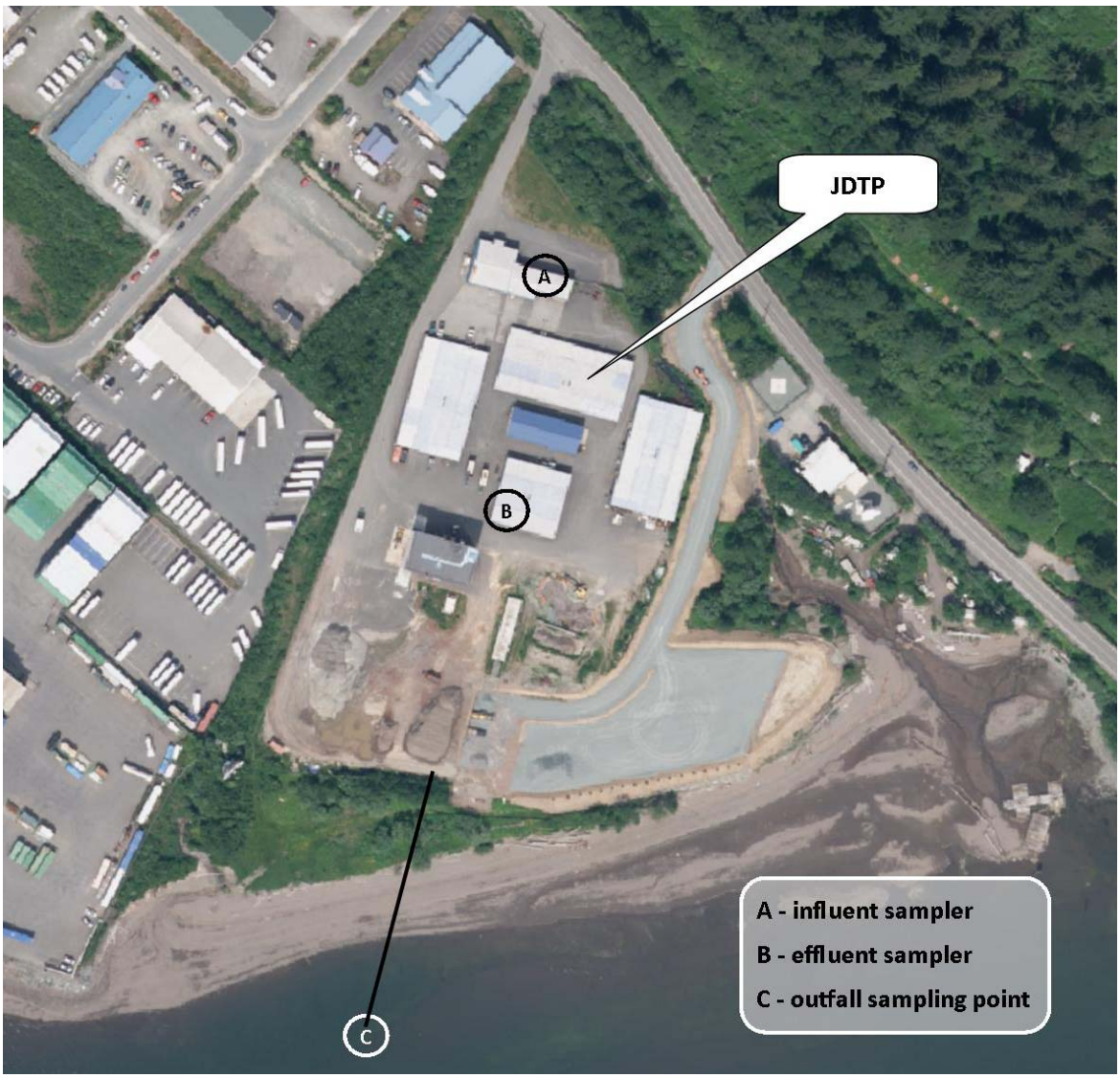


FIGURE 7 - JDTP Site Sampling Map

JDTP APDES general water quality parameter monitoring requirements and effluent limits are listed in Table 3a. Shown in Tables 3b and 3c are the JDTP effluent discharged receiving waters monitoring requirements. CSO diversion effluent monitoring requirements are shown in Table 3d.

TABLE 3a - JDTP Monitoring Requirements and Effluent Limits

Parameter	Units	Effluent Limits			Monitoring Requirements [a]		
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Sample Location [b]	Sample Frequency	Sample Type
Flow	MGD	2.76	---	6.0	effluent	continuous	recording
BOD_5	mg/L	30	45	60	influent & effluent	1/month	24-hr composite
	lb/day	690	1035	1380			
	% removal	85	See Permit AK0023213Part 1.2		effluent vs influent	1/month	calculation
TSS	mg/L	30	45	60	influent & effluent	1/month	24-hr composite
	lb/day	690	1035	1380			
	% removal	85	See Permit AK0023213Part 1.2		effluent vs influent	1/month	calculation
Fecal Coliform [c, d, e]	FC/100 mL	200	400	800	effluent	1/week	grab
Total Ammonia as N	mg/L	14	21	30	effluent	1/month	24-hr composite
pH	s.u.	6.5 - 8.5			effluent	5/week	grab
Dissolved Oxygen	mg/L	2.0 [d]	---	17.0	effluent	5/week	grab
Copper [b]	µg/L	---	---	report	effluent	1/quarter	24-hr composite
Temperature	°C	---	---	report	effluent	5/week	grab
Whole Effluent Toxicity [e]	TU_c	---	---	---	effluent	1/year	24-hr composite

Notes:

a. Effluent samples must be collected after the last treatment unit prior to discharge.
b. Influent and effluent samples must be collected during the same 24-hour period.
c. FC/100 mL = colonies of fecal coliform bacteria (FC) per 100 mL.
d. All fecal coliform bacteria average results must be reported as the geometric mean.
e. Reporting is required within 24 hours of a maximum daily limit violation.
f. Daily minimum dissolved oxygen concentrations.
g. Refer to the Permit No. AK0023213 Part 1.3 for sampling requirements.

TABLE 3b - JDTP Effluent Discharged Chronic Mixing Zone Monitoring Requirements

Parameter	Units	Sampling Frequency	Sample Type	Effluent Sampling Frequency
Fecal coliform [a]	#/100 mL	1/month [b]	grab	1 day/week
Enterococci Bacteria	counts/100 mL	2/year [c, d]	grab	---

Notes:

a. All mixing zone fecal coliform bacteria average results must be reported as the geometric mean.
b. Beginning December 27, 2001, fecal coliform must be monitored once/month during May, June, July, August, September, and October, and twice [two more times] during November - April. The winter samples must be obtained as long as it is safe to do so.
c. Twice per year consists of one sample taken in the summer months (June 1-Sept. 30), and one in the winter (Oct. 1- May 31).
d. Sampling should occur at the same time as Fecal coliform bacteria sampling.

TABLE 3c - JDTP Effluent Discharged Ambient Station Monitoring Requirements

Parameter	Units	Sampling Frequency	Sample Type	Effluent Sampling Frequency
Total Ammonia[a]	mg/L	2/year[b]	grab	1/month
pH[a]	S.U.	2/year[b]	grab	5/week
Temperature[a]	^{O}C	2/year[b]	grab	5/week
Salinity[a]	g/kg	2/year[b]	grab	---

Notes:

a. Ambient station ammonia, pH, temperature, and salinity samples should be taken concurrently with the boundary of the mixing zone ammonia sample.

b. Twice per year consists of one sample taken in the summer months (June 1- Sept 30) and one in the winter (Oct 1- May 31).

TABLE 3d - JDTP CSO Diversion Effluent Monitoring Requirements

Parameter	Units	Sample Location	Sampling Frequency	Sample Type
Flow	MGD	effluent	each opening	recording
BOD_5	mg/L	effluent	each opening	grab
	lbs/day			
TSS	mg/L	effluent	each opening	grab
	lbs/day			
Fecal Coliform	#/100 mL	effluent	each opening	grab
Enterococci Bacteria	counts/100 mL	effluent	each opening	grab
Duration of opening	hours	effluent	each opening	recording
Reason for discharge	---	---	each opening	---
Volume of discharge		effluent	each opening	---

A.5.2C ABTP Monitoring Requirements

The ABTP APDES permit requires sampling of the plant influent, plant effluent, and receiving water body (about a 30 meter circular radius centered on the outfall), as shown in Figure 8.

FIGURE 8- ABTP Site Sampling Map

ABTP APDES general water quality parameter monitoring requirements and effluent limits are listed in Table 4a. Shown in Table 4b are the ABTP effluent discharged receiving waters monitoring requirements.

TABLE 4a - ABTP Monitoring Requirements and Effluent Limits

Parameter	Units	Effluent Limits				Monitoring Requirements		
		Minimum Value	30 Day Average	7 Day Average	Maximum Value	Sample Location [b]	Sample Frequency	Sample Type
Flow	MGD	N/A	N/A	N/A	0.16	effluent	daily (5/week)	measured
BOD_5	mg/L	report	report	report	report	Influent	1/month	grab or composite
	lb/day	report	report	report	report			
	mg/L	N/A	30	45	60	effluent		
	lb/day	N/A	40.0	60.0	80.1			
	% removal	---	85	---	---	effluent vs influent	1/month	calculation
TSS	mg/L	report	report	report	report	Influent	1/month	grab or composite
	lb/day	report	report	report	report			
	mg/L	N/A	30	45	60	effluent		
	lb/day	N/A	40.0	60.0	80.1			
	% removal	---	85	---	---	effluent vs influent	1/month	calculation
Fecal Coliform [a]	FC/100 mL	---	200	---	800	effluent	1/month	grab
Enterococci Bacteria [a]	count/100 mL	---	---	---	report	effluent	1/month [b]	grab
Dissolved Oxygen	mg/L	2.0	---	---	---	effluent	1/month	grab
pH	s.u.	6.0	---	---	9.0	effluent	3/week	grab
Total Residual Chlorine	mg/L	---	0.5	---	1.0	effluent	3/week	grab

Notes:

a. All fecal coliform and enterococci bacteria must be reported as the geometric mean.
b. Monitoring is only required May-Sept when discharging into marine water.

TABLE 4b - ABTP Effluent Discharged Receiving Waters Monitoring Requirements

Parameter	Units	Effluent Limits			Monitoring Requirements		
		Monthly Average	Minimum Value	Maximum Value	Location	Sampling Frequency	Sample Type
Fecal Coliform Bacteria [a]	FC/100 mL	14	---	43 [b]	outside boundary of MZ	2/year [c]	grab
Total Residual Chlorine [d]	mg/L	0.0075	---	0.013	outside boundary of MZ	2/year [c]	grab
pH	s.u.	---	6.5	8.5	outside boundary of MZ	upon request [e]	grab
Dissolved Oxygen	mg/L	---	6	17	outside boundary of MZ	upon request [e]	grab
Fecal Coliform Bacteria [a]	FC/100 mL	200	---	400	shoreline in MZ	2/year [c]	grab
Enterococci Bacteria [a]	count/100 mL	---	---	report	shoreline in MZ	2/year [f]	grab

Notes:

a. All fecal coliform and enterococci bacteria must be reported as the geometric mean.
b. No more than 10% of the samples taken during the reporting period may exceed this value.
c. Sampling must occur twice during each of the following time periods: October-April; and May-September.
d. The total residual chlorine limits are not quantifiable using EPA-approved analytical methods. DEC will use the minimum level of 0.1 mg/L as the compliance evaluation level for this parameter.
e. Since exceedance of the pH and dissolved oxygen limits is not expected during normal treatment plant operation, monitoring is not required unless requested by ADEC.
f. Monitoring of enterococci bacteria is required twice during the time period of May through September. Sampling events should take place during different months.
g.

A.5.2D SCWFP Monitoring Requirements

The SCWFP APDES permit requires sampling of the Reverse Flow/Air Scrub Cleaning process water, Enhanced Flux Maintenance waste, and the Chemical Clean-in-Place waste at the SCWFP as shown in Figure 9.

FIGURE 9- SCWFP Site Map

SCWFP APDES general water quality parameter monitoring requirements and effluent limits are listed in Tables 5a, 5b, and 5c

TABLE 5a - SCWFP Reverse Flow/Air Scrub Cleaning Process Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limits			Monitoring Requirements [a]		
		Average Monthly Limit	Maximum Daily Limit	Minimum Daily Limit	Sample Location [b]	Sample Frequency	Sample Type
Flow	MGD	Report	Report	--	effluent	continuous	recording
Temperature	˚C	Report	Report	--	effluent	1/Month	grab
Turbidity	NTU	Report	Report	--	effluent	1/Month	grab
Arsenic	µg/L	Report	10	--	effluent	1/Month	grab
Copper	µg/L	Report	Report	--	effluent	2/Year	grab
Iron	µg/L	Report	Report	--	effluent	2/Year	grab
Lead	µg/L	Report	Report	--	effluent	2/Year	grab
Magnesium	µg/L	Report	Report	--	effluent	2/Year	grab
Manganese	µg/L	Report	Report	--	effluent	2/Year	grab
Zinc	µg/L	Report	Report	--	effluent	2/Year	grab
Chloride	mg/L	Report	Report	--	effluent	2/Year	grab
Sulfates	mg/L	Report	Report	--	effluent	2/Year	grab

Notes

a. Discharge flow volume must be monitored and reported monthly regardless of which membrane cleaning process is used.
b. All metal concentrations shall be reported as total recoverable metal.
c. Twice per year consists of one sample taken in the summer months (May 1 through September 30) and one sample taken in the winter months (October 1 through April 30).

TABLE 5b – SCWFP Enhanced Flux Maintenance Cleaning Process Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limits			Monitoring Requirements [a]		
		Average Monthly Limit	Maximum Daily Limit	Minimum Daily Limit	Sample Location [b]	Sample Frequency	Sample Type
pH	SU	Report	8.5	6.5	effluent	1/Month	grab
Total Ammonia as N	mg/L	Report	Report	--	effluent	1/Month	grab
Total Residual Chlorine	mg/L	0.0075	Report	--	effluent	1/Month	grab
Arsenic	µg/L	Report	Report	--	effluent	2/Year	grab
Copper	µg/L	Report	Report	--	effluent	2/Year	grab
Iron	µg/L	Report	Report	--	effluent	2/Year	grab
Lead	µg/L	Report	Report	--	effluent	2/Year	grab
Magnesium	µg/L	Report	Report	--	effluent	2/Year	grab
Manganese	µg/L	Report	Report	--	effluent	2/Year	grab
Zinc	µg/L	Report	Report	--	effluent	2/Year	grab
Chloride	mg/L	Report	Report	--	effluent	2/Year	grab
Sulfates	mg/L	Report	Report	--	effluent	2/Year	grab
Salinity	ppt	Reprot	Report	--	Effluent	2/Year	grab

Notes:

a. Compliance with the limits for total residual chlorine cannot be determined using EPA-approved analytical methods. DEC will use 0.1 mg/L as the compliance limit for this parameter.
b. All metal concentrations shall be reported as total recoverable metal
c. Twice per year consists of one sample taken in the summer months (May 1 through September 30) and one sample taken in the winter months (October 1 through April 30).

TABLE 5c – SCWFP Chemical Clean-in-Place Cleaning Process Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limits			Monitoring Requirements [a]		
		Average Monthly Limit	Maximum Daily Limit	Minimum Daily Limit	Sample Location [b]	Sample Frequency	Sample Type
pH	SU	Report	8.5	6.5	effluent	1/Year	grab
Total Ammonia as N	mg/L	Report	Report	--	effluent	1/Year	grab
Total Residual Chlorine	mg/L	0.0075	Report	--	effluent	1/Year	grab
Arsenic	µg/L	Report	Report	--	effluent	1/Year	grab
Copper	µg/L	Report	Report	--	effluent	1/Year	grab
Iron	µg/L	Report	Report	--	effluent	1/Year	grab
Lead	µg/L	Report	Report	--	effluent	1/Year	grab
Magnesium	µg/L	Report	Report	--	effluent	1/Year	grab
Manganese	µg/L	Report	Report	--	effluent	1/Year	grab
Zinc	µg/L	Report	Report	--	effluent	1/Year	grab
Chloride	mg/L	Report	Report	--	effluent	1/Year	grab
Sulfates	mg/L	Report	Report	--	effluent	1/Year	grab
Salinity	ppt	Reprot	Report	--	Effluent	1/Year	grab

Notes:

a. Samples should be taken in alternating seasons, on year during the summer months (May 1 through September 30) and the next year during the winter months (October 1 through April 30).
b. Compliance with the limits for total residual chlorine cannot be determined using EPA-approved analytical methods. DEC will use 0.1 mg/L as the compliance limit for this parameter.
c. All metal concentrations shall be reported as total recoverable metal

A.5.3 Compliance Schedule

Summarized results of all required monitoring data are submitted monthly on the Discharge Monitoring Report (DMR) to ADEC, Division of Water, 555 Cordova Street, Anchorage, AK, 99501 by the 15th day of the following month. Quarterly reported data is reported on the DMR due in the month following the end of the monitoring quarter.

A.6 DATA QUALITY

The objective of CBJ's treatment plant monitoring program is to collect data of sufficient quality to verify that the treatment plants are in compliance with APDES permit requirements. The QAPP will ensure that the precision and accuracy of permit compliance data are known and documented, that sample collection, analysis, and reporting are complete, and that samples are representative of flows tested. This plan also describes systems for documentation of sample custody, data verification, and records retention.

A.6.1 Components of Data Quality

Data quality may be expressed in terms of:

- Detectability
- Precision
- Bias/Accuracy
- Completeness
- Representativeness
- Comparability

Detectability is the ability of the method to reliably measure a pollutant concentration above background. ADEC DOW uses two quantities to define detectability: method detection limit (MDL) and practical quantification limit (PQL)/reporting limit (RL)/minimum level (ML).

- The MDL is the minimum value which the instrument can discern above background but with no certainty to the accuracy of the measured value. For field measurements, manufacturer's listed instrument detection limit (IDL) may be used.
- The PQL (or RL or ML) is the minimum value that can be reported with confidence (generally some multiple of the MDL).

Note: The measurement method of choice should, at a minimum, have a PQL three times more sensitive than the respective ADEC Water Quality Standards and/or permitted pollutant level (for permitted facilities).

Sample data measured below the MDL is reported as ND or non-detect and "0" is entered when used in the calculation of an average. Sample data measured ≥ MDL but < PQL is reported as "< [the value of the] PQL" and entered as the value of the MDL when used in an average. Sample data measured above the PQL is reported as reliable data unless otherwise qualified per the specific sample analysis.

Precision is the agreement among repeated measurements of the same parameter and provides information about the consistency of methods. Precision will be determined on laboratory data by the analysis of sample duplicates. Precision is expressed in terms of the RPD between measurements of the duplicate samples (A and B).

The calculation for RPD is:

$$RPD = \frac{(A - B)}{(A + B)/2} \times 100$$

Bias (or Accuracy) is a measure of confidence that describes how close a measurement is to its "true" value. Bias is expressed as percent recovery (%R). Bias criteria for %R vary depending on the method. %R is normally determined by the use of known traceable laboratory control standards or MS. It is a measure of the systematic error; potential sources of systematic errors include:

- Physical or chemical instability of the samples
- Interference effects
- Calibration of the measurement system
- Contamination

Field and laboratory audits and 3rd party performance evaluation samples are independent (external) means to assess overall measurement bias. Methods to determine and assess bias of field and laboratory measurements include instrument calibrations and various types of QC checks (such as split samples, sample blanks, standard control samples, performance evaluation (PE) sample checks, and DMRQA studies).

The calculation for bias is:

$$Bias = \frac{Measured\ Value}{True\ Value} \times 100\%$$

Completeness is the characteristic of having a sufficient number of valid sample results to make decisions or evaluate compliance with statistical confidence. APDES permits prescribe sample data collection frequencies needed to meaningfully assess the impact of effluent on receiving waters.

The procedures established in this QAPP are designed to provide data that will be valid, reportable, and complete. To achieve this objective, every effort will be made to collect and successfully analyze each

scheduled sample and to avoid sample loss, but some sample loss will occur. CBJ collects samples at a frequency to exceed the APDES required sample requirements to accommodate for unforeseen sample loss.

Representativeness is the degree to which contents of samples match the whole of the flow stream being sampled. It involves decisions of where to sample, type of sample (grab, continuous, composite, etc.), what parameters to analyze, and frequency of sample collection. Considerations include variation in the constitution of the flow stream over time, homogeneity of the flow stream or volume being sampled, and use of the data.

Comparability is the degree to which data can be meaningfully compared to other data collected by using standardized methods of sampling and analysis. Comparability is shown by referencing the appropriate approved measurement method as specified in federal and/or state regulatory and guidance documents (e.g., ASTM, Standard Methods, and Alaska Water Quality Standards). This concept is important to note as many wastewater parameters are defined by the method; for example, fats, oils and grease (FOG) is defined as material that is extractable in hexane, TSS is the material that is retained by a filter of a certain pore size, and BOD is the oxygen taken up under prescribed conditions

Identified in Table 6 are the data quality goals, including precision and accuracy, for the MWWTP, JDTP, ABTP, and SCWFP APDES permits parameters. If data are found to be unusable, the data will be rejected. Further evaluation will be made and appropriate actions (including resampling if necessary) initiated as described in Section C.1 - Assessments and Response Actions.

TABLE 6 - Data Quality Goals for MWWTP, JDTP, ABTP, and SCWFP APDES Permit Parameters

Group	Parameter	Units	EPA/Standard Methods No.	MDL (Method Detection Limit)	RL (Reporting Limit)	Precision (RDP)	Bias (%R)
General Water Quality	pH	s.u.	SM 4500-H B	0.01	0.01	0.1	0.1
	Temperature	°C	EPA 170.1	N/A	0.2	0.2	N/A
	Dissolved Oxygen	mg/L	SM 4500-O G	N/A	0.01	N/A	N/A
	TSS	mg/L	SM 2540 D	0.05	4	< 20%	< 15
	TDS	mg/L	SM 2540 C	0.05	4	< 20%	< 15
	BOD_5	mg/L	SM 5210 B	2	2	< 20%	75-125
	Turbidity	NTU	SM 2130 B	0.1	N/A	0.1	< 15
	Hardness	mg/L as $CaCO_3$	SM 2340 B	1	5	< 20%	80-115
	Alkalinity	mg/L as $CaCO_3$	SM 2320 B	1	2	< 20%	80-115
Fecal Coliform	Fecal coliform	#/100 mL	SM 9222 B	CFU/100 mL	CFU/100 mL	N/A	95-105
Toxicity	Whole Effluent Toxicity	TU_c	SM 8010 D	$100/IC_{25}$	LOEC / NOEC	< 20%	N/A
Total Recoverable Inorganics	Copper	µg/L	EPA 220.2/SM 3113 B	0.4	1.0	< 20%	80-115
	Chlorine	µg/L	SM 4500-Cl.G	10	1.0	< 20%	80-115
	Lead	µg/L	EPA 239.2	0.3	1.0	< 20%	80-115
	Silver	µg/L	EPA 239.2	0.3	1.0	< 20%	80-115
	Zinc	µg/L	EPA 239.2	0.9	2.5	< 20%	80-115
Dissolved Inorganics	Copper	µg/L	EPA 200.8	0.4	1.0	< 20%	80-120
	Lead	µg/L	EPA 200.8	0.03	1.2	< 20%	80-120
	Silver	µg/L	EPA 200.8	0.30	1.0	< 20%	85-115
	Zinc	µg/L	EPA 200.8	0.65	2.5	< 20%	80-120
Nutrients	Total Phosphorous	mg/L	SM 4500-P B	0.03	0.1	< 20%	80-115
	Total Kjeldahl Nitrogen	mg/L	SM 4500-NH3 C	1.0	5.0	< 20%	80-115
	Total Ammonia as N	mg/L	SM 4500-NH3 B,D	0.15	0.5	< 20%	80-120
	Nitrate + Nitrite as N	mg/L	SM 4110/ EPA 300.0(A)	0.03	1.0	< 20%	85-115

A.7 SPECIAL TRAINING REQUIREMENTS/CERTIFICATION

The purpose of this section is to ensure that necessary training requirements are known and provided.

A.7.1 Sample Collection Training

The Wastewater Treatment Senior Operators, Water Treatment Senior Operators, Laboratory Technician, and Instrumentation Technician ensure that all operators are trained in proper sample collection, handling, and analysis techniques. Prior to conducting sampling activities, personnel will review field procedures and sampling requirements discussed in this document to ensure permit required samples are collected and handled appropriately.

A.7.2 Methods Training

Personnel are required to review the applicable laboratory analysis SOP for all analyzes they conduct. CBJ and contracted laboratory SOPs have been included in this document as Appendix E, F, and G, respectively. Particular attention should be paid to any quality control requirements implemented for the particular analysis. A list of specialized training and certifications to be completed by the MWWTP, JDTP, ABTP, and SCWFP treatment plant personnel have been summarized Table 7.

TABLE 7 - MWWTP, JDTP, ABTP, and SCWFP Personnel Specialized Trainings and Certifications

Trainings / Certifications	Operators	Senior Operators	Instrumentation Technician
Water/Wastewater Treatment Operator Certification	X	X	
Laboratory Safety	X	X	X
MWWTP/JDTP/ABTP/SCWFP QAPP	X	X	X
Laboratory and Field Sampling SOPs	X	X	X
COC Procedures & Data Recording	X	X	
Laboratory & Field Instrumentation QC			X
Hazardous Goods Handling, Disposal, and Shipping	X	X	X

A.8 DOCUMENTS AND RECORDS

Sample collection records are kept on bench sheets and in logbooks. These records document overall system operation consisting of sample collection and COC records, quality control check records, and field sampling SOPs. Summarized in Table 8 are such records and documents maintained in association with the MWWTP, JDTP, ABTP, and SCWFP APDES permits; several documents have been included in the QAPP appendices for reference.

TABLE 8 - CBJ Records and Documents Associated with the MWWTP, JDTP, ABTP, and SCWFP APDES Permits

Category	Record/Document Type	Location	Retention Time	QAPP Appendix
Site Information	Site Maps	CBJ Digital Network	5 years	A, B, C, and D
	Site Pictures	CBJ Digital Network	5 years	---
	MWWTP / JDTP / ABTP/SCWFP QAPP	MWWTP/JDTP/ABTP/SCWFP	indefinitely	---
Data Reporting	CBJ Daily Temperature QC Record	MWWTP/JDTP/ABTP/SCWFP	3 years	E
	Contracted Lab COC Forms	MWWTP/JDTP/ABTP/SCWFP	3 years	F
	Contracted Lab Analysis Results	MWWTP/JDTP/ABTP/SCWFP	3 years	---
	DMRs	MWWTP/JDTP/ABTP/SCWFP	3 years	---
Quality Assurance Documents	Field Sampling SOPs	MWWTP/JDTP/ABTP/SCWFP	5 years	E
	Contracted Laboratory SOPs	MWWTP/JDTP/ABTP/SCWFP	5 years	F and G
	Contracted Laboratory QAM or QA/QC Manual	MWWTP/JDTP/ABTP/SCWFP	5 years	F and G
	Laboratory Training Records	MWWTP/JDTP/ABTP/SCWFP	5 years	---
	DMRQA and PE Sample Results	MWWTP/JDTP/ABTP/SCWFP	5 years	---
	Site Audits	MWWTP/JDTP/ABTP/SCWFP	5 years	---
	Laboratory Audits	MWWTP/JDTP/ABTP/SCWFP	5 years	---
	QA and Corrective Action Reports	MWWTP/JDTP/ABTP/SCWFP	5 years	---

B. DATA GENERATION AND ACQUISITION

B.1 SAMPLING PROGRAM DESIGN

Sample collection locations, required sampling parameters, and frequency of collection are specified in the MWWTP, JDTP, ABTP, and SCWFP APDES Permits AK0022951, AK0023213, AKG572000, and AKG380000. Sample collection locations have been indicated on Figures 6, 7, and 8, while sampling parameters and collection frequencies have been summarized in Tables 2a, 2b, 2c, 3a, 3b, 3c, 3d, 4a, 4b, 5a, 5b, and 5c.

- Influent samples assess the chemical/physical characteristics of wastewater entering the MWWTP, JDTP, and ABTP, and are used to calculate the percent removal for BOD and TSS (as compared to the effluent sample results).

- Effluent samples assess the chemical/physical characteristics of the treated wastewater discharged from the treatment plants.

- Ambient receiving water samples are collected, around the mixing zone, to assess any potential water quality impacts generated by discharge of the treated effluent to the receiving water body. The MWWTP mixing zone extends 100 meters upstream and downstream from the discharge. The JDTP mixing zone is a 90 meter circular radius centered on the outfall line extending from the marine bottom to the water surface. The ABTP mixing zone is a 30 meter circular radius centered on the outfall line, from the end of the pipe to the water surface.

B.1.1 APDES PERMIT Monitoring Locations, Parameters Measured, and Collection Frequencies

Monitoring locations established in the APDES permit for MWWTP (AK0022951), JDTP (AK0023213), ABTP (AKG572000), and SCWFP (AKG380000) have been shown in Table 9 with a site description and site location rationale.

TABLE 9 - MWWTP, JDTP, ABTP, and SCWFP Monitoring Locations, Site Descriptions, and Site Selection Rationale

Site Description	Latitude	Longitude	Sampling Site Location Rationale
MWWTP			
MWWTP Influent	58° 21′ 44″ N	134° 35′ 47″ W	Beginning of the treatment process
MWWTP Effluent	58° 21′ 44″ N	134° 35′ 50″ W	End of the treatment process
Mendenhall River Discharge	58° 21′ 43″ N	134° 35′ 53″ W	---
Mendenhall River Mixing Zone Upstream Sample Site	58° 21′ 45″ N	134° 35′ 49″ W	Upstream boundary used to monitor for any deterioration in receiving water quality due to the discharge of treated effluent
Mendenhall River Mixing Zone Downstream Sample Site	58° 21′ 40″ N	134° 35′ 55″ W	Downstream boundary used to monitor for any deterioration in receiving water quality due to the discharge of treated effluent
JDTP			
JDTP Influent	58° 17′ 14″ N	134° 23′ 5″ W	Beginning of the treatment process
JDTP Effluent	58° 17′ 13″ N	134° 23′ 4″ W	End of the treatment process
Gastineau Channel Outfall	58° 16′ 59″ N	134° 23′ 19″ W	---
Gastineau Channel Chronic Mixing Zone Sample Site	NW: 58° 17′ 15″ N SE: 58° 16′ 57″ N	NW: 134° 23′ 23″ W SE: 134° 23′ 16″ W	Boundary used to monitor for any deterioration in receiving water quality due to the discharge of treated effluent
Gastineau Channel Ambient Station Zone Sample Site	58° 17′ 1″ N	134° 23′ 11″ W	To gather data for ammonia water quality criteria calculations during future permit issuances
ABTP			
ABTP Influent	58° 23′ 14″ N	134° 38′ 54″ W	Beginning of the treatment process
ABTP Effluent	58° 23′ 14′′ N	134° 38′ 55″ W	End of the treatment process
Auke Bay Outfall Discharge	58° 23′ 5″ N	134° 38′ 54″ W	Discharge into receiving waters
Auke Bay Shoreline Sample	58° 23′ 6″ N	134° 38′ 53″ W	Sample site within mixing zone at shoreline area of human use closest to the point of discharge
Auke Bay Outside MZ Sample	58° 23′ 5″ N	134° 38′ 59″ W	Mixing zone boundary used to monitor for any deterioration in receiving waterbody quality.
SCWFP			
Reverse Flow/ Air Scrub Effluent	59° 19′ 31.4″ N	134° 27′ 50.64″ W	At the outlet of the discharge line prior to entering the floor drain for discharge
Enhance Flux Maintenance Effluent	59° 19′ 31.4″ N	134° 27′ 50.64″ W	Sample port on the back of the holding tank
Chemical Clean-in-Place	59° 19′ 31.4″ N	134° 27′ 50.64″ W	Sample port on the back of the holding tank

Plant-specific sampling parameters and collection frequencies have been denoted in Tables 2a, 2b, and 2c for the MWWTP from APDES Permit AK0022951, in Tables 3a, 3b, 3c and 3d for the JDTP from APDES AK0023213, in Tables 4a and 4b for the ABTP permit AKG572000, and in Tables 5a, 5b, and 5c for the SCWFP permit AKG380000. Sample collection locations have been graphically displayed on Figures 6, 7, 8, and 9 for the MWWTP, JDTP, ABTP, and SCWFP, respectively.

B.2 SAMPLING METHOD REQUIREMENTS

This section describes the procedures that will be used to collect, preserve, transport, and store samples in compliance with APDES requirements. Samplers should wear disposable gloves and safety eyewear, be aware of the potential hazards, and take care not to touch the inside of bottles or lids/caps during sampling.

B.2.1 Sample Types

Water quality samples collected under the APDES permit are either composite or grab, as shown in Tables 2a, 2b, 3a, 3b, 3c, 3d, 4a, 4b, 5a, 5b, and 5c. Composite samples are collected over a given time frame directly into a refrigerated sample carboy. Small aliquots are taken from the sample stream and deposited directly into the sample container; the volume of the aliquots can vary based upon system operations (i.e., flow-paced or standard volume). The sample container is held at 4°C $\pm$ 2°C for sample preservation. The time of the first sample aliquot, composite intervals, and the final compositing time are noted in logbooks or on bench sheets. The final compositing time is the sample collection time noted on the COC form. Grab samples are collected in one collection bottle at a discrete time.

B.2.2 Sample Equipment and Containers

CBJ sample collection equipment and field instrumentation is detailed in Table 10. Sample collection for ABTP consists only of grab samples.

TABLE 10 - CBJ Sample Collection Equipment and Field Instrumentation

Vendor	Model	Description	Site Location
Sigma	1600	24-hour composite sampler	MWWTP Influent
Sigma	900	24-hour composite sampler	MWWTP Effluent/ JDTP Influent/ JDTP Effluent
Hach	2100Q	Turbidimeter	MWWTP/SCWFP
Hach	SS6	Online Turbidimeter	MWWTP
H-B	S/N 1246208	Thermometer	MWWTP
Milltronics	OCM III	Flowmeter	JDTP
Thermo-Scientific	Orion Star A212	Conductivity	MWWTP
Thermo-Scientific	A3265	pH, temperature, and DO meter	MWWTP / JDTP / ABTP
Hach	Pocket Colorimeter II	Chlorine residual colorimeter	ABTP
Hach	DR900	Chlorine residual colorimeter	SCWFP

Samples are collected in either polyethylene or glass containers. Shown in Table 11 is a summary of sample containers, types of preservation, sample volume, and permissible hold times associated with sample collection. Sample containers are provided by the contracted laboratory. Fecal coliform samples are collected in sterile, disposable specimen containers.

TABLE 11 - Summary of Sample Containers, Preservation, Volumes, and Hold Times

Group	Parameter	Container [a]	Preservation	Maximum Holding Time	Minimum Volume
General Water Quality	pH	P, G	None required	< 15 min	100 mL
	Temperature	P, G	None required	in-situ	100 mL
	Dissolved Oxygen	P, G	None required	< 15 min/in-situ	300 mL
	TSS	P, G	0 ≤ 6 °C	7 days	1 L
	TDS	P, G	0 ≤ 6 °C	7 days	1 L
	BOD_5	P, G	0 ≤ 6 °C	48 hours	1 L
	Turbidity	P, G	0 ≤ 6 °C (store in dark)	48 hours	100 mL
	Hardness	P, G	HNO_3 to pH < 2	6 months	100 mL
	Alkalinity	P, G	0 ≤ 6 °C	14 days	200 mL
Fecal Coliform	Fecal coliform	P, G	0 < 10 °C	6-24 hours [b]	100 mL
Toxicity	Whole Effluent Toxicity	P, G	0 ≤ 6 °C	36 hours	10 L
Inorganics	Arsenic	P,G	HNO_3 to pH < 2	6 months	250 mL
	Copper	P, G	HNO_3 to pH < 2	6 months	1 L
	Chloride	P, G	None required	28 days	250 mL
	Chlorine	P, G	None required	< 15 min	10 mL
	Iron	P, G	HNO_3 to pH < 2	6 months	250 mL
	Lead	P, G	HNO_3 to pH < 2	6 months	1 L
	Magnesium	P, G	HNO_3 to pH < 2	6 months	250 mL
	Manganese	P, G	HNO_3 to pH < 2	6 months	250 mL
	Salinity	P, G	0 ≤ 6 °C	28 days	100 mL
	Silver	P, G	HNO_3 to pH < 2	6 months	1 L
	Sulfates	P, G	0 ≤ 6 °C	28 days	100 mL
	Zinc	P, G	HNO_3 to pH < 2	6 months	1 L
Nutrients	Total Phosphorous	P, G	0 ≤ 6 °C, H_2SO_4 to pH < 2	28 days	100 mL
	Total Kjeldahl Nitrogen	P, G	0 ≤ 6 °C, H_2SO_4 to pH < 2	28 days	500 mL
	Total Ammonia as N	P, G	0 ≤ 6 °C, H_2SO_4 to pH < 2	28 days	500 mL
	Nitrate + Nitrite as N	P, G	0 ≤ 6 °C, H_2SO_4 to pH < 2	28 days	200 mL

Notes:

a. P = polyethylene, G = glass
b. Maximum hold time is dependent on the geographical proximity of sample source to the laboratory

B.2.3 Sample Preservation Requirements

Samples collected are preserved in accordance of the methods specified in Table 11 above.

B.2.4 Cross-Contamination Reduction Efforts

In an effort to reduce the potential for cross-contamination, the influent and effluent samplers have dedicated collection carboys. All sampling carboys and glassware are washed with laboratory-grade soap, rinsed with tap water, rinsed with distilled water, and dried immediately after use.

B.3 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

Samples are identified, handled, documented, and custody controlled in compliance with the following sections. Samples may be analyzed in the field, CBJ lab, or in a contracted laboratory. Contracted non-Alaska laboratories must be members of the National Environmental Laboratory Accreditation Conference (NELAC) and/or State certified for the respective waste water analytical methods. All sampling equipment and sample containers will be cleaned according to the equipment specifications and/or the analytical laboratory. Bottles supplied by a contracted laboratory are new or pre-cleaned and should never be rinsed or reused. A temperature blank shall accompany each cooler.

B.3.1 Field Grab Sample Handling

Field grab samples analyses begin within the timeframe specified on Table 11. Sample collection and analysis information is recorded on laboratory bench sheets or in logbooks.

B.3.2 Contracted Laboratory Sample Handling

Sample containers are provided by the contracted laboratory. Container types and preservatives are listed in Table 11. Samples are labeled with waterproof ink and prepared as described on the COC. At a minimum, each label will contain the following information:

- Site location
- Sample identification
- Sample type (grab or 24-hr composite)
- Date and time of sample collection
- Sampler's initials
- Analyses required
- Method of preservation (as needed)

Contracted Laboratory for Wastewater Analyses (Local Drop-off)

Analytical samples are hand delivered to the local contracted lab for wastewater analysis (Admiralty Environmental, LLC) with complete COC paperwork. Appendix F contains relevant Admiralty Environmental documents, such as the laboratory contract with CBJ, QAM, and SOPs. Company contact information is as follows:

Admiralty Environmental
641 W. Willoughby Ave., Suite 301
Juneau, Alaska 99801

David Wetzel, President
Hope O'Neill, Manager
Phone: (907) 463-4415 / Fax: (480) 247-4476

Admiralty Environmental prepares a summary report (both written and electronic) of the following findings:

- Title page
- COC copies
- QC summary and documentation of any discrepancies affecting system measurement
- Sampling and analysis dates
- Test methods
- Method detection limits
- Recovery percentages
- QC data (including method blank, MS data, MS duplicate data, and laboratory control sample data)

Contracted Laboratory for Whole Effluent Toxicity (Shipped)

Whole Effluent Toxicity samples are shipped out of Juneau to Bio-Aquatic Testing, Inc. for analysis with completed COC paperwork. The laboratory's QC/QA Manual and SOPs are contained in Appendix G. Company contact information is as follows:

Bio-Aquatic Testing Inc.	Chris Robason	(972) 242-7750 x 25
2501 Mayes Road, Ste. 100	Christine Henderson	(972) 242-7750 x 12
Carrollton, Texas 75006		Fax: (972)-242-7749

Bio-Aquatic Testing, Inc. prepares a summary report (both written and electronic) of the following findings:

- Cover letter
- Test identification
- Sample collection and test initiation dates
- Study management
- Test material description (including results of chemical/physical parameter analysis)
- Description of dilution water used in the test
- Description of brine used for salinity control
- Description of test organisms
- Test procedures and conditions
- Data analysis methods

Contracted Laboratory for Priority Pollutants (Shipped)

Priority Pollutant samples are shipped out of Juneau to Am Test Laboratories, Inc. for analysis with completed COC paperwork. The laboratory's QC/QA Manual and SOPs are contained in Appendix H. Company contact information is as follows:

Am Test Laboratories Inc.	Kathy Fugiel	(425)-885-1664
13600 NE 126th Place	Fax:	(425)-820-0245
Suite C		
Kirkland, WA 98034		

Am Test Laboratories, Inc. prepares a summary report (both written and electronic) of the following findings:

- Cover letter
- Test identification
- Sample collection and test initiation dates
- Sample Acceptance/Compliance Check Form
- QC data (including method blank, MS data, MS duplicate data, and laboratory control sample data)
- Method Detection Limits
- Recovery percentages
- Data analysis methods

B.3.3 Holding Time Requirements

Method specific holding times for sample analysis are shown in Table 11. Handling and transport times are scheduled to prevent exceedance of any holding period.

B.3.4 COC Forms

COC forms are completed for any samples submitted to a laboratory for analysis. MWWTP, JDTP, ABTP, and SCWFP retain copies of completed COC forms onsite for the duration stated in Table 8. A sample COC form has been included in Appendix F.

B.3.5 Contracted Laboratory Sample Custody Records, Storage Locations, and Security

Contracted laboratories account for the MWWTP, JDTP, ABTP, SCWFP samples immediately upon receipt in their custody; they follow procedures identified in Appendices F,G and H to receive, inspect, track, store, and secure the samples.

B.3.6 Shipping Requirements

For samples shipped out of Juneau, CBJ receives specific shipping instructions from the contracted laboratories charged with analyzing the samples. A completed and signed COC form is secured to the inside lid of the cooler in a watertight plastic envelope. Coolers are packed with ice and a temperature blank before being secured with strapping tape and delivered to the air carrier for shipment. The contracted labs provide a copy of the air waybill, either via facsimile or email. The contracted laboratories inspect the shipment upon arrival noting any broken custody seals, damaged sample containers, or labeling discrepancies. CBJ staff will be contacted by the contracted laboratory within 24 hours of finding an issue with a sample submission. If the discrepancies are typographical in nature, CBJ may elect to continue with analysis. Whereas, if a custody seal is broken or sample container is damaged, the samples will be disposed of appropriately, necessitating resampling.

B.4 ANALYTICAL METHODS AND REQUIREMENTS

This section discusses standard analytical methods required for permit compliance as shown in Table 6. All monitoring will be in accordance with EPA-approved analytical procedures and in compliance with 40 CFR Part 136, *Guidelines Establishing Test Procedures for Analysis of Pollutants*. Method SOPs have been included as appendices to this document:

- Appendix E1 – CBJ MWWTP/JDTP/ABTP/SCWFP SOPs
- Appendix F2 – Admiralty SOPs
- Appendix G2 – Bio-Aquatics Testing SOPs
- Appendix H2 – AmTest Laboratories Testing SOPs

B.4.1 Sample Homogeneity

Field grab sample analysis will begin within the timeframe stipulated in Table 11 and will be assumed to be homogeneous. To ensure homogenous 24-hour composite samples, the sampling carboy is shaken prior to dispensing aliquots.

B.4.2 Sample Preparation

Sample preparations will be in accordance with laboratory SOPs (included as Appendices E, F, G and H).

B.4.3 Field Grab Sample Analytical Methods

Field grab samples will be analyzed for the parameters identified in Tables 2a, 2b, 3a, 3b, 3c, 3d, 4a, 4b, 5a, 5b, and 5c in accordance with the methods listed in Table 6.

B.4.4 Laboratory Sample Analytical Methods

Laboratory samples will be analyzed for the parameters identified in Tables 2a, 2b, 3a, 3b, 3c, 3d, 4a, 4b, 5a, 5b, and 5c in accordance with the methods listed in Table 6.

B.5 QUALITY CONTROL REQUIREMENTS

B.5.1 Field Grab Samples Quality Control

Both field splits and buffer verifications will be completed in association with field grab samples for quality control as shown in Table 12. Field splits necessitate collecting one sample on-site and splitting the sample at the time of measurement into two aliquots. Buffer verification is the process of checking the analytical instrument value of a known standard after calibration and sample measurement has been completed.

TABLE 12 - Field Grab Samples Replicates and Buffer Verifications

Parameter	Field Splits		Buffer Verifications	
	Frequency	Acceptance	Frequency	Acceptance
pH	monthly	± 0.25 pH units	1/sampling set	15%
Dissolved Oxygen	monthly	± 0.4 mg/L	1/sampling set	15%
Chlorine	monthly	± 0.05 mg/L	1/sampling set	15%

B.5.2 Laboratory Samples Quality Control - Blind Splits/Duplicates for Laboratory Verification

CBJ will provide blind splits or duplicate samples to the contracted laboratory to examine laboratory analysis quality control. TSS, BOD_5, and fecal coliform samples will be tested quarterly, while the remainder of the analyte panel will be tested annually. Acceptance criteria are benchmarked as less than 20% deviations among sample results. Two samples will be collected from the same source to produce the blind split or duplicate sample; sample labeling will be ambiguous as not to forewarn the laboratory of the quality control measure.

B.5.3 Contracted Laboratory Verification

The contracted laboratory is responsible for completing the necessary QA/QC measures on their analytical techniques and data analysis. Some of the verification processes that the laboratory may use blanks, MS, laboratory fortified blanks, or duplicate samples. Additionally, it is expected that the contracted laboratory QA maintains records documenting such activities.

B.5.4 Performance Evaluation Samples (DMRQA)

MWWTP, JDTP, ABTP, and SCWFP participate in the EPA DMRQA performance evaluation annually. Grab field performance samples are prepared and tested by one of the CBJ operators. Performance samples for the remaining analytes are submitted to the contracted laboratories for analysis. The Senior Operator compiles the DMRQA data, oversees preparation of the reports, and submits the completed report to the EPA.

B.6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

Prior to a sampling event, all sampling instruments and equipment should be inspected, tested, and calibrated in accordance with the manufacturer's specifications; these activities should be documented in logbooks or on bench sheets.

B.7 INSTRUMENT CALIBRATION AND FREQUENCY

B.7.1 CBJ Instrumentation/Equipment

Instrumentation and equipment must be properly calibrated to meet data quality requirements. Shown in Table 13 are the calibration recommendations for MWWTP, JDTP, ABTP, and SCWFP equipment. SOPs for operation and calibration of the equipment have been included in Appendix E; additionally, operating manuals are available onsite.

TABLE 13 - Equipment Calibration Recommendations

Vendor	Model	Description	Calibration Activity	Frequency	Acceptance Criteria	Corrective Action
Sigma	1600	24-hour composite sampler	temperature verification	Daily	stable temperature at 0 - 6°C	adjust temp as needed; replace if unstable
Sigma	900	24-hour composite sampler	temperature verification	Daily	stable temperature at 0 - 6°C	adjust temp as needed; replace if unstable
Hach	2100Q	turbidimeter	0 NTU calibration	every use	± 2% of reading	recalibrate
			cal with NIST traceable standard	Each cal/ verification	± 2% of reading	use gel or Formazin calibration standard; recalibrate
Hach	SS6	turbidimeter	cal with NIST traceable standard	quarterly	± 15% of standard	recalibrate; repair; replace
H-B	S/N 1246208	thermometer	recalibration and certification	1/5 yrs	< 1°C	send in for recalibration and certification
			ice point check	annually	< 1°C	send in for recalibration and certification
Milltronics	OCM III	flowmeter	zero level check	annually	0 MGD indication	recalibrate; repair
Thermo-Scientific	Orion Star A212	conductivity	0 calibration check; 1413 µS standard check	every use	0.5% ± 1 digit of standard	recalibration; inspect cell constant; replace probe
Thermo-Scientific	A3265	pH, temperature, and DO meter	pH – 4 & 7 buffer calibration	Daily	> 95% slope	recalibrate; replace electrode
			DO – saturated cell calibration	Daily	95 – 105% slope	calibrate; replace probe
Hach	Pocket Colorimeter II	residual chlorine detection	Cal with Hach STD 1-3	Daily	± 10% standard value	recalibrate, send for repair
Hach	DR900	residual chlorine detection	Cal with Hach STD	every use	± 10% standard value	recalibrate, send for repair

The Instrumentation Technician and the Utilities Superintendent work collaboratively to purchase new and/or upgrade existing equipment and instrumentation used for permit compliance; some parameters examined are range, accuracy, tolerance, construction, and installation considerations.

B.7.2 Contracted Laboratory Instrumentation/Equipment

Contracted laboratories will follow the calibration procedures found in their quality assurance manuals and SOPs. Specific calibration procedures for regulated pollutants will be in agreement with the respective EPA Approved Clean Water Act Pollutant methods of analysis. Field and/or laboratory calibration records will be made available to ADEC upon request.

B.8 SUPPLIES AND CONSUMABLES

All supplies and consumables used at MWWTP, JDTP, ABTP, and SCWFP are documented and tracked. Laboratory supplies are marked with the received and expiration dates. Older supplies will be used first. Time-sensitive supplies, such as calibration standard and sample preservatives, are appropriately labeled with expiration dates; expired chemicals will be disposed of immediately in an approved method. All sampling containers will be confirmed clean and contaminate-free prior to use.

B.9 DATA MANAGEMENT

B.9.1 Data Recording and Reporting

Raw data is entered into a database repository on the shared network drive. Data is drawn from the database to prepare the monthly DMRs which are submitted to Senior Operators for review and submission to ADEC. Displayed in Figure 10 is a data reporting flowchart.

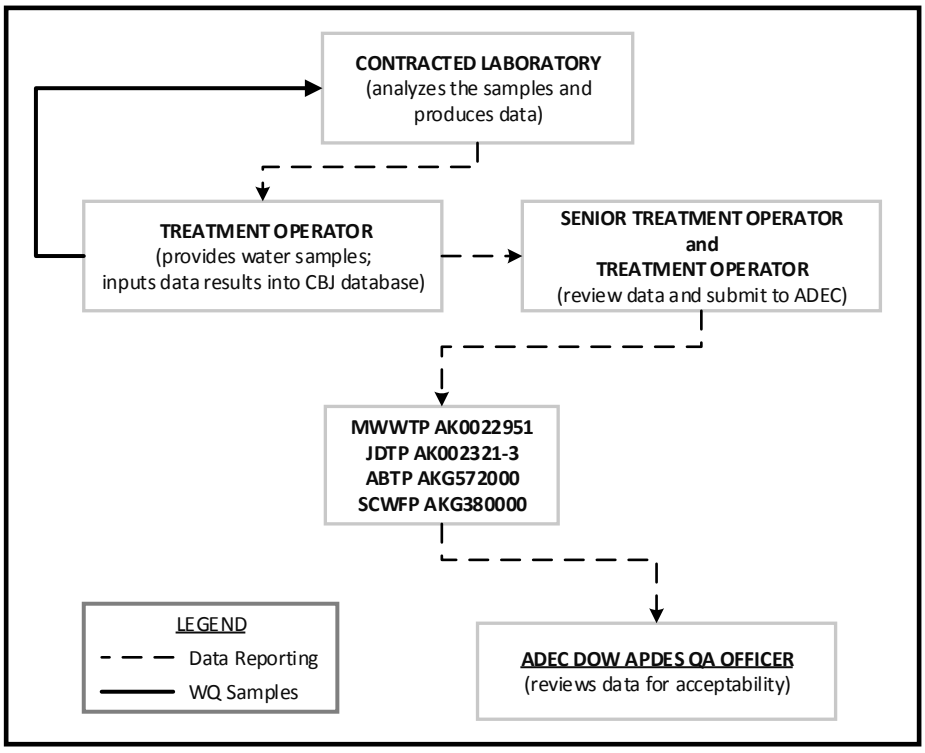


FIGURE 10 - Data Reporting Flowchart

B.9.2 Outliers

When raw data points lie outside the normal range of values, they are considered outliers; these outliers can be the result of transcription errors, improper sampling procedures, laboratory analytical errors, or actual sample variability. Outliers will be maintained within the data set unless demonstrated to have been caused

by a specific error (at which time an explanation will be provided with any report that would have included that specific result).

B.9.3 Significant Figures

Where rounding of figures is done, it occurs at the last stage of the calculation process. The units used in reporting data will be those units most commonly used. Data reporting on the DMRs will be reported to the number of decimal places that match the corresponding limit expressed in the APDES permit.

B.9.4 Data Logging, Storage, and Retrieval

Data is logged at the MWWTP, JDTP, ABTP, and SCWFP. All data results and records are archived as part of the APDES permit. Data management files will be stored on a secure computer. Specific data storage site locations and retention timeframes have been specified in Table 8.

C. ASSESSMENTS

In order to ensure that data collection is conducted as planned, a process of evaluation and validation is necessary. This validation process will ensure that QAPP elements are correctly followed, data quality is adequate, and that a Corrective Action Plan is used if unforeseen circumstances require deviations from the Sampling and Analysis Plan.

CBJ Responsibilities

- **Assessment of Project Activities:** Senior Operators will oversee that field activities are in compliance with established sampling and QA procedures.
- **Technical Systems Audit:** A technical systems audit will be conducted yearly by the Utilities Superintendent examining that the management structure, policy, practices, and procedures are in conformance with the QAPP. The technical systems audit will review project facilities, equipment, personnel, training, procedures, and record keeping.
- **Audit of Data Quality:** An audit of data quality is a procedure to identify means to correct systematic data errors during calculations and automated data processing. This will be used in response to errors detected in the technical systems audit.
- **Peer Review:** Periodic peer review of data is done to ensure that procedures and analyzes are conducted in accordance with the specified methods. Data is reviewed at a 10% frequency by Senior Operators to confirm data entry into the computer spreadsheet.
- **Laboratory Performance Evaluation:** Laboratory performance evaluations are conducted by participating in the annual DMRQA Study to evaluate the proficiency of the staff.

Contracted Laboratories Responsibilities

- **Certification Maintenance:** Contracted laboratories have appropriate State and Federal certifications. Certifications will be confirmed, as needed.
- **Laboratory Performance Evaluation:** Annual DMRQA Study is to evaluate the proficiency of the contracted laboratories. CBJ will enroll the contracted laboratories in the DMRQA Study and have the results sent directly to the EPA.

C.1 ASSESSMENTS AND RESPONSE ACTIONS

Assessments performed for the technical systems audit will be documented with notes. If audits and other assessments find practices or procedures that do not conform to the QAPP, the Utilities Superintendent will initiate a response action. Response actions are corrective actions taken to reduce or preclude the recurrence of a condition adverse to quality. The Utilities Superintendent will determine the cause of problems and select appropriate corrective actions. Follow-up documentation will include additional assessments for corrective actions.

C.2 REVISIONS TO QAPP

Revisions to the QAPP that include changes in monitoring methods, sampling site locations, or changes in analyzes, must solicit input and pre-approval by ADEC DOW staff before implementation.

D. DATA VALIDATION AND USABILITY

D.1 DATA REVIEW

Data Review is the process that evaluates the overall data package to ensure procedures were followed and that reported data is reasonable and consistent with associated QA/QC results. The following areas which have been clearly developed throughout this QAPP will be reviewed; deviations will be noted on the DMR submission so that subsequent reviewers can determine if the data is usable.

- Sampling locations and collection times
- Sample collection methods
- Sample handling procedures
- Analytical methods/procedures
- Calibration, control, and maintenance of equipment

D.2 VERIFICATION AND VALIDATION METHODS

This section will describe the process for validating and verifying data to determine if it satisfies the QAPP-defined user requirements. Verifying project data will consist of ensuring any conclusions based on measurements or analyzes are correct.

D.2.1 Data Verification

Data Verification is the process of evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual requirements.

D.2.2 Verification Methods

Data verification will be evaluated in-house on an ongoing basis. Verification checks on at least 10% of all generated data will be conducted to see if the data were complete, if sampling and analysis matched QAPP requirements, and if SOPs were followed.

If consistent errors are found, in consultation with the ADEC, MWWTP, JDTP, and/or ABTP will conduct an independent technical review. A qualified third party will be hired for the review. The independent technical review will be a documented, in-depth critical review of the data to verify the accuracy of any calculations, examine the applicability of SOPs, ensure the completeness and accuracy of data, and to ensure conformance with applicable permit requirements.

D.2.3 Data Validation

Data validation means determining if the data satisfies QAPP-defined user requirements; that is, that the data refer back to the overall data quality goals. Data validation is a sample-specific process that is used to determine the analytical quality of a specific data set. This ensures that the reported values meet the quality goals of the data operations. Data validation will consist of a review and assessment of the following elements:

- Completeness
- Accuracy (transcription errors)

- Unexpected results, with possible explanations
- Adherence to sampling and analysis procedures
- Review of quality control data

All data generated shall be validated in accordance with the QA/QC requirements specified in the methods and the technical specification outlined in this QAPP.

D.3 RECONCILIATION WITH USER REQUIREMENTS

The Utilities Superintendent will carry out data evaluations to determine, to the extent practicable, if data satisfies the permit requirements in terms of data types, data quantity, and data quality.

D.3.1 Reconciling Results with Permit Requirements

- **Review Permit Requirements and Sampling Locations:** Ensure that appropriate samples were collected at the specified frequency.
- **Conduct a Preliminary Data Review:** Project quality assurance reports, including data validation reports, are reviewed and basic statistics are calculated.
- **Assess Data Conformance With Data Quality Criteria:** Calculate and compare the actual data quality indicators (precision, accuracy) to the objectives specified in Table 6.
- **Use Results of Assessment:** should be included with the DMR (if results indicate that data has been impacted) or used as an indicator to modify or improve portions of the sampling and data collection process

Only data that has been verified and validated shall be used for APDES reporting purposes.

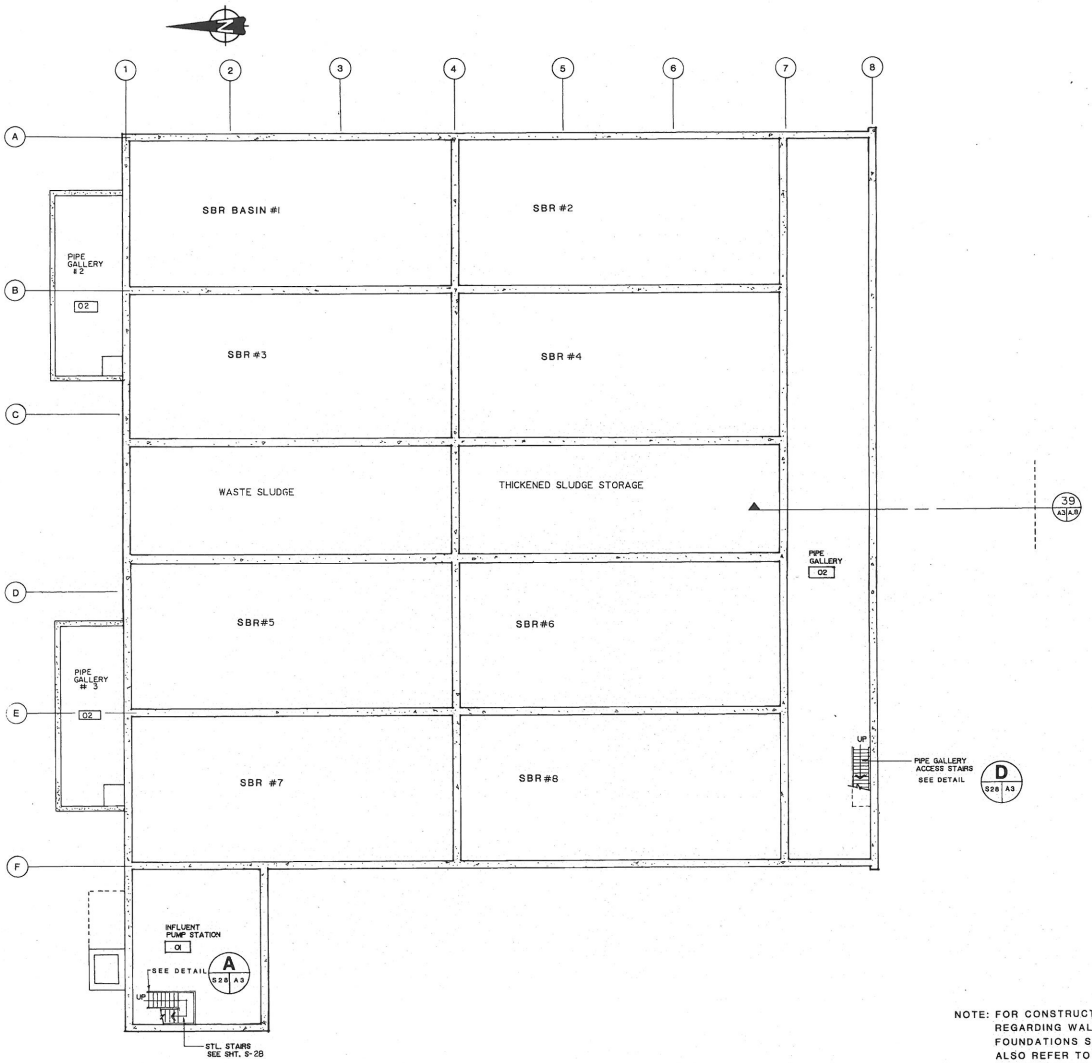
If there are any problems with quality sampling and analysis, these issues will be addressed immediately and methods will be modified to ensure that data quality goals are being met. Modifications to monitoring will require notification to ADEC and subsequent edits to the approved QAPP.

References

- Standard Methods for the Examination of Water and Wastewater, 22nd Edition
- EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5
- EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5
- EPA Guidance on Systematic Planning using the DQOs Process, EPA QA/G-4
- 40 CFR 136.6 for EPA-approved preservation methods and containers

Appendix A1

MWWTP Site Plan



WALL LEGEND
CONCRETE
CONCRETE MASONRY (BLOCK)
METAL STUD & GWB

NOTE: FOR CONSTRUCTION DIMENSIONS REGARDING WALLS, FOOTINGS & FOUNDATIONS SEE SHT. S-1. ALSO REFER TO SHT. S-1 FOR GRID LINE LAYOUT.

STATE OF ALASKA — 49TH — LARRY D. NICHOLS No. A 6645 — REGISTERED PROFESSIONAL ENGINEER

NO.	REVISIONS	DRAWN BY	APPROVED	APPROVED	DATE
NO.	REVISIONS	DRAWN BY	APPROVED	APPROVED	DATE

DESIGNED K.T. Shore (C.E.)
DRAWN RDL
CHECKED Mark Hunt (C.E.)
APPROVED
APPROVED Larry Nichols
DATE 06-01-13

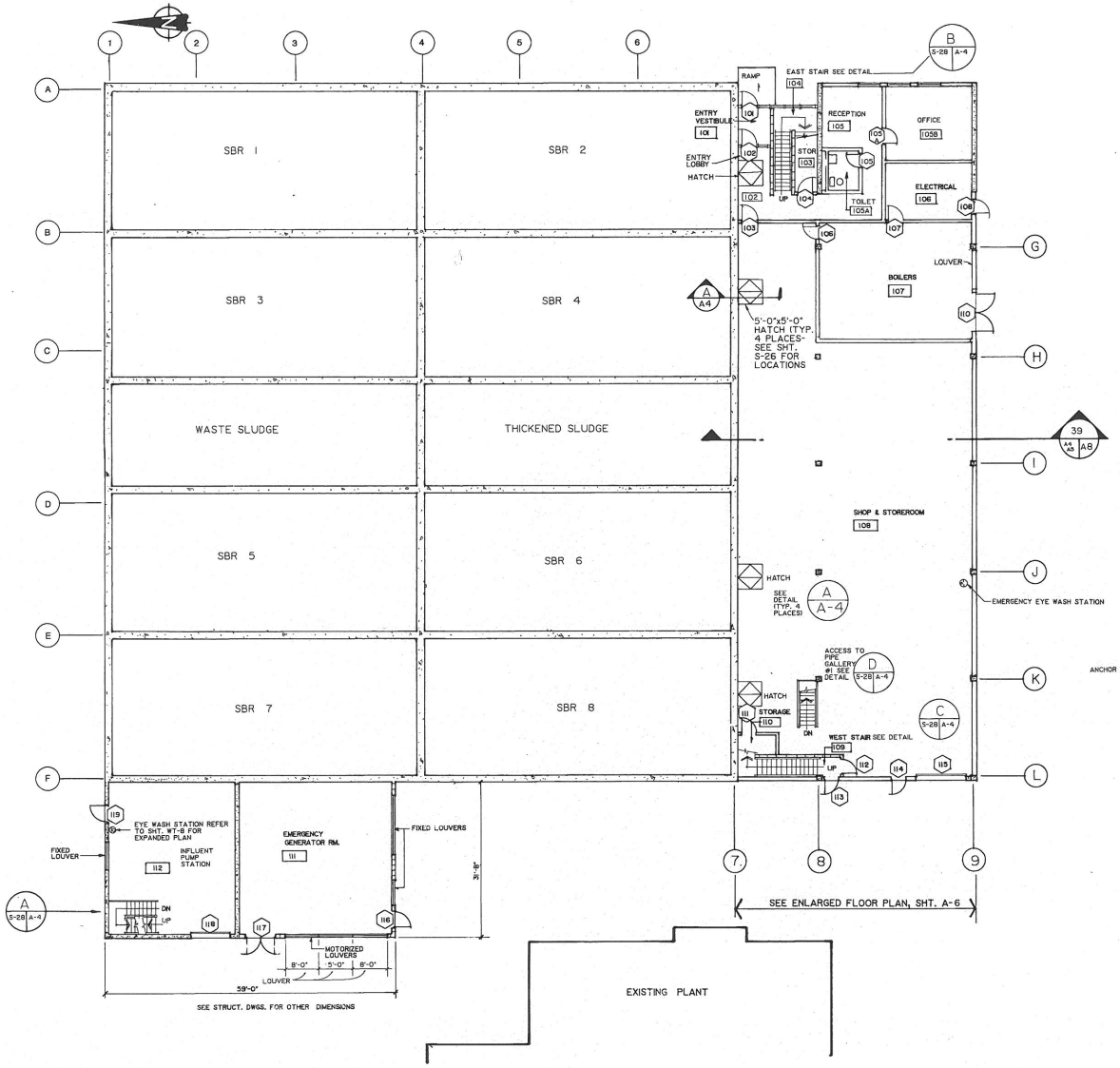
CITY/BOROUGH OF JUNEAU ☆ ALASKA'S CAPITAL CITY

ARCTIC ENGINEERS INC. JUNEAU, ALASKA

MENDENHALL VALLEY TREATMENT PLANT EXPANSION

BASEMENT LEVEL PLAN

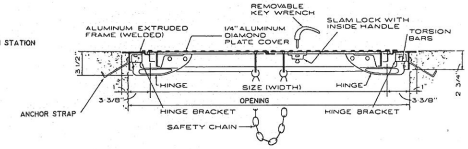
SCALE 3 3/32"=1'-0"
NO. A-3
REV.

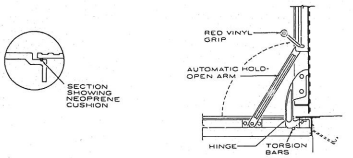


NOTE:
REFER TO SHEET S-15, FOR STRUCTURAL DIMENSIONS AND GRID LINE LAYOUT.

WALL LEGEND

- CONCRETE
- CONCRETE MASONRY (BLOCK)
- METAL STUD & GWB





HATCH X-SECTION DETAIL (A/A4)
NTS

STATE OF ALASKA
7491 TH
LARRY S NICHOLS
No. A 6645
REGISTERED PROFESSIONAL ENGINEER

NO.	REVISIONS	DRAWN BY	APPROVED	APPROVED	DATE
NO.	REVISIONS	DRAWN BY	APPROVED	APPROVED	DATE

DESIGNED KH Shop 4. (C-26)
DRAWN RDL
CHECKED Dick Hunt (C-16)
APPROVED
APPROVED Larry Nichols
DATE SEPT. 17, 1985

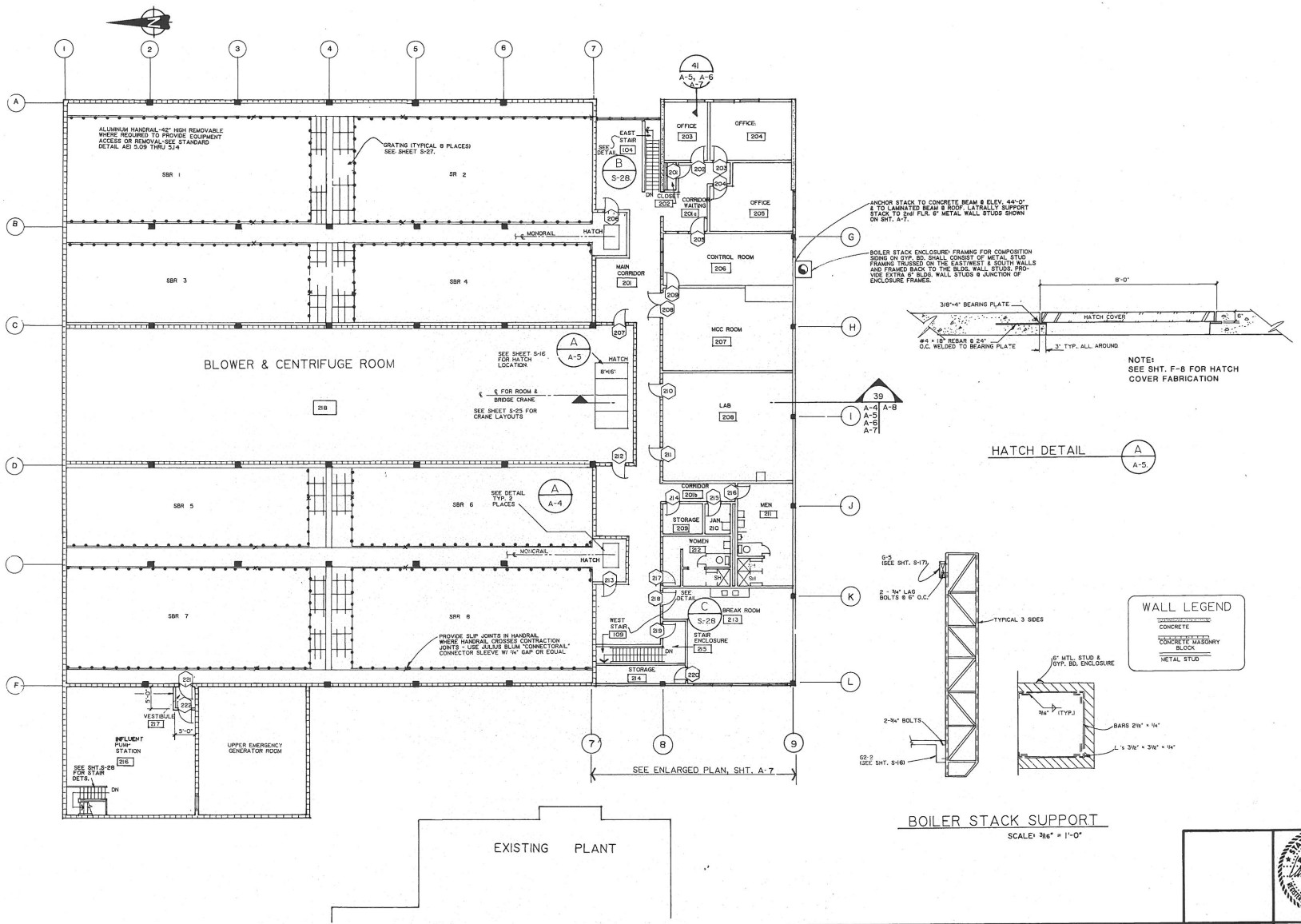
CITY/BOROUGH OF JUNEAU
☆ ALASKA'S CAPITAL CITY

ARCTIC ENGINEERS INC. JUNEAU, ALASKA

MENDENHALL VALLEY TREATMENT PLANT EXPANSION

GROUND FLOOR PLAN

SCALE 3/32"=1'-0"
NO. A-4
REV.



NO.	REVISIONS	DRAWN BY	APPROVED	APPROVED	DATE
1	ADD BOILER STACK SUPPORT	L.M.			

NO.	REVISIONS	DRAWN BY	APPROVED	APPROVED	DATE
3		4			

DESIGNED Kit Shore 6-20
DRAWN RDL
CHECKED Mark Wunch 6-20
APPROVED
APPROVED Larry Nichols
DATE SEPT. 17, 1986

CITY/BOROUGH OF JUNEAU
☆ ALASKA'S CAPITAL CITY

ARCTIC ENGINEERS INC. JUNEAU, ALASKA

MENDENHALL VALLEY TREATMENT PLANT EXPANSION

SECOND FLOOR

SCALE 3/32"=1'-0"
NO. A-5
REV.

STATE OF ALASKA
49TH
LARRY D NICHOLS
No. A 6645
REGISTERED PROFESSIONAL ENGINEER

	ITEM	DIMENSIONS
JJ	FUME HOOD GLASS FRONT WITH REMOTE CONTROLLED AIR, GAS, VACUUM, ISOLATED GFI ELECTRICAL OUTLET REMOTE CONTROL, SINGLE SERVICE CUP SINK, TRANSITE LINING, WITH FAN TO PROVIDE 720 c/m @ 0.45" S.P. 1/3 HP - 120/230V	47" W x 29" D
KK	ACID STORAGE BASE CABINET	
LL_1	FRAMED GLASS SLIDING DOOR WALL CABINETS	35" H x 35" W x 12" D
LL_2	FRAMED GLASS SLIDING DOOR WALL CABINETS	29" H x 47" W x 12" D
LL_3	FRAMED GLASS SLIDING DOOR WALL CABINETS	29" H x 29" W x 12" D
MM	CHEMICAL STORAGE ASSEMBLY	84" H x 94" W x 23" D
	TOP UNITS - FRAMED SLIDING GLASS DOORS WITH ADJ. SHELF UNITS	47" H x 94" W x 12" D
	BOTTOM UNITS - DRAWERS & DOORS AS SHOWN SOLID TOP	37" H x 94" W x 23" D
NN	CENTER TABLE WITH CENTRAL REAGENT RACK, SOLID BACK SPLASH CABINETS AS SHOWN	
OO	MICRO-WAVE OVEN- WALL MOUNTED- 2C.F. VOLUMN	

ELEV E A14

ELEV G A14

ELEV F A14

ELEV C A14

220V AT BACK OF CABINET

PLAN VIEW

ELEV D A14

ELEV A A14

ELEV B A14

	ITEM	DIMENSIONS
A	OPEN SHELVING CASE 3 ADJ. SHELVES + BOTTOM	35" W x 47" H x 12" D
B	FRAMED SLIDING GLASS FRONT FLOOR CABINET 5 ADJ. SHELVES + BOTTOM	47" W x 84" H x 16" D
C	DBL. PEDESTAL DESK 4 BOX, 1 BUCKET FILE DRAWERS	50" W x 29 1/2" H x 30" D
D	SWIVEL CHAIR WITH ARM REST	19" W X 17"-20" H (ADJ) x 18"D
E	4 DRAWER LEGAL FILE CABINETS	18" W x 72 1/2" H x 30"D
F	18 C.F. B.O.D. INCUBATOR 120V, 650W	32" W x 72 1/2" H x 30"D
G	14 C.F. REFRIGERATOR/FLAMMABLE MATERIALS 120V, 480W	29 3/4" W x 59" H x 31 1/2" D
H	WASTE RECEPTACLE - 24 QT. CAP POLYETHYLENE	10" D x 19" H
I	MICROSCOPE STOOL PADDED	14" D = 17"-22" H (ADJ)
J	MICROSCOPE DESK	48" W x 28" H x 30" D
K	BALANCE TABLE, MARBLE 3" THICK	47" W x 31" H x 24" D
L	LAB CHAIR POSTUPE WITH FOOTREST PADDED	15 1/2" W x 20-35" H (ADJ) x 14"D
M	EMERGENCY SHOWER EYE/ASH	
N	"ORCEPTOR - TERRAZOE	24" x 24" WITH BACK SPLASH
O	ABC 4 DRY PYUDER FIRE EXTINGUISHER 5lb	
P	VACUUM PUMP, 24 L MIN. - 10 MICRON 1/3 HP 1/2"	
R	4 L/HR. CARNLTEAD DISTILLING APPARTUS	
S	SCALE ARRESTER FOR LABMSTEAD STILL	
T	25 GAL. TIN LINED DISTILLED	
U		
V	TWO TUB SINK, I.D. TUB = EPOXY RESIN WITH CUPC MOUNT DOUBLE SERVICE MIXING FAUCET GOOSENECK, 5 AERATOR	15" L x 15" W x 15" D
W	TWO TUB SINK, I.D. TUB = EPOXY RESIN WITH CUPC MOUNT DOUBLE SERVICE MIXING FAUCET, GOOSENECK & AERATOR	15" L x 7 1/2" W x 15" D
X	SINGLE TUB SINK, I.D. = EPOXY RESIN WITH CUPC MOUNT DOUBLE SERVICE MIXING FAUCET GOOSENECK & AERATOR	15" L x 15" W x 15" D
Y	EPOXY DRAIN THROUGH WITH 6 EA. DECK MOUNT SINGLE SERVICE FAUCET, VACUUM BREAKER GOOSENECK 5 HOSE CONNECTOR	6" x 72" x 6" DEEP
Z	CUP SINK WITH DECK MOUNT SINGLE SERVICE FAUCET, VACUUM BREAKER GOOSENECK 5 HOSE CONNECTOR.	
AA	4 HOLE CONCENTRIC TRIM STEAMING BATH SET INTO COUNTER TOP & PLUMBED FOR FILL AND DRAIN VALVES UNDER FABTRET TOP.	
BB	POLYPROPYLENE PEDDARD MOUNT ON WALL	42" x 24"
CC	PORTABLE ELECTRIC STEMCLAVE 220V 9A	
DD	MUFFLE FURNACE 120V 15 AMPS	
EE	GRAVITY OVEN 120V 1500W	
FF	KOLIFORM INCUBATOR BATH (MAGNI WHIRL 120V 2400W	
GG	DESICATOR CABINET	
HH	AUTO PIPET WASHER RINSER WITH EXTRA HOLDER	
II	HEAT HOODS GALV. AND COATED STEEL	96" W x 30" D

NOTE

ALL BASE WALL CABINETS TO HAVE 1/2" MAIN COUNTER & 7" SPLASH SHELF WITH 10" HIGH REAGENT RACK WHERE SHOWN BACK SPLASH HEIGHTS TO BE 18" HIGH WITH FRONT FLUSH WITH SPLASH SHELF DRAWERS & SHELVES AS SHOWN.

LEGEND

- 220 VOLT OUTLET
- 120 VOLT OUTLET
- ISOLATED CIRCUIT 120 VOLT OUTLET

PLAN
ELEV

NO.	REVISIONS	DRAWN BY	APPROVED	APPROVED	DATE
NO.	REVISIONS	DRAWN BY	APPROVED	APPROVED	DATE

DESIGNED
DRAWN
CHECKED
APPROVED
APPROVED
DATE SEPT. 17, 1985

CITY/BOROUGH OF JUNEAU
ALASKA'S CAPITAL CITY

ARCTIC ENGINEERS INC. JUNEAU, ALASKA

MENDENHALL VALLEY TREATMENT PLANT EXPANSION

LABORATORY FURNISHINGS PLAN & ELEVATIONS

SCALE 3/8" = 1'-0"

NO. A-14

REV.

Appendix A2

MWWTP APDES Permit & Fact Sheet

ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

INDIVIDUAL PERMIT – FINAL

Permit Number AK0022951

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501

In compliance with the provisions of the Clean Water Act (CWA), 33 U.S.C. §1251 *et seq*., as amended by the Water Quality Act of 1987, P.L. 100-4, this permit is issued under provisions of Alaska Statutes (AS) 46.03; the Alaska Administrative Code (AAC) as amended; and other applicable State laws and regulations. The

CITY AND BOROUGH OF JUNEAU

is authorized to discharge from the Mendenhall Wastewater Treatment Plant at 2009 Radcliffe Road, Juneau, Alaska at the following location:

Outfall	Receiving Water or Body	Latitude	Longitude
001	Mendenhall River	58° 21' 43" North	-134° 35' 53" West

In accordance with the discharge point effluent limitations, monitoring requirements, and other conditions set forth herein:

This permit and authorization shall become effective August 1, 2014

This permit and the authorization to discharge shall expire at midnight, July 31, 2019

The permittee shall reapply for a permit reissuance on or before February 1, 2019, 180 days before the expiration of this permit if the permittee intends to continue operations and discharge at the facility beyond the term of this permit.

The permittee shall post or maintain a copy of this permit to discharge at the facility and make it available to the public, employees, and subcontractors at the facility.

Wade Strickland
Signature

June 26, 2014
Date

Wade Strickland
Printed Name

Program Manager
Title

TABLE OF CONTENTS

LIST OF TABLES

SCHEDULE OF SUBMISSIONS

The Schedule of Submissions summarizes required submissions and activities the permittee must complete and/or submit to the Alaska Department of Environmental Conservation (Department or DEC) during the term of this permit. The permittee is responsible for all submissions and activities even if they are not summarized below.

Table 1: Schedule of Submissions

Permit Part	Submittal or Completion	Frequency	Due Date	Submit to[a]
Appendix A, 3.2	Discharge Monitoring Report (DMR)	Monthly	Must be postmarked on or before the 15th day of the month following the reporting period.	Compliance
1.5.9	Annual Receiving Water Quality Monitoring Summary Report	Annually	No later than April 30th of each year.	Compliance
2.1	Written notice that the Quality Assurance Project Plan (QAPP) has been updated and implemented	1/permit cycle	Within 180 Days after the effective date of the permit	Compliance
2.2	Written notice that the Operation and Maintenance (O&M) Plan has been developed or modified and implemented	1/permit cycle	Within 180 Days after the effective date of the permit	Compliance
2.3	Facility Plan	1/permit cycle	180 days before expiration of permit with application for APDES Permit Reissuance	Permitting
Appendix A, 1.3	Application for Permit Reissuance	1/permit cycle	180 days before expiration of the permit	Permitting
Appendix A, 3.4	Oral notification of noncompliance	As Necessary	Within 24 hours from the time the permittee becomes aware of the circumstances of noncompliance	Compliance
Appendix A, 3.4	Written documentation of noncompliance	As Necessary	Within 5 calendar days after the permittee becomes aware of the circumstances	Compliance

Notes:
a) See Appendix A 1.1 for addresses.

1.0 LIMITATIONS AND MONITORING REQUIREMENTS

1.1 Discharge Authorization

During the effective period of this permit, the permittee is authorized to discharge pollutants from Outfall 001 specified herein to Mendenhall River, within the limits and subject to conditions set forth herein. This permit authorizes discharge of only those pollutants resulting from facility processes, waste streams, and operations clearly identified in the permit application process.

1.2 Effluent Limits and Monitoring

1.2.1 The permittee must limit and monitor discharges from Outfall 001 as specified in Table 2. All values represent maximum effluent limits, unless otherwise indicated. The permittee must comply with effluent limits in the table at all times unless otherwise indicated, regardless of monitoring frequency or reporting required by other provisions of this permit.

Table 2: Outfall 001 Effluent Limits and Monitoring Requirements

Parameter	Effluent Limits					Monitoring Requirements		
	Units	Minimum Daily	Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Flow	mgd [a]	----	Report	----	4.9	Effluent	Continuous	Recorded
Dissolved Oxygen	mg/L [b]	Report	----	----	Report	Effluent	1/Month	Grab
Temperature	°C [c]	----	Report	----	Report	Effluent	5/Week	Grab
Biochemical Oxygen Demand, 5-day (BOD_5)	mg/L	----	30	45	60	Effluent	2/Month [d]	24-hour Composite [e]
	lbs/day [f]	----	1,226	1,839	2,452			Calculation [f]
BOD_5	mg/L	----	Report	----	----	Influent	2/Month [d]	24-hour Composite
BOD_5 Percent Removal	%	85	----	----	----	Effluent vs. Influent	1/Month	Calculation [g]
Total Suspended Solids (TSS)	mg/L	----	30	45	60	Effluent	2/Month [d]	24-hour Composite
	lbs/day	----	1,226	1,839	2,452			Calculation
TSS	mg/L	----	Report	----	----	Influent	2/Month [d]	24-hour Composite
TSS Percent Removal	%	85	----	----	----	Effluent vs. Influent	1/Month	Calculation
pH (November 1 – June 30)	SU [h]	6.5	----	----	8.5	Effluent	5/Week	Grab
pH (July 1 – October 31)	SU	6.3	----	----	8.5	Effluent	5/Week	Grab
Fecal Coliform Bacteria (FC) (November 1 – April 30)	FC /100 mL [i]	----	112 [j]	168 [j]	224 [k]	Effluent	2/Week	Grab
Fecal Coliform Bacteria (May 1 – October 31)	FC /100 mL	----	200 [j]	400 [j]	800 [k]	Effluent	1/Week	Grab
Total Ammonia as Nitrogen (N)(November 1 – April 30)	mg/L	----	28.5	----	40.5	Effluent	1/Month	24-hour Composite
	lbs/day	----	1165	----	1655			Calculation

Table 2: Outfall 001 Effluent Limits and Monitoring Requirements

Parameter	Effluent Limits					Monitoring Requirements		
	Units	Minimum Daily	Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Total Ammonia as N (May 1 – October 31)	mg/L	----	Report	----	Report	Effluent	1/Month	24-hour Composite
Copper - Total Recoverable (November 1 – April 30)	µg/L [l]	----	86.7	----	187.0	Effluent	1/Month	24-hour Composite
	lbs/day	----	3.54	----	7.63			Calculation
Copper - Total Recoverable (May 1 – October 31)	µg/L	----	44.5	----	95.8	Effluent	1/Month	24-hour Composite
	lbs/day	----	1.82	----	3.92			Calculation
Lead - Total Recoverable	µg/L	----	Report	----	Report	Effluent	3/Year [m]	24-hour Composite
Silver - Total Recoverable	µg/L	----	Report	----	Report	Effluent	3/Year [m]	24-hour Composite
Zinc - Total Recoverable	µg/L	----	Report	----	Report	Effluent	3/Year [m]	24-hour Composite
Whole Effluent Toxicity (WET) (November 1 – April 30)	TU_c [n]	----	5.1	----	Report	Effluent	1/Year [o]	24-hour Composite
WET (May 1 – October 31)	TU_c	----	Report	----	Report	Effluent	1/Year [o]	24-hour Composite
Hardness as $CaCO_3$	mg/L	----	Report	----	Report	Effluent	1/Month	24-hour Composite
Alkalinity as $CaCO_3$	mg/L	----	Report	----	Report	Effluent	1/Quarter [p]	24-hour Composite
Floating Solids or Visible Foam [q]	Visual	----	----	----	Report	Effluent	1/Month	Visual

Notes:

a. mgd = million gallons per day
b. mg/L = milligrams per liter
c. °C = degrees Celsius
d. Influent and effluent samples must be taken over approximately the same time period.
e. Composite samples must consist of at least eight grab samples collected at equally spaced intervals and proportionate to flow so that composite samples reflect influent/effluent quality during the compositing period.
f. lbs/day = pounds per day = [(parameter concentration in mg/L) x (facility design flow in mgd) x (conversion factor of 8.34)].
g. Minimum % Removal = [(monthly average influent concentration in mg/L – monthly average effluent concentration in mg/L) / (monthly average influent concentration in mg/L)] x 100.
h. SU = pH standard units
i. FC /100 mL = colonies of fecal coliform bacteria per 100 mL
j. All fecal coliform bacteria average results must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the quantities. For example the geometric mean of 100, 200, and 300 is $(100 \times 200 \times 300)^{1/3} = 181.7$.
k. Not more than 10 percent of samples may exceed the daily maximum limit
l. µg/L = micrograms per liter
m. Lead, silver, and zinc must be sampled at least once during each of the following periods each year: January through April, May through August, and September through December. Results must be submitted with the April, August, and December DMRs.
n. TUc = toxic units, chronic
o. Of the requisite two samples per year, one sample must be taken between November—April and one sample must be taken between May—October.

Table 2: Outfall 001 Effluent Limits and Monitoring Requirements

Parameter	Effluent Limits					Monitoring Requirements		
	Units	Minimum Daily	Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type

p. Quarters are defined as January-March, April-June, July-September and October-December. Results for monitoring performed quarterly must be submitted with the DMR for the last month of the quarter: March, June, September, and December DMRs.

q. See Section 1.2.4

1.2.2 Discharge shall not cause contamination of surface or ground waters, and shall not cause or contribute to a violation of the Alaska Water Quality Standards (18 AAC 70), except if excursions are authorized in accordance with applicable provisions in 18 AAC 70.200 – 70.270 (e.g. variance, mixing zone).

1.2.3 The permittee must collect effluent samples from the effluent stream after the last treatment unit before discharge into receiving waters.

1.2.4 The permittee must not discharge any floating solids, debris, sludge, deposits, foam, scum or other residues that cause a film, sheen, or discoloration on the surface of the receiving water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines.

1.2.5 Removal requirements for BOD_5 and TSS. The monthly average percent removal for BOD_5 and TSS shall not be less than 85 percent and must be reported on the DMR. For each parameter, the monthly average percent removal must be calculated from the arithmetic mean of the influent concentration values and the arithmetic mean of the effluent concentration values measured during that month. Influent and effluent samples must be taken over approximately the same time period.

1.2.6 Monthly averages are to be calculated over a calendar month and weekly averages are to be calculated over a time period of Sunday through Saturday. The permittee shall include in the QAPP, required in Section 2.1, how weekly averages that overlap two months will be reported on DMRs.

1.2.7 For all effluent monitoring, the permittee must use an Environmental Protection Agency (EPA) approved test method that can achieve a reporting limit (RL) less than the effluent limit. For a parameter without an effluent limit, the permittee must use the test method; approved under Code of Federal Regulation Title 40 (40 CFR) Part 136, adopted by reference at 18 AAC 83.010, with the most sensitive method detection limit (DL) necessary for compliance monitoring.

1.2.8 For purposes of reporting on the DMR for a single sample, if a value is less than the DL, the permittee must report “less than [numeric value of DL]” and if a value is less than an RL, the permittee must report “less than [numeric value of RL].”

1.2.9 For purposes of calculating a monthly average, zero (0) may be assigned for a value less than the DL, and the [numeric value of DL] may be assigned for a value between the DL and the RL. If the calculated average value is less than the DL, the permittee must report "less than [numeric value of DL]." If the calculated average value is less than the RL, the permittee must report "less than [numeric value of RL]." If a value is equal to or greater than the RL, the permittee must report and use the actual value. The resulting average value must be compared to the compliance level in assessing compliance.

1.3 Additional Monitoring

1.3.1 Design Flow Greater than 1.0 mgd

1.3.1.1 In accordance with the Alaska Pollutant Discharge Elimination System (APDES) application Form 2A, Section 10, Section 11, and Supplement A, a facility with a design flow greater than 1.0 mgd shall conduct additional effluent monitoring of pollutants during the life of the permit and include results of such monitoring with the permittee's reissuance application. The permittee shall perform effluent monitoring at least three times in the first four and one-half years of the permit term (see Table 3 requirements).

1.3.1.2 Each monitoring event shall be conducted in a different calendar year and different season as follows:

Winter – December through February,

Summer – June through August, and

Spring or Fall – March through May or September through November, respectively.

1.3.1.3 Monitoring for these parameters performed to satisfy other monitoring requirements of this permit may be used to satisfy this specific monitoring requirement as long as the "different calendar year and season" criteria are met.

Table 3: Additional Effluent Monitoring for Reissuance Application

Parameter	Units	Sample Location	Sample Frequency	Sample Type
Ammonia (as N)	mg/L	Effluent	3 / 4.5 years [a]	24-hour Composite
Chlorine, Total Residual [b]	mg/L	Effluent	3 / 4.5 years	Grab
Dissolved Oxygen	mg/L	Effluent	3 / 4.5 years	Grab
Nitrate/Nitrite	mg/L	Effluent	3 / 4.5 years	24-hour Composite
Kjeldahl Nitrogen	mg/L	Effluent	3 / 4.5 years	24-hour Composite
Oil and Grease	mg/L	Effluent	3 / 4.5 years	Grab
Phosphorus	mg/L	Effluent	3 / 4.5 years	24-hour Composite
Total Dissolved Solids	mg/L	Effluent	3 / 4.5 years	24-hour Composite
Expanded Effluent Testing (from Supplement A, Form 2A)	varies	Effluent	3 / 4.5 years	Varies

Notes:
a. 3 / 4.5 years means three sample must be taken within four and one half years from the effective date of this permit.
b. Sampling and analyzing for total residual chlorine is not required if the facility does not use chlorine for disinfection, does not use chlorine elsewhere in the treatment process, and has no reasonable potential to discharge chlorine in the effluent.

1.4 Whole Effluent Toxicity (WET) Testing Requirements

1.4.1 Chronic whole effluent toxicity (WET) tests must be conducted on effluent samples from Outfall 001, at a minimum, twice per year. Within a year, the permittee must test for chronic toxicity at least once during the period from May 1 through October 31, and at least once during the period from November 1 through April 30. Permittee may conduct more than two chronic WET tests per year if needed, but must report results of all toxicity tests to the Department.

1.4.2 Chronic WET testing must be conducted on 24-hour composite samples of effluent. A split of each sample collected must be analyzed for the chemical and physical parameters required in Table 2, that have a required monitoring frequency of quarterly or more frequently. When the timing of sample collection coincides with that of the sampling requirements of Table 2, analysis of the split sample will fulfill the requirements of Table 2 as well.

1.4.3 Chronic Test Species and Methods

1.4.3.1 The presence of chronic toxicity must be determined as specified in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, EPA/821-R-02-013, October 2002.

1.4.3.2 Results must be reported in TUc, where TUc = 100/No Observed Effect Concentration (NOEC). The NOEC is the highest effluent concentration to which organisms are exposed in a chronic test that causes no observable adverse effects to the test organism.

1.4.3.3 The permittee must conduct short-term tests with the water flea, *Ceriodaphnia dubia* (survival and reproduction test), and the fathead minnow, *Pimephales promelas* (larval survival and growth test), for the first three suites of tests. After this screening period, monitoring must be conducted using the most sensitive species.

1.4.3.4 If the permittee proposes an alternative species to be used for chronic toxicity testing, the permittee shall perform screening first and provide the results of the screening to DEC for review and written approval prior to implementing the use of the new test species.

1.4.4 Quality Assurance

1.4.4.1 The toxicity testing on each organism must include a series of five test dilutions and a control (0% effluent). The dilution series shall consist of effluent concentrations of 5%, 9%, 18%, 36%, and 72% for samples taken between November through April, and 2%, 3%, 5%, 9%, and 18% for samples taken between May through October.

1.4.4.2 All quality assurance criteria and statistical analyses used for chronic toxicity testing and reference toxicant tests must be in accordance with *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, EPA/821-R-02-013, October 2002, and individual test protocols.

1.4.4.3 In addition to those quality assurance measures specified in the methodology citation in 1.4.4.2, the following quality assurance procedures must be followed:

1.4.4.3.1 If organisms are not cultured in-house, concurrent testing with reference toxicants must be conducted. If organisms are cultured in-house, monthly reference toxicant testing is sufficient. Reference toxicant tests must be conducted using the same test conditions as the effluent toxicity tests.

1.4.4.3.2 If either of the reference toxicant tests or the effluent tests does not meet all test acceptability criteria as specified in the test methods manual, the permittee must resample and retest within 14 days of receipt of the test results.

1.4.4.3.3 Control and dilution water must be receiving water or lab water, as appropriate, as described in the manual. If the dilution water used is different from the culture water, a second control, using culture water, must also be used. Receiving water may be used as control and dilution water upon notification of DEC. In no case shall water that has not met test acceptability criteria be used for either dilution or control.

1.4.5 Accelerated Testing

1.4.5.1 If chronic toxicity is detected above the effluent limit specified in Table 2 of this permit and the permittee demonstrates through an initial investigation and evaluation of facility operations that the cause of the exceedance is known and corrective actions have been implemented, only one accelerated test is necessary. It toxicity exceeding the chronic toxicity limit is detected in this test, then the Toxicity Reduction Evaluation requirement in Section 1.4.6 shall apply.

1.4.5.2 If chronic toxicity is detected above the effluent limit specified in Table 2 of this permit and no initial investigation is conducted or cause is determined by the initial investigation, then the permittee must conduct four additional biweekly tests over an eight week period. This accelerated testing must be initiated within 14 days of receipt of the test results that indicated an exceedance.

1.4.5.3 The permittee must notify DEC of the exceedance in writing within 14 days of receipt of test results. The notice must include the following information:

1.4.5.3.1 A status report on any actions required by the permit with a schedule for actions not yet completed;

1.4.5.3.2 A description of any additional actions the permittee has taken or will take to investigate and correct the cause(s) of the toxicity; and

1.4.5.3.3 Where no actions have been taken, a discussion of the reasons for not taking action.

1.4.5.4 If none of the four accelerated tests exceed effluent limits, the permittee may return to the normal testing frequency. If any of the four tests exceed the limit, then the toxicity reduction evaluation requirements, in Section 1.4.6, shall apply.

1.4.6 Toxicity Reduction Evaluation (TRE) and Toxicity Identification Evaluation (TIE) - Whole Effluent Toxicity

1.4.6.1 If the chronic toxicity limit is exceeded during accelerated testing under Section 1.4.5, the permittee must initiate and submit to DEC a TRE in accordance with *Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations*, (EPA/600/2-88/070) within 14 days of the exceedance. At a minimum, the TRE must include:

1.4.6.1.1 Further actions to investigate and identify the cause of toxicity;

1.4.6.1.2 Actions the permittee will take to mitigate the impact of the discharge and to prevent the recurrence of toxicity; and

1.4.6.1.3 A schedule for these actions.

1.4.6.2 If a TRE is initiated prior to completion of the accelerated testing, the accelerated testing methods may be terminated, or used as necessary in performing the TRE.

1.4.6.3 The permittee may initiate a TIE as part of the TRE process. Any TIE must be performed in accordance with EPA guidance manuals, *Toxicity Identification Evaluation; Characterization of Chronically Toxic Effluents, Phase I* (EPA/600/6-91/005F), *Methods for Aquatic Toxicity Identification Evaluations, Phase II: Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity* (EPA/600/R-92/080), and *Methods for Aquatic Toxicity Identification Evaluations, Phase III: Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity* (EPA-600/R-92/081).

1.4.7 Whole Effluent Toxicity Reporting Requirements

1.4.7.1 The permittee must submit the results of the toxicity tests with the DMR. Toxicity tests taken May 1 through October 31 must be reported with the October DMR. Toxicity tests taken November 1 through April 30 must be reported with the April DMR.

1.4.7.2 Toxicity test results shall be reported according to the guidance: *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, EPA/821-R-02-013, October 2002, or subsequent editions.

1.5 Mixing Zone

In accordance with state regulations at 18 AAC 70.240, as amended through June 26, 2003, a chronic mixing zone for ammonia, copper, lead, fecal coliform bacteria, pH, and chronic WET is authorized in the Mendenhall River for discharges from Outfall 001. The mixing zone is defined as the area of a rectangular shape, 30 meters wide and extending 100 meters upstream and 100 meters downstream centered over the diffuser. The long axis of the rectangular shaped mixing zone runs parallel to the shoreline. The area extends from the river bottom to the surface of the water and is oriented with the river flow (downstream) and tidal flow (upstream). The chronic mixing zone is designed to ensure that the most stringent water quality criteria are met at all points outside the boundary of the mixing zone.

An acute mixing zone, defined as the area of a rectangular shape, 10 meters wide and extending six meters upstream and six meters downstream centered over the diffuser, has been authorized for ammonia and copper. The acute mixing zone is designed to ensure that acute water quality criterion are met at all points outside the boundary of the authorized mixing zone.

1.6 Receiving Water Monitoring

1.6.1 The permittee must conduct receiving water monitoring. The permittee must begin collecting samples of the receiving water at appropriate locations according to the requirements in this section within 30 days of the effective date of this permit.

1.6.2 Monitoring stations must be established in the Mendenhall River at the following locations:

1.6.2.1 100 meters upstream of the diffuser, beyond the influence of the facility's discharge; and

1.6.2.2 At the boundary of the mixing zone, 100 meters downstream of the discharge, at points where the effluent and the Mendenhall River receiving waters are completely mixed.

1.6.3 To the extent practicable, receiving water sample collection must occur on the same day as effluent sample collection.

1.6.4 All receiving water samples must be grab samples and must be taken during periods of low tide.

1.6.5 Copper and lead must be analyzed as dissolved.

1.6.6 Samples must be analyzed for the parameters listed in Table 4.

Table 4: Receiving Water Monitoring Requirements

Parameter	Units	Sampling Location(s)	Sampling Frequency	Sample Type	Reporting Limits [a]
Temperature	°C	Upstream [b] and Downstream [c]	1/Month	Grab	--
Fecal Coliform Bacteria [d]	FC/100 mL	Upstream and Downstream	1/Month	Grab	1.0
Total Ammonia as N	mg/L	Upstream and Downstream	4/Year [e]	Grab	0.05
pH	SU	Upstream and Downstream	1/Month	Grab	--
Copper [f]	µg/L	Upstream and Downstream	2/Year [g]	Grab	2.0
Lead [f]	µg/L	Upstream	2/Year [g]	Grab	2.0
Hardness as $CaCO_3$	mg/L	Upstream and Downstream	1/Month	Grab	10
Dissolved Oxygen	mg/L	Upstream and Downstream	1/Month	Grab	--
Alkalinity as $CaCO_3$	mg/L	Upstream	1/Month	Grab	10

Notes:

a) Permittee must use analytical test methods that can reliably measure a minimum concentration of a given parameter at levels equivalent to or less than the values in this column.

b) Location of sampling must be established upstream as stated in Section 1.6.2.1.

c) Location of sampling must be established downstream as stated in Section 1.6.2.2.

d) All mixing zone fecal coliform bacteria average results must be reported as geometric means. When calculating the geometric mean, replace all results of zero (0) with a one (1). The geometric mean of "n" quantities is the "nth" root of the quantities. For example, the geometric mean of 100, 200, and 300 is $(100 \times 200 \times 300)^{1/3} = 181.7$.

e) Of the requisite four samples per year, two samples must be taken between November—April and two samples must be taken between May—October.

f) Analysis for copper and lead in the receiving water must be as a dissolved metal.

g) Of the requisite two samples per year, one sample must be taken between May 1 and October 31, and one sample must be taken between November 1 and April 30.

1.6.7 Quality assurance and quality control for all monitoring must be documented in the QAPP required under Section 2.1., "Quality Assurance Project Plan".

1.6.8 Receiving water monitoring results must be included in an Annual Receiving Water Monitoring Summary report submitted to DEC no later than April 30th of each year. This report must summarize receiving water quality monitoring from the previous calendar year. At a minimum, the annual receiving water reports must include:

1.6.8.1 Dates of sample collection;

1.6.8.2 Results of sample analyses; and

1.6.8.3 Details of the locations from which grab samples were taken.

2.0 SPECIAL CONDITIONS

2.1 Quality Assurance Project Plan

2.1.1 The permittee must develop and maintain a QAPP for all monitoring required by this permit. The permittee must submit written notice to DEC affirming that its QAPP is up to date and is being implemented within 180 days of the effective date of this permit. Any existing QAPP may be modified under this section.

2.1.2 All procedures in the previous QAPP must be followed until the new QAPP has been implemented.

2.1.3 The QAPP must be designed to assist in planning for the collection and analysis of effluent and receiving water samples in support of the permit and to help explain data anomalies whenever they occur.

2.1.4 The permittee may use either the generic DEC Wastewater Treatment Facility Quality Assurance Project Plan (DEC QAPP) or must develop a facility-specific QAPP. Some facility specific information is required to complete the QAPP when using the generic DEC QAPP.

2.1.5 Throughout all sample collection and analysis activities, the permittee must use approved procedures, as described in the *Requirements for Quality Assurance Project Plans* (EPA/QA/R-5) and *Guidance for Quality Assurance Project Plans* (EPA/QA/G-5). The QAPP must be prepared in the format specified in these documents.

2.1.6 At a minimum, a QAPP must include:

2.1.6.1 Details on number of samples, type of sample containers, preservation of samples, holding times, analytical methods, analytical detection and quantitation limits for each target compound, type and number of quality assurance field samples, precision and accuracy requirements, sample preparation requirements, sample shipping methods, and laboratory data delivery requirements;

2.1.6.2 A description of how the permittee will report weekly monitoring averages on DMRs when the week overlaps two months;

2.1.6.3 Maps indicating the location of each sampling point;

2.1.6.4 Qualification and training of personnel; and

2.1.6.5 Name, address, and telephone number of all laboratories used by or proposed to be used by the permittee.

2.1.7 The permittee must amend the QAPP whenever sample collection, sample analysis, or other procedure addressed by the QAPP is modified.

2.1.8 Copies of the QAPP must be kept on site and made available to DEC upon request.

2.2 Operation and Maintenance Plan

2.2.1 In addition to requirements specified in Appendix A, Part 1.6 of this permit (Proper Operation and Maintenance), the permittee shall develop, maintain and implement an O&M plan for the wastewater treatment facility. An existing O&M plan may be modified under this section.

2.2.2 The permittee must submit written notice to DEC that the plan has been developed or modified and implemented within 180 days of the effective date of this permit.

2.2.3 All procedures in the previous O&M plan must be followed until the new O&M plan has been implemented.

2.2.4 The permittee shall ensure that the plan includes appropriate best management practices (BMPs). BMPs include measures that prevent or minimize the potential for the release of pollutants to Mendenhall River.

2.2.5 The permittee must ensure that the plan includes a maintenance schedule for the diffuser including a schedule for inspecting the diffuser.

2.2.6 The O&M plan must be reviewed annually and documentation of annual plan review by the permittee shall be retained on-site and made available to DEC upon request.

2.3 Facility Plan Requirement

2.3.1 The permittee must develop a Facility Plan that evaluates the facility's existing condition and identifies near- and long-term needs and improvements appropriate for a 10-20 year planning period. A guidance manual for preparing a facility plan has been published by EPA (EPA-430/9-76-015 *Construction Grants Program Requirements*, 1975). Permittee may, at its discretion, follow procedures outlined in this publication. The finalized Facility Plan must be submitted with the application for APDES Permit Reissuance, at least 180 days before expiration of this permit.

2.3.2 The Facility Plan must include, but is not limited to:

2.3.2.1 An evaluation of existing wastewater treatment and disposal systems used by the facility. This section of the Facility Plan must assess performance relative to existing design capacity given current conditions and identify any existing deficiencies and/or problems;

2.3.2.2 A determination of the adequacy of the facility's treatment process, maintenance program, process control measures, operating procedures, and records management protocols;

2.3.2.3 An evaluation of reasonably foreseeable future wasteloads and flows including, industrial dischargers;

2.3.2.4 An evaluation of future needs for treatment and infrastructure changes or upgrades, including identifying when changes or upgrades should be initiated;

2.3.2.5 A proposed schedule for implementation of specific recommendations identified from Sections 2.3.2.1-2.3.2.3; and

2.3.2.6 A specified schedule wherein the Facility Plan will be reviewed, revised, and amended in order to keep the plan up to date.

2.4 Pretreatment Requirements

2.4.1 The general prohibitions of the National Pretreatment Standards, adopted by reference at 18 AAC 83.010, require that the POTW must not allow non-domestic wastes from point sources covered by pretreatment standards, or sources subject to National Pretreatment Standards, to indirectly discharge or otherwise introduce into the POTW pollutants that would cause pass through or interference. The specific prohibitions of the National Pretreatment Standards, adopted by reference at 18 AAC 83.010, are described below in Section 2.4.2 and apply to all point sources discharging non-domestic waste that could introduce pollutants into the POTW whether or not the discharge is subject to other National Pretreatment Standards or any federal, state, or local requirements.

2.4.2 The permittee must not allow the introduction of the following pollutants into the POTW:

2.4.2.1 Pollutants that create a fire or explosion hazard in the POTW including, but not limited to, wastestreams with a closed cup flashpoint of less than 60 °C (140 degrees Fahrenheit (°F)) using the test methods specified in 40 CFR 261.21.

2.4.2.2 Pollutants that will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, unless the treatment is specifically designed to accommodate such discharges.

2.4.2.3 Solid or viscous pollutants in amounts that will cause obstruction to the flow in the POTW, including sewers, resulting in interference.

2.4.2.4 Any pollutant, including oxygen demanding pollutants (BOD_5, etc.) released in a discharge at a flow rate and/or pollutant concentration that will cause interference with the POTW.

2.4.2.5 Heat in amounts that will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW exceeds 40 °C (104 °F) unless the Department, upon request of the permittee, approves alternate temperature limits.

2.4.2.6 Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.

2.4.2.7 Pollutants that result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems.

2.4.2.8 Any trucked or hauled pollutants, except at discharge points designated by the POTW.

2.4.3 The permittee must enforce any National Pretreatment Standards including the above listed prohibited discharges (40 CFR 403.5(a) and (b)), Categorical Standards (40 CFR 403.6), and locally developed effluent limits (40 CFR 403.5(c)), adopted by reference at 18 AAC 83.010(g)) in accordance with Sections 307(b) and (c) of the CWA.

2.4.4 The permittee must require any industrial user of its treatment works to comply with any applicable requirements in 40 CFR 403 through 471, adopted by reference in 18 AAC 83.010.

2.4.5 The permittee must implement and enforce local law and regulations (e.g. municipal code, sewer use ordinance) addressing the regulation of non-domestic users.

2.4.6 The permittee must retain all records relating to its pretreatment activities in accordance with 40 CFR 403.12(o), adopted by reference in 18 AAC 83.010, and must make such records available to DEC and/or EPA upon request.

2.4.7 The permittee must require SIUs to conduct wastewater sampling as specified in 40 CFR 403.12(e) or (h), adopted by reference at 18 AAC 83.010. Frequency of wastewater sampling by the SIUs must be appropriate for the character and volume of the wastewater but no less than once every six months. Sample collection and analysis must be performed in accordance with 40 CFR 403.12 (b)(5)(ii) through (v), adopted by reference at 18 AAC 83.010 and 40 CFR 136. If the permittee elects to conduct all of the non-domestic user monitoring for any SIU instead of requiring self-monitoring, the permittee must conduct sampling in accordance with the requirements of this paragraph.

2.4.8 The permittee must require all categorical and non-categorical users to notify the permittee immediately of all discharges that could cause problems to the POTW, including any slug loadings as defined by 40 CFR 403.5 adopted by reference at 18 AAC 83.010. As soon as the permittee becomes aware of such discharges, the permittee must immediately implement slug control response measures consistent with the *Guidance Manual for Control of Slug Loadings to POTWs*, EPA, 1991.

2.4.9 The permittee must enforce and obtain remedies for any industrial user noncompliance with applicable pretreatment standards and requirements or local law and regulations. This must include timely and appropriate reviews of industrial reports to identify all violations of the local ordinance and federal pretreatment standards and requirements. Once violations have been uncovered, the permittee must take timely and appropriate action to address the noncompliance.

2.5 Identification Sign(s)

The permittee shall continue to post a sign or signs on the shoreline adjacent to the discharge point that indicate the name and contact number for the facility, the permit number, the type of discharge (treated domestic wastewater), and the approximate location and size of the mixing zone. The sign(s) must inform the public that certain activities, such as harvesting of aquatic life for raw consumption and primary contact recreation, should not take place in the mixing zone.

2.6 Removed Substances

Collected screenings, grit, solids, scum, and other facility residuals, or other pollutants removed in the course of treatment or control of water and wastewaters shall be disposed of in a Department approved manner and method in accordance with 18 AAC 60, such as to prevent any pollution from such materials from entering navigable waters.

APPENDIX A. Standard Conditions

Appendix A

Standard Conditions
APDES Individual Permit
Publicly Owned Treatment Works

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Appendix A, Standard Conditions is an integral and enforceable part of the permit. Failure to comply with a Standard Condition in this Appendix constitutes a violation of the permit and is subject to enforcement.

1.0 Standard Conditions Applicable to All Permits

1.1 Contact Information and Addresses

1.1.1 Permitting Program

Documents, reports, and plans required under the permit and Appendix A are to be sent to the following address:

State of Alaska
Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, Alaska 99501
Telephone (907) 269-6285
Fax (907) 269-3487
Email: DEC.Water.WQPermit@alaska.gov

1.1.2 Compliance and Enforcement Program

Documents and reports required under the permit and Appendix A relating to compliance are to be sent to the following address:

State of Alaska
Department of Environmental Conservation
Division of Water
Compliance and Enforcement Program
555 Cordova Street
Anchorage, Alaska 99501
Telephone Nationwide (877) 569-4114
Anchorage Area / International (907) 269-4114
Fax (907) 269-4604
Email: dec-wqreporting@alaska.gov

1.2 Duty to Comply

A permittee shall comply with all conditions of the permittee's APDES permit. Any permit noncompliance constitutes a violation of 33 U.S.C 1251-1387 (Clean Water Act) and state law and is grounds for enforcement action including termination, revocation and reissuance, or modification of a permit, or denial of a permit renewal application. A permittee shall comply with effluent standards or prohibitions established under 33 U.S.C. 1317(a) for toxic pollutants within the time provided in the regulations that establish those effluent standards or prohibitions even if the permit has not yet been modified to incorporate the requirement.

1.3 Duty to Reapply

If a permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must apply for and obtain a new permit. In accordance with 18 AAC 83.105(b), a permittee with a currently effective permit shall reapply by submitting a new application at least 180 days before the existing permit expires, unless the Department has granted the permittee permission to submit an application on a later date. However, the Department will not grant permission for an application to be submitted after the expiration date of the existing permit.

1.4 Need to Halt or Reduce Activity Not a Defense

In an enforcement action, a permittee may not assert as a defense that compliance with the conditions of the permit would have made it necessary for the permittee to halt or reduce the permitted activity.

1.5 Duty to Mitigate

A permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

1.6 Proper Operation and Maintenance

1.6.1 A permittee shall at all times properly operate and maintain all facilities and systems of treatment and control and related appurtenances that the permittee installs or uses to achieve compliance with the conditions of the permit. The permittee's duty to operate and maintain properly includes using adequate laboratory controls and appropriate quality assurance procedures. However, a permittee is not required to operate back-up or auxiliary facilities or similar systems that a permittee installs unless operation of those facilities is necessary to achieve compliance with the conditions of the permit.

1.6.2 Operation and maintenance records shall be retained and made available at the site.

1.6.3 In accordance with 18 AAC 72.065, the owner of operator of a domestic system that has 100 or more service connections or that is used, or intended for use, by 500 or more people per day shall ensure that the system is operated by a person certified under 18 AAC 74.

1.7 Permit Actions

A permit may be modified, revoked and reissued, or terminated for cause as provided in 18 AAC 83.130. If a permittee files a request to modify, revoke and reissue, or terminate a permit, or gives notice of planned changes or anticipated noncompliance, the filing or notice does not stay any permit condition.

1.8 Property Rights

A permit does not convey any property rights or exclusive privilege.

1.9 Duty to Provide Information

A permittee shall, within a reasonable time, provide to the Department any information that the Department requests to determine whether a permittee is in compliance with the permit, or whether cause exists to modify, revoke and reissue, or terminate the permit. A permittee shall also provide to the Department, upon request, copies of any records the permittee is required to keep under the permit.

1.10 Inspection and Entry

A permittee shall allow the Department, or an authorized representative, including a contractor acting as a representative of the Department, at reasonable times and on presentation of credentials establishing authority and any other documents required by law, to:

1.10.1 Enter the premises where a permittee's regulated facility or activity is located or conducted, or where permit conditions require records to be kept;

1.10.2 Have access to and copy any records that permit conditions require the permittee to keep;

1.10.3 Inspect any facilities, equipment, including monitoring and control equipment, practices, or operations regulated or required under a permit; and

1.10.4 Sample or monitor any substances or parameters at any location for the purpose of assuring permit compliance or as otherwise authorized by 33 U.S.C. 1251-1387 (Clean Water Act).

1.11 Monitoring and Records

A permittee must comply with the following monitoring and recordkeeping conditions:

1.11.1 Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity.

1.11.2 The permittee shall retain records in Alaska of all monitoring information for at least three years, or longer at the Department's request at any time, from the date of the sample, measurement, report, or application. Monitoring records required to be kept include:

1.11.2.1 All calibration and maintenance records,

1.11.2.2 All original strip chart recordings or other forms of data approved by the Department for continuous monitoring instrumentation,

1.11.2.3 All reports required by a permit,

1.11.2.4 Records of all data used to complete the application for a permit,

1.11.2.5 Field logbooks or visual monitoring logbooks,

1.11.2.6 Quality assurance chain of custody forms,

1.11.2.7 Copies of discharge monitoring reports, and

1.11.2.8 A copy of this APDES permit.

1.11.3 Records of monitoring information must include:

1.11.3.1 The date, exact place, and time of any sampling or measurement;

1.11.3.2 The name(s) of any individual(s) who performed the sampling or measurement(s);

1.11.3.3 The date(s) and time any analysis was performed;

1.11.3.4 The name(s) of any individual(s) who performed any analysis;

1.11.3.5 Any analytical technique or method used; and

1.11.3.6 The results of the analysis.

1.11.4 Monitoring Procedures

Analyses of pollutants must be conducted using test procedures approved under 40 CFR Part 136, adopted by reference at 18 AAC 83.010, for pollutants with approved test procedures, and using test procedures specified in the permit for pollutants without approved methods.

1.12 Signature Requirement and Penalties

1.12.1 Any application, report, or information submitted to the Department in compliance with a permit requirement must be signed and certified in accordance with 18 AAC 83.385. Any person who knowingly makes any false material statement, representation, or certification in any application, record, report, or other document filed or required to be maintained under a permit, or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be subject to penalties under 33 U.S.C. 1319(c)(4), AS 12.55.035(c)(1)(B), (c)(2) and (c)(3), and AS 46.03.790(g).

1.12.2 In accordance with 18 AAC 83.385, an APDES permit application must be signed as follows:

1.12.2.1 For a corporation, a responsible corporate officer shall sign the application; in this subsection, a responsible corporate officer means:

1.12.2.1.1 A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation; or

1.12.2.1.2 The manager of one of more manufacturing, production, or operating facilities, if

1.12.2.1.2.1 The manager is authorized to make management decisions that govern the operation of the regulated facility, including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental statutes and regulations;

1.12.2.1.2.2 The manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and

1.12.2.1.2.3 Authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

1.12.2.2 For a partnership or sole proprietorship, by the general partner or the proprietor, respectively, shall sign the application.

1.12.2.3 For a municipality, state, federal, or other public agency, either a principal executive officer or ranking elected official shall sign the application; in this subsection, a principal executive officer of an agency means:

1.12.2.3.1 The chief executive officer of the agency; or

1.12.2.3.2 A senior executive officer having responsibility for the overall operations of a principal geographic unit or division of the agency.

1.12.3 Any report required by an APDES permit, and a submittal with any other information requested by the Department, must be signed by a person described in Appendix A, Part 1.12.2, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1.12.3.1 The authorization is made in writing by a person described in Appendix A, Part 1.12.2;

1.12.3.2 The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, including the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility; or an individual or position having overall responsibility for environmental matters for the company; and

1.12.3.3 The written authorization is submitted to the Department to the Permitting Program address in Appendix A, Part 1.1.1.

1.12.4 If an authorization under Appendix A, Part 1.12.3 is no longer effective because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Appendix A, Part 1.12.3 must be submitted to the Department before or together with any report, information, or application to be signed by an authorized representative.

1.12.5 Any person signing a document under Appendix A, Part 1.12.2 or Part 1.12.3 shall certify as follows:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

1.13 Proprietary or Confidential Information

1.13.1 A permit applicant or permittee may assert a claim of confidentiality for proprietary or confidential business information by stamping the words “confidential business information” on each page of a submission containing proprietary or confidential business information. The Department will treat the stamped submissions as confidential if the information satisfies the test in 40 CFR §2.208, adopted by reference at 18 AAC 83.010, and is not otherwise required to be made public by state law.

1.13.2 A claim of confidentiality under Appendix A, Part 1.13.1 may not be asserted for the name and address of any permit applicant or permittee, a permit application, a permit, effluent data, sewage sludge data, and information required by APDES or NPDES application forms provided by the Department, whether submitted on the forms themselves or in any attachments used to supply information required by the forms.

1.13.3 A permittee’s claim of confidentiality authorized under Appendix A, Part 1.13.1 is not waived if the Department provides the proprietary or confidential business information to the EPA or to other agencies participating in the permitting process. The Department will supply any information obtained or used in the administration of the state APDES program to the EPA upon request under 40 CFR §123.41, as revised as of July 1, 2005. When providing information submitted to the Department with a claim of confidentiality to the EPA, the Department will notify the EPA of the confidentiality claim. If the Department provides the EPA information that is not claimed to be confidential, the EPA may make the information available to the public without further notice.

1.14 Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any action or relieve a permittee

from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under state laws addressing oil and hazardous substances.

1.15 Cultural and Paleontological Resources

If cultural or paleontological resources are discovered because of this disposal activity, work that would disturb such resources is to be stopped, and the Office of History and Archaeology, a Division of Parks and Outdoor Recreation of the Alaska Department of Natural Resources (http://www.dnr.state.ak.us/parks/oha/), is to be notified immediately at (907) 269-8721.

1.16 Fee

A permittee must pay the appropriate permit fee described in 18 AAC 72.

1.17 Other Legal Obligations

This permit does not relieve the permittee from the duty to obtain any other necessary permits from the Department or from other local, state, or federal agencies and to comply with the requirements contained in any such permits. All activities conducted and all plan approvals implemented by the permittee pursuant to the terms of this permit shall comply with all applicable local, state, and federal laws and regulations.

2.0 Special Reporting Obligations

2.1 Planned Changes

2.1.1 The permittee shall give notice to the Department as soon as possible of any planned physical alteration or addition to the permitted facility if:

2.1.1.1 The alteration or addition may make the facility a "new source" under one or more of the criteria in 18 AAC 83.990(44); or

2.1.1.2 The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged if those pollutants are not subject to effluent limitations in the permit or to notification requirements under 18 AAC 83.610.

2.1.2 If the proposed changes are subject to plan review, then the plans must be submitted at least 30 days before implementation of changes (see 18 AAC 15.020 and 18 AAC 72 for plan review requirements). Written approval is not required for an emergency repair or routine maintenance.

2.1.3 Written notice must be sent to the Permitting Program address in Appendix A, Part 1.1.1.

2.2 Anticipated Noncompliance

2.2.1 A permittee shall give seven days' notice to the Department before commencing any planned change in the permitted facility or activity that may result in noncompliance with permit requirements.

2.2.2 Written notice must be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

2.3 Transfers

2.3.1 A permittee may not transfer a permit for a facility or activity to any person except after notice to the Department in accordance with 18 AAC 83.150. The Department may modify or revoke and reissue the permit to change the name of the permittee and incorporate such other requirements under 33 U.S.C. 1251-1387 (Clean Water Act) or state law.

2.3.2 Written notice must be sent to the Permitting Program address in Appendix A, Part 1.1.1.

2.4 Compliance Schedules

2.4.1 A permittee must submit progress or compliance reports on interim and final requirements in any compliance schedule of a permit no later than 14 days following the scheduled date of each requirement.

2.4.2 Written notice must be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

2.5 Corrective Information

2.5.1 If a permittee becomes aware that it failed to submit a relevant fact in a permit application or submitted incorrect information in a permit application or in any report to the Department, the permittee shall promptly submit the relevant fact or the correct information.

2.5.2 Information must be sent to the Permitting Program address in Appendix A, Part 1.1.1.

2.6 Bypass of Treatment Facilities

2.6.1 Prohibition of Bypass

Bypass is prohibited. The Department may take enforcement action against a permittee for any bypass, unless:

2.6.1.1 The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

2.6.1.2 There were no feasible alternatives to the bypass, including use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. However, this condition is not satisfied if the permittee, in the exercise of reasonable engineering judgment, should have installed adequate back-up equipment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance; and

2.6.1.3 The permittee provides notice to the Department of a bypass event in the manner, as appropriate, under Appendix A, Part 2.6.2.

2.6.2 Notice of bypass

2.6.2.1 For an anticipated bypass, the permittee submits notice at least 10 days before the date of the bypass. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the conditions of Appendix A, Parts 2.6.1.1 and 2.6.1.2.

2.6.2.2 For an unanticipated bypass, the permittee submits 24-hour notice, as required in 18 AAC 83.410(f) and Appendix A, Part 3.4, Twenty-four Hour Reporting.

2.6.2.3 Written notice must be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

2.6.3 Notwithstanding Appendix A, Part 2.6.1, a permittee may allow a bypass that:

2.6.3.1 Does not cause an effluent limitation to be exceeded, and

2.6.3.2 Is for essential maintenance to assure efficient operation.

2.7 Upset Conditions

2.7.1 In any enforcement action for noncompliance with technology-based permit effluent limitations, a permittee may claim upset as an affirmative defense. A permittee seeking to establish the occurrence of an upset has the burden of proof to show that the requirements of Appendix A, Part 2.7.2 are met.

2.7.2 To establish the affirmative defense of upset, the permittee must demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that:

2.7.2.1 An upset occurred and the permittee can identify the cause or causes of the upset;

2.7.2.2 The permitted facility was at the time being properly operated;

2.7.2.3 The permittee submitted 24-hour notice of the upset, as required in 18 AAC 83.410(f) and Appendix A, Part 3.4, Twenty-four Hour Reporting; and

2.7.2.4 The permittee complied with any mitigation measures required under 18 AAC 83.405(e) and Appendix A, Part 1.5, Duty to Mitigate.

2.7.3 Any determination made in administrative review of a claim that noncompliance was caused by upset, before an action for noncompliance is commenced, is not final administrative action subject to judicial review.

2.8 Notice of New Introduction of Pollutants

2.8.1 Any POTW shall provide adequate notice to the Department, including information on the quality and quantity of effluent introduced into the POTW, and any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW as soon as the POTW has knowledge of a change, but no later than seven days in advance of any:

2.8.1.1 New introduction of pollutants into the POTW from an indirect discharger if that introduction of pollutants would be subject to 33 U.S.C 1311 or 33 U.S.C 1316 if the POTW directly discharged those pollutants, and

2.8.1.2 Substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

2.8.2 Written notice must be sent to the Permitting Program address in Appendix A, Part 1.1.1.

3.0 Monitoring, Recording, and Reporting Requirements

3.1 Representative Sampling

A permittee must collect effluent samples from the effluent stream after the last treatment unit before discharge into the receiving waters. Samples and measurements must be representative of the volume and nature of the monitored activity or discharge.

3.2 Reporting of Monitoring Results

At intervals specified in the permit, monitoring results must be reported on the EPA discharge monitoring report (DMR) form, as revised as of March 1999, adopted by reference.

3.2.1 Monitoring results shall be summarized each month on the DMR or an approved equivalent report. The permittee must submit reports monthly postmarked by the 15th day of the following month.

3.2.2 The permittee must sign and certify all DMRs and all other reports in accordance with the requirements of Appendix A, Part 1.12, Signatory Requirements and Penalties. All signed and certified legible original DMRs and all other documents and reports must be submitted to the Department at the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

3.2.3 If, during the period when this permit is effective, the Department makes available electronic reporting, the permittee may, as an alternative to the requirements of Appendix A, Part 3.2.2, submit monthly DMRs electronically by the 15th day of the following month in accordance with guidance provided by the Department. The permittee must certify all DMRs and other reports, in accordance with the requirements of Appendix A, Part 1.12, Signatory Requirements and Penalties. The permittee must retain the legible originals of these documents and make them available to the Department upon request.

3.3 Additional Monitoring by Permittee

If the permittee monitors any pollutant more frequently than the permit requires using test procedures approved in 40 CFR Part 136, adopted by reference at 18 AAC 83.010, or as specified in this permit, the results of that additional monitoring must be included in the calculation and reporting of the data submitted in the DMR required by Appendix A, Part 3.2. All limitations that require averaging of measurements must be calculated using an arithmetic means unless the Department specifies another method in the permit. Upon request by the Department, the permittee must submit the results of any other sampling and monitoring regardless of the test method used.

3.4 Twenty-four Hour Reporting

A permittee shall report any noncompliance event that may endanger health or the environment as follows:

3.4.1 A report must be made:

3.4.1.1 Orally within 24 hours after the permittee becomes aware of the circumstances, and

3.4.1.2 In writing within five days after the permittee becomes aware of the circumstances.

3.4.2 A report must include the following information:

3.4.2.1 A description of the noncompliance and its causes, including the estimated volume or weight and specific details of the noncompliance;

3.4.2.2 The period of noncompliance, including exact dates and times;

3.4.2.3 If the noncompliance has not been corrected, a statement regarding the anticipated time the noncompliance is expected to continue; and

3.4.2.4 Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3.4.3 An event that must be reported within 24 hours includes:

3.4.3.1 An unanticipated bypass that exceeds any effluent limitation in the permit (see Appendix A, Part 2.6, Bypass of Treatment Facilities).

3.4.3.2 An upset that exceeds any effluent limitation in the permit (see Appendix A, Part 2.7, Upset Conditions).

3.4.3.3 A violation of a maximum daily discharge limitation for any of the pollutants listed in the permit as requiring 24-hour reporting.

3.4.4 The Department may waive the written report on a case-by-case basis for reports under Appendix A, Part 3.4 if the oral report has been received within 24 hours of the permittee becoming aware of the noncompliance event.

3.4.5 The permittee may satisfy the written reporting submission requirements of Appendix A, Part 3.4.1.2 by submitting the written report via email, if the following conditions are met:

3.4.5.1 The Noncompliance Notification Form or equivalent form is used to report the noncompliance;

3.4.5.2 The written report includes all the information required under Appendix A, Part 3.4.2;

3.4.5.3 The written report is properly certified and signed in accordance with Appendix A, Parts 1.12.3 and 1.12.5.;

3.4.5.4 The written report is scanned as a PDF (portable document format) document and transmitted to the Department as an attachment to the email; and

3.4.5.5 The permittee retains in the facility file the original signed and certified written report and a printed copy of the conveying email.

3.4.6 The email and PDF written report will satisfy the written report submission requirements of this permit provided the email is received by the Department within five days after the time the permittee becomes aware of the noncompliance event, and the email and written report satisfy the criteria of Part 3.4.5. The email address to report noncompliance is: dec-wqreporting@alaska.gov

3.5 Other Noncompliance Reporting

A permittee shall report all instances of noncompliance not required to be reported under Appendix A, Parts 2.4 (Compliance Schedules), 3.3 (Additional Monitoring by Permittee), and 3.4 (Twenty-four Hour Reporting) at the time the permittee submits monitoring reports under Appendix A, Part 3.2 (Reporting of Monitoring Results). A report of noncompliance under this part must contain the information listed in Appendix A, Part 3.4.2 and be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

4.0 Penalties for Violations of Permit Conditions

Alaska laws allow the State to pursue both civil and criminal actions concurrently. The following is a summary of Alaska law. The permittee should read the applicable statutes for further substantive and procedural details.

4.1 Civil Action

Under AS 46.03.760(e), a person who violates or causes or permits to be violated a regulation, a lawful order of the Department, or a permit, approval, or acceptance, or term or condition of a permit, approval or acceptance issued under the program authorized by AS 46.03.020 (12) is liable, in a civil action, to the state for a sum to be assessed by the court of not less than $500 nor more than $100,000 for the initial violation, nor more than $10,000 for each day after that on which the violation continues,

and that shall reflect, when applicable:

4.1.1 Reasonable compensation in the nature of liquated damages for any adverse environmental effects caused by the violation, that shall be determined by the court according to the toxicity, degradability, and dispersal characteristics of the substance discharged, the sensitivity of the receiving environment, and the degree to which the discharge degrades existing environmental quality;

4.1.2 Reasonable costs incurred by the state in detection, investigation, and attempted correction of the violation;

4.1.3 The economic savings realized by the person in not complying with the requirements for which a violation is charged; and

4.1.4 The need for an enhanced civil penalty to deter future noncompliance.

4.2 Injunctive Relief

4.2.1 Under AS 46.03.820, the Department can order an activity presenting an imminent or present danger to public health or that would be likely to result in irreversible damage to the environment be discontinued. Upon receipt of such an order, the activity must be immediately discontinued.

4.2.2 Under AS 46.03.765, the Department can bring an action in Alaska Superior Court seeking to enjoin ongoing or threatened violations for Department-issued permits and Department statutes and regulations.

4.3 Criminal Action

Under AS 46.03.790(h), a person is guilty of a Class A misdemeanor if the person negligently:

4.3.1 Violates a regulation adopted by the Department under AS 46.03.020(12);

4.3.2 Violates a permit issued under the program authorized by AS 46.03.020(12);

4.3.3 Fails to provide information or provides false information required by a regulation adopted under AS 46.03.020(12);

4.3.4 Makes a false statement, representation, or certification in an application, notice, record, report, permit, or other document filed, maintained, or used for purposes of compliance with a permit issued under or a regulation adopted under AS 46.03.020(12); or

4.3.5 Renders inaccurate a monitoring device or method required to be maintained by a permit issued or under a regulation adopted under AS 46.03.020(12).

4.4 Other Fines

Upon conviction of a violation of a regulation adopted under AS 46.03.020(12), a defendant who is not an organization may be sentenced to pay a fine of not more than $10,000 for each separate violation (AS 46.03.790(g)). A defendant that is an organization may be sentenced to pay a fine not exceeding the greater of: (1) $200,000; (2) three times the pecuniary gain realized by the defendant as a result of the offense; or (3) three times the pecuniary damage or loss caused by the defendant to another, or the property of another, as a result of the offense (AS 12.55.035(c)(1)(B), (c)(2), and (c)(3)).

APPENDIX B. Acronyms

Appendix B

Acronyms

The following acronyms are common terms that may be found in an Alaska Pollutant Discharge Elimination System (APDES) permit and fact sheet.

18 AAC 15	Alaska Administrative Code. Title 18 Environmental Conservation, Chapter 15: Administrative Procedures
18 AAC 70	Alaska Administrative Code. Title 18 Environmental Conservation, Chapter 70: Water Quality Standards
18 AAC 72	Alaska Administrative Code. Title 18 Environmental Conservation, Chapter 72: Wastewater Disposal
18 AAC 83	Alaska Administrative Code. Title 18 Environmental Conservation, Chapter 83: Alaska Pollutant Discharge Elimination System

All chapters of Alaska Administrative Code, Title 18 are available at the Alaska Administrative Code database http://www.legis.state.ak.us/cgi-bin/folioisa.dll/aac

1Q10	Lowest One-Day Average Flow Rate Expected to Occur Once Every 10 Years
30B3	Biologically-Based Flow - Excursion Freq. < Once Every 3 Years for 30-day Average Flow
7Q10	Lowest 7-Day Average Flow Rate Expected to Occur Once Every 10 Years
40 CFR	Code of Federal Regulations Title 40: Protection of Environment
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
Ag	Silver
AML	Average Monthly Limit
APDES	Alaska Pollutant Discharge Elimination System
AS	Alaska Statutes
AS 46.03	Alaska Statutes Title 46, Chapter 03: Environmental Conservation. Available at http://www.legis.state.ak.us/default.htm
BOD_5	Biochemical Oxygen Demand, 5-day
BMP	Best Management Practice
CBJ	City and Borough of Juneau
CFR	Code of Federal Regulations
CFS or cfs	Cubic Feet Per Second
COD	Chemical Oxygen Demand
Cu	Copper
CV	Coefficient Variation
CWA	Clean Water Act
DEC	Department of Environmental Conservation
DL	Method Detection Limit
DMR	Discharge Monitoring Report

DO	Dissolved Oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FC	Fecal Coliform Bacteria
GPD or gpd	Gallons per day
gpm	Gallons per minute
lbs/day	Pounds per day
LTA	Long-Term Average
MDL	Maximum Daily Limit
mg/L	Milligrams per Liter
MGD or mgd	Million gallons per day
MLLW	Mean Lower Low Water
MRC	Maximum Reported Concentration
MWWTP	Mendenhall Wastewater Treatment Plant
MZ	Mixing Zone
N	Nitrogen
N/A	Not Applicable
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOEC	No Observed Effect Concentration
NPDES	National Pollutant Discharge Elimination System
Pb	Lead
POTW	Publicly Owned Treatment Works
O&M	Operation and Maintenance
QAPP	Quality Assurance Project Plan
RL	Reporting Limit
RP	Reasonable Potential
RPA	Reasonable Potential Analysis
RPM	Reasonable Potential Multiplier
SBR	Sequential Batch Reactor
SIU	Significant Industrial User
SU	Standard Units
TBEL	Technology-Based Effluent Limits
T/E spp	Threatened or Endangered Species

TIE	Toxicity Identification Evaluation
TRE	Toxicity Reduction Evaluation
TSD	Technical Support Document
TSS	Total Suspended Solids
TU_a	Toxic Unit, Acute
TUc	Toxic Unit, Chronic
µg/L	Micrograms per Liter
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UV	Ultraviolet
WET	Whole Effluent Toxicity
WLA	Wasteload Allocation
WQBEL	Water Quality-Based Effluent Limits
WQS	Water Quality Standards
Zn	Zinc

APPENDIX C. Definitions

Appendix C

Definitions

The following are common definitions of terms associated with APDES permits. Not all the terms listed may appear in a permit. Consult the footnote references for a complete list of terms and definitions.

Administrator[a]	Means the Administrator of the EPA or an authorized representative
Alaska Pollutant Discharge Elimination System (APDES)[a]	Means the state's program, approved by EPA under 33 U.S.C. 1342(b), for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits and imposing and enforcing pretreatment requirements under 33 U.S.C. 1317, 1328, 1342, and 1345
Annual	Means once per calendar year
Aquaculture[b]	Means the cultivation of aquatic plants or animals for human use or consumption
Average	Means an arithmetic mean obtained by adding quantities and dividing the sum by the number of quantities
Average Monthly Discharge Limitation[a]	Means the highest allowable average of "daily discharges" over a calendar month calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured for that month
Best Management Practices (BMPs)[a]	Means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage areas.
Biochemical Oxygen Demand, 5-day (BOD_5)	Means the amount, in milligrams per liter, of oxygen used in the biochemical oxidation of organic matter in five days at 20° C
Boundary[b]	Means line or landmark that serves to clarify, outline, or mark a limit, border, or interface
Bypass[a]	Means the intentional diversion of waste streams from any portion of a treatment facility
Chemical Oxygen Demand (COD)[f]	Is used as a measure of the oxygen equivalent of the organic matter content of a sample that is susceptible to oxidation by a strong chemical oxidant
Clean Water Act (CWA)[a]	Means the federal law codified at 33 U.S.C. 1251-1387, also referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972
Commissioner[a]	Means the commissioner of the Alaska Department of Environmental Conservation or the commissioner's designee
Composite Samples	Composite samples must consist of at least eight equal volume grab samples. 24 hour composite sample means a combination of at least eight discrete samples of equal volume collected at equal time intervals over a 24-hour period at the same location. A "flow proportional composite" sample means a combination of at least eight discrete samples collected at equal time intervals over a 24-hour period with each sample volume proportioned according to the flow volume. The sample aliquots must be

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
g) See EPA Permit Writers Manual

	collected and stored in accordance with procedures prescribed in the most recent edition of *Standard Methods for the Examination of Water and Wastewater*.
Contact Recreation[b]	Means activities in which there is direct and intimate contact with water. Contact recreation includes swimming, diving, and water skiing. Contact recreation does not include wading.
Criterion[b]	Means a set concentration or limit of a water quality parameter that, when not exceeded, will protect an organism, a population of organisms, a community of organisms, or a prescribed water use with a reasonable degree of safety. A criterion might be a narrative statement instead of a numerical concentration or limit.
Daily Discharge[a]	Means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants measured in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with a limitation expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day.
Datum	A datum defines the position of the spheroid, a mathematical representation of the earth, relative to the center of the earth. It provides a frame of reference for measuring locations on the surface of the earth by defining the origin and orientation of latitude and longitude lines.
Department[a]	Means the Alaska Department of Environmental Conservation
Design Flow[a]	Means the wastewater flow rate that the plant was designed to handle
Director[a]	Means the commissioner or the commissioner's designee assigned to administer the APDES program or a portion of it, unless the context identifies an EPA director
Discharge[a]	When used without qualification, discharge means the discharge of a pollutant
Discharge of a Pollutant[a]	Means any addition of any pollutant or combination of pollutants to waters of the United States from any point source or to waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft that is being used as a means of transportation. Discharge includes any addition of pollutants into waters of the United States from surface runoff that is collected or channeled by humans; discharges through pipes, sewers, or other conveyances owned by a state, municipality, or other person that do not lead to a treatment works; discharges through pipes, sewers, or other conveyances leading into privately owned treatment works; and does not include an addition of pollutants by any indirect discharger.
Dissolved Oxygen (DO)[b]	Means the concentration of oxygen in water as determined either by the Winkler (iodometric) method and its modifications or by the membrane electrode method. The oxygen dissolved in water or wastewater and usually expressed in milligrams per liter or percent saturation

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
g) See EPA Permit Writers Manual

Domestic Wastewater[c]	Means waterborne human wastes or graywater derived from dwellings, commercial buildings, institutions, or similar structures. "Domestic wastewater" includes the contents of individual removable containers used to collect and temporarily store human wastes.
Ecosystem[b]	Means a system made up of a community of animals, plants, and bacteria and the system's interrelated physical and chemical environment
Effluent[b]	Means the segment of a wastewater stream that follows the final step in a treatment process and precedes discharge of the wastewater stream to the receiving environment
Estimated	Means a way to estimate the discharge volume. Approvable estimations include, but are not limited to, the number of persons per day at the facility, volume of potable water produced per day, lift station run time, etc.
Fecal Coliform Bacteria (FC)[b]	Bacteria that can ferment lactose at 44.5° $\pm$ 0.2°C to produce gas in a multiple tube procedure. Fecal coliform bacteria also means all bacteria that produce blue colonies in a membrane filtration procedure within 24 ± 2 hours of incubation at 44.5° $\pm$ 0.2°C in an M-FC broth.
Final Approval to Operate	Means the approval that the Department issues after it has reviewed and approved the construction and operation of the engineered wastewater treatment works plans submitted to the Department in accordance with 18 AAC 72.215 through 18 AAC 72.280 or as amended.
Geometric Mean	The geometric mean is the N^{th} root of the product of N. All sample results of zero will use a value of 1 for calculation of the geometric mean. Example geometric mean calculation: $\sqrt[4]{12x23x34x990} = 55$.
Grab Sample	Means a single instantaneous sample collected at a particular place and time that represents the composition of wastewater only at that time and place
Influent	Means untreated wastewater before it enters the first treatment process of a wastewater treatment works
Maximum Daily Discharge Limitation[a]	Means the highest allowable "daily discharge"
Mean[b]	Means the average of values obtained over a specified period and, for fecal coliform analysis, is computed as a geometric mean
Mean Lower Low Water[b]	Means the tidal datum plane of the average of the lower of the two low waters of each day, as would be established by the National Geodetic Survey, at any place subject to tidal influence
Measured	Means the actual volume of wastewater discharged using appropriate mechanical or electronic equipment to provide a totalized reading. Measure does not provide a recorded measurement of instantaneous rates.
Method Detection Limit (DL)[d]	Means the minimum concentration of a substance (analyte) that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
g) See EPA Permit Writers Manual

Micrograms per Liter (µg/L)[b]	Means the concentration at which one millionth of a gram (10^{-6} g) is found in a volume of one liter
Milligrams per Liter (mg/L)[b]	Means the concentration at which one thousandth of a gram (10^{-3} g) is found in a volume of one liter. It is approximately equal to the unit "parts per million (ppm)," formerly of common use.
Mixing Zone[b]	Means a volume of water adjacent to a discharge in which wastes discharged mix with the receiving water
Month	Means the time period from the 1st of a calendar month to the last day in the month
Monthly Average	Means the average of daily discharges over a monitoring calendar month calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month
No Observed Effect Concentration (NOEC)[e]	Means the highest concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specific time of observation. NOEC is determined using hypothesis testing.
Permittee	Means a company, organization, association, entity, or person who is issued a wastewater permit and is responsible for ensuring compliance, monitoring, and reporting as required by the permit
pH[g]	Means a measure of the hydrogen ion concentration of water or wastewater; expressed as the negative log of the hydrogen ion concentration in mg/L. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic.
Primary Contact Recreation	See Contact Recreation
Principal Executive Officer[a]	Means the chief executive officer of the agency or a senior executive officer having responsibility for the overall operations of a principal geographic unit of division of the agency
Pollutant[a]	Means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under 42 U.S.C. 2011), heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, or agricultural waste discharged into water
Quality Assurance Project Plan (QAPP)	Means a system of procedures, checks, audits, and corrective actions to ensure that all research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality
Quarter	Means the time period of three months based on the calendar year beginning with January
Receiving Water Body	Means lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, straits, passages, canals, the Pacific Ocean, Gulf of Alaska, Bering Sea, and Arctic Ocean, in the territorial limits of the state, and all other bodies of surface water, natural or artificial, public or private, inland or

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
g) See EPA Permit Writers Manual

	coastal, fresh or salt, which are wholly or partially in or bordering the state or under the jurisdiction of the state. (See "Waters of the U.S." at 18 AAC 83.990(77))
Recorded	Means a permanent record using mechanical or electronic equipment to provide a totalized reading, as well as a record of instantaneous readings
Report	Report results of analysis
Reporting Limits	Minimum concentration of a given parameter that can be reliably measured and reported by a laboratory using a particular analytical method. A reporting limit is greater than or equal to a method detection limit and is typically set by a laboratory.
Residual Chlorine	Means chlorine remaining in water or wastewater at the end of a specified contact period as combined or free chlorine
Responsible Corporate Officer[a]	Means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function or any other person who performs similar policy or decision making functions for the corporation The Responsible Corporate Officer can also be the manager of one or more manufacturing, production, or operating facilities if the requirements of 18 AAC 83.385(a)(1)(B)(i)-(iii) are met.
Secondary Recreation[b]	Means activities in which incidental water use can occur. Secondary recreation includes boating, camping, hunting, hiking, wading, and recreational fishing. Secondary contact recreation does not include fish consumption.
Settleable Solids[b]	Means solid material of organic or mineral origin that is transported by and deposited from water, as measured by the volumetric Imhoff cone method and at the method detection limits specified in method 2540(F), *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), adopted by reference in 18 AAC 70.020(c)(1)
Severe Property Damage[a]	Means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
Sheen[b]	Means an iridescent appearance on the water surface
Shellfish[b]	Means a species of crustacean, mollusk, or other aquatic invertebrate with a shell or shell-like exoskeleton in any stage of its life cycle
Significant Industrial User (SIU)[g]	Means an indirect discharger that is the focus of control efforts under the national pretreatment program; includes all indirect dischargers subject to national categorical pretreatment standards, and all other indirect dischargers that contribute 25,000 gpd or more of process wastewater, or which make up five percent or more of the hydraulic or organic loading to the municipal treatment plant, subject to certain exceptions [40 CFR $403.3(t)].
Suspended Solids	Means insoluble solids that either float on the surface of, or are in suspension in, water, wastewater, or other liquids. The quantity of material removed from

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
g) See EPA Permit Writers Manual

	wastewater in a laboratory test, as prescribed in *Standard Methods for the Examination of Water and Wastewater* and referred to as nonfilterable.
Total Suspended Solids (TSS)[g]	Means a measure of the filterable solids present in a sample, as determined by the method specified in 40 CFR Part 136
Toxic Unit, Chronic (TUc)[e]	Means the reciprocal of the effluent concentration that causes no observable effect on the test organisms by the end of the chronic exposure period (i.e., 100/NOEC)
Twice per year	Means two time periods during the calendar year: October through April and May through September
Upset[a]	Means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
Wastewater Treatment	Means any process to which wastewater is subjected in order to remove or alter its objectionable constituents and make it suitable for subsequent use or acceptable for discharge to the environment
Waters of the United States or Waters of the U.S.	Has the meaning given in 18 AAC 83.990(77)
Water Recreation[b]	See contact recreation or secondary recreation
Water Supply[b]	Means any of the waters of the United States that are designated in 18 AAC 70 to be protected for fresh water or marine water uses. Water supply includes waters used for drinking, culinary, food processing, agricultural, aquacultural, seafood processing, and industrial purposes. Water supply does not necessarily mean that water in a waterbody that is protected as a supply for the uses listed in this paragraph is safe to drink in its natural state.
Week	Means the time period of Sunday through Saturday

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
g) See EPA Permit Writers Manual

ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT FACT SHEET – FINAL

Permit Number: AK0022951

City and Borough of Juneau – Mendenhall Wastewater Treatment Plant

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Wastewater Discharge Authorization Program

555 Cordova Street

Anchorage, AK 99501

Public Comment Period Start Date: April 11, 2014
Public Comment Period Expiration Date: May 12, 2014
Alaska Online Public Notice System

Technical Contact: Sally Wanstall
Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
410 Willoughby Ave., Suite 303
Juneau, AK 99811-1800
(907) 465-5216
Fax: (907) 465-5177
sally.wanstall@alaska.gov

Proposed issuance of an Alaska Pollutant Discharge Elimination System (APDES) permit to the

CITY AND BOROUGH OF JUNEAU

For wastewater discharges from

Mendenhall Wastewater Treatment Plant
2009 Radcliffe Road
Juneau, AK, 99801

The Alaska Department of Environmental Conservation (the Department or DEC) proposes to issue an APDES individual permit (AK0022951) to the City and Borough of Juneau. The permit authorizes and sets conditions on the discharge of pollutants from this facility to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility and outlines best management practices to which the facility must adhere.

This fact sheet explains the nature of potential discharges from Mendenhall Wastewater Treatment Plant and the development of the permit including:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions
- technical material supporting the conditions in the permit
- proposed monitoring requirements in the permit

Appeals Process

The Department has both an informal review process and a formal administrative appeal process for final APDES permit decisions. An informal review request must be delivered within 15 days after receiving the Department's decision to the Director of the Division of Water at the following address:

Director, Division of Water
Alaska Department of Environmental Conservation
410 Willoughby Avenue, Suite 310
Juneau, AK 99811-1800

Interested persons can review 18 AAC 15.185 for the procedures and substantive requirements regarding a request for an informal Department review.

See http://www.dec.state.ak.us/commish/InformalReviews.htm for information regarding informal reviews of Department decisions.

An adjudicatory hearing request must be delivered to the Commissioner of the Department within 30 days of the permit decision or a decision issued under the informal review process. An adjudicatory hearing will be conducted by an administrative law judge in the Office of Administrative Hearings within the Department of Administration. A written request for an adjudicatory hearing shall be delivered to the Commissioner at the following address:

Commissioner
Alaska Department of Environmental Conservation
410 Willoughby Street, Suite 303
P.O. Box 111800
Juneau AK, 99811-1800.

Interested persons can review 18 AAC 15.200 for the procedures and substantive requirements regarding a request for an adjudicatory hearing. See http://www.dec.state.ak.us/commish/ReviewGuidance.htm for information regarding appeals of Department decisions.

Documents are Available

The permit, fact sheet, application, and related documents can be obtained by visiting or contacting DEC between 8:00 a.m. and 4:30 p.m. Monday through Friday at the addresses below. The permit, fact sheet, application, and other information are located on the Department's Wastewater Discharge Authorization Program website: http://www.dec.state.ak.us/water/wwdp/index.htm .

Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 555 Cordova Street Anchorage, AK 99501 (907) 269-6285	Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 410 Willoughby Avenue, Suite 310 P.O. Box 111800 Juneau, AK 99811-1800 (907) 465-5180

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1.0 APPLICANT

This fact sheet provides information on the Alaska Pollutant Discharge Elimination System (APDES) permit for the following entity:

Name of Facility:	Mendenhall Wastewater Treatment Plant (MWWTP)
APDES Permit Number:	AK0022951
Facility Location:	2009 Radcliffe Road, Juneau, AK 99801
Mailing Address:	2009 Radcliffe Road, Juneau, AK 99801
Facility Contact:	Ms. Samantha Stoughtenger

2.0 FACILITY INFORMATION

The City and Borough of Juneau (CBJ or permittee) owns, operates, and maintains the MWWTP located in Juneau, Alaska. The sequential batch reactor (SBR) secondary treatment plant discharges treated municipal wastewater to the Mendenhall River though a submerged multi-port diffuser located approximately 5,800 feet downriver of the Brotherhood Bridge, and 1.4 miles upstream from the Gastineau Channel. The map in Appendix A to the Fact Sheet depicts the location of the treatment plant and the discharge location.

The design flow of the MWWTP is 4.9 million gallons per day (mgd) and is the largest of three wastewater treatment facilities in the Juneau area. The plant services a resident population of approximately 20,000 and supporting commercial businesses. Because Juneau is a summer season destination area, the actual population is higher during the summer months. The MWWTP only receives wastewater from the domestic wastewater collection system and storm water is conveyed through a separate sewer collection system.

The Alaskan Brewing Company has been identified as a Significant Industrial User that discharges to the domestic wastewater collection system and ultimately to the MWWTP. The brewing company discharges 31,500 gallons per day (gpd) intermittently into the MWWTP collection system. The permittee indicated in their permit reissuance application that the brewing company has not caused or contributed to any problems at the plant in the three years prior to application submittal.

The MWWTP provides preliminary treatment of the influent sewage by fine screening and grit removal. The influent flows into the plant, solids are ground, and a sieve removes large debris. The wastewater settles in the influent well and is lifted into tea cup strainers that remove grit. The grit falls into a grit clarifier where it is removed. From the influent pump station, the wastewater is distributed to one of eight SBRs where it receives secondary biological treatment facilitated by the use of aeration blowers and jet circulation pumps. When an SBR completes a reaction cycle, the treated effluent is decanted and disinfected by ultra-violet (UV) light treatment prior to discharge to Mendenhall River. Treated effluent is discharged on an intermittent basis from the MWWTP coinciding with the decanting of each SBR. Each SBR is decanted at a rate of approximately 5,000 to 6,000 gallons per minute (gpm) for approximately 20 minutes at the end of each respective SBR reaction cycle. The treated effluent is conveyed through a 48-inch diameter high density polyethylene (HDPE) outfall pipeline that is anchored to the river bottom and oriented perpendicularly to the direction of flow in Mendenhall River. The diffuser fitted at the end of the outfall is approximately 70 feet in length and contains 13-rectangular ports each having a cross sectional area of 0.5 square feet (ft^2).

Sludge removed from the SBRs is stored in the sludge storage tank. The sludge is then dewatered in a belt filter press and is sent to either a local or out-of-state landfill for disposal.

Table 1: Design Criteria for Mendenhall Wastewater Treatment Plant

Design Flow	4.9 mgd
Average Monthly Flow	2.08 mgd [a]
Influent Biological Oxygen Demand, 5-day (BOD_5) Loading	7,356 lbs/day [b]
Influent Total Suspended Solids (TSS) Loading	8,990 lbs/day

Notes:
a. Monthly average flow measured from May 2006 to July 2013.
b. lbs/day = pounds per day

2.1 Background

In the mid-1960s, the first wastewater treatment facility was constructed at the MWWTP site. In the 1970s and again in the 1980s, the MWWTP underwent major upgrades and expansions. Construction of the current SBR facility began in 1986, and MWWTP began treating wastewater using SBR secondary treatment in 1989. Between 1989 and 1991, further modifications were made to various control equipment and process control strategies that resulted in improved BOD_5 and TSS removal rates as well as increased daily average flow capacity. In 2000, MWWTP installed a UV light disinfection system and discontinued the use of chlorination in June, 2003.

The MWWTP has historically been permitted by the Environmental Protection Agency (EPA) under National Pollutant Discharge Elimination System (NPDES) Permit Number AK0022951; which was last issued on May 1, 2006 and expired on April 30, 2011. On October 31, 2008 the Department received authority from EPA to administer the NPDES Program in the State of Alaska for domestic wastewater discharges. CBJ submitted a timely permit reissuance application to the Department. As a result, the Department accordingly issued a letter to CBJ noting that appropriate APDES permit reapplication materials had been received, and in accordance with 18 AAC 83.155(c), until a new APDES permit was issued by the Department, the 2006 EPA-issued NPDES permit (2006 permit) was administratively extended.

3.0 COMPLIANCE HISTORY

Discharge Monitoring Reports (DMR) from May 2006 to July 2013 were reviewed to determine the facility's compliance with effluent limits during the previous permit cycle. Table 2 below details specific incidences of permit limit exceedances that occurred since the permit was issued in May 2006. Not included in Table 2 are reportable noncompliance violations due to missed submittal dates for DMRs or missed sampling events. DMRs have been submitted consistently on time since May 2006 with the exception of one month, January 2011, when the DMR was submitted late. Throughout the permit cycle the permittee has submitted noncompliance notifications to DEC as required, reporting missed sampling events and other issues of noncompliance.

In the past five years, the MWWTP has been inspected three times, once by EPA in April 2008, and twice by DEC staff in May 2008 and December 2010. Deficiencies noted during EPA's 2008 inspection

were the Quality Assurance Project Plan (QAPP) did not accurately reflect the current sampling and analyses at the plant, and samples were being received at the contract laboratory outside the acceptable temperature range. No follow-up compliance or enforcement action was taken following the EPA inspection.

In May 2008, DEC staff conducted an inspection of the MWWTP and noted minor errors on the DMRs and that the QAPP had limited access in a locked office and was unsigned. No follow-up compliance or enforcement action was taken following the DEC 2008 inspection.

The latest inspection was conducted December 1, 2010 by DEC which included a site visit and records review. Following the inspection, an Inspection Report and Compliance letter was sent to the permittee on May 18, 2011 noting that overall the facility was clean and appeared to be in good operational order; however the following deficiencies were noted therein: the QAPP was unsigned, undated, and contained outdated information; fecal coliform bacteria monitoring frequency during the months of December 2010 and November 2010 were not as required in the permit; the receiving water monitoring reports did not include the date samples were analyzed; and a report showing river flow and ambient hardness had not been submitted with the permit reissuance application.

Table 2: Permit Limit Exceedances

Parameter	Units	Year	Month	Effluent Limit	Value Reported on DMR
pH	SU [a]	2006	May	6.5 – 9.0	6.2
		2011	March	6.5 – 9.0	6.3
		2011	May	6.5 – 9.0	6.0
		2011	November	6.5 – 9.0	6.4
		2011	December	6.5 – 9.0	6.0
BOD_5 Average Monthly	mg/L [b]	2007	September	30	36
		2009	March	30	33
		2009	August	30	34.3
		2009	September	30	65.3
		2012	April	30	31
		2013	March	30	41
		2013	April	30	38
BOD_5 Average Weekly	mg/L	2006	August	45	48
		2007	September	45	45.2
		2009	August	45	63.5
		2009	September	45	75.2
BOD_5 Maximum Daily	mg/L	2009	August	60	74.8
		2009	September	60	92.5

Parameter	Units	Year	Month	Effluent Limit	Value Reported on DMR
		2013	April	60	79
BOD_5 Percent Removal	% [c]	2009	January	Minimum 85	83.3
		2009	September	Minimum 85	81.1
TSS Average Monthly	mg/L	2009	February	30	31
		2012	March	30	37
		2012	April	30	48
		2012	May	30	40.4
		2013	April	30	42
TSS Average Weekly	mg/L	2012	March	45	46
		2012	April	45	55
		2012	May	45	50.3
		2013	April	45	66
TSS Maximum Daily	mg/L	2012	April	60	72
		2013	April	60	213
TSS Maximum Daily	lbs/day	2013	April	2452	3109
TSS Percent Removal	%	2008	December	Minimum 85	84.1
		2009	February	Minimum 85	82.7
		2009	April	Minimum 85	82
		2012	March	Minimum 85	84
		2012	April	Minimum 85	84
		2012	May	Minimum 85	79
		2013	April	Minimum 85	81
Maximum Daily Effluent Flow	mgd	2012	September	4.9	5.3

Notes:

a. SU = Standard pH units
b. mg/L = milligrams per liter
c. % = percent

4.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

4.1 Basis for Permit Effluent Limits

The Clean Water Act (CWA) requires that the permit limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBEL) or water quality-based effluent limits (WQBEL). A TBEL is set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the water quality standards (WQS) of a water body are met. A WQBEL may be more stringent than a TBEL. The basis for the proposed effluent limits in the permit is provided in Section 4.3 and Appendices B through D of this document.

4.2 Basis for Effluent and Receiving Water Monitoring

In accordance with Alaska Statute (AS) 46.03.110(d), the Department may specify in a permit the terms and conditions under which waste material may be disposed. Monitoring in a permit is required to determine compliance with effluent limits. Monitoring may also be required to gather effluent and receiving water body data to determine if additional effluent limits are required and/or to monitor effluent impact on the receiving water body quality.

The permit also requires the permittee to perform effluent monitoring required by the APDES Form 2A application, so that this data is available when the permittee applies for reissuance of their APDES permit. The permittee is responsible to conduct the monitoring and report results on DMRs or on the application for reissuance, as appropriate, to the Department.

4.3 Effluent Limits

The permit contains limits that are both TBELs and WQBELs. The Department first determines if TBELs are required to be incorporated into the permit. TBELs for publicly owned treatment works (POTWs), which apply to the publicly owned MWWTP, are derived from the secondary treatment standards found in Title 40 Code of Federal Regulations (40 CFR) §133.102 and (adopted by reference at 18 AAC 83.010(e)). The effluent limits imposed in this permit for BOD_5, BOD_5 percent removal, TSS, and TSS percent removal, are based on secondary treatment standards. For pollutants of concern with no associated TBELs, but that have reasonable potential to cause or contribute to an exceedance of water quality criteria, WQBELs are established to be protective of the designated uses of the receiving water. In cases where both TBELs and WQBELs are calculated, as is the case with pH in the permit, the more stringent limit is retained as the final permit effluent limit.

In the 2006 permit, calculated permit effluent limits for pH, fecal coliform bacteria, copper, and ammonia varied throughout the year to correspond to the seasonal variations of the Mendenhall River. In the 2014 APDES permit (2014 permit), the Department continues to consider the river's seasonal variations with respect to calculating and setting effluent limits for these parameters. However, the 2014 permit divides the year into hydrological similar time periods that are different than those used in the 2006 permit.

The 2006 permit divided the year into four time periods, November through May, June, July through September, and October. Following a review of 10 years of historic river flow data (October 3, 2002 through October 3, 2012), the Department has changed the number of hydrological divisions from the four divisions previously identified in the 2006 permit to two

identified for the 2014 permit and this fact sheet. Of the two temporal divisions identified, one, which includes the months of November through April, has lower dilution availability in the receiving water with average river flows from 110 cubic feet per second (cfs) to 445 cfs and the second division, which includes the months of May through October, has higher dilution availability in the receiving water with average river flows of 959 cfs to 3568 cfs. For the parameter of pH, the two annual divisions are modified. Additional discussion on pH is included later in this section.

This change to two temporal divisions in a year has resulted in effluent limit changes that apply to only a couple of months in the year. In particular are the months of May, June, and October. May was previously considered a month with low river flows but the Department has determined that May is more accurately characterized as a month having higher river flows. June and October each were considered previously to have unique hydrological river flows; however, the Department has determined that these two months have river flow rates that are within the higher flow range.

Effluent limit changes made in the 2014 permit as compared to the 2006 permit are:

- *pH* - The pH minimum daily effluent limits included in the 2014 permit are based on a modification of the two temporal divisions applied to other parameters. The modified divisions are November through June and July through October. A review of five years of data from August 2008 through July 2013 indicated that a pH minimum daily concentration of 6.5 SU can be achieved by the treatment plant during the months of November through June. This is consistent with the pH minimum daily effluent limits included in the 2006 permit with the exception of the daily minimum for the month of June which is more stringent in the 2014 permit than in the 2006 permit. The month of June was considered a unique hydrological time period in the 2006 permit and a pH minimum daily effluent limit of 6.4 SU was imposed. The same five years of data also indicated that the treatment plant can achieve a more stringent daily maximum limit of 8.5 SU year round. The 2006 permit established a pH maximum daily effluent limit based on secondary treatment TBELs and in the 2014 permit the pH maximum daily effluent limit is based on water quality criterion.
- *Fecal coliform bacteria* - Fecal coliform bacteria limits in the 2006 permit were contingent upon the average effluent/receiving water dilution ratio for a calendar month and whether chlorine was being used for total or partial disinfection. This approach resulted in tiered effluent limits for fecal coliform bacteria with only one effluent limit tier effective during a given month. Applicable fecal coliform bacteria effluent limits during the months of June through October were dependent on chlorine use alone and during the months of November through May both the calculated average monthly effluent/receiving water dilution ratio and chlorine use were used by the permittee to determine the applicable fecal coliform bacterial limits for the month.

  Currently, the MWWTP does not use chlorine for disinfection which eliminates the need for fecal coliform bacteria effluent limits to vary due to chlorine usage. In an effort to further simplify fecal coliform bacteria effluent limits in the 2014 permit, the Department reviewed the average effluent/receiving water dilution ratios used by the permittee to determine applicable fecal coliform bacteria effluent limits from August 2008 through July 2013. Submitted data indicated that during the months of November through May,

when the dilution ratio was a factor in determining applicable fecal coliform bacteria effluent limits, the same tier was used each month with the exception of two months, January 2009 and January 2010. During those two month, a lower calculated average dilution ratio resulted in lower fecal coliform bacteria effluent limits.

The fecal coliform bacteria effluent limits included in the 2014 permit are based on historic monthly river conditions and the permittee will not be required to calculate an effluent/receiving water dilution ratio to determine the applicable fecal coliform bacteria effluent limit. During the months of November through April, new river flow data indicates that the critical dilution is less than a 15:1 ratio. This ratio corresponds to the lowest tiered limit in the 2006 permit for the same months, and the tiered limit that was applied for the months of January 2009 and January 2010. The fecal coliform bacteria effluent limits included in the 2014 permit for months with lower available dilution (November through April) are more stringent than those applied during the 2006 permit cycle when the effluent/receiving water dilution ratio was calculated to be less than 15:1. To be consistent with requirements found in 18 AAC 83.530, an average weekly geometric limit has also been included in the 2014 permit for the months of November through April, which were not present in the 2006 permit.

The fecal coliform bacteria effluent limits included in the 2014 permit for months with higher available dilution (May through October) are more stringent than those applied during the 2006 permit cycle. The Department reviewed five years of data from August 2008 through July 2013 and determined that the MWWTP's treatment system can treat wastewater during the months of May through October to a level that can achieve a monthly geometric mean of 200 FC/100 mL, a maximum weekly geometric mean of 400 FC/100 mL, and a maximum daily count of 800 FC/100 mL.

- *Copper* - Copper limits for the months of May, June, and October are more stringent in the 2014 permit than those included in the 2006 permit. In the 2006 permit, the effluent copper limits during the month of May were consistent with the other months that were determined to have low river flows. The months of June and October did not have copper effluent limits but monitoring results were to be reported.

  There is an inverse relationship between river flow and river hardness, and metals, such as copper, are more toxic in soft water; therefore, water quality criteria becomes more stringent as the river flow increases. The change in effluent copper limits during the months of May, June, and October are a result of the determination that the river flows during these months are similar to other months with higher river flows. In the 2014 permit, all other months have copper effluent limits consistent with those set in the 2006 permit.

- *Ammonia* - Consistent with the rational above for available dilution for the month of May, the Department has determined that the discharge does not have the reasonable potential to cause or contribute to a violation of ammonia water quality criteria during the month of May; therefore, effluent limits for ammonia have been removed for the month of May. However, ammonia monitoring will continue and limits may be reinstated in the next permit if determined appropriate based on a review of ammonia data collected during the permit cycle. Ammonia limits in the 2014 permit for all other months are either more stringent or remain the same as the 2006 permit. The elimination of ammonia

effluent limits during the month of May is compliant with 18 AAC 83.480(b)(2). See Section 6.0, Antibacksliding, for further discussion.

- *Total residual chlorine* – As discussed in Section 2.1 of the fact sheet, the MWWTP discontinued the use of chlorine as a method of wastewater disinfection in June 2003 and there is no reason to believe chlorine is otherwise expected to be present in the effluent. Accordingly, there is no documented basis for concern warranting the continued inclusion of chlorine permit effluent limits; therefore, no chlorine effluent limits are included in the 2014 permit. See Section 6.0, Antibacksliding, for further discussion.
- *Chronic whole effluent toxicity (WET)* - An average monthly limit for chronic WET has been included in the 2014 permit for the months of November through April because the Department found that there is reasonable potential for chronic WET to exceed water quality criteria for chronic WET at the boundary of the mixing zone.

See Appendices B through D for more details on each of the changes. Table 3 summarizes the effluent limits and monitoring.

Table 3: Outfall 001 Effluent Limits and Monitoring Requirements

Parameter	Effluent Limits					Monitoring Requirements		
	Units	Minimum Daily	Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Flow	mgd	----	Report	----	4.9	Effluent	Continuous	Recorded
Dissolved Oxygen	mg/L	Report	----	----	Report	Effluent	1/Month	Grab
Temperature	°C [a]	----	Report	----	Report	Effluent	5/Week	Grab
BOD_5	mg/L	----	30	45	60	Effluent	2/Month [b]	24-hour Composite [c]
	lbs/day	----	1,226	1,839	2,452			Calculation [d]
BOD_5	mg/L	----	Report	----	----	Influent	2/Month [b]	24-hour Composite
BOD_5 Percent Removal	%	85	----	----	----	Effluent vs. Influent	1/Month	Calculation [e]
TSS	mg/L	----	30	45	60	Effluent	2/Month [b]	24-hour Composite
	lbs/day	----	1,226	1,839	2,452			Calculation
TSS	mg/L	----	Report	----	----	Influent	2/Month [b]	24-hour Composite
TSS Percent Removal	%	85	----	----	----	Effluent vs. Influent	1/Month	Calculation
pH (November 1 – June 30)	SU	6.5	----	----	8.5	Effluent	5/Week	Grab
pH (July 1 – October 31)	SU	6.3	----	----	8.5	Effluent	5/Week	Grab

Parameter	Effluent Limits					Monitoring Requirements		
	Units	Minimum Daily	Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Fecal Coliform Bacteria (FC) (November 1 – April 30)	FC/100 mL [f]	----	112 [g]	168 [g]	224 [h]	Effluent	2/Week	Grab
Fecal Coliform Bacteria (May 1 – October 31)	FC/100 mL	----	200 [g]	400 [g]	800 [h]	Effluent	1/Week	Grab
Total Ammonia as Nitrogen (N) (November 1 – April 30)	mg/L	----	28.5	----	40.5	Effluent	1/Month	24-hour Composite
	lbs/day	----	1165	----	1655			Calculation
Total Ammonia as N (May 1 – October 31)	mg/L	----	Report	----	Report	Effluent	1/Month	24-hour Composite
Copper - Total Recoverable (November 1 – April 30)	µg/L [i]	----	86.7	----	187.0	Effluent	1/Month	24-hour Composite
	lbs/day	----	3.54	----	7.63			Calculation
Copper - Total Recoverable (May 1 – October 31)	µg/L	----	44.5	----	95.8	Effluent	1/Month	24-hour Composite
	lbs/day	----	1.82	----	3.92			Calculation
Lead - Total Recoverable	µg/L	----	Report	----	Report	Effluent	3/Year [j]	24-hour Composite
Silver - Total Recoverable	µg/L	----	Report	----	Report	Effluent	3/Year [j]	24-hour Composite
Zinc - Total Recoverable	µg/L	----	Report	----	Report	Effluent	3/Year [j]	24-hour Composite
Whole Effluent Toxicity (WET) (November 1 – April 30)	TUc [k]	----	5.1	----	Report	Effluent	1/Year [l]	24-hour Composite
WET (May 1 – October 31)	TUc	----	Report	----	Report	Effluent	1/Year [l]	24-hour Composite
Hardness as $CaCO_3$	mg/L	----	Report	----	Report	Effluent	1/Month	24-hour Composite
Alkalinity as $CaCO_3$	mg/L	----	Report	----	Report	Effluent	1/Quarter [m]	24-hour Composite
Floating Solids or Visible Foam	Visual	----	----	----	Report	Effluent	1/Month	Visual

Parameter	Effluent Limits					Monitoring Requirements		
	Units	Minimum Daily	Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type

Notes:

a. ^{o}C = degree Celsius
b. Influent and effluent samples must be taken over approximately the same time period.
c. Composite samples must consist of at least eight grab samples collected at equally spaced intervals and proportionate to flow so that composite samples reflect influent/effluent quality during the compositing period.
d. lbs/day = pounds per day = [(parameter concentration in mg/L) x (facility design flow in mgd) x (conversion factor of 8.34)].
e. Minimum % Removal = [(monthly average influent concentration in mg/L – monthly average effluent concentration in mg/L) / (monthly average influent concentration in mg/L)] x 100.
f. FC/100 mL = colonies of fecal coliform bacteria per 100 milliliters
g. All fecal coliform bacteria average results must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the quantities. For example the geometric mean of 100, 200, and 300 is $(100 \times 200 \times 300)^{1/3} = 181.7$.
h. Not more than 10 percent of samples may exceed the daily maximum limit
i. µg/L = micrograms per liter
j. Lead, silver, and zinc must be sampled at least once during each of the following periods each year: January through April, May through August, and September through December. Results must be submitted with the April, August, and December DMRs.
k. TUc = toxic units, chronic
l. WET testing is to be conducted, at least, a total of twice per year, one sample must be taken between November through April and one sample must be taken between May through October.
m. Quarters are defined as January-March, April-June, July-September and October-December. Results for monitoring performed quarterly must be submitted with the DMR for the last month of the quarter: March, June, September, and December DMRs.

4.4 Effluent and Influent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. The permittee has the option of taking more frequent samples than required under the permit. These additional samples shall be used for averaging if they are conducted using the Department – approved test methods (found in 18 AAC 70 and 40 CFR Part 136 [adopted by reference in 18 AAC 83.010]), and if the method detection limits are less than the effluent limits.

The permit requires monitoring of the effluent for flow, BOD_5, TSS, pH, fecal coliform bacteria, total ammonia as N, copper, and WET to determine compliance with the effluent limits. The permit also requires monitoring of the influent for BOD_5 and TSS to calculate monthly removal rates for these parameters. In addition, the permit includes requirements to monitor the effluent for lead, silver, and zinc in order to conduct future reasonable potential analyses during permit reissuance. The permit requires monitoring effluent for dissolved oxygen, hardness, and alkalinity to evaluate the characteristics of the effluent and supply information for permit reissuance.

Monitoring changes made in the 2014 permit as compared to the 2006 permit include:

- copper and hardness monitoring during the months of July through September have been reduced from twice per month to once per month;
- turbidity monitoring has been removed;
- total residual chlorine monitoring has been removed; and

- during the month of May, fecal coliform bacteria monitoring has been reduced from twice per week to once per week.

In the 2006 permit, EPA required more frequent effluent monitoring for copper during the months of July through September compared to the rest of the months in order to better assess the discharge's effect on water quality. The submitted effluent copper data combined with data from receiving water both upstream and downstream has been reviewed and it has been determined that the wastewater discharge does not have reasonable potential to cause or contribute to exceedances of copper water quality criteria in the water body. Therefore, the Department has determined that a sufficient copper dataset exists to reduce monitoring to once per month monitoring to assess copper's variability. Hardness monitoring frequency in the 2006 permit was coordinated with the frequency of copper monitoring because the toxicity of copper is hardness dependent. The coordinated frequency will continue in the 2014 permit and hardness monitoring is accordingly also reduced to once per month.

Turbidity water quality criterion for rivers are based on the natural conditions of the receiving water. Mendenhall River's turbidity is predominately influenced by glacier silt and to a lesser extent, residential impact. The average turbidity of the river, determined from data submitted during the 2006 permit cycle, is 99 nephelometric turbidity units (NTUs). Throughout the 2006 permit cycle, the effluent did not cause more than a 10% increase in turbidity in the receiving water and therefore did not exceed water quality criterion. The turbidity monitoring requirement has not been carried forward in the 2014 permit; however, the permittee is encouraged to continue monitoring effluent turbidity as part of their operational process to identify possible issues that may affect UV disinfection.

Total residual chlorine monitoring has been removed because chlorine is no longer used as part of the treatment plant's operation.

As discussed in Section 4.3 of this fact sheet, following a review of 10 years of historic river flow data the Department determined that the month of May is more accurately characterized as a month having higher river flows and therefore higher dilution availability. The reduction of fecal coliform bacteria effluent monitoring frequency from twice per week to once per week during the month of May is consistent with other months with high dilution availability

Table 3 above presents the effluent and influent monitoring requirements.

4.5 Additional Monitoring

In accordance with APDES Application Form 2A, Section 10, Section 11, and Supplement A, the permittee shall perform additional effluent monitoring of pollutants during the life of the permit and shall submit the results of this testing with their application requesting permit reissuance. A summary of the required monitoring has been included in Table 4. Monitoring of these pollutants performed to satisfy other monitoring requirements of this permit may be used to satisfy this specific monitoring requirement as long as the "different calendar year and season" criteria, specified on Form 2A, are met. The permittee shall consult and review Form 2A upon permit issuance to ensure that the required monitoring in the application will be completed prior to submitting a request for permit reissuance. The permittee is responsible for all submissions and activities required on the application Form 2A even if they are not summarized in the Table 4. A copy of Form 2A can be found at: http://dec.alaska.gov/water/wwdp/index.htm.

Table 4: Additional Effluent Monitoring for Reissuance Application

Parameter	Units	Sample Location	Sample Frequency	Sample Type
Ammonia (as N)	mg/L	Effluent	3 / 4.5 years [a]	24-hour Composite
Chlorine, Total Residual [b]	mg/L	Effluent	3 / 4.5 years	Grab
Dissolved Oxygen	mg/L	Effluent	3 / 4.5 years	Grab
Nitrate/Nitrite	mg/L	Effluent	3 / 4.5 years	24-hour Composite
Kjeldahl Nitrogen	mg/L	Effluent	3 / 4.5 years	24-hour Composite
Oil and Grease	mg/L	Effluent	3 / 4.5 years	Grab
Phosphorus	mg/L	Effluent	3 / 4.5 years	24-hour Composite
Total Dissolved Solids	mg/L	Effluent	3 / 4.5 years	24-hour Composite
Expanded Effluent Testing (from Supplement A, Form 2A)	varies	Effluent	3 / 4.5 years	Varies

Notes:
a. 3 / 4.5 years means three sample must be taken within four and one half years from the effective date of this permit.
b. Sampling and analyzing for total residual chlorine is not required if the facility does not use chlorine for disinfection, does not use chlorine elsewhere in the treatment process, and has no reasonable potential to discharge chlorine in the effluent.

4.6 Whole Effluent Toxicity Monitoring

18 AAC 83.435 requires that a permit contain limitations on WET when a discharge has reasonable potential to cause or contribute to an exceedance of a water quality criterion.

WET tests are laboratory tests that measure the total toxic effect of an effluent on living organisms. While quantities of individual pollutants can be analytically determined, these measurements alone may not be able to specifically identify observable toxic responses, biological availability, and complex interactions within the effluent. WET tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. The two different durations of toxicity tests are acute and chronic. Acute toxicity tests measure survival over a 96-hour exposure. Chronic toxicity tests measure reductions in survival, growth, and reproduction over a 7-day exposure.

WET sampling and analysis is required to be conducted twice per year, once between the months of November and April and once between the months of May and October. During the months of November through April, the calculated critical available dilution is insufficient to ensure the toxicity water quality criterion will be met at the boundary of the mixing zone. Therefore, an average monthly chronic WET limit of 5.1 TUc has been included in the 2014 permit, which was not present in the 2006 permit. The 2014 permit requires a series of five dilutions be used when analyzing chronic WET.

4.7 Receiving Water Body Limits and Monitoring Requirements

As previously mentioned, the MWWTP discharges to the Mendenhall River through an outfall fitted with a diffuser located approximately 5,800 feet downriver of the Brotherhood Bridge and 1.4 miles upstream from the Gastineau Channel. River flows in the Mendenhall River vary seasonally with the lower flows occurring during the colder months of November through April and the higher flows occurring during the warmer months of May through October as a result of increased glacial melting. The lowest flows are associated with winter conditions. At the point of wastewater discharge, the river is tidally influenced; however, given the discharge's significant upstream distance from the tidally influenced salt water, tidal action in the area of the discharge is not significant. Nevertheless, during low river flows, a high tide can moderately direct the discharge plume upstream. Accordingly, the Department authorizes the mixing zone to extend upstream of the outfall's terminus, and has included requirements that upstream monitoring be conducted beyond the boundary of the authorized mixing zone to ensure results represent receiving water conditions free of influence from the wastewater discharge. See Section 5.4 of this document for the complete mixing zone analysis.

The 2006 permit authorized a mixing zone defined as rectangular in shape, centered over the diffuser, with a width of 30 meters and extending upstream and downstream from the diffuser a distance of 150 meters, to the full depth of the river. The 2006 permit required receiving water monitoring 150 meters upstream and 150 meters downstream of the point of discharge at approved locations corresponding to the boundary of the authorized mixing zone.

The 2014 permit continues to require monitoring of the receiving water at approved locations; however, because the size of the mixing zone has been reduced in length, the permittee must identify new locations. A mixing zone has been authorized for the parameters, fecal coliform bacteria, total ammonia, copper, lead, chronic WET, and pH. Except for lead and chronic WET, all other parameters mentioned in the preceding sentence must be monitored both upstream and downstream. Lead is only required to be monitored upstream because lead requires dilution to meet water quality criteria, but there is no corresponding reasonable potential for lead to exceed water quality criteria at the boundary of the mixing zone. Chronic WET will not be monitored in the receiving water as chronic WET testing already measures the effluent with respect to an established dilution series, which is consistent with the 2006 permit requirement. Downstream monitoring will demonstrate compliance with water quality criterion and upstream monitoring results will supply information on the receiving water.

The permit also requires monitoring of temperature, hardness, dissolved oxygen, and alkalinity upstream beyond the influence of the facility's discharge to gather necessary receiving water data for future permit issuances. Receiving water monitoring of pH and temperature have been retained in the 2014 permit to determine ammonia criterion for future permit issuances and hardness monitoring has also been carried forward to determine criteria for hardness dependent metals. Alkalinity is required to be monitored at the upstream location so data will be available to calculate pH in the receiving water when mixed with the effluent.

Receiving water monitoring requirements for copper have been reduced from four times per year to twice per year, lead monitoring has been brought forward from the 2006 permit, and silver and zinc monitoring have been discontinued. A review of concentrations for these metals over five years (between August 2008 and July 2013) in the receiving water downstream of the MWWTP

outfall and in the effluent indicate that MWWTP effluent discharges have not resulted in or contributed toward any exceedances of water quality criteria for copper, lead, silver, and zinc.

The 2006 permit required the permittee to report Mendenhall River flow data recorded at USGS gauge # 15052900 (Brotherhood Bridge gauge). However, the subject USGS gauge did not produce reliable flow data as it was (1) within the tidal zone of the Mendenhall River; (2) located in an area susceptible to dramatic annual changes due to riverbank erosion, riverbed scouring, and river course changes; and, (3) although this gauge was installed by USGS, it did not receive regular calibration or maintenance. Flow data from USGS gauge # 15052500 (Mendenhall River gauge), which is located upstream of Brotherhood Bridge, used together with measurements from USGS gauge # 15052800 (Montana Creek gauge), provide 10 years of reliable information used to calculate water quality criteria for hardness dependent metals and to conduct reasonable potential analyses (RPA) for this permit. Currently, the Montana Creek gauge is no longer available (taken out of service in October, 2012); however, the historical dataset of daily flows from Montana Creek (data available for August 1, 1965 through October 3, 2012), combined with flow data from the Mendenhall River gauge are representative of the range of flows reasonably expected for this river. The 2014 permit discontinues the requirement to report daily river flow data from the Brotherhood Bridge gauge.

Receiving water monitoring is to take place during low tide and during periods of effluent discharge from the facility when practicable. Monitoring data collected from receiving waters must be compiled and submitted annually in the Annual Receiving Water Monitoring Summary Report per Section 1.5.9 of the permit. Data submitted in the report will be used to confirm that water quality criteria is being met at the boundary of the mixing zone and to supply receiving water data for future permit issuance. Table 5 details receiving water monitoring requirements.

Table 5: Receiving Water Body Monitoring Requirements

Parameter	Units	Sampling Location(s)	Sampling Frequency	Sample Type	Reporting Limits [a]
Temperature	°C	Upstream [b] and Downstream [c]	1/Month	Grab	---
Fecal Coliform Bacteria [d]	FC/100 mL	Upstream and Downstream	1/Month	Grab	1.0
Total Ammonia as N	mg/L	Upstream and Downstream	4/Year [e]	Grab	0.05
pH	SU	Upstream and Downstream	1/Month	Grab	---
Copper – Dissolved [f]	µg/L	Upstream and Downstream	2/Year [g]	Grab	2.0
Lead – Dissolved [f]	µg/L	Upstream	2/Year [g]	Grab	2.0
Hardness as $CaCO_3$	mg/L	Upstream and Downstream	1/Month	Grab	10
Dissolved Oxygen	mg/L	Upstream and Downstream	1/Month	Grab	---

Parameter	Units	Sampling Location(s)	Sampling Frequency	Sample Type	Reporting Limits [a]
Alkalinity as $CaCO_3$	mg/L	Upstream	1/Month	Grab	10

Notes:

a. Permittee must use analytical test methods that achieve a reporting limit equivalent to or less than the values in this column.
b. Location of sampling must be upstream of the point of discharge, beyond the mixing zone boundary, and taken during periods of low tide.
c. Location of sampling must be 100 meters downstream of the diffuser, at the boundary of the authorized mixing zone.
d. All mixing zone fecal coliform bacteria average results must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero (0) with a one (1). The geometric mean of "n" quantities is the "nth" root of the quantities. For example, the geometric mean of 100, 200, and 300 is (100 x 200 x 300)1/3 = 181.7.
e. Of the requisite four samples per year, two samples must be taken during November through April in different months and two samples must be taken during May through October in different months.
f. Analysis for copper and lead in the receiving water must be as a dissolved metal.
g. Of the requisite two samples per year, one sample must be taken between November 1 and April 30, and one sample must be taken between May 1 and October 31.

5.0 RECEIVING WATER BODY

The permittee discharges treated domestic wastewater effluent into Mendenhall River at latitude 58° 21'43" N, longitude 134° 35' 53" W. The WQS at 18 AAC 70.020(a) classifies the Mendenhall River as being protected for the following freshwater uses: Classes (1) (A), (B), and (C) for use in water supply (drinking, culinary and food processing, agriculture, aquaculture, and industrial), water recreation (contact and secondary recreation), and growth and propagation of fish, shellfish, other aquatic life and wildlife.

5.1 Low Flow Conditions

The *Technical Support Document for Water Quality-Based Toxics Control* (TSD) (EPA, 1991) and the WQS recommend the flow conditions for use in calculation WQBELs using steady-state modeling. The TSD and WQS state that WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every 10 years (7Q10) for chronic criteria and the lowest one-day average flow rate expected to occur once every 10 years (1Q10) for acute criteria. Because the chronic criterion for ammonia is based on a 30-day average concentration, the 30B3 has been used for the chronic ammonia criterion instead of the 7Q10. The 30B3 is a biologically-based design flow intended to ensure an excursion frequency of once every three years for a 30-day average flow rate. The 7Q10, 1Q10, and 30B3 have been calculated for the two identified hydrological seasons.

DEC analyzed 10 years of Mendenhall River flow data from October 3, 2002 through October 3, 2012. Monthly averages, minimum flows, and maximum flows were determined by combining the flows from the USGS gauges #15052500 at Mendenhall River, upstream from the MWWTP discharge, and Montana Creek gauge #15052800, also upstream from the treatment plant but further downstream than gauge #15052500. The Department determined that dividing the year into two seasons, November through April and May through October, results in a permit

optimally aligned with historical flow data in the Mendenhall River. Seasonal low flows calculated for the Mendenhall River in the 2014 permit are summarized in Table 6.

The Mendenhall River is influenced by tidal action at the point of wastewater discharge from the MWWTP. When the tide starts to come in, additional water available for dilution is present at the discharge location. However, when determining low river flow, it was determined that the most critical time for the discharge is during low river flow, when the tide is out. Therefore, available dilution and the mixing zone was determined using low river flow only.

Table 6: Low Flows in the Mendenhall River at the Point of Discharge

	1Q10 (cfs)	7Q10 (cfs)	30B3 (cfs)
Critical Flows, November – April	30	35	49
Critical Flows, May - October	183	292	561

5.2 Water Quality Standards

Regulations in 18 AAC 70 require that the conditions in permits ensure compliance with the WQS. The state's WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an antidegradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the beneficial use classification of each water body.

Water bodies in Alaska are designated for all uses unless the water has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some water bodies in Alaska can also have site specific water quality criterion per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b). The Mendenhall River has not been reclassified, nor have site-specific water quality criteria been established. Therefore, Mendenhall River must be protected for all freshwater designated use classes listed in 18 AAC 70.020(a), and also listed in Section 5.0 of this document.

5.3 Water Quality Status of Receiving Water

Any part of a water body for which the water quality does not or is not expected to meet applicable water quality criteria is defined as a "water quality limited segment" and placed on the state's impaired water body list. The Mendenhall River is not included on any of the impaired water body lists catalogued in the *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report*, July 15, 2010.

5.4 Mixing Zone Analysis

In accordance with state regulations at 18 AAC 70.240, as amended through June 26, 2003, the Department may authorize a mixing zone in a permit. The permittee submitted a mixing zone application, modeling predictions, and summary report to the Department on June 29, 2012 and requested a mixing zone for copper, lead, silver, zinc, ammonia, fecal coliform bacteria, and chronic WET. The permittee utilized CORMIX, a hydrodynamic mixing zone model, to predict concentrations of pollutants of interest potentially present in MWWTP effluent.

The Department reviewed the CORMIX models submitted by the permittee and conducted additional CORMIX modeling for pollutants: fecal coliform bacteria, ammonia, copper, lead, and chronic WET. Models were performed by the Department to simulate conditions during the two river flow scenarios. Based on the modeling, a review of the application, and other submitted data, the Department is authorizing a chronic and an acute mixing zone.

The Department authorizes a chronic mixing zone for: fecal coliform bacteria, pH, ammonia, chronic toxicity, copper, and lead. The Department authorizes a smaller, initial acute mixing zone for ammonia, and copper.

Appendix E, Mixing Zone Analysis Checklist, outlines regulatory criteria that the Department must consider when analyzing a mixing zone request. These regulatory criteria include: the size of the mixing zone, treatment technology, existing uses of the water body, human consumption, spawning areas, human health, aquatic life, and endangered species. All criteria must be met for the Department to authorize a mixing zone. The following sections summarize the Department's mixing zone analysis.

Size In sizing the mixing zone, available dilution during critical flow conditions and the size of the bounded area of the river were taken into consideration. Dilution factors were determined for each hydrological seasons by comparing the ratio of critical river flow to discharge flow. All dilution factors are calculated with the discharge flow rate set equal to MWWTP's design flow of 4.9 mgd. For each of the two seasons, (November - April and May – October) there are three values for the dilution factor: one based on the 1Q10 flow rate of the receiving water and used to determine reasonable potential (RP) and wasteload allocations for acute aquatic life criteria, one based on the 7Q10 flow rate of the receiving water and used to determine RP and wasteload allocations for chronic aquatic life criteria (except ammonia) and conventional pollutants, and one based on the 30B3 flow rate of the receiving water and used to determine RP and wasteload allocations for the chronic ammonia criterion. This resulted in a total of six different dilution factors under initial consideration, as summarized in Table 7 below.

Table 7: Effluent Dilution Factors

Season	Acute (1Q10)	Chronic (7Q10)	Chronic (30B3)
November-April	5.0	5.6 [a]	7.5
May-October	25.1	39.5	75.0

Note:
a. Dilution value = 5.6 was also used in setting chronic fecal coliform bacteria effluent limits.

Receiving water and facility-specific variables were entered into the CORMIX model to determine the behavior of the effluent as it mixes with the receiving water. A range of variables were considered while modeling boundary conditions including, but not limited to: positioning of the outfall structure, diffuser and effluent port diameters, effluent discharge velocity, river flows, the temperature and pH of the effluent and river, effluent pollutant concentrations, and receiving water pollutant concentration. Conservative (i.e. 99th percentile of effluent pollutant concentrations and maximum effluent flow rate) conditions were used as effluent input variables.

The CORMIX modeling results were used to determine the length and width of the discharge plume at the point each of the dilutions in Table 7 were achieved. Also taken into consideration were the dilutions actually available due to the restriction of the river's width. Where the limitation of the width of the river resulted in a dilution less than the calculated critical dilution(s) presented in Table 7 above, the lesser dilution(s) and plume size(s) were used. Table 8 shows the dilutions that were used to determine RP and, if required, calculate effluent WQBELs.

Table 8: Dilutions Factors Used

Season	Acute (1Q10)	Chronic (7Q10)	Chronic (30B3)
November-April	5.0	5.6	7.5
May-October	18 [a]	35 [a]	35 [b]

Notes:
a. These dilutions are based on river width restrictions as well as flow.
b. More dilution is available; however, ammonia does need more dilution to meet water quality criteria.

Through CORMIX modeling it was determined that a chronic mixing zone centered over the diffuser and extending 100 meters upstream and 100 meters downstream with a width of 30 meters has an available dilution of 35 during the months of May through October. The mixing zone was sized using river flow conditions during the months of May through October; however RP and WQBELs for the lower river flow months, November through April, have been determined using the lower available dilutions noted in Table 8.

The 99th percentile of the pollutants of concern plus seasonal receiving water conditions were input into the CORMIX model to confirm that chronic water quality criteria for fecal coliform bacteria, pH, ammonia, chronic toxicity, copper, and lead will be met at and beyond the boundary of the authorized chronic mixing zone regardless of the season.

A smaller, initial acute mixing zone is sized to prevent lethality to passing organisms, while a chronic mixing zone is sized to protect the ecology of the water body as a whole. According to EPA (1991), lethality to passing organisms would not be expected if an organism passing through the plume along the path of maximum exposure is not exposed to a concentration exceeding the acute criteria when averaged over a one hour time period. Furthermore, the travel time of an organism drifting through the acute mixing zone must be less than approximately 15 minutes if a one-hour average exposure is not to exceed the acute criterion. Based on the Mendenhall River's ambient flow velocities and the short time interval between effluent being discharged and compliance with the acute water quality criteria (65 seconds), it is improbable that any organism would be exposed to the discharge plume for greater than 15 minutes.

Acute dilutions were calculated using the MWWTP's design flow and the 1Q10 river flow calculated for each of the two determined hydrological seasons. Through CORMIX modeling it was determined that an acute mixing zone centered over the diffuser and extending six meters upstream and six meters downstream with a width of 10 meters has an available dilution of five during the months of November through April. This dilution has been applied to all pollutants of concern and the modeling demonstrates that acute water quality criteria for all pollutants of concern will be met at the boundary of the acute mixing zone.

In accordance with 18 AAC 70.255, as amended through June 2003, the Department determined that the authorized size of the mixing zone for the MWWTP wastewater discharge is appropriate.

Technology In accordance with 18 AAC 70.240(a)(3), as amended through June 2003, the Department finds that available evidence demonstrates that effluent from the MWWTP will be treated to remove, reduce, and disperse pollutants, using methods found by the Department to be the most effective and technologically and economically feasible, consistent with the highest statutory and regulatory treatment requirements.

Wastewater operations at the MWWTP generally meet and occasionally exceed secondary treatment requirements. The facility system includes preliminary treatment of influent by fine screening and grit removal followed by clarification, treatment by one of eight SBRs where it is treated using aeration blowers, jet circulation pumps and UV disinfection. The treatment methods incorporated at the MWWTP are commonly employed and accepted for treatment of similar discharges throughout the United States.

Low Flow Design In accordance with 18 AAC 70.255(f), Appendix C describes the process used to determine if the discharge authorized in the permit has the reasonable potential to cause or contribute to a violation of a water quality criterion. Appendix C, Tables C- 2 and C-3 compares maximum projected effluent concentrations for the acute (1Q10) and chronic (7Q10) mixing zones to their respective criterion.

In establishing final permit limits and modeling mixing zones, DEC assumes steady state exposure conditions and “worst case” effluent and receiving water conditions. Chronic criteria are modeled with design flows for effluent together with critical receiving water flows at 7Q10 levels, and exposures for acute criteria are modeled at design flows for effluent and 1Q10 critical receiving water flow.

Existing Use In accordance with 18 AAC 70.245, as amended through June 2003, the mixing zone has been appropriately sized to fully protect the existing uses listed is Section 5.0 of this fact sheet. The existing uses have been maintained and protected under the terms of the previous permit. The permit reissuance application does not propose any changes that would likely result in a lower quality effluent and the size of the mixing zone has been reduced in this permit issuance. The Department has determined that the existing uses and biological integrity of the water body will be maintained and fully protected under the terms of the permit.

Human Consumption In accordance with 18 AAC 70.250(b)(2) and (b)(3), as amended through June 2003, the pollutants discharged cannot produce objectionable color, taste, or odor in aquatic resources harvested for human consumption; nor can the discharge preclude or limit established processing activities or commercial, sport, personal use, or subsistence fish and shellfish harvesting. There has been no indication that established fishing or shellfish harvesting has been precluded by the discharge, and signs are required to be posted to inform the public that certain activities such as harvesting of aquatic life for raw consumption and primary contact recreation should not take place in the mixing zone. The Department finds that the permit requirements will be protective of the water body’s uses.

Spawning Areas In accordance with 18 AAC 70.255(h), as amended through June 2003, the mixing zone is not authorized in a known spawning area for anadromous fish or resident fish spawning beds. The Mendenhall River is included in the Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes as Stream No. 111-50-10500, and is

catalogued for the presence of chum salmon, coho salmon, pink salmon, sockeye salmon, steelhead trout, and Dolly Varden char. Adult salmonids, which enter the river in late summer and fall, primarily use the lower habitats as a migration corridor as they return to spawn in clear water tributary and headwater streams during the spring (ADF&G, 2011). The lower portion of the Mendenhall River, in the vicinity of the discharge, is characterized as a migratory corridor for salmonids entering and leaving the system, but is not characterized as a spawning area.

Human Health In accordance with 18 AAC 70.250 and 18 AAC 70.255, as amended through June 2003, the mixing zone authorized in the permit shall be protective of human health and will not result in pollutants discharged at levels that will bioaccumulate, bioconcentrate, or persist above natural levels in sediments, water, or biota or at levels that otherwise will create a public health hazard through encroachment on a water supply or contact recreation uses. Under the conditions of the permit, the pollutants discharged will not produce objectionable color, taste, or odor in aquatic resources harvested for human consumption; nor will the pollutants discharged preclude or limit established processing activities of commercial, sport, personal-use, or subsistence fish and shellfish harvesting.

An analysis of the effluent testing data that was included with the MWWTP wastewater discharge application and the results of the RPA conducted on pollutants of concern indicate that the level of treatment at MWWTP is protective of human health. The quality of the effluent is expected to meet water quality criteria in the receiving water. (See Appendix C)

Aquatic Life and Wildlife In accordance with 18 AAC 70.250 and 18 AAC 70.255, as amended through June 2003, pollutants for which the mixing zone will be authorized will not accumulate in concentrations outside of the mixing zone that are undesirable, present a nuisance to aquatic life, cause permanent or irreparable displacement of indigenous organisms, or result in a reduction in fish or shellfish population levels. Based on a review of effluent data (including WET testing results), outfall structure and location, mixing zone modeling, and river velocities at the point of discharge, the Department concludes that the discharge will meet all water quality criteria at the boundary of and outside the mixing zone.

Endangered Species In accordance with 18 AAC 70.250(a)(2)(D), as amended through June 2003, the Department finds that the authorized mixing zone will not cause an adverse effect on threatened or endangered species. Impacts to overall water quality and any threatened or endangered species therein, are not expected based on the size of the mixing zone, the discharge characteristics, and the river velocities associated with the receiving water. The National Marine Fisheries Service, in a letter dated August 31, 2012, and the United States Fish and Wildlife Service, in a signed email dated August 17, 2012, indicated that while several Endangered Species Act (ESA)-listed species occur in the Mendenhall River vicinity and downstream waters, plant operations will not adversely impact any designated or proposed critical habitat or Essential Fish Habitat (EFH). Additional ESA and EFH information is included in Sections 9.1 and 9.2 of this document.

6.0 ANTIBACKSLIDING

18 AAC 83.480 requires that “effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit.”

18 AAC 83.480(c) also states that a permit may not be reissued "to contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time the permit is renewed or reissued."

Effluent limitations may be relaxed under two categories as allowed under 18 AAC 83.480 (CWA §402(o)) and CWA §303(d)(4). 18 AAC 83.480(b) allows relaxed limitations in renewed, reissued, or modified permits when there have been material and substantial alterations or additions to the permitted facility that justify the relaxation. CWA §303(d)(4)(A) states that, for water bodies where the water quality does not meet applicable water quality standards, effluent limitations may be revised under two conditions; the revised effluent limitation must ensure the attainment of the water quality standard (based on the water body's total maximum daily load or the WLA) or the designated use which is not being attained is removed in accordance with the water quality standard regulations.
CWA §303(d)(4)(B) states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, water quality-based effluent limitations may be revised as long as the revision is consistent with the State's antidegradation policy. Even if the requirements of CWA §303(d)(4) or 18 AAC 83.480(b) are satisfied, 18 AAC 83.480(c) prohibits relaxed limits that would result in violations of WQS or effluent limitation guidelines.

The 2014 permit eliminates effluent limits for ammonia during the month of May and eliminates all effluent limits for total residual chlorine. Effluent limitations for all other pollutants are as stringent as or more stringent than those in the 2006 permit.

Following a review of new information gathered during the 2006 permit cycle, the Department has determined that the discharge from the MWWTP does not have the reasonable potential to cause or contribute to a violation of ammonia water quality criteria at the boundary of the mixing zone during the month of May; therefore, effluent limits for ammonia have been removed for the month of May. The Department reviewed new river flow rates and reported average monthly effluent/receiving water dilution ratios the permittee submitted for each month since it was first required in the 2006 permit. For the month of May, 76:1 was the lowest reported dilution ratio, which is well above the dilution ratio required (7.3:1) to meet ammonia water quality criteria. Based on this new information, the elimination of ammonia effluent limits during the month of May is compliant with 18 AAC 83.480(b)(2). All other ammonia effluent limits in the 2014 permit are either more stringent or remain the same as the 2006 permit.

The MWWTP has not used chlorine in the treatment process since the installation of the UV disinfection system prior to issuance of the 2006 permit. Chlorine effluent limits in the 2006 permit applied only if chlorine was added to the effluent for total or partial disinfection. Chlorine effluent limits were included in the 2006 permit to allow CBJ to disinfect its effluent should the UV system fail. Throughout the 2006 permit cycle the UV disinfection system has proved to be reliable and the use of chlorine has not been needed. The removal of effluent limits for total residual chlorine is consistent with the requirements applied during the 2006 permit cycle.

Monitoring frequency of copper and hardness during the months of July through September have been reduced from twice per month to once per month and the monitoring of fecal coliform bacteria during the month of May has been reduced from twice per week to once per week.

Due to the inverse relationship between river flow and hardness, and the increase in the toxicity of copper as hardness decreases, water quality criteria for copper is more stringent during times of high river flows. However, as river flow rates increase more dilution becomes available which can offset the increased toxicity of copper. The 2006 permit required monitoring of copper and hardness in the effluent more frequently during the summer months with the highest river flows, July through September, in

order to better assess the discharge's effect on water quality. Following a review of copper data submitted during the 2006 permit cycle and in accordance with EPA's *Interim Guidance for Performance-Based Reductions of NPDES Permit Monitoring Frequencies* [1996], the Department has determined that a reduction in copper and hardness monitoring during the months of July through September is justified.

See fact sheet Sections 4.3 and 4.4 for discussions on the basis for conditions in the 2014 permit (e.g. monitoring) that have changed from the 2006 permit issuance.

7.0 ANTIDEGRADATION

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, WQBELs may be revised as long as the revision is consistent with the State's antidegradation policy. The Antidegradation Policy of the WQS (18 AAC 70.015) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. This section analyzes and provides rationale for the Department's decisions in the permit issuance with respect to the Antidegradation Policy.

The Department's approach to implementing the Antidegradation Policy, found in 18 AAC 70.015, is based on the requirements in 18 AAC 70 and the Department's *Policy and Procedure Guidance for Interim Antidegradation Implementation Methods*, dated July 14, 2010. Using these procedures and policy, the Department determines whether a water body, or portion of a water body, is classified as Tier 1, Tier 2, or Tier 3, where a higher numbered tier indicates a greater level of water quality protection. At this time, no Tier 3 waters have been designated in Alaska. The Mendenhall River is not listed as impaired on DEC's most recent *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report*; therefore, a Tier 1 designation is not warranted. Accordingly, this antidegradation analysis conservatively assumes that the discharge is to a Tier 2 water body.

The State's Antidegradation Policy in 18 AAC 70.015(a)(2) states that if the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water (i.e. Tier 2 waters), that quality must be maintained and protected. The Department may allow a reduction of water quality only after finding that five specific requirements of the antidegradation policy at 18 AAC 70.015(a)(2)(A)-(E) are met. The Department's findings follows:

1. **18 AAC 70.015 (a)(2)(A).** Allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located.

   Based on the evaluation required per 18 AAC 70.015(a)(2)(D) below, the Department has determined that the most reasonable and effective pollution prevention, control, and treatment methods are being used and that the localized lowering of water quality is necessary.

   The MWWTP is the largest of three wastewater treatment facilities serving CBJ. As such, MWWTP is responsible for treating roughly two-thirds of the wastewater produced by the steadily increasing CBJ resident population base (27,034 people in July 1990 growing to 32,164 people in July 2011) and supporting businesses. According to Juneau's Economic Development Council, Juneau's annual increase in population has been higher than for the state as a whole over the last five years with an increase of more than 1.5% per year. Continued operation of the MWWTP is essential for protecting human health and the environment from the adverse effects of untreated domestic wastewater.

The Department concludes that the operation of the MWWTP and the authorization of the discharge are necessary to accommodate the important economic development of CBJ and that the finding is met.

2. **18 AAC 70.015 (a)(2)(B).** Except as allowed under this subsection, reducing water quality will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235 or the whole effluent toxicity limit in 18 AAC 70.030.

The permit reissuance application does not propose any changes that would likely result in wastewater of lower quality to be discharged from the MWWTP than has been discharged under previously issued NPDES permits. The water quality criteria in 18 AAC 70.020 are the basis for the permit effluent limits and serve the specific purposes of protecting the existing and designated uses. Modeling results and the results of monitoring data submitted during the previous permit cycle indicate that discharges authorized by the permit conform to the requirements of 18 AAC 70.020.

The Department has not established or adopted site-specific criteria for the Mendenhall River. Therefore, criteria allowed by 18 AAC 70.235 have not been violated by issuance of this permit.

An average monthly chronic WET limit has been established for the months of November through April to ensure the applicable water quality criteria in 18 AAC 70.030 will be met at the boundary of the authorized mixing zone. During the months of May through October, analyses showed that there is no reasonable potential for chronic WET to cause or contribute to an excursion of applicable water quality criterion. The permit requires accelerated testing of chronic toxicity if WET effluent limits are exceeded, and if the accelerated tests also exceed the WET limit, the permit requires further action to investigate and identify the cause of toxicity. The Department has concluded that water quality criteria for chronic WET will be met at the boundary of the mixing zone and the applicable criterion of 18 AAC 70.030 will not be violated.

The Department has determined that this finding is met.

3. **18 AAC 70.015(a)(2)(C).** The resulting water quality will be adequate to fully protect existing uses of the water.

A list of the uses Mendenhall River is protected for can be found in this fact sheet, Section 5.0. WQSs, upon which the permit effluent limits are based, serve the specific purpose to protect existing and designated uses of the receiving waters. Accordingly, permit effluent limits restrict the MWWTP discharge which ensures that water quality criteria will not be exceeded at the end of pipe, or beyond the boundary of the authorized mixing zone.

The Department concludes the water quality of the receiving waters will be adequate to protect all existing uses and therefore this finding is satisfied.

4. **18 AAC 70.015(a)(2)(D).** The methods of pollution prevention, control, and treatment found by the Department to be most effective and reasonable will be applied to all wastes and other substances to be discharged.

The methods of prevention, control, and treatment the Department finds to be most effective and reasonable are currently in use at the facility and include meeting federal (40 CFR 133) and State (18 AAC 72.050) secondary treatment requirements as well as disinfecting the effluent prior to discharge. The type of treatment employed at MWWTP is similar in nature to other like facilities and their discharges throughout the United States (U.S.), including Alaska. The SBR system

used by the facility was selected to meet the need for a relative compact system and for its treatment efficiencies.

The MWWTP has both a QAPP and Operations and Maintenance (O&M) Plan to ensure protocol for discharging adequately treated wastewater is followed to the extent feasible. Both plans are required to be kept updated. The 2014 permit requires that a Facility Plan be developed over the course of the permit cycle to evaluate existing conditions, and identify and prioritize short- and long-term needs and improvements. The Department concludes that the most effective and reasonable methods of pollution prevention, control, and treatment will be applied and therefore the finding is satisfied.

5. **18 AAC 70.015(a)(2)(E).** All wastes and other substances discharged will be treated and controlled to achieve (i) for new and existing point sources, the highest statutory and regulatory requirements; and (ii) for nonpoint sources, all cost-effective and reasonable best management practices.

   The applicable "highest statutory and regulatory treatment requirements" are defined in 18 AAC 70.990(30) (as amended June 26, 2003) and in the *Policy and Procedure Guidance for Interim Antidegradation Implementation Methods*, dated July 2010. Accordingly, there are three parts to the definition:

   (A) any federal technology-based effluent limitation guidelines identified in 40 CFR § 125.3 and 40 CFR §122.29, as amended through August 15, 1997, both adopted by reference at 18 AAC 83.010;

   (B) minimum treatment standards in 18 AAC 72.040; and

   (C) any treatment requirements imposed under another state law that is more stringent than a requirement of this chapter.

   The first part of the definition includes all federal technology-based effluent limit guidelines, including "For POTWs, effluent limitations based upon…Secondary Treatment" at 40 CFR § 125.3(a)(1) defined at 40 CFR § 133.102 adopted by reference at 18 AAC 83.010(e), which are incorporated in this permit.

   The second part of the definition 18 AAC 70.990(B) (2003) appears to be in error, as 18 AAC 72.040 describes discharges to sewers and not minimum treatment. The correct reference appears to be the minimum treatment standards found at 18 AAC 72.050, which refers to domestic wastewater discharges only. The authorized domestic wastewater discharge is in compliance with the minimum treatment standards found in 18 AAC 72.050 as reflected by the permit limits specifying secondary treatment standards.

   The third part includes any more stringent treatment required by state law, including 18 AAC 70 and 18 AAC 72. The correct operation of equipment, water quality monitoring, implementation of secondary treatment standards for the domestic wastewater discharge (40 CFR 133 and 18 AAC 72.050), and implementation of applicable best management practices (BMPs) will control the discharge and satisfy all applicable state requirements.

   After review of the applicable statutory and regulatory requirements, including 18 AAC 70, 18 AAC 72, and 18 AAC 83, the Department finds that the discharge from the existing point source meets the highest applicable statutory and regulatory requirements and that this finding is met.

8.0 OTHER PERMIT CONDITIONS

8.1 Quality Assurance Project Plan

The permittee is required to develop procedures to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to update the QAPP within 180 days of the effective date of the final permit. Additionally, the permittee must submit a letter to the Department within 180 days of the effective date of the permit stating that the plan has been implemented within the required time frame. The QAPP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples; laboratory analysis; and data reporting. The permittee is required to amend the QAPP whenever any procedure addressed by the QAPP is modified. The plan shall be retained on-site and made available to the Department upon request.

8.2 Operation and Maintenance Plan

The permit requires the permittee to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop or update and implement an O&M Plan for its facility within 180 days of the effective date of the final permit. If an O&M Plan has already been developed and implemented, the permittee need only to review the existing plan to make sure it is up to date and all necessary revisions are made. The plan must be reviewed annually and retained on site and made available to the Department upon request.

8.3 Facility Plan

The permittee is required to develop, over the course of the permit cycle, a Facility Plan evaluating MWWTP's existing condition and identifying near- and long-term needs and potential improvements to ensure that the MWWTP continues to provide environmentally responsible waste treatment and disposal services to CBJ. The Facility Plan shall develop a strategy to address present and projected future problems and/or needs for a time period of 10-20 years. The Facility Plan shall evaluate existing systems and design capacities using current conditions and determine adequacy of the facility's treatment process, maintenance program, process control measures, operating procedures, and record management. The Facility Plan shall also evaluate anticipated future wasteloads and flows, identify potential deficiencies and/or problems, and evaluate whether and when infrastructure changes or upgrades should be initiated.

The Facility Plan must be submitted to the Department with the permit reissuance application 180 days before permit expiration.

8.4 Pretreatment Requirements

The results of the 2002 industrial user survey indicated that the MWWTP receives wastewater from only one significant industrial user (SIU), the Alaska Brewing Company. MWWTP's Effluent Mixing Zone Analysis (Tetra Tech, 2012) listed a second "significant user", Lemon Creek Correctional Center/Industrial Laundry Facility. The Department determined that though the Correctional Facility discharged an average daily volume of 15,244 gallons to the MWWTP during 2012, this quantity is below the regulatory threshold to be considered a SIU according to 40 CFR §403.3(v), adopted by reference in 18 AAC 83.010(g)(2).

The MWWTP is subject to general pretreatment regulations in subparts of 40 CFR §403 applicable to POTWs that receive wastewater from sources subject to National Pretreatment Standards (see 40 CFR 403.1 "Purpose and Applicability."). However, current conditions as regulated in this permit and the pretreatment activities already in place are sufficient to manage the discharge. The Department is not requiring State approval of a pretreatment program at this time.

8.5 Standard Conditions

Appendix A of the permit contains standard regulatory language that must be included in all APDES permits. These requirements are based on the regulations and cannot be challenged in the context of an individual APDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

9.0 OTHER LEGAL REQUIREMENTS

9.1 Endangered Species Act

The Endangered Species Act (ESA) requires federal agencies to consult with the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. As a state agency, DEC is not required to consult with these federal agencies regarding permitting actions. However, the Department values input from these agencies and has voluntarily contacted the agencies to notify them of the development of the permit and to obtain a list of threatened and endangered species near the discharge. On August 16, 2012 emails requesting comments from USFWS and NOAA were sent out.

DEC received a response by email on August 17, 2012 from USFWS regarding potential effects to threatened or endangered species in the vicinity of the MWWTP discharge. USFWS stated that there are no species listed under the Endangered Species Act as threatened or endangered within the jurisdiction of the Fish and Wildlife Service in Southeast Alaska.

DEC received a mailed response August 31, 2012 from NMFS regarding potential effects to threatened or endangered species in the vicinity of the MWWTP discharge. NMFS stated that two listed species are found in the vicinity of the project area. The endangered humpback whale (*Megaptera novaengliae*) can be found in nearby bodies of marine water including Fritz Cove, Lynn Canal, Favorite Channel and Saginaw Channel. The threatened eastern Distinct Population Segment of Stellar sea lion (*Eumetopias jubatus*) is also found in these areas. There are no critical habitat areas for these species designated in the vicinity of the MWWTP or its discharge area. The nearest critical habitat area, Benjamin Island, is located about 20 miles northwest of the project area in marine waters.

9.2 Essential Fish Habitat

Essential fish habitat (EFH) includes the waters and substrate (sediments, etc.) necessary for fish species to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires federal agencies to consult with NOAA when

a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. As a state agency, DEC is not required to consult with federal agencies regarding permitting actions; however, DEC contacted NMFS to notify them of the issuance of this permit and to obtain listings of EFH near the subject discharge.

NMFS was contacted on August 16, 2012, to confirm preliminary findings of several EFH identified in the Mendenhall River. Based on existing information provided by NMFS, the following species have been identified as having EFH in the Mendenhall River and in the vicinity downstream of the discharge (NMFS, 2012b):

- Chinook salmon (marine juvenile, marine immature, maturing adult life stages)
- Chum salmon (marine juvenile, marine immature, maturing adult life stages)
- Coho salmon (marine juvenile, marine immature, maturing adult life stages)
- Pink salmon (marine juvenile, marine immature, maturing adult life stages)
- Sockeye salmon (marine juvenile, marine immature, maturing adult life stages)

In addition, since Mendenhall River is a freshwater system, the Alaska Department of Fish and Game's (ADFG) "Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes" and associated Atlas are the appropriate documents for determining EFH in freshwaters of Alaska. The discharge and mixing zone location are not in areas of documented salmon spawning, but salmon do use the segment of the river as a migratory corridor.

9.3 Sludge (Biosolids) Requirements

Sludge means any solid, semi-solid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. State and federal requirements regulate the management and disposal of sewage sludge (biosolids). The permittee must consult both state and federal regulations to ensure proper management of the biosolids and compliance with applicable requirements.

State Requirements:

The Department separates wastewater and biosolids permitting. The permittee should contact the Department's Solid Waste Program for information regarding state regulations for biosolids. The permittee can access the Department's Solid Waste Program web page for more information and who to contact.

Federal Requirements:

EPA is the permitting authority for the federal sewage sludge regulations at 40 CFR Part 503. Biosolids management and disposal activities are subject to the federal requirements in Part 503. The Part 503 regulations are self-implementing, which means that a permittee must comply with the regulations even if no federal biosolids permit has been issued for the facility.

A POTW is required to apply for an EPA biosolids permit. The permittee should ensure that a biosolids permit application has been submitted to EPA. In addition, the permittee is required to submit a biosolids permit application to EPA for the use or disposal of sewage sludge at least 180 days before this APDES permit expires in accordance with 40 CFR §§122.21(c)(2) and 122.21(q) [see also 18 AAC 83.110(c) and 18 AAC 83.310, respectively]. The application form

is NPDES Form 2S and can be found on EPA's website, www.epa.gov, under NPDES forms. A completed NPDES Form 2S should be submitted to:
U.S. Environmental Protection Agency, Region 10, NPDES Permits Unit OWW-130, Attention: Biosolids Contact, 1200 Sixth Avenue, Suite 900, Seattle, WA 98101-3140. The EPA Region 10 telephone number is 1-800-424-4372.

Information about EPA's biosolids program and CWA Part 503 is available at www.epa.gov and either search for 'biosolids' or go to the EPA Region 10 website link and search for 'NPDES Permits'.

9.4 Permit Expiration

The permit will expire five years from the effective date of the permit.

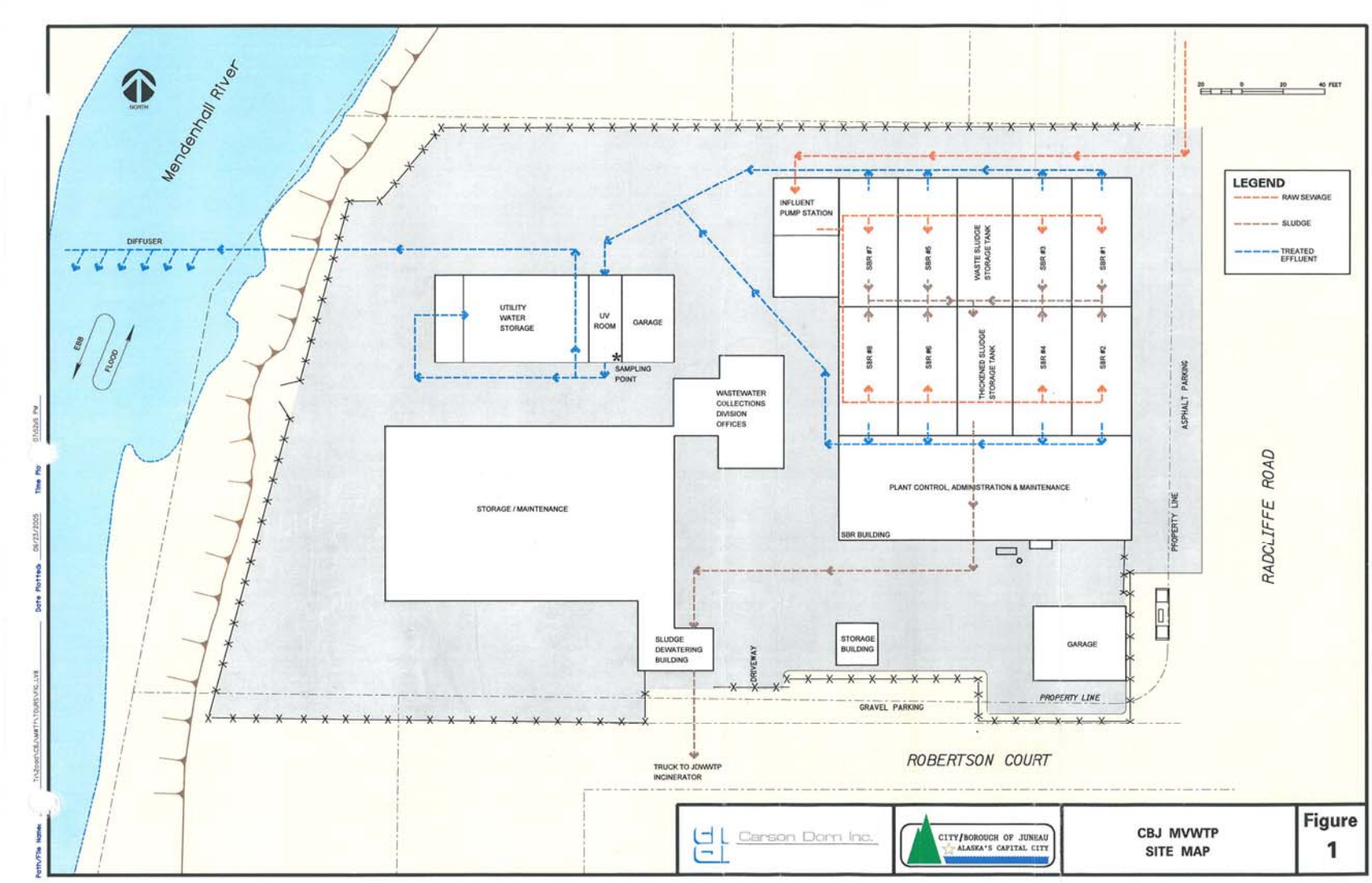
10.0 REFERENCES

1. Alaska Department of Environmental Conservation, *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report*, July 15, 2010.
2. Alaska Department of Environmental Conservation, *Interim Antidegradation Implementation Methods*, Policy and Procedure 05.03.103, July 14, 2010.
3. Alaska Department of Environmental Conservation, *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances*, as amended through December 12, 2008.
4. Alaska Department of Fish and Game. (ADF&G). *Technical Report No. 11-03. Juvenile Salmonid presence in the Mendenhall River, Juneau, Alaska*. May 2011.
5. EPA 1991. *Technical Support Document for Water Quality-based Toxics Control*. US Environmental Protection Agency, Office of Water, the Department/505/2-90-001.
6. EPA April 19, 1996, *Interim Guidance for Performance-Based Reductions of NPDES Permit Monitoring Frequencies*, (EPA/833/B-96-001)
7. National Marine Fisheries Service (NMFS), Alaska Region, Protected Resources Division, Email correspondence. August 16, 2012.
8. Tetra Tech, 2012. City and Borough of Juneau. Mendenhall Wastewater Treatment Plant Effluent Mixing Zone Analysis.
9. NMFS, Office of Habitat Conservation, 2012. Essential Fish Habitat Mapper. Retrieved from http://www.habitat.noaa.gov/protection/efh/habitatmapper.html

APPENDIX A. FACILITY INFORMATION

Figure 1: Mendenhall Wastewater Treatment Plant, Location Relative to Mendenhall River

Figure 2: Mendenhall Wastewater Treatment Plant Process Flow Diagram



APPENDIX B. BASIS FOR EFFLUENT LIMITS

The Clean Water Act (CWA) requires a Publicly Owned Treatment Works (POTWs) to meet effluent limits based on available wastewater treatment technology, specifically, the secondary treatment standards found in Title 40 Code of Federal Regulations (CFR) 40 CFR 133, adopted by reference in Alaska Administrative Code (AAC) 18 AAC 83.010(c)(9)(e). The Department may find, by analyzing the effect of an effluent discharge on the receiving water body, that secondary treatment effluent limits alone are not sufficiently stringent to meet State of Alaska water quality criteria found at 18 AAC 70. In such cases, the Department is required to develop more stringent water quality-based effluent limits (WQBEL), which are designed to ensure that the water quality standards (WQS) of the receiving water body are met.

Secondary treatment effluent limits for POTWs do not limit every parameter that may be present in the effluent. Technology-based effluent limits (TBEL) have only been developed for biochemical oxygen demand, 5-day (BOD_5), total suspended solids (TSS), and pH. Effluent from a POTW may contain other pollutants, such as bacteria, chlorine, ammonia, or metals, depending on the type of treatment system used and the quality of the influent entering the POTW (e.g., industrial facilities, as well as residential areas may discharge into the POTW). When TBELs do not exist for a particular pollutant expected to be in the effluent, the Department must determine if the pollutant may cause or contribute to an exceedance of a water quality criteria for the water body. If a pollutant causes or contributes to an exceedance of a water quality criteria, a WQBEL for the pollutant must be established in the permit.

B.1 Secondary Treatment Effluent Limits

The CWA requires a POTW to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as secondary treatment, which all POTWs were required to meet by July 1, 1977. As mentioned above, the Department has adopted the secondary treatment effluent limits, which are found in 40 CFR 133.102. The secondary treatment TBELs apply to all POTWs and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. In addition to the federal secondary treatment regulations in 40 CFR Part 133, the State of Alaska requires maximum daily limits of 60 milligrams per liter (mg/L) for BOD_5 and TSS in its own secondary treatment regulations (18 AAC 72.990). The secondary treatment standards of 40 CFR 133 are more prescriptive than the 18 AAC 72.990 standards (i.e., the 40 CFR 133 standards also include minimum percent removal requirements for BOD_5 and TSS) and are the final TBELs included in the permit as listed in Table B-1.

Table B- 1: Secondary Treatment Effluent Limits

Parameter	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Range
BOD_5	30 mg/L	45 mg/L	60 mg/L	---
TSS	30 mg/L	45 mg/L	60 mg/L	---
Removal Rates for BOD_5 and TSS	85% (minimum)	---	---	---
pH	---	---	---	6.0 – 9.0 SU [a]

Notes:
a. SU = Standard pH units

B.1.1 Mass-Based Limits

The regulation at 18 AAC 83.540 requires that effluent limits be expressed in terms of mass, if possible. The regulation at 18 AAC 83.520 requires that effluent limits for a POTW be calculated based on the design flow of the facility. The mass based limits are expressed in pounds per day (lbs/day) and for the Mendenhall Wastewater Treatment Plant (MWWTP), with a design flow of 4.9 million gallons per day (mgd), the calculations are as follows:

Mass based limit (lbs/day) = concentration limit (mg/L) × design flow (mgd) × 8.341[1]

The BOD_5 and TSS mass based limits for the permit are:

Average Monthly Limit = 30 mg/L x 4.9 (mgd) x 8.34 = 1226 lbs/day

Average Weekly Limit = 45 mg/L x 4.9 (mgd) x 8.34 = 1839 lbs/day

Maximum Daily Limit = 60 mg/L x 4.9 (mgd) x 8.34 = 2452 lbs/day

B.2 Water Quality – Based Effluent Limits

B.2.1 Statutory and Regulatory Basis

18 AAC 70.010 prohibits conduct that causes or contributes to a violation of the WQS.
18 AAC 70.090 requires that permits include terms and conditions to ensure water quality criteria are met, including operating, monitoring, and reporting requirements.

The regulations require the permitting authority to make this evaluation using procedures that account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water body. The limits must be stringent enough to ensure that water quality criteria are met and must be consistent with any available wasteload allocation (WLA).

B.2.2 Reasonable Potential Analysis

When evaluating the effluent to determine if WQBELs based on chemical-specific numeric criteria are needed, the Department projects the receiving water body concentration for each pollutant of concern downstream of where the effluent enters the receiving water body. The chemical-specific concentration of the effluent and receiving water body and, if appropriate, the dilution available from the receiving water body, are factors used to project the receiving water body concentration. If the projected concentration of the receiving water body exceeds the numeric criterion for a limited parameter, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality criterion, and a WQBEL must be developed.

According to 18 AAC 70.990(38), a mixing zone is an area in a water body surrounding, or downstream of, a discharge where the effluent plume is diluted by the receiving water. Specified water quality criteria and limits may be exceeded within a mixing zone. A mixing zone can be authorized only when adequate receiving water body flow exists, and the concentration of the pollutant of concern in the receiving water body is below the numeric criterion necessary to protect the designated uses of the water body.

[1] 8.341 is a conversion factor with units (lb x L) / (mg x gallon x 10^6)

B.2.3 Procedure for Deriving Water Quality-Based Effluent Limits

The *Technical Support Document for Water Quality-Based Toxics Control* (TSD) (EPA, 1991) and the WQS recommend the flow conditions for use in calculating WQBEL using steady-state modeling. The TSD and WQS state the WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years (7Q10) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years (1Q10) for acute criteria.

The first step in developing a WQBEL is to develop a WLA for the pollutant. A WLA is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality criterion or a total maximum daily load in the receiving water body. If a mixing zone is authorized in the permit, the WQBELs apply at all points outside the mixing zone.

In cases where a mixing zone is not authorized, either because the receiving water body already exceeds the criterion, the receiving water body flow is too low to provide dilution, or for some other reason one is not authorized, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee will not cause or contribute to an exceedance of the criterion.

The WQS at 18 AAC 70.020(a) designates classes of water for beneficial uses of water supply, water recreation, and of growth and propagation of fish, shellfish, other aquatic life, and wildlife.

B.2.4 Specific Water Quality-Based Effluent Limits

B.2.4.1 Toxic Substances

The WQS for toxic and other deleterious organic and inorganic substances for freshwater uses are codified in 18 AAC 70.020(b)(11). Individual criteria are summarized in the Department's, *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances*, as amended through December 12, 2008. In WQS, the most stringent criteria for metals, other than arsenic, are the chronic criteria for the protection of aquatic life.

As discussed in Section 4.3 of the fact sheet, the Department evaluated five years of data detailing ambient receiving water and effluent concentrations of copper, lead, silver, and zinc to determine if there was reasonable potential for the metals contained in the MWWTP effluent to cause or contribute to an excursion of water quality criteria in the receiving water body. The toxicities of these four metals vary with the hardness of the water. Therefore, the water quality criteria for these metals also vary with hardness. The Department used updated hardness numbers for calculating the metals water quality criteria that are different than those used by EPA in the 2006 permit issuance and those used by the permittee in the mixing zone application. The Department's updated calculations resulted in different calculated water quality criteria. Formulas from *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances* were used to calculate applicable criteria. The hardness of the receiving water when mixed with the effluent was applied in the formulas (detailed in Tables B-2 and B-3) using the equation:

$$(E_{Hd} - R_{Hd}) / \text{dilution} + R_{Hd}$$

Where,

E_{Hd} represents effluent hardness

R_{Hd} is the predicted river hardness for a given season.

Since toxicity decreases (and numeric water quality criteria increase) as hardness increases, the 5th percentile of effluent hardness data submitted during the five years evaluated (56 mg/L) was used to represent the effluent hardness. Data shows that the ambient hardness in the Mendenhall River varies inversely to the river's flow. During low river flows the hardness is higher than hardness reported during high river flows. Because the year has been divided into two hydrological seasons due to the Mendenhall River flow rates variability, different receiving water hardness values were used for each season.

River hardness values and flow rates taken on the same day were correlated and used to predicted hardness for the 1Q10 and 7Q10 for each season. Each of the predicted hardness were then multiplied by the 5th percentile ratio of the actual hardness to the predicted hardness to get a reasonable worst-case hardness values for the 1Q10 and 7Q10 flow rates for each season.

Tables B-2 and B-3 present the calculations for metal criteria. The reasonable potential analyses for metals did not show a reasonable potential to exceed water quality criteria in the water body at the boundary of the authorized mixing zone. A summary of the reasonable potential analysis is provided in Appendix C.

Table B- 2: Calculation of Metals Criteria, November - April

Parameter		Criterion Formula	Hardness Used (mg/L)	Criterion (µg/L) [a] (as Dissolved Metal)
Copper	Acute	(exp(0.9422*ln[hardness]-1.700))*0.960	731	87.5
	Chronic	(exp(0.8545*ln[hardness]-1.702))*0.960	633	43.4
Lead	Acute	(exp(1.273*ln[hardness]-1.460))*0.501	731	515
	Chronic	(exp(1.273*ln[hardness]-4.705))*0.522	633	17.4
Silver	Acute	(exp(1.72*ln[hardness]-6.52))*0.850	731	98.4
	Chronic	NA	NA	NA
Zinc	Acute	(exp(0.8473*ln[hardness]+0.884))*0.978	731	632
	Chronic	(exp(0.8473*ln[hardness]+0.884))*0.986	633	564
Note: a. µg/L = micrograms per liter				

Table B- 3: Calculation of Metals Criteria, May - October

Parameter		Criterion Formula	Hardness Used (mg/L)	Criterion (µg/L) (as Dissolved Metal)
Copper	Acute	(exp(0.9422*ln[hardness]-1.700))*0.960	117	15.5
	Chronic	(exp(0.8545*ln[hardness]-1.702))*0.960	70	6.6
Lead	Acute	(exp(1.273*ln[hardness]-1.460))*0.769	117	76.3
	Chronic	(exp(1.273*ln[hardness]-4.705))*0.842	70	1.7
Silver	Acute	(exp(1.72*ln[hardness]-6.52))*0.850	117	4.2
	Chronic	NA	NA	NA
Zinc	Acute	(exp(0.8473*ln[hardness]+0.884))*0.978	117	134
	Chronic	(exp(0.8473*ln[hardness]+0.884))*0.986	70	87.6

B.2.4.2 Floating, Suspended or Submerged Matter, including Oil and Grease

The water quality criteria for floating, suspended or submerged matter, including oil and grease, are narrative. The most stringent standard, found at 18 AAC 70.020(b)(8)(A)(i), require that fresh waters, "may not, alone or in combination with other substances or wastes, make the water unfit or unsafe for the use; cause a film, sheen, or discoloration on the receiving of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the receiving of the water, within the water column, on the bottom, or upon adjoining shorelines."

B.2.4.3 pH

TBELs exist for pH as well as water quality criteria. The water quality criteria, found at 18 AAC 70.020(b)(6), for water supply, aquaculture; water contact recreation; and growth and propagation of fish, shellfish, other aquatic life, and wildlife are the most stringent standards for pH. These standards state that fresh waters, "May not be less than 6.5 or greater than 8.5."

Because pH is based on logarithms, determining a receiving water plus effluent pH concentration cannot be calculated the same as would other parameters. The calculation of pH for the mixture of the two flows is based on the procedures described in *Technical Guidance of Supplementary Stream Design Conditions for Steady State Modeling*, Environmental Protection Agency (EPA 1988).

B.2.4.4 Dissolved Oxygen

The criteria for agricultural water supply are the most stringent standards for dissolved oxygen (DO). The standards at 18 AAC 70.020(b)(3)(A)(iii) require that "DO must be greater than 7 mg/L in receiving waters; the concentration of total dissolved gas may not exceed 110% of saturation at any point of sample collection." The standards at 18 AAC 70.020(b)(3)(C) require that "DO must be greater than 7 mg/L in waters used by anadromous or resident fish. In no case may DO be less than 5 mg/L to a depth of 20 centimeters (cm) in the interstitial waters of gravel used by anadromous or resident fish for spawning. For waters not used by anadromous or resident fish, DO must be greater than or equal to 5 mg/L. In no case may DO be greater than 17 mg/L. The concentration of total dissolved gas may not exceed 110% of saturation at any point of sample collection."

B.2.4.5 Fecal Coliform Bacteria

The criteria at 18 AAC 70.020(b)(2) for waters designated for use as water supply for drinking, culinary, and food processing purposes are the most stringent standards for fecal coliform bacteria. The standards require that in a 30-day period, the geometric mean of samples may not exceed 20 colonies of fecal coliform bacteria per 100 mL (FC/100 mL), and not more than 10% of the total samples may exceed 40 FC/100 mL.

Though TBELs for fecal coliform bacteria do not exist in regulations, POTWs that employ ultraviolet (UV) disinfection have demonstrated the capability of achieving a monthly geometric mean of 400 FC/100 mL, a weekly geometric mean of 800 FC/100 mL, and a maximum daily count of 1200 FC/100 mL on a regular basis. If sufficient dilution and assimilative capacity exists in the receiving water, the fecal coliform bacteria limits

mentioned in the preceding paragraph can be applied. Following an evaluation of the previous five years of fecal coliform bacteria effluent data from the MWWTP, DEC determined that the plant can achieve more stringent limits.

For the months of November through April, the chronic mixing zone dilution of 5.6, derived from the 7Q10 river flow, has been applied to assure the 20 FC/100 mL and 40 FC/100 mL water quality criteria are met at the boundary of the mixing zone during critical conditions. This resulted in an average monthly geometric mean limit of 112 FC/100 mL, an average weekly geometric mean of 168 FC/100 mL, and a maximum daily limit of 224 FC/100 mL. For the months of May through October DEC has determined that the plant can treat wastewater to a level that can achieve a monthly geometric mean of 200 FC/100 mL, a maximum weekly geometric mean of 400 FC/100 mL, and a maximum daily count of 800 FC/100 mL. Dilution is available to meet these limits and the authorized mixing zone is as small as practicable.

B.2.4.6 Total Residual Chlorine

The MWWTP does not use chlorine for disinfection, thus there are no effluent limits for total residual chlorine in the permit. The MWWTP has not used chlorine in its treatment process since the installation of an UV disinfection system. Therefore the proposed permit no longer contains effluent limits for total residual chlorine.

B.2.4.7 Total Ammonia (as Nitrogen)

The WQS contain criteria for the protection of aquatic life from the toxic effects of ammonia. Because the Mendenhall River is known to be a migratory corridor for salmonids, ammonia criteria has been applied which are protection of salmonids, including early life stages. The criteria for ammonia is dependent on pH and temperature because the fraction of ammonia present as the toxic, unionized form increases with increasing pH and temperature; therefore, the ammonia criteria are also pH and temperature dependent. Receiving water data for temperature and pH collected from August 2008 through July 2013 were evaluated. The 85th percentile for pH, for the entire year (7.6 SU) was used to represent reasonable worst-case conditions. The chronic ammonia criterion for water with fish early life stages present is a function of both pH and temperature; however, only temperatures greater than 14 degrees Celsius (^{O}C) affect the criterion. The temperature of the Mendenhall River is consistently below 14 ^{O}C and a single pH is used to represent the worst-case condition for the entire year. As a result, the chronic criterion for total ammonia does not have seasonal variation. Ammonia acute criterion is based on pH only. With a single pH representing the worst-case condition for the year, the acute criterion also does not have seasonal variation.

Data collected by the permittee from August 2008 through July 2013 were evaluated to determine whether there was reasonable potential for ammonia to cause or contribute to an exceedance of the criteria. Ammonia concentrations exceed the applicable water quality criteria at the end of the pipe; however, no reasonable potential was found for ammonia at the boundary of the authorized chronic or acute mixing zones. The permit continues to require monthly monitoring of ammonia throughout the year and permit limits set in the 2006 permit for the months of November through April have been retained as the plant has demonstrated the ability to meet the ammonia limits as well as to meet the requirements of 18 AAC 83.480 stating that effluent limitations, standards, or conditions must be at least as

stringent as the final effluent limitations, standards, or conditions in the previous permit. Ammonia limits for the month of May have been removed, which is discussed in Section 4.3 and Section 6.0 of this document.

Table B-4 details the equations used to determine water quality criteria for ammonia and Section B.2.4.11 and Table B-8 summarizes the selection of limits.

Table B- 4: Water Quality Criteria for Ammonia

	Acute Criteria	Chronic Criteria
Equations	$\frac{0.275}{1+10^{7.204-pH}}+\frac{39}{1+10^{pH-7.204}}$	$\left[\frac{0.0577}{1+10^{7.688-pH}}+\frac{2.487}{1+10^{pH-7.688}}\right]\times MIN\left(2.85, 1.45\times 10^{0.028\times(25-T)}\right)$
Results	11.4 mg/L	3.98 mg/L

B.2.5 Selection of Most Stringent Limits

B.2.5.1 BOD_5 and TSS

The permit proposes technology-based effluent limits for BOD_5 and TSS.

B.2.5.2 pH

Water quality criteria for pH, between 6.5 SU and 8.5 SU, are the most stringent WQBELs for pH and shall be applied at the end of the pipe during the months of November through June. During the months of July through October the minimum daily limit has been reduced to 6.3 SU based on plant performance. This minimum daily limit is still above TBEL mandated limit for pH of 6.0 SU and pH water quality criteria will be met at the boundary of the mixing zone.

Table B- 5: Selection of pH Permit Limits, November - June

	Minimum Daily (SU)	Maximum Daily (SU)
Technology Based Limits	6.0	9.0
Water Quality-Based Limits	6.5	8.5
Selected Limits	6.5	8.5

Table B- 6: Selection of pH Permit Limits, July - October

	Minimum Daily (SU)	Maximum Daily (SU)
Technology Based Limits	6.0	9.0
Water Quality-Based Limits	6.3	8.5
Selected Limits	6.3	8.5

B.2.5.3 Fecal Coliform Bacteria

A monthly geometric mean of 200 FC/100 mL, a weekly geometric mean of 400 FC/100 mL, and a maximum daily count of 800 FC/100 mL are appropriate limits for the MWWTP for the months of May through October when high river flows supply the necessary dilution to be protective of the applicable water quality criteria. From November through April, the Department determined that more stringent fecal coliform bacteria effluent limits are necessary due to the lower river flows. This determination is consistent with the 2006 permit.

Table B- 7: Selection of Fecal Coliform Bacteria Permit Limits

	Average Monthly (FC/100 mL)	Average Weekly (FC/100 mL)	Maximum Daily (FC/100 mL)
UV-Based Limits	400	800	1200
Selected Limits November - April	112	------	224
Selected Limits May - October	200	400	800

B.2.5.4 Ammonia

WQBEL for ammonia were calculated for the months of November through April using updated data collected during the previous permit cycle. These newly calculated limits were then compared to those limits set in the 2006 permit and the more stringent limits have been applied in the 2014 permit.

Table B- 8: Selection of Effluent Ammonia Limits for November - April

	Average Monthly Limit (mg/L)	Maximum Daily Limit (mg/L)
2006 Permit Limits	28.5	48.0
WQBEL	29.5	40.5
Selected Limits	28.5	40.5

APPENDIX C. REASONABLE POTENTIAL DETERMINATION

The following describes the process the Alaska Department of Environmental Conservation (the Department or DEC) used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to a violation of Alaska Water Quality Standards (WQS). The Department used the process described in the *Technical Support Document for Water Quality-Based Toxics Control* (TSD) (Environmental Protection Agency (EPA), 1991) and DEC's guidance, *Reasonable Potential Procedure for Water Quality-Based Effluent Limits*, *APDES Permit* (January 2009) to determine the reasonable potential for any pollutant to exceed a water quality criterion.

To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, the Department compares the maximum projected receiving water body concentration to the criteria for that pollutant. Reasonable potential to exceed exists if the projected receiving water body concentration exceeds the criteria, and a water quality-based effluent limit must be included in the permit (18 Alaska Administrative Code (AAC) 83.435). This section discusses how the maximum projected receiving water body concentration is determined.

C.1 Mass Balance

For a discharge to a flowing water body, the maximum projected receiving water body concentration is determined using a steady state model represented by the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \text{(Equation C-1)}$$

where,

C_d = Receiving water body concentration downstream of the effluent discharge

C_e = Maximum projected effluent concentration

C_u = 95th percentile measured receiving water body upstream concentration

Q_d = Receiving water body flow rate downstream of the effluent discharge = $Q_e + Q_u$

Q_e = Effluent flow rate (set equal to the design flow of the wastewater treatment plant)

Q_u = Receiving water body low flow rate upstream of the discharge (1Q10, 7Q10 or 30B3)

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_e Q_e + C_u Q_u}{Q_e + Q_u} \qquad \text{(Equation C-2)}$$

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with the receiving stream. If a mixing zone based on a percentage of the critical flow in the receiving stream is authorized based on the assumption of incomplete mixing with the receiving water body, the equation becomes:

$$C_d = \frac{C_e Q_e + C_u (Q_U \times MZ)}{Q_e + (Q_u \times MZ)} \qquad \text{(Equation C-3)}$$

where MZ is the fraction of the receiving water body flow available for dilution. Where mixing is rapid and complete, MZ is equal to 1 and equation C-2 is equal to equation C-3 (i.e., all of the critical low flow volume is available for mixing).

If a mixing zone is not authorized, dilution is not considered when projecting the receiving water body concentration, and

$$C_d = C_e \quad \text{(Equation C-4)}$$

In other words, if a mixing zone is not authorized (either because the stream already exceeds water quality criteria or the Department does not allow one), the Department considers only the concentration of the pollutant in the effluent regardless of the upstream flow and concentration. If the concentration of the pollutant in the effluent is less than the water quality standard, the discharge cannot cause or contribute to a water quality violation for that pollutant. In this case, the mixing or dilution factor (% MZ) is equal to zero and the mass balance equation is simplified to $C_d = C_e$.

Equation C-2 can be simplified by introducing a "dilution factor" (D):

$$D = \frac{Q_e + Q_u}{Q_e} \quad \text{(Equation C-5)}$$

After the dilution factor simplification, this becomes:

$$C_d = \frac{(C_e - C_U)}{D} + C_U \quad \text{(Equation C-6)}$$

If the criterion is expressed as dissolved metal, the effluent concentrations are measured in total recoverable metal and must be converted to dissolved metal as shown in Equation C-7.

$$C_d = \left[\frac{CF \times C_e - C_U}{D}\right] + C_U \quad \text{(Equation C-7)}$$

Where C_e is expressed as total recoverable metal, C_u and C_d are expressed as dissolved metal, and CF is a conversion factor used to convert between dissolved and total recoverable metal. Equations C-6 and C-7 are the forms of the mass balance equation which were sued to determine reasonable potential and calculated wasteload allocations.

C.2 Maximum Projected Effluent Concentration

To calculate the maximum projected effluent concentration, the Department used the procedure described in Section 3.3 of the *TSD*, "Determining the Need for Permit Limits with Effluent Monitoring Data." In this procedure, the 95th percentile of the effluent data is the maximum projected effluent concentration which is used in the calculation of the maximum projected receiving water body concentration.

Since there are a limited number of data points available, the 95th percentile is calculated by multiplying the maximum reported effluent concentration by a "reasonable potential multiplier" (RPM). The RPM is the ratio of the 99th percentile concentration to the maximum reported effluent concentration and accounts for the statistical uncertainty in the effluent data. The RPM is calculated from the coefficient of variation (CV) of the data and the number of data points. The CV is defined as the ratio of the standard deviation of the data set to the mean. When fewer than 10 data points are available, the *TSD* recommends making the assumption that the CV is equal to 0.6. A CV value of 0.6 is a conservative estimate that assumes a relatively high variability.

Using the equations in Section 3.3.2 of the TSD, the RPM for chronic whole effluent toxicity (WET) is calculated as follows.

The percentile represented by the highest reported concentration is calculated.

$$p_n = (1 - confidence\ level)^{1/n} \quad \text{(Equation C-8)}$$

Where,

p_n = the percentile represented by the highest reported concentration
n = the number of samples
confidence level = 95% = 0.95

The data set contains 10 WET effluent samples, therefore:

$$p_{10} = (1 - 0.95)^{1/10}$$

$$p_{10} = 0.741$$

This means that we can say, with 95% confidence that the maximum reported effluent chronic WET concentration is greater than the 74th percentile.

The RPM is the ratio of the 95th percentile concentration (at the 95% confidence level) to the maximum reported effluent concentration. This is calculated as follows:

$$RPM = \frac{C_{95}}{C_p} \quad \text{(Equation C-9)}$$

Where,

$$C = e^{(z\sigma - 0.5\sigma^2)} \quad \text{(Equation C-10)}$$

Where,

$$\sigma^2 = \ln(CV^2 + 1) \quad \text{(Equation C-11)}$$

$$\sigma = \sqrt{\sigma^2}$$

$$CV = coefficitent\ of\ variation = \frac{standard\ deviation}{mean}$$

z = the inverse of the normal cumulative distribution function at a given percentile

In the case of chronic WET:

CV = coefficient of variation = 0.261

$\sigma^2 = \ln(CV^2 + 1) = 0.066$

$\sigma = \sqrt{\sigma^2} = 0.26$

$Z_{95} = 1.64$ for the 95th percentile

$Z_{74} = 0.647$ for the 74 percentile (from z-table)

$C_{95} = \exp(1.64 \times 0.26 - 0.5 \times 0.066) = 1.48$

$C_{74} = \exp(0.647 \times 0.26 - 0.5 \times 0.066) = 1.14$

$RPM = C_{95}/C_{74} = 1.48/1.14$

RPM = 1.29

The maximum projected effluent concentration is determined by multiplying the maximum reported effluent concentration by the RPM:

$$C_e = (RPM) \times (MRC) \quad \text{(Equation C-12)}$$

Where,

MRC = Maximum Reported Concentration

In the case of chronic WET,

C_e = (1.29)(5 toxic units, chronic (TUc)) = 6.45 or 6.5 TUc (maximum projected effluent concentration)

Comparison with ambient criteria for chronic toxicity

In order to determine if reasonable potential exists for this discharge to violate the ambient criteria, the highest projected concentrations at the boundary of the mixing zone are compared with the ambient criteria. During the months of November through April, the available mixing zone dilution is 5.6. For chronic WET:

Maximum projected effluent concentration (6.45 TUc) / available dilution (5.6) = 1.15 TUc

Chronic: 1.15 TUc > 1.0 TUc (chronic WET criteria) **YES**, there is a reasonable potential to violate

Since there is a reasonable potential for the effluent to cause an exceedance of chronic toxicity water quality criterion for protection of aquatic life, a water quality-based effluent limit for chronic toxicity is required. See Appendix D for that calculation.

C.3 Upstream (Ambient) Concentration of Pollutant

The ambient concentration in the mass balance equation is based on a reasonable worst-case estimate of the pollutant concentration upstream from the discharge. For criteria that are expressed as maxima (such as ammonia), the 85th percentile of the ambient data is used as an estimate of the worst case. Data collected from monitoring locations upstream above the boundary of the authorized mixing zone were used to represent ambient concentrations for ammonia, metals, and fecal coliform bacteria. There is not data available for chronic WET concentrations in the ambient receiving water, thus, it is assumed that ambient concentrations of chronic WET is zero. These values were used in the reasonable potential analyses.

Table C-1 summarizes the calculation of the maximum project effluent concentration. Tables C-2 and C-3 show the comparison of the maximum projected effluent concentrations to their respective criteria with the appropriate dilution applied. The most stringent criterion is the lower of the acute and the chronic criteria.

Table C- 1: Calculating Maximum Projected Effluent Concentration

Parameter	Units	Max. Reported Effluent Conc. [a]	Number of Samples	CV	RPM	Max Projected Effluent Conc. (C_e) [a]	Conversion Factor	Max Projected Effluent Metals Conc. (C_e) [b]
Total Ammonia as Nitrogen	mg/L [c]	25	59	0.225	1.0 [d]	25	-----	-----
Copper -Acute	µg/L [e]	36.9	60	0.273	1.0 [d]	36.9	0.960	35.4
-Chronic	µg/L	36.9	60	0.273	1.0 [d]	36.9	0.960	35.4
Lead -Acute	µg/L	1.44	15	0.451	1.37	1.97	0.571	1.12
-Chronic	µg/L	1.44	15	0.451	1.37	1.97	0.537	1.05
Silver -Acute	µg/L	1.0	15	0.424	1.35	1.35	0.850	1.15
Zinc -Acute	µg/L	50	15	0.417	1.34	67	0.978	65.5
-Chronic	µg/L	50	15	0.417	1.34	67	0.986	66.1
Fecal Coliform Bacteria	FC/100 mL [f]	675	463	2.545	1.0 [d]	675	-----	-----
Chronic WET	TUc	5.0	10	0.261	1.29	6.46	-----	-----

Notes:

a. Metals as total recoverable
b. Metals converted to dissolved
c. mg/L = milligrams per liter
d. A calculated multiplier of less than 1.0 has been set equal to 1.0 because the RPA is used to statistically predict a possible maximum concentration in the future.
e. µg/L = micrograms per liter
f. FC/100 mL = colonies of fecal coliform bacteria per 100 mL

Table C- 2: Reasonable Potential Determination, November - April

Parameter	Maximum Projected Effluent Conc. (C_e) [a]	Effluent Flow (Q_e) cfs [b]	Upstream Conc. (C_u) [a]	Receiving Water Flow (Q_u) cfs	Dilution Ratio (D) [c]	Maximum Conc. at Boundary of Mixing Zone (C_d) [a]	Criterion Aquatic Life Fresh Water [a]	Does C_d Exceed Criteria ?
Total Ammonia as N – chronic (mg/L)	25	7.58	0.4	49	7.5	3.7	3.98	No
Total Ammonia as N – acute (mg/L)	25	7.58	0.4	30	5.0	5.3	11.4	No
Copper – chronic (µg/L)	35.4	7.58	5.15	35	5.6	10.6	43.4	No
Copper – acute (µg/L)	35.4	7.58	5.15	30	5.0	11.2	87.5	No
Lead – chronic (µg/L)	1.12	7.58	0.22	35	5.6	0.4	17.4	No
Lead – acute (µg/L)	1.05	7.58	0.22	30	5.0	0.4	515	No
Silver – acute (µg/L)	1.15	7.58	0.10	30	5.0	0.3	98.4	No
Zinc – chronic (µg/L)	65.5	7.58	4.98	35	5.6	15.9	564	No
Zinc – acute (µg/L)	66.1	7.58	4.98	30	5.0	17.1	632	No

Fecal Coliform Bacteria (FC/100mL)	675	7.58	9.2	35	5.6	128	20	Yes
Chronic WET (TUc)	6.46	7.58	0	35	5.6	1.15	1.0	Yes

Notes:
a. All metals concentrations are as dissolved
b. Flow daily maximum limit is 4.9 million gallons per day (mgd) = 7.58 cubic feet per second (cfs)
c. See Section 5.4 and Table 8 of this document for discussion on the dilution ratio used.

Table C- 3: Reasonable Potential Determination, May - October

Parameter	Maximum Projected Effluent Conc. (C_e) [a]	Effluent Flow (Q_e) cfs [b]	Upstream Conc. (C_u) [a]	Receiving Water Flow (Q_u) cfs	Dilution Ratio (D) [c]	Maximum Conc. at Boundary of Mixing Zone (C_d) [a]	Criterion Aquatic Life Fresh Water [a]	Does C_d Exceed Criteria?
Total Ammonia as N – chronic (mg/L)	25	7.58	0.4	561	35	1.1	3.98	No
Total Ammonia as N – acute (mg/L)	25	7.58	0.4	183	18	1.8	11.4	No
Copper – chronic (µg/L)	35.4	7.58	5.15	292	35	6.0	6.6	No
Copper – acute (µg/L)	35.4	7.58	5.15	183	18	6.8	15.5	No
Lead – chronic (µg/L)	1.12	7.58	0.22	292	35	0.26	1.7	No
Lead – acute (µg/L)	1.05	7.58	0.22	183	18	0.29	76	No
Silver – acute (µg/L)	1.15	7.58	0.10	183	18	0.13	4.2	No
Zinc – chronic (µg/L)	65.5	7.58	4.98	292	35	6.7	87.6	No
Zinc – acute (µg/L)	66.1	7.58	4.98	183	18	8.4	134	No
Fecal Coliform Bacteria (FC/100mL)	675	7.58	9.2	292	35	28	20	Yes
Chronic WET (TUc)	6.46	7.58	0	292	35	0.18	1.0	No

Notes:
a. All metals concentrations are as dissolved
b. Flow daily maximum limit is 4.9 mgd = 7.58 cfs
c. See Section 5.4 and Table 8 of this document for discussion on the dilution ratio used.

APPENDIX D. EFFLUENT LIMIT CALCULATION

Once the Alaska Department of Environmental Conservation (the Department or DEC) determines that the effluent has a reasonable potential to exceed a water quality criterion, a water quality-based effluent limit (WQBEL) for the pollutant is developed. The first step in calculating a permit limit is development of a waste load allocation (WLA) for the pollutant.

D.1 Mixing Zone-based WLA

When the Department authorizes a mixing zone for the discharge, the WLA is calculated using the available dilution, background concentrations of the pollutant, and water quality criteria.

Acute and chronic aquatic life standards apply over different time frames and may have different mixing zones; therefore it is not possible to compare the WLAs directly to determine which standard results in the most stringent limits. The acute criteria are applied as a one-hour average and may have a smaller mixing zone, while the chronic criteria are applied as a four-day average and may have a larger mixing zone. To allow for comparison, long-term average (LTA) loads are calculated from both the acute and chronic WLAs. The most stringent LTA is used to calculate the permit limits.

D.2 "End-of-Pipe" WLAs

In many cases, there is no dilution available, either because the receiving water body exceeds the criteria or because the Department does not authorize a mixing zone for a particular pollutant. When there is no dilution available, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee's discharge does not contribute to an exceedance of the criterion. As with the mixing-zone based WLA, the acute and chronic criteria must be converted to LTAs and compared to determine which one is more stringent. The more stringent LTA is then used to develop permit limits.

D.3 Permit Limit Derivation

Once the appropriate LTA has been calculated, the Department applies the statistical approach described in Chapter 5 of the *Technical Support Document for Water Quality-Based Toxics Control* (TSD) (Environmental Protection Agency (EPA), 1991) to calculate maximum daily and average monthly permit limits. This approach takes into account effluent variability using the coefficient of variation (CV), sampling frequency, and the difference in time frames between the average monthly and maximum daily limits.

The maximum daily limit is based on the CV of the data and the probability basis, while the average monthly limit is dependent on these two variables and the monitoring frequency. As recommended in the TSD, the Department used a probability basis of 95 percent for average monthly limit calculation and 99 percent for the maximum daily limit calculation.

The following is a summary of the steps to derive water quality-based effluent limits for pollutants that have a reasonable potential to exceed water quality criteria. Chronic whole effluent toxicity (WET) is used as an example.

Step 1- Determine the WLA

The acute and chronic aquatic life criteria are converted to acute and chronic WLAs (WLA_{acute} or $WLA_{chronic}$) using the following equation:

1. $Q_d C_d = Q_e C_e + Q_u C_u$

Q_d = downstream flow = $Q_u + Q_e$
C_d = aquatic life criteria that cannot be exceeded downstream
Q_e = effluent flow
C_e = concentration of pollutant in effluent = WLA_{acute} or $WLA_{chronic}$
Q_u = upstream flow
C_u = upstream background concentration of pollutant

Rearranging the above equation to determine the effluent concentration (C_e) or WLA results in the following:

2. $$C_e = WLA = \frac{Q_d C_d - Q_u C_u}{Q_e} = \frac{C_d(Q_u + Q_e) - Q_u C_u}{Q_e}$$

when C_u is zero, this equation becomes:

3. $$C_e = WLA = \frac{Q_d C_d}{Q_e}$$

With a dilution factor of 5.6, the equation becomes

4. WLA = 5.6 * C_d

For example, for chronic WET for the chronic WLA, the calculation is:

$C_e = WLA_{chronic} = 5.6 * 1.0 = 5.6$

Only chronic WET is being calculated so there is no acute WLA:

$C_e = WLA_{acute} =$

Step 2 - Determine the Long-Term Average (LTA)

LTA_{acute} and $LTA_{chronic}$ concentrations are calculated from the acute and chronic WLAs using the following equations:

$$LTA_{acute} = WLA_{acute} * e^{(0.5\sigma^2 - z\sigma)}$$

where,

$\sigma^2 = \ln(CV^2 + 1)$

z = 2.326 for 99th percentile probability basis

$$CV = coefficitent\ of\ variation = \frac{standard\ deviation}{mean}$$

$$LTA_{chronic} = WLA_{chronic} * e^{(0.5\sigma^2 - z\sigma)}$$

where,

$$\sigma^2 = \ln\left(\frac{CV^2}{4} + 1\right)$$

z = 2.326 for 99th percentile probability basis

$$CV = coefficitent\ of\ variation = \frac{standard\ deviation}{mean}$$

The calculations for chronic WET are provided below. Only chronic toxicity is being calculated because there is only chronic water quality criterion for WET.

$$LTA_{chronic} = WLA_{chronic} * e^{(0.5\sigma^2 - z\sigma)}$$

where,

$$\sigma^2 = \ln\left(\frac{CV^2}{4} + 1\right)$$

$$\sigma^2 = \ln\left(\frac{0.261^2}{4} + 1\right)$$

$$\sigma^2 = 0.0169$$

$$z = 2.326 \; for \; 99^{th} \; percentile \; probability \; basis$$

$$LTA_{chronic} = 4.2$$

Step 3 - Most Limiting LTA

To protect a water body from both acute and chronic effects, the more limiting of the calculated LTA_{acute} and $LTA_{chronic}$ is used to derive the effluent limits. In the example of chronic WET the $LTA_{chronic}$ is the more limiting. The TSD recommends using the 95th percentile for the average monthly limit (AML) and the 99th percentile for the maximum daily limit (MDL).

Step 4 - Calculate the Permit Limits

The MDL and the AML are calculated as follows:

$$MDL = LTA_{chronic} * e^{(z\sigma - 0.5\sigma^2)}$$

where,

$$\sigma^2 = \ln(CV^2 + 1)$$

z = 2.326 for 99th percentile probability basis

CV= coefficient of variation

$$AML = LTA_{chronic} * e^{(z\sigma - 0.5\sigma^2)}$$

where,

$$\sigma^2 = \ln\left(\frac{CV^2}{n} + 1\right)$$

z = 1.64 for 95th percentile probability basis

$$CV = coefficitent \; of \; variation = \frac{standard \; deviation}{mean}$$

n = number of sampling events required per month

The MDL and the AML for chronic WET are calculated as follows:

$$MDL = LTA_{chronic} * e^{(z\sigma - 0.5\sigma^2)}$$

where,

$\sigma^2 = \ln(CV^2 + 1)$

$\sigma^2 = \ln(0.261^2 + 1)$

$\sigma^2 = 0.066$

$z = 2.326\ for\ 99^{th}\ percentile\ probability\ basis$

CV = coefficient of variation

MDL = 7.4 TUc

$$AML = LTA_{chronic} * e^{(z\sigma - 0.5\sigma^2)}$$

where,

$$\sigma^2 = \ln\left(\frac{CV^2}{n} + 1\right)$$

$$\sigma^2 = \ln\left(\frac{0.261^2}{4} + 1\right)$$

$\sigma^2 = 0.0169$

$z = 1.645\ for\ 95^{th}\ percentile\ probability\ basis$

$$CV = coefficitent\ of\ variation = \frac{standard\ deviation}{mean}$$

n = number of sampling events required per month for chronic toxicity is the default of 4.

AML = 5.1 TUc

Table D- 1: Summary of Effluent Limit Calculations

Parameter	Season	Units	Most Stringent WQS	Dilution	CV	$WLA_{chronic}$	$LTA_{limiting}$	MDL	AML
Chronic WET	November – April	TUc	1.0	5.6	0.261	5.6	4.2	-----	5.1
Ammonia	November – April	mg/L	3.98	7.5	0.225	27	25	40.5	29.5

Calculated ammonia WQBELs for the months of November through April were compared to limits imposed in the 2006 permit and the more stringent limits were applied in the 2014 permit. See Table B-8 of the fact sheet for the comparison and selection of ammonia limits.

A reasonable potential analysis of effluent copper concentrations resulted in a determination that though applicable water quality criteria for copper was exceeded at the point of discharge, there is no reasonable potential for copper to exceed or contribute to an exceedance of water quality criteria at the boundary of the authorized mixing zone. WQBELs for copper, based on data collected during the 2006 permit cycle, were not applied in this permit because calculated limits were less stringent than those imposed in the 2006 permit. Copper limits from the 2006 permit are applied in the 2014 permit.

Fecal coliform bacteria limits for the months of November through April were calculated using the water quality criterion as a geometric mean, 20 FC/100 mL, and the critical dilution factor for this time period of 5.6. 18 AAC 83.530 states that discharge permit effluent limits must, unless impracticable, be stated as an average weekly and average monthly discharge limitations for a POTW. Due to the lack of guidance available for calculating weekly geometric mean limits for bacteria, the weekly geometric mean for fecal coliform bacteria in this permit follows the precedent set by the secondary treatment standards at 18 AAC 83.605 for BOD_5 and TSS. The weekly average limit equals 1.5 times the calculated monthly average limit. For this permit:

Fecal coliform bacteria weekly geometric mean limit = 1.5 X 112 FC/100 mL = 168 FC/100 mL.

APPENDIX E. MIXING ZONE ANALYSIS CHECKLIST

Mixing Zone Authorization Checklist

based on Alaska Water Quality Standards (2003)

The purpose of the Mixing Zone Checklist is to guide the permit writer through the mixing zone regulatory requirements to determine if all the mixing zone criteria at 18 AAC 70.240 through 18 AAC 70.270 are satisfied, as well as provide justification to authorize a mixing zone in an APDES permit. In order to authorize a mixing zone, all criteria must be met. The permit writer must document all conclusions in the permit Fact Sheet; however, if the permit writer determines that one criterion cannot be met, then a mixing zone is prohibited, and the permit writer need not include in the Fact Sheet the conclusions for when other criteria were met.

Criteria	Description	Resources	Regulation	MZ Approved Y/N
Size	Is the mixing zone as small as practicable? - Applicant collects and submits water quality ambient data for the discharge and receiving water body (e.g. flow and flushing rates) - Permit writer performs modeling exercise and documents analysis in Fact Sheet at: ►APPENDIX C ►Section 5.4 Mixing Zone Analysis - describe what was done to reduce size.	•Technical Support Document for Water Quality Based Toxics Control •Fact Sheet, Appendix C •Fact Sheet, Appendix D • DEC's RPA Guidance • EPA Permit Writers' Manual	18 AAC 70.240 (a)(2) 18 AAC 70.245 (b)(1) - (b)(7) 18 AAC 70.255(e) (3) 18 AAC 70.255 (d)	Y
Technology	Were the most effective technological and economical methods used to disperse, treat, remove, and reduce pollutants? **If yes**, describe methods used in Fact Sheet at Section 5.4 Mixing Zone Analysis. Attach additional documents if necessary.		18 AAC 70.240 (a)(3)	Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
Low Flow Design	**For river, streams, and other flowing fresh waters.** - Determine low flow calculations or documentation for the applicable parameters. Justify in Fact Sheet	• Fact Sheet Section 5.1	18 AAC 70.255(f)	Y
Existing Use	Does the mixing zone…	Fact Sheet Section 5.4, Mixing Zone Analysis, Existing Use		
	(1) partially or completely eliminate an existing use of the water body outside the mixing zone? **If yes, mixing zone prohibited.**		18 AAC 70.245(a)(1)	Y
	(2) impair overall biological integrity of the water body? **If yes, mixing zone prohibited.**		18 AAC 70.245(a)(2)	Y
	(3) provide for adequate flushing of the water body to ensure full protection of uses of the water body outside the proposed mixing zone? **If no, then mixing zone prohibited.**		18 AAC 70.250(a)(3)	Y
	(4) cause an environmental effect or damage to the ecosystem that the department considers to be so adverse that a mixing zone is not appropriate? **If yes, then mixing zone prohibited.**		18 AAC 70.250(a)(4)	Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
Human Consumption	Does the mixing zone…	Fact Sheet Section 5.4, Mixing Zone Analysis, Human Consumption		
	(1) produce objectionable color, taste, or odor in aquatic resources harvested for human consumption? **If yes, mixing zone may be reduced in size or prohibited.**		18 AAC 70.250(b)(2)	
	(2) preclude or limit established processing activities of commercial, sport, personal use, or subsistence shellfish harvesting? **If yes, mixing zone may be reduced in size or prohibited.**		18 AAC 70.250(b)(3)	Y
Spawning Areas	Does the mixing zone…	Fact Sheet Section 5.4, Mixing Zone Analysis, Spawning Areas		
	(1) discharge in a spawning area for anadromous fish or Arctic grayling, northern pike, rainbow trout, lake trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, king, and sockeye salmon? **If yes, mixing zone prohibited.**		18 AAC 70.255 (h)	Y
Human Health	Does the mixing zone…	Fact Sheet Section 5.4, Mixing Zone Analysis, Human Health		

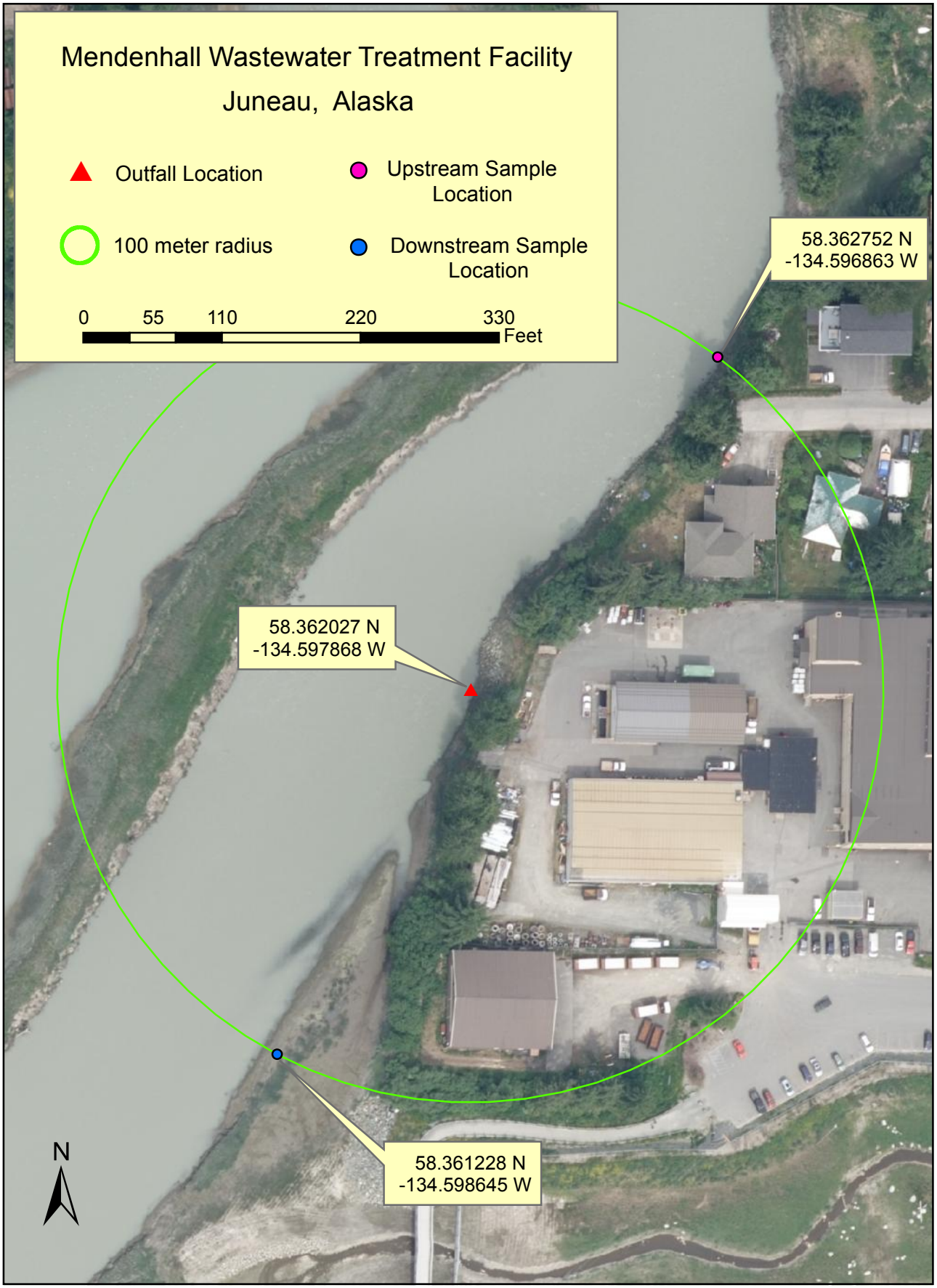
Criteria	Description	Resources	Regulation	MZ Approved Y/N
	(1) contain bioaccumulating, bioconcentrating, or persistent chemical above natural or significantly adverse levels? **If yes, mixing zone prohibited.**		18 AAC 70.250 (a)(1)	Y
	(2) contain chemicals expected to cause carcinogenic, mutagenic, tetragenic, or otherwise harmful effects to human health? **If yes, mixing zone prohibited.**			Y
	(3) Create a public health hazard through encroachment on water supply or through contact recreation? **If yes, mixing zone prohibited.**		18 AAC 70.250(a)(1)(C)	Y
	(4) meet human health and aquatic life quality criteria at the boundary of the mixing zone? **If no, mixing zone prohibited.**		18 AAC 70.255 (b),(c)	Y
	(5) occur in a location where the department determines that a public health hazard reasonably could be expected? **If yes, mixing zone prohibited.**		18 AAC 70.255(e)(3)(B)	Y
Aquatic Life	Does the mixing zone…	Fact Sheet Section 5.4, Mixing Zone Analysis, Aquatic Life and Wildlife		
	(1) create a significant adverse effect to anadromous, resident, or shellfish spawning or rearing? **If yes, mixing zone prohibited.**		18 AAC 70.250(a)(2)(A-C)	Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
	(2) form a barrier to migratory species? **If yes, mixing zone prohibited.**			Y
	(3) fail to provide a zone of passage? **If yes, mixing zone prohibited.**			Y
	(4) result in undesirable or nuisance aquatic life? **If yes, mixing zone prohibited.**		18 AAC 70.250(b)(1)	Y
	(5) result in permanent or irreparable displacement of indigenous organisms? **If yes, mixing zone prohibited.**		18 AAC 70.255(g)(1)	Y
	(6) result in a reduction in fish or shellfish population levels? **If yes, mixing zone prohibited.**		18 AAC 70.255(g)(2)	Y
	(7) prevent lethality to passing organisms by reducing the size of the acute zone? **If yes, mixing zone prohibited.**		18 AAC 70.255(b)(1)	Y
	(8) cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone? **If yes, mixing zone prohibited.**		18 AAC 70.255(b)(2)	Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
Endangered Species	Are there threatened or endangered species (T/E spp) at the location of the mixing zone?If yes, are there likely to be adverse effects to T/E spp based on comments received from USFWS or NOAA. If yes, will conservation measures be included in the permit to avoid adverse effects? **If yes, explain conservation measures in Fact Sheet. If no, mixing zone prohibited.**	Fact Sheet Section 5.4, Mixing Zone Analysis, Endangered Species Applicant or permit writer requests list of T/E spp from USFWS prior to drafting permit conditions.	Program Description, 6.4.1 #5 18 AAC 70.250(a)(2)(D)	Y

Appendix A3

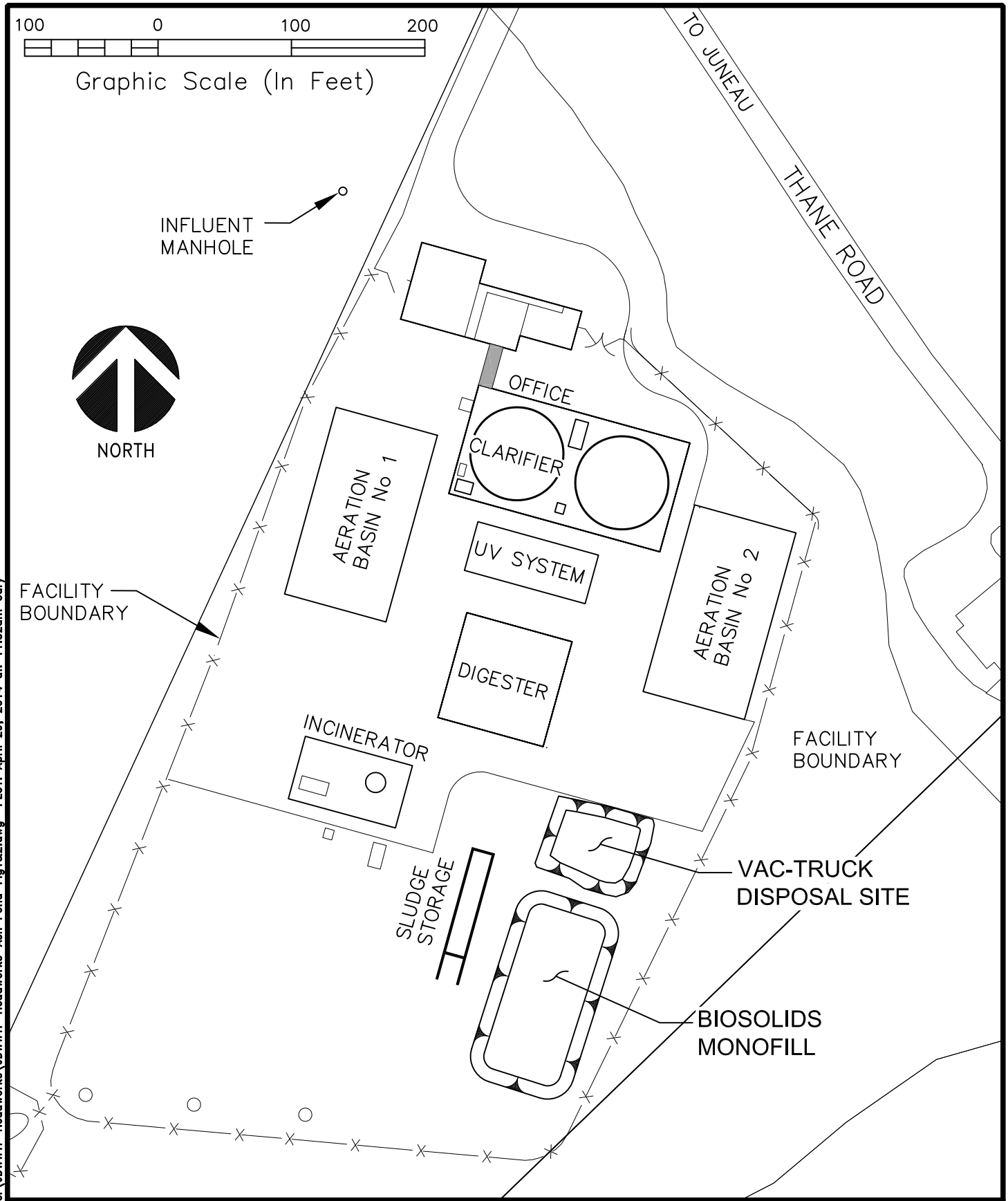
MWWTP Receiving Waters Sampling Map



NAD 83 Alaska State Plane 5001 US Survey Feet CBJ GIS Department 20151002

Appendix B1

JDTP Site Plan



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Carson Dorn Inc.

712 WEST 12TH STREET
JUNEAU, ALASKA 99801
(907) 586-4447

CITY/BOROUGH OF JUNEAU
ALASKA'S CAPITAL CITY

JDWWTP SITEPLAN

Appendix B2

JDTP APDES Permit & Fact Sheet

ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

INDIVIDUAL PERMIT – FINAL

Permit Number: AK0023213

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501

In compliance with the provisions of the Clean Water Act (CWA), 33 U.S.C. §1251 *et seq.*, as amended by the Water Quality Act of 1987, P.L. 100-4, this permit is issued under provisions of Alaska Statutes (AS) 46.03; the Alaska Administrative Code (AAC) as amended; and other applicable State laws and regulations. The

CITY AND BOROUGH OF JUNEAU

is authorized to discharge from the Juneau-Douglas Wastewater Treatment Facility (JD WWTF) at Juneau, Alaska at the following locations:

Outfall	Receiving Waterbody	Latitude	Longitude
001	Gastineau Channel	58° 17′ 2″ North	134° 23′ 13″ West

Combined Sewer Outfall	Receiving Waterbody	Latitude	Longitude
N-11	Gastineau Channel	58° 18′ 21″ North	134° 25′ 48″ West
N-11.2	Gastineau Channel	58° 17′ 58″ North	134° 24′ 24″ West
N-15.1	Gastineau Channel	58° 16′ 37″ North	134° 23′ 32″ West

In accordance with the discharge point effluent limitations, monitoring requirements, and other conditions set forth herein:

This permit and authorization shall become effective June 1, 2015

This permit and the authorization to discharge shall expire at midnight, May 31, 2020

The permittee shall reapply for a permit reissuance on or before December 2, 2019, 180 days before the expiration of this permit if the permittee intends to continue operations and discharge at the facility beyond the term of this permit.

The permittee shall post or maintain a copy of this permit to discharge at the facility and make it available to the public, employees, and subcontractors at the facility.

Wade Strickland
Signature

April 13, 2015
Date

Wade Strickland
Printed Name

Program Manager
Title

TABLE OF CONTENTS

TABLES

APPENDICES

SCHEDULE OF SUBMISSIONS

The Schedule of Submissions summarizes some of the required submissions and activities the permittee must complete and/or submit to the Alaska Department of Environmental Conservation (DEC or Department) during the term of this permit. The permittee is responsible for all submissions and activities even if they are not summarized below.

Table 1. Schedule of Submissions

Location of Requirement	Submittal or Completion	Frequency	Due Date	Submit to [a]
Appendix A Section 3.2	Discharge Monitoring Report (DMR)	Monthly	Must be postmarked or submitted electronically through the eDMR system, on or before the 15th day of the following month.	Compliance Program
Permit Section 1.3.6	Whole Effluent Toxicity Monitoring Report	As required under Permit Section 1.3	Toxicity tests taken from April 1 through October 31 shall be reported with the December DMR. Toxicity tests taken from November 1 through March 31 shall be reported with the May DMR.	Compliance Program
Permit Section 1.5.2.3	Receiving Waterbody Monitoring Station Approval	1/permit cycle	Written approval must be submitted within 180 days after the effective date of the final permit.	Permitting Program
Permit Section 1.6.6	Combined Sewer Overflow Annual Report	Annually	The report must be submitted no later than January 31 of each year following the effective date of the final permit.	Compliance Program
Permit Section 2.1	Quality Assurance Project Plan	1/permit cycle	The plan must be reviewed and updated within 180 days after the effective date of the final permit. Provide DEC written notice upon completion.	Compliance Program

Location of Requirement	Submittal or Completion	Frequency	Due Date	Submit to [a]
Permit Section 2.3	Operations and Maintenance Plan (OMP)	Annually	The plan must be reviewed and updated within 180 days after the effective date of the final permit. Provide DEC written notice upon completion.	Compliance Program
Permit Section 2.4	Industrial User Survey	1/permit cycle	180 days before expiration of the final permit	Permitting Program
Appendix A Section 1.3	Application for Permit Reissuance	1/permit cycle	180 days before expiration of the final permit	Permitting Program
Permit Section 2.5	Facility Plan	1/permit cycle	180 days before expiration of the final permit	Permitting Program
Appendix A Section 3.4	Oral notification of noncompliance	As required	Within 24 hours from the time the permittee becomes aware of the circumstances of noncompliance	Compliance Program
Appendix A Section 3.4	Written documentation of noncompliance	As required	Within 5 days after the permittee becomes aware of the circumstances	Compliance Program

a) See Appendix A 1.1 for addresses

1.0 LIMITATIONS AND MONITORING REQUIREMENTS

1.1 Discharge Authorization

During the effective period of this permit, the permittee is authorized to discharge pollutants from Outfall 001 specified herein to Gastineau Channel, within the limits and subject to conditions set forth herein. This permit authorizes discharge of only those pollutants resulting from facility processes, waste streams, and operations clearly identified in the permit application process.

1.2 Effluent Limits and Monitoring

The permittee must limit and monitor discharges from Outfall 001 as specified in Table 2. All values represent maximum effluent limits, unless otherwise indicated. The permittee must comply with effluent limitations in the table at all times unless otherwise indicated, regardless of monitoring frequency or reporting required by other provisions of this permit.

Table 2. Outfall 001: Effluent Limits and Monitoring Requirements

Effluent Limits						Monitoring Requirements		
Parameter	**Units**	**Average Monthly Limit**	**Average Weekly Limit**	**Maximum Daily Limit**	**Minimum Daily Limit**	**Sample Location**	**Sample Frequency**	**Sample Type**
Flow	million gallons per day (mgd)	2.76	not applicable (N/A)	6.0	N/A	effluent	continuous	recording
Biochemical Oxygen Demand (BOD_5)	milligrams per liter (mg/L)	30	45	60	N/A	influent and effluent [b]	1/month	24-hour composite [c]
	pounds per day (lbs/day) [a]	690	1,035	1,380				
Total Suspended Solids (TSS)	mg/L	30	45	60	N/A	influent and effluent [b]	1/month	24-hour composite [c]
	lbs/day [a]	690	1,035	1,380				
BOD_5 minimum percent (%) removal: 85%			TSS minimum percent removal: 85%			influent and effluent	1/month	calculated [d]
Fecal Coliform (FC) Bacteria [e]	FC/100 mL	200	400	800	N/A	effluent	1/week	grab
Enterococci Bacteria	count/100 milliliters (mL)	N/A	N/A	report	N/A	effluent	1/month[f]	grab
Total Ammonia, as Nitrogen	mg/L	14	21	30	N/A	effluent	1/month	24-hour composite [c]
Copper, total recoverable	micrograms per liter (µg/L)	N/A	N/A	report	N/A	effluent	1/quarter	24-hour composite [c]
pH	standard units (s.u.)	N/A	N/A	8.5	6.5	effluent	5/week	grab
Dissolved Oxygen (DO)	mg/L	N/A	N/A	17	2.0	effluent	5/week	grab
Temperature	degrees Celsius (˚C)	N/A	N/A	report	N/A	effluent	5/week	grab
Whole Effluent Toxicity (WET)	Chronic Toxic Units (TUc)	N/A	N/A	report	N/A	See Permit Section 1.3 for WET requirements		

Table 2. Outfall 001: Effluent Limits and Monitoring Requirements

Effluent Limits						Monitoring Requirements		
Parameter	**Units**	**Average Monthly Limit**	**Average Weekly Limit**	**Maximum Daily Limit**	**Minimum Daily Limit**	**Sample Location**	**Sample Frequency**	**Sample Type**

Footnotes:

a. lbs/day = concentration (mg/L) x flow (mgd) x 8.34 (conversion factor). Influent and effluent samples must be taken over approximately the same time period.
b. Limits apply to effluent. Report average monthly influent concentration.
c. See Appendix C for a definition.
d. Minimum % Removal = [(monthly average influent concentration in mg/L - monthly average effluent concentration in mg/L) / (monthly average influent concentration in mg/L)] x 100. The monthly average percent removal must be calculated using the arithmetic mean of the influent value and the arithmetic mean of the effluent value for that month.
e. All FC bacteria average results must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the quantities. For example the geometric mean of 100, 200, and 300 is (100 x 200 x 300)1/3= 181.7.
f. Sampling required once per month only during the time period May-Sept. Sampling should be conducted at same time as FC bacteria sampling.

1.2.1 The discharge shall not cause contamination of surface or ground waters, and shall not cause or contribute to a violation of the Alaska Water Quality Standards (18 AAC 70), unless allowed in this permit through exceptions to the standards or in a compliance schedule 18 AAC 70.200 – 70.270 and 18 AAC 70.910.

1.2.2 Influent samples must be collected prior to the waste stream flowing into the first treatment unit of the wastewater treatment system. Effluent samples must be collected from the effluent stream after the last treatment unit before discharge into receiving waters.

1.2.3 The permittee must not discharge any floating solids, debris, sludge, deposits, foam, scum or other residues that cause a film, sheen, or discoloration on the surface of the receiving water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines.

1.2.4 For all effluent monitoring, the permittee must use an Environmental Protection Agency (EPA) approved test method that can achieve a reporting limit less than the effluent limit. For a parameter without an effluent limit, the permittee must use the test method; approved under Code of Federal Regulation Title 40 (40 CFR) Part 136, adopted by reference at 18 AAC 83.010, with the most sensitive method detection limit (MDL) necessary for compliance monitoring.

1.2.5 Monthly averages are to be calculated over a calendar month and weekly averages are to be calculated over a time period of Sunday through Saturday. The permittee shall include in the Quality Assurance Project Plan (QAPP), required in Part 2.1, how weekly averages that overlap two months will be reported on DMRs.

1.2.6 For purposes of reporting on the DMR for a single sample, if a value is less than the MDL, the permittee must report "less than [numeric value of MDL]" and if a value is less than a minimum level (ML), the permittee must report "less than [numeric value of ML]."

1.2.7 For purposes of calculating a monthly average, zero may be assigned for values less than the MDL, and the numeric value of the MDL may be assigned for values between the MDL and the ML. If the average value is less than the MDL, the permittee must report "less than {numeric value of MDL}." if the average value is less than the ML, the permittee must report "less than [numeric value of ML]." If a value is equal to or greater than the ML, the permittee must report and use the actual value. The resulting average value must be compared to the compliance level, ML, in assessing compliance.

1.2.8 Permittees have the option of taking more frequent samples than are required in the permit. These samples must be used for averaging if they are conducted using the Department-approved test methods (generally found in 18 AAC 70 and 40 CFR §136 [adopted by reference in 18 AAC 83.010]) and if the method detection limits are less than the effluent limits.

1.3 Whole Effluent Toxicity Testing Requirements

The permittee must conduct chronic WET tests on effluent samples from Outfall 001. Testing must be conducted in accordance with Sections 1.3.1 through 1.3.6.

1.3.1 The permittee must conduct annual toxicity tests on 24-hour composite effluent samples as described below.

1.3.2 Chronic Test Species and Methods

1.3.2.1 The permittee must conduct larval development tests with a bivalve species, either *Crassostrea gigas* (Pacific oyster) or *Mytulis galloprovincialis* (blue mussel) depending on the availability of the bivalve, and fertilization tests with an echinoderm, either *Strongylocentrotus purpuratus* (purple sea urchin) or *Dendraster excentricus* (sand dollar), depending on the availability of the echinoderm.

1.3.2.2 Presence of chronic toxicity must be estimated as specified in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms*,EPA/600/R/95-136, August 1995).

1.3.2.3 Results must be reported in TUc where TUc =100/no observed effect concentration (NOEC) or 100/IC25 (in percent effluent). See Appendix C for a definition of NOEC and IC25.

1.3.2.4 Both the NOEC and the IC25 must be reported. The NOEC must be used for compliance with the WET testing conditions.

1.3.3 Quality Assurance

1.3.3.1 The toxicity testing on each organism shall include a series of five test dilutions and a control. The series must include the instream waste concentration (IWC), two dilutions above the IWC, and two dilutions below the IWC. No concentration shall be greater than two times that of the next lower concentration. The IWC is the concentration of the effluent at the boundary of the mixing zone. The IWC for this discharge is estimated at 5.0%.

1.3.3.2 The chronic toxicity trigger is defined as toxicity exceeding 20 TUc corresponding to receiving water dilution of 5.0%.

1.3.3.3 All quality assurance criteria and statistical analyses used for chronic tests and reference toxicant tests must be in accordance with *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms*, (EPA/600/R/95-136, August 1995).and individual test protocols.

1.3.3.4 In addition to those quality assurance measures specified in the methodology, quality assurance procedures must be followed:

1.3.3.4.1 If organisms are not cultured in-house, concurrent testing with reference toxicants must be conducted. If organisms are cultured in-house, monthly reference toxicant testing is sufficient. Reference toxicant tests must be conducted using the same test conditions as were used in the effluent toxicity tests.

1.3.3.4.2 If either one of the reference toxicant tests or the effluent tests do not meet all test acceptability criteria as specified in the test methods manual, the permittee must re-sample and re-test within 14 days of receipt of the test results.

1.3.3.4.3 To the extent practicable, control and dilution water should be receiving water. If the dilution water used is different from the culture water, a second control using culture water shall also be used. For purposes of this paragraph, "receiving water" means water collected from Gastineau Channel, outside of the influence of the permittee's discharge. In no case shall water that has not met test acceptability criteria be used as dilution water.

1.3.4 Accelerated Testing

1.3.4.1 If toxicity is greater than 20 TUc in any test, the permittee shall conduct six biweekly (every two weeks) tests over a 12-week period. Accelerated testing must be initiated within two weeks of receipt of test results that indicate exceedance.

1.3.4.2 Initial investigation: If the permittee demonstrates through an evaluation of facility operations that the cause of the exceedance is known and corrective actions have been implemented, only one accelerated test is necessary.

1.3.4.3 The permittee shall notify DEC in writing of exceedances within two weeks of receipt of the test results. Notification shall include the following information:

1.3.4.3.1 a status report on any actions required by the permit with a schedule for actions not yet completed;

1.3.4.3.2 a description of any additional actions the permittee has taken or will take to investigate and correct the cause(s) of toxicity; and

1.3.4.3.3 where no actions have been taken, a discussion of all reasons for not taking action.

1.3.4.4 If none of the accelerated tests indicates toxicity greater than 20 TUc, the permittee may return to the normal testing frequency.

1.3.4.5 If toxicity is greater than 20 TUc in any of the accelerated tests, the permittee must initiate TRE as outlined in Section 1.3.5 within 15 days of the exceedance.

1.3.4.6 If the permittee is able to adequately demonstrate through an evaluation of facility operations that the cause of the exceedance(s) is known and corrective actions have been immediately implemented, or in cases where additional test quality assurance or quality control is necessary, only one accelerated test is necessary. If toxicity is greater than 20 TUc in this test, then TRE requirements in Section 1.3.5 shall apply.

1.3.5 Toxicity Reduction Evaluation and Toxicity Identification Evaluation

1.3.5.1 If toxicity is greater than 20 TUc in any of the accelerated tests, the permittee shall initiate a TRE in accordance with *Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants* (EPA/833-B-99-002, August 1999). The permittee will develop a more detailed TRE workplan as expeditiously as possible. At a minimum, the workplan shall include:

1.3.5.1.1 further actions to investigate and identify the cause of toxicity,

1.3.5.1.2 actions the permittee will take to mitigate impact of the discharge and to prevent recurrence of toxicity, and

1.3.5.1.3 a schedule for these actions.

1.3.5.2 If a TRE is initiated before completion of accelerated testing, the accelerated testing schedule may be terminated or used as necessary in performing the TRE.

1.3.5.3 The permittee may initiate a Toxicity Identification Evaluation (TIE) as part of the TRE process. Any TIE must be performed in accordance with EPA guidance manuals, *Toxicity Identification Evaluation, Characterization of Chronically Toxic Effluents, Phase I* (EPA/600-6-91-005F, May 1992); *Methods for Aquatic Toxicity Identification Evaluation, Phase II: Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity* (EPA/600-R-92-080, September 1993); and *Methods for Aquatic Toxicity Identification Evaluations, Phase III: Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity* (EPA/600-R-92-081, September 1993).

1.3.6 Reporting

1.3.6.1 Toxicity tests taken from April 1 through October 31 shall be reported with (in a separate written report) the December DMR. Toxicity tests taken from November 1 through March 31 shall be reported (in a separate written report) with the May DMR.

1.3.6.2 The permittee shall submit results of any accelerated testing, under Section 1.3.5, within two weeks of receipt of results from the laboratory. The full report must be submitted within four weeks of receipt of results from the laboratory. If an initial investigation indicates the source of toxicity and accelerated testing is unnecessary, the result of the investigation must be submitted with the DMR for the month following completion of the investigation.

1.3.6.3 The toxicity test report results must include all relevant information outlined in Section 10, *Report Preparation of Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms*, (EPA/600-R-95-136, August 1995).In addition to toxicity test results, the permittee must report: dates of sample collection and initiation of each test; the toxicity triggers as defined in Section 1.3.5; flow rate at the time of sample collection; and results of the monitoring required in Section 1.3.

1.4 Mixing Zone

1.4.1 In accordance with state regulations at 18 AAC 70.240, as amended through June 26, 2003, a mixing zone for ammonia, copper, dissolved oxygen, FC bacteria, and WET is authorized in Gastineau Channel for this discharge.

1.4.2 The chronic mixing zone for this discharge has a dilution of 20.3:1 and is defined as a circle, with a radius of 83 meters (m), centered on the outfall line and over the diffuser.

1.4.3 The acute mixing zone for this discharge has a dilution of 2.6:1 and is defined as a circle with a radius of 9 m, centered on the outfall line and over the diffuser.

1.5 Receiving Waterbody Monitoring

1.5.1 The permittee must conduct receiving water monitoring. Receiving water monitoring must start within 180 days of the effective date of the permit and continue for the duration of the permit.

1.5.2 Two receiving waterbody monitoring stations, a boundary of the mixing zone station (Station MXZ), and an ambient station (Station AMB), must be established in Gastineau Channel.

1.5.2.1 The boundary of Station MXZ must be established either at the southeast boundary of the chronic mixing zone during an ebb tide (receding or outgoing tide) or at the northwest boundary of the chronic mixing zone during a flood tide (rising or incoming tide).

1.5.2.2 Station AMB, representing ambient conditions in Gastineau Channel, must be established in a location outside the influence of the facility's discharge, greater than 83 m from the end of the outfall diffuser.

1.5.2.3 The permittee must seek written approval of the receiving water monitoring stations from DEC within 180 days of the effective date of the permit. A failure to obtain DEC approval of the locations of the receiving water monitoring stations does not relieve the permittee of the receiving water monitoring requirements.

1.5.3 To the extent practicable, receiving water sample collection must occur on the same day as corresponding effluent sample collection.

1.5.4 Samples must be analyzed for the parameters listed in Tables 3 and 4 and must achieve MDLs that are equivalent to or less than their respective receiving water limits. The permittee may request different MDLs. The request must be in writing and must be approved by DEC.

1.5.5 FC bacteria must be monitored once per month May through October and two more times between November and April.

1.5.6 Based upon the results and DEC approval, after two years, FC bacteria monitoring may be reduced to twice per year. If the sampling frequency has been reduced, and the method of disinfection changes, monitoring must recommence as stated above.

Table 3. Station MXZ: Boundary of Chronic Mixing Zone Monitoring Requirements

Parameter	Units	Sampling Frequency	Sample Type
FC Bacteria [a]	FC/100 mL	1/month [b,c]	grab
Enterococci Bacteria	counts/100 mL	2/year [c,d,e]	grab

Footnotes:

a. FC bacteria average results must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the quantities. For example the geometric mean of 100, 200, and 300 is (100 x 200 x 300)1/3= 181.7.
b. FC bacteria must be monitored once per month during May, June, July, Aug, Sept, and Oct and two more times during Nov through April. See Permit Section 1.5.5.
c. Monitoring results must be submitted to DEC with the DMR for the month following sample collection.
d. Twice per year consists of one sample taken in the summer months (June 1– Sept 30), and one in the winter (Oct 1-May 31).
e. Sampling only required during the months May-Sept. Sampling should occur at the same time as FC bacteria sampling.

Table 4. Station AMB: Ambient Station Monitoring Requirements

Parameter	Units	Sampling Frequency	Sample Type
Total Ammonia as Nitrogen [a]	mg/L	2/year [b,c]	grab
pH [a]	s.u.	2/year [b,c]	grab
Temperature [a]	°C	2/year [b,c]	grab
Salinity [a]	grams/kilogram	2/year [b,c]	grab

Footnotes:

a. Ambient station ammonia, pH, temperature, and salinity samples should be taken concurrently with the boundary of the mixing zone ammonia sample.
b. Twice per year consists of one sample taken in the summer months (June 1– Sept 30), and one in the winter (Oct 1-May 31).
c. Monitoring results must be submitted to DEC with the DMR for the month following sample collection.

1.5.7 Quality assurance/quality control (QA/QC) plans for all the monitoring must be documented in the QAPP required under Section 2.1., "Quality Assurance Project Plan".

1.5.8 Receiving water monitoring results must be submitted to DEC with the DMR for the month following sample collection. At a minimum, the report must include:

1.5.8.1 Dates of sample collection and analyses;

1.5.8.2 Results of sample analyses; and

1.5.8.3 Relevant QA/QC information.

1.6 Combined Sewer Overflows

The permittee is authorized to discharge from the combined sewer overflow (CSO) outfalls listed in Table 5 in accordance with the terms and conditions of this section.

Table 5. Permitted Combined Sewer Overflows

Diversion Structure	Location	Receiving Waterbody
N-11 (High School)	Sta "AE" 2+82 1' Rt. Near intersection of Glacier Avenue and Highland Drive	Gastineau Channel
N11.2 (City Hall)	Sta "C" Intersection of Marine Way and South Seward Street, Sealaska Diversion	Gastineau Channel
N-15.1 (formerly MH#T-4) (Douglas)	Water's edge, approximately at the intersection of Front and Dock Streets in Douglas	Gastineau Channel

1.6.1 The permittee must comply with the following technology-based requirements:

1.6.1.1 No dry weather CSOs are permitted.

1.6.1.2 The permittee must use all available and reasonable measures to prevent or moderate such discharges through proper operation and regular maintenance.

1.6.1.3 The permittee must maximize use of the collection system for storage.

1.6.1.4 The permittee shall continue to implement selected CSO controls to minimize CSO impacts from nondomestic discharges.

1.6.1.5 The permittee must maximize flow to the WWTF for treatment.

1.6.1.6 The permittee must control solid and floatable materials in sewer overflows.

1.6.1.7 The permittee must implement a pollution prevention program.

1.6.1.8 The permittee must ensure that the public receives adequate notification of CSO occurrences and CSO impacts.

1.6.2 The permittee must comply with the following water –quality based requirements:

1.6.2.1 The permittee shall not discharge any pollutant at a level that causes or contributes to an instream excursion above numeric or narrative criteria adoped as part of Alaska Water Quality Standards (18 AAC 70), unless allowed in this permit through exceptions to the standards or in a compliance schedule 18 AAC 70.200 – 70.270 and 18 AAC 70.910.

1.6.2.2 The permittee shall discharge no more than an average of four overflow events per year not receiving the following minimum treatment:

1.6.2.2.1 Primary clarification or equivalent.

1.6.2.2.2 Solids and floatables disposal.

1.6.2.2.3 Fecal Coliform counts maintained below a maximum daily 43 FC/100 mL.

1.6.2.2.4 Total Residual Chlorine concentration below a maximum daily 0.013 mg/L.

1.6.3 The permittee shall implement and effectively operate and maintain the CSO controls identified in the JD WWTF Long Term Control Plan.Each diversion structure listed in Table 5 above, must be monitored, when discharging, as listed in Table 6, below.

1.6.4 By January 31st of each year, the permittee must submit an annual report summarizing the information from each discharge from the previous year and demonstrating compliance with the technology-based requirements at Permit Section 1.6.1, water-quality based requirements at Permit Section 1.6.2, and the controls outlined in Table 6, below.

Table 6. CSO Diversion Monitoring Requirements

Parameter	Units	Sample Location	Sampling Frequency	Sample Type
Flow	mgd	effluent	once per diversion event	record and report the total volume of discharge per day for each opening when discharging
BOD_5	mg/L and lbs/day [a]	effluent	once per diversion event	grab
TSS	mg/L and lbs/day [a]	effluent	once per diversion event	grab
FC Bacteria	FC/100 mL	effluent	once per diversion event	grab
Enterococci Bacteria	counts/100 mL	effluent	once per diversion event	grab
Duration of opening	minutes	effluent	once per diversion event	report the time that the overflow is opened and closed and total minutes open
Reason for discharge	N/A	N/A	once per diversion event	N/A

Footnote:
a. lbs/day = concentration (mg/L) x flow (mgd) x 8.34 (conversion factor).

2.0 SPECIAL CONDITIONS

2.1 Quality Assurance Project Plan

2.1.1 Within 180 days of the effective date of the permit, the permittee must develop and implement a QAPP for all monitoring required by this permit. Any existing QAPP may be modified under this section.

2.1.2 The QAPP must be designed to assist in planning for the collection and analysis of effluent and receiving water samples in support of the permit and to help explain data anomalies whenever they occur.

2.1.3 The permittee may use either the generic DEC WWTF QAPP or develop a facility-specific QAPP. Some facility specific information is required to complete the QAPP when using the generic DEC QAPP. A generic DEC QAPP is located at http://dec.alaska.gov/water/wqapp/wqapp_index.htm.

2.1.4 The permittee must provide written notice to DEC when the QAPP has been completed. The QAPP shall be maintained onsite and made available to DEC upon request.

2.1.5 Throughout all sample collection and analysis activities, the permittee must use DEC-approved QA/QC and chain-of-custody procedures, as described in the *Requirements for Quality Assurance Project Plans* (EPA/QA/R-5, March 2001)at http://www.epa.gov/quality/qs-docs/r5-final.pdf and *Guidance for Quality Assurance Project Plans* (EPA/QA/G-5, December 2002) at http://www.epa.gov/quality/qs-docs/g5-final.pdf. The QAPP must be prepared in the format specified in these documents.

2.1.6 At a minimum, a QAPP must include the following:

2.1.6.1 Details on number of samples, type of sample containers, preservation of samples, holding times, analytical methods, analytical detection and quantitation limits for each target compound, type and number of quality assurance field samples, precision and accuracy requirements, sample preparation requirements, sample shipping methods, and laboratory data delivery requirements;

2.1.6.2 Maps indicating the location of each sampling point;

2.1.6.3 Qualification and training of personnel;

2.1.6.4 Name, address, and telephone number of all laboratories used by or proposed to be used by the permittee; and

2.1.6.5 The inclusion of how weekly averages that overlap two months will be reported on the DMR.

2.1.7 The permittee must amend the QAPP whenever sample collection, sample analysis, or other procedure addressed by the QAPP is modified.

2.2 Additional Effluent Monitoring

2.2.1 The permittee shall perform the additional effluent testing in the Alaska Pollutant Discharge Elimination System (APDES) Application Form 2A, Section 11 as well as all applicable supplemental monitoring listed in Section 12. The permittee shall submit the results of the additional testing with their application for reissuance of this APDES permit. The permittee shall consult and review Form 2A, Section 11 upon permit issuance to ensure that the required monitoring in the application will be completed prior to submitting a request for permit reissuance. Form 2A may be found at the following site: http://dec.alaska.gov/water/wwdp/index.htm. Monitoring for the parameters contained in this permit may be used to satisfy this specific monitoring requirement as long as the "different calendar year and season" criteria as described in Form 2A are met.

2.3 Operation and Maintenance Plan

2.3.1 In addition to requirements specified in Appendix A, Part 1.6 of this permit (Proper Operation and Maintenance), within 180 days of the effective date of this permit, the permittee shall review and update as necessary, the JD WWTF OMP. Any existing OMP may be modified under this section.

2.3.2 The permittee must provide written notice to DEC when the OMP has been completed. The OMP shall be maintained onsite and made available to DEC upon request.

2.3.3 The OMP must be reviewed annually. Documentation of annual plan review by the permittee shall be retained onsite and made available to DEC upon request.

2.3.4 The OMP must include appropriate best management practices (BMPs) which prevent or minimize potential for the release of pollutants to Gastineau Channel.

2.3.5 The permittee must develop a description of pollution prevention measures and controls appropriate for the facility. The appropriateness and priorities of controls in the OMP must reflect identified potential sources of pollutants at the facility. The description of BMPs must address to the extent practicable, the following minimum components:

2.3.5.1 Spill prevention and control;

2.3.5.2 Optimization of chemical usage;

2.3.5.3 Preventive maintenance program;

2.3.5.4 Minimization of pollutant inputs from industrial users;

2.3.5.5 Research, development, and implementation of a public information and education program to control the introduction of household hazardous materials to the sewer system; and

2.3.5.6 Water conservation.

2.4 Industrial User Survey

The permittee shall conduct an industrial user survey of industrial users connected to JD WWTF. The industrial user survey must be conducted once during the term of this permit and be submitted to DEC at least 180 days before the expiration of the permit.

2.5 Facility Planning Requirement

2.5.1 The permittee must develop a Facility Plan that evaluates the facility's existing condition and identifies near and long-term needs and improvements appropriate for a 10-20 year planning window. A guidance manual for preparing a facility plan has been published by EPA (EPA-430/9-76-015 *Construction Grants Program Requirements*, 1975). Permittee may, at its discretion, follow procedures outlined in this publication. The finalized Facility Plan must be submitted with the application for APDES permit reissuance, 180 days before expiration of this permit. Any existing Facility Plan may be modified under this section.

2.5.2 The Facility Plan must include, but is not limited to:

2.5.2.1 An evaluation of existing wastewater treatment and disposal systems used by the facility. This section of the Facility Plan must assess performance relative to existing design capacity given current conditions and identify any existing deficiencies and/or problems;

2.5.2.2 A determination of the adequacy of the facility's treatment process, maintenance program, process control measures, operating procedures, and records management protocols;

2.5.2.3 An evaluation of reasonably foreseeable future wasteloads and flows including an evaluation of future needs for treatment and infrastructure changes or upgrades, including identifying when changes or upgrades should be initiated;

2.5.2.4 A proposed schedule for implementation of specific recommendations identified from sections 2.4.2.1-2.4.2.3, above; and

2.5.2.5 A specified schedule wherein the Facility Plan will be reviewed, revised and amended in order to keep the plan up to date.

3.0 GENERAL PROVISIONS

3.1 Identification Sign

At least one sign must be posted on the shoreline near the discharge area during discharge. Signs must inform the public that secondary treated domestic wastewater is being discharged, state that there is a mixing zone and describe it, warn users of the area that certain activities such as the harvesting of aquatic life for raw consumption and bathing should not take place in the mixing zone, and provide the phone number and identify of the discharger.

3.2 Removed Substances

Collected screenings, grit, solids, scum, and other facility residuals, or other pollutants removed in the course of treatment or control of water and wastewaters shall be disposed of in a Department approved manner and method in accordance with 18 AAC 60, such as to prevent any pollution from such materials from entering navigable waters.

APPENDIX A

STANDARD CONDITIONS

APDES INDIVIDUAL PERMIT

PUBLICLY OWNED TREATMENT WORKS

September 2011

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Appendix A, Standard Conditions is an integral and enforceable part of the permit. Failure to comply with a Standard Condition in this Appendix constitutes a violation of the permit and is subject to enforcement.

1.0 Standard Conditions Applicable to All Permits

1.1 Contact Information and Addresses

1.1.1 Permitting Program

Documents, reports, and plans required under the permit and Appendix A are to be sent to the following address:

State of Alaska
Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, Alaska 99501
Telephone (907) 269-6285
Fax (907) 269-3487
Email: DEC.Water.WQPermit@alaska.gov

1.1.2 Compliance and Enforcement Program

Documents and reports required under the permit and Appendix A relating to compliance are to be sent to the following address:

State of Alaska
Department of Environmental Conservation
Division of Water
Compliance and Enforcement Program
555 Cordova Street
Anchorage, Alaska 99501
Telephone Nationwide (877) 569-4114
Anchorage Area / International (907) 269-4114
Fax (907) 269-4604
Email: dec-wqreporting@alaska.gov

1.2 Duty to Comply

A permittee shall comply with all conditions of the permittee's APDES permit. Any permit noncompliance constitutes a violation of 33 U.S.C 1251-1387 (Clean Water Act) and state law and is grounds for enforcement action including termination, revocation and reissuance, or modification of a permit, or denial of a permit renewal application. A permittee shall comply with effluent standards or prohibitions established under 33 U.S.C. 1317(a) for toxic pollutants within the time provided in the regulations that establish those effluent standards or prohibitions even if the permit has not yet been modified to incorporate the requirement.

1.3 Duty to Reapply

If a permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must apply for and obtain a new permit. In accordance with 18 AAC 83.105(b), a permittee with a currently effective permit shall reapply by submitting a new application at least 180 days before the existing permit expires, unless the Department has granted the permittee permission to submit an application on a later date. However, the Department will not grant permission for an application to be submitted after the expiration date of the existing permit.

1.4 Need to Halt or Reduce Activity Not a Defense

In an enforcement action, a permittee may not assert as a defense that compliance with the conditions of the permit would have made it necessary for the permittee to halt or reduce the permitted activity.

1.5 Duty to Mitigate

A permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

1.6 Proper Operation and Maintenance

1.6.1 A permittee shall at all times properly operate and maintain all facilities and systems of treatment and control and related appurtenances that the permittee installs or uses to achieve compliance with the conditions of the permit. The permittee's duty to operate and maintain properly includes using adequate laboratory controls and appropriate quality assurance procedures. However, a permittee is not required to operate back-up or auxiliary facilities or similar systems that a permittee installs unless operation of those facilities is necessary to achieve compliance with the conditions of the permit.

1.6.2 Operation and maintenance records shall be retained and made available at the site.

1.6.3 In accordance with 18 AAC 72.065, the owner of operator of a domestic system that has 100 or more service connections or that is used, or intended for use, by 500 or more people per day shall ensure that the system is operated by a person certified under 18 AAC 74.

1.7 Permit Actions

A permit may be modified, revoked and reissued, or terminated for cause as provided in 18 AAC 83.130. If a permittee files a request to modify, revoke and reissue, or terminate a permit, or gives notice of planned changes or anticipated noncompliance, the filing or notice does not stay any permit condition.

1.8 Property Rights

A permit does not convey any property rights or exclusive privilege.

1.9 Duty to Provide Information

A permittee shall, within a reasonable time, provide to the Department any information that the Department requests to determine whether a permittee is in compliance with the permit, or whether cause exists to modify, revoke and reissue, or terminate the permit. A permittee shall also provide to the Department, upon request, copies of any records the permittee is required to keep under the permit.

1.10 Inspection and Entry

A permittee shall allow the Department, or an authorized representative, including a contractor acting as a representative of the Department, at reasonable times and on presentation of credentials establishing authority and any other documents required by law, to:

1.10.1 Enter the premises where a permittee's regulated facility or activity is located or conducted, or where permit conditions require records to be kept;

1.10.2 Have access to and copy any records that permit conditions require the permittee to keep;

1.10.3 Inspect any facilities, equipment, including monitoring and control equipment, practices, or operations regulated or required under a permit; and

1.10.4 Sample or monitor any substances or parameters at any location for the purpose of assuring permit compliance or as otherwise authorized by 33 U.S.C. 1251-1387 (Clean Water Act).

1.11 Monitoring and Records

A permittee must comply with the following monitoring and recordkeeping conditions:

1.11.1 Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity.

1.11.2 The permittee shall retain records in Alaska of all monitoring information for at least three years, or longer at the Department's request at any time, from the date of the sample, measurement, report, or application. Monitoring records required to be kept include:

1.11.2.1 All calibration and maintenance records,

1.11.2.2 All original strip chart recordings or other forms of data approved by the Department for continuous monitoring instrumentation,

1.11.2.3 All reports required by a permit,

1.11.2.4 Records of all data used to complete the application for a permit,

1.11.2.5 Field logbooks or visual monitoring logbooks,

1.11.2.6 Quality assurance chain of custody forms,

1.11.2.7 Copies of discharge monitoring reports, and

1.11.2.8 A copy of this APDES permit.

1.11.3 Records of monitoring information must include:

1.11.3.1 The date, exact place, and time of any sampling or measurement;

1.11.3.2 The name(s) of any individual(s) who performed the sampling or measurement(s);

1.11.3.3 The date(s) and time any analysis was performed;

1.11.3.4 The name(s) of any individual(s) who performed any analysis;

1.11.3.5 Any analytical technique or method used; and

1.11.3.6 The results of the analysis.

1.11.4 Monitoring Procedures

Analyses of pollutants must be conducted using test procedures approved under 40 CFR Part 136, adopted by reference at 18 AAC 83.010, for pollutants with approved test procedures, and using test procedures specified in the permit for pollutants without approved methods.

1.12 Signature Requirement and Penalties

1.12.1 Any application, report, or information submitted to the Department in compliance with a permit requirement must be signed and certified in accordance with 18 AAC 83.385. Any person who knowingly makes any false material statement, representation, or certification in any application, record, report, or other document filed or required to be maintained under a permit, or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be subject to penalties under 33 U.S.C. 1319(c)(4), AS 12.55.035(c)(1)(B), (c)(2) and (c)(3), and AS 46.03.790(g).

1.12.2 In accordance with 18 AAC 83.385, an APDES permit application must be signed as follows:

1.12.2.1 For a corporation, a responsible corporate officer shall sign the application; in this subsection, a responsible corporate officer means:

1.12.2.1.1 A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation; or

1.12.2.1.2 The manager of one of more manufacturing, production, or operating facilities, if

1.12.2.1.2.1 The manager is authorized to make management decisions that govern the operation of the regulated facility, including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental statutes and regulations;

1.12.2.1.2.2 The manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and

1.12.2.1.2.3 Authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

1.12.2.2 For a partnership or sole proprietorship, by the general partner or the proprietor, respectively, shall sign the application.

1.12.2.3 For a municipality, state, federal, or other public agency, either a principal executive officer or ranking elected official shall sign the application; in this subsection, a principal executive officer of an agency means:

1.12.2.3.1 The chief executive officer of the agency; or

1.12.2.3.2 A senior executive officer having responsibility for the overall operations of a principal geographic unit or division of the agency.

1.12.3 Any report required by an APDES permit, and a submittal with any other information requested by the Department, must be signed by a person described in Appendix A, Part 1.12.2, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1.12.3.1 The authorization is made in writing by a person described in Appendix A, Part 1.12.2;

1.12.3.2 The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, including the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility; or an individual or position having overall responsibility for environmental matters for the company; and

1.12.3.3 The written authorization is submitted to the Department to the Permitting Program address in Appendix A, Part 1.1.1.

1.12.4 If an authorization under Appendix A, Part 1.12.3 is no longer effective because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Appendix A, Part 1.12.3 must be submitted to the Department before or together with any report, information, or application to be signed by an authorized representative.

1.12.5 Any person signing a document under Appendix A, Part 1.12.2 or Part 1.12.3 shall certify as follows:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

1.13 Proprietary or Confidential Information

1.13.1 A permit applicant or permittee may assert a claim of confidentiality for proprietary or confidential business information by stamping the words “confidential business information” on each page of a submission containing proprietary or confidential business information. The Department will treat the stamped submissions as confidential if the information satisfies the test in 40 CFR §2.208, adopted by reference at 18 AAC 83.010, and is not otherwise required to be made public by state law.

1.13.2 A claim of confidentiality under Appendix A, Part 1.13.1 may not be asserted for the name and address of any permit applicant or permittee, a permit application, a permit, effluent data, sewage sludge data, and information required by APDES or NPDES application forms provided by the Department, whether submitted on the forms themselves or in any attachments used to supply information required by the forms.

1.13.3 A permittee’s claim of confidentiality authorized under Appendix A, Part 1.13.1 is not waived if the Department provides the proprietary or confidential business information to the EPA or to other agencies participating in the permitting process. The Department will supply any information obtained or used in the administration of the state APDES program to the EPA upon request under 40 CFR §123.41, as revised as of July 1, 2005. When providing information submitted to the Department with a claim of confidentiality to the EPA, the Department will notify the EPA of the confidentiality claim. If the Department provides the EPA information that is not claimed to be confidential, the EPA may make the information available to the public without further notice.

1.14 Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any action or relieve a permittee

from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under state laws addressing oil and hazardous substances.

1.15 Cultural and Paleontological Resources

If cultural or paleontological resources are discovered because of this disposal activity, work that would disturb such resources is to be stopped, and the Office of History and Archaeology, a Division of Parks and Outdoor Recreation of the Alaska Department of Natural Resources (http://www.dnr.state.ak.us/parks/oha/), is to be notified immediately at (907) 269-8721.

1.16 Fee

A permittee must pay the appropriate permit fee described in 18 AAC 72.

1.17 Other Legal Obligations

This permit does not relieve the permittee from the duty to obtain any other necessary permits from the Department or from other local, state, or federal agencies and to comply with the requirements contained in any such permits. All activities conducted and all plan approvals implemented by the permittee pursuant to the terms of this permit shall comply with all applicable local, state, and federal laws and regulations.

2.0 Special Reporting Obligations

2.1 Planned Changes

2.1.1 The permittee shall give notice to the Department as soon as possible of any planned physical alteration or addition to the permitted facility if:

2.1.1.1 The alteration or addition may make the facility a "new source" under one or more of the criteria in 18 AAC 83.990(44); or

2.1.1.2 The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged if those pollutants are not subject to effluent limitations in the permit or to notification requirements under 18 AAC 83.610.

2.1.2 If the proposed changes are subject to plan review, then the plans must be submitted at least 30 days before implementation of changes (see 18 AAC 15.020 and 18 AAC 72 for plan review requirements). Written approval is not required for an emergency repair or routine maintenance.

2.1.3 Written notice must be sent to the Permitting Program address in Appendix A, Part 1.1.1.

2.2 Anticipated Noncompliance

2.2.1 A permittee shall give seven days' notice to the Department before commencing any planned change in the permitted facility or activity that may result in noncompliance with permit requirements.

2.2.2 Written notice must be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

2.3 Transfers

2.3.1 A permittee may not transfer a permit for a facility or activity to any person except after notice to the Department in accordance with 18 AAC 83.150. The Department may modify or revoke and reissue the permit to change the name of the permittee and incorporate such other requirements under 33 U.S.C. 1251-1387 (Clean Water Act) or state law.

2.3.2 Written notice must be sent to the Permitting Program address in Appendix A, Part 1.1.1.

2.4 Compliance Schedules

2.4.1 A permittee must submit progress or compliance reports on interim and final requirements in any compliance schedule of a permit no later than 14 days following the scheduled date of each requirement.

2.4.2 Written notice must be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

2.5 Corrective Information

2.5.1 If a permittee becomes aware that it failed to submit a relevant fact in a permit application or submitted incorrect information in a permit application or in any report to the Department, the permittee shall promptly submit the relevant fact or the correct information.

2.5.2 Information must be sent to the Permitting Program address in Appendix A, Part 1.1.1.

2.6 Bypass of Treatment Facilities

2.6.1 Prohibition of Bypass

Bypass is prohibited. The Department may take enforcement action against a permittee for any bypass, unless:

2.6.1.1 The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

2.6.1.2 There were no feasible alternatives to the bypass, including use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. However, this condition is not satisfied if the permittee, in the exercise of reasonable engineering judgment, should have installed adequate back-up equipment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance; and

2.6.1.3 The permittee provides notice to the Department of a bypass event in the manner, as appropriate, under Appendix A, Part 2.6.2.

2.6.2 Notice of bypass

2.6.2.1 For an anticipated bypass, the permittee submits notice at least 10 days before the date of the bypass. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the conditions of Appendix A, Parts 2.6.1.1 and 2.6.1.2.

2.6.2.2 For an unanticipated bypass, the permittee submits 24-hour notice, as required in 18 AAC 83.410(f) and Appendix A, Part 3.4, Twenty-four Hour Reporting.

2.6.2.3 Written notice must be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

2.6.3 Notwithstanding Appendix A, Part 2.6.1, a permittee may allow a bypass that:

2.6.3.1 Does not cause an effluent limitation to be exceeded, and

2.6.3.2 Is for essential maintenance to assure efficient operation.

2.7 Upset Conditions

2.7.1 In any enforcement action for noncompliance with technology-based permit effluent limitations, a permittee may claim upset as an affirmative defense. A permittee seeking to establish the occurrence of an upset has the burden of proof to show that the requirements of Appendix A, Part 2.7.2 are met.

2.7.2 To establish the affirmative defense of upset, the permittee must demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that:

2.7.2.1 An upset occurred and the permittee can identify the cause or causes of the upset;

2.7.2.2 The permitted facility was at the time being properly operated;

2.7.2.3 The permittee submitted 24-hour notice of the upset, as required in 18 AAC 83.410(f) and Appendix A, Part 3.4, Twenty-four Hour Reporting; and

2.7.2.4 The permittee complied with any mitigation measures required under 18 AAC 83.405(e) and Appendix A, Part 1.5, Duty to Mitigate.

2.7.3 Any determination made in administrative review of a claim that noncompliance was caused by upset, before an action for noncompliance is commenced, is not final administrative action subject to judicial review.

2.8 Notice of New Introduction of Pollutants

2.8.1 Any POTW shall provide adequate notice to the Department, including information on the quality and quantity of effluent introduced into the POTW, and any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW as soon as the POTW has knowledge of a change, but no later than seven days in advance of any:

2.8.1.1 New introduction of pollutants into the POTW from an indirect discharger if that introduction of pollutants would be subject to 33 U.S.C 1311 or 33 U.S.C 1316 if the POTW directly discharged those pollutants, and

2.8.1.2 Substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

2.8.2 Written notice must be sent to the Permitting Program address in Appendix A, Part 1.1.1.

3.0 Monitoring, Recording, and Reporting Requirements

3.1 Representative Sampling

A permittee must collect effluent samples from the effluent stream after the last treatment unit before discharge into the receiving waters. Samples and measurements must be representative of the volume and nature of the monitored activity or discharge.

3.2 Reporting of Monitoring Results

At intervals specified in the permit, monitoring results must be reported on the EPA discharge monitoring report (DMR) form, as revised as of March 1999, adopted by reference.

3.2.1 Monitoring results shall be summarized each month on the DMR or an approved equivalent report. The permittee must submit reports monthly postmarked by the 15th day of the following month.

3.2.2 The permittee must sign and certify all DMRs and all other reports in accordance with the requirements of Appendix A, Part 1.12, Signatory Requirements and Penalties. All signed and certified legible original DMRs and all other documents and reports must be submitted to the Department at the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

3.2.3 If, during the period when this permit is effective, the Department makes available electronic reporting, the permittee may, as an alternative to the requirements of Appendix A, Part 3.2.2, submit monthly DMRs electronically by the 15th day of the following month in accordance with guidance provided by the Department. The permittee must certify all DMRs and other reports, in accordance with the requirements of Appendix A, Part 1.12, Signatory Requirements and Penalties. The permittee must retain the legible originals of these documents and make them available to the Department upon request.

3.3 Additional Monitoring by Permittee

If the permittee monitors any pollutant more frequently than the permit requires using test procedures approved in 40 CFR Part 136, adopted by reference at 18 AAC 83.010, or as specified in this permit, the results of that additional monitoring must be included in the calculation and reporting of the data submitted in the DMR required by Appendix A, Part 3.2. All limitations that require averaging of measurements must be calculated using an arithmetic means unless the Department specifies another method in the permit. Upon request by the Department, the permittee must submit the results of any other sampling and monitoring regardless of the test method used.

3.4 Twenty-four Hour Reporting

A permittee shall report any noncompliance event that may endanger health or the environment as follows:

3.4.1 A report must be made:

3.4.1.1 Orally within 24 hours after the permittee becomes aware of the circumstances, and

3.4.1.2 In writing within five days after the permittee becomes aware of the circumstances.

3.4.2 A report must include the following information:

3.4.2.1 A description of the noncompliance and its causes, including the estimated volume or weight and specific details of the noncompliance;

3.4.2.2 The period of noncompliance, including exact dates and times;

3.4.2.3 If the noncompliance has not been corrected, a statement regarding the anticipated time the noncompliance is expected to continue; and

3.4.2.4 Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3.4.3 An event that must be reported within 24 hours includes:

3.4.3.1 An unanticipated bypass that exceeds any effluent limitation in the permit (see Appendix A, Part 2.6, Bypass of Treatment Facilities).

3.4.3.2 An upset that exceeds any effluent limitation in the permit (see Appendix A, Part 2.7, Upset Conditions).

3.4.3.3 A violation of a maximum daily discharge limitation for any of the pollutants listed in the permit as requiring 24-hour reporting.

3.4.4 The Department may waive the written report on a case-by-case basis for reports under Appendix A, Part 3.4 if the oral report has been received within 24 hours of the permittee becoming aware of the noncompliance event.

3.4.5 The permittee may satisfy the written reporting submission requirements of Appendix A, Part 3.4.1.2 by submitting the written report via email, if the following conditions are met:

3.4.5.1 The Noncompliance Notification Form or equivalent form is used to report the noncompliance;

3.4.5.2 The written report includes all the information required under Appendix A, Part 3.4.2;

3.4.5.3 The written report is properly certified and signed in accordance with Appendix A, Parts 1.12.3 and 1.12.5.;

3.4.5.4 The written report is scanned as a PDF (portable document format) document and transmitted to the Department as an attachment to the email; and

3.4.5.5 The permittee retains in the facility file the original signed and certified written report and a printed copy of the conveying email.

3.4.6 The email and PDF written report will satisfy the written report submission requirements of this permit provided the email is received by the Department within five days after the time the permittee becomes aware of the noncompliance event, and the email and written report satisfy the criteria of Part 3.4.5. The email address to report noncompliance is: dec-wqreporting@alaska.gov

3.5 Other Noncompliance Reporting

A permittee shall report all instances of noncompliance not required to be reported under Appendix A, Parts 2.4 (Compliance Schedules), 3.3 (Additional Monitoring by Permittee), and 3.4 (Twenty-four Hour Reporting) at the time the permittee submits monitoring reports under Appendix A, Part 3.2 (Reporting of Monitoring Results). A report of noncompliance under this part must contain the information listed in Appendix A, Part 3.4.2 and be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

4.0 Penalties for Violations of Permit Conditions

Alaska laws allow the State to pursue both civil and criminal actions concurrently. The following is a summary of Alaska law. The permittee should read the applicable statutes for further substantive and procedural details.

4.1 Civil Action

Under AS 46.03.760(e), a person who violates or causes or permits to be violated a regulation, a lawful order of the Department, or a permit, approval, or acceptance, or term or condition of a permit, approval or acceptance issued under the program authorized by AS 46.03.020 (12) is liable, in a civil action, to the state for a sum to be assessed by the court of not less than $500 nor more than $100,000 for the initial violation, nor more than $10,000 for each day after that on which the violation continues,

and that shall reflect, when applicable:

4.1.1 Reasonable compensation in the nature of liquated damages for any adverse environmental effects caused by the violation, that shall be determined by the court according to the toxicity, degradability, and dispersal characteristics of the substance discharged, the sensitivity of the receiving environment, and the degree to which the discharge degrades existing environmental quality;

4.1.2 Reasonable costs incurred by the state in detection, investigation, and attempted correction of the violation;

4.1.3 The economic savings realized by the person in not complying with the requirements for which a violation is charged; and

4.1.4 The need for an enhanced civil penalty to deter future noncompliance.

4.2 Injunctive Relief

4.2.1 Under AS 46.03.820, the Department can order an activity presenting an imminent or present danger to public health or that would be likely to result in irreversible damage to the environment be discontinued. Upon receipt of such an order, the activity must be immediately discontinued.

4.2.2 Under AS 46.03.765, the Department can bring an action in Alaska Superior Court seeking to enjoin ongoing or threatened violations for Department-issued permits and Department statutes and regulations.

4.3 Criminal Action

Under AS 46.03.790(h), a person is guilty of a Class A misdemeanor if the person negligently:

4.3.1 Violates a regulation adopted by the Department under AS 46.03.020(12);

4.3.2 Violates a permit issued under the program authorized by AS 46.03.020(12);

4.3.3 Fails to provide information or provides false information required by a regulation adopted under AS 46.03.020(12);

4.3.4 Makes a false statement, representation, or certification in an application, notice, record, report, permit, or other document filed, maintained, or used for purposes of compliance with a permit issued under or a regulation adopted under AS 46.03.020(12); or

4.3.5 Renders inaccurate a monitoring device or method required to be maintained by a permit issued or under a regulation adopted under AS 46.03.020(12).

4.4 Other Fines

Upon conviction of a violation of a regulation adopted under AS 46.03.020(12), a defendant who is not an organization may be sentenced to pay a fine of not more than $10,000 for each separate violation (AS 46.03.790(g)). A defendant that is an organization may be sentenced to pay a fine not exceeding the greater of: (1) $200,000; (2) three times the pecuniary gain realized by the defendant as a result of the offense; or (3) three times the pecuniary damage or loss caused by the defendant to another, or the property of another, as a result of the offense (AS 12.55.035(c)(1)(B), (c)(2), and (c)(3)).

Appendix B

Acronyms

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The following acronyms are common terms that may be found in an Alaska Pollutant Discharge Elimination System (APDES) permit.

18 AAC 15	Alaska Administrative Code. Title 18 Environmental Conservation, Chapter 15: Administrative Procedures
18 AAC 70	Alaska Administrative Code. Title 18 Environmental Conservation, Chapter 70: Water Quality Standards
18 AAC 72	Alaska Administrative Code. Title 18 Environmental Conservation, Chapter 72: Wastewater Disposal
18 AAC 83	Alaska Administrative Code. Title 18 Environmental Conservation, Chapter 83: Alaska Pollutant Discharge Elimination System

All chapters of Alaska Administrative Code, Title 18 are available at the Alaska Administrative Code database http://www.legis.state.ak.us/cgi-bin/folioisa.dll/aac

40 CFR	Code of Federal Regulations Title 40: Protection of Environment
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
APDES	Alaska Pollutant Discharge Elimination System
AS	Alaska Statutes
AS 46.03	Alaska Statutes Title 46, Chapter 03: Environmental Conservation. Available at http://www.legis.state.ak.us/default.htm
AML	Average Monthly Limit
BMP	Best Management Practices
BOD_5	5-Day Biochemical Oxygen Demand
° C	Degrees Celsius
C_d	Aquatic life criteria that cannot be exceed downstream
C_e	Concentration of pollutant in effluent
C_u	Upstream background concentration of pollutant
CSO	Combined Sewer Overflow
CV	Coefficient of Variation
CWA	Clean Water Act
D	Dilution Factor
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FC	Fecal Coliform

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ft	Feet
gpd	Gallons per day
IC_{25}	Inhibition Concentration 25%
L	Liter
lb	Pound
ln	Natural log
LTA	Long Term Average
LTCP	Long Term Control Plan
MDL	Maximum Daily Limit
MDL	Method Detection Limit
MEC	Maximum Expected Concentration
m	Meter
mg/L	Milligrams per Liter
mgd	Million gallons per day
mL	Milliliter
ML	Minimum Level
MOC	Maximum Observed Concentration
MPN	Most Probable Number
MZ	Mixing Zone
n	Sample size
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
N/A	Not Applicable
NOEC	No Observed Effect Concentration
OMP	Operations and Maintenance Plan
POTW	Publicly Owned Treatment Works
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QC	Quality Control
Q_d	Receiving Waterbody Flow Rate = Q_e + Qu
Q_e	Effluent Flow
Q_u	Receiving Waterbody Flow
RP	Reasonable Potential
RPA	Reasonable Potential Analysis
RPM	Reasonable Potential Multiplier

RWC	Receiving Water Concentration
SIU	Significant Industrial User
s.u.	Standard Units
TBEL	Technology-Based Effluent Limit
TIE	Toxicity Identification Evaluation
TRE	Toxicity Reduction Evaluation
TSD	Technical Support Document
TSS	Total Suspended Solids
TUc	Toxic Unit, Chronic
μ	Mean
μg/L	Micrograms per Liter
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
UV	Ultraviolet
WET	Whole Effluent Toxicity
WLA	Waste Load Allocation
WQBEL	Water-Quality Based Effluent Limit
WQS	Water Quality Standards
WWTF	Wastewater Treatment Facility
z	Z test value or z score
σ	Standard deviation
σ^2	Variance

Appendix C

Definitions

APPENDIX C

The following are common definitions of terms associated with APDES permits. Not all the terms listed may appear in a permit. Consult the footnote references for a complete list of terms and definitions.

Administrator[a]	Means the Administrator of the EPA or an authorized representative
Alaska Pollutant Discharge Elimination System (APDES)[a]	Means the state's program, approved by EPA under 33 U.S.C. 1342(b), for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits and imposing and enforcing pretreatment requirements under 33 U.S.C. 1317, 1328, 1342, and 1345
Aquaculture[b]	Means the cultivation of aquatic plants or animals for human use or consumption
Average	Means an arithmetic mean obtained by adding quantities and dividing the sum by the number of quantities
Average Monthly Limit	Means the highest allowable average of "daily discharges" over a calendar month calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured for that month
Biochemical Oxygen Demand (BOD)[c]	Means the amount, in milligrams per liter, of oxygen used in the biochemical oxidation of organic matter in five days at 20° C
Bypass[a]	Means the intentional diversion of waste streams from any portion of a treatment facility
Clean Water Act (CWA)[a]	Means the federal law codified at 33 U.S.C. 1251-1387, also referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972
Commissioner[a]	Means the commissioner of the Alaska Department of Environmental Conservation or the commissioner's designee
Composite Samples	Composite samples must consist of at least eight equal volume grab samples. 24 hour composite sample means a combination of at least eight discrete samples of equal volume collected at equal time intervals over a 24-hour period at the same location. A "flow proportional composite" sample means a combination of at least eight discrete samples collected at equal time intervals over a 24-hour period with each sample volume proportioned according to the flow volume. The sample aliquots must be collected and stored in accordance with procedures prescribed in the most recent edition of *Standard Methods for the Examination of Water and Wastewater*.
Criterion[b]	Means a set concentration or limit of a water quality parameter that, when not exceeded, will protect an organism, a population of organisms, a community of organisms, or a prescribed water use with a reasonable degree of safety. A criterion might be a narrative statement instead of a numerical concentration or limit.
Daily Discharge[a]	Means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants measured in units of mass, the "daily discharge" is calculated as the total

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
g) See EPA Permit Writers Manual

	mass of the pollutant discharged over the day. For pollutants with a limitation expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day.
Department[a]	Means the Alaska Department of Environmental Conservation
Design Flow[a]	Means the wastewater flow rate that the plant was designed to handle
Director[a]	Means the commissioner or the commissioner's designee assigned to administer the APDES program or a portion of it, unless the context identifies an EPA director
Discharge[a]	When used without qualification, discharge means the discharge of a pollutant
Discharge of a Pollutant[a]	Means any addition of any pollutant or combination of pollutants to waters of the United States from any point source or to waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft that is being used as a means of transportation. Discharge includes any addition of pollutants into waters of the United States from surface runoff that is collected or channeled by humans; discharges through pipes, sewers, or other conveyances owned by a state, municipality, or other person that do not lead to a treatment works; discharges through pipes, sewers, or other conveyances leading into privately owned treatment works; and does not include an addition of pollutants by any indirect discharger.
Dissolved Oxygen (DO)[b]	Means the concentration of oxygen in water as determined either by the Winkler (iodometric) method and its modifications or by the membrane electrode method. The oxygen dissolved in water or wastewater and usually expressed in milligrams per liter or percent saturation
Domestic Wastewater[c]	Means waterborne human wastes or graywater derived from dwellings, commercial buildings, institutions, or similar structures. "Domestic wastewater" includes the contents of individual removable containers used to collect and temporarily store human wastes.
Effluent[b]	Means the segment of a wastewater stream that follows the final step in a treatment process and precedes discharge of the wastewater stream to the receiving environment
Fecal Coliform (FC)[b]	Bacteria that can ferment lactose at 44.5° + 0.2°C to produce gas in a multiple tube procedure. Fecal coliform bacteria also means all bacteria that produce blue colonies in a membrane filtration procedure within 24 ± 2 hours of incubation at 44.5° + 0.2°C in an M-FC broth.
Final Approval to Operate	Means the approval that the Department issues after it has reviewed and approved the construction and operation of the engineered wastewater treatment works plans submitted to the Department in accordance with 18 AAC 72.215 through 18 AAC 72.280 or as amended.
Geometric Mean	The geometric mean is the N^{th} root of the product of N. All sample results of zero will use a value of 1 for calculation of the geometric mean. Example geometric mean calculation: $\sqrt[4]{12x23x34x990} = 55$.

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
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Grab Sample	Means a single instantaneous sample collected at a particular place and time that represents the composition of wastewater only at that time and place
Influent	Means untreated wastewater before it enters the first treatment process of a wastewater treatment works
Inhibition Concentration 25% (IC_{25})[e]	Means the point estimate of the toxicant concentration that would cause 25% reduction in a nonlethal biological measurement of the test organisms, such as reproduction or growth
Maximum Daily Limit[a]	Means the highest allowable "daily discharge"
Mean[b]	Means the average of values obtained over a specified period and, for fecal coliform analysis, is computed as a geometric mean
Mean Lower Low Water[b]	Means the tidal datum plane of the average of the lower of the two low waters of each day, as would be established by the National Geodetic Survey, at any place subject to tidal influence.
Measured	Means the actual volume of wastewater discharged using appropriate mechanical or electronic equipment to provide a totalized reading. Measure does not provide a recorded measurement of instantaneous rates.
Method Detection Limit (MDL)[d]	Means the minimum concentration of a substance (analyte) that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte
Micrograms per Liter (µg/L)[b]	Means the concentration at which one millionth of a gram (10^{-6} g) is found in a volume of one liter
Milligrams per Liter (mg/L)[b]	Means the concentration at which one thousandth of a gram (10^{-3} g) is found in a volume of one liter. It is approximately equal to the unit "parts per million (ppm)," formerly of common use.
Minimum Level (ML)[e]	Means the concentration at which the entire analytical system must give a recognizable signal and an acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method-specified sample weights, volumes, and processing steps have been followed. This level is used as the compliance level if the effluent limit is below it.
Mixing Zone[b]	Means a volume of water adjacent to a discharge in which wastes discharged mix with the receiving water
Month	Means the time period from the 1st of a calendar month to the last day in the month
Monthly Average	Means the average of daily discharges over a monitoring month calculated as the sum of all daily discharges measured during a monitoring month divided by the number of daily discharges measured during that month
No Observed Effect Concentration (NOEC)[e]	Means the highest concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specific time of observation. NOEC is

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
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	determined using hypothesis testing.
Permittee	Means a company, organization, association, entity, or person who is issued a wastewater permit and is responsible for ensuring compliance, monitoring, and reporting as required by the permit
pH[g]	Means a measure of the hydrogen ion concentration of water or wastewater; expressed as the negative log of the hydrogen ion concentration in mg/L. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic.
Pollutant[a]	Means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under 42 U.S.C. 2011), heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, or agricultural waste discharged into water
Primary Contact Recreation	Means activities in which there is direct and intimate contact with water. Contact recreation includes swimming, diving, and water skiing. Contact recreation does not include wading.
Priority Pollutants	Means the set of chemical pollutants that EPA regulates and for which EPA has published analytical test methods. A list of the Priority Pollutants can be found in Appendix A to 40 CFR Part 423.
Principal Executive Officer[a]	Means the chief executive officer of the agency or a senior executive officer having responsibility for the overall operations of a principal geographic unit of division of the agency
Quality Assurance Project Plan (QAPP)	Means a system of procedures, checks, audits, and corrective actions to ensure that all research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality
Quarter	Means the time period of three months based on the calendar year beginning with January
Receiving Waterbody	Means lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, straits, passages, canals, the Pacific Ocean, Gulf of Alaska, Bering Sea, and Arctic Ocean, in the territorial limits of the state, and all other bodies of surface water, natural or artificial, public or private, inland or coastal, fresh or salt, which are wholly or partially in or bordering the state or under the jurisdiction of the state. (See “Waters of the U.S.” at 18 AAC 83.990(77))
Recorded	Means a permanent record using mechanical or electronic equipment to provide a totalized reading, as well as a record of instantaneous readings
Report	Report results of analysis
Reporting Limit	Minimum concentration of a given parameter that can be reliably measured and reported by a laboratory using a particular analytical method. A reporting limit is greater than or equal to a method detection limit and is typically set by a laboratory.

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
g) See EPA Permit Writers Manual

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Residual Chlorine	Means chlorine remaining in water or wastewater at the end of a specified contact period as combined or free chlorine
Responsible Corporate Officer[a]	Means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function or any other person who performs similar policy or decision making functions for the corporation The Responsible Corporate Officer can also be the manager of one or more manufacturing, production, or operating facilities if the requirements of 18 AAC 83.385(a)(1)(B)(i)-(iii) are met.
Secondary Recreation[b]	Means activities in which incidental water use can occur. Secondary recreation includes boating, camping, hunting, hiking, wading, and recreational fishing. Secondary contact recreation does not include fish consumption.
Significant Industrial User (SIU)[g]	Means an indirect discharger that is the focus of control efforts under the national pretreatment program; includes all indirect dischargers subject to national categorical pretreatment standards, and all other indirect dischargers that contribute 25,000 gpd or more of process wastewater, or which make up five percent or more of the hydraulic or organic loading to the municipal treatment plant, subject to certain exceptions [40 CFR $403.3(t)].
Suspended Solids	Means insoluble solids that either float on the surface of, or are in suspension in, water, wastewater, or other liquids. The quantity of material removed from wastewater in a laboratory test, as prescribed in *Standard Methods for the Examination of Water and Wastewater* and referred to as nonfilterable.
Total Suspended Solids (TSS)[g]	Means a measure of the filterable solids present in a sample, as determined by the method specified in 40 CFR Part 136
Toxic Unit, Chronic (TUc)[e]	Means the reciprocal of the effluent concentration that causes no observable effect on the test organisms by the end of the chronic exposure period (i.e., 100/NOEC)
Twice per year	Means two time periods during the calendar year: October through April and May through September
Upset[a]	Means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
Waters of the United States or Waters of the U.S.	Has the meaning given in 18 AAC 83.990(77)
Water Supply[b]	Means any of the waters of the United States that are designated in 18 AAC 70 to be protected for fresh water or marine water uses. Water supply includes waters used for drinking, culinary, food processing, agricultural, aquacultural, seafood processing, and industrial purposes. Water supply does not necessarily mean that water in a waterbody that is protected as a supply for the uses listed in this paragraph is safe to drink in its

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
g) See EPA Permit Writers Manual

	natural state.
Week	Means the time period of Sunday through Saturday

a) See 18 AAC 83
b) See 18 AAC 70.990
c) See 18 AAC 72.990
d) See 40 CFR Part 136
e) See EPA Technical Support Document
f) See Standard Methods for the Examination of Water and Wastewater 18th Edition
g) See EPA Permit Writers Manual

ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT FACT SHEET – FINAL

Permit Number: AK0023213

Juneau-Douglas Wastewater Treatment Facility

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Wastewater Discharge Authorization Program

555 Cordova Street

Anchorage, AK 99501

Public Comment Period Start Date: December 5, 2014
Public Comment Period Expiration Date: January 5, 2015
Alaska Online Public Notice System

Technical Contact: Marie Klingman
Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
610 University Avenue
Fairbanks, AK 99709
(907) 451-2101
Fax: (907) 451-2187
marie.klingman@alaska.gov

Issuance of an Alaska Pollutant Discharge Elimination System (APDES) permit to:

CITY AND BOROUGH OF JUNEAU

For wastewater discharges from the

Juneau-Douglas Wastewater Treatment Facility
1540 Thane Road
Juneau, AK, 99801

The Alaska Department of Environmental Conservation (the Department or DEC) has reissued an APDES individual permit to the City and Borough of Juneau (CBJ). The permit authorizes and sets conditions on the discharge of pollutants from this facility to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility and outlines best management practices to which the facility must adhere.

This fact sheet explains the nature of potential discharges from the Juneau-Douglas Wastewater Treatment Facility and the development of the permit including:

- information on public comment, public hearing, and appeal procedures
- a listing of effluent limitations and other conditions
- technical material supporting the conditions in the permit
- monitoring requirements in the permit

Appeals Process

The Department has both an informal review process and a formal administrative appeal process for final APDES permit decisions. An informal review request must be delivered within 15 days after receiving the Department's decision to the Director of the Division of Water at the following address:

Director of Water
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501

Interested persons can review 18 AAC 15.185 for the procedures and substantive requirements regarding a request for an informal Department review.

See http://www.dec.state.ak.us/commish/InformalReviews.htm for information regarding informal reviews of Department decisions.

An adjudicatory hearing request must be delivered to the Commissioner of the Department within 30 days of the permit decision or a decision issued under the informal review process. An adjudicatory hearing will be conducted by an administrative law judge in the Office of Administrative Hearings within the Department of Administration. A written request for an adjudicatory hearing shall be delivered to the Commissioner at the following address:

Commissioner
Alaska Department of Environmental Conservation
410 Willoughby Street, Suite 303
Juneau AK, 99811-1800.

Interested persons can review 18 AAC 15.200 for the procedures and substantive requirements regarding a request for an adjudicatory hearing. See http://www.dec.state.ak.us/commish/ReviewGuidance.htm for information regarding appeals of Department decisions.

Documents are Available

The permit, fact sheet, application, and related documents can be obtained by visiting or contacting DEC between 8:00 a.m. and 4:30 p.m. Monday through Friday at the addresses below. The permit, fact sheet, application, and other information are located on the Department's Wastewater Discharge Authorization Program website: http://www.dec.state.ak.us/water/wwdp/index.htm.

Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 410 Willoughby Avenue, Suite 310 Juneau, AK 99801 (907) 465-5180	Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 610 University Avenue Fairbanks, AK 99709 (907) 451-2100
Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 555 Cordova Street Anchorage, AK 99501 (907) 269-2685	

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1.0 APPLICANT

This fact sheet provides information on the Alaska Pollutant Discharge Elimination System (APDES) permit for the following entity:

Name of Facility:	Juneau-Douglas Wastewater Treatment Facility
APDES Permit Number:	AK0023213
Facility Location:	1540 Thane Road, Juneau, AK 99801
Mailing Address:	2009 Radcliffe Road, Juneau, AK 99801
Facility Contact:	Ms. Samantha Stoughtenger, Utilities Superintendent (907) 586-0393

The map in Appendix A to the Fact Sheet shows the location of the treatment plant and the discharge location.

2.0 FACILITY INFORMATION

The Juneau-Douglas Wastewater Treatment Facility (JD WWTF) collects and treats primarily domestic wastewater from downtown Juneau, West Juneau, and the City of Douglas. The collection system consists of a combination separate and combined sewer system, and is the only combined sewer system in the State of Alaska. The combined sewer system contains three sewer outfalls. See Section 9.4 for details on the combined sewer overflows (CSO). The City and Borough of Juneau (CBJ) is in the process of separating the storm water system from the sewer system, and according to CBJ's 2013 Annual CSO Report, the last CSO discharge event occurred in 2005.

Secondary treatment is provided by an activated sludge biological process, with an average monthly design flow rate of 2.76 million gallons per day (mgd). The treatment process includes grit removal, comminution, aeration (dual basins) secondary clarification (dual tanks), sludge digestion and ultra-violet (UV) disinfection. Waste sludge is dewatered and shipped out of state for disposal.

The secondary treated effluent is discharged into Gastineau Channel through a 300 foot long outfall and diffuser system at a depth of 30 feet (ft) below mean lower low water.

Table 1 summarizes monthly average plant performance from January 2011 through December 2013.

Table 1. Average Plant Performance

Parameter	Monthly Average 2011-2013
Flow	1.07 mgd
5-day Biochemical Oxygen Demand (BOD_5)	8.6 milligrams per liter (mg/L)
BOD_5	89 pounds per day (lbs/day)
BOD_5 percent removal	96.6 percent (%)
Total suspended solids (TSS)	12 mg/L
TSS	118 lbs/day
TSS percent removal	93.4 %
Fecal coliform (FC) bacteria	22 FC per 100 milliliters (mL)
Total Ammonia, as Nitrogen	9.5 mg/L
pH	6.6 - 7.3 standard units (s.u.)
Temperature	14.9 degrees Celsius (°C)
Dissolved oxygen (DO)	4.3-7.4 mg/L

3.0 BACKGROUND

The National Pollutant Discharge Elimination System (NPDES) permit for the JD WWTF was initially issued by the Environmental Protection Agency (EPA) under a four-year term in October 1974 and was later modified in May 1975. EPA reissued the permit again in 1985 and 2001. The 2001 permit expired on December 26, 2006.

Under the Administrative Procedures Act and state regulations at 18 ACC 83.155(c), a federally issued NPDES permit may be administratively extended (i.e., continues in force and effect), provided that the permittee submits a timely and complete application for a new permit prior to the expiration of the current permit. A timely application for a new permit was submitted by CBJ on June 27, 2006; therefore, the 2001 permit issued by EPA is administratively extended until such time a new permit is reissued. In October 2008, the Alaska Department of Environmental Conservation (the Department or DEC) received approval to administer the NPDES Program in the State of Alaska.

4.0 COMPLIANCE HISTORY

Discharge Monitoring Reports (DMRs) from January 2002 to December 2013 were reviewed to determine the facility's compliance with effluent limits as well as discharge from the three CSOs. Effluent violations between January 2002 and December 2008 include two for DO, four for FC bacteria, one for pH, and 20 for TSS. There were no reported BOD_5 effluent violations between January 2002 and December 2008. In 2009 CBJ reported a total of 33 effluent violations, in 2010 a total of 26 effluent violations, in 2011 a total of 21 effluent violations, in 2012 CBJ did not report any effluent violations, and in 2013 CBJ reported a total of 5 effluent violations. Appendix F of this fact sheet provides details on the nature of the reported permit effluent limit exceedances from January 2009 through December 2013. There were no reported discharges from the CSOs between 2009 and 2013 (the last discharge from a CSO was in 2005; see Section 9.4 for more information).

EPA proposed a penalty against CBJ in 2004 alleging that they had failed to submit a Long-Term Control Plan (LTCP) to address CSOs. In August 2006, EPA transmitted a Request for Information and Compliance Order to CBJ and requested they submit a LTCP. In October 2006, CBJ submitted a LTCP that EPA stated did not meet the recommendations in EPA's *Guidance for Long-Term Control Plan;* however, EPA stated that the LTCP was adequate because CBJ intended on separating its sewer system. Subsequently, EPA determined that CBJ had met the terms of the Compliance Order and terminated the Order.

In November 2010, DEC conducted an inspection of JD WWTF. As a result of the inspection, in March 2011, DEC issued CBJ a Notice of Violation (NOV) due to effluent violations as well as CBJ's inability to provide requested permit required documents such as receiving water annual reports, operation and maintenance plans (OMP), DMRs, and sampling records.

On September 15, 2014, DEC conducted another inspection of JD WWTF and noted that the facility had made great strides at coming into compliance. DEC further noted the review of the facility's Quality Assurance Project Plan (QAPP), OMP, CSO LTCP, Best Management Project Plan, NPDES permit, last three years of DMRs, and analytical results and chain of custodies. The inspection report did not identify any missing records, only that the calibration records contained missing entries between January and April 2014. DEC did not note any violations; however, DEC did note as an area of concern, deteriorating catwalks over the aeration basins. CBJ has plans to replace the catwalks.

5.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

5.1 Basis for Permit Limits

The Clean Water Act requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBELs) or water quality-based effluent limits (WQBELs). TBELs are

set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the Water Quality Standards (WQS) of a waterbody are met and may be more stringent than TBELs. Both TBELs (Federal Code of Regulations (CFR) 40 CFR 133 adopted by reference in 18 AAC 83.010) and WQBELs are included in the permit. A detailed discussion of the basis for the effluent limits contained in AK0023213 is provided in Appendix B.

5.2 Basis for Influent, Effluent, and Receiving Water Monitoring

In accordance with Alaska Statutes (AS) 46.03.101(d), the Department may specify in a permit the terms and conditions under which waste material may be disposed. Monitoring in permits is required to determine compliance with effluent limits. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limits are required and/or to monitor effluent impact on receiving waterbody quality. The permittee is responsible for conducting the monitoring and for reporting results on DMRs or on the application for renewal, as appropriate, to the Department. Sections 5.3 through 5.8 summarize monitoring requirements DEC has determined necessary to implement in the permit.

5.3 Monitoring Requirements

The permit requires monitoring of the effluent for flow, BOD_5, TSS, FC bacteria, enterococci bacteria, ammonia, copper, pH, DO, temperature, and whole effluent toxicity (WET) to determine compliance with the effluent limitations and/or for use in future reasonable potential analyses (RPA). The permit also requires monitoring of the influent for BOD_5 and TSS to calculate monthly removal rates for these parameters.

Monitoring frequencies are based on the nature and effect of a pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance.

Table 2 contains influent and effluent monitoring requirements. Table 3 contains parameters for which effluent limits or monitoring requirements have changed since the previous permit.

5.4 Enterococci Bacteria

Enterococci bacteria are indicator organisms of harmful pathogens in marine water and are a better indicator of acute gastrointestinal illness than FC bacteria. In 1986, EPA published Ambient Water Quality Criteria for Bacteria that contained their recommended bacteria water quality criteria for primary contact recreational users from gastrointestinal illness. The Beaches Environmental Assessment and Coastal Health Act of 2000 requires states and territories with coastal recreation waters to adopt bacteria criteria into their WQS that are as protective as EPA's 1986 published bacteria criteria by April 10, 2004. Alaska did not adopt the enterococci bacteria into the WQS by the April 10, 2004 deadline; therefore, EPA promulgated the 1986 bacteria criteria for Alaskan coastal recreational waters in 2004. Accordingly, monitoring for enterococci bacteria is required in the permit at the point of discharge from JD WWTF and in the event of a CSO diversion. At the end of the five year permit cycle, DEC will evaluate the monitoring data and assess the need for applying enterococci limits in the next reissuance of the permit.

5.5 Copper

Alaska WQS at 18 AAC 70.020(23) states that the concentration of substances in water may not exceed the numeric criteria for aquatic life for marine water shown in the Alaska Water Quality Criteria Manual. The acute aquatic life copper concentration (total recoverable) may not exceed 5.8 micrograms per liter (µg/L) and the chronic aquatic life copper concentration (total recoverable) may not exceed 3.7 µg/L. The previous permit required quarterly copper sampling; however, as per the previous permit, because sample results did not exceed 75 µg/L, monitoring for copper was discontinued after two years. Because copper monitoring has been discontinued since 2004, monitoring data from priority pollutant

scans submitted between 2011 and 2013, representing current treatment plant performance, were evaluated for RP. The RPA for copper was based on three effluent samples that led to a large reasonable potential multiplier (RPM), maximum expected concentration (MEC), and RP to exceed WQ criteria at the end of pipe. (See Section 6.5 for more details). Because there is RP for copper to exceed WQ criteria at the end of the pipe, this permit requires monitoring of the effluent for copper. Quarterly monitoring is required for the life of the permit to more closely monitor the copper concentration in the effluent and to obtain a larger data set for use in the next RPA.

5.6 Whole Effluent Toxicity Monitoring

Alaska WQS at 18 AAC 70.030 requires that an effluent discharged to a water may not impart chronic toxicity to aquatic organisms, expressed as 1.0 chronic toxic unit (TUc), at the point of discharge, or if the Department authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone.

WET tests are laboratory tests that measure the total toxic effect of an effluent on living organisms. WET tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. There are two different durations of toxicity test: acute and chronic. Acute toxicity tests measure survival over a 96-hour exposure. Chronic toxicity tests measure reductions in survival, growth, and reproduction over a 7-day exposure. State regulation 18 AAC 83.335 recommends chronic testing for facilities with dilution factors less than 100:1 at the boundary of the mixing zone, acute testing for facilities with dilution factors greater than 1000:1 at the boundary of the mixing zone, and either acute or chronic for dilution factors between 100:1 and 1000:1 at the boundary of the mixing zone.

The previous permit required that CBJ conduct toxicity tests using the following organisms: for the larval development test, a bivalve species, either *Crassostrea gigas* (pacific oyster) or *Mytilus galloprovincialis* (blue mussel) and for purposes of the sperm fertilization test, and depending on the availability, an echinoderm, either *Strongylocentrotus purpuratus* (purple sea urchin) or *Dendraster excentricus* (sand dollar). Four tests per species were required. The organisms were tested at the following effluent concentrations: 15, 8.0, 3.8, 2.0, 1.0 and 0% (control), with 3.8% effluent corresponding to the instream waste concentration at the boundary of the mixing zone.

The results indicated that for all tested organisms, there was no observable effect at a 15% effluent concentration. In addition, the IC_{25} for all tested species was >15%. (See Appendix B of the permit for a definition of IC_{25}.)

In order to reassess the toxicity of JD WWTF, and ensure compliance with 18 AAC 83.335, effluent monitoring for WET is required in the permit. WET monitoring conducted as a requirement in this permit will also satisfy the WET monitoring requirements found in Application Form 2A, that must be completed when reapplying for coverage.

The test dilution series as well as the TUc trigger has been adjusted in this permit from 15, 8.0, 3.8, 2.0, and 1.0% effluent to 20, 10, 5.0, 2.5, and 1.25% effluent and from 26 TUc to 20 TUc to reflect the new chronic mixing zone dilution factor.

The permit also requires accelerated WET testing if toxicity is greater than 20 TUc in any test. Six biweekly WET tests (every two weeks) over a 12-week period is required. If toxicity is greater than 20 TUc in any of the accelerated tests, the permittee must initiate a Toxicity Reduction Evaluation (TRE). A TRE is required so that the specific cause of the toxicity can be identified and mitigated (See Section 1.3.5 of the permit for further details.)

5.7 Combined Sewer Overflows

EPA's CSO Policy, adopted by reference at 18 AAC 83.010(h) contains both technology and WQ-based permit monitoring requirements for Post-Phase II CSOs. During Phase I, a facility is expected to develop a LTCP and achieve an interim level of control. During Phase II, the facility is required to

implement the controls identified in the LTCP. A Post-Phase II CSO permit is one in which the CSO controls have been implemented. CBJ has implemented CSO controls; therefore, the JD WWTF permit contains the Post-Phase II CSO technology and WQ-based permit monitoring requirements found in EPA's CSO Policy.

The technology-based requirements found in the permit consist of nine minimum controls that can reduce CSOs and their effects on waterbodies. The CSO WQ-based requirements prohibit the discharge of any pollutant at a level that causes or contributes to an instream excursion above numeric or narrative criteria adopted as part of Alaska WQ Standards at 18 AAC 70. CSO WQ-based requirements also limit the number of annual overflow events not receiving minimum treatment and establishes numeric WQ-based minimum treatment levels for FC bacteria and TRC.

A copy of EPA's CSO Policy is available at:
http://water.epa.gov/polwaste/npdes/cso/upload/owm0111.pdf.

Table 2. Outfall 001: Effluent Limits and Monitoring Requirements

Effluent Limits						Monitoring Requirements		
Parameter	**Units**	**Average Monthly Limit**	**Average Weekly Limit**	**Maximum Daily Limit**	**Minimum Daily Limit**	**Sample Location**	**Sample Frequency**	**Sample Type**
Flow	mgd	2.76	not applicable (N/A)	6.0	N/A	effluent	continuous	recording
BOD_5	mg/L	30	45	60	N/A	influent and effluent [b]	1/month	24-hour composite [c]
	lbs/day [a]	690	1,035	1,380				
TSS	mg/L	30	45	60	N/A	influent and effluent [b]	1/month	24-hour composite [c]
	lbs/day [a]	690	1,035	1,380				
BOD_5 minimum percent removal: 85%			TSS minimum percent removal: 85%			influent and effluent	1/month	calculated [d]
FC Bacteria [e]	FC/100 mL	200	400	800	N/A	effluent	1/week	grab
Enterococci Bacteria	count/100 mL	N/A	N/A	report	N/A	effluent	1/month [f]	grab
Total Ammonia, as Nitrogen	mg/L	14	21	30	N/A	effluent	1/month	24-hour composite [c]
Copper, total recoverable	µg/L	N/A	N/A	report	N/A	effluent	1/quarter	24-hour composite [c]
pH	s.u.	N/A	N/A	8.5	6.5	effluent	5/week	grab
DO	mg/L	N/A	N/A	17	2.0	effluent	5/week	grab
Temperature	˚ C	N/A	N/A	report	N/A	effluent	5/week	grab
WET	TUc	N/A	N/A	report	N/A	See Permit Section 1.3 for WET requirements		

Footnotes:

a. lbs/day = concentration (mg/L) x flow (mgd) x 8.34 (conversion factor). Influent and effluent samples must be taken over approximately the same time period.
b. Limits apply to effluent. Report average monthly influent concentration.
c. See Appendix C of the permit for a definition.
d. Minimum % Removal = [(monthly average influent concentration in mg/L - monthly average effluent concentration in mg/L) / (monthly average influent concentration in mg/L)] x 100. The monthly average percent removal must be calculated using the arithmetic mean of the influent value and the arithmetic mean of the effluent value for that month.
e. All FC bacteria average results must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the quantities. For example the geometric mean of 100, 200, and 300 is (100 x 200 x 300)1/3= 181.7.
f. Sampling required once per month only during the time period May-Sept. Sampling should be conducted at same time as FC bacteria sampling.

Table 3. Effluent and Monitoring Requirement Changes from Prior Permit

Parameter	Units	Average Monthly Limit		Average Weekly Limit		Maximum Daily Limit		Sample Frequency	
		2001 Permit	2015 Permit	2001 Permit	2015 Permit	2001 Permit	2015 Permit	2001 Permit	2015 Permit
FC Bacteria	FC/100 mL	400	200	800	400	1,200	800	1/week	no change
Enterococci Bacteria	count/100 mL	N/A	N/A	N/A	N/A	N/A	report	N/A	1/month (May-Sept)
Total Ammonia, as Nitrogen	mg/L	report	14 mg/L	N/A	21 mg/L	report	30 mg/L	2/year	1/month
Copper, total recoverable	µg/L	report	no change	N/A	N/A	report	no change	1/quarter*	1/quarter (for the term of the permit)
pH	s.u.	N/A	N/A	N/A	N/A	6.0 (minimum) 8.5 (maximum)	6.5 (minimum) no change (maximum)	5/week	no change
DO	mg/L	N/A	N/A	N/A	N/A	2.0 (minimum) 17 (maximum)	no change	1/week	5/week
WET	TUc	N/A	N/A	N/A	N/A	26 TUc (trigger)	20 TUc (trigger)	quarterly for one year until a total of four tests per species has occurred	annually
*After two years, if no sample results exceed 75µg/L, this monitoring may be discontinued.									

5.8 Receiving Waterbody Monitoring Requirements

The permit establishes two receiving waterbody monitoring stations in Gastineau Channel. The boundary of the mixing zone station (MXZ) must be established either at the southeast boundary of the chronic mixing zone during an ebb tide (receding or outgoing tide) or at the northwest boundary of the chronic mixing zone during a flood tide (rising or incoming tide). The ambient station (AMB) representing ambient conditions in Gastineau Channel, must be established in a location outside the influence of the facility's discharge, greater than 83 meters (m) from the end of the outfall diffuser. The monitoring station locations must receive written approval from DEC.

This permit reestablishes the FC bacteria boundary of mixing zone monitoring requirements that were included in the prior permit. Enterococci bacteria boundary of mixing zone monitoring is also required, and will be compared with the concurrent sampling of effluent FC bacteria.

Ambient monitoring for ammonia is required for use in the next RPA. Because criteria for ammonia in marine water are dependent on the pH, temperature, and salinity of the receiving water, pH, temperature, and salinity receiving water measurements shall also be required whenever ammonia is sampled. The collection of the ambient samples will also provide useful data for future mixing zone modeling.

Table 4 contains boundary of mixing zone monitoring requirements and Table 5 contains ambient receiving waterbody monitoring requirements.

Table 4. Station MXZ: Boundary of Mixing Zone Monitoring Requirements

Parameter	Units	Sampling Frequency	Sample Type
FC Bacteria [a]	FC/100 mL	1/month [b,c]	grab
Enterococci Bacteria	counts/100 mL	2/year [c,d,e]	grab

Footnotes:

a. FC bacteria average results must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the quantities. For example the geometric mean of 100, 200, and 300 is (100 x 200 x 300)1/3= 181.7.
b. Sampling required once per month during May, June, July, Aug, Sept, and Oct and two more times during Nov through April. See Permit Section 1.5.4.
c. Monitoring results must be submitted to DEC with the DMR for the month following sample collection.
d. Twice per year consists of one sample taken in the summer months (June 1– Sept 30), and one in the winter (Oct 1- May 31).
e. Sampling only required during the months May-Sept. Sampling should occur at the same time as FC bacteria sampling.

Table 5. Station AMB: Ambient Station Monitoring Requirements

Parameter	Units	Sampling Frequency	Sample Type
Total Ammonia as Nitrogen [a]	mg/L	2/year [b,c]	grab
pH [a]	s.u.	2/year [b,c]	grab
Temperature [a]	°C	2/year [b,c]	grab
Salinity [a]	grams/kilogram	2/year [b,c]	grab

Footnotes:

a. Ambient station ammonia, pH, temperature, and salinity samples should be take concurrently with the boundary of the mixing zone ammonia sample.
b. Twice per year consists of one sample taken in the summer months (June 1– Sept 30), and one in the winter (Oct 1- May 31).
c. Monitoring results must be submitted to DEC with the DMR for the month following sample collection.

6.0 RECEIVING WATERBODY

6.1 Description of Receiving Waterbody

Gastineau Channel is a long narrow tidal inlet with depths ranging from 240 ft at the entrance to exposed tidal flats at the northwestern end. No major freshwater tributaries discharge to the channel. The circulation is driven by tides, with a mean range of 13.8 ft and a diurnal range of 16.4 ft. Peak ebb and flood tide current speeds can reach two knots.

6.2 Outfall Location

The treated effluent from JD WWTF is discharged at 58° 17’ 2” North latitude and 134° 23’ 13” West longitude, to Gastineau Channel.

6.3 Water Quality Standards

Regulations in 18 AAC 70 require that the conditions in permits ensure compliance with the Alaska WQS. The State’s WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an antidegradation policy. The use classification system designates the beneficial uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the beneficial use classification of each waterbody. The antidegradation policy ensures that the beneficial uses and existing water quality are maintained.

Waterbodies in Alaska are designated for all uses unless the water has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some waterbodies in Alaska can also have site–specific water quality criterion per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b). Gastineau Channel has not been reclassified pursuant to 18 AAC 70.230, nor does it have site-specific water quality criteria pursuant to 18 AAC 70.235. Therefore, existing uses and designated uses are the same and Gastineau Channel must be protected for all marine designated use classes listed in 18 AAC 70.020(a)(2). These marine designated uses consist of the following: water supply for aquaculture, seafood processing and industry; contact and secondary recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life.

6.4 Water Quality Status of Receiving Water

Any part of a waterbody for which the water quality does not or is not expected to meet applicable WQS is defined as a “water quality limited segment” and placed on the state’s impaired waterbody list. Gastineau Channel is not included on the *Alaska’s Final 2010 Integrated Water Quality Monitoring and Assessment Report*, July 15, 2010.

6.5 Mixing Zone Analysis

Under 18 AAC 70.240, as amended through June 26, 2003, the Department may authorize a mixing zone in a permit. A chronic mixing zone is sized to protect the ecology of the waterbody as a whole, while an acute mixing zone is sized to prevent lethality to passing organisms. DEC modeled the acute and chronic mixing zones and calculated dilution factors using CORMIX modeling software. Inputs included the maximum expected effluent concentrations and the acute and chronic WQ criteria of parameters that demonstrated RP (See Appendix B for details on the RPA), as well as any site-specific discharge and ambient data.

Based on the maximum expected effluent concentrations and chronic WQ criteria, ammonia required the most dilution of the parameters that demonstrated RP to exceed WQ criteria; therefore, ammonia determined the chronic mixing zone size. All other parameters needing a chronic mixing zone to meet their respective water quality criterion fit within the chronic mixing zone. The water quality criteria for ammonia, copper, DO, FC bacteria, and WET may be exceeded within the authorized chronic mixing

zone. The chronic mixing zone for this discharge has a dilution of 20.3:1 and is defined as a circle, with a radius of 83 m, centered on the outfall line and over the diffuser and extends from the seafloor to the surface. All chronic aquatic life criteria will be met and apply at and beyond the boundary of the chronic mixing zone.

There is a smaller, initial, acute mixing zone surrounding the outfall and contained within the larger chronic mixing zone for the parameters ammonia and copper. The acute mixing zone for this discharge has a dilution of 2.6:1 and is defined as a circle with a radius of 9 m, centered on the outfall line and over the diffuser. According to EPA (1991) and 18 AAC 70.255, lethality to passing organisms would not be expected if an organism passing through the plume along the path of maximum exposure is not exposed to concentrations exceeding the acute criteria when averaged over a one hour time period. Furthermore, the travel time of an organism drifting through the acute mixing zone must be less than approximately 15 minutes if a one hour exposure is not to exceed the acute criterion. The Department determined that the travel time of an organism drifting through the acute mixing zone to be approximately two minutes; therefore, there will be no lethality to organisms passing through the acute mixing zone.

Based on the maximum expected effluent concentrations and acute WQ criteria, copper required the most dilution of the parameters that demonstrated RP to exceed acute WQ criteria. However, the RPA for copper would be only based on three samples, which results in a large maximum expected concentration of 43.4 mg/L as a result of the large RPM that is used with very small datasets. DEC compared the MEC of 43.4 mg/L to the maximum observed concentration of 9.9 mg/L and concluded that the MEC of 43.4 mg/L derived from a very small dataset would in essence allow for the discharge of a disproportionally higher copper concentration than observed in the effluent. Therefore, the Department is using ammonia's acute dilution factor in the sizing of the initial, acute mixing zone for this permit cycle. Meanwhile, DEC is reinstating the previous permit's quarterly monitoring frequency for copper in order to obtain a larger data set for use in the next RPA and mixing zone analysis.

In addition to ammonia, copper, which also needs an acute mixing zone to meet WQ criteria, fits into the acute mixing zone. Acute aquatic life criteria will be met and apply at and beyond the boundary of this smaller initial mixing zone surrounding the outfall.

Appendix E outlines criteria that must be met in order for the Department to authorize a mixing zone. These criteria include the size of the mixing zone, treatment technology, existing uses of the waterbody, human consumption, spawning areas, human health, aquatic life, and endangered species.

The following summarizes this analysis:

Size

In accordance with 18 AAC 70.255, the mixing zone must be as small as practicable. In order to ensure that the mixing zone is as small as practicable, DEC used CORMIX, a mixing zone modeling software program, to model the chronic and acute mixing zones.

Because 18 AAC 70.245(b)(5) requires the Department to consider the characteristics of the effluent after treatment of the wastewater, DEC reviewed the last three years of effluent water quality data from January 2011 through December 2013 as well as monthly monitoring logs that CBJ submitted with their DMRs to determine which parameters had RP to exceed WQ criteria, and then which of the parameters required the most dilution to meet WQ criteria for the chronic and acute mixing zones. Ammonia required the most dilution for both the chronic and acute mixing zones (see above discussion). Therefore, ammonia was modeled in CORMIX to determine the smallest practicable mixing zone sizes.

The maximum expected concentration for ammonia, corresponding acute and chronic WQ criterion, and ambient concentrations (in the absence of actual data, DEC uses 15% of the most stringent WQ criterion to establish an ambient concentration) were entered into CORMIX. Accordingly, DEC used 15% of the most stringent WQ criterion for the ambient ammonia concentration. Ambient data for temperature, pH,

and salinity was derived from DEC's Commercial Passenger Environmental Compliance Program Juneau Harbor WQ Sampling[1], and ambient copper data was derived from the Alaska-Juneau (AJ) Mine Project Seawater Monitoring Program. Other data required for the mixing zone modeling included: the input of receiving water characteristics at the outfall such as the depth the receiving water at the outfall, the ambient velocity, wind velocity, and outfall and diffuser specifications, such as the size, direction, and number of ports. Based on the inputs, CORMIX predicted the distance at which ammonia would meet WQ criteria as well as the corresponding dilution at that point.

Table 6 summarizes basic CORMIX inputs that were used to model the chronic and acute mixing zones for ammonia.

Table 6. Summary of CORMIX Inputs

Parameter Modeled	**Maximum Expected Concentration**	**Ambient Concentration**	**Chronic Water Quality Criterion**	**Acute Water Quality Criterion**
Ammonia	29.5 mg/L	0.25 mg/L	1.7 mg/L	5.8 mg/L
Outfall and Receiving Waterbody Characteristics				
Outfall Type	Submerged Multiport Diffuser Discharge			
Outfall Length	90 m			
Diffuser Length	9.14 m (with 4 openings, 4 risers)			
Diffuser Type	alternating perpendicular			
Port Diameter	0.254 m			
Depth at Discharge	9.14 m			
Ambient Velocity	0.1 knots low tidal current 0.9 knots high tidal current			
Wind Velocity	2 knots			
Effluent Characteristics				
Flow Rate	2.76 mgd			
Temperature	14.9 º C			

Technology

In accordance with 18 AAC 70.240(a)(3), the most effective technological and economical methods should be used to disperse, treat, remove, and reduce pollutants. Secondary treatment is provided by an

[1] ADEC Commercial Passenger Vessel Environmental Compliance Program. Juneau Harbor water quality sampling, unpublished data, 2013.

activated sludge biological process. The treatment process includes grit removal, comminution, aeration (dual basins) secondary clarification (dual tanks), and sludge digestion. Effluent is disinfected with UV light prior to discharge into Gastineau Channel.

Existing Use

In accordance with 18 AAC 70.245, the mixing zone has been appropriately sized to fully protect the existing uses of Gastineau Channel. The waterbody's existing uses have been maintained and protected under the terms of the previous permit, which included a very similar mixing zone authorization. The mixing zone authorization does not propose any modifications that would result in changes to existing uses.

Human Consumption

In accordance with the conditions of the permit, and in accordance with 18 AAC 70.250(b)(2) and (b)(3), the pollutants discharged cannot produce objectionable color, taste, or odor in aquatic resources harvested for human consumption; nor can the discharge preclude or limit established processing activities or commercial, sport, personal use, or subsistence fish and shellfish harvesting.

There is no indication that the pollutants discharged have produced objectionable color, taste, or odor in aquatic resources harvested for human consumption. Additionally, the discharge has not precluded or limited established processing activities or commercial, sport, personal use, or subsistence fish and shellfish harvesting.

Spawning Areas

In accordance with 18 AAC 70.255(h), the mixing zone may not be authorized in a known spawning area for anadromous fish or resident fish spawning redds for Arctic grayling, northern pike, rainbow trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, king, and sockeye salmon. The Alaska Department of Fish and Game (ADF&G) interactive regulatory and interactive essential fish habitat (EFH) maps at http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=maps.maps do not indicate any EFH, to include spawning areas, in the vicinity of JD WWTF. See Section 10.2 for more information on EFH.

Human Health

In accordance with 18 AAC 70.250 and 18 AAC 70.255, the mixing zone must be protective of human health. An analysis of the effluent data that was included with JD WWTF discharge application and the results of the RPA conducted on pollutants of concern indicate that the level of treatment at JD WWTF is protective of human health. The effluent data was then used in conjunction with applicable WQ Criteria, which serve the purpose of protecting human and aquatic life, to size the mixing zone to ensure all WQ Criteria are met in the waterbody at the boundary of the mixing zone.

Aquatic Life and Wildlife

In accordance with 18 AAC 70.250 and 18 AAC 70.255, the mixing zone authorized in the permit shall be protective of aquatic life and wildlife. CORMIX modeling conducted for this discharge to the Gastineau Channel incorporated the most stringent water quality criterion in the model for protection of the growth and propagation of fish, shellfish, other aquatic life, and wildlife, and all water quality criteria will be met at the boundary of the authorized mixing zone.

Endangered Species

In accordance with 18 AAC 70.250(a)(2)(D), the authorized mixing zone will not cause an adverse effect on threatened or endangered species. The National Marine Fisheries Service (NMFS) maintains an interactive endangered species map at http://alaskafisheries.noaa.gov/mapping/esa/. DEC reviewed this map for threatened and endangered species near JD WWTF outfall. The map showed that the endangered humpback whale (*Megaptera novaengliae)* and the threatened eastern Steller sea lion

(*Eumetopias jubatus)* do occur in Gastineau Channel. EPA, however, determined during the previous permit issuance in 2001, that these species would not be affected by JD WWTF discharge.

On October 8, 2014 DEC contacted the United States Fish and Wildlife Service (USFWS) and NMFS and requested them to identify any threatened or endangered species under their jurisdiction in the vicinity of the JD WWTF outfall. This fact sheet and permit was also submitted to USFWS and NMFS for review during the public notice period. See Section 10.1 of the fact sheet for more information regarding endangered species.

7.0 ANTIBACKSLIDING

18 AAC 83.480 requires that "effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit."
18 AAC 83.480(c) also states that a permit may not be reissued "to contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time the permit is renewed or reissued." The effluent limitations in this permit reissuance are consistent with 18 AAC 83.480. The permit effluent limitations, standards, and conditions in AK0023213 are as stringent as in the previously issued permit and are consistent with 18 AAC 83.480. Accordingly, no backsliding analysis is required for this permit reissuance.

8.0 ANTIDEGRADATION

Section 303(d)(4) of the CWA states that, for waterbodies where the water quality meets or exceeds the level necessary to support the waterbody's designated uses, WQBELs may be revised as long as the revision is consistent with the State's antidegradation policy. The Antidegradation Policy of the WQS (18 AAC 70.015) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. This section analyzes and provides rationale for the Department's decisions in the permit issuance with respect to the Antidegradation Policy.

The Department's approach to implementing the Antidegradation Policy, found in 18 AAC 70.015, is based on the requirements in 18 AAC 70 and the Department's *Policy and Procedure Guidance for Interim Antidegradation Implementation Methods*, dated July 14, 2010. Using these procedures and policy, the Department determines whether a waterbody, or portion of a waterbody, is classified as Tier 1, Tier 2, or Tier 3, where a higher numbered tier indicates a greater level of water quality protection. At this time, no Tier 3 waters have been designated in Gastineau Channel is not listed as impaired on DEC's most recent *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report;* therefore, a Tier 1 designation is not warranted. In addition, little other baseline receiving water data exists. Accordingly, this antidegradation analysis conservatively assumes that the discharge is to a Tier 2 waterbody.

The State's Antidegradation Policy in 18 AAC 70.015(a)(2) states that if the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water (i.e. Tier 2 waters), that quality must be maintained and protected. The Department may allow a reduction of water quality only after finding that five specific requirements of the antidegradation policy at 18 AAC 70.015(a)(2)(A)-(E) are met. The Department's findings follow:

- ***18 AAC 70.015 (a)(2)(A). Allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located.***

JD WWTF provides a vital service for residents and visitors to Juneau, the capital of the State of Alaska, by collecting, treating, and disposing of domestic wastewater from government offices, individual households, schools, medical facilities, and supporting businesses from the City of Juneau, West Juneau, and the City of Douglas. With approximately 2,038 service connections, JD WWTF is the second largest WWTF servicing the Juneau area. (Mendenhall WWTF is the largest, with 4,598 service connections, and the Auke Bay WWTF is the smallest with 169 service connections.) It can be reasonably expected that the yearly legislative session,

seasonal tourists, and outlying Juneau area residents recreating and conducting business in the downtown Juneau area increases the flow through these service connections and thus the need for the wastewater treatment services provided by JD WWTF. Ultimately, by providing wastewater treatment services, JD WWTF contributes not only to the local economic and social development of Juneau, but to the overall economic and social development of the State of Alaska as well.

DEC determined that the permitted activities are necessary to accommodate important economic and social development and the anticipated minor lowering of water quality is necessary for these purposes and that the finding is met.

- ***18 AAC 70.015 (a)(2)(B). Except as allowed under this subsection, reducing water quality will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235 or the whole effluent toxicity limit in 18 AAC 70.030.***

Section 1.2.1 of the permit requires that the discharge shall not cause a violation of the WQS at 18 AAC 70 except if excursions are authorized in accordance with provisions in 18 AAC 70.200 – 70.270 (e.g., variance, mixing zone, etc.). As a result of the facility's RP to exceed WQ criteria for ammonia, copper, DO, FC bacteria, and WET, a mixing zone is authorized in JD WWTF's permit in accordance with 18 AAC 70.240. The resulting effluent end-of pipe limitations and monitoring requirements in the permit (See Table 2) protect WQS, and therefore, will not violate the water quality criteria found at 18 AAC 70.020.

There are no site-specific criteria associated with 18 AAC 70.235.

Alaska WQS at 18 AAC 70.030 requires that an effluent discharged to a waterbody may not impart chronic toxicity to aquatic organisms, expressed as 1.0 TUc, at the point of discharge, or if the Department authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone.

The Department has authorized a chronic mixing zone for this permit with a dilution of 20.3, and subsequently assigned a chronic toxicity trigger based on the minimum effluent dilution achieved in the mixing zone of 20 TUc. If the WET trigger is met, JD WWTF will not violate the WET limit in 18 AAC 70.030.

DEC determined that the reduction in water quality will not violate the criteria of 18 AAC 70.020. 18 AAC 70.235, or 18 AAC 70.030 and that the finding is met.

- ***18 AAC 70.015(a)(2)(C). The resulting water quality will be adequate to fully protect existing uses of the water.***

The WQS serve the specific purpose of protecting the existing uses of the receiving waterbody. Gastineau Channel is protected for all designated uses (See Section 6.3 of this fact sheet); therefore, the most stringent water quality criteria found in 18 AAC 70.020 and in the Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (2008) were selected for use in the RPA for JD WWTF effluent. This will ensure that the resulting water quality at and beyond the boundary of the authorized mixing zone will fully protect all designated uses of the receiving waterbody.

DEC determined that the discharge from JD WWTF will be adequate to fully protect existing uses of the water and that the finding is met.

- ***18 AAC 70.015(a)(2)(D). The methods of pollution prevention, control, and treatment found by the department to be most effective and reasonable will be applied to all wastes and other substances to be discharged.***

JD WWTF utilizes a variety of measures to prevent, control and treat the pollution that may be generated as a result of the facility's wastewater treatment operations. JD WWTF Operation and Maintenance Plan (OMP) establishes standard operational procedures and regular maintenance schedules for the prevention, control, and treatment of all wastes and other substances discharged from the facility. The permitted CSOs must comply with specific minimum controls including the maximization of flow to the WWTF for treatment and the

implementation of a pollution prevention program. (See Section 1.6.1 of the permit). The permit also requires accelerated WET testing if toxicity is greater than 20 TUc in any test. If toxicity is greater than 20 TUc in any of the accelerated tests, the permittee must initiate a TRE. The TRE is required so that the specific cause of the toxicity can be identified and mitigated (See Section 1.3.5 of the permit.) Section 3.0 of the permit requires that pollutants removed in the course of treatment such as screenings and grit be disposed of in accordance with Alaska Solid Waste Management Regulations at 18 AAC 60. In addition, and new to this permit, is the requirement that JD WWTF develop a Facility Plan to evaluate the adequacy of current treatment and disposal systems as well as future treatment and infrastructure needs (See Section 2.4 of the permit).

DEC determined that the methods of pollution prevention, control, and treatment to be most effective and reasonable for applying to all wastes and substances discharged from JD WWTF, are the practices and requirements set out in the permit and that the finding is met.

- ***18 AAC 70.015(a)(2)(E). All wastes and other substances discharged will be treated and controlled to achieve (i) for new and existing point sources, the highest statutory and regulatory requirements; and (ii) for nonpoint sources, all cost-effective and reasonable best management practices.***

The applicable "highest salutatory and regulatory treatment requirements" are defined in 18 AAC 70.990(30) (as amended June 26, 2003) and in the Implementation Methods. Accordingly, there are three parts to the definition, which are:

- (A) any federal technology-based effluent limitation guidelines (ELG) identified in 40 CFR § 125.3 and 40 CFR § 122.29, as amended through August 15, 1997, adopted by reference at 18 AAC 83.010(c)(9);
- (B) minimum treatment standards in 18 AAC 72.040; and
- (C) any treatment requirement imposed under another state law that is more stringent than a requirement of this chapter.

The first part of the definition includes all federal technology-based ELGs including "For POTWs, effluent limitations based upon…Secondary Treatment" at 40 CFR § 125.3(a)(1) defined at 40 CFR § 133.102, adopted by reference at 18 AAC 83.010(e), which are incorporated in this permit.

The second part of the definition 18 AAC 70.990(B) (2003) appears to be in error, as 18 AAC 72.040 describes discharges to sewers and not minimum treatment. The correct reference appears to be the minimum treatment standards found at 18 AAC 72.050, which refers to domestic wastewater discharges only. The permit includes stipulations that meet the intent of 18 AAC 70.990.

The third part includes any more stringent treatment required by state law, including 18 AAC 70 and 18 AAC 72. Neither the regulations in 18 AAC 15 and 18 AAC 72 nor another state law that the Department is aware of impose more stringent requirements than those found in 18 AAC 70.

After review of the applicable statutory and regulatory requirements, including 18 AAC 70, 18 AAC 72, and 18 AAC 83, the Department finds that the discharge from JD WWTF meets the highest applicable statutory and regulatory requirements and that this finding is met.

9.0 OTHER PERMIT CONDITIONS

9.1 Quality Assurance Project Plan

The permittee is required to develop procedures to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to update the QAPP within 180 days of the effective date of the final permit. Additionally, the permittee must submit a letter to the Department within 180 days of the effective date of the permit stating that the plan has been implemented within the required time frame. The QAPP shall consist of standard operating procedures

the permittee must follow for collecting, handling, storing and shipping samples; laboratory analysis; and data reporting. The plan shall be retained on site and made available to the Department upon request.

9.2 Operation and Maintenance Plan

The permit requires the permittee to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limitations, monitoring requirements, and all other permit requirements at all times. The permittee is required to review and update the OMP that was required under the previous permit within 180 days of the effective date of the reissued permit. The plan shall be reviewed annually, be updated as necessary, be retained on site, and made available to the Department upon request.

9.3 Facility Plan

The permit requires the permittee to develop a Facility Plan that evaluates the existing condition and performance, as well as the near and long term needs of JD WWTF. The plan is required to ensure that the permittee will continue to comply with permit limits as the facility ages and if the design flow capacity is exceeded.

9.4 Combined Sewer Overflow

JD WWTF collection system originally contained six CSO diversion structures that were manually operated and opened by an operator in the field in response to high tide and precipitation events. As a result of capital improvements over the past 30 years, three of the CSOs have been eliminated. The three remaining diversions are located at the High School, City Hall and in Douglas. (See Table 5 of the permit for locations.) None of the remaining diversions referenced in the preceding sentence have been opened since 2005. Consequently, JD WWTF has not incurred any CSO-related bypasses of secondary treatment due to high combined influent flows and the CSO is considered to be controlled.

It is anticipated that CBJ will continue its efforts to separate the storm and sewer system to further reduce the likelihood of CSO diversions. In the 2013 Annual CSO Summary Report, CBJ reported continued efforts to identify and correct infiltration and inflow problems in order to reduce the flow of ground and storm water into the JD collection system. CBJ has implemented building codes that prohibit the connection of storm drain connections such as sump pumps, area drains, and roof leaders to the sewer system. They also conduct periodic sewer system inspections with smoke, dye, and cameras to ensure that that there are no new storm drain connections made to the sewer system. The 2014 LTCP also states that CBJ has 11 projects on its Capital Improvement Program list that will further separate the storm and sanitary sewers.

Should the need arise to open a diversion structure, the permit contains monitoring requirements and minimum controls that are consistent with EPA's CSO Policy, adopted by reference at 18 AAC 83.010(h). The CSO Policy requires a LTCP and nine minimum controls in CSO permits. One of the minimum controls in the CSO Policy and permit requires public notification of CSO occurrences and impacts. As such, CBJ has an active public education program and notifies the public of CSO events via periodic notices on utility bills, the local newspaper, and on CBJ website. The new permit, also consistent with the CSO Policy, requires the implementation and effective operation and maintenance of the CSO controls identified in the LTCP that CBJ developed as a condition of the prior permit. As mentioned above, given the lack of CSO events over the course of the previous decade, implementation of the LTCP has resulted in the control of CSOs.

The permit, also consistent with the CSO Policy, contains reporting requirements. CBJ is required to submit an annual report to document any CSO discharges and compliance with technology and WQ-based requirements.

9.5 Standard Conditions

Appendix A of the permit contains standard regulatory language that must be included in all APDES permits. These requirements are based on the regulations and cannot be challenged in the context of an individual APDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

10.0 OTHER LEGAL REQUIREMENTS

10.1 Ocean Discharge Criteria

Section 403(a) of the CWA, Ocean Discharge Criteria, prohibits the issuance of a permit under Section 402 of the CWA for a discharge into the territorial sea, the water of the contiguous zone, or the oceans except in compliance with Section 403. Permits for discharges seaward of the baseline of the territorial seas must comply with the requirements of Section 403, which include development of an Ocean Discharge Criteria Evaluation (ODCE).

An interactive map depicting Alaska's baseline plus additional boundary lines is available at http://www.charts.noaa.gov/OnLineViewer/AlaskaViewerTable.shtml. The map is provided for information purposes only. The U.S. Baseline committee makes the official determinations on baseline.

A review of the baseline line maps revealed that JD WWTF outfall terminus is positioned landward of the baseline of the territorial sea; therefore, Section 403 of the CWA does not apply to the permit, and an ODCE is not required to be completed for this permit reissuance.

10.2 Endangered Species Act

NMFS is responsible for administration of the Endangered Species Act (ESA) for listed cetaceans, seals, sea lions, sea turtles, anadromous fish, marine fish, marine plants, and corals. All other species (including polar bears, walrus, and sea otters) are administered by the USFWS.

Section 7 of the ESA requires a federal agency to consult with the USFWS and NMFS to determine whether their authorized actions may harm threatened and endangered species or their habitats. As a state agency, DEC is not required to consult with USFWS or NMFS regarding permitting actions; however, DEC interacts voluntarily with these federal agencies to obtain listings of threatened and endangered species and critical habitat. DEC contacted USFWS and NMFS on October 8, 2014 and requested them to identify any threatened or endangered species under their jurisdiction in the vicinity of JD WWTF outfall.

NMFS maintains an interactive endangered species map at http://alaskafisheries.noaa.gov/mapping/esa/. DEC reviewed this map for threatened and endangered species near JD WWTF outfall. The map showed that the endangered humpback whale (*Megaptera novaengliae)* and the threatened eastern Steller sea lion (*Eumetopias jubatus)* do occur in Gastineau Channel. EPA, however, determined during the last permit issuance in 2001, that these species would not be affected by JD WWTF discharge.

10.3 Essential Fish Habitat

EFH includes the waters and substrate (sediments, etc.) necessary for fish from commercially-fished species to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires federal agencies to consult NMFS when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH.

EPA provided NMFS a copy of the draft permit and fact sheet following EPA's tentative determination that the issuance of the 2001 permit would not affect any EFH species in the vicinity of JD WWTF discharge and that therefore, no federal to federal consultation was required. As a state agency, DEC is not required to consult with NMFS regarding permitting actions; however, DEC interacts voluntarily with NMFS. On October 8, 2014 DEC contacted and requested NMFS to identify any EFH under their jurisdiction in the vicinity of JD WWTF.

In addition, the Alaska Department of Fish and Game (ADF&G) maintains regulatory and interactive maps that identify anadromous streams, fish passage, and fish inventory at: http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=maps.maps. DEC reviewed the maps on ADF&G's website and did not identify any EFH in the vicinity of JD WWTF outfall that would be adversely affected by the facility's discharge.

10.4 Sludge (Biosolids) Requirements

Sludge means any solid, semi-solid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. State and federal requirements regulate the management and disposal of sewage sludge (biosolids). The permittee must consult both state and federal regulations to ensure proper management of the biosolids and compliance with applicable requirements.

10.4.1 State Requirements

The Department separates wastewater and biosolids permitting. The permittee should contact the Department's Solid Waste Program for information regarding state regulations for biosolids. The permittee can access the Department's Solid Waste Program web page for more information and who to contact.

10.4.2 Federal Requirements

EPA is the permitting authority for the federal sewage sludge regulations at 40 CFR Part 503. Biosolids management and disposal activities are subject to the federal requirements in Part 503. The Part 503 regulations are self-implementing, which means that a permittee must comply with the regulations even if no federal biosolids permit has been issued for the facility.

A POTW is required to apply for an EPA biosolids permit. The permittee should ensure that a biosolids permit application has been submitted to EPA. In addition, the permittee is required to submit a biosolids permit application to EPA for the use or disposal of sewage sludge at least 180 days before this APDES permit expires in accordance with 40 CFR §§122.21(c)(2) and 122.21(q) [See also 18 AAC 83.110(c) and 18 AAC 83.310, respectively]. The application form is NPDES Form 2S and can be found on EPA's website, www.epa.gov, under NPDES forms. A completed NPDES Form 2S should be submitted to:
U.S. Environmental Protection Agency, Region 10, NPDES Permits Unit OWW-130, Attention: Biosolids Contact, 1200 Sixth Avenue, Suite 900, Seattle, WA 98101-3140. The EPA Region 10 telephone number is 1-800-424-4372.

Information about EPA's biosolids program and CWA Part 503 is available at www.epa.gov and either search for 'biosolids' or go to the EPA Region 10 website link and search for 'NPDES Permits'.

10.5 Permit Expiration

The permit will expire five years from the effective date of the permit

11.0 REFERENCES

ADEC (Alaska Department of Environmental Conservation). 2003. 18 AAC 70 Water Quality Standards, as amended through June 26, 2003.

ADEC. 2010. Alaska water quality criteria manual for toxics and other deleterious organic and inorganic substances, as amended through December 12, 2008.

ADEC. 2010. Interim antidegradation methods, Effective July 14, 2010.

ADEC. 2010. Alaska's final 2010 integrated water quality monitoring and assessment report, July 15, 2010.

ADEC. 2012. 18 AAC 70 Water quality standards, as amended through April 8, 2012.

ADEC. 2014. Alaska Pollutant Discharge Elimination System permits reasonable potential analysis and effluent limits development guide.

Denton, D.L., J.M. Miller, and R.A. Stuber. 2010. EPA Regions 8, 9, and 10 toxicity training tool. January 2010. San Francisco.

Echo Bay Alaska, Inc. 1991. AJ mine project seawater monitoring program: Seawater monitoring data May 1989 through March 1991. Anchorage.

EPA (Environmental Protection Agency).1991. Technical support document for water quality-based toxics control. EPA/505/2-90-001.

EPA. 1995. Short-Term Methods for estimating the chronic toxicity of effluents and receiving waters to west coast marine and estuarine organisms. EPA/600/R-95-136.

EPA. 1995. Combined Sewer Overflows Guidance for Permit Writers. EPA/832/B-95-008.

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. 2004. Recommended standards for wastewater facilities, 2004 edition. Albany.

APPENDIX A. FACILITY INFORMATION

Figure 1. Juneau-Douglas Wastewater Treatment Facility Location

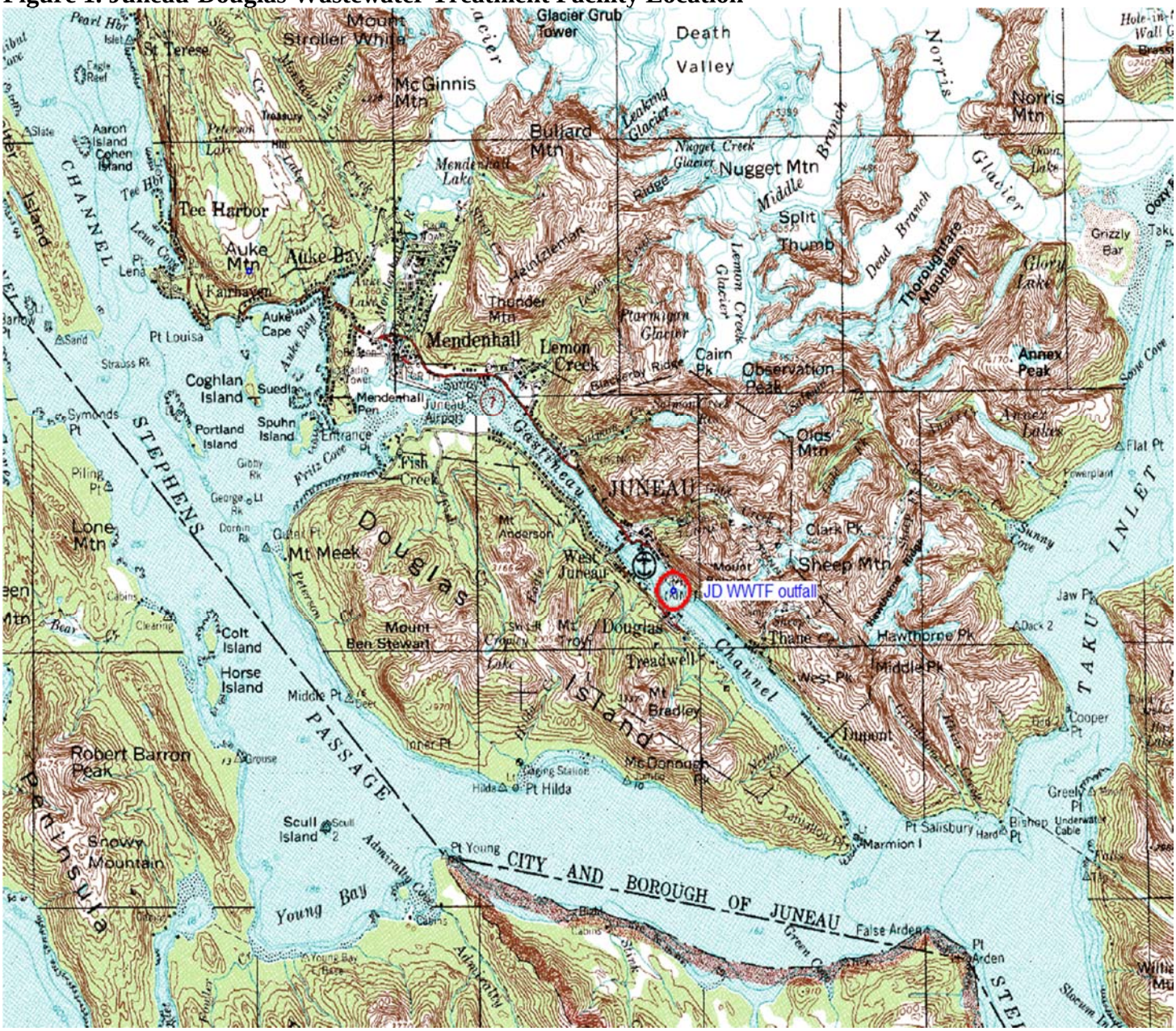
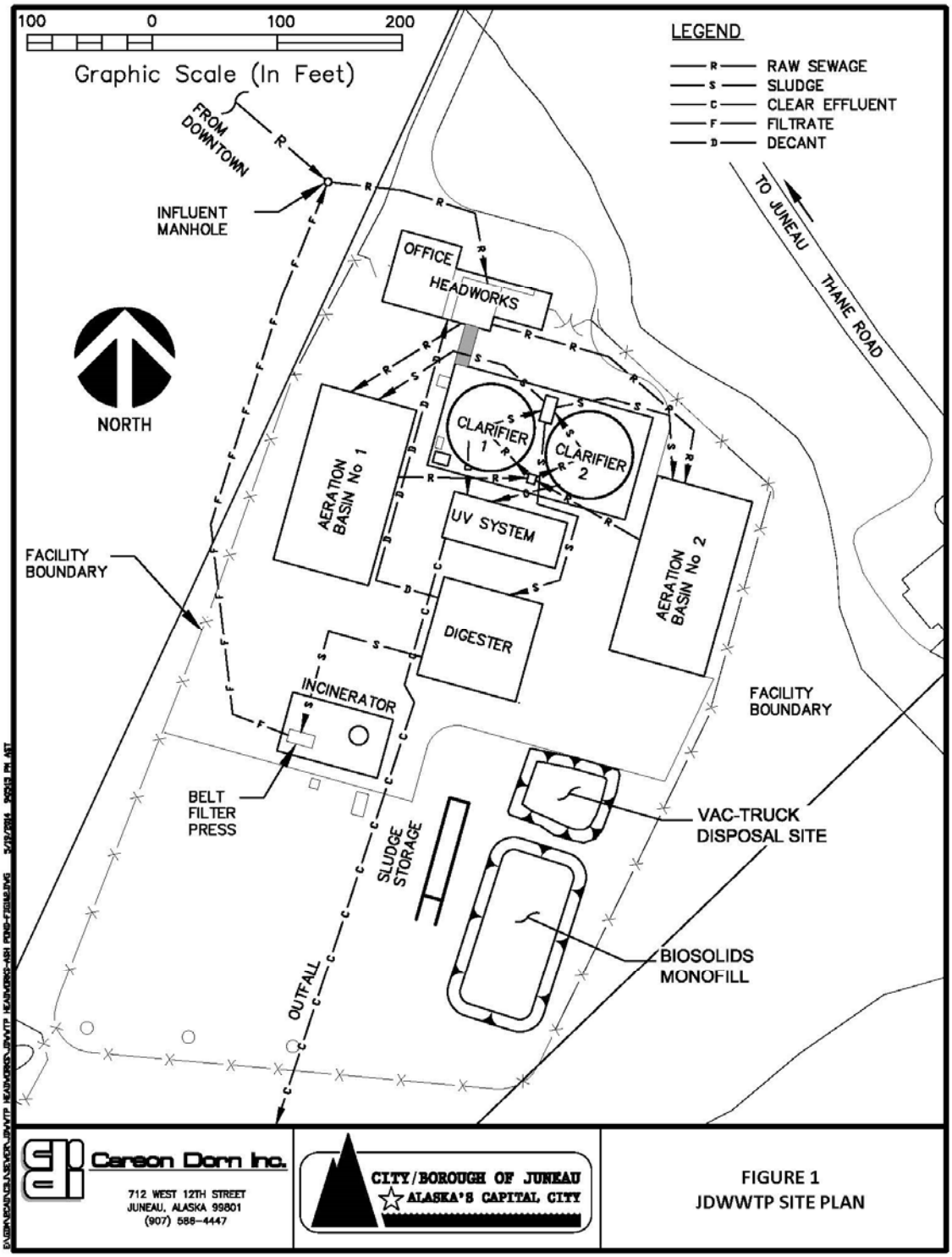


Figure 2. Juneau-Douglas Wastewater Treatment Facility Process Flow Diagram



APPENDIX B. BASIS FOR EFFLUENT LIMITATIONS

B.1 Statutory and Regulatory Basis

18 AAC 70.010 prohibits conduct that causes or contributes to a violation of the water quality standards (WQS). 18 AAC 15.090 requires that permits include terms and conditions to ensure criteria are met, including operating, monitoring, and reporting requirements.

The regulations require the permitting authority to make this evaluation using procedures that account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water body. The limits must be stringent enough to ensure that WQS are met and must be consistent with any available wasteload allocation (WLA).

The Clean Water Act (CWA) requires a Publicly Owned Treatment Works (POTWs) to meet effluent limits based on available wastewater treatment technology, specifically, secondary treatment effluent limits. The Alaska Department of Environmental Conservation (the Department or DEC) may find, by analyzing the effect of an effluent discharge on the receiving waterbody, that secondary treatment effluent limits are not sufficiently stringent to meet water quality WQS. In such cases, the Department is required to develop more stringent water quality-based effluent limits (WQBELs), which are designed to ensure that the WQS of the receiving waterbody are met.

Secondary treatment effluent limits for POTWs do not limit every parameter that may be present in the effluent. Limits have only been developed for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. Effluent from a POTW may contain other pollutants, such as bacteria, chlorine, ammonia, or metals, depending on the type of treatment system used and the quality of the influent to the POTW (e.g., industrial facilities, as well as residential areas discharge into the POTW). When technology-based effluent limits (TBELs) do not exist for a particular pollutant expected to be in the effluent, the Department must determine if the pollutant may cause or contribute to an exceedance of a water quality (WQ) criterion for the waterbody. If a pollutant causes or contributes to an exceedance of a WQ criterion, a WQBEL for the pollutant must be established in the permit. Table B-1 summarizes the basis for effluent limits contained in the permit. Further details for each effluent limit follows in this section.

Table B-1. Basis for Effluent Limits

EFFLUENT PARAMETER	UNITS	EFFLUENT LIMITS					
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Average Monthly Percent Removal	Minimum Daily Limit	Basis for Limit
Flow	million gallons per day (mgd)	2.76	---	6.0	---	---	18 AAC 72.255
pH	standard units (s.u.)	---	---	8.5	---	6.5	18 AAC 70.020(b)(18)(A)(i) 18 AAC 70.020(b)(18)(C)
Dissolved Oxygen (DO)	milligrams per liter (mg/L)	---	---	17	---	2.0	18 AAC 83.480
BOD_5	mg/L	30	45	60	85 % [b] (minimum)	---	18 AAC 83.010(e)
	pounds per day (lbs/day) [a]	---	---	---			
TSS	mg/L	30	45	60	85% [b] (minimum)	---	18 AAC 83.010(e)
	lbs/day [a]	---	---	---			
Fecal Coliform (FC) Bacteria [c]	FC/100 mL	200	400	800	---	---	18 AAC 83.480
Total Ammonia, as Nitrogen	mg/L	14	21	30	---	---	18 AAC 83.435(6)(d) 18 AAC 83.530(d) AS 46.03.101(d)

Footnotes:

a. lbs/day = concentration (mg/L) x average monthly flow (mgd) x 8.34 (conversion factor). Influent and effluent samples must be taken over approximately the same time period.

b. Minimum % Removal = [(monthly average influent concentration in mg/L - monthly average effluent concentration in mg/L) / (monthly average influent concentration in mg/L)] x 100. The monthly average percent removal must be calculated using the arithmetic mean of the influent value and the arithmetic mean of the effluent value for that month.

c. All FC bacteria average results must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the quantities. For example the geometric mean of 100, 200, and 300 is (100 x 200 x 300)1/3= 181.7.per liter)

B.2 Secondary Treatment Effluent Limitations

The CWA requires a POTW to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977. The Department has adopted the "secondary treatment" effluent limits, 18 AAC 83.010(e), which are found in 40 CFR §133.102. The technology-based effluent limits apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. In addition to the federal secondary treatment regulations in 40 CFR Part 133.102, the State of Alaska requires maximum daily limitations of 60 mg/L for BOD_5 and TSS in its definition of secondary treatment found in its waste disposal regulations (18 AAC 72.990); however, the waste disposal regulations do not specify the percent removal requirements that are required by 40 CFR 133, so the more stringent 40 CFR 133 requirements are applied. The secondary treatment effluent limits are listed in Table B-2.

Table B-2. Secondary Treatment Effluent Limits

Parameter	Units	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Average Monthly Minimum Removal
BOD_5	mg/L	30	45	60	85%
TSS	mg/L	30	45	60	85%
pH	s.u.	Between 6.0 – 9.0 s.u. at all times			

B.3 Water Quality – Based Effluent Limits

WQBELs included in Alaska Pollutant Discharge Elimination System (APDES) permits are derived from WQS. APDES regulation18 AAC 83.435(a)(2) requires that permits include WQBELs that can achieve water quality standard established under CWA §303, including state narrative criteria for water quality. The WQS are composed of use classifications, numeric and/or narrative water quality criteria and an antidegradation policy (See Section 7.0, Antidegradation). The use classification system designates the beneficial uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the beneficial use classification of each waterbody. Existing uses are those uses actually attained in a waterbody on or after November 28, 1975, whether or not they are included in the WQS [40 CFR § 131.3(e)]. Designated uses are those uses specified in water quality standards for each waterbody or segment whether or not they are being attained [40 CFR § 131.3(f)].

Waterbodies in Alaska are designated for all uses unless the waterbody has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some waterbodies in Alaska may also have site–specific water quality criteria per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b).

Permit AK0023213 authorizes discharges of secondary treated domestic wastewater to marine water. The designated uses for marine water that have not been reclassified are: water supply for aquaculture, seafood processing, and industrial; contact and secondary

recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life.

B.4 Reasonable Potential Analysis

The Department used the process described in the Technical Support Document (TSD) for Water Quality-Based Toxics Control (Environmental Protection Agency, 1991) and DEC's guidance, APDES *Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 30, 2014) to evaluate the Juneau-Douglas Wastewater Treatment Facility (JD WWTF) effluent.

Discharge monitoring reports (DMRs) from January 2011 through December 2013, supplemental monitoring logs that the City and Borough of Juneau submitted with their DMRs, monitoring data from DEC's 2013 Commercial Passenger Environmental Compliance Program[1], and the JD WWTF discharge application priority pollutant scan results (priority pollutants are chemical pollutants that EPA regulates and for which EPA has published analytical test methods) were reviewed to identify pollutants of concern (POC).

POC are those pollutants that already have a TBEL or WQBEL for a particular pollutant, pollutants with a total maximum load WLA or watershed analysis, pollutants identified as present in the effluent through monitoring, or those pollutants that are likely to be present in the effluent based on the nature of the operation.

The Department identified the following as POC in the JD WWTF effluent: FC Bacteria (present in the effluent above WQ criteria), Enterococci Bacteria (likely to be present in the effluent based on the domestic nature of the effluent), DO (present in the effluent in levels lower that WQ criteria), ammonia and copper (both present in the effluent in levels above WQ criteria).

When evaluating the effluent to determine if WQBELs based on chemical-specific numeric criteria are needed, the Department projects the receiving waterbody concentration downstream of where the effluent enters the receiving waterbody for each pollutant of concern. The chemical-specific concentration of the effluent and receiving waterbody and, if appropriate, the dilution available from the receiving waterbody, are factors used to project the receiving waterbody concentration. If the projected concentration of the receiving waterbody exceeds the numeric criterion for a limited parameter, then there is RP that the discharge may cause or contribute to an excursion above the applicable WQ criterion. Appendix C contains more details on the RPA conducted for this permit.

The Department may authorize a small volume of receiving water to provide dilution of the effluent; this volume is called a mixing zone. Mixing zone allowances will increase the allowable mass loadings of the pollutant to the waterbody. A mixing zone can be used only when there is adequate receiving waterbody flow volume, and the concentration of the pollutant of concern in the receiving waterbody is below the numeric water quality criterion necessary to protect the designated uses of the waterbody.

B.5 Procedure for Deriving Water Quality-Based Effluent Limits

The first step in developing a WQBEL is to develop a WLA for the pollutant. A WLA is the concentration or loading of a pollutant that the permittee may discharge without causing

or contributing to an exceedance of WQ criteria or a total maximum daily load in the receiving waterbody.

In cases where a mixing zone is not authorized, either because the receiving waterbody already exceeds the criterion, the receiving waterbody flow is too low to provide dilution, or for some other reason one is not authorized, the criterion becomes the WLA.

Establishing the criterion as the WLA ensures that the permittee will not cause or contribute to an exceedance of the criterion.

The WQS at 18 AAC 70.020(a) designates classes of water for beneficial uses of water supply, water recreation, and of growth and propagation of fish, shellfish, other aquatic life, and wildlife. JD WWTF must adhere to the most stringent of the standards for these designated uses because Gastineau Channel is protected for all uses.

B.6 Effluent Limits in JD WWTF Permit

B.6.1 *Dissolved Oxygen*

Aerobic microorganisms require DO in order to metabolize organic wastes into inorganic byproducts and reproduce. The 2004 Recommended Standards for Wastewater Facilities recommends a minimum concentration of 2.0 mg/L of DO in the mixed liquor aeration tank in design requirements for a mechanical aeration system.

JD WWTF consists of an activated sludge process with mechanical aeration. As such, a minimum DO concentration is required to ensure a healthy microorganism population and the successful treatment of biological wastes.

A DO minimum effluent concentration of 2.0 mg/L was established in the prior permit as a controllable minimum concentration for JD WWTF activated sludge process. Monitoring data submitted by the City and Borough of Juneau (CBJ) in which the facility sampled five times per week in 2013, indicates that current plant performance exceeds the 2.0 mg/L minimum concentration with an average minimum effluent DO concentration of 4.8 mg/L.

Alaska WQS at 18 AAC 70.020(b)(15)(A) states that surface marine DO concentrations for aquaculture, contact recreation, secondary recreation, the harvesting for consumption of raw mollusks or other raw aquatic life, and the growth and propagation of fish, shellfish, other aquatic life, and wildlife, must be not be less than 6 mg/L for a depth of one meter except when natural conditions cause this value to be depressed, and that in no case may DO levels exceed 17 mg/L.

DEC compared the monitoring results that CBJ submitted for 2013 to the marine DO WQ criteria of a minimum concentration of 6.0 mg/L and a maximum concentration of 17 mg/L, and concluded, that JD WWTF cannot consistently meet the minimum DO WQ criterion of 6.0 mg/L at the point of discharge. Therefore, the DO minimum concentration of 2.0 mg/L of the prior permit shall be retained for this permit reissuance as an effluent minimum concentration, and DO WQ criteria will apply at the boundary of the authorized mixing zone.

DEC, in its CWA Section 401 Certification of the 2001 National Pollutant Discharge Elimination System (NPDES) permit, also required a DO maximum daily limit (MDL) of 17 mg/L. Consistent with the conditions of 18 AAC 83.480 (reissued permits) that require

permit effluent limits, standards, or conditions to be at least as stringent as the final effluent limits, standards, or conditions in the previous permit, and JD WWTF's performance data, the maximum daily effluent limit (17 mg/L) of the previous permit is applied as the DO MDL for this permit reissuance.

The permit increases DO monitoring from 1/week to 5/week in order to more accurately assess effluent DO concentrations in the next permit cycle.

B.6.2 *Fecal Coliform Bacteria*

Alaska WQS at 18 AAC 70.020(b)(14)(D) states that based on a 5-tube dilution test, the FC median most probable number (MPN) for the harvesting for consumption of raw mollusks or other raw aquatic life may not exceed 14 FC/100 mL, and not more than 10% of the samples may exceed a FC median MPN of 43 FC/100 mL.

As mentioned above, in 2001 the Department issued a CWA Section 401 Certification for the NPDES JD WWTF discharge permit. The Certification included effluent limits for FC bacteria. The Certification required that the effluent discharged from the JD WWTF not exceed a monthly average limit (AML) of 400 FC/100 mL, an average weekly limit (AWL) of 800 FC/100 mL, and a MDL of 1200 FC/100 mL. These limits are dependent on the use of specific technological processes, and were applied because the facility used ultra-violet light for disinfection.

During the development of this permit reissuance, the Department reviewed the FC bacteria monitoring results submitted on discharge monitoring reports from January 2011 to December 2013. In these three years, the facility's performance demonstrated that the effluent could consistently meet FC bacteria effluent limits that are required at the vast majority of secondary treatment facilities statewide (AML 200 FC/100 mL, AWL 400 FC/100 mL, MDL 800 FC/100 mL).

The limits of an AML of 200 FC/100 mL, an AWL of 400 FC/100 mL were each exceeded only once in three years, and JD WWTF never exceed the MDL of 800 FC/100 mL. The average reported maximum daily concentration over three years was 80 FC/100 mL.

FC bacteria can be reasonably expected to exceed WQ criteria (See Appendix C.3). A mixing zone is required to meet the WQ criteria of 14 FC/100 mL AML and 43 FC/100 mL MDL. At a maximum expected FC bacteria concentration of 800 FC/100 mL, FC bacteria requires a dilution factor of 18.6. Because ammonia requires more dilution (20.3) to meet WQ criteria than FC bacteria, ammonia drives the chronic mixing zone, and FC bacteria is included in the chronic mixing zone sized for ammonia.

DEC multiplied the chronic mixing zone dilution factor by the FC bacteria WQ criteria and obtained an AML of 284 FC/100 mL and a MDL of 873 FC/100 mL. DEC then compared these limits with the previously discussed AML of 200 FC/100 mL and the MDL of 800 FC/100 mL and selected the more stringent limits for the permit. An AWL of 400 FC/100 mL is selected as there is not a comparable FC WQ criterion. The selected limits are protective of WQ criteria at the boundary of the mixing zone.

Therefore, based on the facility's consistent ability to produce an effluent capable of meeting the FC bacteria concentration limits required of the vast majority of secondary treatment facilities throughout the state, and compliance with the State's definition of

disinfection at 18 AAC 72.990(21)(A)(B), the FC bacteria limits are reduced in this permit to an AML of 200 FC/100 mL, an AWL of 400 FC/100 mL, and a MDL of 800 FC/100 mL.

Monitoring of FC bacteria concentrations will be required at the boundary of the chronic mixing zone. The monitoring results will be assessed for compliance with Alaska WQ criteria at 18 AAC 70.020(b)(14)(D).

B.6.3 *Total Ammonia, as Nitrogen*

Total ammonia is the sum of ionized (NH_4^+) and un-ionized ammonia (NH_3). Temperature, pH, and salinity affect which form, NH_4^+ or NH_3 is present. NH_3 is more toxic to aquatic organisms than NH_4^+ and predominates with higher temperature and pH. NH_3 is less toxic with increased salinity.

Biological wastewater treatment processes reduce the amount of total nitrogen in domestic wastewater; however, without advanced treatment, wastewater effluent may still contain elevated levels of ammonia nitrogen. Excess ammonia as nitrogen in the environment can lead to DO depletion, eutrophication, and toxicity to aquatic organisms.

The prior permit required CBJ to monitor ammonia twice per year. CBJ elected to monitor more frequently and submitted their monitoring logs with their DMRs. The review of data from January 2011- December 2013 indicated a range of results from no ammonia detected to a maximum observed concentration of 25 mg/L. The average ammonia concentration of 87 reported results was 9.5 mg/L.

Because CBJ did not monitor Gastineau Channel for ambient pH, temperature, and salinity, DEC used pH, temperature, and salinity data collected by DEC's 2013 Commercial Passenger Environmental Compliance Program[1] to establish an acute criterion of 11.5 mg/L and a chronic of criterion 1.7 mg/L for JD WWTF. CBJ's ammonia monitoring results indicated exceedances for both acute and chronic WQ criteria; ammonia was therefore selected for RPA. The resulting RPA indicated that there is RP for ammonia to exceed WQ criteria at the end of pipe.

Because there is RP for ammonia to exceed WQ criteria at the end of the pipe, and because ammonia is the driving parameter in the authorized mixing zone, WQBELs were developed for ammonia (MDL 30 mg/L, AML 14 mg/L) that are protective of WQ criteria at the boundary of the mixing zone.

18 AAC 83.530(d) requires effluent limits from a continuously discharging POTW to be stated as average weekly and average monthly limits unless impracticable. Secondary treatment standards at 18 AAC 83.605 establishes AWLs as being 1.5 times the AML. Following this precedent, the AWL for ammonia is derived by multiplying ammonia's AML of 14 mg/L 1.5 times to obtain an AWL of 21 mg/L.

Furthermore, Alaska Statutes (AS) 46.03.101(d), states that the Department may specify in a permit the terms and conditions under which waste material may be disposed. Accordingly, monitoring in the permit is increased from twice per year to once per month to more closely monitor ammonia concentrations in the effluent.

See Appendix C for details on RP determination and Appendix D for details on permit limit derivation.

B.6.4 *pH*

Alaska WQS at 18 AAC 70.020(b)(18)(A)(i) (aquaculture) and 18 AAC 70.020(b)(18)(C) (Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife) states that the pH water quality criteria may not be less than 6.5 or greater than 8.5 s.u..

DEC reviewed the monthly pH effluent monitoring results from JD WWTF between January 2011 and December 2013. During this time period, the average reported minimum pH level was 6.6 s.u., while the average maximum reported pH level was 7.3 s.u. Because the facility has consistently demonstrated compliance with the marine pH WQ criteria, the Department has determined that a mixing zone for pH is no longer required, and compliance with the pH marine WQ criteria will be required at the point of discharge from the facility.

APPENDIX C. REASONABLE POTENTIAL DETERMINATION

The following describes the process the Alaska Department of Environmental Conservation (the Department or DEC) used to determine if the discharge authorized in the draft permit has the reasonable potential (RP) to cause or contribute to a violation of Alaska Water Quality Standards. The Department used the process described in the *Technical Support Document (TSD) for Water Quality-Based Toxics Control* (Environmental Protection Agency, 1991) and DEC's guidance, *Alaska Pollutant Discharge Elimination System (APDES) Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 30, 2014) to determine the RP for any pollutant to exceed a water quality (WQ) criterion.

To determine if there is RP for the discharge to cause or contribute to an exceedance of WQ criteria for a given pollutant, the Department compares the maximum projected receiving waterbody concentration to the criteria for that pollutant. RP to exceed exists if the projected receiving waterbody concentration exceeds WQ criteria, and a water quality-based effluent limit must be included in the permit

The ambient concentration in the mass balance equation is based on a reasonable worst-case estimate of the pollutant concentration upstream from the discharge. For criteria that are expressed as maxima (such as ammonia), the 85th percentile of the ambient data is generally used as an estimate of the worst-case. If ambient data is not available, DEC uses 15% of the most stringent given pollutant's criteria as a worst case estimate.

This section discusses how the maximum projected receiving waterbody concentration is determined.

C.1 Mass Balance

For a discharge to a flowing waterbody, the maximum projected receiving waterbody concentration is determined using a steady state model represented by the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \text{(Equation C-1)}$$

Where,

C_d = Receiving waterbody concentration downstream of the effluent discharge

C_e = Maximum projected effluent concentration

C_u = 85th percentile measured receiving waterbody ambient concentration

Q_e = Effluent flow rate (set equal to the design flow of the wastewater treatment facility)

Q_u = Receiving waterbody flow

Q_d = Receiving waterbody flow rate = Qe + Qu

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_e Q_e + C_u Q_u}{Q_e + Q_u} \qquad \text{(Equation C-2)}$$

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with the receiving waterbody. If a mixing zone based on a percentage of the critical flow in the receiving waterbody is authorized based on the assumption of incomplete mixing with the receiving waterbody, the equation becomes:

$$C_d = \frac{C_e Q_e + C_u(Q_u \times MZ)}{Q_e + (Q_u \times MZ)} \quad \text{(Equation C-3)}$$

Where,

MZ = the fraction of the receiving waterbody flow available for dilution.

Where mixing is rapid and complete, MZ is equal to 1 and equation C-2 is equal to equation C-3 (i.e., all of the critical low flow volume is available for mixing).

If a mixing zone is not authorized, dilution is not considered when projecting the receiving waterbody concentration, and

$$C_d = C_e \quad \text{(Equation C-4)}$$

In other words, if a mixing zone is not authorized (either because the stream already exceeds water quality (WQ) criteria or the Department does not allow one), the Department considers only the concentration of the pollutant in the effluent regardless of the upstream flow and concentration. If the concentration of the pollutant in the effluent is less than the WQ criteria, the discharge cannot cause or contribute to a WQ violation for that pollutant. In this case, the mixing or dilution factor (% MZ) is equal to zero and the mass balance equation is simplified to $C_d = C_e$.

Equation C-2 can be simplified by introducing a dilution factor (D):

$$D = \frac{Q_e + Q_u}{Q_e} \quad \text{(Equation C-5)}$$

After the D simplification, this becomes:

$$C_d = \frac{(C_e - C_u)}{D} + D_u \quad \text{(Equation C-6)}$$

C.2 Maximum Projected Effluent Concentration

To calculate the maximum projected effluent concentration, the Department used the procedure described in Section 3.3 of the *TSD*, "*Determining the Need for Permit Limits with Effluent Monitoring Data*." In this procedure, the 99th percentile of the effluent data is the maximum projected effluent concentration which is used in the calculation of the maximum projected receiving waterbody concentration.

Since there are a limited number of data points available, the 99th percentile is calculated by multiplying the maximum observed effluent concentration (MOC) by a reasonable potential multiplier (RPM). The RPM is the ratio of the 99th percentile concentration to the MOC and accounts for the statistical uncertainty in the effluent data. The RPM is calculated from the coefficient of variation (CV) of the data and the number of data points. The CV is defined as the ratio of the standard deviation of the data set to the mean. When fewer than 10 data points are available, the *TSD* recommends making the assumption that the CV is equal to 0.6. A CV value of 0.6 is a conservative estimate that assumes a relatively high variability.

DEC used ProUCL, a statistical software program, to determine that the monitoring data submitted for ammonia follows a normal distribution. Therefore, the RPM equation in Section 2.4.2.1 of the *APDES Permits Reasonable Potential Analysis and Effluent Limits Development Guide* is used to determine the RPM for ammonia.

$$RPM = \frac{\mu_n + z_{99}\,\sigma}{\mu_n + p_n\,\sigma} \qquad \text{(Equation C-7)}$$

Where,

z_{99} = the z − statistic at the 99th percentile = 2.326

μ_n = mean calculated by ProUCL = 10.83

σ = the standard deviation calculated by ProUCL = 7.454

p_n = the z − statistic at the 95th percent confidence level of $(1 - 0.95)^{\frac{1}{n}} = 1.751$

n = number of valid data samples = 73

RPM = 1.2

The maximum expected concentration (MEC) is determined by multiplying the MOC by the RPM:

$$\text{MEC} = (\text{RPM})(\text{MOC})$$

MOC = 25 milligrams per liter (mg/L)

In the case of ammonia,

MEC = (1.2)(25) = 30 mg/L

Comparison with WQ criteria for ammonia

In order to determine if RP exists for this discharge to violate WQ criteria, the highest projected concentrations at the boundary of the mixing zone is compared with acute and chronic WQ criteria. For example:

Acute: 11.5 mg/L = 11.5 mg/L (acute criterion)

NO, there is not RP to violate acute criterion

Chronic: 1.7 mg/L = 1.7 mg/L (chronic criterion)

NO, there is not RP to violate chronic criterion

Table C-1 summarizes the data, multipliers, and criteria used to determine RP to exceed WQ criteria at the end of the pipe and at the boundary of the chronic mixing zone.

Table C-1: Reasonable Potential Calculation and Determination

Parameter	MOC	Number of Samples	Upstream Concentration	CV	RPM	MEC	Maximum Projected Receiving Waterbody Concentration [a]	Most Stringent Criterion	Boundary of Mixing Zone RP?
Total Ammonia as Nitrogen (mg/L)	25	73	0.26	0.7	1.2	29.51	1.70	1.7 (chronic)	No
Copper, total recoverable (micrograms per liter (µg/L)	9.92	3	0.90	0.6	4.4	43.41	2.99	3.7 (chronic)	No

Footnote:
a. Calculated using CORMIX dilution factor of 20.3

C.3 Fecal Coliform Bacteria Reasonable Potential Determination

The prior Juneau-Douglas Wastewater Treatment Facility (JD WWTF) permit limits were 400 FC/100 milliliters (mL) average monthly limit (AML), 800 FC/100 mL average weekly limit (AWL), and 1,200 FC/100 mL maximum daily limit (MDL). DEC reviewed discharge monitoring results from 2011-2013 (See Appendix B.6.2) and compared them with the State's definition of disinfection at 18 AAC 72.990(21)(A)(B) and the FC bacteria effluent limits established in the vast majority of WWTFs that have FC bacteria mixing zones throughout Alaska. (200 FC/100mL AML, 400 FC/100 mL AWL, and 800 FC/100 mL MDL). The monitoring results demonstrate that JD WWTF can consistently meet the more stringent FC bacteria effluent limits; however the facility does not consistently comply with FC bacteria Alaska Water Quality Standards (14 FC/100 mL AML or 43 FC/100 mL MDL). Therefore, it can be reasonably expected that JD WWTF will have RP to exceed WQ criteria for FC bacteria.

APPENDIX D. SELECTION OF EFFLUENT LIMITS

If the Alaska Department of Environmental Conservation (the Department or DEC) does not authorize a mixing zone, water quality (WQ) criteria are applied at the end of the pipe, and technology-based effluent limits (TBELs) are selected for those parameters that are solely technology based.

When DEC authorizes a mixing zone, parameters are identified in the mixing zone that will require dilution to meet WQ criteria. If there are TBELs for an identified parameter in the mixing zone, TBELs apply at the end of the pipe, and WQ criteria for that parameter, apply at the boundary of the mixing zone. If the reasonable potential analysis (RPA) requires the development of water-quality based effluent limits (WQBELs) for specific parameters in order to protect aquatic life at the boundary of the mixing zone, WQBELs are applied as end-of-pipe effluent limits. Those parameters that are not identified in the authorized mixing zone, must meet applicable WQ criteria at the end of pipe.

In the absence of WQ criteria for a particular pollutant, such as for 5-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS), TBELs are applied as end-of pipe effluent limits.

In the case of the Juneau-Douglas Wastewater Treatment Facility (JD WWTF), ammonia demonstrated RP to exceed at the end of pipe and required the most dilution to meet WQ criteria at the boundary of the authorized mixing zone. Therefore, the Department developed WQBELs for ammonia.

D.1 Effluent Limit Calculation

Once the Department determines that the effluent has a reasonable potential to exceed a WQS, a WQBEL for the pollutant is developed. The Department used the process described in the *Technical Support Document (TSD) for Water Quality-Based Toxics Control* (Environmental Protection Agency, 1991) and DEC's guidance, *Alaska Pollutant Discharge Elimination System (APDES) Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 30, 2014) to calculate WQBELs for ammonia. The first step in calculating WQBELs is the development of a waste load allocation (WLA) for the pollutant.

D.1.1 Mixing Zone-based WLA

When the state authorizes a mixing zone for the discharge, the WLA is calculated using the available dilution, background concentrations and WQ criteria of the pollutant.

Since acute aquatic life and chronic aquatic life standards apply over different time frames and may have different mixing zones, it is not possible to compare the WLAs directly to determine which standard is the most stringent. The acute criteria are applied as a one-hour average and may have a smaller mixing zone, while the chronic criteria are applied as a four-day average and may have a larger mixing zone. To allow for comparison, long-term average (LTA) loads are calculated from both the acute and chronic WLAs. The most stringent LTA is used to calculate the permit limits.

D.1.2 "End-of-Pipe" WLAs

In many cases, there is no dilution available, either because the receiving waterbody exceeds the criteria or because the state does not authorize a mixing zone for a particular pollutant. When there is no dilution available, the criterion becomes the WLA. Establishing the criterion as the

WLA ensures that the permittee's discharge does not contribute to an exceedance of the criterion. As with the mixing-zone based WLA, the acute and chronic criteria must be converted to LTAs and compared to determine which one is more stringent. The more stringent LTA is then used to develop permit limits.

D.1.3 Permit Limit Derivation

Once the appropriate LTA has been calculated, the Department applies the statistical approach described in Chapter 5 of the TSD to calculate the maximum daily limit (MDL) and average monthly limit (AML). This approach takes into account effluent variability (using the coefficient of variation (CV)), sampling frequency, and the difference in time frames between the AML and MDL.

The MDL is based on the CV of the data and the probability basis, while the AML is dependent on these two variables and the monitoring frequency. As recommended in the TSD, the Department used a probability basis of 95% for the AML calculation and 99% for the MDL calculation.

The following is a summary of the steps to derive WQBELs from WQ criteria for pollutants that have reasonable potential to exceed WQ criteria. These steps are found in the Department's Reasonable Potential Analysis and Effluent Limitation Guidance and the guidance's accompanying Excel Reasonable Potential Analysis Tool. The guidance and tool were used to calculate the MDL and AML for ammonia in the JD WWTF permit.

Step 1- Determine the WLA

The acute and chronic aquatic life criteria are converted to acute and chronic waste load allocations using the following equations:

$$WLA_{a,c,hh} = \left(WQC_{a,c,hh}\right)\left(D_{a,c,hh}\right) + C_s\left(1 - D_{a,c,hh}\right)$$

$$WLA_{a,c,hh} = WQC_{a,c,hh}\left(\frac{Q_d + Q_s}{Q_d}\right) + C_s\left(1 - \left[\frac{Q_d + Q_s}{Q_d}\right]\right)$$

Where: $D_{a,c} = Dilution = \frac{(Q_d + Q_s)}{Q_d}$

$D_{hh}(Dilution\ [Human\ Health]) = D_c\ (Dilution[Chronic\ Aquatic\ Life])$

$Q_s = Critical\ Upstream\ Flow$

$Q_d = Critical\ Discharge\ Flow$

$C_s = Critical\ Upstream\ Concentration$

$WLA_{a,c} = Wasteload\ Allocation\ (acute, chronic, or\ human\ health)$

$WQC_{a,c} = C_r = Water\ Quality\ Criterion(acute, chronic, or\ human\ health)$

For ammonia,

$D_a = 2.6$

$D_c = 20.3$

$C_s = 0.255$ (15% of the most stringent ammonia WQC)

$WLA_a = 29.51 mg/L$

$WLA_c = 29.59\, mg/L$

$WQC_a = 11.5\, mg/L$

$WQC_c = 1.7\, mg/L$

Step 2 - Determine the Long-Term Average (LTA)

The WLAs are converted to LTAs using multipliers that are derived from equations in section 5.4 of the TSD:

$$LTA_a = WLA_a * exp(0.5\sigma^2 - z_{99}\sigma)$$

$$LTA_c = WLA_c * exp(0.5\sigma_4^2 - z_{99}\sigma_4)$$

Where:

$z_{99} = the\ z-statistic\ at\ the\ 99^{th} percentile = 2.326$

$LTA_a\ only: \sigma = ln[CV^2 + 1]^{1/2}$

$LTA_a\ only: \sigma^2 = ln[CV^2 + 1]$

$LTA_c\ only: \sigma_4 = ln\left[\left(\frac{CV^2}{4}\right) + 1\right]^{1/2}$

$LTA_c\ only: \sigma_4^2 = ln\left[\left(\frac{CV^2}{4}\right) + 1\right]$

$CV = coefficient\ of variation$

For ammonia:

$LTA_a = 8.42\, mg/L$

$LTA_c = 14.37\, mg/L$

Step 3 – Choosing the More Limiting LTA

To protect a waterbody from both acute and chronic effects, the more limiting of the two LTAs is used to derive the effluent limits. In the case of ammonia, the LTA_a is more limiting.

Step 4 - Calculate the Permit Limits

The MDL and AML are calculated using the following equations that are found in table 5-2 of the TSD:

$$MDL_{aquatic\ life} = LTA * exp(z_{99}\sigma - 0.5\sigma^2)$$

Where:

$$z_{99} = the\ z - statistic\ at\ the\ 99^{th} percentile = 2.326$$

$$\sigma_n = ln[CV^2 + 1]^{1/2}$$

$$\sigma_n^2 = ln[CV^2 + 1]$$

$$CV = coefficient\ of variation$$

$$AML_{aquatic\ life} = LTA * exp(z_{95}\sigma_n - 0.5\sigma_n^2)$$

Where:

$$z_{95} = the\ z - statistic\ at\ the\ 95^{th} percentile = 1.645$$

$$\sigma_n = ln\left[\left(\frac{CV^2}{n}\right) + 1\right]^{1/2}$$

$$\sigma_n^2 = ln\left[\left(\frac{CV^2}{n}\right) + 1\right]$$

$$CV = coefficient\ of variation$$

$$n = number\ of\ samples\ per\ month$$

For ammonia:

$$MDL = 30\ mg/L$$

$$AML = 14\ mg/L$$

D.2 Mass-Based Limits

Alaska Pollutant Discharge Elimination System (APDES) regulations at 18 AAC 83.540 require that effluent limits be expressed in terms of mass unless they cannot appropriately be expressed by mass, if it is infeasible, or if the limits can be expressed in terms of other units of measurement. In addition, 18 AAC 83.520 requires that effluent limits for a publicly owned treatment works be calculated based on the design flow of the facility. Expressing limitations in terms of concentration as well as mass encourages the proper operation of a facility at all times. The mass based limits are expressed in pounds per day and are calculated as follows:

mass-based limit (pounds (lbs)/day) = concentration limit (milligrams per liter) × design flow (million gallons per day (mgd)) × 8.34 (lbs/gallon)

D.3 Flow

Flow is based on the hydraulic design capacity of the wastewater treatment facility (WWTF) (flow rate as gallons or mgd) and is determined by a professional engineer and approved by the Department during the WWTF plan review process conducted per 18 AAC 72. A flow limit based on the design capacity ensures that the WWTF operates within its capabilities to receive and properly treat sustained average flow quantities and specific pollutants.

D.4 Effluent Limit Summary

Table D-1 provides a summary and reference to those parameters in JD WWTF that contain effluent limits at the point of discharge.

Table D-1. Summary of Effluent Limitations

Parameter	Fact Sheet Reference
BOD_5	Appendix B-Section B.2
TSS	Appendix B- Section B.2
Dissolved Oxygen	Appendix B-Section B.6.1
Fecal Coliform Bacteria	Appendix B-Section B.6.2
Total Ammonia, as Nitrogen	Appendix B- Section B.6.3
pH	Appendix B- Section B.6.4

APPENDIX E. MIXING ZONE ANALYSIS CHECKLIST

The purpose of the Mixing Zone Checklist is to guide the permit writer through the mixing zone regulatory requirements to determine if all the mixing zone criteria at 18 AAC 70.240 through 18 AAC 70.270 are satisfied, as well as provide justification to authorize a mixing zone in an APDES permit. In order to authorize a mixing zone, all criteria must be met. The permit writer must document all conclusions in the permit Fact Sheet; however, if the permit writer determines that one criterion cannot be met, then a mixing zone is prohibited, and the permit writer need not include in the Fact Sheet the conclusions for when other criteria were met. See Section 6.5 of the Fact Sheet for the Juneau-Douglas Wastewater Treatment Facility mixing zone analysis.

Criteria	Description	Resources	Regulation
Size	Is the mixing zone as small as practicable? **Yes**	•Technical Support Document for Water Quality Based Toxics Control • DEC's RPA Guidance • EPA Permit Writers' Manual	18 AAC 70.240 (a)(2) 18 AAC 70.245 (b)(1) - (b)(7) 18 AAC 70.255(e) (3) 18 AAC 70.255 (d)
Technology	Were the most effective technological and economical methods used to disperse, treat, remove, and reduce pollutants? **Yes**		18 AAC 70.240 (a)(3)
Low Flow Design	**For river, streams, and other flowing fresh waters.** - Determine low flow calculations or documentation for the applicable parameters.		18 AAC 70.255(f)

Criteria	Description	Resources	Regulation
Existing use	Does the mixing zone…		
	(1) partially or completely eliminate an existing use of the waterbody outside the mixing zone? **No** **If yes, mixing zone prohibited.**		18 AAC 70.245(a)(1)
	(2) impair overall biological integrity of the waterbody? **No** **If yes, mixing zone prohibited.**		18 AAC 70.245(a)(2)
	(3) provide for adequate flushing of the waterbody to ensure full protection of uses of the waterbody outside the proposed mixing zone? **Yes** **If no, then mixing zone prohibited.**		18 AAC 70.250(a)(3)
	(4) cause an environmental effect or damage to the ecosystem that the department considers to be so adverse that a mixing zone is not appropriate? **No** **If yes, then mixing zone prohibited.**		18 AAC 70.250(a)(4)
Human consumption	Does the mixing zone…		
	(1) produce objectionable color, taste, or odor in aquatic resources harvested for human consumption? **No** **If yes, mixing zone may be reduced in size or prohibited.**		18 AAC 70.250(b)(2)
	(2) preclude or limit established processing activities of commercial, sport, personal use, or subsistence shellfish harvesting? **No** **If yes, mixing zone may be reduced in size or prohibited.**		18 AAC 70.250(b)(3)

Criteria	Description	Resources	Regulation
Spawning Areas	Does the mixing zone…		
	(1) discharge in a spawning area for anadromous fish or Arctic grayling, northern pike, rainbow trout, lake trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, king, and sockeye salmon? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255 (h)
Human Health	Does the mixing zone…		
	(1) contain bioaccumulating, bioconcentrating, or persistent chemical above natural or significantly adverse levels? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250 (a)(1)
	(2) contain chemicals expected to cause carcinogenic, mutagenic, teratogenic, or otherwise harmful effects to human health? **No** **If yes, mixing zone prohibited.**		
	(3) Create a public health hazard through encroachment on water supply or through contact recreation? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250(a)(1)(C)
	(4) meet human health and aquatic life quality criteria at the boundary of the mixing zone? **Yes** **If no, mixing zone prohibited.**		18 AAC 70.255 (b),(c)
	(5) occur in a location where the department determines that a public health hazard reasonably could be expected? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(e)(3)(B)

Criteria	Description	Resources	Regulation
Aquatic Life	Does the mixing zone…		
	(1) create a significant adverse effect to anadromous, resident, or shellfish spawning or rearing? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250(a)(2)(A-C)
	(2) form a barrier to migratory species? **No** **If yes, mixing zone prohibited.**		
	(3) fail to provide a zone of passage? **No** **If yes, mixing zone prohibited.**		
	(4) result in undesirable or nuisance aquatic life? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250(b)(1)
	(5) result in permanent or irreparable displacement of indigenous organisms? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(g)(1)
	(6) result in a reduction in fish or shellfish population levels? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(g)(2)
	(7) prevent lethality to passing organisms by reducing the size of the acute zone? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(b)(1)
	(8) cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(b)(2)

Criteria	Description	Resources	Regulation
Endangered Species	Are there threatened or endangered species (T/E spp) at the location of the mixing zone?**No** If yes, are there likely to be adverse effects to T/E spp based on comments received from USFWS or NOAA. **Not applicable** If yes, will conservation measures be included in the permit to avoid adverse effects? **Not applicable** **If no, mixing zone prohibited.**		Program Description, 6.4.1 #5 18 AAC 70.250(a)(2)(D)

*Based on the 2003 Alaska Water Quality Standards 18 AAC 70.240 through 18 AAC 70.270.

APPENDIX F. JUNEAU-DOUGLAS WWTF EFFLUENT LIMIT VIOLATIONS 2009-2013

Monitoring Period	Parameter	Value Type	Reported Value	Permit Limit
2009				
January	Fecal Coliform (FC) Bacteria	maximum daily limit (MDL)	1,500 FC/100 milliliters (mL)	1,200 FC/100 mL
	Total Suspended Solids (TSS)	average monthly limit (AML)	39.6 mg/L	30 mg/L
			1,154.7 lbs/day	690 lbs/day
		average weekly limit (AWL)	192.1 milligrams per liter (mg/L)	45 mg/L
			3,336.5 pounds per day (lbs/day)	1,035 lbs/day
		MDL	750 mg/L	60 mg/L
			11,595.6 lbs/day	1,380 lbs/day
		minimum percent (%) removal	76.4%	85% minimum removal
February	No reported effluent violations			
March	TSS	AML	47 mg/L	30 mg/L
			890 lbs/day	690 lbs/day
		AWL	103.4 mg/L	45 mg/L
			3,935.1 lbs/day	1,035 lbs/day
		MDL	329 mg/L	60 mg/L
			15,587 lbs/day	1,380 lbs/day
		minimum % removal	77.7%	85% minimum removal
April	pH	daily minimum	5.7 standard units (s.u.)	6 s.u.
	TSS	MDL	76 mg/L	60 mg/L

Monitoring Period	Parameter	Value Type	Reported Value	Permit Limit
May	FC Bacteria	AWL	1,010 FC/100 mL	800 FC/100 mL
	pH	daily minimum	5.9 s.u.	6 s.u.
	TSS	AML	33 mg/L	30 mg/L
		AWL	52.1 mg/L	45 mg/L
		MDL	70 mg/L	60 mg/L
June	pH	daily minimum	5.9 s.u.	6 s.u.
July	No reported effluent violations			
August	No reported effluent violations			
September	No reported effluent violations			
October	TSS	MDL	184 mg/L	60 mg/L
			3,023 lbs/day	1,380 lbs/day
November	FC Bacteria	AWL	1,117 FC/100 mL	800 FC/100 mL
		MDL	1,300 FC/100 mL	1,200 FC/100 mL
December	5-Day Biochemical Oxygen Demand (BOD_5)	AWL	77 mg/L	45 mg/L
		MDL	141 mg/L	60 mg/L
	TSS	AML	32 mg/L	30 mg/L
		AWL	91.3 mg/L	45 mg/L
		MDL	188 mg/L	60 mg/L
		minimum % removal	84.5 %	85%
2010				
January	No reported effluent violations			
February	BOD_5	AWL	50 mg/L	45 mg/L
	TSS	AML	88 mg/L	30 mg/L
		AWL	185 mg/L	45 mg/L
		MDL	129 mg/L	60 mg/L

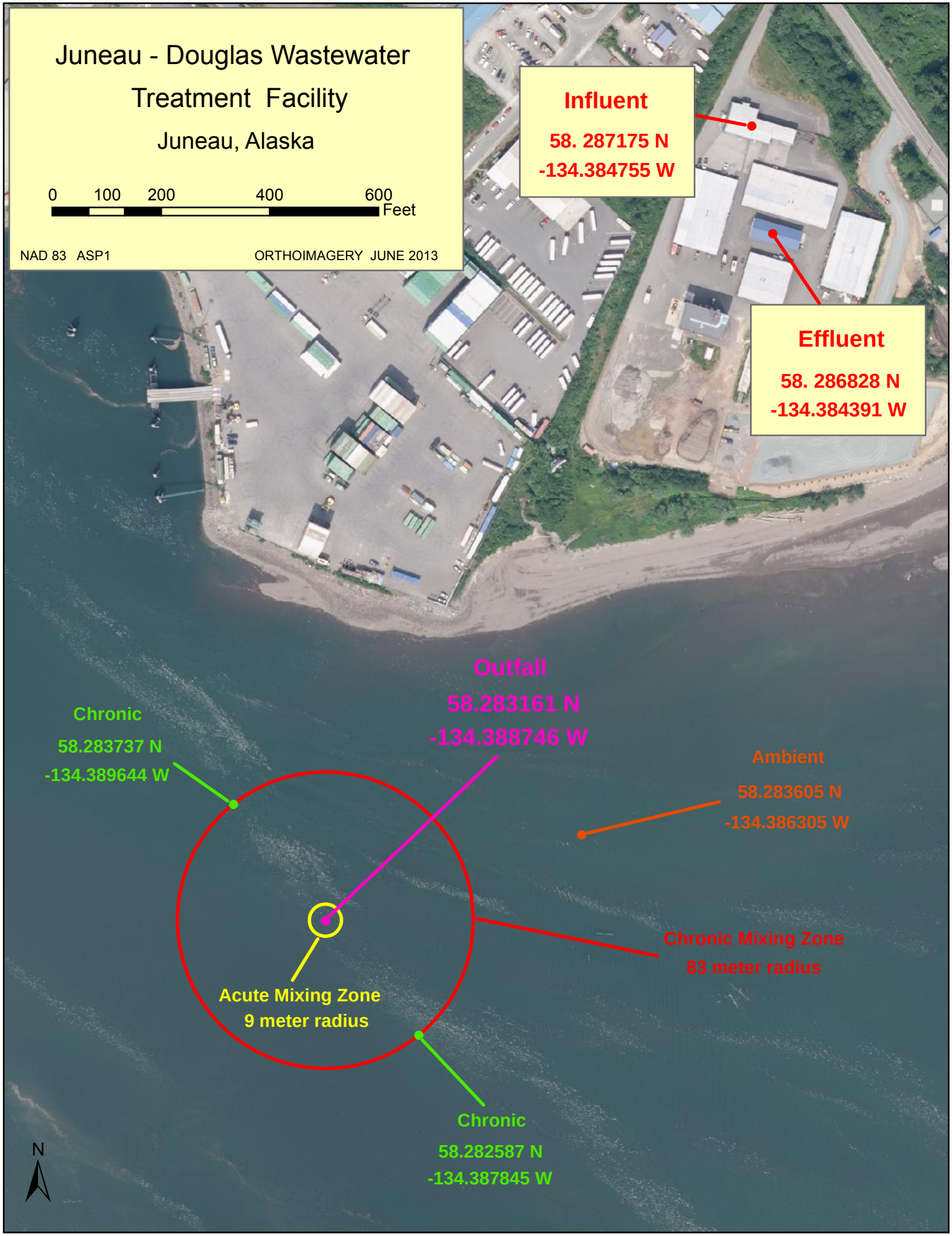
Monitoring Period	Parameter	Value Type	Reported Value	Permit Limit
March	BOD_5	minimum % removal	82 %	85%
April	BOD_5	AML	66 mg/L	30 mg/L
		AWL	185 mg/L	45 mg/L
		MDL	185 mg/L	60 mg/L
		minimum % removal	68 %	85%
	TSS	AML	93 mg/L	30 mg/L
		AWL	200 mg/L	45 mg/L
			1,171 lbs/day	1,035 lbs/day
		MDL	185 mg/L	60 mg/L
			1,816.5 lbs/day	1,380 lbs/day
		minimum % removal	66.9 %	85%
May	pH	daily minimum	5.8 s.u.	6 s.u.
June	BOD_5	AWL	66 mg/L	45 mg/L
		MDL	66 mg/L	60 mg/L
	TSS	AML	33 mg/L	30 mg/L
		AWL	135 mg/L	45 mg/L
			1,559.4 lbs/day	1,035 lbs/day
		MDL	135 mg/L	60 mg/L
			1,559.4 lbs/day	1,380 lbs/day
July	No reported effluent violations			
August	No reported effluent violations			
September	No reported effluent violations			
October	FC Bacteria	AML	1,230 FC/100 mL	400 FC/100 mL
		MDL	1,230 FC/100 mL	1,200 FC/100 mL
November	TSS	minimum % removal	78.6 %	85%
December	No reported effluent violations			

Monitoring Period	Parameter	Value Type	Reported Value	Permit Limit
2011				
January	No reported effluent violations			
February	No reported effluent violations			
March	BOD_5	AML	39.4 mg/L	30 mg/L
		AWL	146 mg/L	45 mg/L
		MDL	146 mg/L	60 mg/L
		minimum % removal	80.7 %	85%
	TSS	AML	57 mg/L	30 mg/L
		AWL	162 mg/L	45 mg/L
		MDL	162 mg/L	60 mg/L
		minimum % removal	81.2 %	85%
April	BOD_5	AML	44 mg/L	30 mg/L
		AWL	176 mg/L	45 mg/L
			3,205 lbs/day	1,035 lbs/day
		MDL	178 mg/L	60 mg/L
			3,205 lbs/day	1,380 lbs/day
		minimum % removal	75 %	85%
	TSS	AML	60 mg/L	30 mg/L
			933 lbs/day	690 lbs/day
		AWL	252 mg/L	45 mg/L
			4,538 lbs/day	1,035 lbs/day
		MDL	252 mg/L	60 mg/L
			4,538 lbs/day	1,380 lbs/day
		minimum % removal	75 %	85%
2012 No reported effluent violations				

Monitoring Period	Parameter	Value Type	Reported Value	Permit Limit
2013				
January	No reported effluent violations			
February	No reported effluent violations			
March	No reported effluent violations			
April	pH	daily minimum	4.4 s.u.	6 s.u.
May	No reported effluent violations			
June	No reported effluent violations			
July	No reported effluent violations			
August	TSS	AWL	152 mg/L	45 mg/L
September	TSS	AWL	62 mg/L	45 mg/L
		MDL	120 mg/L	60 mg/L
			1,805 lbs/day	1,380 lbs/day
October	No reported effluent violations			
November	No reported effluent violations			
December	No reported effluent violations			

Appendix B3

JDTP Sampling Site Map



CBJ GIS Department

20151105

Appendix B4

ADEC Receiving Waterbody Monitoring Station Approval

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Environmental Conservation

DIVISION OF WATER
Wastewater Discharge Authorization Program

610 University Avenue
Fairbanks Alaska 99709-3643
Main: 907.451.2100
Toll Free: 800.510.2332
Fax: 907.451.2187
www.dec.alaska.gov

December 2, 2015

Mr. Brian Doyle
City and Borough of Juneau
Engineering & Public Works Department
2009 Radcliffe Road
Juneau, AK 99801

Re: Receiving Waterbody Monitoring Station Approval

Dear Mr. Doyle:

The Department of Environmental Conservation has reviewed your request for receiving waterbody monitoring station approval as required under Juneau-Douglas Wastewater Treatment Facility discharge permit AK0023213 Section 1.5.2. The below requested receiving waterbody monitoring stations are consistent with AK0023213 permit requirements and are therefore approved.

Station MXZ

- Southeast boundary of mixing zone during an ebb tide:
  58.282587° N latitude, 134.387845° W longitude
- Northwest boundary of mixing zone during a flood tide:
  58.283737° N latitude, 134.389644° W longitude

Station AMB

- Ambient conditions greater than 83 meters from the end of the outfall diffuser:
  58.283605° N latitude, 134.386305° W longitude

Sincerely,

Marie Klingman
Environmental Program Specialist

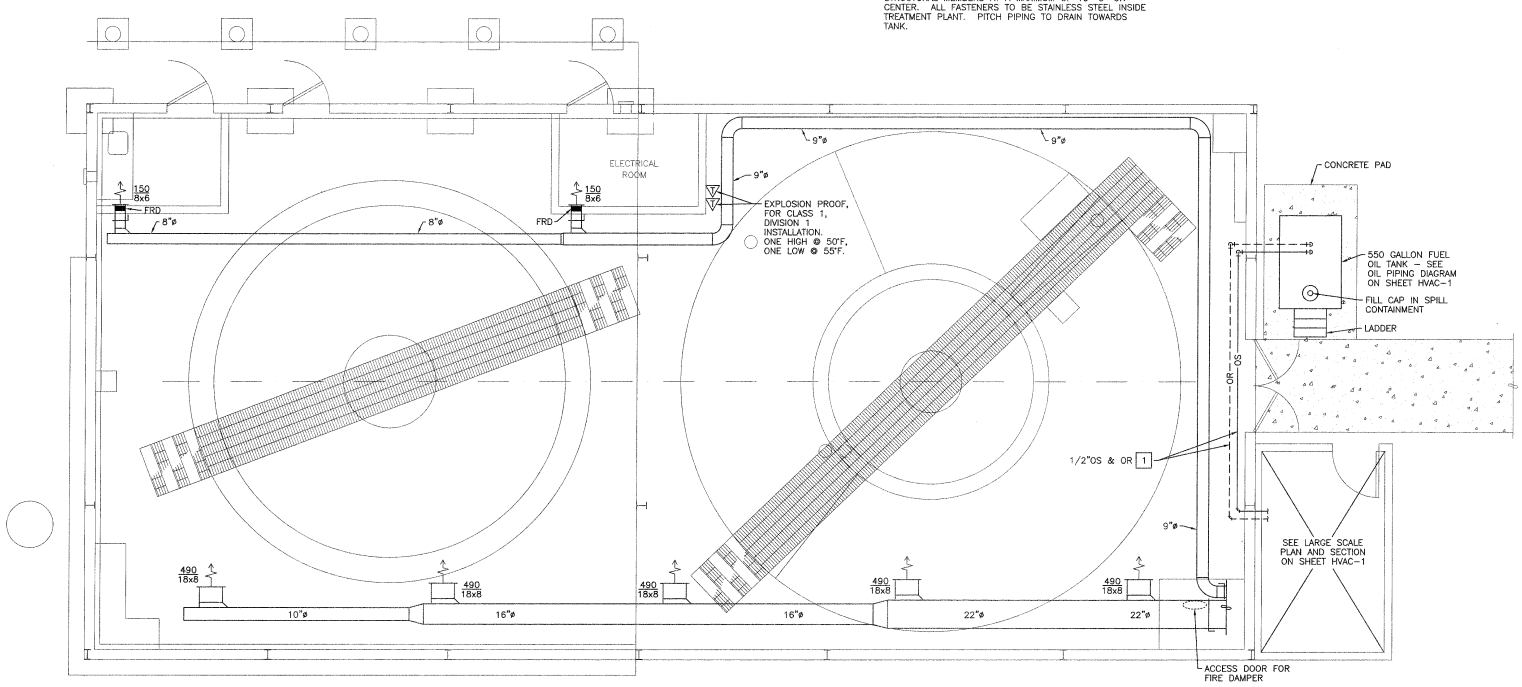
cc: Samantha Stoughtenger/CBJ
Wade Strickland/DEC

Appendix C1

ABTP Site Plan

CONSTRUCTION NOTE:

[1] OIL SUPPLY AND OIL RETURN PIPING SUPPORTED FROM GALVANIZED 1-5/8" CHANNEL FRAMING AT 6'-0" ON CENTER. CHANNEL FRAMING BOLTED TO BUILDING STRUCTURAL MEMBERS AT A MAXIMUM OF 10'-0" ON CENTER. ALL FASTENERS TO BE STAINLESS STEEL INSIDE TREATMENT PLANT. PITCH PIPING TO DRAIN TOWARDS TANK.



PLAN

1 0 5 10 FEET

AS-BUILT

REV	DATE	BY	DESCRIPTION
1	1-13-00	WAN	AS REPORTED AS-BUILT

SCALE: GRAPHIC

DATE PRINTED:

DESIGNED JR
DRAWN WN
CHECKED DM
DATE 3-5-98

CITY AND BOROUGH OF JUNEAU
AUKE BAY
WASTEWATER TREATMENT PLANT
EXPANSION
CONTRACT No. E97-003

STATE OF ALASKA 49th
DOUGLAS H. MURRAY
ME 7870
REGISTERED PROFESSIONAL ENGINEER
EXPIRATION DATE: 12-31-01

Carson Dorn Inc.
712 WEST 12TH STREET
JUNEAU, ALASKA 99801
(907) 586-4447

MURRAY & ASSOCIATES, P. C.
CONSULTING ENGINEERS
P O BOX 21081
JUNEAU, ALASKA 99802
TEL: 907 586-6622
FAX: 907 586-6066

CLARIFIER BUILDING
ADDENDUM NO. 2

DRAWING HVAC-2
SHEET No.

Appendix C2

ABTP APDES Permit & Fact Sheet

Alaska Department of Environmental Conservation

Division of Water

AUTHORIZATION TO DISCHARGE

AUTHORIZATION TO DISCHARGE UNDER THE ALASKA POLLUTANT ELIMINATION SYSTEM (APDES) FOR SMALL PUBLICLY OWNED TREATMENT WORKS AND OTHER SMALL TREATMENT WORKS PROVIDING SECONDARY TREATMENT OF DOMESTIC WASTEWATER AND DISCHARGING TO SURFACE WATER

FACILITY ASSIGNED AUTHORIZATION NUMBER: AKG572004

GENERAL PERMIT NUMBER: AKG572000
See this General Permit for all permit requirements.

The following facility is authorized to discharge in accordance with the terms of the State of Alaska General Permit AKG572000 and any site specific requirements listed in this authorization.

The authorization effective date is **November 1, 2012**

The authorization to discharge shall expire at midnight, **October 31, 2017**

SECTION 1 – RESPONSIBLE PARTY INFORMATION

Issued to:	Tom Trego, Wastewater Utilities Superintendent City and Borough of Juneau

SECTION 2 – FACILITY INFORMATION

Facility Name:	Auke Bay Wastewater Treatment Facility (WWTF)
Facility Location:	11825 Glacier Highway Juneau, Alaska
	Latitude: 58° 23' 06" N Longitude: 134° 38' 55" W
Type of Facility:	Activated Sludge Secondary Treatment Package Plant
Waterbody Discharged to:	Auke Bay
Type of Disinfection:	Chlorination

SECTION 3 –EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Effluent Compliance Point: at the end of the treatment process prior to discharge to Auke Bay

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Effluent Parameter	Units	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Minimum Daily Limit	Average Monthly Percent Removal	Sample Location	Sample Frequency	Sample Type
Flow	mgd	Report	N/A	0.16	N/A	N/A	effluent	daily (5/week)	measured
pH	standard pH units (s.u.)	N/A	N/A	9.0	6.0	N/A	effluent	3/week	grab
Total Residual Chlorine [a]	mg/L	0.5	N/A	1.0	N/A	N/A	effluent	3/week	grab
Dissolved Oxygen	mg/L	N/A	N/A	N/A	2.0	N/A	effluent	1/month	grab
Biochemical Oxygen Demand, 5-day (BOD_5)	mg/L	30	45	60	N/A	N/A	effluent [c]	1/month	grab or composite [d]
	lbs/day [b]	40	60	80					
	mg/L	report	N/A	N/A	N/A	N/A	influent [c]	1/month	grab or composite [d]
	% removal [e]	N/A	N/A	N/A	N/A	85 (minimum)	effluent and influent	1/month	calculation
Total Suspended Solids (TSS)	mg/L	30	45	60	N/A	N/A	effluent [c]	1/month	grab or composite
	lbs/day [b]	40	60	80					
	mg/L	report	N/A	N/A	N/A	N/A	influent [c]	1/month	grab or composite [d]
	% removal [e]	N/A	N/A	N/A	N/A	85 (minimum)	effluent and influent	1/month	calculation
Fecal Coliform Bacteria (FC) [f]	FC/ 100 mL	200	N/A	800	N/A	N/A	effluent	1/month	grab
Enterococci Bacteria [f]	count/100 mL	N/A	N/A	report	N/A	N/A	effluent	1/month (May-Sept) [g]	grab

Footnotes:

a. Monitoring for total residual chlorine is not required if chlorine is not used as a disinfectant or introduced elsewhere in the treatment process.
b. lbs/day = [(BOD or TSS concentration in mg/L) x (facility design flow in gpd) x (conversion factor of 8.34)/1,000,000]
c. Influent and effluent samples must be taken over approximately the same time period.
d. See Appendix C of AKG572000 permit for a definition.
e. Minimum % Removal = [(monthly average influent concentration in mg/L - monthly average effluent concentration in mg/L) / (monthly average influent concentration in mg/L)] x 100. The monthly percent removal must be calculated using the arithmetic mean of the influent value and the arithmetic mean of the effluent value for that month.
f. All fecal coliform bacteria and enterococci bacteria average results must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the quantities. For example the geometric mean of 100, 200, and 300 is $(100 \times 200 \times 300)^{1/3} = 181.7$.
g. Monitoring is only required May- Sept when discharging to marine water.

SECTION 4 – MIXING ZONE AND RECEIVING WATER INFORMATION

Receiving Area Compliance Point: boundary of the mixing zone

Mixing Zone Authorization: This discharge is assigned a mixing zone to meet the Alaska Water Quality Standards (18 AAC 70) for fecal coliform bacteria, total residual chlorine, dissolved oxygen, and pH.

Mixing Zone Description: The mixing zone for this discharge is defined as the area of 30 meter radius circle, centered over the diffuser, from the end of pipe to the surface.

Mixing zone samples should be collected, if safely possible, just outside of the mixing zone boundary. Shoreline samples must be collected from within the mixing zone at the shoreline area of human use closest to the point of discharge.

The Permittee shall provide the Department of Environmental Conservation (DEC) prior written notice if water from inside of the mixing zone is used, or is intended to be used as a water supply for aquaculture, human consumption, food processing, or contact recreation. These water uses are defined in the Alaska Water Quality Standards (18 AAC 70).

RECEIVING AREA LIMITATIONS AND MONITORING REQUIREMENTS

Mixing Zone (MZ) Parameter	Units	Monthly Average	Minimum Value	Maximum Value	Frequency of Analysis	Sample Type
Fecal Coliform Bacteria[a] (outside boundary of MZ)	FC/100 mL	14	N/A	43[b]	2/year[c]	grab
Total Residual Chlorine[d] (outside boundary of MZ)	mg/L	0.0075	N/A	0.013	2/year[c]	grab
pH (outside boundary of MZ)	s.u.	N/A	6.5	8.5	upon request[e]	grab
Dissolved Oxygen (outside boundary of MZ)	mg/L	N/A	6	17	upon request[e]	grab
Fecal Coliform Bacteria[a] (shoreline in MZ)	FC/100 mL	200	N/A	400	2/year[c]	grab
Enterococci Bacteria[a] (shoreline in MZ)	count/100 mL	N/A	N/A	report	2/year[f]	grab

Footnotes:

a. All fecal coliform bacteria and enterococci bacteria average results must be reported as the geometric mean.
b. Not more than 10% of the samples taken during the reporting period may exceed this value.
c. Twice per year shall consist of two time periods during the calendar year, (Oct. through April and May through Sept.). When sampling is not possible during the stated time period, twice per year shall be one sample in the summer and the other just before freeze up.
d. The total residual chlorine limits are not quantifiable using EPA-approved analytical methods. DEC will use the minimum level of 0.1 mg/L as the compliance evaluation level for this parameter. Monitoring for chlorine is not required if chlorine is not used as a disinfectant or introduced elsewhere in the treatment process.
e. Since exceedance of the pH and dissolved oxygen limits is not expected when the treatment system is operated according to design, monitoring is not required unless requested by DEC.
f. Monitoring of enterococci bacteria is required twice during the time period of May through September. Each sampling event should take place in a different month.

SECTION 5 – SITE SPECIFIC REQUIREMENTS
(In addition to those required in the APDES general permit.)

None

If you have any technical questions regarding this authorization or the requirements of the general permit, please contact Sally Wanstall at (907) 465-5216 or sally.wanstall@alaska.gov.

SECTION 6 – CERTIFICATION/SIGNATURE

Signature	October 1, 2012 Date
Brian Doyle Printed Name	Environmental Program Manager Title

STATE OF ALASKA AUTHORIZATION: ATTACHMENT 1

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) FOR SMALL PUBLICLY OWNED TREATMENT WORKS (POTW's) AND OTHER SMALL TREATMENT WORKS TREATING DOMESTIC SEWAGE TO SECONDARY STANDARDS AND DISCHARGING TO MARINE WATERS

FACILITY ASSIGNED NUMBER AKG-57-1000-013

NPDES PERMIT NUMBER: **AKG-57-1000**
See this General Permit for additional permit requirements

THE FOLLOWING FACILITY IS AUTHORIZED TO DISCHARGE IN ACCORDANCE WITH THE TERMS OF NPDES GENERAL PERMIT AKG-57-1000 AND ANY SITE SPECIFIC REQUIREMENTS LISTED IN THIS AUTHORIZATION:

Issued to:	City and Borough of Juneau		
Facility Name:	Auke Bay Wastewater Treatment Facility		
Location of Discharge:	Auke Bay, Alaska		
Latitude:	58° 23' 18" N	**Longitude:**	134° 38' 52" W
Waterbody or Surface discharged to:	Auke Bay		
Maximum Volume:	0.16 million gallons per day (MGD)		
Type of Disinfection:	Chlorination		
Type of Facility:	Secondary treatment plant		
NPDES Permit Category:	1		
Effluent Compliance Point	End of the treatment process prior to discharge into the receiving water		
Waterbody Compliance Point	Outer edge of the mixing zone		

SITE SPECIFIC PERMIT REQUIREMENTS UNDER THIS AUTHORIZATION (in addition to those required in the NPDES general permit):

1. This authorization is effective on July 21, 2004 and expires on July 20, 2009. The ADEC written authorization shall be effective for five (5) years. If general permit AKG 57-1000 is modified or renewed during the term of the written authorization, the new permit requirements apply.
2. See the attached discharge monitoring report for site specific limitations and monitoring requirements.
3. In response to the City and Borough of Juneau's (CBJ) request for a modified effluent total chlorine residual (TCR) limit, a compliance schedule for the Auke Bay Wastewater Treatment Facility is being implemented. The CBJ is changing the method of disinfection from chlorination to ultra-violet light disinfection. The new disinfection system will be installed and operational by December 31, 2007. In the interim period between issuance of the authorization and December

31, 2007 a modified TCR limit of 1.0 mg/l 30 day average and 2.0 mg/l daily maximum for the effluent will granted till the new ultra-violet disinfection system is operational and Approval to Operate is granted by ADEC, but no later than December 31, 2007. Beginning January 1, 2008, the TCR will return to the limits in the General permit, 0.5 mg/l 30 day average, 1.0 mg/l daily maximum.

EFFLUENT LIMITATIONS AND MONITORING:

Effluent Characteristic	Minimum Value	30 Day Average	7 Day Average	Maximum Value	Units	Frequency of Analysis	Sample Type
Total Flow (effluent or influent)	N/A	N/A	N/A	0.16	mgd	Daily 5/week	measured / recorded
5-day Biochemical Oxygen Demand (influent)	report	report	report	report	mg/l	1/month	Grab or composite[3]
	report	report	report	report	lbs/day		
5-day Biochemical Oxygen Demand (effluent)	N/A	30	45	60	mg/l	1/month	Grab or composite[3]
	N/A	40.0	60.0	80.1	lbs/day		
Total Suspended Solids (influent)	report	report	report	report	mg/l	1/month	Grab or composite[3]
	report	report	report	report	lbs/day		
Total Suspended Solids (effluent)	N/A	30	45	60	mg/l	1/month	Grab or composite[3]
	N/A	40.0	60.0	80.1	lbs/day		
TSS minimum % removal: 85%			BOD minimum % removal: 85%		%	1/month	Calculated[4]
Fecal Coliform Bacteria (effluent)[1]	N/A	200	N/A	800	FC per 100 ml	1/month	Grab
Dissolved Oxygen (effluent)	2	N/A	N/A	N/A	mg/l	1/month	Grab
pH (effluent)	6	N/A	N/A	9	S.U.	3/week	Grab
Total Residual Chlorine (effluent)[2]	N/A	1.0 till 12/31/07	N/A	2.0 till 12/31/07	mg/l	3/week	Grab
		0.5 after 12/31/07		1.0 after 12/31/07			

Footnotes

1. All effluent fecal coliform average results must be reported as the geometric mean
2. Test not required if chlorine is not used as disinfectant.
3. Composite samples must consist of at least four equal volume grab samples, two of which must be taken during periods of peak flow (7-9 a.m. and 6-8 p.m.).
4. Percent removal should be calculated with the influent and effluent concentration (mg/l).

MIXING ZONE AUTHORIZATION:

This discharge is assigned a mixing zone to meet the Alaska Water Quality Standards (18 AAC 70) for fecal coliform bacteria, chlorine, pH and dissolved oxygen. The mixing zone for this discharge is defined as the area of a 30 meter radius circle centered over the diffuser or end of pipe (if no diffuser), from the end of pipe to the surface. It shall be the responsibility of the permittee to inform this department, in writing, if water from inside of the mixing zone is used, or is intended to be used, as a water supply for aquaculture, human consumption or food processing, or if any area inside the mixing zone is used for contact water recreation or the harvesting for human consumption of raw mollusks or other raw aquatic life. These water uses are defined in the Alaska Water Quality Standards (18 AAC 70).

Mixing zone samples should be collected, if safely possible, from the down current leading edge of the plume, just outside of the mixing zone boundary. Shoreline samples, if required, must be collected from within the mixing zone at the shoreline area of human use closest to the effluent line outlet or center of the diffuser. If flow does not extend to the edge of the mixing zone boundary during the required monitoring period, sample collection is not required and the reason for the absence of flow should be indicated on the discharge monitoring report.

MIXING ZONE LIMITATIONS AND MONITORING:

Mixing Zone Characteristic	Minimum Value	30 Day Average	Maximum Value	Units	Frequency of Analysis	Sample Type
Fecal Coliform Bacteria (Outside edge of MZ)[1]	N/A	14	43[2]	FC per 100 ml	Twice per year -- 2/year[5]	Grab
Fecal Coliform Bacteria (Shoreline in MZ)[1]	N/A	NA	NA[2]	FC per 100 ml	Twice per year -- 2/year[5]	Grab
Total Chlorine[3] (Outside edge of MZ)	N/A	N/A	0.0075	mg/l	Twice per year -- 2/year[5]	Grab
pH (Outside edge of MZ)[4]	6.5	N/A	8.5	S.U.	Upon Request by ADEC	Grab
Dissolved Oxygen	6.0	N/A	17	mg/l	Upon Request by ADEC	Grab

Footnotes

1. All mixing zone fecal coliform results must be reported as the geometric mean;
2. Not more than 10% of the samples taken during the reporting period may exceed this value;
3. The Alaska Water Quality Standards, (18 AAC 70), limit is 0.0075 mg/l for total residual chlorine, but the detection limit for monitoring purposes in this permit is 0.1 mg/L; test not required if chlorine is not used as disinfectant.
4. pH for marine waters must be within 0.2 S.U. of background.
5. Twice per year shall consist of two time periods during the calendar year, (Oct. through April and May through Sept.). When sampling is not possible during the stated time period, twice per year shall be, one sample in the summer and the other just before freeze up.

WARNING SIGNS:

At least one sign must be posted near the discharge area, during discharge. The sign/s must provide the identity and telephone numbers of the discharger, must inform the public that treated wastewater is being discharged, and that users of the area should exercise caution. If a mixing zone is authorized, the sign/s must also inform the public that a mixing zone exists and shall include the size and location of the mixing zone.

SIGNATURE:

SIGNATURE ON FILE **June 23, 2004**

Signature Date

William D. McGee Technical Engineer

Printed Name Title

Discharge Monitoring Report
(DMR) – PAGE 1 of 2

Permit number: AKG-57-1000-013	Expires: July 20, 2009	Submit this report to:	ADEC and EPA to the addresses on Part D 11 of the NPDES general permit.
ADEC File number: 1513.45.009			
Applicant Name: City and Borough of Juneau		**Responsible party:**	**Scott Jeffers/WW Utilities Superintendent**
Address: 155 South Seward, Juneau, AK 99801		**Phone / email:**	**(907)586-0393**
Facility: Auke Bay Wastewater Treatment Facility		**Onsite Contact:**	**Rico Tempel**
Location: Auke Bay, Juneau		**Phone:**	**(907)586-0393**

Required Reporting Frequency Monthly	**Discharge:** Secondary treated wastewater discharged into Auke Bay	**Sample Period** **From:** **To:**

Parameter		Min. Value	30 day Average	7 day Average	Max. Value	Number of Analyses	Number of Violations	Units	Frequency of Analysis	Sample Method
Discharge 1										
Flow Rate (effluent or influent)	Estmt'd/ Measure							mgd	Daily 5/week	Measured/ recorded
	Permit Limits	N/A	report	N/A	0.16	report	report			
Biochemical Oxygen Demand (influent)	Analytical Results							mg/l	1/month	Grab or Composite
	Permit Limits	N/A	report	report	report	report	report			
Biochemical Oxygen Demand (effluent)	Analytical Results							mg/l	1/month	Grab or Composite
	Permit Limits	N/A	30	45	60	report	report			
Biochemical Oxygen Demand (effluent)	Analytical Results							lbs/day	1/month	Grab or Composite
	Permit Limits	N/A	40.0	60.0	80.1	report	report			
Biochemical Oxygen Demand % removal	Analytical Results							%	1/month	Calculated
	Permit Limits	85%	N/A	N/A	N/A	report	report			
Total Suspended Solids (influent)	Analytical Results							mg/l	1/month	Grab or Composite
	Permit Limits	N/A	report	report	report	report	report			
Total Suspended Solids (effluent)	Analytical Results							mg/l	1/month	Grab or Composite
	Permit Limits	N/A	30	45	60	report	report			
Total Suspended Solids (effluent)	Analytical Results							lbs/day	1/month	Grab or Composite
	Permit Limits	N/A	40.0	60.0	80.1	report	report			
Total Suspended Solids % removal	Analytical Results							%	1/month	Calculated
	Permit Limits	85%	N/A	N/A	N/A	report	report			
Fecal Coliform Bacteria (effluent)	Analytical Results							#/100 ml	1/month	Grab
	Permit Limits	N/A	200	N/A	800	report	report			
Dissolved Oxygen (effluent)	Analytical Results							mg/l	1/month	Grab
	Permit Limits	2	N/A	N/A	N/A	report	report			
pH (effluent)	Analytical Results							Std. Units	3/week	Grab
	Permit Limits	6	N/A	N/A	9	report	report			
Total Residual Chlorine (effluent)	Analytical Results							mg/l	3/week	Grab
	Permit Limits till 12/31/07	N/A	1.0	N/A	2.0	report	report			
	Permit Limits after 12/31/07		0.5		1.0					

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

NAME, TITLE OF PRINCIPAL EXECUTIVE OFFICER	SIGNATURE OF PRINCIPAL, EXECUTIVE OFFICER OR AUTHORIZED AGENT		
		DATE	( )_____-_____ TELEPHONE

COMMENT AND EXPLANATION OF ANY VIOLATIONS (REFERENCE ALL ATTACHMENT HERE)

_____ CHECK HERE IF THERE WAS NO DISCHARGE DURING THE ENTIRE REPORTING PERIOD

Discharge Monitoring Report
(DMR) – PAGE 2 of 2

Permit number: AKG-57-1000-013	Expires: July 20, 2009	Submit this report to:	ADEC and EPA to the addresses on Part D 11 of the NPDES general permit.
ADEC File number: 1513.45.009			

Applicant Name: City and Borough of Juneau	**Responsible party:**	**Scott Jeffers/WW Utilities Superintendent**
Address: 155 South Seward, Juneau, AK 99801	**Phone:**	**(907)586-0393**
Facility: Auke Bay Wastewater Treatment Facility	**Onsite Contact:**	**Rico Tempel**
Location: Auke Bay, Juneau	**Phone:**	**(907)586-0393**

Required Reporting Frequency Monthly	**Discharge**: Secondary treated wastewater discharged into Auke Bay.	**Sample Period**
		From:
		To:

Mixing Zone

Parameter		Min. Value	30 day Average	7 day Average	Max. Value	Number analyses	Number violations	Units	Frequency of Analysis	Sample Method
Fecal Coliform Bacteria (Edge of MZ)	Analytical Results							#/100 ml	Twice per year – 2/year	Grab
	Permit Limits	N/A	14	N/A	43	report	report			
Fecal Coliform Bacteria (Shoreline)	Analytical Results							#/100 ml	Twice per year – 2/year	Grab
	Permit Limits	N/A	NA	N/A	NA	report	report			
Dissolved Oxygen	Analytical Results							mg/l	Upon request by ADEC	Grab
	Permit Limits	6.0	N/A	N/A	17	report	report			
pH	Analytical Results							Std. Units	Upon request by ADEC	Grab
	Permit Limits	6.5	N/A	N/A	8.5	report	report			
Total Chlorine (if chlorine is used as disinfectant)	Analytical Results							mg/l	Twice per year – 2/year	Grab
	Permit Limits	N/A	N/A	N/A	0.0075	report	report			

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

NAME, TITLE OF PRINCIPAL EXECUTIVE OFFICER	**SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT**		
		DATE	( )_____-_____ TELEPHONE

COMMENT AND EXPLANATION OF ANY VIOLATIONS (REFERENCE ALL ATTACHMENT HERE)

_____ CHECK HERE IF THERE WAS NO DISCHARGE DURING THE ENTIRE REPORTING PERIOD

NPDES Compliance Hotline, Seattle, Washington. Phone: (206) 553-1846

Alaska Department of Environmental Conservation

Division of Water, Wastewater Discharge Program

Phones: ANCHORAGE (907) 269-3059, Fax: 269-7508
FAIRBANKS (907) 451-2130, Fax: 451-2187
JUNEAU (907) 465-5300, Fax: 465-5274

NONCOMPLIANCE NOTIFICATION[1]

GENERAL INFORMATION	PERMIT/AUTHORIZATION #: AKG-57-1000-013	
APPLICANT/COMPANY: City and Borough of Juneau	FACILITY NAME: Auke Bay Wastewater Treatment Facility	FACILITY LOCATION: Auke Bay, Juneau, AK
PERSON REPORTING	PHONE NUMBER OF PERSON REPORTING	REPORTED HOW? (e.g. by phone)
DATE/TIME EVENT WAS NOTICED	**DATE/TIME REPORTED**	**NAME OF ADEC STAFF CONTACTED**

VERBAL NOTIFICATION MUST BE MADE TO ADEC & EPA WITHIN 24 HOURS OF DISCOVERY

INCIDENT DETAILS (attach additional sheets, lab reports and photos as necessary)

DESCRIBE THE EVENT (include amounts of wastewater involved)

CAUSE OF EVENT (be specific)

PERMIT CONDITION DEVIATION (Identify each permit condition exceeded during the event. Attach additional sheets if necessary).

Parameter (e.g. BOD, pH)	Permit Limit	Exceedance (sample result)	Sample date

CORRECTIVE ACTIONS
Attach a description of corrective actions taken to restore the system to normal operation and to minimize or eliminate chances of recurrence.

ENVIRONMENTAL DAMAGE:	☐ Yes	☐ No	☐ Unknown	If yes, provide details below.

ACTUAL/POTENTIAL IMPACT ON ENVIRONMENT/PUBLIC HEALTH (describe in detail. Attach additional sheets as needed.)

ACTIONS TAKEN TO REDUCE OR ELIMINATE ACTUAL/POTENTAIL IMPACT ON ENVIRONMENT/PUBLIC HEALTH [(describe in detail) (e.g. Supplied drinking water to nearby well owners and informed well owners not to drink from wells until further notice)].

COMMENTS

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.

NAME: SIGNATURE: DATE:

FORMS MUST BE SENT TO DEC WITHIN 5 DAYS OF THE EVENT.

1. Includes noncompliance caused by upset. Note that there are other noncompliance reporting that do not require 24 hour reporting. See Part III H of the general permit.

NPDES Compliance Hotline, Seattle, Washington. Phone: (206) 553-1846

Alaska Department of Environmental Conservation

Division of Water, Wastewater Discharge Program

Phones: ANCHORAGE (907) 269-3059, Fax: 269-7508
FAIRBANKS (907) 451-2130, Fax: 451-2187
JUNEAU (907) 465-5300, Fax: 465-5274

ACCIDENTAL DISCHARGE / SPILL NOTIFICATION[1]

GENERAL INFORMATION:	PERMIT/AUTHORIZATION #: AKG-57-1000-013	
APPLICANT/COMPANY: City and Borough of Juneau	FACILITY NAME: Auke Bay Wastewater Treatment Facility	FACILITY LOCATION Auke Bay, Juneau, AK
PERSON REPORTING	PHONE NUMBER OF PERSON REPORTING	REPORTED HOW? (e.g. by phone)
DATE/TIME OF SPILL	**DATE/TIME REPORTED**	**NAME OF DEC STAFF CONTACTED**

VERBAL NOTIFICATION MUST BE MADE TO ADEC & EPA WITHIN 24 HOURS OF DISCOVERY OF SPILL.

INCIDENT DETAILS (attach additional sheets, lab reports and photos as necessary)

PRODUCT SPILLED (e.g. sewage, secondary treated & disinfected wastewater, glycol, etc)		**SOURCE OF SPILL**	
QUANTITY SPILLED (volume or weight)	**QUANTITY CONTAINED**	**QUANTITY RECOVERED**	**QUANTITY DISPOSED**

CAUSE OF SPILL AND ACTIONS TAKEN TO CORRECT THE CAUSE (be specific)

CLEANUP ACTIONS (describe in detail)

DISPOSAL METHODS AND LOCATION (describe in detail)

STATUS OF CLEANUP ACTIONS (If clean up has not begun, provide estimated time to begin and complete clean up and reasons for the delay)

SURFACE AREA AFFECTED (square feet):	**SURFACE TYPE (e.g. tundra, land covered with snow, etc):**

ENVIRONMENTAL DAMAGE:	☐ Yes	☐ No	☐ Unknown	If yes, provide details below.

ACTUAL/POTENTIAL IMPACT ON ENVIRONMENT/PUBLIC HEALTH (describe in detail)

COMMENTS

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.

Name Signature Date

FORMS MUST BE SENT TO DEC WITHIN 5 DAYS OF THE EVENT.

1. Includes all overflows and unanticipated bypass that exceeds the effluent limits in the authorization.

STATE OF ALASKA AUTHORIZATION: ATTACHMENT 1

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) FOR SMALL PUBLICLY OWNED TREATMENT WORKS (POTW's) AND OTHER SMALL TREATMENT WORKS TREATING DOMESTIC SEWAGE TO SECONDARY STANDARDS AND DISCHARGING TO MARINE WATERS

FACILITY ASSIGNED NUMBER AKG-57-1000-013

NPDES PERMIT NUMBER: **AKG-57-1000**
See this General Permit for additional permit requirements

THE FOLLOWING FACILITY IS AUTHORIZED TO DISCHARGE IN ACCORDANCE WITH THE TERMS OF NPDES GENERAL PERMIT AKG-57-1000 AND ANY SITE SPECIFIC REQUIREMENTS LISTED IN THIS AUTHORIZATION:

Issued to:	City and Borough of Juneau		
Facility Name:	Auke Bay Wastewater Treatment Facility		
Location of Discharge:	Auke Bay, Alaska		
Latitude:	58° 23' 18" N	**Longitude:**	134° 38' 52" W
Waterbody or Surface discharged to:	Auke Bay		
Maximum Volume:	0.16 million gallons per day (MGD)		
Type of Disinfection:	Chlorination		
Type of Facility:	Secondary treatment plant		
NPDES Permit Category:	1		
Effluent Compliance Point	End of the treatment process prior to discharge into the receiving water		
Waterbody Compliance Point	Outer edge of the mixing zone		

SITE SPECIFIC PERMIT REQUIREMENTS UNDER THIS AUTHORIZATION (in addition to those required in the NPDES general permit):

1. This authorization is effective on July 21, 2004 and expires on July 20, 2009. The ADEC written authorization shall be effective for five (5) years. If general permit AKG 57-1000 is modified or renewed during the term of the written authorization, the new permit requirements apply.
2. See the attached discharge monitoring report for site specific limitations and monitoring requirements.
3. In response to the City and Borough of Juneau's (CBJ) request for a modified effluent total chlorine residual (TCR) limit, a compliance schedule for the Auke Bay Wastewater Treatment Facility is being implemented. The CBJ is changing the method of disinfection from chlorination to ultra-violet light disinfection. The new disinfection system will be installed and operational by December 31, 2007. In the interim period between issuance of the authorization and December

31, 2007 a modified TCR limit of 1.0 mg/l 30 day average and 2.0 mg/l daily maximum for the effluent will granted till the new ultra-violet disinfection system is operational and Approval to Operate is granted by ADEC, but no later than December 31, 2007. Beginning January 1, 2008, the TCR will return to the limits in the General permit, 0.5 mg/l 30 day average, 1.0 mg/l daily maximum.

EFFLUENT LIMITATIONS AND MONITORING:

Effluent Characteristic	Minimum Value	30 Day Average	7 Day Average	Maximum Value	Units	Frequency of Analysis	Sample Type
Total Flow (effluent or influent)	N/A	N/A	N/A	0.16	mgd	Daily 5/week	measured / recorded
5-day Biochemical Oxygen Demand (influent)	report	report	report	report	mg/l	1/month	Grab or composite[3]
	report	report	report	report	lbs/day		
5-day Biochemical Oxygen Demand (effluent)	N/A	30	45	60	mg/l	1/month	Grab or composite[3]
	N/A	40.0	60.0	80.1	lbs/day		
Total Suspended Solids (influent)	report	report	report	report	mg/l	1/month	Grab or composite[3]
	report	report	report	report	lbs/day		
Total Suspended Solids (effluent)	N/A	30	45	60	mg/l	1/month	Grab or composite[3]
	N/A	40.0	60.0	80.1	lbs/day		
TSS minimum % removal: 85%			BOD minimum % removal: 85%		%	1/month	Calculated[4]
Fecal Coliform Bacteria (effluent)[1]	N/A	200	N/A	800	FC per 100 ml	1/month	Grab
Dissolved Oxygen (effluent)	2	N/A	N/A	N/A	mg/l	1/month	Grab
pH (effluent)	6	N/A	N/A	9	S.U.	3/week	Grab
Total Residual Chlorine (effluent)[2]	N/A	1.0 till 12/31/07	N/A	2.0 till 12/31/07	mg/l	3/week	Grab
		0.5 after 12/31/07		1.0 after 12/31/07			

Footnotes

1. All effluent fecal coliform average results must be reported as the geometric mean
2. Test not required if chlorine is not used as disinfectant.
3. Composite samples must consist of at least four equal volume grab samples, two of which must be taken during periods of peak flow (7-9 a.m. and 6-8 p.m.).
4. Percent removal should be calculated with the influent and effluent concentration (mg/l).

MIXING ZONE AUTHORIZATION:

This discharge is assigned a mixing zone to meet the Alaska Water Quality Standards (18 AAC 70) for fecal coliform bacteria, chlorine, pH and dissolved oxygen. The mixing zone for this discharge is defined as the area of a 30 meter radius circle centered over the diffuser or end of pipe (if no diffuser), from the end of pipe to the surface. It shall be the responsibility of the permittee to inform this department, in writing, if water from inside of the mixing zone is used, or is intended to be used, as a water supply for aquaculture, human consumption or food processing, or if any area inside the mixing zone is used for contact water recreation or the harvesting for human consumption of raw mollusks or other raw aquatic life. These water uses are defined in the Alaska Water Quality Standards (18 AAC 70).

Mixing zone samples should be collected, if safely possible, from the down current leading edge of the plume, just outside of the mixing zone boundary. Shoreline samples, if required, must be collected from within the mixing zone at the shoreline area of human use closest to the effluent line outlet or center of the diffuser. If flow does not extend to the edge of the mixing zone boundary during the required monitoring period, sample collection is not required and the reason for the absence of flow should be indicated on the discharge monitoring report.

MIXING ZONE LIMITATIONS AND MONITORING:

Mixing Zone Characteristic	Minimum Value	30 Day Average	Maximum Value	Units	Frequency of Analysis	Sample Type
Fecal Coliform Bacteria (Outside edge of MZ)[1]	N/A	14	43[2]	FC per 100 ml	Twice per year -- 2/year[5]	Grab
Fecal Coliform Bacteria (Shoreline in MZ)[1]	N/A	NA	NA[2]	FC per 100 ml	Twice per year -- 2/year[5]	Grab
Total Chlorine[3] (Outside edge of MZ)	N/A	N/A	0.0075	mg/l	Twice per year -- 2/year[5]	Grab
pH (Outside edge of MZ)[4]	6.5	N/A	8.5	S.U.	Upon Request by ADEC	Grab
Dissolved Oxygen	6.0	N/A	17	mg/l	Upon Request by ADEC	Grab

Footnotes

1. All mixing zone fecal coliform results must be reported as the geometric mean;
2. Not more than 10% of the samples taken during the reporting period may exceed this value;
3. The Alaska Water Quality Standards, (18 AAC 70), limit is 0.0075 mg/l for total residual chlorine, but the detection limit for monitoring purposes in this permit is 0.1 mg/L; test not required if chlorine is not used as disinfectant.
4. pH for marine waters must be within 0.2 S.U. of background.
5. Twice per year shall consist of two time periods during the calendar year, (Oct. through April and May through Sept.). When sampling is not possible during the stated time period, twice per year shall be, one sample in the summer and the other just before freeze up.

WARNING SIGNS:

At least one sign must be posted near the discharge area, during discharge. The sign/s must provide the identity and telephone numbers of the discharger, must inform the public that treated wastewater is being discharged, and that users of the area should exercise caution. If a mixing zone is authorized, the sign/s must also inform the public that a mixing zone exists and shall include the size and location of the mixing zone.

SIGNATURE:

SIGNATURE ON FILE **June 23, 2004**

Signature | Date

William D. McGee | Technical Engineer

Printed Name | Title

Discharge Monitoring Report
(DMR) – PAGE 1 of 2

Permit number: AKG-57-1000-013	Expires: July 20, 2009	Submit this report to:	ADEC and EPA to the addresses on Part D 11 of the NPDES general permit.
ADEC File number: 1513.45.009			
Applicant Name: City and Borough of Juneau		**Responsible party:**	**Scott Jeffers/WW Utilities Superintendent**
Address: 155 South Seward, Juneau, AK 99801		**Phone / email:**	**(907)586-0393**
Facility: Auke Bay Wastewater Treatment Facility		**Onsite Contact:**	**Rico Tempel**
Location: Auke Bay, Juneau		**Phone:**	**(907)586-0393**

Required Reporting Frequency Monthly	**Discharge:** Secondary treated wastewater discharged into Auke Bay	**Sample Period** **From:** **To:**

Parameter		Min. Value	30 day Average	7 day Average	Max. Value	Number of Analyses	Number of Violations	Units	Frequency of Analysis	Sample Method
Discharge 1										
Flow Rate (effluent or influent)	Estmt'd/ Measure							mgd	Daily 5/week	Measured/ recorded
	Permit Limits	N/A	report	N/A	0.16	report	report			
Biochemical Oxygen Demand (influent)	Analytical Results							mg/l	1/month	Grab or Composite
	Permit Limits	N/A	report	report	report	report	report			
Biochemical Oxygen Demand (effluent)	Analytical Results							mg/l	1/month	Grab or Composite
	Permit Limits	N/A	30	45	60	report	report			
Biochemical Oxygen Demand (effluent)	Analytical Results							lbs/day	1/month	Grab or Composite
	Permit Limits	N/A	40.0	60.0	80.1	report	report			
Biochemical Oxygen Demand % removal	Analytical Results							%	1/month	Calculated
	Permit Limits	85%	N/A	N/A	N/A	report	report			
Total Suspended Solids (influent)	Analytical Results							mg/l	1/month	Grab or Composite
	Permit Limits	N/A	report	report	report	report	report			
Total Suspended Solids (effluent)	Analytical Results							mg/l	1/month	Grab or Composite
	Permit Limits	N/A	30	45	60	report	report			
Total Suspended Solids (effluent)	Analytical Results							lbs/day	1/month	Grab or Composite
	Permit Limits	N/A	40.0	60.0	80.1	report	report			
Total Suspended Solids % removal	Analytical Results							%	1/month	Calculated
	Permit Limits	85%	N/A	N/A	N/A	report	report			
Fecal Coliform Bacteria (effluent)	Analytical Results							#/100 ml	1/month	Grab
	Permit Limits	N/A	200	N/A	800	report	report			
Dissolved Oxygen (effluent)	Analytical Results							mg/l	1/month	Grab
	Permit Limits	2	N/A	N/A	N/A	report	report			
pH (effluent)	Analytical Results							Std. Units	3/week	Grab
	Permit Limits	6	N/A	N/A	9	report	report			
Total Residual Chlorine (effluent)	Analytical Results							mg/l	3/week	Grab
	Permit Limits till 12/31/07	N/A	1.0	N/A	2.0	report	report			
	Permit Limits after 12/31/07		0.5		1.0					

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

NAME, TITLE OF PRINCIPAL EXECUTIVE OFFICER	**SIGNATURE OF PRINCIPAL, EXECUTIVE OFFICER OR AUTHORIZED AGENT**		
		DATE	( )_____-_____ TELEPHONE

COMMENT AND EXPLANATION OF ANY VIOLATIONS (REFERENCE ALL ATTACHMENT HERE)

_____ CHECK HERE IF THERE WAS NO DISCHARGE DURING THE ENTIRE REPORTING PERIOD

Discharge Monitoring Report
(DMR) – PAGE 2 of 2

Permit number: AKG-57-1000-013	Expires: July 20, 2009	Submit this report to:	ADEC and EPA to the addresses on Part D 11 of the NPDES general permit.
ADEC File number: 1513.45.009			

Applicant Name: City and Borough of Juneau	**Responsible party:**	**Scott Jeffers/WW Utilities Superintendent**
Address: 155 South Seward, Juneau, AK 99801	**Phone:**	**(907)586-0393**
Facility: Auke Bay Wastewater Treatment Facility	**Onsite Contact:**	**Rico Tempel**
Location: Auke Bay, Juneau	**Phone:**	**(907)586-0393**

Required Reporting Frequency Monthly	**Discharge**: Secondary treated wastewater discharged into Auke Bay.	**Sample Period**
		From:
		To:

Mixing Zone

Parameter		Min. Value	30 day Average	7 day Average	Max. Value	Number analyses	Number violations	Units	Frequency of Analysis	Sample Method
Fecal Coliform Bacteria (Edge of MZ)	Analytical Results							#/100 ml	Twice per year – 2/year	Grab
	Permit Limits	N/A	14	N/A	43	report	report			
Fecal Coliform Bacteria (Shoreline)	Analytical Results							#/100 ml	Twice per year – 2/year	Grab
	Permit Limits	N/A	NA	N/A	NA	report	report			
Dissolved Oxygen	Analytical Results							mg/l	Upon request by ADEC	Grab
	Permit Limits	6.0	N/A	N/A	17	report	report			
pH	Analytical Results							Std. Units	Upon request by ADEC	Grab
	Permit Limits	6.5	N/A	N/A	8.5	report	report			
Total Chlorine (if chlorine is used as disinfectant)	Analytical Results							mg/l	Twice per year – 2/year	Grab
	Permit Limits	N/A	N/A	N/A	0.0075	report	report			

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

NAME, TITLE OF PRINCIPAL EXECUTIVE OFFICER	**SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT**		
			( )_____-_____
		DATE	TELEPHONE

COMMENT AND EXPLANATION OF ANY VIOLATIONS (REFERENCE ALL ATTACHMENT HERE)

_____ CHECK HERE IF THERE WAS NO DISCHARGE DURING THE ENTIRE REPORTING PERIOD

NPDES Compliance Hotline, Seattle, Washington. Phone: (206) 553-1846

Alaska Department of Environmental Conservation

Division of Water, Wastewater Discharge Program

Phones: ANCHORAGE (907) 269-3059, Fax: 269-7508
FAIRBANKS (907) 451-2130, Fax: 451-2187
JUNEAU (907) 465-5300, Fax: 465-5274

NONCOMPLIANCE NOTIFICATION[1]

GENERAL INFORMATION	PERMIT/AUTHORIZATION #: AKG-57-1000-013	
APPLICANT/COMPANY: City and Borough of Juneau	FACILITY NAME: Auke Bay Wastewater Treatment Facility	FACILITY LOCATION: Auke Bay, Juneau, AK
PERSON REPORTING	PHONE NUMBER OF PERSON REPORTING	REPORTED HOW? (e.g. by phone)
DATE/TIME EVENT WAS NOTICED	**DATE/TIME REPORTED**	**NAME OF ADEC STAFF CONTACTED**

VERBAL NOTIFICATION MUST BE MADE TO ADEC & EPA WITHIN 24 HOURS OF DISCOVERY

INCIDENT DETAILS (attach additional sheets, lab reports and photos as necessary)

DESCRIBE THE EVENT (include amounts of wastewater involved)

CAUSE OF EVENT (be specific)

PERMIT CONDITION DEVIATION (Identify each permit condition exceeded during the event. Attach additional sheets if necessary).

Parameter (e.g. BOD, pH)	Permit Limit	Exceedance (sample result)	Sample date

CORRECTIVE ACTIONS
Attach a description of corrective actions taken to restore the system to normal operation and to minimize or eliminate chances of recurrence.

ENVIRONMENTAL DAMAGE:	☐ Yes	☐ No	☐ Unknown	If yes, provide details below.

ACTUAL/POTENTIAL IMPACT ON ENVIRONMENT/PUBLIC HEALTH (describe in detail. Attach additional sheets as needed.)

ACTIONS TAKEN TO REDUCE OR ELIMINATE ACTUAL/POTENTAIL IMPACT ON ENVIRONMENT/PUBLIC HEALTH [(describe in detail) (e.g. Supplied drinking water to nearby well owners and informed well owners not to drink from wells until further notice)].

COMMENTS

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.

NAME: SIGNATURE: DATE:

FORMS MUST BE SENT TO DEC WITHIN 5 DAYS OF THE EVENT.

1. Includes noncompliance caused by upset. Note that there are other noncompliance reporting that do not require 24 hour reporting. See Part III H of the general permit.

NPDES Compliance Hotline, Seattle, Washington. Phone: (206) 553-1846

Alaska Department of Environmental Conservation

Division of Water, Wastewater Discharge Program

Phones: ANCHORAGE (907) 269-3059, Fax: 269-7508
FAIRBANKS (907) 451-2130, Fax: 451-2187
JUNEAU (907) 465-5300, Fax: 465-5274

ACCIDENTAL DISCHARGE / SPILL NOTIFICATION[1]

GENERAL INFORMATION:	PERMIT/AUTHORIZATION #: AKG-57-1000-013	
APPLICANT/COMPANY: City and Borough of Juneau	FACILITY NAME: Auke Bay Wastewater Treatment Facility	FACILITY LOCATION Auke Bay, Juneau, AK
PERSON REPORTING	PHONE NUMBER OF PERSON REPORTING	REPORTED HOW? (e.g. by phone)
DATE/TIME OF SPILL	**DATE/TIME REPORTED**	**NAME OF DEC STAFF CONTACTED**

VERBAL NOTIFICATION MUST BE MADE TO ADEC & EPA WITHIN 24 HOURS OF DISCOVERY OF SPILL.

INCIDENT DETAILS (attach additional sheets, lab reports and photos as necessary)

PRODUCT SPILLED (e.g. sewage, secondary treated & disinfected wastewater, glycol, etc)	**SOURCE OF SPILL**		
QUANTITY SPILLED (volume or weight)	**QUANTITY CONTAINED**	**QUANTITY RECOVERED**	**QUANTITY DISPOSED**

CAUSE OF SPILL AND ACTIONS TAKEN TO CORRECT THE CAUSE (be specific)

CLEANUP ACTIONS (describe in detail)

DISPOSAL METHODS AND LOCATION (describe in detail)

STATUS OF CLEANUP ACTIONS (If clean up has not begun, provide estimated time to begin and complete clean up and reasons for the delay)

SURFACE AREA AFFECTED (square feet):	**SURFACE TYPE (e.g. tundra, land covered with snow, etc):**

ENVIRONMENTAL DAMAGE:	☐ Yes	☐ No	☐ Unknown	**If yes, provide details below.**

ACTUAL/POTENTIAL IMPACT ON ENVIRONMENT/PUBLIC HEALTH (describe in detail)

COMMENTS

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.

Name Signature Date

FORMS MUST BE SENT TO DEC WITHIN 5 DAYS OF THE EVENT.

1. Includes all overflows and unanticipated bypass that exceeds the effluent limits in the authorization.

ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM (APDES) PERMIT FACT SHEET

General Permit Number: AKG572000

Small Publicly Owned Treatment Works (POTWs) and other Small Treatment Works Providing Secondary Treatment of Domestic Wastewater and Discharging to Surface Water

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501

Public Comment Start Date: June 5, 2012
Public Comment Expiration Date: July 5, 2012

Technical Contact: Marie Klingman
Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
610 University Avenue
Fairbanks, Alaska 99709
Phone: (907) 451-2101
marie.klingman@alaska.gov

The Alaska Department of Environmental Conservation (the Department or DEC) has reissued APDES general permit to small POTWs and other small privately-owned treatment works providing secondary treatment of domestic wastewater discharging to waters of the United States (U.S.) in the State of Alaska. The general permit places conditions on the discharge of pollutants from authorized facilities to waters of the U.S. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the authorized facilities and outlines best management practices to which the facility must adhere.

This fact sheet explains the nature of potential discharges from small domestic wastewater facilities and the development of the permit including:

- a listing of effluent limitations, monitoring requirements and other conditions;
- technical material supporting the conditions in the permit; and
- information on appeal procedures.

Appeals Process

The Department has both an informal review process and a formal administrative appeal process for final APDES permit decisions. An informal review request must be delivered within 15 days after receiving the Department's decision to the Director, Division of Water at the following address:

Director of Water
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501

Interested persons can review 18 AAC 15.185 for the procedures and substantive requirements regarding a request for an informal Department review.

See http://www.dec.state.ak.us/commish/InformalReviews.htm for information regarding informal reviews of Department decisions.

An adjudicatory hearing request must be delivered to the Commissioner of the Department within 30 days of the permit decision or a decision issued under the informal review process. An adjudicatory hearing will be conducted by an administrative law judge in the Office of Administrative Hearings within the Department of Administration. A written request for an adjudicatory hearing shall be delivered to the Commissioner at the following address:

Commissioner
Alaska Department of Environmental Conservation
410 Willoughby Street, Suite 303
Juneau, AK 99811-1800

Interested persons can review 18 AAC 15.200 for the procedures and substantive requirements regarding a request for an adjudicatory hearing. See http://www.dec.state.ak.us/commish/ReviewGuidance.htm for information regarding appeals of Department decisions.

Documents are Available

The permit, fact sheet, application, and related documents can be obtained by visiting or contacting DEC between 8:00 a.m. and 4:30 p.m. Monday through Friday at the addresses below. The permit, fact sheet, application, and other information are also located on the Department's Wastewater Discharge Authorization Program website: http://www.dec.state.ak.us/water/wwdp/index.htm .

Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501
(907) 269-6285

Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
610 University Avenue
Fairbanks, AK 99709
(907) 451-2183

Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
410 Willoughby Avenue, Suite 310
Juneau, AK 99801
(907) 465-5180

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1.0 INTRODUCTION

1.1 Basis for Issuance of a General Permit

Section 301(a) of the Clean Water Act (CWA) and 18 AAC 83.015 provided that the discharge of pollutants is unlawful except in accordance with an APDES permit. Although such permits are usually issued to individual dischargers, DEC regulations at 18 AAC 83.205 authorize Departmental issuance of general permits to categories or subcategories of discharges within existing geographic or political boundaries when

1.1.1 a number of point sources involve the same or substantially similar types of operations;

1.1.2 discharge the same types of wastes;

1.1.3 require the same effluent limits or operating conditions;

1.1.4 require the same or similar monitoring requirements; and

1.1.5 in the opinion of the Department, are more appropriately controlled under a general permit than under individual permits.

A violation of a condition contained in a general permit constitutes a violation of the CWA and subjects the owner or operator of the permitted discharge to the penalties specified in Section 309 of the CWA.

1.2 Permit Issuance History

In 2004, the Environmental Protection Agency (EPA) identified approximately 100 small publicly owned treatment works (POTWs) and privately-owned treatment works in Alaska as candidates for general permit coverage. These were smaller facilities discharging less than 1.0 million gallons per day (mgd) treating predominately domestic wastewater and discharging to waters of the U.S. in the State of Alaska. The types of operations at these facilities, the waste, operating conditions, effluent limits, and monitoring requirements were all similar in this group. Therefore, EPA determined that a general permit was an appropriate National Pollutant Discharge Elimination System permit mechanism for these dischargers.

Upon further evaluation by EPA, it was concluded that two general permits were necessary to address the low-volume domestic discharges in the State, one for facilities that discharged to freshwater (AKG570000) and one for facilities that discharged to marine water (AKG571000). Because Alaska Water Quality Standards (WQS) contain permit limitations that are different for freshwater and marine dischargers, EPA opted for two general permits in order to clarify the requirements.

Both general permits were assigned effective dates of July 21, 2004 and corresponding expiration date of July 21, 2009. In accordance with 18 AAC 83.155, facilities authorized to discharge domestic wastewater under these permits have been operating

under an administrative extension since the permits' expiration (i.e. the conditions of the prior permits remain in effect and enforceable until a new permit is issued by the Department).

The Department is now reissuing AKG570000 and AKG571000 under general permit number AKG572000. This reissued general permit only authorizes discharges from facilities that use a mechanical means to treat domestic wastewater and that discharge to surface water. AKG572000 specifically re-authorizes existing discharges and authorizes new discharges from publicly and privately owned domestic wastewater treatment facilities (WWTFs) in the State of Alaska. Facilities previously authorized to discharge under either AKG570000 or AKG571000 that do not qualify for coverage under AKG572000 (i.e. lagoons, common collectors, etc.) will be administratively extended under the expired general permits until the Department provides coverage for them under a new general permit in the near future. Types of facilities and discharges not covered by AKG572000 are listed in part 1.3 of the permit.

There are approximately 50 facilities that were authorized to discharge to freshwater under AKG57000 or marine water under AKG571000 that are eligible for coverage under the reissued general permit. The facilities previously covered under general permits AKG570000 and AKG571000, as well as those facilities that the Department determines to be qualified for coverage under the reissued permit, will be granted automatic coverage under AKG572000. These facilities are listed in Appendix D of the general permit.

1.3 Description of WWTF Operations

The operations at WWTFs that will be covered under the general permit generally include preliminary processes (e.g. pumping, screening, and grit removal), primary settling treatment in large primary clarifiers or sedimentation tanks to remove settleable suspended solids, and biological secondary treatment processes. The secondary treatment step is often achieved by an activated sludge system in which wastewater is continuously fed into an aerated tank where it is mixed with an active mass of microorganisms (i.e. activated sludge) capable of aerobically degrading organic matter. After a specific treatment time, the mixed liquor passes into a secondary clarifier where the sludge settles under quiescent conditions and a clarified effluent is produced for discharge. Most facilities provide some level of disinfection either via chlorination or ultra-violet radiation prior to discharge as well.

Advanced technologies used increasingly in Alaska include membrane bioreactors (MBRs). MBRs combine the use of biological processes and membrane technology to provide a high standard of wastewater treatment. Instead of the secondary clarifier used in the activated sludge process, flow in the MBR system passes through a microporous membrane while solids and large bacteria remain in the treatment system for biological degradation. MBRs can operate at longer solids detention times, thereby not only enhancing the treatment of organic matter, but producing less waste biosolids (or sludge).

The waste biosolids generated by the treatment processes is generally thickened and processed for ultimate disposal. Dewatered biosolids in Alaska are generally either co-incinerated, placed in the municipal solid waste landfill, or land applied. However, biosolids handling and disposal are regulated under separate federal regulations and therefore are not addressed by the general permit.

2.0 PERMIT COVERAGE

2.1 Facilities and Discharges Covered by the Permit

Coverage under the general permit will be limited to WWTFs that treat primarily domestic wastewater to secondary treatment standards, have an actual flow and design flow of less than 1.0 mgd, and that discharge to surface water.

The WWTFs pre-selected for coverage under the general permit use processes similar to the description of operations described in fact sheet section 1.3. These facilities are listed in two tables of Appendix D of the permit. Appendix D, Table A contains a list of WWTFs that were authorized to discharge under the administratively extended AKG570000 and AKG5710000 general permits, and Appendix D, Table B contains a list of WWTFs that submitted a notice of intent (NOI) requesting permit coverage after the expiration date of the 2004 EPA-issued general permits as well as WWTFs that were previously covered under state permits.

See part 1.3 of the general permit for facilities and discharges that are not covered by the permit.

2.2 Automatic Coverage

18 AAC 83.210(h) provides that the Department may notify a discharger that their discharge is covered by a general permit even if the discharger has not submitted a NOI seeking coverage. A discharger so notified may request an individual permit under 18 AAC 83.215(b).

WWTFs authorized under the administratively extended AKG570000 and AKG571000 EPA-issued general permits with the exception of those facilities that are excluded under part 1.3 of the permit, will receive automatic coverage. Upon permit coverage, an authorization letter identifying a new APDES authorization number and a copy of the final general permit and fact sheet will be sent to qualified facilities. Authorization to discharge under the general permit does not begin until the permittee receives a written notice of authorization from the Department.

As previously mentioned, 18 AAC 83.215(b) allows any owner or operator authorized by a general permit to request to be excluded from the coverage of the general permit by applying for an individual permit. The responsible party shall submit an individual permit application (Form 2A and Form 2M if requesting a mixing zone) with reasons supporting the request to the Department no later than 90 days after the publication of the general permit. The request shall be processed under the provisions of 18 AAC

83.115 and 18 AAC 83.120. The Department will grant the request by issuing an individual permit if the reasons cited by the responsible party are adequate to support the request.

A permittee who already has authorization to discharge under an individual permit may request general permit coverage. If the Department approves coverage under a general permit, the individual permit is revoked.

2.3 Applying for Coverage

The Department anticipates that there are additional facilities that could obtain coverage under the general permit. These include facilities that are currently operating as well as new facilities. The procedure for obtaining authorization to discharge under the general permit is as follows:

a) The eligible facility submits a completed NOI to the Department at least 30 days before the expected start of discharge. See part 1.4 of the general permit for specific notification requirements.

b) The Department reviews the NOI for completeness.

c) If the NOI is considered complete and the facility is considered eligible for coverage under the general permit, the Department sends the permittee a written notice of authorization. Authorization to discharge under the general permit does not begin until the permittee receives a written notice of authorization from the Department. If the Department determines that the NOI is not complete, the Department will request that additional information be submitted. If the Department determines that the facility is not eligible for coverage under the general permit, authorization will be denied and, if appropriate, the applicant will be directed to submit an application for an individual permit.

3.0 EFFLUENT LIMITS

3.1 Basis for Permit Limits

In general, the CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBELs) or water quality-based effluent limits (WQBELs). TBELs are set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the WQS of a waterbody are met and may be more stringent than TBELs. A discussion of the basis for the effluent limits contained in AKG572000 follows.

3.2 Technology-Based Effluent Limits

5-Day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), pH, and Total Residual Chlorine (TRC)

The CWA requires a POTW to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required technology-based

performance level, referred to as “secondary treatment,” that all POTWs were required to meet by July 1, 1977. “Secondary treatment” TBELs are established in 40 Code of Federal Regulations (CFR) §133.102 [which are adopted by reference at 18 AAC 83.010(e)]. The TBELs apply to all POTWs and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of the pollutants BOD_5, TSS, and pH.

Per 40 CFR §125.3(c)(2), the Department is also using best professional judgment under section 402(a)(1) of the CWA to implement case-by-case technology-based secondary treatment requirements for non-POTWs (i.e. privately-owned treatment facilities) authorized to discharge domestic wastewater under this general permit. The secondary treatment requirements found in 40 CFR §133.102 were promulgated specifically for POTWs. While secondary requirements only directly apply to POTWs, the Department is applying secondary treatment standards to the privately-owned treatment facilities covered by this permit as they are identical to POTWs in mechanics and treatment efficacy, and accordingly, (the secondary standards) provide the most meaningful baseline pollutant control guidelines for this sector of privately-owned treatment facilities.

Monthly, weekly, and percent removal BOD_5 and TSS effluent requirements as well as pH minimum and maximum effluent limits may be found in the federal secondary treatment regulations at 40 CFR Part 133. Additionally, a maximum daily limit (MDL) of 60 milligrams per liter (mg/L) for BOD_5 and TSS is included in the general permit (as was required in the previous general permits) to meet the conditions of 18 AAC 83.480 (reissued permits) that require effluent limits, standards, or conditions to be at least as stringent as the final effluent limits, standards, or conditions in the previous permit.

The TRC limit of 0.5 mg/L is not found at 40 CFR §133.102 [adopted by reference at 18 AAC 83.010(e)] nor is it a state regulation; rather it is derived from standard domestic wastewater treatment operating practices. The Water Pollution Control Federation's (WPCF) Chlorination of Wastewater (1976), indicates that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual concentration is maintained after 15 minutes of contact time. The WPCF concluded that a treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/L limit on a monthly average basis.

An average monthly limit (AML) of 0.5 mg/L for TRC was applied as a TBEL in the previous general permits for facilities with authorized TRC mixing zones. (see fact sheet section 4.0 for a discussion on mixing zones). The general permits also contained a TRC MDL of 1.0 mg/L. Consistent with the conditions of 18 AAC 83.480 (reissued permits) that require effluent limits, standards, or conditions to be at least as stringent as the final effluent limits, standards, or conditions in the previous permit, and in the absence of new information to indicate TRC technological advances that would alter the WPCF’s 1976 conclusions, the TRC limits that were applied as TBELs in the previous general permits are being applied as TRC TBELs in AKG572000.

TBELs for this general permit are presented in Table 1.

Table 1: Technology-Based Effluent Limits

Parameter	Average Monthly Limit (mg/L)	Average Weekly Limit (mg/L)	Maximum Daily Limit (mg/L)	Percent Removal (%)
5-Day Biochemical Oxygen Demand	30	45	60	85
Total Suspended Solids	30	45	60	85
pH	within the range of 6.0 - 9.0 standard units			
Total Residual Chlorine	0.5	---	1.0	---

3.3 Water Quality-Based Effluent Limits

WQBELs included in APDES permits are derived from WQS. APDES regulations 18 AAC 83.435(a)(1) require that permits include WQBELs that "achieve water quality standard established under CWA §303, including State narrative criteria for water quality." The WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy (see fact sheet section 8.0 for a discussion on antidegradation).The use classification system designates the beneficial uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the beneficial use classification of each waterbody.

Waterbodies in Alaska are designated for all uses unless the water has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some waterbodies in Alaska may also have site–specific water quality criteria per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b).

AKG572000 authorizes discharges of secondary treated domestic wastewater to both fresh and marine waterbodies. The designated uses for freshwater are water supply for drinking, culinary, and food processing, agriculture, aquaculture, and industrial; contact and secondary recreation; and growth and propagation of fish, shellfish, other aquatic life, and wildlife. The designated uses for marine water are water supply for aquaculture, seafood processing, and industrial; contact and secondary recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life. WQS for freshwater uses and marine uses can be different and are noted below.

3.3.1 TRC

The WQS for toxic and other deleterious organic and inorganic substances for

freshwater uses are codified in 18 AAC 70.020(b)(11) and for marine water uses in 18 AAC 70.020(b)(23). TRC criteria provide protection for aquatic life. For freshwater the WQS requires that TRC may not exceed either an acute concentration of 0.019 mg/L or a chronic concentration of 0.011 mg/L. For marine water the WQS requires that TRC may not exceed either an acute concentration of 0.013 mg/L or a chronic concentration of 0.0075 mg/L.

3.3.2 Fecal Coliform Bacteria (FC)

FC bacteria are a non-pathogenic indicator species whose presence suggests the likelihood that pathogenic bacteria are present. The most stringent WQS at 18 AAC 70.020(b)(2)(A) provides protection for freshwater designated for drinking, culinary, and food processing water supply. The WQS requires that in a 30-day period, the geometric mean may not exceed 20 FC/100 mL, and not more than 10% of the samples may exceed 40 FC/100 mL. The most stringent WQS at 18 AAC 70.020(b)(14)(D) provides protection for marine water designated for harvesting for consumption of raw mollusks or other raw aquatic life. The WQS require that in a 30-day period, the geometric mean of samples may not exceed 14 FC/100 mL, and not more than 10 percent of the total samples may exceed 43 FC/100 mL.

3.3.3 Dissolved Oxygen (DO)

WQS at 18 AAC 70.020(b)(3) states that surface DO for freshwater uses to include the growth and propagation of fish, shellfish, other aquatic life, and wildlife must be greater than 7 mg/L and in no case may DO be greater than 17 mg/L. WQS at 18 AAC 70.020(b)(15)(C) states that surface DO for marine water uses to include the growth and propagation of fish, shellfish, other aquatic life, and wildlife must be greater than 6 mg/L and that in no case may DO be greater than 17 mg/L.

3.3.4 pH

WQS for pH at 18 AAC 70.020(b)(6) for freshwater uses and 18 AAC 70.020(b)(18)(C) for marine uses provides protection for the growth and propagation of fish, shellfish, other aquatic life, and wildlife. The WQS for both freshwater and marine water ph may not be less than 6.5 standard pH units (s.u.) or greater than 8.5 s.u.

Table 2 lists the applicable water criteria as WQBELs for TRC, FC, DO and pH.

Table 2: Water Quality Based Effluent Limits

Parameter	Units	Water	Chronic	Acute
Total Residual Chlorine (TRC)[a]	mg/L	fresh	0.011	0.019
		marine	0.0075	.013
Fecal Coliform Bacteria (FC)	FC/100 mL	fresh	20	40[b]
		marine	14	43[c]
Dissolved Oxygen	mg/L	fresh	may not be less than 7 or greater than 17	
		marine	may not be less than 6 or greater than 17	
pH	s.u.	fresh	may not be less than 6.5 or greater than 8.5	
		marine	may not be less than 6.5 or greater than 8.5	

Footnotes:

a. TRC effluent limits are only applicable if chlorine is used as a disinfectant.
b. Not more than 10% of the samples may exceed 40 FC/100 mL
c. Not more than 10% of the samples may exceed 43 FC/100 mL

3.4 Flow

Flow will be based on the hydraulic design capacity of the WWTF (flow rate as gallons per day) and shall be determined by a professional engineer and approved by the Department during the WWTF plan review process conducted per 18 AAC 72. A flow limit based on the design capacity ensures that the WWTF operates within its capabilities to receive and properly treat sustained average flow quantities and specific pollutants.

3.5 Mass-Based Limits

The general permit contains place holders for mass-based limits for BOD_5 and TSS. State regulations at 18 AAC 83.540 require that effluent limits be expressed in terms of mass unless they cannot appropriately be expressed by mass, if it is infeasible, or if the limits can be expressed in terms of other units of measurement. In addition, 18 AAC 83.520 requires that effluent limits for a POTW be calculated based on the design flow of the WWTF. Expressing limitations in terms of concentration as well as mass encourages the proper operation of a WWTF at all times.

Because mass-based limits are derived from the facility's design flow, they must be calculated for each facility and therefore mass-based limits will be assigned during the authorization process. The mass-based limits are expressed in lbs/day and are calculated as follows:

$$Mass\ based\ limit\ \left(\frac{lbs}{day}\right) = concentration\ limit\ \left(\frac{mg}{L}\right) \times design\ flow\ (mgd) \times 8.34 \frac{lbs}{gal}$$

3.6 Effluent Limits Summary

The more stringent of the technology or WQBELs are included as permit limits.

Table 3: Effluent Limits

EFFLUENT PARAMETER	UNITS	EFFLUENT LIMITS					
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Average Monthly Percent Removal	Minimum Daily Limit	Basis for Limit
Flow[a]	gpd	---	---	---	---	---	---
pH	s.u.	---	---	8.5	---	6.5	18 AAC 83.010(e)
Total Residual Chlorine (TRC)[b,c]	mg/L	0.011 (fresh)	---	0.019 (fresh)	---	---	18 AAC 70.020(b)(11)
		0.0075 (marine)		0.013 (marine)			18 AAC 70.020(b)(23)
Dissolved Oxygen	mg/L	---	---	17	---	7 (fresh)	18 AAC 70.020(b)(3)
						6 (marine)	18 AAC 70.020(b)(15)
5-Day Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	60	85%[e] (minimum)	---	18 AAC 83.010(e)
	lbs/day[d]	---	---	---			
Total Suspended Solids (TSS)	mg/L	30	45	60	85%[e] (minimum)	---	18 AAC 83.010(e)
	lbs/day[d]	---	---	---			
Fecal Coliform Bacteria (FC)[f]	FC/100 mL	20 (fresh)	---	40 (fresh)	---	---	18 AAC 70.020(b)(2)
		14 (marine)		43 (marine)			18 AAC 70.020(b)(14)

Footnotes

a. A facility specific flow limit shall be included as a part of the authorization to discharge.
b. The TRC effluent limits are not quantifiable using EPA approved analytical methods. DEC will use the minimum level (ML) of 0.1 mg/L as the compliance evaluation level for this parameter.
c. Monitoring for chlorine is not required if chlorine is not used as a disinfectant or introduced elsewhere in the treatment process.
d. BOD_5 and TSS mass loading limits apply to each discharge. The loading limits are calculated for each facility by the following formula: pounds per day limitation = concentration limit (mg/L) x facility design flow (mgd) x 8.34 (conversion factor). Loading limitations are applicable to the average monthly, average weekly and maximum daily basis.
e. Minimum % Removal = [(monthly average influent concentration in mg/L - monthly average effluent concentration in mg/L) / (monthly average influent concentration in mg/L)] x 100.The monthly average percent removal must be calculated using the arithmetric mean of the influent value and the arithmetric mean of the effluent value for that month.
f. All effluent FC average results must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the quantities. For example the geometric mean of 100, 200, and 300 is $(100 \times 200 \times 300)^{1/3} = 181.7$.

4.0 MIXING ZONES

Mixing zones are DEC authorized areas where an effluent undergoes initial dilution. A mixing zone is an allocated impact zone in the receiving waterbody where water quality criteria can be exceeded as long as toxic conditions are prevented and the designated use of the water is not impaired as a result of the mixing zone.

In accordance with 18 AAC 70.240, as amended through June 23, 2003, DEC may authorize mixing zones. Permittees may request modification to effluent limits pursuant to 18 AAC 70.260. If a mixing zone is requested, Form 2M must also be submitted with the NOI. Form 2M may be located through the link in part 1.4.2 of the general permit. Per 18 AAC 70.260,

the burden of proof for justifying a mixing zone rests with the applicant. Note the Department has determined that existing dischargers listed in Appendix D of the permit (that requested a mixing zone) have satisfied this requirement.

Appendix A outlines criteria that must be met prior to the Department authorizing a mixing zone. These criteria include an analysis of the size of the mixing zone, treatment technology, existing uses of the waterbody, human consumption, spawning areas, human health, aquatic life, and endangered species. If one criterion is not met, then a mixing zone is prohibited and effluent limits must be met at the end of the outfall line prior to discharge to the receiving waterbody.

The Department may establish limits at the boundary of an authorized mixing zone in the receiving waterbody. These limits shall be based on the limits and requirements of the Alaska WQS (18 AAC 70). The permittee will be notified of any receiving waterbody limits when issued authorization by DEC to discharge under the general permit.

The Department reviewed effluent and mixing zone monitoring data for each of the facilities that were authorized mixing zones under AKG570000 and AKG571000. The monitoring results do not support revising the mixing zones, nor is there a documented basis for concern to do so at this time. Therefore, the mixing zones for each of the facilities previously authorized under AKG570000 and AKG571000 and that are eligible for coverage under AKG572000 shall be reauthorized. If facility conditions change (e.g. increase flow volume) requiring the permittee to provide updated mixing information, DEC will evaluate the submitted information to determine if modification of the existing mixing zone authorization is warranted.

5.0 MONITORING

5.1 Basis for Effluent and Ambient Monitoring

In accordance with 18 AAC 83.430, the Department may specify in a permit the terms and conditions under which waste material may be disposed of. Monitoring in permits is required to determine compliance with effluent limits. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limits are required and/or to monitor effluent impact on receiving waterbody quality. The permittees are responsible for conducting the monitoring and for reporting results on DMRs or on the application for renewal, as appropriate, to the Department. In addition to the pollutants that are listed above as having permit limits that require monitoring to track compliance, sections 5.2 through 5.4 outline additional monitoring requirements DEC has determined necessary to implement in the permit.

5.2 Enterococci Bacteria

Enterococci bacteria are indicator organisms of harmful pathogens in marine water and are a better indicator of acute gastrointestinal illness than fecal coliform bacteria. In 1986 EPA published Ambient Water Quality Criteria for Bacteria-1986 that contained their recommended bacteria water quality criteria for primary contact recreational users from gastrointestinal illness. The Beaches Environmental Assessment and Coastal

Health Act of 2000 requires states and territories with coastal recreation waters to adopt bacteria criteria into their WQS that are as protective as EPA's 1986 published bacteria criteria by April 10, 2004. Alaska did not adopt the enterococci bacteria into the WQS by the April 10, 2004 deadline, therefore EPA promulgated the 1986 bacteria criteria for Alaskan coastal recreational waters in 2004. Accordingly, monitoring for enterococci bacteria shall be required for all facilities authorized to discharge under AKG572000. At the end of the five year permit cycle, DEC will evaluate the monitoring data and assess the need for applying enterococci limits in the next reissuance of the general permit.

5.3 Total Ammonia as Nitrogen

Total ammonia is the sum of ionized (NH_4^+) and un-ionized ammonia (NH_3). Temperature and pH affect which form, NH_4^+ or NH_3 is present. NH_3, which is more toxic to aquatic organisms than NH_4^+, predominates at higher pH and temperature levels.

Biological wastewater treatment processes reduce the amount of total nitrogen in domestic wastewater; however without advanced treatment, wastewater effluent may still contain elevated levels of ammonia nitrogen. Excess ammonia nitrogen in the environment can lead to dissolved oxygen depletion, eutrophication, and toxicity to aquatic organisms.

In order to evaluate the discharge of ammonia nitrogen, the Department is requiring that the largest facilities, those that discharge above 0.25 mgd up to 1.0 mgd and that would likely have the largest impact in the environment, to monitor for total ammonia as nitrogen for four years beginning in the second year of the general permit. Criteria for ammonia are pH and temperature dependent; therefore temperature and pH measurements shall be taken concurrently with ammonia. The Department will analyze the monitoring results to determine whether continued monitoring or limits for total ammonia are warranted in the next reissuance of the general permit. If the Department discontinues ammonia monitoring it will be discontinued as per the requirements for reissued permits at 18 AAC 83.480.

5.4 Temperature and pH

Criteria for ammonia are pH and temperature dependent, therefore temperature and the pH measurements that are necessary for ammonia monitoring shall be taken concurrently with ammonia.

5.5 Monitoring Frequencies

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance and compliance. Permittees have the option of taking more frequent samples than are required under the general permit. These samples must be used for averaging if they are conducted using the Department-approved test methods (generally found in 18 AAC 70 and 40 CFR §136 [adopted by reference in 18 AAC 83.010]) and if the method detection limits are less than the effluent limits.

Facilities covered under the general permit are expected to range in size from a few hundred gallons per day (gpd) discharge up to 1 mgd. Given this wide range in discharge

volume, the general permit requires monitoring frequencies that are dependent on the design flow of the facility.

The monitoring frequencies are divided into three categories:

- Class A WWTFs with a design flow above 250,000 gpd up to 1.0 mgd
- Class B WWTFs with a design flow above 5,000 gpd up to and including 250,000 gpd
- Class C WWTFs with a design flow less than and including 5,000 gpd

Table 4 summarizes monitoring frequencies for the three design flow categories.

1. Table 4: Monitoring Requirements

Design Flow	Parameter	Monitoring Frequency	Sample Type
Class A: above 250,000-1,000,000 gpd	Flow	daily (5/week)	recording
	pH	daily (5/week)[a]	grab
	Total Residual Chlorine (TRC)	daily (5/week)	grab
	Dissolved Oxygen (DO)	1/week	grab
	5-Day Biochemical Oxygen Demand (BOD_5)	2/month	24-hour composite[b]
	Total Suspended Solids (TSS)	2/month	24-hour composite[b]
	Fecal Coliform Bacteria (FC)	2/month	grab
	Enterococci Bacteria	1/month[c]	grab
	Total Ammonia as Nitrogen	quarterly (4/year)[d]	grab
	Temperature	quarterly (4/year)[a,d]	grab
Class B: above 5,000-250,000 gpd	Flow	daily (5/week)	measured
	pH	3/week	grab
	TRC	3/week	grab
	DO	1/month	grab
	BOD_5	1/month	grab or composite
	TSS	1/month	grab or composite
	FC	1/month	grab
	Enterococci Bacteria	1/month[c]	grab
Class C: less than 5,000 gpd	Flow	1/week	measured or estimated
	pH	1/quarter	grab
	TRC	1/week	grab
	DO	1/quarter	grab
	BOD_5	1/quarter	grab or composite
	TSS	1/quarter	grab or composite
	FC	1/quarter	grab
	Enterococci Bacteria	1/quarter[c]	grab

Footnotes:

a. pH and temperature must be measured concurrently with ammonia when ammonia is sampled.
b. See Appendix C of the general permit for a definition of composite
c. Enterococci bacteria monitoring only required May – September when discharging to marine water.
d. Ammonia and temperature sampling is only required in years 2 through 5 of the permit.

6.0 AMBIENT MONITORING

Receiving water monitoring is occasionally required in APDES permits in order to evaluate if the effluent is causing or contributing to an in stream excursion of WQS. Given the nature and size of the discharges authorized under the general permit, ambient monitoring is not a permit requirement. The permit, however, does allow the permitting authority to require ambient monitoring under specific situations. Ambient monitoring may be required in individual authorizations for site specific evaluations related to: protection of WQS, evaluation of receiving waterbody impairments, or, evaluation or issues associated with threatened or endangered species. The permittee will be notified of any additional monitoring when issued authorization to discharge under the general permit.

7.0 COMPLIANCE SCHEDULES

Per 18 AAC 70.910, the Department has authority to include compliance schedules as conditions of a permit, certification, or approval. 18 AAC 83.560 also specifically discusses compliance schedules in APDES permits. DEC has determined that facilities that have historically received authorizations containing high FC permit effluent limits (e.g. AML 100,000 FC/100 mL, MDL 150,000 FC/100 mL) will receive five-year compliance schedules in their authorizations to come into compliance with the more stringent FC limits (AML 200 FC/100 mL, AWL 400 FC/100 mL, MDL 800 FC/100 mL) that the vast majority of permittees covered by this general permit have demonstrated the capability of achieving on a regular basis.

Compliance with the new FC effluent limits must be met as soon as possible. However, in order to meet the new FC effluent limits, facility upgrades may become necessary and will require the submittal and DEC approval of engineered plans, the procurement of funding, the seeking and awarding of bids, the construction or installation of new treatment operations, the receipt of DEC's final approval to operate, and the optimization of the facility with the new upgrade. Therefore, a five-year compliance schedule will provide a reasonable and appropriate time frame to achieve compliance with the new FC effluent limits. Also since the compliance schedules will extend beyond one year, 18 AAC 83.560(b) states that interim requirements and dates for their achievement must be established. These interim requirements and dates for their achievement will be outlined in each authorization that obtains the five-year compliance schedule.

8.0 ANTI-BACKSLIDING

18 AAC 83.480 requires that "effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit." 18 AAC 83.480 (c) also says that a permit may not be reissued "to contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time the permit is renewed or reissued." The effluent limitations in this permit reissuance are consistent with 18 AAC 83.430. The permit effluent limitations, standards, and conditions in AKG572000 are

as stringent as in the previous permits, AKG570000 and AKG571000. Accordingly, no backsliding analysis is required for this permit reissuance.

9.0 ANTIDEGRADATION

The Antidegradation Policy of the Alaska WQS (18 AAC 70.015) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. The Department's approach to implementing the policy found in 18 AAC 70.015 is based on the requirements in 18 AAC 70 and the *Interim Antidegradation Implementation Methods* dated July 14, 2010. Using these requirements and policies, the Department determines on a parameter-by-parameter basis whether a waterbody or a portion of a waterbody is classified tier 1, 2, or 3 where a larger number indicates a greater level of water quality protection. Tier 3 classifications, or "outstanding national resource" waters, have not currently been identified in the State. Where there is insufficient information to make a determination about water quality, the Department presumes that the water is of high quality and subject to at least tier 2 protection. A degradation to tier 2 waters may occur only after the Department concludes that the five findings at 18 AAC 70.015(a)(2)(A)-(E) are met.

There is insufficient information to make a reasonable determination of water quality for all potential waterbodies under AKG572000 on a parameter-by-parameter basis. As a result, for purposes of applying the antidegradation policy, the Department has conservatively assumed that the receiving waterbody for each authorized discharge is a tier 2 waterbody for all parameters regulated under the permit.

18 AAC 70.015(a)(2)(A)-(E) and the Department's findings are as follows:

- ***AAC 70.015 (a)(2)(A). Allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located.***

Because of the nature of the discharges, all existing facilities covered under the general permit, expansions of existing facilities (still resulting in a total design flow of less than 1.0 mgd), and facilities authorized to discharge under the general permit for the first time would be expected to cause only minor degradation of water quality. All facilities authorized to discharge under the general permit are minor POTWs or other facilities treating domestic wastewater with design discharge flows of less than 1.0 mgd. Furthermore, most facilities authorized to discharge have flow volumes that are considerably less than 1.0 mgd. These facilities do not receive significant contributions from non-domestic industrial users. Facilities not meeting these criteria are excluded from coverage under the general permit. The effluent limits in the general permit are consistent with all applicable technology standards and Alaska WQS and, as discussed above in part 8.0, are the same as the effluent limits in the 2004 EPA-issued general permits, AKG570000 and AKG571000. Consequently, the allowable concentrations of pollutants discharged by facilities covered under the existing general permit remain the same.

The treatment processes used at the treatment facilities covered under the general permit are considered standard secondary treatment (e.g. activated sludge) and are processes commonly used by POTWs and other privately-owned treatment works treating domestic wastewater throughout the U.S. A major upgrade of treatment processes or implementation of other wastewater disposal alternatives designed to eliminate the potential for minor degradation of water quality, if technically feasible, would require a substantial financial investment for both community-based POTWs and small privately owned treatment works as well as state and federal grant and loaning agencies, and could result in an increase in user and consumer fees. Increased treatment costs and consumer fees lead to decreases in "after tax" or disposable personal income (DPI) spending of ratepayers. Reductions in DPI in a community's local economy would result in fewer dollars being spent on non-essential goods and services by ratepayers, ultimately leading to decreases in labor demand, which further impacts household spending due to losses in employment.

WWTFs, facility expansions, and surface water discharges from new facilities accommodate planned and approved growth in the areas surrounding the facilities. Thus, current and future development in the communities served by the facilities authorized to discharge under the general permit is dependent on collection, treatment, and discharge of wastewater. Eliminating or requiring implementation of alternatives to existing discharges, prohibiting capacity increases of existing discharges, and prohibiting coverage of new dischargers under the general permit would inhibit important socioeconomic growth and development in the areas where the discharges are located.

DEC determined that the permitted activities are necessary to accommodate important economic and social development and the anticipated minor lowering of water quality is necessary for these purposes; therefore, 18 AAC 70.015(a)(2)(A) is satisfied.

- ***18 AAC 70.015 (a)(2)(B). Except as allowed under this subsection, reducing water quality will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235 or the whole effluent toxicity limit in 18 AAC 70.030.***

Facilities with wasteload allocations from an approved total maximum daily load analysis and facilities discharging a pollutant that causes or contributes to an impairment of a waterbody listed as impaired on the CWA Section 303(d) list are excluded from coverage under the general permit. Therefore, discharges authorized by the general permit will not cause or contribute to impairment of the state's waters. Furthermore, general permit conditions stipulate that the discharge shall not cause contamination of surface or ground waters nor shall the discharge cause a violation of Alaska WQS 18 AAC 70.

Pollutants of concern in treated domestic wastewater include the conventional pollutants BOD_5, TSS, oil and grease, pH, and FC. TRC is also a pollutant of concern where chlorine is used for treatment of pathogens. The general permit includes numeric or narrative effluent limits and best management practices addressing each of these pollutants of concern. Furthermore, the general permit contains monitoring and reporting requirements for

enterococci bacteria to determine what levels, if any, of this pathogen is present in the wastestream.

In addition, any facility receiving a significant contribution from a non-domestic industrial user is excluded from coverage under the general permit. Because of the nature of the permitted discharges, other pollutants are not expected to be present in the discharges at levels that would cause, have the reasonable potential to cause, or contribute to an exceedance of any Alaska WQS, including the whole effluent toxicity limit at 18 AAC 70.030.

DEC determined that the reduction in water quality will not violate the criteria of 18 AAC 70.020, 18 AAC 70.235, or 18 AAC 70.030; therefore, 18 AAC 70.015(a)(2)(B) is satisfied.

- ***18 AAC 70.015(a)(2)(C). The resulting water quality will be adequate to fully protect existing uses of the water.***

The general permit requires eligible POTWs and other privately-owned treatment facilities treating domestic wastewater to meet numeric and narrative effluent limits. The effluent limits and best management practices are derived from and comply with the applicable technology standards and Alaska WQS, including the most stringent water quality criteria for each pollutant of concern to ensure protection of all water use classes in Alaska's WQS.

The general permit requires influent and effluent monitoring at frequencies based on design flow. Facilities with larger design flows are required to monitor more frequently than facilities with smaller design flows. The results of this monitoring must be reported to DEC. In addition, DEC will perform permit compliance inspections to meet the goals of the Department's Division of Water Compliance Program. The permit allows DEC to require additional or ambient monitoring through the authorization to discharge for site-specific evaluations related to protection of WQS, evaluation of receiving water impairments, or evaluation of issues associated with threatened or endangered species.

DEC determined that the discharges from POTWs and other privately-owned treatment facilities treating domestic wastewater operating under the terms and conditions of the general permit will be adequate to fully protect the existing uses of the water; therefore, 18 AAC 70.015(a)(2)(C) is satisfied.

- ***18 AAC 70.015(a)(2)(D). The methods of pollution prevention, control, and treatment found by the department to be most effective and reasonable will be applied to all wastes and other substances to be discharged.***

The general permit contains effluent limits for BOD_5 and TSS based on the federal secondary treatment standards at 40 CFR 133.102. These standards are adopted by reference at 18 AAC 83.010(e) and applied to all facilities discharging domestic wastewater (including privately-

owned treatment facilities) by 18 AAC 72.050. The activated sludge treatment processes used at the treatment facilities covered under the general permit are considered standard secondary treatment processes used by POTWs and other privately-owned treatment facilities treating domestic wastewater throughout the U.S.

The pH, FC, TRC, and DO limits in the permit are derived from and comply with Alaska's WQS. These limits are applied based on attaining the most stringent applicable water quality criteria at the point of discharge or on attaining these water quality criteria at the boundary of a mixing zone authorized pursuant to 18 AAC 70.240. Any modified effluent limits based on an authorized mixing zone must also comply with the applicable technology standards. For example, modified pH limits may not be less than 6.0 or greater than 9.0 standard units, which are the secondary treatment standards for pH. These values were included in the 2004 EPA-issued general permit based on standard treatment practices and have been carried over to the reissued general permit.

The methods of prevention, control, and treatment DEC finds to be most effective are the practices and requirements set out in the permit; therefore, 18 AAC 70.015(a)(2)(D) is satisfied.

- ***18 AAC 70.015(a)(2)(E). All wastes and other substances discharged will be treated and controlled to achieve (i) for new and existing point sources, the highest statutory and regulatory requirements; and (ii) for nonpoint sources, all cost-effective and reasonable best management practices.***

The "highest statutory and regulatory requirements" are defined in 18 AAC 70.990(30) (as amended June 26, 2003) as:

- (A) any federal TBEL identified in 40 CFR §125.3 and 40 CFR §122.29, as amended through August 15, 1997, adopted by reference;
- (B) minimum treatment standards in 18 AAC 72.040; and
- (C) any treatment requirement imposed under another state law that is more stringent than a requirement of this chapter.

The first part of the definition includes all federal TBELs for POTWs. CWA Section 304(d) required EPA to publish information on the degree of effluent reduction attainable through the application of secondary treatment for certain types of POTWs. Section 301(b)(1)(b) requires POTWs to meet effluent limits based on secondary treatment standards. EPA promulgated secondary treatment standards at 40 CFR Part 133. Alaska adopted these standards by reference at 18 AAC 83.010(e) and applied them to all facilities discharging domestic wastewater including privately-owned treatment works in 18 AAC 72.050. Facilities receiving authorization to discharge under AKG572000 must meet the terms and conditions included in the permit that are derived from and comply with these statutory and regulatory requirements.

TBELs found at 40 CFR §133.102 include BOD_5, TSS, and pH. These limits are applied as TBELs in AKG572000. The regulations at 40 CFR §122.29 refers to industrial wastewater discharge and does not apply to AKG572000's domestic wastewater discharge.

The second part of the definition appears to be in error, as 18 AAC 72.040 describes discharges to sewers and not minimum treatment. The correct reference appears to be the minimum treatment standards found at 18 AAC 72.050, which refers to domestic wastewater discharges. Coverage under this permit will be limited to POTWs or privately-owned treatment works that provide a minimum of secondary treatment of domestic wastewater, the minimum treatment requirements found at 18 AAC 72.050.

The third part of the definition refers to treatment requirements imposed under another state law that are more stringent than 18 AAC 70. Other regulations beyond 18 AAC 70 that apply to this permitting action include 18 AAC 15 and 18 AAC 72. Neither the regulations in 18 AAC 15 and 18 AAC 72 nor another state law that the Department is aware of impose more stringent requirements than those found in 18 AAC 70.

The methods of treatment and control DEC finds to achieve the highest statutory and regulatory requirements are the practices and requirements set out in the permit; therefore, 18 AAC 70.015(a)(2)(E) is satisfied.

10.0 OTHER LEGAL REQUIREMENTS

10.1 Endangered Species Act

The National Marine Fisheries Service (NMFS) is responsible for administration of the Endangered Species Act (ESA) for listed cetaceans, seals, sea lions, sea turtles, anadromous fish, marine fish, marine plants, and corals. All other species (including polar bears, walrus, and sea otters) are administered by the U.S. Fish and Wildlife Service (USFWS).

Section 7 of the ESA requires a federal agency to consult with the USFWS and NMFS to determine whether their authorized actions may harm threatened and endangered species or their habitats. As a state agency, DEC is not required to consult with USFWS or NMFS regarding permitting actions; however, DEC interacts voluntarily with these federal agencies to obtain listings of threatened and endangered species and critical habitat.

The general permit covers WWTFs that discharge into all potential marine and freshwater surface waterbodies in the State of Alaska. Tetra Tech, Inc., on behalf of the Department, conducted an Ocean Discharge Criteria Evaluation (ODCE) in 2010 and identified threatened and endangered species that may be potentially affected by discharges from facilities authorized under the general permit.

The Department reviews the listing periodically for updates. Species of concern that inhabit or that have inhabited these waters at least at one time and that are listed as either threatened or endangered as of April 2012 are included in Table 5. The

USFWS and NMFS Endangered, Threatened, Proposed, Candidate, and Delisted Species in Alaska table may be accessed through the following link:

http://www.fakr.noaa.gov/protectedresources/default.htm

Table 5: Threatened and Endangered Species

Species Name	Scientific Name	Listing Status
Albatross, short-tailed	*Phoebastria (Diomedea) albatrus*	Endangered
Bear, polar	*Ursus maritimus*	Threatened
Curlew, Eskimo	*Numenius borealis*	Endangered
Eider, spectacled	*Somateria fischeri*	Threatened
Eider, Stellar's AK breeding population	*Polysticta stelleri*	Threatened
Otter, Northern Sea southwest Alaska distinct population segment	*Enhydra lutris kenyoni*	Threatened
Seal, bearded Beringia distinct population segment	*Erignathus barbatus nauticus*	Proposed for Listing
Seal, ringed Arctic subspecies	*Phoca hispida hispida*	Proposed for Listing
Sea turtle, green*	*Chelonia mydas*, including *agassizi*	Threatened
Sea turtle, leatherback*	*Dermochelys coriacea*	Endangered
Sea turtle, loggerhead*	*Caretta caretta*	Threatened
Sea-lion, Stellar eastern population (east of 144º longitude)	*Eumetopias jubatus*	Threatened
Sea-lion, Stellar western population (west of 144º longitude)	*Eumetopias jubatus*	Endangered
Whale, blue*	*Balaenoptera musculus*	Endangered
Whale, bowhead	*Balaena mysticetus*	Endangered

Species Name	Scientific Name	Listing Status
Whale, Cook Inlet beluga	*Delphinapterus leucas*	Endangered
Whale, finback	*Balaenoptera physalus*	Endangered
Whale, humpback	*Megaptera novaeangliae*	Endangered
Whale, North Pacific right*	*Eubalaena japonica*	Endangered
Whale, sei*	*Balaenoptera borealis*	Endangered
Whale, sperm	*Physeter catodon (=macrocephalus)*	Endangered
*Occurs rarely in Alaska		

10.2 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) designates Essential Fish Habitat (EFH) in waters used by anadromous salmon and various life stages of marine fish under NMFS jurisdiction. EFH refers to those waters and associated river bottom substrates necessary for fish spawning, breeding, feeding, or growth to maturity—including aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish. Spawning, breeding, feeding, or growth to maturity covers a species' full life cycle necessary for fish from commercially-fished species to spawn, breed, feed, or grow to maturity.

The EFH regulations define an adverse effect as any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Section 305(b) of the Magnuson-Stevens Act 916 USC 1855(b)) requires federal agencies to consult the NMFS when any activity proposed to be permitted, funded, or undertaken by a federal agency may have an adverse effect on designated EFH as defined by the Act. As a state agency, DEC is not required to consult with NMFS regarding permitting actions, but interacts voluntarily with NMFS to identify EFH.

Tetra Tech, Inc., on behalf of the Department, conducted an ODCE in 2010 and identified EFH for Alaska marine waters. (Tetra Tech 2010b). These maps are available for review in Appendix C of the ODCE prepared by Tetra Tech, or at

http://www.alaskafisheries.noaa.gov/habitat

ADF&G also maintains regulatory and interactive maps that identify anadromous streams, fish passage, and fish inventory at:

http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=maps.maps

10.3 Ocean Discharge Criteria Evaluation

The Ocean Discharge Criteria establish guidelines for permitting discharges into the territorial seas, the contiguous zone and the ocean. The Department conducted an ODCE using criteria established in accordance with CWA Section 403 and 40 CFR Part 125, adopted by reference at 18 AAC 83.010(c). Based on the available information, the Department determines whether the discharge will cause unreasonable degradation of the marine environment. 40 CFR Part 125.121, adopted by reference at 18 AAC 83.010(c)(8), states unreasonable degradation of the marine environment means

a) significant adverse changes in ecosystem diversity, productivity, and stability of the biological community within the area of discharge and surrounding biological communities;

b) threat to human health through direct exposure to pollutants or through consumption of exposed aquatic organisms; or

c) loss of aesthetic, recreational, scientific or economic values which is unreasonable in relation to the benefit derived from the discharge.

40 CFR Part 125.122, adopted by reference at 18 AAC 83.010(c)(8), provides 10 criteria to consider in the determination of whether there is unreasonable degradation or irreparable harm. The 10 criteria include: the amount and nature of the pollutants; the potential transport of the pollutants; the character and uses of the receiving water and its biological communities; the importance of the receiving water area; the existence of special aquatic sites (including parks, refuges, etc.); any applicable requirements of an approved Coastal Zone Management plan; and potential impacts on water quality, ecological health, and human health.

After consideration of these criteria, the Department has determined that discharges authorized by the permit and discharged in accordance with the requirements of the permit will not cause unreasonable degradation of the receiving waters.

The general permit is for authorization of small facilities treating domestic wastewater only. Facilities are required to treat the wastewater to secondary treatment standards and comply with WQS either at the end of the pipe prior to discharge, or at the boundary of an authorized mixing zone. Due to the size and nature of the discharge and compliance with WQS, unreasonable degradation should not occur when facilities are operating under the terms and conditions of the permit.

10.4 Permit Expiration

The permit will expire five years from the effective date of the permit.

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Water Pollution Control Federation. 1976. Chlorination of wastewater, manual of practice no. 4. Moore & Moore, Washington D.C

APPENDIX A: MIXING ZONE ANALYSIS CHECK LIST

The purpose of the Mixing Zone Check List is to guide the permit writer through the mixing zone regulatory requirements to determine if all the mixing zone criteria at 18 AAC 70.240 through 18 AAC 70.270 are satisfied, as well as provide justification to establish a mixing zone in an APDES permit. In order to establish a mixing zone, all criteria must be met. The permit writer must document all conclusions in the permit Fact Sheet; however, if the permit writer determines that one criterion cannot be met, then a mixing zone is prohibited, and the permit writer need not include in the Fact Sheet the conclusions for when other criteria were met.

Criteria	Description	Resources	Regulation
Size	Is the mixing zone as small as practicable? **Yes**	•Technical Support Document for Water Quality Based Toxics Control • DEC's RPA Guidance • EPA Permit Writers' Manual	18 AAC 70.240 (a)(2) 18 AAC 70.245 (b)(1) - (b)(7) 18 AAC 70.255(e) (3) 18 AAC 70.255 (d)
Technology	Were the most effective technological and economical methods used to disperse, treat, remove, and reduce pollutants? **Yes**		18 AAC 70.240 (a)(3)
Low Flow Design	**For river, streams, and other flowing freshwaters.** - Determine low flow calculations or documentation for the applicable parameters.		18 AAC 70.255(f)
Existing use	Does the mixing zone…		

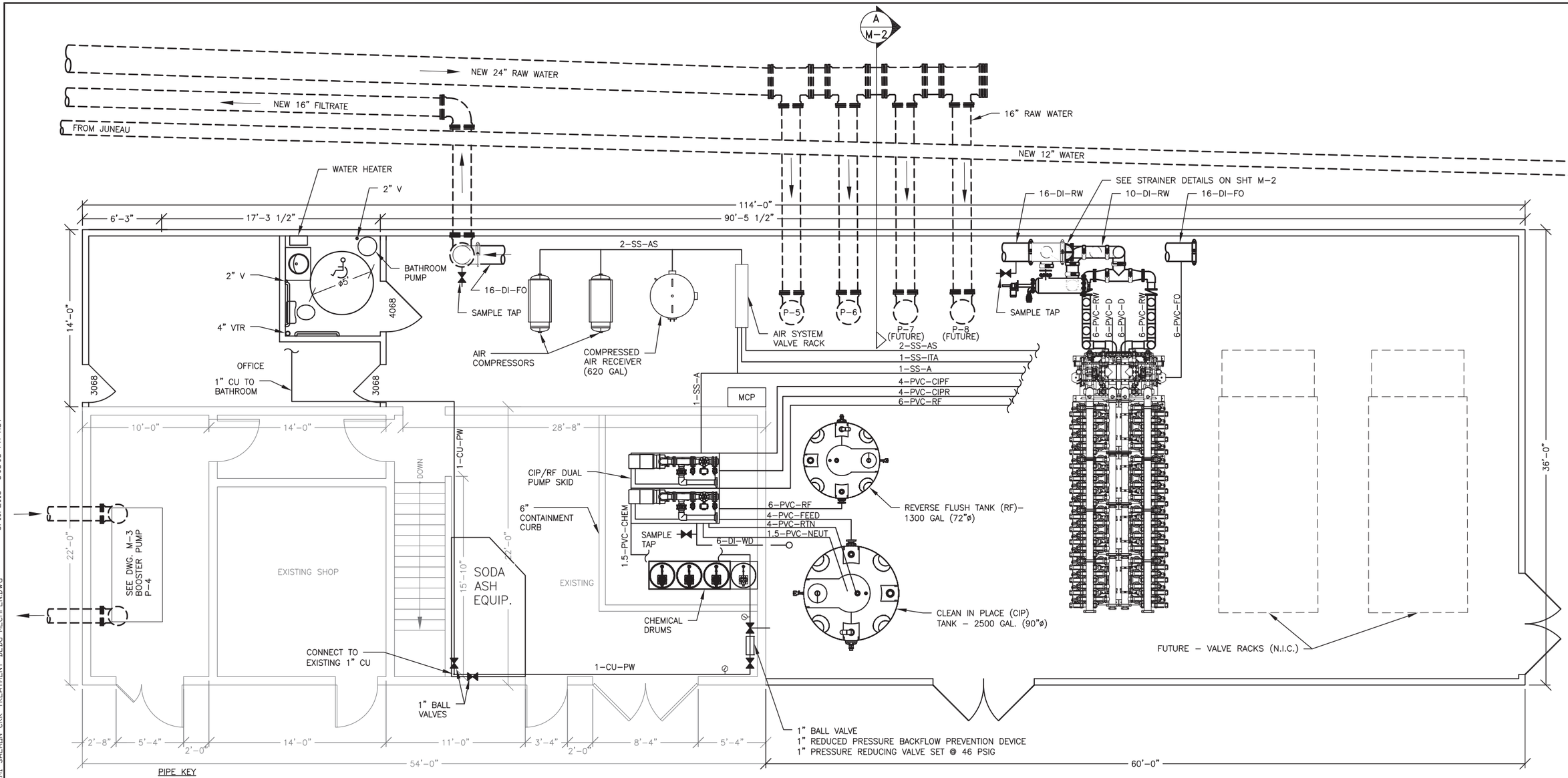
Criteria	Description	Resources	Regulation
	(1) partially or completely eliminate an existing use of the waterbody outside the mixing zone? **No** **If yes, mixing zone prohibited.**		18 AAC 70.245(a)(1)
	(2) impair overall biological integrity of the waterbody? **No** **If yes, mixing zone prohibited.**		18 AAC 70.245(a)(2)
	(3) provide for adequate flushing of the waterbody to ensure full protection of uses of the waterbody outside the proposed mixing zone? **Yes** **If no, mixing zone prohibited.**		18 AAC 70.250(a)(3)
	(4) cause an environmental effect or damage to the ecosystem that the department considers to be so adverse that a mixing zone is not appropriate? **No** **If yes, then mixing zone prohibited.**		18 AAC 70.250(a)(4)
Human consumption	Does the mixing zone…		
	(1) produce objectionable color, taste, or odor in aquatic resources harvested for human consumption? **No** **If yes, mixing zone may be reduced in size or prohibited.**		18 AAC 70.250(b)(2)
	(2) preclude or limit established processing activities of commercial, sport, personal use, or subsistence shellfish harvesting? **No** **If yes, mixing zone may be reduced in size or prohibited.**		18 AAC 70.250(b)(3)
Spawning Areas	Does the mixing zone…		

Criteria	Description	Resources	Regulation
	(1) discharge in a spawning area for anadromous fish or Arctic grayling, northern pike, rainbow trout, lake trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, king, and sockeye salmon? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255 (h)
Human Health	Does the mixing zone…		
	(1) contain bioaccumulating, bioconcentrating, or persistent chemical above natural or significantly adverse levels? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250 (a)(1)
	(2) contain chemicals expected to cause carcinogenic, mutagenic, tetragenic, or otherwise harmful effects to human health? **No** **If yes, mixing zone prohibited.**		
	(3) create a public health hazard through encroachment on water supply or through contact recreation? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250(a)(1)(C)
	(4) meet human health and aquatic life quality criteria at the boundary of the mixing zone? **Yes** **If no, mixing zone prohibited.**		18 AAC 70.255 (b),(c)
	(5) occur in a location where the department determines that a public health hazard reasonably could be expected? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(e)(3)(B)
Aquatic Life	Does the mixing zone…		
	(1) create a significant adverse effect to anadromous, resident, or shellfish spawning or rearing? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250(a)(2)(A-C)
	(2) form a barrier to migratory species? **No** **If yes, mixing zone prohibited.**		

Criteria	Description	Resources	Regulation
	(3) fail to provide a zone of passage? **No** **If yes, mixing zone prohibited.**		
	(4) result in undesirable or nuisance aquatic life? **No** **If yes, mixing zone prohibited.**		18 AAC 70.250(b)(1)
	(5) result in permanent or irreparable displacement of indigenous organisms? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(g)(1)
	(6) result in a reduction in fish or shellfish population levels? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(g)(2)
	(7) prevent lethality to passing organisms by reducing the size of the acute zone? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(b)(1)
	(8) cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone? **No** **If yes, mixing zone prohibited.**		18 AAC 70.255(b)(2)
Endangered Species	Are there threatened or endangered species (T/E spp) at the location of the mixing zone? **No** If yes, are there likely to be adverse effects to T/E spp based on comments received from USFWS or NOAA? **Not applicable** If yes, will conservation measures be included in the permit to avoid adverse effects? **Not applicable** **If yes, explain conservation measures in Fact Sheet. If no, mixing zone prohibited.**		Program Description, 6.4.1 #5 18 AAC 70.250(a)(2)(D)

Appendix D1

SCWFP Site Plan



PIPE KEY

A	AIR
AS	AIR SCRUB
CHEM	CHEMICAL
CIPF	CLEAN IN PLACE FEED
CIPR	CLEAN IN PLACE RETURN
CU	COPPER
DI	DUCTILE IRON
FEED	FEED
FO	FILTRATE OUT
ITA	INTEGRITY TEST AIR
NEUT	NEUTRALIZATION
PVC	POLYVINYL CHLORIDE
PW	POTABLE WATER
RF	REVERSE FLUSH
RTN	RETURN
RW	RAW WATER
SS	STAINLESS STEEL

2' 0 2' 4' 6 FEET

SIZE
MATERIAL
PURPOSE
X-XXX-XX

1/2" BALL VALVE

SAMPLE TAP ASSEMBLY

PRESSURE GAUGE 0-100 PSI

1/2" BALL VALVE

PRESSURE GUAGE ASSEMBLY

NOTE:
1. INSULATE ALL NEW RAW WATER, FILTRATE AND POTABLE WATER PIPING WITH 1/2" ARMAFLEX INSULATION.+
2. PROVIDE PIPE LABELS ON ALL PIPES WITH NAMES AS SHOWN IN THE PIPE KEY. PROVIDE DIRECTION OF FLOW ARROWS. COLOR TO BE DETERMINED BY THE ENGINEER.

REV	DATE	BY	DESCRIPTION

SCALE GRAPHIC
DESIGNED JLD
DRAWN GDM
CHECKED JLD
DATE MAY 2015

CITY/BOROUGH OF JUNEAU
ALASKA'S CAPITAL CITY

SALMON CREEK
WATER FILTRATION PLANT
CONTRACT NO. E15-224

STATE OF ALASKA
JAMES L. DORN
CE 5323
2/11/2015
REGISTERED PROFESSIONAL ENGINEER

Carson Dorn Inc.
712 WEST 12TH STREET
JUNEAU, ALASKA 99801
(907) 586-4447

NEW FILTRATION BUILDING
MECHANICAL PLAN

DRAWING
M-1
SHEET No.
25 of 67

E:\GDM\2CAD\CBJ\SALMON CRK WATER FILTRATION\05-MECHANICAL\M1-SALMON CRK TREATMENT BLDG MECHPLN.DWG 5/10/2015 6:05:08 PM AST

Appendix D2

SCWFP Authorization to Discharge & General Permit

Alaska Department of Environmental Conservation

Division of Water

AUTHORIZATION TO DISCHARGE

AUTHORIZATION TO DISCHARGE UNDER THE ALASKA POLLUTANT ELIMINATION SYSTEM (APDES) FOR WASTEWATER DISCHARGES FROM DRINKING WATER TREATMENT FACILITIES

FACILITY ASSIGNED AUTHORIZATION NUMBER: AKG380005

GENERAL PERMIT NUMBER: AKG380000
See this General Permit for all permit requirements.

The following facility is authorized to discharge in accordance with the terms of the State of Alaska General Permit AKG380000 and any site specific requirements listed in this authorization.

The authorization effective date is **March 9, 2016**

The authorization to discharge shall expire at midnight, **June 30, 2019**

The permittee shall reapply for a permit reissuance on or before **January 1, 2019**, 180 days before the expiration of this permit.

SECTION 1 – RESPONSIBLE PARTY INFORMATION

Issued to: City and Borough of Juneau
Samantha Stoughterger – Waste & Wastewater Utility Superintendent
155 South Seward Street
Juneau, AK 99801

SECTION 2 – FACILITY INFORMATION

Facility Name: Salmon Creek Water Filtration Plant

Facility Location: Three mile Egan Drive; Juneau, AK

Latitude: 59° 19’ 31.40” North Longitude: 134° 27’ 50.64” West

Type of Facility: Membrane Drinking Water Treatment Backwash

Raw Water Source: Surface Water from Salmon Creek

Waterbody Discharged To: Gastineau Channel - Marine Receiving Waters

Design Capacity Flow: 0.080 million gallons per day; 80,000 gallons per day

SECTION 3 – EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Effluent Compliance Point: After the last treatment unit before discharge into receiving waters and before any mixing occurs with the storm water stream. The permittee must monitor the discharge as specified in Tables A, B, and C.

Table A summarizes effluent limits and monitoring requirements applicable when the effluent discharge is a result of the reverse flow/air scrub cleaning of the membranes. Table B summarizes effluent limits and monitoring requirements applicable when the effluent discharge is a result of the enhanced flux maintenance process. Table C summarizes effluent limits and monitoring requirements applicable when the effluent discharge is a result of the chemical clean-in-place process.

Table A: Outfall 001A - Reverse Flow/Air Scrub Cleaning Process Effluent Limits and Monitoring Requirements

Effluent Parameter	Daily Minimum Limit	Monthly Average Limit	Daily Maximum Limit	Units [a]	Sample Frequency	Sample Type
Total Discharge Flow	-----	Report	Report	mgd	Continuous [b]	Recorded
Temperature	-----	Report	Report	˚C	1/Month	Grab
Turbidity	-----	Report	Report	NTU	1/Month	Grab
Arsenic [c]	-----	Report	10	µg/L	1/Month	Grab
Copper [c]	-----	Report	Report	µg/L	2/Year [d]	Grab
Iron [c]	-----	Report	Report	µg/L	2/Year	Grab
Lead [c]	-----	Report	Report	µg/L	2/Year	Grab
Magnesium [c]	-----	Report	Report	µg/L	2/Year	Grab
Manganese [c]	-----	Report	Report	µg/L	2/Year	Grab
Zinc [c]	-----	Report	Report	µg/L	2/Year	Grab
Chloride	-----	Report	Report	mg/L	2/Year	Grab
Sulfates	-----	Report	Report	mg/L	2/Year	Grab

Footnotes:

a. mgd – million gallons per day; ºC – degrees Celsius; NTU – nephelomentric turbidity units; µg/L – micrograms per liter; mg/L – milligrams per liter
b. Discharge flow volume must be monitored and reported monthly regardless of which membrane cleaning process is used.
c. All metal concentrations shall be reported as total recoverable metal.
d. Twice per year consists of one sample taken in the summer months (May 1 through September 30) and one sample taken in the winter months (October 1 through April 30).

Table B: Outfall 001B - Enhanced Flux Maintenance Cleaning Process Effluent Limits and Monitoring Requirements

Effluent Parameter	Daily Minimum Limit	Monthly Average Limit	Daily Maximum Limit	Units	Sample Frequency	Sample Type
pH	6.5	Report	8.5	SU [a]	1/Month	Grab
Total Ammonia, as N	-----	Report	Report	mg/L	1/Month	Grab
Total Residual Chlorine	-----	0.0075 [b]	Report	mg/L	1/Month	Grab
Arsenic [c]	-----	Report	10	µg/L	2/Year [d]	Grab
Copper [c]	-----	Report	Report	µg/L	2/Year	Grab
Iron [c]	-----	Report	Report	µg/L	2/Year	Grab
Lead [c]	-----	Report	Report	µg/L	2/Year	Grab
Magnesium [c]	-----	Report	Report	µg/L	2/Year	Grab
Manganese [c]	-----	Report	Report	µg/L	2/Year	Grab
Zinc [c]	-----	Report	Report	µg/L	2/Year	Grab
Chloride	-----	Report	Report	mg/L	2/Year	Grab
Sulfates	-----	Report	Report	mg/L	2/Year	Grab
Salinity	-----	Report	Report	ppt [e]	2/Year	Grab

Footnotes:

a. SU – standard pH units
b. Compliance with the limits for total residual chlorine cannot be determined using EPA-approved analytical methods. DEC will use 0.1 mg/L as the compliance limit for this parameter.
c. All metal concentrations shall be reported as total recoverable metal.
d. Twice per year consists of one sample taken in the summer months (May 1 through September 30) and one sample taken in the winter months (October 1 through April 30).
e. ppt – parts per thousand

Table C: Outfall 001C - Chemical Clean-in-Place Cleaning Process Effluent Limits and Monitoring Requirements

Effluent Parameter	Daily Minimum Limit	Monthly Average Limit	Daily Maximum Limit	Units	Sample Frequency	Sample Type
pH	6.5	Report	8.5	SU	1/Year [a]	Grab
Total Ammonia, as N	-----	Report	Report	mg/L	1/Year	Grab
Total Residual Chlorine	-----	0.0075 [b]	Report	mg/L	1/Year	Grab
Arsenic [c]	-----	Report	10	µg/L	1/Year	Grab
Copper [c]	-----	Report	Report	µg/L	1/Year	Grab
Iron [c]	-----	Report	Report	µg/L	1/Year	Grab
Lead [c]	-----	Report	Report	µg/L	1/Year	Grab

Magnesium [c]	-----	Report	Report	µg/L	1/Year	Grab
Manganese [c]	-----	Report	Report	µg/L	1/Year	Grab
Zinc [c]	-----	Report	Report	µg/L	1/Year	Grab
Chloride	-----	Report	Report	mg/L	1/Year	Grab
Sulfates	-----	Report	Report	mg/L	1/Year	Grab
Salinity	-----	Report	Report	ppt	1/Year	Grab

Footnotes:

a. Samples should be taken in alternating seasons, one year during the summer months (May 1 through September 30) and the next year during the winter months (October 1 through April 30).
b. Compliance with the limits for total residual chlorine cannot be determined using EPA-approved analytical methods. DEC will use 0.1 mg/L as the compliance limit for this parameter.
c. All metal concentrations shall be reported as total recoverable metal.

SECTION 4 – MIXING ZONE

No mixing zone is authorized, effluent limits are required to be met at the end of the pipe.

If you have any technical questions regarding this authorization of the requirements of the general permit, pleas contact either Sally Wanstall at sally.wanstall@alaska.gov or 907-465-5216.

SECTION 5 – CERTIFICATION/SIGNATURE

	March 9, 2016
Signature	Date
	Section Manager
Earl L. Crapps	Domestic & Industrial Utilities
Printed Name	Title

AUTHORIZATION TO DISCHARGE UNDER THE ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

Wastewater Discharges from Drinking Water Treatment Facilities

GENERAL PERMIT NUMBER AKG380000

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501

In compliance with the provisions of the Clean Water Act (CWA), 33 U.S.C. §1251 et seq., as amended by the Water Quality Act of 1987, P.L. 100-4, the permit is issued under provisions of Alaska Statutes (AS) 46.03; the Alaska Administrative Code (AAC) as amended; and other applicable State laws and regulations.

Owners and operators of drinking water treatment facilities that discharge to waters of the United States (U.S.), except those facilities excluded from coverage in Part 1 of this Alaska Pollutant Discharge Elimination System (APDES) permit, are authorized to discharge to waters of the U.S., only in accordance with effluent limitations, monitoring requirements, and other conditions set forth herein.

A COPY OF THIS GENERAL PERMIT MUST BE KEPT AT THE SITE WHERE DISCHARGES OCCUR.

The permit shall become effective July 1, 2014.

The permit and the authorization to discharge shall expire at midnight on June 30, 2019.

The permittee shall reapply for a permit reissuance on or before January 1, 2019, 180 days before the expiration of this permit.

Wade Strickland
Signature

May 30, 2014
Date

Wade Strickland
Wade Strickland

Program Manager
Program Manager

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SCHEDULE OF SUBMISSIONS

The Schedule of Submissions summarizes some of the required submissions and activities the permittee must complete and/or submit to the Alaska Department of Environmental Conservation (DEC or the Department) during the term of the permit. The permittee is responsible for all submissions and activities even if they are not summarized in Table 1 below.

Table 1: Schedule of Submissions

Permit Part	Submittal	Frequency	Due Date	Submit Documentation To
1.4	Notice of Intent to discharge from a new or recommencing facility	1/permit cycle	45 days prior to discharge	Permitting
1.5	Notice of Intent for an existing facility	1/permit cycle	180 days before expiration of the general permit	Permitting
2.3.2	Best Management Practices (BMP) Plan Implementation Notification	--	60 days after authorization	Compliance
2.3.6.2	BMP Plan Certification	1/year	No later than January 31	Compliance
Appendix A 3.2	Discharge Monitoring Reports	1/month	On the 15th day of the month following the reporting period	Compliance
Appendix A 3.4	Oral notification of noncompliance	As Necessary	Within 24 hours from the time the permittee becomes aware of the circumstances of noncompliance	Compliance
	Written documentation of noncompliance	As Necessary	Within 5 days after the permittee becomes aware of the circumstances	Compliance

1.0 PERMIT COVERAGE

1.1 Coverage and Eligibility

1.1.1 Existing Facilities: This general permit applies to backwash water or reject water disposal from drinking water treatment facilities that discharge to waters of the U.S. Potable water treatment and conditioning operations eligible for coverage under this general permit include conventional/direct treatment systems, ion exchange, and membrane filters. Discharges from other treatment systems not specifically listed as eligible for coverage under this general permit that can meet the requirements of the general permit may also be eligible for coverage upon Department approval.

1.1.2 New Facilities/Recommencing Facilities: Upon an applicant's submittal of a permit application or Notice of Intent (NOI) to discharge in accordance with 18 AAC 83.210(b), a new/recommencing drinking water treatment facility that meets the criteria for coverage under the permit will be authorized coverage.

1.1.3 Expanding Facilities: Drinking water treatment facilities that expand or modify the facility during the permit cycle must submit a new NOI that describes the new discharge. The facility must also submit engineering plans stamped by a licensed Alaska engineer for approval by DEC, Division of Water prior to operation of the expanded or modified facility. The current general permit authorization may be terminated and a new authorization, reflecting the modified treatment system configuration and resulting effluent quantity and quality, will be issued in its place if the facility meets all the necessary requirements for coverage.

1.1.4 Authorization to discharge requires written notification from the Department that coverage has been granted and that a specific permit number has been assigned to the facility.

1.1.5 Facilities with authorization under a separate Alaska Pollutant Discharge Elimination System (APDES) permit for discharges from drinking water treatment facilities are not required to seek coverage under this permit.

1.2 Prohibitions

The permit does not authorize the discharge from treatment facilities not specifically listed nor those that cannot meet the requirements of Part 1.1.1.

1.3 Requiring an Individual Permit

1.3.1 The Department reserves the right to determine if any facility is eligible for coverage under this general permit and may require any applicant or permittee authorized by the permit to apply for and obtain an APDES individual permit. The Department may require any person authorized by the permit to apply for and obtain an APDES individual permit when:

1.3.1.1 The single discharge or the cumulative number of discharges is/are a significant contributor of pollution;

1.3.1.2 The discharger is not in compliance with the terms and conditions of the general permit;

1.3.1.3 A change has occurred in the availability of demonstrated technology or practices for the control or abatement of pollutants applicable to the point source;

1.3.1.4 Effluent limitation guidelines are subsequently promulgated for the point sources covered by the general permit;

1.3.1.5 A Total Maximum Daily Load and corresponding wasteload allocation have been completed for a water body or a segment of a water body;

1.3.1.6 Circumstances have changed since the time of the request to be covered such that the discharger is no longer appropriately controlled under the general permit, or either a temporary or permanent reduction or elimination of the authorized discharge is necessary; or

1.3.1.7 Radium is present in the water supply and a treatment system may concentrate radium to a point where it becomes a human health or water quality concern.

1.3.2 Any applicant denied coverage under this part must apply for and obtain coverage under either (1) an individual permit or (2) another applicable general permit.

1.3.3 Any permittee of a facility that may be authorized to discharge by the permit may request to be excluded from coverage of the permit by applying for an individual permit. The owner or operator shall submit APDES individual permit applications Form 1 and 2C and Form 2M if the discharger is requesting a mixing zone along with reasons supporting the request to the Department at the address in Appendix A, Part 1.1.1 (Contact Information and Addresses).

1.3.4 When an APDES individual permit is issued to a permittee otherwise covered by this general permit, the applicability of this general permit to the facility is automatically terminated on the effective date of the individual permit.

1.3.5 When an APDES individual permit is denied to an owner or operator otherwise covered by this general permit, the permittee is automatically reinstated under this general permit on the date of such denial, unless otherwise specified by the Department.

1.3.6 A permittee excluded from coverage under this general permit solely because it already has an individual permit may request that the individual permit be revoked and that the permittee be covered by this general permit. Upon revocation of the individual permit, this general permit shall apply to the discharge.

1.4 Notification Requirements

1.4.1 The applicant shall submit a complete NOI form, in accordance with 18 AAC 83.210.

1.4.2 The Department will review a NOI for completeness and accuracy. If a NOI is found to be incomplete, the Department will notify the applicant of the needed changes to the NOI submittal.

1.4.3 The NOI shall be signed by the owner or other signatory authority in accordance with Appendix A, Part 1.12 (Signature Requirements), and a copy (electronic or paper) must be retained on site in accordance with Appendix A, Part 1.11 (Monitoring and Records).

1.4.4 An applicant must submit a complete NOI to DEC at the address in Appendix A, Part 1.1.1 (Contact Information and Addresses) to obtain coverage under this general permit.

1.4.4.1 Per 18 AAC 72, eligibility to operate under this permit requires DEC Division of Water approval of engineering plans of the treatment system. New or expanding facilities must submit engineering plans with the NOI. Engineering plans submitted for review and approval must be stamped by a professional engineer licensed to practice in the State of Alaska.

1.4.5 The Department will send a copy of the general permit and authorization to a permittee upon determining that the facility is eligible for coverage under the general permit. The Department will inform an applicant in writing that a facility is not eligible for coverage under the permit. An entity may not discharge until receiving written authorization from the Department.

1.5 Permit Expiration

The permit will expire at midnight on June 30, 2019. A permittee wishing to continue coverage under a new permit must submit a new complete NOI at least 180 days prior to the expiration of this general permit (Appendix A, Part 1.3).

2.0 LIMITATIONS AND MONITORING REQUIREMENTS

2.1 Effluent Limits and Monitoring Requirements

2.1.1 The permittee must limit and monitor discharges as specified in Table 2 for facilities using conventional/direct treatment, Table 3 for facilities using membrane treatment, and Table 4 for facilities using ion exchange. All values represent maximum effluent limits, unless otherwise indicated. The permittee must comply with effluent limits in the table(s) at all times unless otherwise indicated, regardless of monitoring frequency or reporting required by other provisions of this permit. Unless otherwise indicated, the effluent limits apply to discharges to fresh or marine waters. For facilities using multiple treatment technologies (e.g. conventional/direct and reverse osmosis), the permittee shall comply with additional effluent limits and monitoring requirements as specified in the authorization to discharge.

Table 2: Facilities Using Conventional/Direct Drinking Water Treatment

	Effluent Limits				Monitoring Requirements	
Parameter	**Daily Minimum**	**Monthly Average**	**Daily Maximum**	**Units**	**Sample Frequency**	**Sample Type**
Total Chlorine Residual [a]	Report	Report	0.011 [fresh] 0.0075 [marine]	mg/L	1/Month	Grab
Total Dissolved Solids[b]	Report	Report	500	mg/L	1/Month	Grab
pH	6.5	Report	8.5	SU	1/Month	Grab
Aluminum[b]	Report	0.71	1.43	µg/L	1/Month	Grab
Arsenic	Report	Report	10	µg/L	1/Month [c]	Grab
Calcium	Report	Report	Report	mg/L	Semiannually	Grab
Chloride, Total	Report	Report	Report	mg/L	Semiannually	Grab
Copper	Report	Report	Report	µg/L	Semiannually	Grab
Dissolved Oxygen	Report	Report	Report	mg/L	Upon DEC Request	Grab
Fluoride[e]	Report	Report	Report	µg/L	Semiannually	Grab
Iron	Report	Report	Report	µg/L	Semiannually	Grab
Lead	Report	Report	Report	µg/L	Semiannually	Grab
Magnesium	Report	Report	Report	µg/L	Semiannually	Grab
Manganese	Report	Report	Report	µg/L	Semiannually	Grab
Potassium permanganate [d]	Report	Report	Report	mg/L	Semiannually	Grab
Salinity [f]	Report	Report	Report	µmhos/cm^3	Semiannually	Grab
Sulfates	Report	Report	Report	mg/L	Semiannually	Grab
Temperature	Report	Report	Report	˚ C	1/Month	Grab
Total Ammonia, as N	Report	Report	Report	mg/L	1/Month	Grab
Total Discharge Flow	Report	Report	Report	MGD	Continuous	Recorded
Trihalomethanes	Report	Report	Report	mg/L	Semiannually	Grab
Turbidity	Report	Report	Report	NTU[g]	Semiannually	Grab
Zinc	Report	Report	Report	µg/L	Semiannually	Grab

a. Compliance with the receiving water limits for total residual chlorine cannot be determined using EPA-approved analytical methods. DEC will use the 0.1 mg/L as the compliance limit for this parameter.

b. For freshwater discharges only.

c. Arsenic must only be monitored at a frequency of monthly if it is believed present in the wastestream from source water (i.e., groundwater); otherwise, arsenic must be monitored semiannually.

d. Potassium permanganate (KMnO4) monitoring is only required for discharges from any filters where KMnO4 is used.

e. Fluoride monitoring is required only if the facility backwashes with fluoridated, finished water.

f. For marine discharges only.

g. Nephelometric Turbidity Units

h. Metals concentrations shall be reported as total recoverable metal.

Table 3: Facilities Using Membrane Drinking Water Treatment

	Effluent Limits				Monitoring Requirements	
Parameter	**Daily Minimum**	**Monthly Average**	**Daily Maximum**	**Units**	**Sample Frequency**	**Sample Type**
Total Chlorine Residual[a]	Report	Report	0.011 [fresh] 0.0075 [marine]	mg/L	1/Month	Grab
Total Dissolved Solids[b]	Report	Report	500	mg/L	Semiannually	Grab
pH	6.5	Report	8.5	SU	1/Month	Grab
Arsenic	Report	Report	10	µg/L	1/Month [c]	Grab
Chloride	Report	Report	Report	mg/L	Semiannually	Grab
Copper	Report	Report	Report	µg/L	Semiannually	Grab
Dissolved Oxygen	Report	Report	Report	mg/L	Upon Dept. Request	Grab
Fluoride[d]	Report	Report	Report	µg/L	Semiannually	Grab
Iron	Report	Report	Report	µg/L	Semiannually	Grab
Lead	Report	Report	Report	µg/L	Semiannually	Grab
Magnesium	Report	Report	Report	µg/L	Semiannually	Grab
Manganese	Report	Report	Report	µg/L	Semiannually	Grab
Salinity [e]	Report	Report	Report	µmhos/cm^3	Semiannually	Grab
Sulfates	Report	Report	Report	mg/L	Semiannually	Grab
Temperature	Report	Report	Report	˚ C	1/Month	Grab
Total Ammonia, as N	Report	Report	Report	mg/L	1/Month	Grab
Total Discharge Flow	Report	Report	Report	MGD	Continuous	Recorded
Zinc	Report	Report	Report	µg/L	Semiannually	Grab

a. Compliance with the receiving water limits for total residual chlorine cannot be determined using EPA-approved analytical methods. DEC will use the 0.1 mg/L as the compliance limit for this parameter.

b. For freshwater discharges only.

c. Arsenic must only be monitored at a frequency of monthly if it is believed present in the wastestream from source water (i.e., groundwater); otherwise, arsenic must be monitored semiannually.

d. Fluoride monitoring only if the facility backwashes with fluoridated, finished water.

e. For marine discharges only.

f. Metals concentrations shall be reported as total recoverable metal.

Table 4: Facilities Using Ion Exchange Drinking Water Treatment

	Effluent Limits				Monitoring Requirements	
Parameter	**Daily Minimum**	**Monthly Average**	**Daily Maximum**	**Units**	**Sample Frequency**	**Sample Type**
Total Chlorine Residual [a]	Report	Report	0.011 [fresh] 0.0075 [marine]	mg/L	1/Month	Grab
Total Dissolved Solids[b]	Report	Report	500	mg/L	Semiannually	Grab
pH	6.5	Report	8.5	SU	1/Month	Grab
Arsenic	Report	Report	10	µg/L	1/Month [c]	Grab
Chloride	Report	Report	Report	mg/L	Semiannually	Grab
Conductivity	Report	Report	Report	µmho/cm	Semiannually	Grab
Copper	Report	Report	Report	µg/L	Semiannually	Grab
Dissolved Oxygen	Report	Report	Report	mg/L	Upon Dept. Request	Grab
Fluoride[d]	Report	Report	Report	µg/L	Semiannually	Grab
Iron	Report	Report	Report	µg/L	Semiannually	Grab
Lead	Report	Report	Report	µg/L	Semiannually	Grab
Magnesium	Report	Report	Report	µg/L	Semiannually	Grab
Manganese	Report	Report	Report	µg/L	Semiannually	Grab
Salinity [e]	Report	Report	Report	µmhos/cm[3]	Semiannually	Grab
Sulfates	Report	Report	Report	mg/L	Semiannually	Grab
Total Ammonia, as N	Report	Report	Report	mg/L	1/Month	Grab
Total Discharge Flow	Report	Report	Report	MGD	Continuous	Recorded
Zinc	Report	Report	Report	µg/L	Semiannually	Grab

a. Compliance with the receiving water limits for total residual chlorine cannot be determined using EPA-approved analytical methods. DEC will use the 0.1 mg/L as the compliance limit for this parameter.

b. For freshwater discharges only.

c. Arsenic must only be monitored at a frequency of monthly if it is believed present in the wastestream from source water (i.e., groundwater); otherwise, arsenic must be monitored semiannually.

d. Fluoride monitoring only if the facility backwashes with fluoridated, finished water.

e. For marine discharges only.

f. Metals concentrations shall be reported as total recoverable metal.

2.1.2 Discharge shall not cause contamination of surface or ground waters, and shall not cause or contribute to a violation of the Water Quality Standards (WQS) 18 AAC 70, except if excursions are authorized in accordance with applicable provisions in 18 AAC 70.200 – 70.270.

2.1.3 The permittee must collect effluent samples from the effluent stream after the last treatment unit before discharge into receiving waters.

The permittees may request in writing that monitoring frequencies be reduced or eliminated for monitor only parameters (i.e., parameters that don't have associated effluent limits) after two years of monitoring and reporting if results indicate no detections above applicable water quality criteria. Monitoring reductions can only occur once written approval from the Department is received.

2.1.4 For all effluent monitoring, with the exception of total residual chlorine, the permittee must use the methods cited in Appendix A 1.11.4 (Monitoring Procedures) that can achieve a method detection limit (MDL) less than the effluent limit. For a parameter without an effluent limit in this permit, the permittee must use the most sensitive MDL from and EPA-approved analytical test method necessary for compliance monitoring. The permittee must use and EPA-approved test method for total residual chlorine monitoring, but in this permit, sample concentrations below the MDL of the EPA-approved method use or 0.1 mg/L, whichever is lower, will be considered the compliance limit. The permittee may substitute alternative methods of monitoring or analysis upon receipt of prior written approval from the Department.

2.1.5 Samples and measurements taken shall be representative of the volume and nature of the monitored discharge.

2.1.6 The Department may require additional monitoring parameters and increased monitoring frequency on a case-by-case basis.

2.1.7 If the permittee monitors any influent, effluent, or receiving water characteristic identified in the permit more frequently than required, the results of such monitoring shall be reported to the Department in the monitoring report required under Appendix A, Section 3.1.

2.2 Mixing Zone and Modification of Effluent Limits

2.2.1 In accordance with 18 AAC 70.240, DEC can authorize a discharge specific mixing zone. A permittee may request modification to the water quality-based effluent limits based upon a mixing zone, provided the necessary information is included in the NOI and APDES Form 2M. DEC will approve modified effluent limits under this general permit if the modified limits and resulting mixing zone are consistent with the provisions of the CWA, 18 AAC 83, and 18 AAC 70.240 – 70.270, and:

2.2.1.1 The mixing zone and the resulting dilution factors are established by DEC in accordance with the WQS (18 AAC 70).

2.2.1.2 The public is provided reasonable notice of and an opportunity to comment on the modified effluent limits and associated mixing zone.

2.3 Best Management Practices Plan

The following Best Management Practices (BMP) Plan applies to all permittees:

2.3.1 Through implementation of the BMP Plan, the permittee must prevent or minimize the generation and potential for the release of pollutants from the facility to the waters of the U.S. through normal and ancillary activities; and

2.3.2 The permittee must develop and implement a BMP Plan that achieves the objectives and the specific requirements listed in Part 2.3.3. Any existing BMP Plan may be modified for submittal and approval under this section. The permittee will indicate on the NOI if the BMP Plan is ready to implement when the NOI is submitted, otherwise the permittee shall notify DEC in writing that the BMP Plan has been prepared and is ready to implement within 60 days of receiving authorization to discharge.

2.3.3 The permittee must develop and amend the BMP Plan consistent with the following objectives for the control of pollutants:

2.3.3.1 The number and quantity of pollutants and the toxicity of effluent generated, discharged or potentially discharged at the facility must be minimized by the permittee to the extent feasible by managing each waste stream in the most appropriate manner;

2.3.3.2 Under the BMP Plan and any standard operating procedures included in the BMP Plan, the permittee must ensure proper operation and maintenance of water management and wastewater treatment systems. BMP Plan elements must be developed in accordance with good engineering practices; and

2.3.3.3 Each component or system in the drinking water treatment facility must be examined for its waste minimization opportunities and its potential for causing a release of significant amounts of pollutants to waters of the U.S. due to equipment failure, improper operation, or natural phenomena such as rain or snowfall. The examination must include all normal operations and ancillary activities including material storage areas, storm water, in-plant transfer, material handling and process handling areas, loading or unloading operations, spillage or leaks, sludge and waste disposal, or drainage from raw material storage.

2.3.4 The BMP Plan must be consistent with the objectives in Part 2.3.3. The BMP Plan should be consistent with the general guidance contained in *Guidance Manual for Developing Best Management Practices* (EPA 833-B-93-004, October 1993) or any subsequent revision to this guidance document. The BMP Plan must include, at a minimum, the following items:

2.3.4.1 Statement of BMP policy. The BMP Plan must include a statement of management commitment to provide the necessary financial, staff, equipment, and training resources to develop and implement the BMP Plan on a continuing basis;

2.3.4.2 The BMP Committee. The BMP Plan must establish a BMP Committee responsible for developing, implementing, and maintaining the BMP Plan;

2.3.4.3 Description of potential pollutant sources;

2.3.4.4 Risk identification and assessment;

2.3.4.5 Standard operating procedures to achieve the above objectives and specific best management practices (Part 2.3.3);

2.3.4.6 Reporting of BMP incidents. The reports must include a description of the circumstances leading to the incident, corrective actions taken and recommended changes to operating and maintenance practices to prevent recurrence;

2.3.4.7 Materials compatibility;

2.3.4.8 Good housekeeping;

2.3.4.9 Inspections;

2.3.4.10 Preventative maintenance and repair;

2.3.4.11 Security;

2.3.4.12 Employee training;

2.3.4.13 Record keeping and reporting;

2.3.4.14 Prior evaluation of any planned modifications to the facility to ensure that the requirements of the BMP Plan are considered as part of the modifications; and

2.3.4.15 Final constructed site plans, drawings and maps (including detailed storm water outfall/culvert configurations).

2.3.5 Specific Best Management Practices.

The BMP Plan must establish specific BMPs or other measures to achieve the objectives under Permit Section 2.3 and which ensure that the following specific requirements are met:

2.3.5.1 Control Measures: The permittee must ensure that proper neutralization, solids settling, and/or erosion control measures are put in place;

2.3.5.2 Proper Operation and Maintenance: The permittee must at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) in such a manner that the requirements of the permit and the requirements of the written authorization are met;

2.3.5.3 Removed Substances: The permittee must dispose of collected grit, scum, sludge, or other pollutants removed in the course of treatment or control of wastewater in a Department-approved manner; and

2.3.5.4 The permittee is required to maintain an annual inventory of the name, quantities, and application rates of chemicals and biocides that are added to wastewaters generated from the drinking water treatment units.

2.3.6 BMP Plan Review and Certification.

2.3.6.1 The permittee's facility manager and the BMP Committee must conduct an annual review of the BMP Plan.

2.3.6.2 The permittee must complete a certified statement that the review described in Part 2.3.6.1 has been completed and that the BMP Plan fulfills the requirements set forth in this general permit. The statement must be certified by the dated signatures of each BMP Committee member. The statement must be submitted to DEC on or before January 31st of each year of operation under this general permit after the initial BMP Plan submittal.

2.3.7 Documentation. The permittee must maintain a copy (electronic or paper) of the BMP Plan at the facility and make it available to DEC or an authorized representative upon request.

2.3.8 BMP Plan Modification.

2.3.8.1 The permittee must amend the BMP Plan whenever there is a change in the facility or in the operation of the facility which materially increases the generation of pollutants or their release or potential release to receiving waters.

2.3.8.2 The permittee must amend the BMP Plan whenever it is found to be ineffective in achieving the general objective of preventing and minimizing the generation and the potential for the release of pollutants from the facility to waters of the U.S. and/or the specific requirements.

2.3.8.3 Any changes to the BMP Plan must be consistent with the objectives and specific requirements listed in Part 2.3.3. All changes in the BMP Plan must be reported to DEC with the annual certification required under Part 2.3.6.

2.4 Removed Substances

Collected screenings, grit, solids, scum, and other facility residuals, or other pollutants removed in the course of treatment or control of water and wastewaters shall be disposed of in a Department-approved manner and method in accordance with 18 AAC 60, such as to prevent any pollution from such materials from entering waters of the U.S.

3.0 SPECIAL CONDITIONS

3.1 Quality Assurance Project Plan

3.1.1 The permittee must develop a quality assurance project plan (QAPP) for all monitoring required by this permit. The QAPP must be implemented within 120 days of the effective date of this general permit.

3.1.2 The QAPP must be designed to assist in planning for the collection and analysis of effluent and receiving water samples in support of the general permit and in explaining data anomalies when they occur.

3.1.3 Throughout all sample collection and analysis activities, the permittee must use the EPA-approved quality assurance/quality control and chain-of-custody procedures described in *Requirements for Quality Assurance Project Plans* (EPA/QA/R-5) and *Guidance for Quality Assurance Project Plans* (EPA/QA/G-5). The QAPP must be prepared in the format which is specified in these documents.

3.1.4 The permittee must amend the QAPP whenever there is a modification in sample collection, sample analysis, or other procedure addressed by the QAPP.

3.1.5 Copies (electronic or paper) of the QAPP must be kept on site and made available to DEC or DEC representative upon request.

APPENDIX A

STANDARD CONDITIONS

APDES PERMIT

NONDOMESTIC DISCHARGES

September 2011

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Appendix A of the permit contains standard regulatory language that must be included in all APDES permits. These requirements are based on the regulations and cannot be challenged in the context of an individual APDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements. Appendix A, Standard Conditions is an integral and enforceable part of the permit. Failure to comply with a Standard Condition in this Appendix constitutes a violation of the permit and is subject to enforcement.

1.0 Standard Conditions Applicable to All Permits

1.1 Contact Information and Addresses

1.1.1 Permitting Program

Documents, reports, and plans required under the permit and Appendix A are to be sent to the following address:

State of Alaska
Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, Alaska 99501
Telephone (907) 269-6285
Fax (907) 269-3487
Email: DEC.Water.WQPermit@alaska.gov

1.1.2 Compliance and Enforcement Program

Documents and reports required under the permit and Appendix A relating to compliance are to be sent to the following address:

State of Alaska
Department of Environmental Conservation
Division of Water
Compliance and Enforcement Program
555 Cordova Street
Anchorage, Alaska 99501
Telephone Nationwide (877) 569-4114
Anchorage Area / International (907) 269-4114
Fax (907) 269-4604
Email: dec-wqreporting@alaska.gov

1.2 Duty to Comply

A permittee shall comply with all conditions of the permittee's APDES permit. Any permit noncompliance constitutes a violation of 33 U.S.C 1251-1387 (Clean Water Act) and state law and is grounds for enforcement action including termination, revocation and reissuance, or modification of a permit, or denial of a permit renewal application. A permittee shall comply with effluent standards or prohibitions established under 33 U.S.C. 1317(a) for toxic pollutants within the time provided in the regulations that establish those effluent standards or prohibitions even if the permit has not yet been modified to incorporate the requirement.

1.3 Duty to Reapply

If a permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must apply for and obtain a new permit. In accordance with 18 AAC 83.105(b), a permittee with a currently effective permit shall reapply by submitting a new application at least 180 days before the existing permit expires, unless the Department has granted the permittee permission to submit an application on a later date. However, the Department will not grant permission for an application to be submitted after the expiration date of the existing permit.

1.4 Need to Halt or Reduce Activity Not a Defense

In an enforcement action, a permittee may not assert as a defense that compliance with the conditions of the permit would have made it necessary for the permittee to halt or reduce the permitted activity.

1.5 Duty to Mitigate

A permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

1.6 Proper Operation and Maintenance

1.6.1 A permittee shall at all times properly operate and maintain all facilities and systems of treatment and control and related appurtenances that the permittee installs or uses to achieve compliance with the conditions of the permit. The permittee's duty to operate and maintain properly includes using adequate laboratory controls and appropriate quality assurance procedures. However, a permittee is not required to operate back-up or auxiliary facilities or similar systems that a permittee installs unless operation of those facilities is necessary to achieve compliance with the conditions of the permit.

1.6.2 Operation and maintenance records shall be retained and made available at the site.

1.7 Permit Actions

A permit may be modified, revoked and reissued, or terminated for cause as provided in 18 AAC 83.130. If a permittee files a request to modify, revoke and reissue, or terminate a permit, or gives notice of planned changes or anticipated noncompliance, the filing or notice does not stay any permit condition.

1.8 Property Rights

A permit does not convey any property rights or exclusive privilege.

1.9 Duty to Provide Information

A permittee shall, within a reasonable time, provide to the Department any information that the Department requests to determine whether a permittee is in compliance with the permit, or whether cause exists to modify, revoke and reissue, or terminate the permit. A permittee shall also provide to the Department, upon request, copies of any records the permittee is required to keep under the permit.

1.10 Inspection and Entry

A permittee shall allow the Department, or an authorized representative, including a contractor acting as a representative of the Department, at reasonable times and on presentation of credentials establishing authority and any other documents required by law, to:

1.10.1 Enter the premises where a permittee's regulated facility or activity is located or conducted, or where permit conditions require records to be kept;

1.10.2 Have access to and copy any records that permit conditions require the permittee to keep;

1.10.3 Inspect any facilities, equipment, including monitoring and control equipment, practices, or operations regulated or required under a permit; and

1.10.4 Sample or monitor any substances or parameters at any location for the purpose of assuring permit compliance or as otherwise authorized by 33 U.S.C. 1251-1387 (Clean Water Act).

1.11 Monitoring and Records

A permittee must comply with the following monitoring and recordkeeping conditions:

1.11.1 Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity.

1.11.2 The permittee shall retain records in Alaska of all monitoring information for at least three years, or longer at the Department's request at any time, from the date of the sample, measurement, report, or application. Monitoring records required to be kept include:

1.11.2.1 All calibration and maintenance records,

1.11.2.2 All original strip chart recordings or other forms of data approved by the Department for continuous monitoring instrumentation,

1.11.2.3 All reports required by a permit,

1.11.2.4 Records of all data used to complete the application for a permit,

1.11.2.5 Field logbooks or visual monitoring logbooks,

1.11.2.6 Quality assurance chain of custody forms,

1.11.2.7 Copies of discharge monitoring reports, and

1.11.2.8 A copy of this APDES permit.

1.11.3 Records of monitoring information must include:

1.11.3.1 The date, exact place, and time of any sampling or measurement;

1.11.3.2 The name(s) of any individual(s) who performed the sampling or measurement(s);

1.11.3.3 The date(s) and time any analysis was performed;

1.11.3.4 The name(s) of any individual(s) who performed any analysis;

1.11.3.5 Any analytical technique or method used; and

1.11.3.6 The results of the analysis.

1.11.4 Monitoring Procedures

Analyses of pollutants must be conducted using test procedures approved under 40 CFR Part 136, adopted by reference at 18 AAC 83.010, for pollutants with approved test procedures, and using test procedures specified in the permit for pollutants without approved methods.

1.12 Signature Requirement and Penalties

1.12.1 Any application, report, or information submitted to the Department in compliance with a permit requirement must be signed and certified in accordance with 18 AAC 83.385. Any person who knowingly makes any false material statement, representation, or certification in any application, record, report, or other document filed or required to be maintained under a permit, or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be subject to penalties under 33 U.S.C. 1319(c)(4), AS 12.55.035(c)(1)(B), (c)(2) and (c)(3), and AS 46.03.790(g).

1.12.2 In accordance with 18 AAC 83.385, an APDES permit application must be signed as follows:

1.12.2.1 For a corporation, a responsible corporate officer shall sign the application; in this subsection, a responsible corporate officer means:

1.12.2.1.1 A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation; or

1.12.2.1.2 The manager of one of more manufacturing, production, or operating facilities, if

1.12.2.1.2.1 The manager is authorized to make management decisions that govern the operation of the regulated facility, including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental statutes and regulations;

1.12.2.1.2.2 The manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and

1.12.2.1.2.3 Authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

1.12.2.2 For a partnership or sole proprietorship, by the general partner or the proprietor, respectively, shall sign the application.

1.12.2.3 For a municipality, state, federal, or other public agency, either a principal executive officer or ranking elected official shall sign the application; in this subsection, a principal executive officer of an agency means:

1.12.2.3.1 The chief executive officer of the agency; or

1.12.2.3.2 A senior executive officer having responsibility for the overall operations of a principal geographic unit or division of the agency.

1.12.3 Any report required by an APDES permit, and a submittal with any other information requested by the Department, must be signed by a person described in Appendix A, Part 1.12.2, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1.12.3.1 The authorization is made in writing by a person described in Appendix A, Part 1.12.2;

1.12.3.2 The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, including the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility; or an individual or position having overall responsibility for environmental matters for the company; and

1.12.3.3 The written authorization is submitted to the Department to the Permitting Program address in Appendix A, Part 1.1.1.

1.12.4 If an authorization under Appendix A, Part 1.12.3 is no longer effective because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Appendix A, Part 1.12.3 must be submitted to the Department before or together with any report, information, or application to be signed by an authorized representative.

1.12.5 Any person signing a document under Appendix A, Part 1.12.2 or Part 1.12.3 shall certify as follows:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

1.13 Proprietary or Confidential Information

1.13.1 A permit applicant or permittee may assert a claim of confidentiality for proprietary or confidential business information by stamping the words “confidential business information” on each page of a submission containing proprietary or confidential business information. The Department will treat the stamped submissions as confidential if the information satisfies the test in 40 CFR §2.208, adopted by reference at 18 AAC 83.010, and is not otherwise required to be made public by state law.

1.13.2 A claim of confidentiality under Appendix A, Part 1.13.1 may not be asserted for the name and address of any permit applicant or permittee, a permit application, a permit, effluent data, sewage sludge data, and information required by APDES or NPDES application forms provided by the Department, whether submitted on the forms themselves or in any attachments used to supply information required by the forms.

1.13.3 A permittee’s claim of confidentiality authorized under Appendix A, Part 1.13.1 is not waived if the Department provides the proprietary or confidential business information to the EPA or to other agencies participating in the permitting process. The Department will supply any information obtained or used in the administration of the state APDES program to the EPA upon request under 40 CFR §123.41, as revised as of July 1, 2005. When providing information submitted to the Department with a claim of confidentiality to the EPA, the Department will notify the EPA of the confidentiality claim. If the Department provides the EPA information that is not claimed to be confidential, the EPA may make the information available to the public without further notice.

1.14 Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any action or relieve a permittee

from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under state laws addressing oil and hazardous substances.

1.15 Cultural and Paleontological Resources

If cultural or paleontological resources are discovered because of this disposal activity, work that would disturb such resources is to be stopped, and the Office of History and Archaeology, a Division of Parks and Outdoor Recreation of the Alaska Department of Natural Resources (http://www.dnr.state.ak.us/parks/oha/), is to be notified immediately at (907) 269-8721.

1.16 Fee

A permittee must pay the appropriate permit fee described in 18 AAC 72.

1.17 Other Legal Obligations

This permit does not relieve the permittee from the duty to obtain any other necessary permits from the Department or from other local, state, or federal agencies and to comply with the requirements contained in any such permits. All activities conducted and all plan approvals implemented by the permittee pursuant to the terms of this permit shall comply with all applicable local, state, and federal laws and regulations.

2.0 Special Reporting Obligations

2.1 Planned Changes

2.1.1 The permittee shall give notice to the Department as soon as possible of any planned physical alteration or addition to the permitted facility if:

2.1.1.1 The alteration or addition may make the facility a "new source" under one or more of the criteria in 18 AAC 83.990(44); or

2.1.1.2 The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged if those pollutants are not subject to effluent limitations in the permit or to notification requirements under 18 AAC 83.610.

2.1.2 If the proposed changes are subject to plan review, then the plans must be submitted at least 30 days before implementation of changes (see 18 AAC 15.020 and 18 AAC 72 for plan review requirements). Written approval is not required for an emergency repair or routine maintenance.

2.1.3 Written notice must be sent to the Permitting Program address in Appendix A, Part 1.1.1.

2.2 Anticipated Noncompliance

2.2.1 A permittee shall give seven days' notice to the Department before commencing any planned change in the permitted facility or activity that may result in noncompliance with permit requirements.

2.2.2 Written notice must be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

2.3 Transfers

2.3.1 A permittee may not transfer a permit for a facility or activity to any person except after notice to the Department in accordance with 18 AAC 83.150. The Department may modify or revoke and reissue the permit to change the name of the permittee and incorporate such other requirements under 33 U.S.C. 1251-1387 (Clean Water Act) or state law.

2.3.2 Written notice must be sent to the Permitting Program address in Appendix A, Part 1.1.1.

2.4 Compliance Schedules

2.4.1 A permittee must submit progress or compliance reports on interim and final requirements in any compliance schedule of a permit no later than 14 days following the scheduled date of each requirement.

2.4.2 Written notice must be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

2.5 Corrective Information

2.5.1 If a permittee becomes aware that it failed to submit a relevant fact in a permit application or submitted incorrect information in a permit application or in any report to the Department, the permittee shall promptly submit the relevant fact or the correct information.

2.5.2 Information must be sent to the Permitting Program address in Appendix A, Part 1.1.1.

2.6 Bypass of Treatment Facilities

2.6.1 Prohibition of Bypass

Bypass is prohibited. The Department may take enforcement action against a permittee for any bypass, unless:

2.6.1.1 The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

2.6.1.2 There were no feasible alternatives to the bypass, including use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. However, this condition is not satisfied if the permittee, in the exercise of reasonable engineering judgment, should have installed adequate back-up equipment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance; and

2.6.1.3 The permittee provides notice to the Department of a bypass event in the manner, as appropriate, under Appendix A, Part 2.6.2.

2.6.2 Notice of bypass

2.6.2.1 For an anticipated bypass, the permittee submits notice at least 10 days before the date of the bypass. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the conditions of Appendix A, Parts 2.6.1.1 and 2.6.1.2.

2.6.2.2 For an unanticipated bypass, the permittee submits 24-hour notice, as required in 18 AAC 83.410(f) and Appendix A, Part 3.4, Twenty-four Hour Reporting.

2.6.2.3 Written notice must be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

2.6.3 Notwithstanding Appendix A, Part 2.6.1, a permittee may allow a bypass that:

2.6.3.1 Does not cause an effluent limitation to be exceeded, and

2.6.3.2 Is for essential maintenance to assure efficient operation.

2.7 Upset Conditions

2.7.1 In any enforcement action for noncompliance with technology-based permit effluent limitations, a permittee may claim upset as an affirmative defense. A permittee seeking to establish the occurrence of an upset has the burden of proof to show that the requirements of Appendix A, Part 2.7.2 are met.

2.7.2 To establish the affirmative defense of upset, the permittee must demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that:

2.7.2.1 An upset occurred and the permittee can identify the cause or causes of the upset;

2.7.2.2 The permitted facility was at the time being properly operated;

2.7.2.3 The permittee submitted 24-hour notice of the upset, as required in 18 AAC 83.410(f) and Appendix A, Part 3.4, Twenty-four Hour Reporting; and

2.7.2.4 The permittee complied with any mitigation measures required under 18 AAC 83.405(e) and Appendix A, Part 1.5, Duty to Mitigate.

2.7.3 Any determination made in administrative review of a claim that noncompliance was caused by upset, before an action for noncompliance is commenced, is not final administrative action subject to judicial review.

2.8 Existing Manufacturing, Commercial, Mining, and Silvicultural Discharges

2.8.1 In addition to the reporting requirements under 18 AAC 83.410, an existing manufacturing, commercial, mining, and silvicultural discharger shall notify the Department as soon as that discharger knows or has reason to believe that any activity has occurred or will occur that would result in:

2.8.1.1 The discharge, on a routine or frequent basis, of any toxic pollutant that is not limited in the permit, if that discharge will exceed the highest of the following notification levels:

2.8.1.1.1 One hundred micrograms per liter (100 µg/L);

2.8.1.1.2 Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile, 500 micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol, and one milligram per liter (1 mg/L) for antimony;

2.8.1.1.3 Five times the maximum concentration value reported for that pollutant in the permit application in accordance with 18 AAC 83.310(c)-(g); or

2.8.1.1.4 The level established by the Department in accordance with 18 AAC 83.445.

2.8.1.2 Any discharge, on a non-routine or infrequent basis, of a toxic pollutant that is not limited in the permit, if that discharge will exceed the highest of the following notification levels:

2.8.1.2.1 Five hundred micrograms per liter (500 µg/L);

2.8.1.2.2 One milligram per liter (1 mg/L) for antimony;

2.8.1.2.3 Ten times the maximum concentration value reported for that pollutant in the permit application in accordance with 18 AAC 83.310(c)-(g); or

2.8.1.2.4 The level established by the Department in accordance with 18 AAC 83.445.

3.0 Monitoring, Recording, and Reporting Requirements

3.1 Representative Sampling

A permittee must collect effluent samples from the effluent stream after the last treatment unit before discharge into the receiving waters. Samples and measurements must be representative of the volume and nature of the monitored activity or discharge.

3.2 Reporting of Monitoring Results

The permittee shall summarize monitoring results on the annual report form or approved equivalent. The permittee shall submit its annual report at the interval specified in the permit. The permittee shall sign and certify all annual reports and other reports in accordance with the requirements of Appendix A, Part 1.12, Signatory Requirement and Penalties. The permittee shall submit the legible originals of these documents to the ADEC Compliance and Enforcement Program at the address in Appendix A, Part 1.1.2.

3.3 Additional Monitoring by Permittee

If the permittee monitors any pollutant more frequently than the permit requires using test procedures approved in 40 CFR Part 136, adopted by reference at 18 AAC 83.010, or as specified in this permit, the results of that additional monitoring must be included in the calculation and reporting of the data submitted in the DMR or annual report required by Appendix A, Part 3.2. All limitations that require averaging of measurements must be calculated using an arithmetic means unless the Department specifies another method in the permit. Upon request by the Department, the permittee must submit the results of any other sampling and monitoring regardless of the test method used.

3.4 Twenty-four Hour Reporting

A permittee shall report any noncompliance event that may endanger health or the environment as follows:

3.4.1 A report must be made:

3.4.1.1 Orally within 24 hours after the permittee becomes aware of the circumstances, and

3.4.1.2 In writing within five days after the permittee becomes aware of the circumstances.

3.4.2 A report must include the following information:

3.4.2.1 A description of the noncompliance and its causes, including the estimated volume or weight and specific details of the noncompliance;

3.4.2.2 The period of noncompliance, including exact dates and times;

3.4.2.3 If the noncompliance has not been corrected, a statement regarding the anticipated time the noncompliance is expected to continue; and

3.4.2.4 Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3.4.3 An event that must be reported within 24 hours includes:

3.4.3.1 An unanticipated bypass that exceeds any effluent limitation in the permit (see Appendix A, Part 2.6, Bypass of Treatment Facilities).

3.4.3.2 An upset that exceeds any effluent limitation in the permit (see Appendix A, Part 2.7, Upset Conditions).

3.4.3.3 A violation of a maximum daily discharge limitation for any of the pollutants listed in the permit as requiring 24-hour reporting.

3.4.4 The Department may waive the written report on a case-by-case basis for reports under Appendix A, Part 3.4 if the oral report has been received within 24 hours of the permittee becoming aware of the noncompliance event.

3.4.5 The permittee may satisfy the written reporting submission requirements of Appendix A, Part 3.4 by submitting the written report via e-mail, if the following conditions are met:

3.4.5.1 The Noncompliance Notification Form or equivalent form is used to report the noncompliance;

3.4.5.2 The written report includes all the information required under Appendix A, Part 3.4.2;

3.4.5.3 The written report is properly certified and signed in accordance with Appendix A, Parts 1.12.3 and 1.12.5.;

3.4.5.4 The written report is scanned as a PDF (portable document format) document and transmitted to the Department as an attachment to the e-mail; and

3.4.5.5 The permittee retains in the facility file the original signed and certified written report and a printed copy of the conveying email.

3.4.6 The e-mail and PDF written report will satisfy the written report submission requirements of this permit provided the e-mail is received by the Department within five days after the time the permittee becomes aware of the noncompliance event and the e-mail and written report satisfy the criteria of Part 3.4.5. The e-mail address to report noncompliance is: dec-wqreporting@alaska.gov

3.5 Other Noncompliance Reporting

A permittee shall report all instances of noncompliance not required to be reported under Appendix A, Parts 2.4 (Compliance Schedules), 3.3 (Additional Monitoring by Permittee), and 3.4 (Twenty-four Hour Reporting) at the time the permittee submits monitoring reports under Appendix A, Part 3.2. (Reporting of Monitoring Results). A report of noncompliance under this part must contain the information listed in Appendix A, Part 3.4.2 and be sent to the Compliance and Enforcement Program address in Appendix A, Part 1.1.2.

4.0 Penalties for Violations of Permit Conditions

Alaska laws allow the State to pursue both civil and criminal actions concurrently. The following is a summary of Alaska law. Permittees should read the applicable statutes for further substantive and procedural details.

4.1 Civil Action

Under AS 46.03.760(e), a person who violates or causes or permits to be violated a regulation, a lawful

order of the Department, or a permit, approval, or acceptance, or term or condition of a permit, approval or acceptance issued under the program authorized by AS 46.03.020 (12) is liable, in a civil action, to the State for a sum to be assessed by the court of not less than $500 nor more than $100,000 for the initial violation, nor more than $10,000 for each day after that on which the violation continues, and that shall reflect, when applicable:

4.1.1 Reasonable compensation in the nature of liquated damages for any adverse environmental effects caused by the violation, that shall be determined by the court according to the toxicity, degradability, and dispersal characteristics of the substance discharged, the sensitivity of the receiving environment, and the degree to which the discharge degrades existing environmental quality;

4.1.2 Reasonable costs incurred by the State in detection, investigation, and attempted correction of the violation;

4.1.3 The economic savings realized by the person in not complying with the requirements for which a violation is charged; and

4.1.4 The need for an enhanced civil penalty to deter future noncompliance.

4.2 Injunctive Relief

4.2.1 Under AS 46.03.820, the Department can order an activity presenting an imminent or present danger to public health or that would be likely to result in irreversible damage to the environment be discontinued. Upon receipt of such an order, the activity must be immediately discontinued.

4.2.2 Under AS 46.03.765, the Department can bring an action in Alaska Superior Court seeking to enjoin ongoing or threatened violations for Department-issued permits and Department statutes and regulations.

4.3 Criminal Action

Under AS 46.03.790(h), a person is guilty of a Class A misdemeanor if the person negligently:

4.3.1 Violates a regulation adopted by the Department under AS 46.03.020(12);

4.3.2 Violates a permit issued under the program authorized by AS 46.03.020(12);

4.3.3 Fails to provide information or provides false information required by a regulation adopted under AS 46.03.020(12);

4.3.4 Makes a false statement, representation, or certification in an application, notice, record, report, permit, or other document filed, maintained, or used for purposes of compliance with a permit issued under or a regulation adopted under AS 46.03.020(12); or

4.3.5 Renders inaccurate a monitoring device or method required to be maintained by a permit issued or under a regulation adopted under AS 46.03.020(12).

4.4 Other Fines

Upon conviction of a violation of a regulation adopted under AS 46.03.020(12), a defendant who is not an organization may be sentenced to pay a fine of not more than $10,000 for each separate violation (AS 46.03.790(g)). A defendant that is an organization may be sentenced to pay a fine not exceeding the greater of: (1) $200,00; (2) three times the pecuniary gain realized by the defendant as a result of the offense; or (3) three times the pecuniary damage or loss caused by the defendant to another, or the property of another, as a result of the offense (AS 12.55.035(c)(B), (c)(2), and (c)(3)).

APPENDIX B ACRONYMS

1/Month	Once Per Month
2/Year	Twice Per Year
AAC	Alaska Administrative Code
DEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
ADF&G	Alaska Department of Fish and Game
APDES	Alaska Pollutant Discharge Elimination System
WQS	Alaska Water Quality Standard
BMP	Best Management Practices
BPJ	Best Professional Judgment
CFR	Code of Federal Regulations
CWA	Clean Water Act
DMR	Discharge Monitoring Report
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
GPD	Gallons Per Day
MGD	Million Gallons Per Day
mg/L	Milligrams per liter
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
ODCE	Ocean Discharge Criteria Evaluation
USFWS	United States Fish & Wildlife Service
U.S.C.	United States Code
USGS	United States Geological Survey

APPENDIX C DEFINITIONS

The following are common definitions of terms associated with APDES permits. Not all the terms listed may appear in a permit. Consult the footnote references for a complete list of terms and definitions.

Alaska Pollutant Discharge Elimination System (APDES)[a]	Means the state's program, approved by EPA under 33 U.S.C. 1342(b), for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits and imposing and enforcing pretreatment requirements under 33 U.S.C. 1317, 1328, 1342, and 1345
Annual	Means once per calendar year
Average	Means an arithmetic mean obtained by adding quantities and dividing the sum by the number of quantities
Average Monthly Discharge Limitation[a]	Means the highest allowable average of "daily discharges" over a calendar month calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured for that month
Best Management Practices (BMPs)[a]	Means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage areas.
Biochemical Oxygen Demand (BOD)[c]	Means the amount, in milligrams per liter, of oxygen used in the biochemical oxidation of organic matter in five days at 20° C
Bypass[a]	Means the intentional diversion of waste streams from any portion of a treatment facility
Clean Water Act (CWA)[a]	Means the federal law codified at 33 U.S.C. 1251-1387, also referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972
Coastal	Means any location in or on a water of the United States landward of the inner boundary of the territorial seas.
Color[b]	Means the condition that results in the visual sensations of hue and intensity as measured after turbidity is removed
Commissioner[a]	Means the commissioner of the Alaska Department of Environmental Conservation or the commissioner's designee
Composite Samples	Composite samples must consist of at least eight equal volume grab samples. 24 hour composite sample means a combination of at least eight discrete samples of equal volume collected at equal time intervals over a 24-hour period at the same location. A "flow proportional composite" sample means a combination of at least eight discrete samples collected at equal time intervals over a 24-hour period with each sample volume proportioned according to the flow volume. The sample aliquots must be collected and

a) See 18 AAC 83

b) See 18 AAC 70.990

c) See 18 AAC 72.990

d) See 40 CFR Part 136

e) See EPA Technical Support Document

f) See Standard Methods for the Examination of Water and Wastewater 18th Edition

g) See EPA Permit Writers Manual

	stored in accordance with procedures prescribed in the most recent edition of *Standard Methods for the Examination of Water and Wastewater*.
Contact Recreation[b]	Means activities in which there is direct and intimate contact with water. Contact recreation includes swimming, diving, and water skiing. Contact recreation does not include wading.
Criterion[b]	Means a set concentration or limit of a water quality parameter that, when not exceeded, will protect an organism, a population of organisms, a community of organisms, or a prescribed water use with a reasonable degree of safety. A criterion might be a narrative statement instead of a numerical concentration or limit.
Daily Discharge[a]	Means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants measured in units of mass, the “daily discharge” is calculated as the total mass of the pollutant discharged over the day. For pollutants with a limitation expressed in other units of measurement, the “daily discharge” is calculated as the average measurement of the pollutant over the day.
Department[a]	Means the Alaska Department of Environmental Conservation
Design Flow[a]	Means the wastewater flow rate that the plant was designed to handle
Director[a]	Means the commissioner or the commissioner’s designee assigned to administer the APDES program or a portion of it, unless the context identifies an EPA director
Discharge[a]	When used without qualification, discharge means the discharge of a pollutant
Discharge of a Pollutant[a]	Means any addition of any pollutant or combination of pollutants to waters of the United States from any point source or to waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft that is being used as a means of transportation. Discharge includes any addition of pollutants into waters of the United States from surface runoff that is collected or channeled by humans; discharges through pipes, sewers, or other conveyances owned by a state, municipality, or other person that do not lead to a treatment works; discharges through pipes, sewers, or other conveyances leading into privately owned treatment works; and does not include an addition of pollutants by any indirect discharger.
Domestic Wastewater[c]	Means waterborne human wastes or graywater derived from dwellings, commercial buildings, institutions, or similar structures. "Domestic wastewater" includes the contents of individual removable containers used to collect and temporarily store human wastes.
Effluent[b]	Means the segment of a wastewater stream that follows the final step in a treatment process and precedes discharge of the wastewater stream to the receiving environment
Estimated	Means a way to estimate the discharge volume. Approvable estimations include, but are not limited to, the number of persons per day at the facility, volume of potable water produced per day, lift station run time, etc.
Excluded area	Means an area not authorized as a receiving water under a permit
Fecal Coliform	Bacteria that can ferment lactose at 44.5° + 0.2°C to produce gas in a multiple tube

a) See 18 AAC 83

b) See 18 AAC 70.990

c) See 18 AAC 72.990

d) See 40 CFR Part 136

e) See EPA Technical Support Document

f) See Standard Methods for the Examination of Water and Wastewater 18th Edition

g) See EPA Permit Writers Manual

Bacteria (FC)[b]	procedure. Fecal coliform bacteria also means all bacteria that produce blue colonies in a membrane filtration procedure within 24 ± 2 hours of incubation at 44.5° + 0.2°C in an M-FC broth.
Fish[b]	Means any of the group of cold-blooded vertebrates that live in water and have permanent gills for breathing and fins for locomotion
Geometric Mean	The geometric mean is the N^{th} root of the product of N. All sample results of zero will use a value of 1 for calculation of the geometric mean. Example geometric mean calculation: $\sqrt[4]{12x23x34x990} = 55$.
Grab Sample	Means a single instantaneous sample collected at a particular place and time that represents the composition of wastewater only at that time and place
Graywater[b]	Means wastewater from a laundry, kitchen, sink, shower, bath, or other domestic source that does not contain excrement, urine, or combined storm water
Influent	Means untreated wastewater before it enters the first treatment process of a wastewater treatment works
Maximum Daily Discharge Limitation[a]	Means the highest allowable "daily discharge"
Mean[b]	Means the average of values obtained over a specified period and, for fecal coliform analysis, is computed as a geometric mean
Measured	Means the actual volume of wastewater discharged using appropriate mechanical or electronic equipment to provide a totalized reading. Measure does not provide a recorded measurement of instantaneous rates.
Milligrams per Liter (mg/L)[b]	Means the concentration at which one thousandth of a gram (10^{-3} g) is found in a volume of one liter. It is approximately equal to the unit "parts per million (ppm)," formerly of common use.
Mixing Zone[b]	Means a volume of water adjacent to a discharge in which wastes discharged mix with the receiving water
Month	Means the time period from the 1^{st} of a calendar month to the last day in the month
Monthly Average	Means the average of daily discharges over a monitoring month calculated as the sum of all daily discharges measured during a monitoring month divided by the number of daily discharges measured during that month
New Facility	Means a facility that has not operated in the area specified in the Notice of intent (NOI) prior to the submission of the NOI.
Offshore	Means offshore of the inner boundary of the territorial seas.
Open waters	Means ponds, lakes, streams, rivers, and marine waters.
Permittee	Means a company, organization, association, entity, or person who is issued a wastewater

a) See 18 AAC 83

b) See 18 AAC 70.990

c) See 18 AAC 72.990

d) See 40 CFR Part 136

e) See EPA Technical Support Document

f) See Standard Methods for the Examination of Water and Wastewater 18th Edition

g) See EPA Permit Writers Manual

	permit and is responsible for ensuring compliance, monitoring, and reporting as required by the permit
pH[g]	Means a measure of the hydrogen ion concentration of water or wastewater; expressed as the negative log of the hydrogen ion concentration in mg/L. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic.
Primary Treatment [c]	Means wastewater treatment that: (a) will subsequently discharge wastewater to land or waters that are not waters of the United States and substantially removes all floating and settleable solids; or uses fine screens with 0.04-inch or smaller openings; or (b) will subsequently discharge wastewater to waters of the United States and uses screening, sedimentation, and skimming adequate to remove at least 30 percent of the biochemical oxygen demanding material and of the suspended solids in the treatment works influent; and disinfection, where appropriate.
Principal Executive Officer[a]	Means the chief executive officer of the agency or a senior executive officer having responsibility for the overall operations of a principal geographic unit of division of the agency
Pollutant[a]	Means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under 42 U.S.C. 2011), heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, or agricultural waste discharged into water
Receiving Water Body	Means lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, straits, passages, canals, the Pacific Ocean, Gulf of Alaska, Bering Sea, and Arctic Ocean, in the territorial limits of the state, and all other bodies of receiving water, natural or artificial, public or private, inland or coastal, fresh or salt, which are wholly or partially in or bordering the state or under the jurisdiction of the state. (See "Waters of the U.S." at 18 AAC 83.990(77))
Recommencing Facilities	Those facilities that may have let permit coverage lapse but still meet the coverage requirements of the general permit.
Reject Water	The portion of incoming water that has passed across the membrane but has not been converted to product water.
Report	Report results of analysis.
Residual Chlorine	Means chlorine remaining in water or wastewater at the end of a specified contact period as combined or free chlorine.
Responsible Corporate Officer[a]	Means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function or any other person who performs similar policy or decision making functions for the corporation The Responsible Corporate Officer can also be the manager of one or more manufacturing, production, or operating facilities if the requirements of 18 AAC 83.385(a)(1)(B)(i)-(iii) are met.
Secondary	Means activities in which incidental water use can occur. Secondary recreation includes boating, camping, hunting, hiking, wading, and recreational fishing. Secondary contact

a) See 18 AAC 83

b) See 18 AAC 70.990

c) See 18 AAC 72.990

d) See 40 CFR Part 136

e) See EPA Technical Support Document

f) See Standard Methods for the Examination of Water and Wastewater 18th Edition

g) See EPA Permit Writers Manual

Recreation[b]	recreation does not include fish consumption.
Semiannually	See "Twice per year"
Severe Property Damage[a]	Means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
Sheen[b]	Means an iridescent appearance on the water surface
Shellfish[b]	Means a species of crustacean, mollusk, or other aquatic invertebrate with a shell or shell-like exoskeleton in any stage of its life cycle
Territorial Seas	Means the belt of the seas measured from the line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the off shore limit of inland waters, and extending off shore a distance of three miles.
Total Suspended Solids (TSS)[g]	Means a measure of the filterable solids present in a sample, as determined by the method specified in 40 CFR Part 136
Twice per year	Means two time periods during the calendar year: October through April and May through September
Upset[a]	Means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
Wastewater Treatment	Means any process to which wastewater is subjected in order to remove or alter its objectionable constituents and make it suitable for subsequent use or acceptable for discharge to the environment
Waters of the United States or Waters of the U.S.	Has the meaning given in 18 AAC 83.990(77)
Water Recreation[b]	See contact recreation or secondary recreation
Water Supply[b]	Means any of the waters of the United States that are designated in 18 AAC 70 to be protected for fresh water or marine water uses. Water supply includes waters used for drinking, culinary, food processing, agricultural, aquacultural, seafood processing, and industrial purposes. Water supply does not necessarily mean that water in a waterbody that is protected as a supply for the uses listed in this paragraph is safe to drink in its natural state.
Week	Means the time period of Sunday through Saturday.

a) See 18 AAC 83

b) See 18 AAC 70.990

c) See 18 AAC 72.990

d) See 40 CFR Part 136

e) See EPA Technical Support Document

f) See Standard Methods for the Examination of Water and Wastewater 18th Edition

g) See EPA Permit Writers Manual

APPENDIX D NOTICE OF INTENT

FILE NUMBER_____(for ADEC use)

NOTICE OF INTENT (NOI) / APPLICATION
TO DISCHARGE UNDER:

APDES General Permit No. AKG380000
For Wastewater Discharges from Drinking Water Treatment Facilities

Please submit this NOI to:

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, Alaska 99501

Submittal of this document constitutes notice that the party identified in Section 3 intends to be covered by the APDES General Permit No. AKG380000 authorizing discharges into waters of the United States resulting from the discharge of wastewater from drinking water treatment facilities and obligates the permittee to comply with the terms and conditions of the permit. Please provide all information below. Attach supplemental information sheets as appropriate.

SECTION 1 – PERMIT INFORMATION

Previous Permit or Authorization No. (if applicable):

Please describe the coverage requested.

[ ] New Use: A wastewater discharge that has not been authorized under a previous permit, including new facilities.

[ ] New Use: A wastewater discharge that was previously authorized under an Individual Permit or a different General Permit.

SECTION 2 – FACILITY INFORMATION

Facility Name:	Phone:	
Street/Location:	FAX:	
City (nearest city if not in a city):	State: Alaska	Zip:
Email Address:		
Population Served by this Facility:		
Number of outfalls:		
Outfall 1 daily discharge Flow Rate: (GPD)		Outfall 2 daily discharge Flow Rate: (GPD)
Average:	Maximum:	Design Capacity:

SECTION 3 – RESPONSIBLE PARTY INFORMATION

(Owner/Operator or Person responsible for overall management of the project and discharge)

☐ Land/Tundra	Last Name:	Phone:
Title:		
Mailing Address:		FAX:
City:	State:	Zip:
E-mail Address:		

SECTION 4 –ON-SITE CONTACT/OPERATOR INFORMATION
[ ] Check if same as Responsible Party

First Name:	Last Name:	Phone:
Title:		
Mailing Address:		FAX:
City:	State: Alaska	Zip:
E-mail Address:		

SECTION 5 – BILLING INFORMATION

First Name:	Last Name:	Phone:
Title:		
Mailing Address:		FAX:
City:	State: Alaska	Zip:
E-mail Address:		

SECTION 6 – RECEIVING WATER INFORMATION

Name of Receiving Water Body or Area:

Type of Receiving Area:	☐ Fresh Water	☐ Marine Water	

Outfall location:

Latitude / Longitude in **either**
decimal degrees **or** in *degrees: minutes: seconds*:

Latitude: Longitude:
Determined by: [ ] GPS [ ] Map [ ] Internet

Seasonal Discharger: [ ] Yes [ ] No
If you answered yes, please provide the requested months of the proposed discharge

Submit to DEC two maps. A site map showing the exact location (latitude and longitude) of all facilities associated with the project including the outfall line. Include a topographic map or aerial photograph showing the general location of the facility, discharge area, and expected flow direction of the discharge, including nearby drinking water sources within ¼ mile. Also provide approximate distance of the end of pipe from the edge of any other wastewater mixing zone (if known).

RAW WATER SOURCE:	☐ **Surface Water**	☐ **Groundwater**	☐ **GWUDISW**	☐ Combination

DESCRIPTION OF WASTEWATER TREATMENT AND OPERATION. Provide: (a) the raw water treatment requirements (e.g., iron/manganese removal, pathogen removal etc); (b) the water treatment processes employed by the facility (e.g., coagulation, oxidation, ph adjustment, etc); (c) all known substances (removed substances, chemical

additives, chemical reaction products) that may potentially be found in the wastewater (e.g., silt, chlorine, arsenic, etc.); (d) the wastewater treatment process; (e) schematic flow diagram of the water and wastewater treatment processes; and (f) proof of approval of plans for the treatment works and all associated facilities as required by 18 AAC 72.600.

SLUDGE: Describe all disposal methods for any sludge, grit, screenings, and other facility residuals produced during treatment of the drinking water and wastewater (backwash).

ION EXCHANGE SYSTEMS: provide quantities, composition, and frequency of regeneration of the resin regeneration solutions and disposal of the non-domestic wastewater produced during the regeneration process.

SYSTEMS USING MEMBRANE FILTERS: provide details of the chemicals used for storage of the membranes and plans for disposing of the membrane maintenance and cleaning solutions, especially plans for disposal of the filter storage solution.

MATERIAL SAFETY DATA SHEET (MSDS): Provide MSDS for all chemicals used for the treatment process, quantities of chemicals used in the treatment process i.e. pounds of chemical used per million gallons of water produced, pounds of chemical used per day, gallons and strength of chemical used per month, and the specific treatment use of the chemicals.

SECTION 7 - REQUEST FOR MIXING ZONE AND EFFLUENT MODIFICATION FROM DEC

Do you wish to request a mixing zone from DEC? [ ] Yes [ ] No

If you answered "No" to the above question or have questions concerning mixing zones, please contact the domestic wastewater permitter at the DEC office closest to your facility.
Anchorage area 907-269-6285; Fairbanks area 907-451-2183; Juneau area 907-465-5180

THE FOLLOWING INFORMATION. AND A COMPLETED FORM 2M MUST BE PROVIDED IF REQUESTING A MIXING ZONE AND YOU ANSWERED "YES" IN SECTION 7. The burden of proof for justifying a mixing zone through demonstrating compliance with the requirements of 18 AAC 70.240 – 18 AAC 70.270 rests with the applicant. Data from late winter/early spring and late summer/early fall is preferable.

Length of discharge line from shoreline (measured at M.L.L.W.):		Diameter of diffuser:	
Length of diffuser:		Depth of diffuser (measured at M.L.L.W.):	
Orientation of diffuser to shoreline: (e.g. perpendicular, 45°, parallel):		Number of ports:	
Height of ports above diffuser:		Angle of diffuser pipe (degrees from top of pipe):	
Diffuser port diameter:		Port Spacing:	
Direction of the current relative to diffuser (perpendicular, parallel, angle):			

Uses of Receiving Water at Distance from Diffuser or End of Pipe

USE	DISTANCE	UNITS
Supply for drinking water		
Supply for agriculture including irrigation & stock water		
Supply for aquaculture		

Supply for industrial use		
Contact recreation		
Secondary recreation		
Fish spawning		
Harvesting and consumption of raw fish of other aquatic life		

SECTION 8 – ADDITIONAL INFORMATION TO INCLUDE

SITE MAP: Submit a site map showing the exact location (latitude and longitude) of all facilities associated with the project. Include a topographic map or aerial photograph showing the general location of the facility, the expected flow direction of the discharge, and discharge area.

FOR NEW OR REVISED OPERATIONS: Provide a brief description of the treatment process(es) provided by the facility including the level of treatment and type of disinfection (if any). Include schematic flow diagram of the wastewater treatment process. If available, please provide the past years' worth of monitoring data.

ENGINEERED PLAN APPROVAL: Provide either proof of approval by DEC or the submission of plans to ADEC for the system and all associated facilities, as required by 18 AAC 72.205, 72.255, and 72.260.

SECTION 9 – CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature	Title
Printed Name	Date

APPENDIX E NONCOMPLIANCE NOTIFICATION

Alaska Department of Environmental Conservation

Division of Water, Wastewater Discharge Program

Phones: ANCHORAGE (907) 269-3059, Fax: 269-7508
FAIRBANKS (907) 451-2130, Fax: 451-2187
JUNEAU (907) 465-5300, Fax: 465-5274
E-mail address: dec_wqreporting@alaska.gov

NONCOMPLIANCE NOTIFICATION

GENERAL INFORMATION	PERMIT# (if any):	
Applicant Company:	**Facility Name**	**Facility Location:**
Person Reporting:	**Phone Numbers of Person Reporting**	**Reported How? (e.g. by phone)**
Date/Time Event was Noticed	**Date/Time Reported**	**Name of DEC Staff Contacted**

VERBAL NOTIFICATION MUST BE MADE TO DEC WITHIN 24 HOURS OF DISCOVERY (notification by email is acceptable)

INCIDENT DETAILS (attach additional sheets, lab reports and photos as necessary)

Estimated Quantity involved (volume or weight)

Cause of the event (be specific)

Permit Condition Deviation (Identify each permit condition exceeded during the event)

Parameter (e.g. BOD, pH)	Permit Limit	Exceedance (sample result)	Sample Date

Corrective Actions (Attach a description of corrective actions taken to restore the system to normal operation and to minimize or eliminate chances of recurrence.)

Environmental Damage: (if yes, provide details below) ☐ **Yes** ☐ **No** ☐ **Unknown**

Actual /Potential Impact on Environment/Public Health (describe in detail)

Actions taken to reduce or eliminate Actual/Potential Impact on Environmental Health (describe in detail) (e.g. Supplied drinking water to nearby well owners and informed well owners not to drink from wells until further notice)

COMMENTS

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations..

Name: **Signature:** **Date:**

FORMS MUST BE SENT TO DEC WITHIN 7 DAYS OF THE EVENT.

Alaska Department of Environmental Conservation

Division of Water, Wastewater Discharge Program

Phones: ANCHORAGE (907) 269-3059, Fax: 269-4604
FAIRBANKS (907) 451-2130, Fax: 451-2187
JUNEAU (907) 465-5300, Fax: 465-5274
E-mail address: dec_wqreporting@alaska.gov

ACCIDENTAL DISCHARGE/SPILL NOTIFICATION

GENERAL INFORMATION	**PERMIT# (if any):**		
Applicant Company:	**Facility Name**	**Facility Location:**	
Person Reporting:	**Phone Numbers of Person Reporting**	**Reported How? (e.g. by phone)**	
Date/Time Event was Noticed	**Date/Time Reported**	**Name of DEC Staff Contacted**	

VERBAL NOTIFICATION MUST BE MADE TO DEC WITHIN 24 HOURS OF DISCOVERY (notification by email is acceptable)

INCIDENT DETAILS (attach additional sheets, lab reports and photos as necessary)

Product Spilled (e.g. sewage, propylene, glycol, etc.)		**Source of Spill**	
Quantity Spilled (volume or weight)	**Quantity Contained**	**Quantity Recovered**	**Quantity Disposed**

Cause of Spill and Actions Taken To Correct The Cause (be specific)

Cleanup Actions (describe in detail)

Disposal Methods and Location (describe in detail)

Environmental Damage: (if yes, provide details below) ☐ Yes ☐ No ☐ Unknown	**Surface Area Affected** (square feet)	**Surface Type** (e.g. tundra, land covered with snow, etc.)

Actual /Potential Impact on Environment/Public Health (describe in detail)

COMMENTS

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: **Signature:** **Date:**

FORMS MUST BE SENT TO DEC WITHIN 7 DAYS OF THE EVENT.

Appendix E1

CBJ Laboratory SOPs

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#		*Standard Operating Procedure* **HACH-Sigma 900 All Weather Refrigerated Automatic Liquid Composite Sampler**	*Created by:*	T. Geib
Date of last modification:	4/29/14		*JSA by:*	

1. **PURPOSE AND SCOPE:**
   This procedure applies to the programming and use of the Hach-Sigma 900 Automatic Composite Liquid Sampler.

2. **INTRODUCTION & APPLICATION:**
   The Sigma 900 All Weather Refrigerated Sampler is designed to automatically collect and preserve samples from a liquid source using refrigeration. The sampler utilizes a built in peristaltic pump to take continuous flow paced samples.

3. **APPROVED SAMPLING METHODS:**
   The Sigma 900 All Weather Refrigerated Sampler conforms to the Standard Methods SM 1060 and SM 5210 when used in the collection of flow paced temperature controlled composite samples.

4. **USE AND PROGRAMMING OF THE HACH-SIGMA 900 ALL WEATHER REFRIGERATED COMPOSITE SAMPLER:**
   All programming, calibration and manual operations are done via the keypad. The following procedure details those functions.
   a. **Keypad and Key Functions** KEY **Function:**
      1. **On** Energizes sampler
      2. **OFF** De-energizes sampler and halts program in process
      3. **START PROGRAM** Initiates the sampling program and resets all counts to zero (including data logger); in multiple bottle mode, this key also causes the distributor to advance to bottle #1.
      4. **NEW PROGRAM** Allows input of a new sample program...programming choices appear on display; when pressed for 5 seconds, allows selection of any one of 5 programs.
      5. **YES/ENTER** Causes a positive response when a question appears on display; accepts new programmed value or previously entered value.
      6. **NO/PASS** Causes a negative response when a question appears on display; in standby state, the software revision number is displayed.
      7. **CLEAR ENTRY** Erases program value shown on display; when held for two seconds, permits enable/disable of level actuation/auxiliary control and selection of Special Outputs.
      8. **DISPLAY FEEDBACK** Displays program status and a review of the program.
      9. **CHANGE/HALT** Stops sampler program and places in standby state. When started, press this key prior to making any new program change and before pressing keys 4, 6, 7, 8, 9. and **NEW PROGRAM.**
      10. **RESUME PROGRAM** Causes the program to continue from the point at which it was halted.

11. **BOTTLE ADVANCE** In multiple bottle mode, causes distributor to move to next bottle.
12. **PUMP (Manual Mode)** Pumps sample liquid (pump forward) when held pump stops when released.
13. **PURGE (Manual Mode)** Purges sample liquid (pump reverse) when held pump stops when released.
14. **STOP PUMP (Manual Mode)** Stops pump when using PUMP LOCK. When held for 3 seconds (with sampler in a standby state), permits selection of other languages.
15. **TAKE SAMPLE** Initiates sample cycle independent of program.
16. **TIME SET** Allows setting real time and date.
17. **TIME READ** Causes real time and date to appear on display. When held for 3 seconds, display indicates time and date each sample was taken or missed.
18. ***(asterisk)** During programming, causes program to back-step. After CHANGE/HALT, allows altering of setup parameters (i.e. line length, container volume, etc.) After CHANGE/HALT, provides review of parameters (i.e. number or bottles, volume bottle(s), line length etc.) After PUMP/PURGE, (Manual Mode) activates PUMP LOCK. Pump runs forward (KEY 5) or reverse (KEY 6) without holding key. KEY 7 stops pump.

b. **Getting the Sampler into "Standby State"**
To access Parameter Entry mode, the sampler must be in a standby state. That is, a program cannot be in progress or "running". The sampler is in a standby state when the display indicates any one of the following: **READY TO START**, **PROGRAM COMPLETE**, or **PROGRAM HALTED.** If the display reads **PROGRAM RUNNING**, press the **CHANGE/HALT** key.

This will stop the program and place the sampler in the "Program Halted" standby state. If the display reads **RE-ENTER PROGRAM, DEPRESS***, refer to the next section for further instructions.

c. **Basic Program:**
1. **With sampler in a standby state press New PGM key. The display will then read ACCESS CODE = _ _ _ _. The Access Code is 9000.**
2. **Display will read Program Delay? Press the NO key.**
3. **Display will read Flow Mode? Press the YES key.**
4. **Display will read Variable Interval? Press the NO key.**
5. **Display will read Interval Counts = 0001 counts? Press YES key.**
6. **Display will read Other Changes? Press YES key.**
7. **Display will read Composite Mode? Press YES key.**
8. **Display will read Change Volume? Press YES or NO.**
9. **Display will read Calibrate Volume? Press YES or NO key. If YES:**

- **Display will read Auto Calibrate? Press the YES key.**
- **Display will read Ready To Pump? Press the YES key.**
- **Display will read Actual Volume? Enter volume measured in ml.**

10. **Display will read Intake Rinses? Press the NO key.**
11. **Display will read Intake Faults? Press the NO key.**
12. **Display will read a four digit program number, ID_ _ _ _.**
13. **Display will then read SETUP COMPLETE-READY TO START.**

d. **Accessing Parameter Entry Mode:**

1. With sampler in a standby state, press the ***** key. This opens the Parameter Entry mode. The display will read: **ALTER PARAMETER?**.
2. Press the **YES** key to change the parameters.
3. The display will read: **ADVANCED PROGRAM?**. This enables the advanced program and causes the advanced program prompts to appear in the programming steps. Refer to Advanced Program Features

   Note: *Press the* **NO** *key to review the existing parameter entries. This disables the advanced program and removes the advanced program prompts from the programming steps.*
4. Press the **YES** key to accept the advanced program. The display will read **ENTER NUMBER OF SAMPLE BOTTLES, TOTAL BOTTLES = --**.
5. Use the numerical keys to enter the number of sample bottles located in the bottle tray. You may enter 1 or 24 in the standard program, or 1, 2, 4, 8, or 24 in the advanced program.
6. Press the **YES** key to accept the number of bottles. The display will read: **ENTER UNITS FOR BOTTLE VOLUME, MILLILITERS?**

   Note: **GALLONS** *may be displayed instead of* **MILLILITERS**.
7. Press **NO** to cause other volume units to appear. When the desired units appear on the display, press the **YES** key.
8. The display will show **VOLUME =** _ _ _ _ _ **ml** (or **VOLUME =** __ **GALLONS**), whichever was chosen in the previous step.
9. Enter the volume for the individual sample bottle by pressing the numerical keys.
10. Press the **YES** key to accept the volume.
11. The display will read **ENTER UNITS FOR TUBING LENGTH, FEET?** ***Note:*** **CENTIMETERS** *may be displayed instead of* **FEET**.
12. Press **NO** to cause other choices to appear in the display. When the desired units appear on the display, press the **YES** key.
13. The display then shows: **ENTER LENGTH OF INTAKE TUBING, LENGTH =** _ _ _ **FEET**. Enter the length of the intake tubing between the sampler and the intake strainer (from 3 to 99 feet).
14. Press the **YES** key to accept the length.

15. After the appropriate intake tubing length has been entered, the display reads: **PROGRAM LOCK?**. When enabled, the program lock feature prevents tampering with the program. Press **NO** to disable the program lock. Press the **YES** key to enable the lock. If you enable the lock, all program entries are completed, and the program is running, the program cannot be halted or a new program cannot be entered until the correct access code has been entered.
16. With the lock enabled, only certain keys are operable: **TIME READ**, **DISPLAY FEEDBACK**, **RESUME PROGRAM**, **and START PROGRAM**. Pressing any other key causes the display to read **ACCESS CODE =**_ _ _ _. If an incorrect code number is entered or if no entry is made within 5 seconds, the display returns to indicate the current program status. ***Note:*** *The Access Code is 9000.*
17. After making the selection for the access code, the display reads: Set Sample Cabinet Temp–Cabinet Temp=_._ _ Deg.C. Enter the desired refrigerated compartment temperature (EPA requires 4 °C)

e. **Volume Calibration Sheet**
Name: Date: SN: ID#:

1. Auto Calibrate? **YES** or **NO**? If **NO** then go to Step 4. If **YES** then the display will read **Ready to Pump**? Press the **YES/ENTER** key to begin pumping liquid into graduated cylinder.
2. Enter actual volume pumped: _____
3. Program continued at Step 15 in Main Sampler Program. You must completely step through the Main Sampler Program until you reach step 18. You will see **SETUP COMPLETE, READY TO START**. At that time, you will manually take a sample by pressing **TAKE SAMPLE** on the keypad. The sample volume will be the desired amount.
4. Timed Calibrate? **YES** or **NO**? If **NO** then:
   Program continued at Step 14b in Main Sampler Program.
   If **YES** then:
   Timed Calibrate - Ready to Pump?
   Press the **YES** key to begin pumping into the cylinder.
5. Stop at mark
   Press the **STOP PUMP** key when liquid has reached the desired volume.
6. Try Again? **YES** or **NO**?
   If **YES** then:
   Another sample cycle will begin.
   If **NO** then:
   Program continued at Step 15 in Main Sampler Program

5. MAINTENANCE:

Ensure that the sampler, pump, pump tubing and suction tubing are clean and in good working order. Ensure that the sample refrigerator is clean and will maintain a set temperature of 4 degrees Celsius.

References:

- Standard Methods for the Examination of Water and Wastewater 22nd Edition; ISBN 978-087553-013-0, ISSN 55-1979
- Sigma 900 All Weather Refrigerated Sampler User Manual: Catalog Number 8837; March 2006, Edition 7
- Wastewater Sampling: U.S. Environmental Protection Agency Science and Ecosystem Support Division Operating Procedure; Number SESDPROC-306-R3

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#	Mendenhall	*Standard Operating Procedure* **HACH-Sigma 1600 Automatic Liquid Composite Sampler**	*Created by:*	T. Geib
Date of last modification:	8/05/2015		*JSA by:*	

1. **PURPOSE AND SCOPE:**
   This procedure applies to the programming and use of the Hach-Sigma 1600 Automatic Composite Liquid Sampler.

2. **INTRODUCTION & APPLICATION:**
   The Sigma 1600 Automatic Composite Sampler is a refrigerated dipper model used to take continuous flow paced influent samples. This sampler is located in the northwest corner of the Mendenhall Treatment Facility's SBR #7. The sample point for this sampler is located at the splitter box.

3. **APPROVED SAMPLING METHODS:**
   For use in the collection of flow paced temperature controlled composite samples, the Sigma 1600 Automatic Refrigerated Sampler conforms to Standard Methods **SM 1060 and SM 5210.**

4. **PROGRAMMING OF THE SIGMA 1600 AUTOMATIC LIQUID SAMPLER:**
   a. Control Panel Feature Description
      1. **Power Button- (ON)** Starts the sampler. Push the ON button once to turn on the power and twice to turn off the sampler.
      2. **EXT-MIN (external/minutes) Toggle Switch-** Allows the selection of timed-cycle mode or flow proportional mode for samples.
      3. **Interval Between Samples 4-digit Thumbwheel Switch-**Controls the minutes between sample events during the timed-cycle mode and **determines the number of contact closures desired before a sample event in the flow proportional mode.** ***Note: The contact closures represent discrete and predetermined volumes of wastewater. The volume value is set on the SCADA Influent Structure page as Sampler Setpoint and is gallons X 10.***
      4. **Start-Reset Push Button-**Starts the timing sequence. It resets all counts and cancels the sample program delay.
         Note: *The sample program will start automatically after the first time interval has elapsed, if the button is not depressed.*
      5. **Test Push Button-**Initiates a sample event. When pressed the dipper arm will start the cycle and the sample is counted.
      6. **Sampling Complete Light-**Automatically turns on after the last sample is taken. The light stays on and the sampler remains inactive until the Start-Reset push button is pressed.
      7. **Sample Countdown 4-digit LED-**In the time-cycle mode; the 4-digit LED display indicates the number of minutes remaining until the next sample. In the flow proportional mode, the display indicates the number of received contact closures before the next sample. The display also indicates the time

remaining before taking the first sample when the Sample Program Delay feature is used. **When using the optional 4–20 mA flow proportional unit, the Sample Countdown display indicates the number of contact closures to be received before the next sample at 100 percent flow.**

8. **Sample Volume x 25 2-digit Thumbwheel Switch-The number of times set on the 2-digit thumbwheel switch (01–99) are the amount of cycles the dipper arm performs per sample.** ***Note: The dipper arm takes a 25 mL sample each time it cycles.***
9. **Multiplex Dial and Samples per Bottle/Bottles per Sample Toggle Switch- Allows the sampler to operate as a composite sampler.** A composite sample is a large sample that consists of many smaller individual samples, all collected in the same container. **To operate the sampler in the composite mode, position the toggle switch to Samples Per Bottle position. The total number of individual sample events that will be collected in a single large container is selected from the black outer band labeled Composite. Set the selector knob to the desired number of individual sample events. The black outer band has a choice of 24, 48, 72, 144, 192 or 288 individual sample events before the unit automatically stops sampling.**

5. OPERATING IN FLOW PROPORTIONAL MODE:

The Mendenhall Influent Sampler uses the flow proportional mode. In the flow proportional mode the sampler takes a sample in proportion to the flow rate, independent of time. The lower the flow rate, the less frequent a sample is taken and the higher the flow rate the more frequent a sample is taken. The sampler can accumulate 1–9999 contact closures before a sample is taken. Contact closures represent a discrete volume of wastewater measured by a flow meter. NOTE: The volume value is set at the SCADA computer on the Influent Structure page in the Influent Sampler Setpoint box. The adjustable value is gallonsX10 per pulse. To initiate the flow proportional mode, place the EXT-MIN toggle switch to the left, EXT.

Example: You wish to take one sample for every 8000 gallons of flow while the SCADA system is set to send one contact closure signal to the sampler for every 2000 gallons of flow. The value entered in the "Interval Between Samples" thumbwheel switch is ooo4.

8000 gal/sample X 1 contact closure/2000gal = 4 contact closures per sample

a. Typical Panel Setup for Operations:

- **POWER: Push button to turn on.**
- **EXT-MIN: Move switch to the EXT position.**
- **MULTIPLEX DIAL: Set at 288.**
- **4-DIGIT THUMBWHEEL SWITCH: Set to 0004 with SCADA setpoint of 300.**

SOP#	Mendenhall	*Standard Operating Procedure* **HACH-Sigma 1600 Automatic Liquid Composite Sampler**	*Created by:*	T. Geib
Date of last modification:	8/05/2015		*JSA by:*	

- **2-DIGIT THUMBWHEEL SWITCH: Set to 04.**
- **START: Push the Start button.**

6. REFRIGERATION TEMPERATURE CONTROL:

The temperature of the refrigerated sample chamber is controlled by a thermostat inside the refrigerator sample chamber. The thermostat should be adjusted to maintain a sample chamber temperature of 4 degrees Celsius.

7. MAINTENANCE:

Ensure that the sampler, flow chamber and dipper are clean and in good working order. Ensure that the sample refrigerator is clean and will maintain a set temperature.

References:

- Standard Methods for the Examination of Water and Wastewater 22nd Edition; ISBN 978-087553-013-0, ISSN 55-1979
- Sigma 1600 Automatic Liquid Sampler Instrument Manual: Catalog Number 6507; eac/jk/dk 01/2011 8ed
- Wastewater Sampling: U.S. Environmental Protection Agency Science and Ecosystem Support Division Operating Procedure; Number SESDPROC-306-R3

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#		*Standard Operating Procedure* **HACH 2100Q Portable Turbidity Meter Calibration & Measurement**	*Created by:*	T.Geib
Date of last revision:	6/12/15		*Approved by:*	

1. PURPOSE:

This procedure applies to both the standardization and direct calibration of the Hach 2100Q Portable Turbidity Meter.

2. SCOPE AND APPLICATION:

The Mendenhall WWTP's NPDES Permit identifies monitoring, measurement and reporting requirements specified by the State and EPA for turbidity monitoring. This procedure is used to monitor turbidity levels for the MWWTP's receiving water samples and also as a secondary quality control measure when calibrating the effluent in-line Hach SS6 Turbidimeter located in U.V. disinfection areas at the MWWTP.

3. SUMMARY OF METHOD:

The method is based on a comparison of the intensity of light scattered by the sample under defined conditions with standard reference suspensions under the same conditions. Turbidity is measured by determining the amount of scatter when a light is passed through a sample. The higher the intensity of scattered light, the higher the turbidity level.

4. EQUIPMENT AND SUPPLIES:

a. Hach 2100Q Portable Turbidimeter Kit.
b. Turbidity Standards (20 NTU, 100 NTU, and 800 NTU).
c. Cuvettes to fit the instrument.
d. Volumetric pipet.
e. Deionized water for rinsing and cleaning.
f. cloth or lint-free tissues.
g. silicon oil cleaning solution (refractive index should match that of the sample cells).
h. Sample Collection Containers.

5. SAFETY/PROCEDURAL PRECAUTIONS:

a. Before using this meter please familiarize yourself by reading the Hach 2100Q Portable Turbidity Meter Manual located in the MWWTP Lab in the "Laboratory Equipment Manual". Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.
b. Employee personal protective equipment (PPE) consisting of gloves and safety glasses or goggles is required when performing this calibration or standardization.
c. The samples are disposed of at the wastewater treatment facility.

6. METHOD:

The Hach 2100Q portable turbidity meter conforms to EPA method 180.1 and SM 2130b. The method is summarized below.

SOP#		*Standard Operating Procedure* **HACH 2100Q Portable Turbidity Meter Calibration & Measurement**	*Created by:*	T.Geib
Date of last revision:	6/12/15		*Approved by:*	

7. CALIBRATION:

All field meters must be calibrated prior to use. Calibration shall be performed at a minimum of once per day for each day of instrument use. Calibration shall be performed prior to the first measurements of the day. Refer to pages 9 and 10 of the Hach 2100Q Portable Turbidimeter User Manual located in the MWWTP Lab "Laboratory Equipment Manual" for specific calibration instructions. For best accuracy, use the same sample cell or four matched sample cells for all readings during calibration. Insert the sample cell in the instrument cell compartment so that the diamond or orientation mark aligns with the raised orientation mark in front of the cell compartment.

8. CALIBRATION VERIFICATION (Verify CAL):

The manufacturer recommends a calibration verification once a week. After a calibration is complete, the meter automatically goes into the Verify Cal mode.

Make sure that the sample cell is clean. Oil the sample cell with silicone oil, refer to Apply silicone oil to a sample cell on page 17 of the Hach 2100Q Manual. Check the standard solution. Prepare or use a formazin standard at the same value and read the value.

a. Push **Verify Cal** to enter the Verify menu.

b. Gently invert the standard. Insert the 10.0 NTU (or other defined value) Verification Standard and close the lid.

c. Push **Read**. The display shows Stabilizing and calibration then shows the result and tolerance range.

d. Push **Done** to return to the reading display. Repeat the verification if the verification failed.

SOP#		*Standard Operating Procedure* **HACH 2100Q Portable Turbidity Meter Calibration & Measurement**	*Created by:*	T.Geib
Date of last revision:	6/12/15		*Approved by:*	

9. MEASUREMENT:

a. Collect a representative sample in a clean container. Fill a sample cell to the line (about 15 milliliter). Take care to handle the sample cell by the top. Cap the cell.
b. Wipe the cell with a soft, lint-free cloth to remove water spots and fingerprints.
c. Apply a thin film of silicone oil (provided in meter kit). Wipe with soft cloth (provided in meter kit) to obtain an even film over the entire surface.
d. Push the "Power" key to turn on the meter. Place the instrument on a flat, sturdy surface.

    1) Note: Do not hold the instrument during measurement.
    2) Gently invert the sample cell to ensure mixing, and then insert the sample cell in the instrument cell compartment so the diamond or orientation mark aligns with the raised orientation mark in front of the cell compartment. Close the lid.
    3) Push the "Read" key. The display shows "Stabilizing" then displays the turbidity in NTU (FNU). The result is also stored in the meter automatically.

10. FREQUENCY/MEASUREMENTS:

The Mendenhall WWTP's NPDES Permit identifies monitoring, measurement and reporting requirements specified by the State and EPA for turbidity monitoring for river sampling in May, June, July, and October and for secondary calibration of the inline turbidity meters located at the MWWTP and the J-D WWTP.

11. QUALITY CONTROL:

The turbidity meters will be maintained and operated in accordance with the manufacturer's instructions.
b. Laboratory Control Samples at least two LCS 0-2NTU, 0-20NTU, 0-200NTU & 200-4000NTU) at the beginning of the analytical run, followed by one per ten samples.
c. Replicates, analyzed 1 per 20 samples or 1 per run if less than 20 samples.
d. Turbidity at the CBJ wastewater treatment plants will be recorded in nephelometric turbidity units (NTU).
e. Time records associated with measurements will be kept in local time, will be made in the 2400 hour military time format, and will be recorded to the nearest five minutes.
f. Before a meter is used it shall be properly calibrated or verified. These calibration and verification checks shall be documented and maintained in the "Turbidity Meter Maintenance and Calibration Record Log Book" and will be maintained on site.

12. DATA ARCHIVAL:

a. Use a black, waterproof pen for all bench sheets and logbooks.
b. Record meter calibration information in the Maintenance and Calibration logbook located in the MWWTP Laboratory.
c. To correct raw data entries, place a single line through the incorrect entry, write the corrected entry near the error and initial the correction. Do not overwrite entries. If the

correction requires an explanation, write a comment and reference the error. Initial and Date the explanation.

References:

- *Hach 2100Q Portable Turbidimeter and 2100Qis Portable Turbidimeter User Manual*, DOC022.53.80041, 01/2010, Edition 1.
- Standards Methods for the Examination of Water and Wastewater 22nd Edition SM 2130B
- EPA Method 180.1

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#	Mendenhall	*Standard Operating Procedure* **Standardization Checks and Direct Calibration of the Hach SS6 Surface Scatter Turbidimeter**	*Created by:*	T.Geib
Date of last modification:	8/05/2015		*JSA by:*	

1. PURPOSE AND SCOPE:

This procedure applies to both the standardization and direct calibration of the Hach Model SS6 Surface Scatter Turbidimeter.

2. INTRODUCTION AND APPLICATION:

The SS6 is used to continuously monitor and measure plant effluent turbidity. This on-line Turbidimeter is located in the UV room in the Disinfection building at the MWWTP. A sample stream is pumped from the effluent channel, just prior to discharge, to a bubble trap from which it gravity feeds down into the analyzer and is then discharged back into the effluent stream.

3. APPROVED TURBIDITY METHODS:

The Hach SS6 Turbidimeter conforms to EPA Method 180.1 and SM 2130B. Both of these methods are based upon a comparison of the intensity of light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension. The higher the intensity of scattered light, the higher the turbidity indication. Indicated units of measurement are in NTUs. A primary standard suspension is used to calibrate the instrument. Formazin polymer is used as the primary standard reference suspension.

4. STANDARDIZATION AND CALIBRATION:

According to the instrument manufacturer standardization checks should be performed on a monthly basis and calibration should be performed at least every four months. Hach also states that “Calibration is not an operator task and must be performed by personnel trained in instrument maintenance and repair, and knowledgeable of the potential chemical hazards.” The Hach Company also recommends recalibrating the Surface Scatter 6 instrument any time the light source is replaced or adjusted. The actual frequency of calibration is every 90 days unless otherwise indicated.

5. EQUIPMENT AND SUPPLIES:

a. Hach calibration cylinder.
b. 500ml bottle 100 NTU StablCal Stabilized Formazin Turbidity Standard.
c. 1 L De-ionized water or 2 500ml wash bottles.
d. Clean rags.
e. Hach 2100Q portable calibrated turbidity analyzer.
f. Hach Standardization Plates if desired.
g. Rubber gloves and safety goggles or glasses.

SOP#	Mendenhall	*Standard Operating Procedure* **Standardization Checks and Direct Calibration of the Hach SS6 Surface Scatter Turbidimeter**	*Created by:*	T.Geib
Date of last modification:	8/05/2015		*JSA by:*	

6. SAFETY/HAZARDOUS WASTE MANAGEMENT:

Employee personal protective equipment (PPE) consisting of rubber gloves and safety glasses or goggles is required when performing this calibration or standardization. The samples are disposed of at the wastewater treatment facility.

7. CALIBRATION CYLINDER METHOD:

Notify Process Operator prior to beginning calibration work.

A calibration cylinder and a 500ml bottle of formazin primary standard solution are used for convenient calibration of the SS6. After the formazin standard is added to the cylinder, the instrument is set to the value of the standard. This calibration method is performed with a clean turbidimeter as follows:

a. With the instrument running, turn off the sample flow, open the sample unit door, and drain the sample tube. With a clean rag wipe the sample tube and overflow area dry.
b. With the sample unit door tightly shut, press the SYS RESET key to establish a zero calibration.
c. The formazin 100 NTU standard is to be used at full strength and only requires mixing (by inverting the bottle repeatedly) for a minimum of 5 minutes. Do not shake bottle as this will entrain air bubbles in the standard.
d. Turn off sample flow to the instrument and drain the turbidimeter body. Insert the calibration cylinder into the top of the body.
e. Pour the formazin standard solution into the cylinder, allowing it to overflow. Allow the solution to stand a short time to allow any bubbles on or near the surface to dissipate and for the turbidity indication to stabilize.
f. Close the sample unit door tightly. Press **6 SIG AVG**. Enter the value of the standard using the numeric keys followed by pressing the **STD** key. Be sure to use a decimal point when keying in the standard value; e.g., 100.0. The decimal will not be displayed.
g. Remove the calibration cylinder from the body. The instrument is now calibrated.

8. DOCUMENTATION/QA/QC:

Document the calibration results on the associated work order and place in the instrument binder for each instrument at each facility. These binders are located onsite at each facility.

9. TURBIDITY CHART AND SCADA INDICATIONS:

Verify that the SS6 transmitter 4-20mA outputs are displayed properly on both the turbidity chart recorder and SCADA video displays. If they are not then determine the error source and make the necessary corrections to make the indications agree with the SS6 signal source. The 4-20mA span represents o-100NTUs. Document any corrective action on work order. Note calibration activity in writing on active turbidity circular chart and initial.

SOP#	Mendenhall	*Standard Operating Procedure* **Standardization Checks and Direct Calibration of the Hach SS6 Surface Scatter Turbidimeter**	*Created by:*	T.Geib
Date of last modification:	8/05/2015		*JSA by:*	

10. STANDARDIZATION CHECKS:

Two methods for performing standardization checks exist. To conveniently perform periodic standardization checks, compare Surface Scatter® 6 Turbidimeter readings to readings from another calibrated laboratory turbidimeter such as the **Hach 2100Q**. Alternatively, use calibrated standardization plates as secondary turbidity standards. Place the plates in the light path to simulate a turbid sample.

11. CALIBRATION OF STANDARDIZATION PLATES:

The standardization plates come from Hach with the SS6 Turbidimeter and are composed of opaque backing, a plate glass covering, and a center filling of Gelex, a stable secondary turbidity standard. Before using the plates as a standardization check, calibrate them on the SS6 instrument that they will be used with, and then document their respective turbidity value. Calibrate the standardization plates as follows:

a. Calibrate the SS6 instrument.
b. Press the SIG AVG keys to select the fastest response.
c. With the instrument running, turn off the sample flow, open the sample unit door, and drain the sample tube to within 1–2 inches below the overflow point. Wipe the overflow area dry.
d. Place the standardization plate in position on top of the sample tube so that the light beam strikes the center of the plate. Note the orientation of the plate and always place it in the same position when using it to check standardization.
e. Close the sample unit door tightly by clamping the latches in the closed position to make sure no outside light can enter the sample unit.
f. When the reading stabilizes, read the turbidity value on the control display.
g. Open the sample unit. Remove the standardization plate and document the turbidity value for the plate.
h. Repeat steps 4 through 7 with the other standardization plate.

Note: *Once calibrated, the plates should only be used with the instrument on which they were calibrated. Standardization plates must be recalibrated when the instrument is recalibrated.* To use the standardization plates to check the instrument calibration, repeat *steps 2* through *7.* The reading should be within ±10% of the value marked on the standardization plate.

Notify Process Operator when completely finished standardization and/or calibration procedure. Initial NPDES NTU chart in control room (calibration completed).

References

- HACH MODEL SS6 and SE SURFACE SCATTER TURBIDIMETER Instruction Manual: 11-17-94-4ED; REV.7, 10/97, Pub. 45000-18
- Standard Methods for the Examination of Water and Wastewater 22nd Edition; ISBN 978-087553-013-0, ISSN 55-1979

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#		*Standard Operating Procedure* **Thermometer Calibration Traceable to NIST Certified Thermometer**	*Created by:*	T.Geib
Date of last modification:	4/28/14		*JSA by:*	

1. PURPOSE:

The CBJ APDES permits identify monitoring, measurement and reporting requirements specified by the State and EPA. The purpose of this SOP is to ensure that all thermometers in use have been validated and are traceable to a National Institute of Standards Technology (NIST) certified thermometer for all reporting purposes.

2. SCOPE:

All reportable data must be validated per EPA's 40 CFR Part 136. All thermometers in use for compliance testing and reporting need to be point checked for accuracy by comparing them to an NIST certified thermometer before initial use, at any time there is a reason to suspect change or damage, and annually thereafter. All thermometers in use will be checked at the temperature/environment of intended use.

3. DEFINITIONS:

a. ***ASTM E1-13 -*** *Standard Specifications from ASTM Liquid –in –Glass Thermometers*

b. ***Clean Water Act -*** is *t*he Federal Water Pollution Control Act Amendments of 1972 as amended by the Clean Water Act of 1977).

c. ***Correction Factor (CF) -*** The difference between the actual readings of the working **thermometer** and the NIST **thermometer** is Correction The difference in the vendor-certified NIST traceable (reference) thermometer's **True Temperature** and the **Observed Temperature** measured by the working laboratory thermometer to be point-checked. This is calculated and recorded in a calibration logbook or on a bench sheet.

d. ***EPA's 40 CFR Part 136 -*** EPA guidelines establishing procedures for the analysis of pollutants.

e. ***National Pollutant Discharge Elimination System (NPDES) -*** means the national system for the issuance of permits under section 402 of the Clean Water Act of 1977.

f. ***NIST-*** National Institute of Standards and Technology.

g. ***Laboratory "reference" Thermometer -*** NIST calibrated and certified thermometer

h. ***Laboratory "working" Thermometers -*** The thermometers that are in use and are compared to the reference NIST certified thermometer.

4. SUMMARY OF METHOD:

Laboratory thermometers and temperature monitoring devices are compared to a reference NIST certified thermometer by placing the NIST thermometer under the same conditions as the temperature device being calibrated.

a. The difference in temperature reading between the reference NIST and the working thermometer are compared, the correction factor is calculated.

SOP#		*Standard Operating Procedure* **Thermometer Calibration Traceable to NIST Certified Thermometer**	*Created by:*	T.Geib
Date of last modification:	4/28/14		*JSA by:*	

b. Devices meeting the acceptable validation criteria are labeled with the date, tech/operators initials and the correction factor.
c. Devices not meeting the acceptability validation criteria are removed from service, and/or disposed of appropriately.
d. Laboratory thermometer maintenance and calibration activities are documented and records are retained

.

5. INTERFERENCES:

Allow the thermometer to stabilize with the solutions before taking the temperature reading.

6. PERSONNEL QUALIFICATIONS/ TRAINING:

Personnel are required to be knowledgeable of the procedures in this SOP. SOP reviews and training records will be maintained on-site.

7. EQUIPMENT AND SUPPLIES:

a. NIST traceable certified thermometer, H-B serial number 1246208 is calibrated annually by an ISO17025 accredited vendor. (reference thermometer)
b. Thermometer to be validated (lab thermometer)
c. Burette stand with rubberized adjustable thermometer clamps/holders
d. Hotplate and stir bars
e. Waterproof laboratory tape
f. Thermometer (vertical) storage rack

8. SAFETEY PRECAUTIONS:

Use appropriate PPE: Eye protection, gloves, etc.

Caution should be taken when handling mercury and mercury containing products. See the applicable product Material Safety Data Sheet (MSDS) for details.

Review mercury precautions prior to handling at EPA's website http://www.epa.gov/mercury "Mercury Release and Spills.

9. MAINTENANCE, CLEANING, AND STORAGE:

It is important to be familiar with and to follow the manufacturer's instructions for use and care.

Thermometers can become damaged or out of calibration, especially as a consequence of thermal shock or extended exposure to direct sunlight. Listed below are some important dos and don'ts when handling thermometers:

a. Visual inspection to ensure that the liquid column has not separated or degraded and that the scale and graduations are still legible.

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b. If your digital thermometer has a detachable sensor with a plug termination, periodically wipe off or clean the sensor contacts. **Dirty contacts can affect temperature readings.**
c. Avoid direct exposure of the thermometer to sunlight. **Store thermometers securely when not in use.**
d. Keep thermometers in a clean protective case when not in use. Each thermometer sensor and the case must be free of sand and debris.
e. Store liquid-filled thermometers **with the bulb down.**
f. Store thermometers in a cool place and inside a building when not in use; do not leave a thermometer in a vehicle that could change in temperature to very hot or very cold, resulting in thermal shock to the thermometer.

10. CALIBRATION PROCEDURE:

All thermometers are checked for accuracy using a reference NIST traceable thermometer. The reference NIST traceable thermometers are **certified one every five years** by an ISO 17025 certified vendor.

Validate the calibration of all working laboratory thermometers by comparing them to the reference NIST **thermometer to establish calibrated accuracy and NIST traceability annually.**

a. First upon receiving the NIST thermometer inspect the thermometer for cracks, chips, and separated liquid level. Then;
   1) record the correction factors for each temperature range in a calibration logbook or on a bench sheet and,
   2) label the thermometer with the appropriate correction factors for each temperature range. (±0.0°C if no correction)

Observe to see if the NIST or the thermometer being validated has a solid line drawn or etched near the bottom quarter of the glass body. If so, this is a **partial immersion thermometer**. For a partial immersion thermometer, you should only submerge the thermometer to this line. If you do not see a line, the thermometer is a **full immersion thermometer**. You can submerge this type of thermometer into the water filled beakers to about one inch from the bottom.

b. Check the **working laboratory thermometer** readings versus the **reference NIST thermometer.** <u>It is necessary to check for corrections at the temperatures that the thermometer was certified at</u>.

   1) Both thermometers need to be kept immersed to the immersion line and in close contact in a solid medium such as sand for higher temperature checks that exceed the boiling point of water, or a liquid medium such as water. It is very important to have the thermometers suspended and not touching the edges of the container since

different materials conduct heat differently. If you are checking complete immersion thermometers the whole thermometer needs to be submerged.

2) Place the thermometers in a container and submerged to the immersion line in the medium. Allow the thermometers and medium time to stabilized and reach the appropriate temperature.

3) After the readings have stabilized, calculate the temperature differences, correction factors, and label the working laboratory thermometers with the date, initials, and correction factor.

4) To establish calibrated accuracy and NIST traceability for other types of temperature detection devices:

   a) Digital thermometers are validated against the reference NIST traceable thermometer and are indicated to be within tolerance. No correction factor is indicated. Recorded as pass/fail in a calibration logbook or on a bench sheet. The device must be verified **quarterly against a reference NIST-certified thermometer.**

   b) Non-contact **(IR)** temperature detection devices are used for verifying sample check-in temperatures **only** and are not used for NPDES compliance testing and reporting purposes.

   c) When an infrared **(IR)** temperature detection device is used the device must be verified **bi-annually** against **a NIST-certified thermometer** over the temperature range that the IR thermometer will be used. At ambient 20°– 30° C and ice-point 0°C.

   d) **Each day of use**, a single check of the IR will be performed by checking the stabilized ambient temperature of a beaker filled with distilled water and a validated liquid-filled working thermometer. Agreement between the two **must be within 1.0ºC**, or the device must be recalibrated at ice-point and checked against the calibrated liquid-filled thermometer. If the second calibration fails, the device must be taken out of service.

   e) **Document the annual, bi-annual and daily calibration checks.** The date, initials and correction factor must be indicated on the thermometer. Document the calibration checks in a calibration logbook or on a bench sheet.

      Examples of possible temperature point-checks:

      - $^{-}5^{0}$C - $^{-}15^{0}$C Laboratory **Freezer**

SOP#		*Standard Operating Procedure* **Thermometer Calibration Traceable to NIST Certified Thermometer**	*Created by:*	T.Geib
Date of last modification:	4/28/14		*JSA by:*	

- *0^0C/32^0F **Ice-Poi**nt Check*
- 0.1^0C -6^0C targeting 4^0C +/- 2^0C storage temperature Laboratory **Refrigerator**
- 20^0 +/- 1^0 C BOD Incubator Not in Service 2014
- 35^0C +/- 0.5^0C Warm Air Incubator Not in Service 2014
- 44.5^0C +/- 0.2^0C Circulating Water Bath Not in Service 2014
- *100^0C/212^0F **Boiling-Point** Check*
- 103-105^0C targeting 104^0C +/- 1^0C **Drying Oven**
- 121^0C Autoclave Not in Service 2014

Ice-Point Check Summary - Fill a container with crushed ice and water. Ensure that the container has enough crushed ice to provide an environment of 0^0C/32^0F, so you may need to add more ice into the container during the process. It will take about 4 to 5 minutes for the mixture of water to stabilize. Then insert the thermometer which needs to be calibrated into the appropriate immersion depth. Secure the thermometer away from the bottom and sides of the container to avoid error. Do not hold. If your thermometer is not accurate at 0^0C/32^0F within 1^0 then follow corrective actions listed in section 8.0 of this SOP.

For the ice and boiling point check procedures please refer to *NIST Special Publication 1088 Maintenance, Validation, and Recalibration of Liquid-in-Glass Thermometers, January 2009*

11. QUALITY CONTROL:

CBJ conforms to 40 CFR Part 160, Good Laboratory Practices.

a. The reference NIST-certified thermometers are re-certified **once every 5 years.**

b. The reference NIST thermometers are verified using the ice-point check method **annually**

c. All in-service laboratory thermometers are verified **annually** at their normally operating temperatures against the reference NIST certified thermometer that has been certified at that temperature range.

d. All in-service digital temperature devices are verified **quarterly** at their normally operating temperatures against the reference NIST certified thermometer.

e. All in-service infrared (IR) temperature devices are verified **bi-annually** using the ice-point check and at their normally operating temperatures against the NIST certified thermometer.

SOP#		*Standard Operating Procedure* **Thermometer Calibration Traceable to NIST Certified Thermometer**	*Created by:*	T.Geib
Date of last modification:	4/28/14		*JSA by:*	

f. All infrared **(IR)** temperature detection devices are checked for accuracy **daily** by checking them against a calibrated thermometer.

g. All maintenance and point-check calibration activities are logged in a calibration logbook or on a bench sheet located in the laboratory.

12. DATA ANALYSIS/CALCULATIONS:

The temperature reading on the reference NIST thermometer must be within the range at which the thermometer to be calibrated will be used or is being used.

The Observed Temperatures are the temperature readings of the thermometers during the calibration process.

NIST reference thermometer CF= the correction factor for the reference **NIST** certified thermometer is determined by the ISO 17025 accredited company that performs the calibration and certification for this thermometer.

Laboratory thermometer CF = the correction factor for the **laboratory thermometer** is calculated by taking the NIST certified reference thermometers TRUE Temperature and subtracting the Observed Temperature of the thermometer being calibrated.

The **True Temperature** measured by the reference **NIST certified thermometer =** the **Observed Temperature** of the reference NIST certified thermometer **plus** its correction factor.

The **True Temperature** measured by the **laboratory thermometer =** its **Observed Temperature plus** the correction factor that was calculated for this thermometer.

13. CORRECTIVE ACTION:

a. Repeat steps 5 through 6 of this SOP. If it is determined that the thermometer is out of the acceptance range it must be taken out of service.
   1) >1 ^{0}C degrees CF the NIST “Reference” thermometer is sent back for re-certification or replaced.
   2) >1 ^{0}C degrees CF the working thermometer taken out of service and discarded appropriately.
   3) >+/-1 ^{0}C the IR thermometer is taken out of service.

b. Report to the QA/QC officer and document corrective actions taken in a calibration logbook or on a bench sheet.

SOP#		*Standard Operating Procedure* **Thermometer Calibration Traceable to NIST Certified Thermometer**	*Created by:*	T.Geib
Date of last modification:	4/28/14		*JSA by:*	

14. DATA ARCHIVAL/RECORDS MANAGEMENT:

a. Calibration worksheets and data will be recorded promptly, legibly and in indelible ink in a calibration logbook or on a bench sheet.

b. The annual Thermometer Calibration and Certification Reports for the NIST traceable thermometer are kept with the certified thermometers along with a copy in the calibration logbook.

c. Any corrections made to the records will be by only placing a single line through the incorrect entry, the correct result will be written to the side with the initials and date of the person making the change.

d. Records will be retained for five years.

REFERENCES:

- Standard Methods for the Examination of Water and Wastewater 22nd Edition Method 2550 B
- Manual for the Certification of Laboratories Analyzing Drinking Water, EPA 815-B-97-001, March 1997.
- EPA SOP for Maintenance & Calibration of Thermometers and Thermometer/Hygrometers Rev. 10-26-2010
- NIST Special Publication 1088 Maintenance, Validation, and Recalibration of Liquid-in-Glass Thermometers, January 2009
- Fluke IR 62 mini Operations & Maintenance Manual

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#		*Standard Operating Procedure* **Automatic and Direct Calibration of Thermo Scientific Orion Star A212 Conductivity Meter**	*Created by:*	T, Geib
Date of last modification:	8/19/15		*Approved by:*	

1. PURPOSE AND SCOPE:

This procedure describes the calibration and use of the Thermo Scientific Orion Star A212 Conductivity Meter.

2. INTRODUCTION AND APPLICATION:

The Orion A212 Conductivity Analyzer is a benchtop meter capable of measuring conductivity, TDS, salinity, resistivity and temperature in Celsius and Fahrenheit.

3. APPROVED SAMPLING METHODS:

The Orion A212 conforms to the Standard Method references SM 120.1 and SM 2510b.

4. AUTOMATIC AND DIRECT CALIBRATION:

Note: For an automatic calibration, the nominal cell constant of the conductivity cell must be entered in the setup menu before the calibration is performed and Thermo Scientific Orion 100 uS/cm, 1413 uS/cm and/or 12.9 mS/cm conductivity standards must be used. Personal protective equipment (PPE) is comprised of gloves and glasses.

a. In the measurement mode press **f1 (cal).**
b. Rinse the conductivity electrode thoroughly with good quality distilled water, blot dry with a Kimwipe or lint-free tissue and place electrode (conductivity cell) in the first standard.
c. When the conductivity cell and standard are ready, press **f3 (start).**
d. Wait for the conductivity value on the meter to stabilize and stop flashing and perform **one** of the following actions:
   1) Press **f2 (accept)** to accept the displayed conductivity value.
   2) Press **f3 (edit)** to access the numeric entry screen and edit the conductivity standard value.
      a. Press 

to highlight a number or decimal point, press **f3 (enter)** to select the highlighted item and repeat until the standard value at the measured temperature is shown.
      b. Press **f2 (done)** to exit the numeric entry screen.
      c. Press **f2 (accept)** to accept the entered conductivity value.
d. Press **f2 (next)** to proceed to the next standard. Thoroughly rinse electrode with distilled water, blot dry and place in the next standard. Then repeat steps 3 through 4. When finished press **f3 (cal done)** to save and end the calibration.

SOP#		*Standard Operating Procedure* **Automatic and Direct Calibration of Thermo Scientific Orion Star A212 Conductivity Meter**	*Created by:*	T, Geib
Date of last modification:	8/19/15		*Approved by:*	

e. The meter will display the calibration summary including the average calculated cell constant and export the data to the calibration log. Press **f1 (meas) to** exit the calibration mode and proceed to the measurement mode.
f. Record Calibration accordingly.

References:

- Thermo Scientific Orion Star A212 Benchtop and Star A222 and Star A322 Portable Conductivity Meters: Reference Guide; 68X576702 RevA 10-11
- Standard Methods for the Examination of Water and Wastewater 22nd Edition; ISBN 978-087553-013-0, ISSN 55-1979

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#		*Standard Operating Procedure* **Thermo Scientific Orion Star A326 Portable pH/RDO/DO Meter**	*Created by:*	T.Geib
Date of last modification:	10/22/14		*JSA by:*	

1. **PURPOSE AND SCOPE:**
   This procedure describes the calibration of the Orion Star A326 Portable pH/RDO/DO meter.

2. **INTRODUCTION AND APPLICATION:**
   The Thermo Scientific Orion A326 pH/DO Analyzer is meter capable of measuring pH, dissolved oxygen and temperature in Celsius and Fahrenheit.

3. **APPROVED SAMPLING METHODS:**
   The Orion A326 conforms to EPA 150.2 and ASTM D-1293-99(B) for pH and ASTM
   D888-09(C) for luminescent dissolved oxygen.

4. **AUTOMATIC AND DIRECT CALIBRATION:**

pH Calibration

One to five pH buffers can be used for calibration. Always use fresh pH buffers and select buffers that bracket the sample pH and are one to four pH units apart. Prepare the pH electrode according to the instructions in the electrode use guide. Connect the pH electrode and any other electrodes to be used (ATC probe, reference electrode) to the meter. Power on the meter and set the measurement mode to pH.

1. In the measurement mode, press ***f1 (cal)***. Press ▲ or ▼ to highlight *pH-Channel* and press ***f2 (select)***.
2. Rinse the pH electrode and any other electrodes in use with distilled water, blot dry with a lint-free tissue and place into the pH buffer.
3. When the electrode and buffer are ready, press ***f3 (start)***.
4. Wait for the pH value on the meter to stabilize and stop flashing and perform one of the following actions:
   a. Press ***f2 (accept)*** to accept the displayed value.
   b. Press ***f3 (edit)*** to access the numeric entry screen and edit the value.
      i. Press ▲, ▶, ▼ or ◀ to highlight a number, decimal point or negative sign; press ***f3 (enter)*** to select the highlighted item and repeat until the value at the measured temperature is shown above the numeric entry screen.
      ii. Press ***f2 (done)*** to exit the numeric entry screen.
      iii. Press ***f2 (accept)*** to accept the entered value.
5. Press ***f2 (next)*** to proceed to the next buffer and repeat steps 2 through 4 or press ***f3 (cal done)*** to save and end the calibration. If five buffers are used, the calibration will save and end once the fifth value is accepted.
   a. If a one point calibration is performed, press ***f2 (accept)*** to accept the displayed slope value or press ***f3 (edit)*** to access the numeric entry screen, enter the slope value and press ***f2 (accept)***.
6. The meter will display the calibration summary including the average slope. Press ***f1 (meas)*** to export the data to the calibration log or press ***f2 (print)*** to export the data to the calibration log and a printer or computer. The meter will automatically proceed to the measurement mode.

SOP#		*Standard Operating Procedure* **Thermo Scientific Orion Star A326 Portable pH/RDO/DO Meter**	*Created by:*	T.Geib
Date of last modification:	10/22/14		*JSA by:*	

pH Buffer Group Selection

The selected buffer group allows for the automatic recognition of certain pH buffers during a pH calibration. The USA buffer group includes pH 1.68, 4.01, 7.00, 10.01 and 12.46 buffers and the DIN buffer group includes pH 1.68, 4.01, 6.86, and 9.18 buffers.

1. In the measurement mode, press ▲.
2. Press ▲, ▶, ▼ or ◀ to highlight *pH Channel* and press ***f3 (select)***.
3. Press ▲ or ▼ to highlight *Mode and Settings* and press ***f3 (select)***.
4. Press ▲ or ▼ to highlight *Buffer Group* and press ***f3 (select)***.
5. Press ▲ or ▼ keys to highlight *USA* or *DIN* and press ***f3 (select)***.
6. Press MEASURE to return to the measurement mode.

a. Record calibration accordingly.

Standard Buffer	Control Number
pH Buffer 4.0	
pH Buffer 7.0	
pH Buffer 10.0	

Date	Initials	Temperature of Calibration	Slope (%)	Electrode No.	Buffers Used for Calibration			Re-check pH 7.0
					pH 4.0	pH 7.0	pH 10.0	
/ /								
Notes								
/ /								
Notes								
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WASTEWATER TREATMENT PLANTS

SOP#		*Standard Operating Procedure* **Thermo Scientific Orion Star A326 Portable pH/RDO/DO Meter**	*Created by:*	T.Geib
Date of last modification:	10/22/14		*JSA by:*	

RDO/DO Calibration

Polarographic DO probes only - A polarographic DO probe must be polarized. The probe is continuously polarized when it is connected to the meter. If the probe is not connected to the meter: connect the probe to the meter, connect the meter to a power source and wait 30 to 60 minutes for polarization.

The Orion Star A326 meter can perform a calibration using water-saturated air (***Air***), air-saturated water (***Water***), Winkler titration (***Manual***) or zero point calibration (***Set Zero***). See the reference guide for detailed instructions for each calibration.

Air Calibration

1. In the measurement mode, press ***f1 (cal)***. Press ▲ or ▼ to highlight *DO-Channel* and press ***f2 (select)***.
2. Press ▲ or ▼ to highlight *Air* and press ***f3 (select)***.
3. Rinse the RDO optical DO probe or polarographic DO probe with distilled water, blot dry with a lint-free tissue and place into the prepared calibration sleeve or BOD bottle. Allow the probe and water-saturated air to reach equilibrium.
4. When the probe and water-saturated air are ready, press ***f3 (start)***.
5. Wait for the dissolved oxygen reading on the meter to stabilize and stop flashing. Once the reading is stable, the meter will display *Accepting Auto % Sat. Calibration* and *100.0 %* if using an RDO optical DO probe or *102.3 %* if using a polarographic DO probe.
6. Press ***f3 (cal done)*** to export the data to the calibration log or press ***f2 (print)*** to export the data to the calibration log and a printer or computer. The meter will proceed to the measurement mode.

Set Zero Calibration

A zero point calibration is performed in an oxygen-free solution. A zero point calibration is not generally required unless measurements will be taken below 10% saturation or 1 mg/L. Perform an air or water calibration before performing a zero point calibration.

1. In the measurement mode, press ***f1 (cal)***. Press ▲ or ▼ to highlight *DO-Channel* and press ***f2 (select)***.
2. Press ▲ or ▼ to highlight *Set Zero* and press ***f3 (select)***.
3. Rinse the RDO optical DO probe or polarographic DO probe and any other electrodes in use with distilled water, blot dry with a lint-free tissue and place into the prepared zero oxygen standard. Allow the probe and standard to reach equilibrium.
4. When the probe and zero oxygen standard are ready, press ***f3 (start)***.
5. Wait for the dissolved oxygen reading on the meter to stabilize and stop flashing. Once the reading is stable, the meter will display *Accepting Auto % Sat. Calibration* and *0.00*.
6. Press ***f3 (cal done)*** to export the data to the calibration log or press ***f2 (print)*** to export the data to the calibration log and a printer or computer. The meter will proceed to the measurement mode.

SOP#		*Standard Operating Procedure* **Thermo Scientific Orion Star A326 Portable pH/RDO/DO Meter**	*Created by:*	T.Geib
Date of last modification:	10/22/14		*JSA by:*	

References:

- Thermo Scientific Orion Star A212 Benchtop and Star A222 and Star A322 Portable Conductivity Meters: Reference Guide; 68X576702 RevA 10-11
- Standard Methods for the Examination of Water and Wastewater 22nd Edition; ISBN 978-087553-013-0, ISSN 55-1979
- Thermo Scientific Products Drinking Water & Wastewater Compliance EPA Methods: Thermo Scientific; CH-EPA RevB 0812

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#	L-405	*Quick Reference* **Temperature Readings**	*Created by:*	T.Geib
Date of last modification:	10/15/2015		*Approved by:*	Cmaines

1. PURPOSE AND SCOPE:

The purpose of this SOP is to ensure that all temperature readings are compliant with EPA's 40 CFR Part 136. The CBJ APDES permits identify monitoring, measurement and reporting requirements specified by the State and EPA.

The temperature test is a measurement of hotness or coldness. Temperature is one of the most common measurements used in the laboratory. The Centigrade system is commonly used in the laboratory reported as Celsius. All reportable data must be validated per EPA's 40 CFR Part 136.

2. THERMOMETER TYPES:

Total immersion	A total immersion thermometer must be totally immersed when read.
Partial immersion	A partial immersion thermometer will have a solid line around the stem at the immersion point.
Liquid filled	These are filled with mercury, spirits (alcohol), or biodegradable liquids and can be obtained in a variety of accuracy levels depending on need. Note that mercury is a hazardous material. If a mercury-filled thermometer is broken, cleanup, transportation, and disposal of the waste must be done in accordance with local, state, and federal guidelines. The biodegradable liquid and spirit-filled thermometers can be easily disposed of if broken and are of equal quality and accuracy as the mercury-filled thermometers.
Digital	These are constructed of a probe, a thermocouple, and a processor (meter or alarm). Some of the meters will also store data points or feed the data to a computer as they are gathered.
Infrared	These electronic thermometers can determine temperatures without coming into contact with the material of interest. They collect energy that has been transmitted, reflected, or emitted from an object and focus it onto a detector which converts the energy to a specific temperature. At close range they can measure the temperature of an area less than a square inch. These are well suited to measure temperatures of moving objects, hard to reach objects, or hazardous materials.
Thermistors	A thermistor is a temperature-sensing element composed of sintered semiconductor material which exhibits a large change in resistance proportional to a small change in temperature. Thermistors are one of the most accurate types of temperature sensors. However thermistors are fairly limited in their temperature range, working only over a nominal range of 0°C to 100°C.

SOP#	L-405	*Quick Reference* **Temperature Readings**	*Created by:*	T.Geib
Date of last modification:	10/15/2015		*Approved by:*	Cmaines

3. SUMMARY of METHOD:

Ensure that temperature readings are from representative samples and temperatures recorded for compliance purposes are validated by being traceable to an NIST certified thermometer. The following documents should be reviewed before completing temperature measurements:

a. Standard Operating Procedure for Thermometer Calibration Traceable to NIST Certified Thermometer
b. Thermo Scientific Orion Star A326 Portable pH/RDO/DO Meters Reference Guide

4. INTERFERENCES:

Allow the thermometer to stabilize with the solutions before taking the temperature reading.

5. PERSONNEL QUALIFICATIONS/ TRAINING:

a. Personnel are required to be knowledgeable of the procedures contained in this SOP, the SOP for Thermometer Calibration Traceable to NIST Certified Thermometer and familiar with the Thermo Scientific Orion Star A326 Reference Guide
b. SOP reviews and training records will be maintained on-site.

6. EQUIPMENT/APPARATUS:

a. NIST traceable certified thermometer, H-B serial number 1246208.
b. One validated thermometer with 1 degree Celsius subdivisions.
c. Temperature measuring device –Portable Thermo Scientific Orion 3 Star Multi-parameter meter.

7. SAFETEY PRECAUTIONS:

a. Use appropriate PPE: Eye protection, gloves, etc.

8. CALIBRATION PROCEDURE:

All thermometers are checked for accuracy using a reference NIST traceable thermometer. Check your thermometer or temperature measuring device's accuracy by comparing it to a validated or certified thermometer's reading **prior to use each day**. Be sure that the recorded temperature includes the correction factor. The multi probe temperature measurement must be within 0.50°C of the NIST certified or traceable thermometer or thermistor. If it is determined that the multi probe's temperature sensor does not meet acceptance criteria, the sensor can be replaced.

9. STORAGE and PRESERVATION:

It is not possible to store or preserve a sample that needs to have the temperature analyzed. The temperature of the sample must be taken immediately after sampling. A large volume

should be collected. The use of a large volume is to prevent ambient or surrounding air temperatures from changing the temperature of the sample.

Measurements are to be taken with a validated liquid-filled laboratory thermometer or Thermo Scientific Orion Star A326 Portable pH/RDO/DO Multimeter. Non-contact (IR) temperature detection devices are used for verifying sample check-in temperatures **only** and are not used for NPDES compliance testing and reporting purposes.

10. MEASUREMENT:

a. Collect a large volume of sample.
b. Place thermometer into sample being tested.
    1) Immerse the thermometer or temperature detecting device into the middle of the sample to avoid touching the sides of the container.
        a. Immerse thermometer in sample long enough for the reading to stabilize.
c. When the thermometer has stabilized, read and record the temperature.

11. DATA ANALYSIS/CALCULATIONS:

Thermometer or Temperature measuring device CF = the correction factor is calculated by taking the NIST certified reference thermometers TRUE Temperature and subtracting the Observed Temperature of the thermometer or temperature detecting device being calibrated. Temperatures are recorded that include the CF.

12. CORRECTIVE ACTION:

a. If it is determined that the thermometer is out of the acceptance range during the accuracy check it must be taken out of service.
    1) >1 ^{0}C degrees CF the working thermometer taken out of service and discarded appropriately.
    2) >0.5^{0}C degrees CF the Thermo Scientific Orion Star A326 Portable pH/RDO/DO Multimeter temperature probe is replaced and the meter is recalibrated.
    3) >+/-1 ^{0}C CF the IR thermometer is taken out of service.
b. Report to the QA/QC officer and document corrective actions taken in the Laboratory Thermometer Maintenance & Calibration Logbook.

13. DATA ARCHIVAL/RECORDS MANAGEMENT:

a. Temperature readings will be recorded promptly, legibly and in indelible ink in the logbook or on the daily bench sheet.
b. Any corrections made to the records will be by only placing a single line through the incorrect entry, the correct result will be written to the side with the initials and date of the person making the change.
c. Records will be retained for five years.

SOP#	L-405	*Quick Reference* **Temperature Readings**	*Created by:*	T.Geib
Date of last modification:	10/15/2015		*Approved by:*	Cmaines

REFERENCES

- Standard Methods for the Examination of Water and Wastewater 22nd Edition Method 2550 B
- Thermo Scientific Orion Star A326 Portable pH/RDO/DO
- Fluke IR 62 mini Operations & Maintenance Manual

14. REVISION LOG:

Revision Date	Revised Section(s) and Notes	Revised By
10/15/2015	Review and Approve and gave index number	Cmaines

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#		*Standard Operating Procedure* **Measuring Total Chlorine Residual using HACH Pocket Colorimeter II Test Kit**	*Created by:*	C. Carlson
Date of last modification:	12/20/13		*JSA by:*	

1. GENERAL DISCUSSION:

This is a colorimetric version of the DPD method (4500-Cl F) and is based on the same principles. Instead of titrating with standard ferrous ammonium sulfate (FAS) solution as in the titration method, a colorimetric procedure is used.

2. SCOPE AND APPLICATION:

This method is adapted from the HACH® Pocket Colorimeter™ II Test Kits instruction manual. As adapted, is equivalent to Standard Methods SM 4500-Cl G which is used to determine the total residual chlorine (TRC) in aqueous samples. The chlorine measurements are used to determine the success of the de-chlorination efforts and compliance reporting for the Auke Bay WWTP and for the chlorine free laboratory grade water verification.

Use of this SOP constitutes acknowledgement that the Hach Pocket Colorimeter ™ II user's manual has been read and understood by the operator.

3. SUMMARY OF METHOD:

Operation of meter is checked. Sample is placed in vial. Instrument is "blanked" with sample. DPD (diethyl-p-phenylenediamine) reagent is added to vial. A 3-minute timer is started. The total residual Chlorine (TRC) is read. A duplicate measurement is made. Results are averaged and recorded in appropriate log books.

Interferences:

- Incl Fude: acidity > 150 mg/L $CaCO_3$, alkalinity > 250 mg/L as $CaCO_3$, bromine, hardness > 1,000 mg/l as $CaCO_3$, iodine, oxidized manganese and oxidized chromium, monochloramine and ozone.

- Damage to the meter by water/liquid entering the cell holder.

4. EQUIPMENT AND SUPPLIES:

4.1. Hach pocket colorimeter™ II chlorine test kit containing:

- Pocket colorimeter –two modes (LOW mode resolution 0.01mg/l, the HIGH mode resolution is 0.1 mg/l.)
- Two 2.5 cm sample cells
- Two 1.0 cm sample cells
- 1 cm sample-cell adapter
- DPD total chlorine reagent powder pillows

4.2. Disposable pipet (10 mL) with manual pipetter - One per sample to be tested

4.3. Hach-Spec√™ Secondary Standards and potassium permanganate standards (1.0 mg/L and 0.1 mg/L)

- The Hach® secondary standards come four to a box and include a blank, a low-range standard, a mid-range standard, and high-range standard.

- The potassium permanganate standard (1.0 mg/L) is prepared per Standard Methods 20th Edition: SM 4500-Cl G. Dilute the 1.0 mg/L standard 9:1 with deionized water to make the 0.1 mg/L standard. Or commercially prepared standards.

4.4. Laboratory timer (count-down or count-up with alarm)

4.5. Kimwipe®

4.6 Chlorine demand free water -Deionized (DI) water for dilution of high level samples.

5. SAFETY/HAZARDOUS WASTE MANAGEMENT:

5.1. Employee personal protective equipment (PPE) is required when working with chemicals and samples. Ie: safety glasses, gloves, etc.

5.2. Sample disposed of at wastewater treatment facility.

6. METHOD:

6.1 The following method applies to the Colorimeter™ II when referring to the instrument.

6.2 Use Spec√™ Secondary Standards and Potassium Permanganate Standards for calibration. **Ensure that the standards have not expired.**

6.3 *Sample preparation*- Warm sample to between 20-25 ºC.

6.4 ***Meter Calibration and Verification of Instrument***

6.4.1 Press the power button on the Colorimeter™II. The display will light up.

6.4.2 Remove the cap from the instrument. Wipe the Spec√™ blank with a clean Kimwipe® and place into the cell holder. Ensure that the alignment mark (looks like half of a diamond) is facing the keypad. Securely cover the cell with the instrument cover.

6.4.3 Press [**ZERO**]. The display will show"**0.00**".

6.4.4 Remove the instrument cap. Remove the Spec√™ blank from the cell holder. Place the STD 1 cell into the cell holder, aligning the alignment mark with the keypad. Securely cover the cell with the instrument cover.

6.4.5 Press [**READ**]. Record the displayed value in the chlorine logbook along with the value of the standard.

Note: If the value is not within ±10 % of the standard value, ensure that the standard cells are clean and repeat the procedure. If values are still out of range, **refer to the instrument manual for trouble shooting instructions.**

6.4.6 Repeat **STEP 6.4.4.** and **STEP 6.4.5**, first with the Spec√™ cell labeled STD 2 and then with the Spec√™ cell labeled STD 3.

6.4.7 Refer to all steps of the *Total Residual Chlorine Measurement Low Range, 0 – 2.00 mg/L* procedure using the potassium permanganate standards as the sample. Record the displayed value in the Total Chlorine Residual meter Maintenance and calibration logbook.

Note: The potassium permanganate standards are required once annually or whenever there appears to be a problem with the secondary standards. The potassium permanganate standards should read 1.0 mg/L (± 10%) and 0.1mg/L (± 20%). If the values are not within the specified percentage of the standard value, ensure that the standard cells are clean and repeat the procedure. If values are still out of range, prepare a new standard. Test the new standard, and then if a problem still exists, refer to the instrument manual for trouble shooting instructions.

6.5 ***Total Residual Chlorine Measurement Low Range, 0 – 2.00 mg/L***

6.5.1 Collect the sample to be analyzed. The sample must be analyzed within 15 minutes of collection. The sample cannot be preserved for later analysis.

SOP#		*Standard Operating Procedure* **Measuring Total Chlorine Residual using HACH Pocket Colorimeter II Test Kit**	*Created by:*	C. Carlson
Date of last modification:	12/20/13		*JSA by:*	

6.5.2 Use a 10 mL pipet to place 10 mL of sample into a 10 mL sample cell (blank sample). Use one pipet per sample (do not cross contaminate samples).

6.5.3 Wipe the exterior of the cell with a Kimwipe® to remove any dirt, smudges, fingerprints, etc. which may reduce the amount of light passing through the cell, thereby giving an inaccurate reading.

6.5.4 Place the sample cell containing the blank sample in the cell holder. Place the instrument cap over the sample cell (to occlude light). **The diamond mark on the sample cell (vial) should be facing the front of the instrument (toward the operator).**

6.5.5 Press [**ZERO**]. After the display "zeros," remove the instrument cap from the cell holder and remove the sample cell. This step "zeros" the meter while correcting for any color inherent in the sample. The colorimeter will turn on and the display will show "**---**" followed by "**0.00**."

6.5.6 Open a DPD Total Chlorine powder pillow by tearing the top portion off and add the contents to the sample cell (blank sample). Cap the cell and gently shake for 20 seconds to mix. **A pink color will form if chlorine is present.**

6.5.7 To allow proper color development, wait at least three minutes but not more than six minutes before performing **STEP 6.5.11**.

6.5.8. Set the timer for 3 minutes or monitor the wall clock for 3 minutes to elapse.

6.5.9 Any undissolved powder does not affect accuracy.

6.5.10 Check the sample cell for bubbles that sometimes form on the sides of the cell. These bubbles will cause a false high result. If bubbles are seen, gently tap the side of the cell and swirl the contents of the cell to dislodge the bubbles.

6.5.11 After three minutes, place the prepared sample in the cell holder. Securely (to block the light) place the instrument cap over the sample cell **(flat part of cap away from operator).**

6.5.12 Press [**READ**]. The display will show "**---**" followed by the total chlorine measurement in mg/L.

Note: If the sample temporarily turned yellow at **STEP 6.5.6** or the display is flashing "**2.20**", (indicating an over-range concentration), the chlorine concentration is too high. The measurement must be repeated with a diluted sample.

6.5.13 Record the displayed reading in the logbook and the appropriate daily bench sheets. If an out-of-range indication is displayed, dilute the sample with DI water. Perform **STEPS 6.4 - 6.5.12** to measure TRC in both the dilution water (DI water) and diluted sample. Multiply the result by the dilution factor.

6.5.13.1 Readings that are ≤0.03 ppm are recorded as <0.03. Readings >0.03 are recorded as displayed on the meter.

6.5.13.2 Dilution water should be chlorine demand free water. If TRC is detected in the dilution water, **contact the plant supervisor immediately.**

6.5.14 Repeat **STEPS 6.4. - 6.4.12** for the replicate sample. If sample readings are ≤0.03 ppm, two readings are sufficient. If any sample readings are ≥0.03 **and** vary by more than 0.02 ppm, or whenever one reading is ≤0.03 and the other is > 0.03, a third reading must be taken.

6.5.15 When finished with the instrument, replace the cap, turn off the Colorimeter™ II by pressing the power button, and return the instrument to the carrying case. Rinse all sample cells (excluding Spec√™ Standards) with DI water. Allow the cells to dry before returning them to the carrying case. **Clean up the work area.**

7. DATA ARCHIVAL:

7.1 Use a black, waterproof pen for all bench sheets and logbooks.

7.2. Record meter calibration information in the HACK Colorimeter II Maintenance and Calibration logbook located in the MTP Laboratory. *Chlorine residual readings need to be recorded on the Daily Bench Sheet* and in the Auke Bay Compliance Sampling Field Logbook.

7.3. To correct raw data entries, place a single line through the incorrect entry, write the corrected entry near the error and initial the correction. Do not overwrite entries.

7.3.1 The corrected entry is written as near its appropriate space as possible or else in the comment box on the appropriate bench sheet.

7.3.2 If the correction requires an explanation, write a comment and reference the error. **Initial and date the explanation.**

7.3.3 Use sequential alphabetical annotation to identify errors and corresponding comments (use A for first error and use A for corresponding explanatory comment; use B for second error, etc.).

8. QUALITY CONTROL

8.1. Refer to 21st Edition of Standard Methods manual for corrective action and handling of out-of-control data.

9. REFERENCES

9.1. HACH® Colorimeter™ II Instruction Manual.

9.2. Standard Methods for the Examination of Water and Wastewater, 21st Edition: SM 4500-Cl G

9.3. USEPA DPD Method 8167

9.4. CBJ MTP Quality Assurance Project Plan –2014

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#		*Quick Reference* **MWWTP** **Effluent Flow Measurement**	*Created by:*	T.Geib
Date of last modification:	4/28/14		*JSA by:*	

1. PURPOSE:

The Mendenhall Wastewater Treatment Plant's NPDES Permit identifies monitoring, measurement and reporting requirements specified by the State of Alaska and the EPA. Effluent flow measurement is one of these requirements.

2. SCOPE AND APPLICATION:

The rate of effluent flow from the Mendenhall Wastewater Treatment Facility (MWWTF) to the receiving water is continuously monitored, measured, and recorded. The effluent flow rate is also used to generate a flow proportional signal to the effluent composite sampler that samples based on flow rate.

3. SUMMARY OF METHOD:

The MWWTF effluent flow rate is derived from a volumetric calculation based upon the measured level drawdown of a sequential batch reactor (SBR) basin of known dimensions during the decant phase of SBR operation. Level instruments utilizing radar measure the SBR drawdown and the Supervisory and Data Acquisition (SCADA) programmable logic controller (PLC) calculates the rate of effluent flow.

4. Equipment and Supplies:

a. Vega Instruments VEGAPULS 51K Operating Instructions.
b. Vega Instruments VEGACONNECT 4 with connection box and Operating Instructions
c. Vega Instruments PACTWARE
d. Laptop computer
e. 50ft measuring tape
f. Personal protective equipment i.e. rubber gloves and safety glasses.

5. METHOD:

The MWWTF effluent flow rate is derived from a volumetric calculation utilizing the known uniform dimensions of the 8 SBR basins and the change in level over time. There are 12,985 gallons per foot of level in an SBR. SBR levels are measured with calibrated radar level instruments. Change in level in the SBR data is only used in an effluent flow calculation during the Decant phase of the SBR operations sequence. The calculated result is displayed as a rate of effluent flow and totalized daily and monthly flow.

6. FREQUENCY/MEASUREMENTS:

The MWWTF SCADA system monitors effluent flow continuously. Effluent flow only occurs during the Decant phase of the SBR cycle. Effluent flow is recorded on a daily basis with a day defined as midnight to midnight.

SOP#		*Quick Reference* **MWWTP** **Effluent Flow Measurement**	*Created by:*	T.Geib
Date of last modification:	4/28/14		*JSA by:*	

7. CALIBRATION:

Overall system accuracy is largely dependent on the VEGAPULS 51K radar level transmitters. The VEGAPULS 51K radar level transmitters are calibrated following procedures in their O&M manual. Each transmitter is calibrated independently and each calibration is verified with manual direct level measurements. The SCADA system indications are verified for consistency with locally measured and/or observed indications.

8. QUALITY CONTROL:

The SBRs are typically completely emptied for servicing at least once annually. At this time the zero or low end of the measurement range is checked for accuracy. Upon filling the high end is checked by direct measurement at top fill water level. Direct measurement is used to verify instrument and SCADA system accuracy locally at the SBR semi-annually. Measurement performance can also be verified in two other ways. Flow from the four even numbered SBRs flows through an electromagnetic flow meter providing an indication that can be compared to the SCADA calculation. Lastly the effluent flow data can be compared to the influent flow data. This latter method is the least desirable because of the lead/lag effect of varying influent flow rates to a batch plant.

9. DATA ARCHIVAL:

Data is backed up by an external hard drive continuously. The SCADA database and alarm log are also backed up and written to an appropriately labeled backup DVD monthly for archival purposes. These DVDs are stored onsite. The MWWTF effluent flow is recorded daily on the Mendenhall wastewater Treatment Plant Process Monitor Sheet by the process operator. The effluent flow is also recorded daily on the Mendenhall Wastewater Treatment Facility Data Sheet.

References:

- Vega Instruments VEGAPULS 51K Operating Instructions Manual; 2.21 751/February 2002
- Vega Instruments VEGACONNECT 4 with connection box and Operating Instructions
- EPA NPDES Compliance Sampling Manual-1977

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#		*Quick Reference* **JDTP Effluent Flow Measurement System**	*Created by:*	C. Carlson
Date of last modification:	2/26/14		*JSA by:*	

1. PURPOSE:

The Juneau-Douglas Wastewater Treatment Plant (JDTP)'s NPDES Permit identifies monitoring, measurement and reporting requirements specified by the State and EPA.

2. SCOPE AND APPLICATION:

The effluent flow rate from the JDTP is continuously monitored and recorded by using a Milltronics OCM III flow monitoring system. The effluent flow measurement equipment is located at the end of the wastewater treatment process located in the U.V. Disinfection Building and is primarily used for measuring flows to the receiving water, and for the operation of the influent and effluent flow proportional composite samplers.

3. SUMMARY OF METHOD:

A typical continuous flow monitoring system consists of a primary flow device, a flow sensor, transmitter, flow recorder, and totalizer. The sensor signal is converted to units of flow which are recorded directly on a chart or transmitted into a data system.

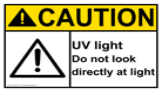
4. EQUIPMENT AND SUPPLIES:

a. Milltronics OCM III flow meter O&M Instruction Manual
b. Spare XRS-5 Transducer
c. Multimeter
d. Multi-head screw driver to open meter for inspection and to replace desiccant
e. Personal protective equipment; gloves, UV safety glasses and or shield
f. Clean rags

5. SAFETY/PROCEDURAL PRECAUTIONS:

The following precautions should be considered when validating the flow meters operation:

a. Take precautions to avoid Ultraviolet Light exposure.
b. Special care must be taken when walking around open flow channels.
c. A safety harness is required when the danger of falling into a large volume of fast moving water presents a life threatening situation.
d. Always watch footing and use hand rails at the facility to minimize accidents during walk-throughs of the facility.
e. Watch for uncovered grating during walk-through.
f. Wear personal protection equipment when appropriate.



SOP#		*Quick Reference* **JDTP Effluent Flow Measurement System**	*Created by:*	C. Carlson
Date of last modification:	2/26/14		*JSA by:*	

6. METHOD:

Milltronics OCM III measures the flow rate of effluent discharged from the JDTP by the emission of a sonic ping. The depth of the effluent at the weir is determined based upon the return time of the ping. The calculated depth is then electronically converted to a measurement of the rate of flow through the system over time (in gallons per day), and totalized flow.

7. FREQUENCY/MEASUREMENTS:

The flow rate is measured continuously. A digital reading is shown, and the reading is recorded continuously on circular charts. A totalizer shows the total elapsed plant flow. Readings are taken off the flow meter and totalizer at two-hour intervals, starting at 0600hrs and continuing until 1600hrs hours daily.

Plant flow is calculated as the difference between totalizer readings at 1000hrs, i.e. 1000hrs readings today minus 1000hrs readings yesterday is equal to yesterday's flow. The value obtained is periodically compared to the 1000hrs-flow reading at the Outer Drive pump station to provide flow meter verification.

Monthly flow totals from both the JDTP and the Outer Drive lift station are compared each month.

The flow chart is checked daily for proper operation and initialized weekly by the process control operator.

The flow recorder charts are replaced every Tuesday @ 0700hrs and ink pens are replaced as necessary. Charts are stored on-site in the lab area.

8. CALIBRATION:

The primary system calibration consists of a zeroing of the system twice yearly or when flow is discontinued for maintenance. By comparing this distance with a referenced “zero” level for the flow stream, the flow meter can calculate the liquid level. The flow meter converts the detected echo from the transducer to a level reading.

To zero the flow metering equipment, all operations must be shut down and there must not be any flow through the system. During the period of no flow, the meter is manually set to zero. The secondary check is conducted by comparing the flow totals recorded at the Outer Drive lift station.

9. QUALITY CONTROL:

Wastewater flow will be expressed in million gallons per day (mgd) Time records associated with flow measurements will be kept in local time, will be made in the 2400 hour military time format, and will be recorded to the nearest five minutes.

SOP#		*Quick Reference* **JDTP Effluent Flow Measurement System**	*Created by:*	C. Carlson
Date of last modification:	2/26/14		*JSA by:*	

Daily flow totals will be recorded on the "Juneau-Douglas WWT Plant Daily Operating Data" sheet and in the JDTP Plant Log. Both documents will be initialed by the individual making the measurement.

The transducer mounting brackets and ultrasonic path shall be kept clear of cobwebs or other debris to avoid any possibility of interference with the measurement.

The transducer face shall be kept clean of any fouling or condensation.

The flow monitoring equipment will be operated, calibrated, and maintained according to manufacturer's specifications.

A "Flow Meter Maintenance and Calibration Record Log Book" will be maintained on site made readily available for inspection.

10. DATA ARCHIVAL:

a. Use a black, waterproof pen for all bench sheets and logbooks.

b. Record meter calibration information in Maintenance and Calibration logbook located in the JDTP Laboratory.

c. To correct raw data entries, place a single line through the incorrect entry, write the corrected entry near the error and initial the correction. Do not overwrite entries.

d. If the correction requires an explanation, write a comment and reference the error. **Initial and date the explanation.**

e. SCADA logger data and circular flow charts are located on site in the JDTP lab area.

References:

- Milltronics OCM III O&M Instruction Manual-2005.
- EPA NPDES Compliance Sampling Manual-1977.

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#		*Standard Operating Procedure* **ABWWTP** **Effluent Flow Measurement**	*Created by:*	D. Dodson C. Carlson
Date of last modification:	10/30/14		*JSA by:*	

1. Purpose:

The Auke Bay Wastewater Treatment Plant's NPDES Permit identifies Effluent flow monitoring, measurement and reporting requirements specified by the State of Alaska and the EPA.

2. Scope and Application:

The rate of effluent flow from the Auke Bay Wastewater Treatment Plant (ABWWTP) to the receiving water is continuously monitored, measured, and recorded. A QC-OC-1R EchoFlo meter is utilized for continuous display of flow and includes instantaneous values (GPM or MGD), average, daily min and max and totalizers.

3. Summary of Method:

The ABWWTP effluent flow rate is derived from a flow through a V-Notch weir and ultrasonic flow measuring device. The combination of the digital and manual flow measurement allows for more accurate data and operation.

4. Equipment and Supplies:

a. ECHOFLO Model QC-OC-1R Operating Instructions.
b. 25 ft. measuring tape
c. Personal protective equipment i.e. rubber gloves and safety glasses.

5. Method:

The ABWWTP effluent flow rate is derived from ultrasonic measuring device located over a 90 degree V-Notch weir. The flow data is collected and displayed in the operator's lab/office. The historical data is then stored on the plants computer located in the same office.

6. Frequency/Measurements:

The ABWWTP system monitors effluent flow continuously. Effluent flow is recorded on a daily basis with a day defined as midnight to midnight.

7. Calibration:

The flow meter can be checked on a weekly basis or more often if needed to ensure accurate flow measurement. Calibration is performed per the manufactures instructions. The frequency of calibration is based on manufactures recommendations or more often if the weekly verification shows a discrepancy of plus or minus 10%.

SOP#		*Standard Operating Procedure* **ABWWTP** **Effluent Flow Measurement**	*Created by:*	D. Dodson C. Carlson
Date of last modification:	10/30/14		*JSA by:*	

8. Quality Control:

The flow through the plant is recorded based on the data from the ultrasonic flow meter. This data is verified by way of measuring the flow through the V-Notch weir and calculating the flow manually.

9. Data Archival:

Data is backed up by an external hard drive continuously and recorded as a cvs file on the operators computer. The ABWWTP effluent flow is recorded daily on the Auke Bay wastewater Treatment Plant Process Monitor Sheet by the process operator. The effluent flow is also recorded daily on the Auke Bay Wastewater Treatment Plant Data Sheet.

References:

- Quality Control Equipment Company manual November 16, 2012
- Isco flow meter hand book
- EPA NPDES Compliance Sampling Manual-1977

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#	L 403	*Standard Operating Procedure* **Collection of Auto Composite Samples at MWWTF**	*Created by:*	K. Sewell
Date of last modification:	10/1/2015		*Approved by:*	Cmaines

1. PURPOSE AND SCOPE:

This procedure applies to the routine collection of automated flow proportioned composite samples for the plant influent, Influent Pump Station (IPS) and effluent at the Mendenhall Treatment Plant.

The influent and effluent composite samples are required by permit twice per month however samples are collected 5 times a week. The IPS compositor was put into service on 8/6/2014 and is being used to determine loadings into the plant. The IPS is not a permitted sample but is sampled to determine loadings prior to treatment and any process sidestreams.

2. PREPARATION AND PRECAUTIONS:

For each sample to be collected the sampling technician will need a clean 1L cubitainer found in the Lab, on the 2nd shelf to the Right of the titration station and a clean 2.5 gallon carboy found in the lab on the counter to the right of the FOG testing area.

Personal protective equipment requirements include; gloves, safety glasses

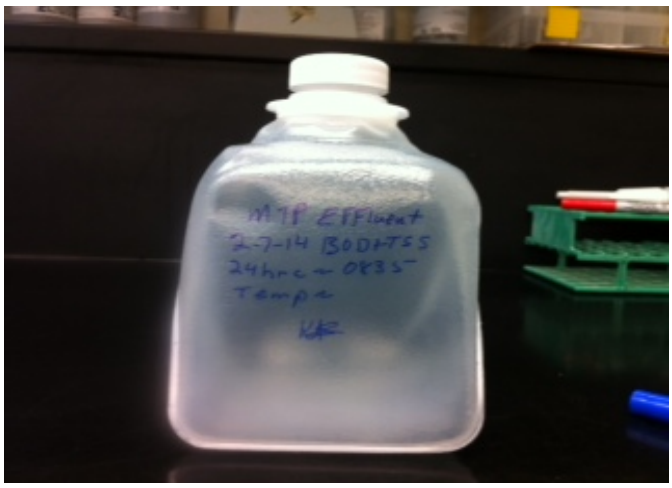
Instrumentation includes a Fluke infrared thermometer to take a temperature reading of each composite sample during collection.

3. PROCEDURE SETUP:

a. The samplers operate 24 hours / day starting at 8:30 am. The compositors should not be turned on before 0830 so resulting samples can be delivered to Admiralty during normal business hours.

b. The sampling technician will need to label/record the following information on the each of the compositor cubitainers:

   1) Sample Location (i.e. MTP Effluent)
   2) Parameters to be analysed (i.e. BOD, TSS)
   3) Time collected
   4) Date collected
   5) Temperature °C
   6) Operators initials.



NOTE: A Chain of Custody (COC) will be required for taking permit samples to Admiralty. Please refer to the COS SOP.

SOP#	L 403	*Standard Operating Procedure* **Collection of Auto Composite Samples at MWWTF**	*Created by:*	K. Sewell
Date of last modification:	10/1/2015		*Approved by:*	Cmaines

4. PROCEDURE:

EFFLUENT COMPOSITE SAMPLE COLLECTION

a. At the end of the 24hr sampling period (+ or - 2hrs), take a clean pre-labelled carboy to the effluent compositor. Open sampler and record the temperature on the sampler thermometer. Target is 4°C, acceptable range 2°C to 6°C. Remove sample and replace with empty carboy.

b. The target sample amount is between 1/3 and 2/3 full of the carboy. If the volume is outside that range, check condition of peristaltic tubing and manually command the sampler to draw an aliquot. The sampler is set to pull a 30mLsample. If the amount is set for 30mLs, make adjustments on the SCADA computer in control room to increase or decrease the volume to achieve a 30 mL sample. If the draw continues to be less than 30 mLs, the peristaltic tubing may need to be replaced due being plugged. If the compositor tubing is visibly fouled, replace tubing. Specialized silicone tubing is in the cabinet in the UV room.

c. If the sampler will not be in used the following day, pull the tubing from the automatic level control channel (ALC) and stop the sampler program by pressing ***CHANGE/HALT*** on the keypad, then enter ***9000***, then press ***YES***. The screen will then read "program halted." Do not turn sampler off.

d. To re-initiate automatic composite sampling, place the sampling tube into the ALC then press ***RESUME PROGRAM*** on sampler keypad. *NOTE: The programs are stopped on Fridays by the lab operator and restarted on Sundays by the on call operator.*

e. Take the sample to the lab. Tighten lid and invert the carboy three times. Take a temp of the sample in the carboy using Fluke IR thermometer, and record the temperature directly on the cubitainer. Invert to mix again then fill the cubitainer, pouring from the carboy.

f. Label with sample location (MTP Effluent), parameters to be analysed, such as BOD and TSS, time, date, and operator's initials. See the Permit Sampling SOP for further details.

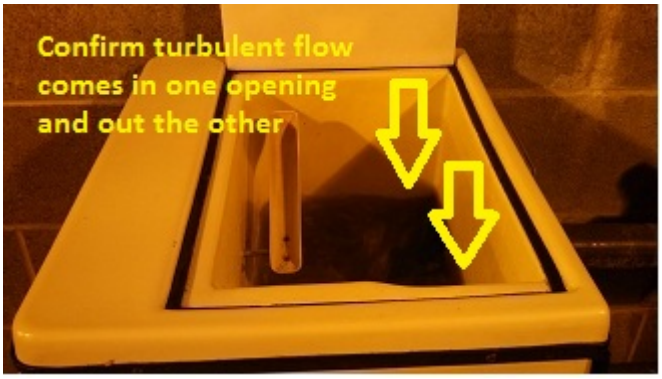
g. Fill out the Mendenhall COC form and record all information prompted by the Mendenhall pH, temp, and D.O. and Compositor daily log bench sheet.

h. Store the sample in the Lab refrigerator and resume collection of the Influent composite sample.

SOP#	L 403	*Standard Operating Procedure* **Collection of Auto Composite Samples at MWWTF**	*Created by:*	K. Sewell
Date of last modification:	10/1/2015		*Approved by:*	Cmaines

INFLUENT COMPOSITE SAMPLE COLLECTION

a. The influent composite sampler is located in SBR 5-8 Basin Room next to the IPS doorway. This sample is a permit required sample.



b. It is important to collect these samples the at the same time five days a week during the sampling cycle. Begin sampling at 0830 on Sunday through 0830 Friday morning. This sampler runs continuously. When not collecting samples for analysis, place a bucket in the sampler and empty daily.

c. Lift the sampler lid and confirm there is a turbulent flow in the compositor sample basin.

d. Place a bucket in the compositor. Open the sample basin on top and brush the side walls to remove the scum. If the sample basin is empty, the sample line from the Teacup header is clogged and must be cleaned. A hose and “drain pig” are hanging behind the compositor for this purpose.

e. Sundays the compositor is started again. To resume automatic composite sampling, replace the bucket with clean carboy. Push ***“TEST”*** button on keypad and observe the sample dipper motion for proper operation. Press ***“RESET”*** on the sampler keypad. Sampling will resume

f. Note the level of the sample in the carboy. The target level in the sampling carboy should be 1/3 to 2/3 full. Adjustments can be made on the SCADA system to adjust the sampling volume.

g. Take the sample to the lab. Tighten lid and invert the carboy three times. Take a temperature of the sample in the carboy using Fluke IR thermometer, and record temperature on cubitainer. Invert to mix again then fill the cubitainer, pouring from the carboy.

h. Label with sample location (MTP Effluent), parameters to be analysed, such as BOD and TSS, time, date, and operator’s initials. See the Permit Sampling SOP for further details.

i. Fill out the Mendenhall COC form and record all information prompted by the pH, temp, D.O. compliance log bench sheet.

j. Store the sample in the Lab refrigerator and resume collection of the IPS composite sample.

INFLUENT PUMP STATION (IPS) COMPOSITE SAMPLE COLLECTION

a. The IPS sampler is located in a shed outside the North West corner of the IPS.

b. When collecting from the IPS compositor there two functions to look for. ***F1 Run*** puts the compositor into ***run mode***. "***F1-Stop"*** stops the 24 hour sampling operation. Use the ***up*** and ***down*** arrows to turn the light on the screen to be able to see whether the compositor is in sample pulling mode.

c. Take the sample from the sampler fridge and put in a clean carboy. Take the sample to het lab.

d. As with the other samples, label the cubitainer with location of sample, date, time and operator initials. Invert the carboy three times and pour into the cubitainer.

e. The IPS information is logged in a log book separate from the Influent and Effluent bench sheet.

f. After all three samples have been collected verify the COC information.

g. Place the sample carboys into a cooler and set an ice pack around the samples. Additionally, place "sample temperature blank" into the cooler. The sample temperature blank is a 250 mL polyethylene bottle containing only distilled water and is checked for temperature by the contract lab which prevents from opening and possibly contaminating the permit samples.

5. CONCLUSION:

a. Always check the COC for the correct time, date, number of bottles and parameters to be tested.. Make sure the bench sheet and log book match the COC and the sample bottles.

b. Consult with the laboratory technician to be sure all entries are acceptable**.**

SOP#	L 403	*Standard Operating Procedure* **Collection of Auto Composite Samples at MWWTF**	*Created by:*	K. Sewell
Date of last modification:	10/1/2015		*Approved by:*	Cmaines

6. REVISION LOG:

Revision Date	Revised Section(s) and Notes	Revised By
9/21/2015	SOP #, Added Revision Log, Approved	Cmaines
10/1/2015	Edited document. Sent to the Lab for review.	Cmaines
10/7/2015	4b, Inf. A., g conclusion	Ksewell
10/9/2015	Edits and Revisions; Sections 4 IPS Sample, 5 Conclusion	Cmaines

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#	L1	*Standard Operating Procedure* **Collection of Auto-Composite Samples at JDTP**	*Created by:*	K.Sewell
Date of last modification:	4/28/14		*JSA by:*	

1. PURPOSE and SCOPE

This procedure applies to the routine collection of automated flow proportioned composite samples of plant influent and plant effluent at the JD Treatment Plant that will be used for compliance reporting.

2. PREPARATION and PRECAUTIONS

For each sample to be collected, the sampling technician will need a clean 1L cubitainer found in the cabinet to the right of the DO/ pH station and a clean 10L carboy found on the counter to the left of the lab sink. Also assemble gloves, safety glasses, and Fluke infrared thermometer.

3. PROCEDURE for EFFLUENT SAMPLING

a. Compositor must not be started before 8:30 am so resulting sample can be delivered to the laboratory during their working hours. At the end of the 24hr sampling period (+ or - 2hrs), take a clean carboy to the effluent compositor. Open sampler and immediately note temperature on sampler thermometer. Target is 4°C, acceptable range 2°C to 6°C. Remove sample and replace with empty carboy.

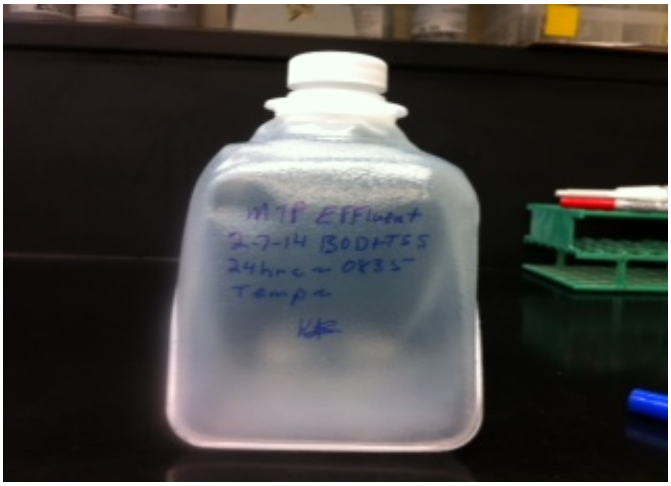
b. Note the level in the carboy. Target sample amount is between 1/3 and 2/3 full. If outside that range, check condition of peristaltic tubing and manually command the sampler to draw an aliquot by pressing CLEAR ENTRY, PUMP,*, PUMP,*, PUMP,*, then the sampler should pump a strong stream. If it does not, replace peristaltic tubing. If the compositor tubing is visibly fouled, replace tubing. Specialized silicone tubing is in the operator storage room, far wall, four shelves from the bottom.

c. If the sampler will not be in use the following day, pull the tubing from the guide pipe in the effluent chamber. Stop the sampler program by pressing HALT PROGRAM on the keypad, Do not turn the sampler off.

d. To re-initiate automatic composite sampling, place sampling tube into guide pipe in the effluent chamber press Resume Sample on sampler keypad.

e. Take the sample to the JD lab. Tighten lid and invert the carboy three times. Take a temp of the sample in the carboy using Fluke IR thermometer, and record temperature on cubitainer. Invert to mix again then fill the cubitainer, pouring from the carboy.

f. Label with sample location (JD Effluent), parameters to be analysed (such as BOD and TSS, time, date, Operator's initials.



g. Fill out the JD COC form and record all information prompted by the sticker or stamp in the bound JD sample LOG book.

h. Put the sample in the cooler with ice packs and temperature blank found in JD lab refrigerator.

i. Take cooler and COC to laboratory for analysis (Admiralty Environmental).

4. PROCEDURE for INFLUENT SAMPLING

a. At the end of the 24hr sampling period (+ or - 2hrs), take a clean carboy to the Influent compositor. Open sampler and immediately note temperature on sampler thermometer. Remove sample carboy; do not yet replace with clean carboy.

b. Note the level of sample in the carboy. Target sample amount is between 1/3 and 2/3 full. If outside that range, check condition of peristaltic tubing and manually command the sampler to draw an aliquot by pressing CLEAR ENTRY, PUMP,*, PUMP,*, PUMP,*, then the sampler should pump a strong stream. If it does not, replace peristaltic tubing. If the compositor tubing is visibly fouled, replace tubing. Specialized silicone tubing is in the operator storage room, far wall, four shelves from the bottom.

c. To re-initiate automatic composite sampling, place sampling tube into influent stream, press RESUME SAMPLE on sampler keypad.

d. Take the sample to the lab. Tighten lid and invert the carboy three times. Take a temp of the sample in the carboy using Fluke IR thermometer, and record

temperature on cubitainer. Invert to mix again then fill the cubitainer, pouring from the carboy.

e. Label with sample location (JD Influent), parameters to be analysed (such as BOD and TSS), time, date, and Operator's initials.

f. Fill out the JD COC form and record all information prompted by the sticker or stamp in the bound JD sample LOG book.

g. Put the sample in the cooler with other samples prepared for delivery, ice packs, and the temperature blank.

h. Take cooler and COC to laboratory for analysis (Admiralty Environmental).

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#	L 404	*Standard Operating Procedure* **MWWTP** **Fecal, pH, Temperature and D.O. Grab Sample**	*Created by:*	KSewell
Date of last modification:	10/9/2015		*Approved by:*	Cmaines

1. PURPOSE AND SCOPE:

a. Fecal samples are required per the MWWTF NPDES permit. MWWTF is required to sample two (2) times per week. Samples are collected on Monday's and Tuesdays each week just after the UV disinfection.

2. PREPARATION AND PRECUATIONS:

a. Items needed are: sterile Fecal Coliform (FC) bottle and clean latex gloves from the lab
b. The FC bottle is sterile. Be sure to leave the seal on the bottle until time to pull the sample.

3. PROCEDURE SETUP:

a. A FC bottle and BOD bottle for pH, temp and D.O.
b. Note the time on the SCADA system in the OPS office when the next decant will start and what basin it will be decanting from.
c. You will also need a 500 mL beaker to set a BOD bottle in. When you put the D.O. probe in the bottle the probe displaces the water and makes a bit of a mess.
d. You will also need a plastic bag to place the FC sample in to insure there is no cross contamination with other samples.

4. PROCEDURE:

a. Get a FC bottle from the lab and label it with the plant name, date, time and OP initials.
b. After the basin has decanted a few minutes to clear the standing water from the disinfection channel, put the bottle in the dipper and pull the sample to above the 100mL line.
c. When the sample is pulled, record the turbidity from the HACH turbidimeter located on the wall next to the discharge
d. After the sample has been pulled; pull a sample from the second sample pole to test for pH, temp and D.O. when you return to the lab.
e. Take the samples to the lab. Put the FC sample in the lab refrigerator until all the permit required samples have been pulled.
f. Fill out the Chain of Custody (COC) and note in the laboratory logbook; the time, basin number and turbidity when the sample was pulled and initial.
g. After COC has been completed, test the pH, temp and D.O. and record on the daily bench sheet what time the basin started and stopped decanting.

5. CONCLUSION:

a. The grab samples for pH, D.O. and temperature should not be tested more than 15 minutes after collection.
b. The FC sample has a 7 hour hold time.

6. REVISION LOG:

Revision Date	Revised Section(s) and Notes	Revised By
9/18/2015	All of it.	K.A.S.
10/9/2015	Reviewed, edited all sections and Approved	CMaines

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP #1		*Standard Operating Procedure*	*Created by:*	K. Sewell S. Blair
Date of last modification:	01/30/14	**JD Grab Samples SOP**	*JSA by:*	

1. PURPOSE and SCOPE

This procedure applies to collection of grab samples for compliance reporting at the JD Plant. These include Fecal Coliform, pH, temperature, and D.O.

2. PREPARATION and PRECAUTIONS

Items needed: Sterile Fecal Coliform sample bottles found in the JD lab in the cabinet below the SCADA computer, gloves, 500 mL plastic beaker, and Fluke IR thermometer. A sampling pole is in the U.V. room opposite the compositor.

3. PROCEDURE for EFFLUENT GRAB SAMPLING

a. Label a Fecal Coliform sample bottle from the JD lab with date, time, plant, and operator initials.

b. There is a sampling access port in the grating over the effluent chamber. Rinse the dipper three times in the stream. After the third rinse pull the sample and fill the Fecal Coliform sample bottle to the 100 mL line on the bottle.

c. Before sealing the bottle shoot the bottle for temp and record on the label.

d. Take another sample with the dipper from the effluent chamber and pour into 500 mL beaker.

e. Take samples to the JD plant lab. Analyze for pH, temperature, and D.O. immediately (place probes into beaker as soon as you set them on the bench. If analysis is not complete within fifteen minutes of taking the sample, discard and resample)

f. Fill out JD chain of custody (COC) for Fecal Coliform sample and place in cooler with other samples for delivery to Admiralty Environmental. Note that holding time is eight hours for Fecal Coliform; coordinate with Admiralty so that they are prepared to run the sample within that holding time.

CITY AND BOROUGH OFJUNEAU
WASTEWATER TREATMENT PLANTS

SOP#		*Standard Operating Procedure* **ABTP Grab Samples**	*Created by:*	C. Carlson D. Dodson
Date of last modification:	10/30/2014		*JSA by:*	

1. PURPOSE and SCOPE

This procedure applies to collection of grab samples for compliance reporting at the Auke Bay Treatment Plant. These include Fecal Coliform, Enterococci bacteria, pH, temperature, D.O., BOD and TSS.

2. PREPARATION and PRECAUTIONS

Items needed: Sterile Fecal Coliform sample bottle, 250 – 500 ml sample squats, gloves, 500 mL plastic beaker, Fluke IR thermometer and a clean sampling dipper.

3. PROCEDURE for EFFLUENT FECAL COLIFORM GRAB SAMPLING

a. Label a Fecal Coliform sample bottle from the lab with date, time, location, facility name, and operator initials.

b. Sample location is at the discharge end of the de-chlorination contact chamber.

c. Fill the fecal Coliform sample bottle to the 100 mL line on the bottle.

d. Before sealing the bottle shoot the bottle for temp and record on the label.

e. Fill out Auke Bay chain of custody (COC) for Fecal Coliform sample and place in cooler with other samples for delivery to the lab. Note that holding time is eight hours for Fecal Coliform; coordinate with lab so that they are prepared to run the sample within that holding time.

4. PROCEDURE for INFLUENT and EFFLUENT GRAB SAMPLING

a. Collect a sample with separate dippers from the influent or effluent stream, pour into 500 mL beaker

b. Take samples to the plant lab. Analyze for pH, temperature, D.O. and chlorine immediately (place probes into beaker as soon as you set them on the bench. If analysis is not complete within fifteen minutes of taking the sample, discard and resample).

c. For analysis of BOD, TSS, MLSS, etc., samples should be collected with a clean dipper at the prescribed sample locations. Pour into the lab-supplied container and label with date, time, location, facility name, and operator initials.

d. Ensure samples are properly preserved and logged on the COC prior to transport.

e. Record results in bound Auke Bay sample log book.

CITY & BOROUGH OF JUNEAU
ALASKA'S CAPITAL CITY

Mendenhall WWTP
2009 Radcliffe Road, Juneau, AK 99801
Tele: 1-907-586-0741
Fax: 1-907-789-1681

November 27, 2013
To: WWT personnel
From: Jim Westcott
RE: Standing directive/SOP for Laboratory Distilled Water Documentation and Purity Certification

Reference: Permit # AK-002295-1
Permit # AK-002321-3
Permit # AKG572000

Any distilled water purchased for laboratory use must be accompanied by the manufactures purity certification. Acceptance criteria for distilled water should also have a measured conductivity <1 umho/cm @ 25C.
Appropriate documentation containing the verification checks and purity certificates for each lot purchased must be maintained on site and available for inspection.

Regards,

Jim Westcott
Mendenhall Wastewater Treatment Plant Supervisor

CITY & BOROUGH OF JUNEAU
ALASKA'S CAPITAL CITY

Mendenhall WWTP
2009 Radcliffe Road, Juneau, AK 99801
Tele: 1-907-586-0741
Fax: 1-907-789-1681

November 27, 2013
To: WWT personnel
From: Jim Westcott
RE: Standing directive/SOP for expired Calibration & Quality Control Standards and Reagents

Reference: Permit # AK-002295-1
Permit # AK-002321-3
Permit # AKG572000

All expired calibration and quality control standards and reagents are to be disposed of immediately regardless of their intended use. Any reagents found to be expired are to be disposed of following applicable hazmat guidelines for safe disposal.

Regards,

Jim Westcott
Mendenhall Wastewater Treatment Plant Supervisor

Appendix E2

CBJ Laboratory Daily Instrument Records

DAILY INSTRUMENTATION RECORD

DATE	TIME	Refrigerator (4 +/- 2^{o}C)	Drying Oven (104 +/- 1^{o}C)	Muffle Furnace (550^{o}C)	Influent Sampler Target (4 +/- 2^{o}C)	Effluent Sampler Target (4 +/- 2^{o}C)	Operator's Initials	Note Any Adjustments

Appendix F1

Admiralty Environmental QAM

LABORATORY QUALITY ASSURANCE MANUAL

Admiralty Environmental

March 2015

Signature and Title Date

Prepared by:_____
Hope O'Neill, Laboratory Manager

Reviewed by:_____
Diana Cote, QA Manager

Approved by:_____
David Wetzel, President

Periodic Review:

Signature	Title	Date
_____	_____	_____

This document supersedes all previous versions under the same title.

TABLE OF CONTENTS

I. INTRODUCTION

This document outlines the quality assurance (QA) program that supports the analytical work performed by Admiralty Environmental. In addition to the chemistry parameters of Biochemical Oxygen Demand, Total Suspended Solids, Chemical Oxygen Demand, ammonia, Settleable Solids, Conductivity, anions by ion chromatography, pH, and residual chlorine, Admiralty Environmental performs microbiological analysis for fecal coliforms by the membrane filtration in drinking water for the SWTW, total and E-coli analysis by MMO-MUG chromogenic/fluorogenic techniques, enterococci analysis by MMO-MUG chromogenic/fluorogenic techniques, SimPlate analysis for HPC, and remote analysis of BOD, TSS, pH, residual chlorine, and fecal coliforms in wastewater.

The basis for this quality assurance manual is the EPA document, "Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and Procedures Quality Assurance," 5th Edition, January 2005. All the pertinent components outlined in the EPA manual are addressed in this document.

1.1 Quality Assurance Program

It is the policy of Admiralty Environmental that the QA Program will be used to assure that all data generated are of a known and documented quality. The QA Program covers all of the activities performed, supported, or required by Admiralty Environmental. The QA Program applies to all personnel working for Admiralty Environmental who supervise, perform, check, and review significant quality related activities in support of a project. The policies, responsibilities, and measures described in this Quality Assurance Manual have the support and endorsement of the President and are mandatory.

1.2 Ethics Policy

It is Admiralty Environmental's policy to use resources efficiently and effectively in providing analytical data of known quality and if necessary, legally defensible in support of the client's needs. Any data alteration or manipulation by any employee, for purposes of making the data appear other than the closest estimate of the value actually obtained, shall not be tolerated. Any supervisor, manager or other person within the laboratory who directs an employee to alter or manipulate data for purposes of making the data appear other than the closest estimate of the value actually obtained or knowingly allows such a practice to continue without correction shall not be tolerated. Such actions, if proved, shall result in immediate dismissal of the employee who performs or directs such alteration or manipulation. Any employee who unlawfully manufactures, distributes, dispenses, possesses, or uses a controlled substance in the workplace or during working hours is subject to disciplinary action up to and including immediate dismissal. This is in addition to any criminal action concerning the offense.

1.3 Major Equipment

Admiralty Environmental is equipped with a variety of equipment and instruments for the analysis of microbiological parameters. All of these items are portable and can be used for both laboratory-based analysis and remote field analysis. A list of equipment is shown in Table 1.1.

TABLE 1.1
LABORATORY EQUIPMENT

Manufacturer	Model #	Description
Acculab	L-series	Analytical balance
Oakton	WP pHTest 3+	pH probe (3)
Fisher	1003-3S	Glass Nitrogen filled thermometer-NIST referenced (2)
HB Instruments	43300-294	Spirit-filled NIST referenced thermometer
Precision	280 Series-single bay 5.5 L	Water-bath Incubator (2)
Precision	280 Series-single bay 19L	Water-bath Incubator (2)
Precision	280 Series-single bay 41L	Water-bath Incubator
Precision	525D	Air Incubator 35 C (2)
Hach	DRB 200	COD reactor block
Amscope	S/ST Series	Dissecting Microscope
Gast	DOA-P704-AA	Vacuum Pump (3)
Millipore	MicroFil	Vacuum filter holder (3)
Millipore	Direct Q3	Water Purification System
Orion	97-08	Dissolved Oxygen Probe (3)
Orion	420A+	Dissolved Oxygen Meter (6)
Orion	105A+	Conductivity Meter
Hach	HQ40-d	LDO Dissolved Oxygen Meter
Hach	Chlorine colorimeter II	Chlorine detector (2)
Hach	DR 890 Spectrometer	Multi-test spectrometer
Hach	DR 3900 Spectrophotometer	UV Spectrophotometer
Sanplatec	Auto C-3B	Auto Dessicator
Eppendorf	Various	Fixed volume pipets
IDEXX	2X	Quanti-tray sealer
Spectroline	CM10	UV Viewing cabinet and lamp
Market Forge	Sterilmatic STM-E	Autoclave
Dionex	ICS-1100	Ion Chromatograph

II. OVERALL CORPORATE STRUCTURE

Admiralty Environmental, LLC is an independent company with corporate headquarters located in Juneau, Alaska. It has been in business since 2005. Admiralty Environmental's clients include industrial and environmental clients, private industry, public water systems, private well and private property owners, and government agencies. Admiralty Environmental provides analytical laboratory analyses in support of the Safe Drinking Act, Clean Water Act, and other environmental regulatory activities directed by the Alaska Department of Environmental Conservation, the U.S. Environmental Protection Agency, the International Maritime Organization, and the United States Coast Guard.

III. QUALITY ASSURANCE MANAGEMENT STRUCTURE

3.1 Quality Assurance Management Concept

The Admiralty Environmental organizational structure designates responsibility assignments so that quality is achieved and maintained primarily by personnel assigned to perform the work. Admiralty Environmental management is responsible for the establishment and execution of the QA Program for all project work. The organizational structure and assignments are designed to promote quality achievement that is maintained by those who have been assigned the responsibility of performing the work, and is verified by persons or organizations not directly responsible for performing the work. It is the responsibility of laboratory manager to provide those individuals who are assigned the responsibility set forth in this QA Manual with the resources and authority necessary to perform the tasks. Admiralty Environmental has several existing mechanisms to support that activity such as internal QA procedures and defined SOPs.

3.2 Lines of Authority

The authority and responsibility for directing QA activities within Admiralty Environmental is delegated by the president to the laboratory manager and includes all areas covered by this QA/QC manual.

1) The laboratory manager will be the authority for all QA matters within Admiralty Environmental.

2) The administration of the QA Program is the responsibility of the QA manager within Admiralty Environmental.

3) Personnel will execute the QA Program requirements.

4) Analysts will be responsible for seeing that QA specific to their duties are carried out.

3.3 Project Flow and Management at Admiralty Environmental

A key component of quality assurance at Admiralty Environmental is the continuous monitoring of projects by the management personnel, either by the sales team prior to the project start or by the project management team after the project start. This is an integral part of the QA Program, designed to ensure that the project requirements are properly communicated to the analysts, and

that the analysts have a pathway to communicate with the client while maintaining their focus on the laboratory operation. The analysts are the most critical component of quality assurance, and their commitment to performing quality work must be supported by the company systems. This is the intent of the program monitoring process.

3.4 Identification of Client Data Quality Objectives

Quality assurance begins with the sales and customer service personnel. The customer service/sales team is responsible for assuring clarity between the client and the laboratory, including the following:

1) Methods required

2) Associated field and laboratory quality control (QAPP requirements, if appropriate)

3) Final data deliverables

4) Electronic Data Deliverables (EDD)

5) Bottle Order and Shipping Requirements

Sales and customer service personnel are also responsible for providing specific quality assurance assistance regarding project specifications, including the following:

1) Communication of any client-specific requests for changes to the normal protocols.

2) Obtaining appropriate technical review of the proposed work to assure that it meets the requirements under which the laboratory operates (i.e., Good Laboratory Practices, EPA regulatory requirements and technical validity).

3) Obtaining an agreement from the technicians and other technical staff that the client desired changes can, in fact, be performed.

4) Development of an estimated level of effort and reasonable cost/timeframe to implement the requested changes.

3.5 Project Management

Quality assurance responsibilities begin after samples are collected. Project management staff supervises the sample custodian and other personnel working in the sample receiving department. Responsibilities include the following:

1) The sample custodian assures that chain of custody procedures have been followed and that sample holding times have not been exceeded.

2) If sample integrity or holding time problems are observed by the sample custodian, then the sample custodian contacts the project manager who, in turn, contacts the client and obtains guidance for corrective actions.

3) Using the computerized functions of the laboratory sample tracking system, samples are tracked, and the chain of custody is maintained and documented.

4) The full login process is defined in the Sample Receiving SOP.

5) If problems arise that can potentially compromise data quality and that cannot be handled using routine procedures, then the project manager will contact the laboratory manager or the appropriate technical consultant for support in working with the client.

Once samples have been logged in, project management continues to have QA responsibilities. Some of the actions required are as follows:

1) Review the sample login data and the approved scope of work/regulatory permit requirements on file with the laboratory for that project.

2) Contact the client if there are any problems or discrepancies in order to resolve them and receive instruction.

3) Electronically transmit project information after approval to the appropriate laboratory technicians and analysts.

4) Organize project status information to make daily lists of project status in order to make good decisions in cooperation with production management and provide clear communication to the clients.

5) Report final Admiralty Environmental results to the client and maintain project records.

3.6 Production Management

The Laboratory Manager or designee is responsible for managing and tracking the step-by-step process of each project as samples make their way through the laboratory.
Responsibilities include:

1) Target the projects to be processed by the laboratory at the start of each workweek such that a schedule is maintained that is realistic and that allows appropriate planning to meet turnaround times and holding time requirements.

2) This “target list” is used by the lead technicians who manage the local daily schedules for each department.

3) Review fast-turnaround projects prior to acceptance and review them with appropriate technical personnel to ensure that they will succeed within normal laboratory operations.

4) When fast-turnaround projects are taken, insert them into the production stream so that individual technicians are notified of scheduling changes in a timely manner.

3.7 Technicians

Technicians are at the heart of the QA program, and without their active and proactive support, quality assurance cannot be maintained. To this end, only technicians who are fully trained in the quality control and methodology of their assigned tasks are allowed to handle samples without direct supervision. Technicians are responsible for the most critical QA tasks. Actions required of technicians include, but are not limited to, the following:

1) Perform the quality control as specified by each method and associated SOP.

2) Review all raw data and quality control to ensure that method requirements have been met.

3) Report problems that arise about data quality or integrity during analysis to the appropriate person(s). Normally, this would include both the Project Manager and the Laboratory Manager.

4) Communicate with the appropriate Project Manager if additional communication with the client is needed in order to resolve any Admiralty Environmental problems. The client is then contacted by the Project Manager to obtain further data or direction.

5) Review and correct quality control problems as appropriate when these are brought forward by other personnel involved in the review and reporting process. It is the responsibility of the analyst to review these issues technically and to discuss them. Any changes to the data that are needed due to errors, miscalculation, or other mistakes must be technically and ethically appropriate and are to be made by the technician(s). Other personnel may be involved in reaching the decision, but the technician must concur that the decision is appropriate. No changes may be made to data without the knowledge of the analyst(s). All such changes must be documented properly such that the chain of events leading to the change can be reconstructed easily, and the persons responsible identified.

6) Contact an appropriate manager, consultant, or other resource for assistance to resolve technical issues that are outside the daily routine. It is important to note that technicians are typically encouraged to attempt to solve these problems themselves or with available outside assistance (such as instrument maintenance companies, instrument suppliers, EPA resources, etc). But it is critical that the management be informed, that expenditures are authorized, and that technical decisions reached are reviewed by technical and management staff in addition to the technicians themselves.

7) Work with the data review team to ensure that data are reviewed per the Admiralty Environmental data review SOPs (see the SOP table below) and that any necessary corrective actions are taken.

3.8 Data Review Process

Because data review is so critical to the success of the laboratory and the QA Program, a brief review of the overall process is included here.

1) The detailed data review process is defined in Data Review SOP maintained in the laboratory, and there are also detailed requirements within each method SOP that are to be considered by the reviewer.

a. The first step in the process is the review of the data by the technician who generated it. This is done at the bench where the technician selects data proposed for reporting and adds comments and observations.
b. Data must then undergo a peer review by the technicians or by another qualified chemist assigned by the Laboratory Manager.
c. The detailed data review process is defined in the Data Review SOP maintained in the main office at Admiralty Environmental, and there are also detailed requirements within each method SOP that are to be considered by the reviewer.
d. If the data are acceptable, the reviewer signs off on the data and the final results are verified for release.
e. If there are problems with the data, the data are referred back to the originating analyst for discussion and corrective actions.

2) The Project Manager conducts a final review of the data by reviewing the raw data compiled by the laboratory technicians.

3) Once the Project Manager review is complete, the Project Manager completes the data review process in the following manner:

    a. Contact technicians for resolution of any outstanding quality issues. As pointed out in the Technicians Section of this manual, the Project Manager does not have the authority to make changes to the data if there appears to be errors. The technician is responsible for any such changes, and without agreement of the technician, no change by the Project Manager may be made. Resolution of some issues may require reanalysis, communication with the client to obtain instructions, or rejection of data if it does not meet a reasonable standard.
    b. Report the final results. This includes a case narrative that discusses any deviations from the procedures, any resolutions of data quality issues, and any communications with the client. Final result reports also include any hardcopy deliverables that are requested by the client as well as any electronic deliverables also requested by the client.
    c. Ensuring Admiralty Environmental's transparency. It is the Project Manager's responsibility to observe any potential blocks to the visibility and traceability for all issues associated with data generated in the laboratory or with problem resolution.

IV. ORGANIZATIONAL STRUCTURE AT ADMIRALTY ENVIROMENTAL

A diagram of the organizational structure is depicted in Figure 4.1.

4.1 President

The president is responsible for the overall management and financial oversight of the laboratory. The president oversees the policies of the laboratory and the commitment of the laboratory to its employees and to its clients.

4.2 Lab Manager/QA Manager

The laboratory manager is responsible for the overall guidance and leadership of the laboratory. The technicians and all auxiliary technical personnel report directly to the Laboratory Manager. The manager is responsible for ensuring that all personnel have demonstrated proficiency in their department, and all data that is reported meets the required quality assurance criteria and regulatory requirements. In addition, the Laboratory Manager will institute routine assessments of measurement systems for precision and accuracy. Other roles performed by the laboratory manager include:

1) Manage the performance of all work conducted in the laboratory to ensure that it is in conformance with the QA Program and SOPs.

2) Plan and schedule training to ensure that personnel are able to perform their tasks in accord with this QA Program and in a safe manner.

3) Schedule and report performance evaluation (PE) samples, ensuring that they are processed and reported by the normal procedures of the laboratory.

4) Schedule internal audits and assist in the process.

5) Manage logbooks, bench sheets, and other laboratory documentation to ensure all are compliant with the QA Program.

6) Manage daily routine quality control activities in the laboratory, such as temperature monitoring, thermometer calibration, sample log-in, etc.

7) Manage the approval of the technical content of all SOPs.

8) Serve as a primary point of contact for certification officers and other regulatory personnel.

9) Manage the maintenance of employee records, including training records.

10) Manage the review subsets of data (10%) to ensure that it is in control, properly reported, and properly documented.

4.3 Laboratory Technicians

Laboratory technicians are responsible for general laboratory tasks, sampling, wet chemistry, and, in some cases, microbiological analysis. Additionally, some laboratory technicians may work closely with the Laboratory Manager on day-to-day laboratory quality assurance. The tasks associated with each branch of the laboratory technician's job are included as follows:

1) General Laboratory Tasks
   a. Operate and perform routine maintenance of instrumentation and laboratory equipment.
   b. Maintain instrument and maintenance records and contact appropriate maintenance support services when needed.
   c. Prepare standards, samples, and dilutions as appropriate to successfully conduct Admiralty Environmental procedures.
   d. Review laboratory instrument and manual data against quality control/technical requirements and take proper corrective action when necessary.

e. Ensure that data is accurately entered into report spreadsheets.
f. Ensure that current practice and current SOPs match and that when practice is changed for any reason, appropriate management is notified and SOPs are brought up to date.
g. Provide comments, observations, and recommendations needed to properly report results to clients.
h. Remain familiar with Admiralty Environmental methods and ensure that the analyses are conducted in conformance with those methods.
i. Alert the Laboratory Manager of any unreconciled quality control issues that could compromise data.
j. Assist with resolving and correcting any client or regulator issues associated with the data generated by the laboratory.
k. Conduct work in conformance with the Ethics Agreement specified by the laboratory and signed by each individual.
l. Report any observations of poor practice or unethical behavior, either intended or unintended.
m. Assist with proper sample and laboratory waste disposal according to appropriate regulations.

2) Sampling
   a. Sampling personnel must have proper knowledge in sampling procedures, sample handling, chain of custody, field measurements, and sample transport.
   b. Samplers must be well-versed in all safety procedures.

3) Wet Chemistry
   a. Laboratory technicians performing wastewater and drinking water wet chemistry tests must be proficient in those procedures, including: biochemical oxygen demand (BOD_5), total suspended solids (TSS), settleable solids (SS), pH, conductivity, residual chlorine, chemical oxygen demand (COD), anions by ion chromatography and metals filtration.
   b. Technicians must also have knowledge of all quality control procedures for each wet chemistry test.
   c. Technicians who have proven proficient in wet chemistry are identified in Table 4.1.

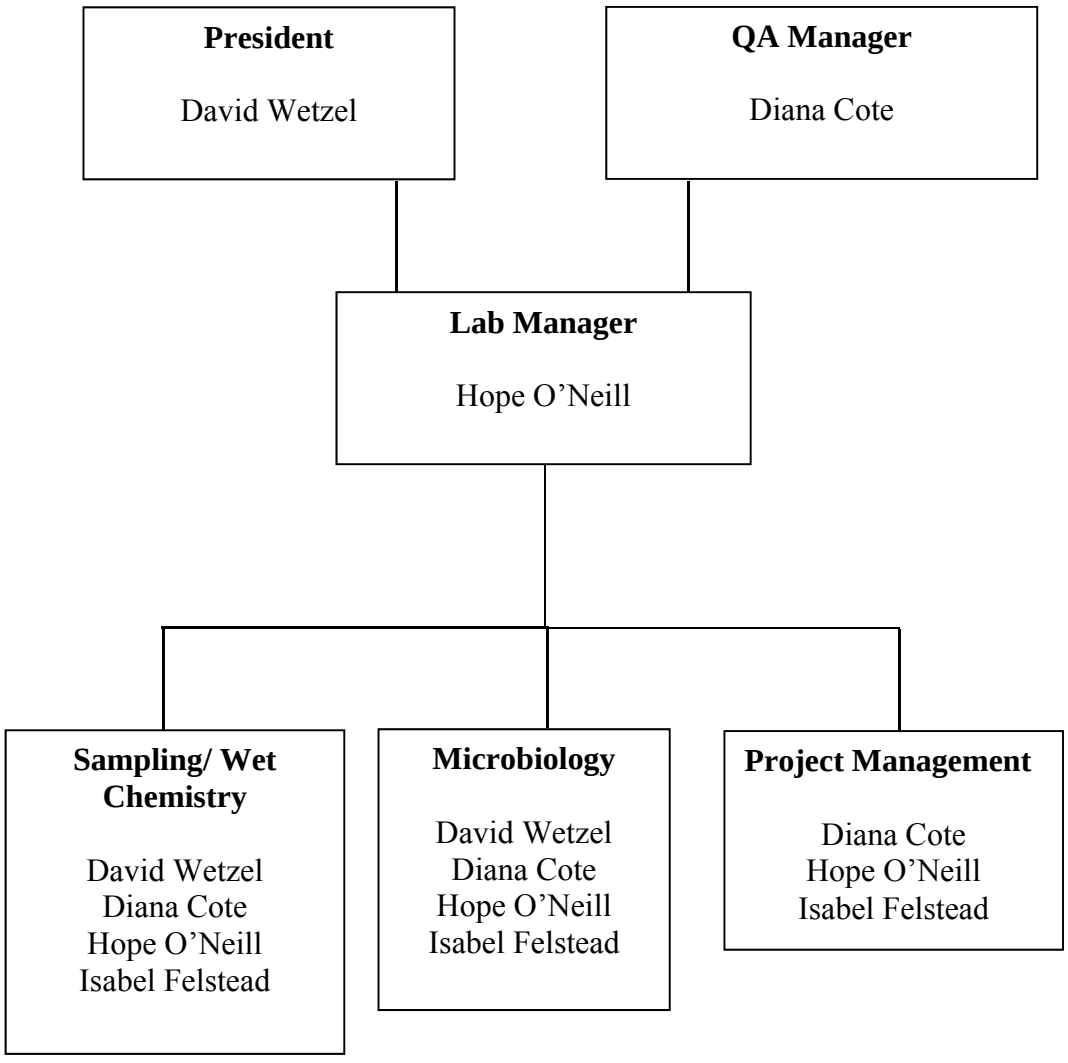
4) Microbiology
   a. Microbiologists will be responsible for performing the membrane filtration method to detect fecal coliforms in both drinking water and wastewater samples in both laboratory and mobile lab settings, as well as performing continuous testing on equipment and reagents to ensure accurate method performance.
   b. To prove proficiency in the above method, microbiologists will run ten performance samples including blank, positive, and negative controls. Only if these samples are correctly identified will an analyst be approved for laboratory testing.
   c. Technicians who have proven proficient in microbiology are identified in Table 4.1.
   d. Microbiologists analyzing samples for Alaska drinking water must have been supervised under a 30-day training program and approved by ADEC, and should complete the State of Alaska certification course for microbiology when such training is available.

5) Quality Assurance
   a. Gather QA/QC data as directed by the Laboratory Manager to support ongoing programs.
   b. Participate in the audit data review processes.
   c. Conduct or assist with internal audits if requested by the Laboratory Manager.
   d. Provide support for the Laboratory Manager in investigating client data issues.
   e. Review and report Performance Evaluation (PT) data, and assist the Laboratory Manager with the proper scheduling and analysis of PT samples.
   f. Assist with training programs as is appropriate.
   g. Summarize quality control observations and provides them to the Laboratory Manager.

Table 4.1 Personnel proving proficient in designated laboratory areas.

	DW Micro biology	WW Micro biology	WW Chemistry
David Wetzel	✔	✔	✔
Diana Cote		✔	✔
Hope O'Neill	✔	✔	✔
Izabel Felstead	✔	✔	✔

Admiralty Environmental
LABORATORY ORGANIZATION
March 2015
Figure 4.1



V. MEASUREMENT QUALITY OBJECTIVES

Measured Quality Objectives (MQOs) are a subset of Data Quality Objectives (DQOs). MQOs are derived from the monitoring project's DQOs. MQOs are designed to evaluate and control various phases (sampling, preparation, and analysis) of the measurement process to ensure that total measurement uncertainty is within the range prescribed by the project's DQOs. They define the acceptable quality of QA Program field and laboratory data for the project. MQOs are defined in terms of Precision, Bias, Representativeness, Detectability, Completeness, and Comparability.

5.1 Detectability

1) Detectability is the ability of the method to reliably measure a pollutant concentration above background. Two components can be used to define detectability: method detection limit (MDL) and practical quantification limit (PQL) or reporting limit (RL).

    a. The MDL is the minimum value which the instrument can discern above background but no certainty to the accuracy of the measured value. For field measurements the manufacturer's listed instrument detection limit can be used.
    b. The PQL or RL is the minimum value that can be reported with confidence (usually some multiple of the MDL).

2) Sample data measured below the MDL is reported as ND or non-detect. Sample data greater than the MDL but below the PQL or RL is reported as estimated data and must be flagged. Sample data measured above the PQL or RL is reported as reliable data unless otherwise qualified per the specific sample analysis.

5.2 Precision

1) Precision is the ability to replicate the measurement. It is expressed as Relative Percent Difference (RPD). Overall project acceptance criteria for precision are analyte, matrix, and method specific and are listed in the Measurement Quality Objectives table. RPD is normally determined by the results of blind sample duplicates/replicates of collected samples, field replicate measurements (for direct measurements made in the field), and the analysis of laboratory control standard or matrix spike duplicates in the laboratory. The calculation for RPD is:

$$\frac{\left(X_1 - X_2\right)}{\frac{\left(X_1 + X_2\right)}{2}} \times 100$$

and is expressed as a percent. X_1= first sample measurement and X_2= second sample measurement.

2) If calculated from three or more replicates, relative standard deviation (RSD) is used rather than the relative percent difference (RPD).

$$RSD = \left(\frac{S}{Y}\right) \times 100$$

Where,

RSD= relative standard deviation, S= standard deviation, and Y= mean of replicate analysis

Standard deviation, S, is defined as follows:

$$S = \sqrt{\frac{\sum_{i=1}^{N}\left(X_i - \overline{X}\right)^2}{N-1}}$$

Where,

S= standard deviation, X_i= measured value of the ith replicate, $\overline{X}$ = mean of replicate measurements, and N= number of replicates.

3) Laboratories also routinely assess precision of their measurements within a laboratory (matrix spike duplicates, lab split samples, laboratory-fortified blank duplicates, etc.). The frequency of laboratory precision measurements and their acceptance criteria are analyte and method specific. Minimum acceptance criteria limits are specified in the respective EPA approved measurement methods and in each laboratory's approved QA Manual. Calculations for laboratory precision are the same as above.

5.3 Bias (Accuracy)

1) Overall bias is assessed through measurements of sample spike and matrix spike duplicate recoveries. Bias is the closeness of the measurement to the true level of the variable. Bias is expresses as percent recovery (%R). Bias criteria for %R vary depending on the analyte and the method. %R is normally determined by the use of known traceable laboratory standards.

2) Laboratory bias is demonstrated through routine instrument calibrations, various types of QC checks (e.g., sample split measurements, sample spike recoveries, matrix spike duplicates, continuing calibration verification checks, internal standards, sample blank measurements (field and lab blanks) and use of certified external quality control samples (external standards), etc.). Bias is normally determined by the percent recovery of the target analyte in spiked samples/sample blanks and internal surrogate standards. Bias (percent recovery or %R) is calculated as follows:

$$\%R = \left(\frac{Analyzed\ Value}{True\ Value}\right) \times 100$$

3) Laboratory bias acceptance criteria limits must be within the respective EPA approved method criteria limits and as specified in the laboratory's QA Manual. Analyte-specific acceptance criteria limits vary dependent upon the measurement method. If requested, the laboratory will maintain on file with the relevant regulatory agency QA Officers a current QA Manual (including all appropriate method SOPs).

4) Field laboratory and data quality audits and third party performance evaluation (PE) samples are independent (external) means to assess measurement bias for the monitoring project.

5.4 Completeness

Completeness is a measure of how many planned measurements for each constituent actually resulted in valid reported data. It is expressed as a percentage of the total number of samples collected. Because of the variety of samples, and the possibility for weather or other shipping-related delays resulting in missed holding times, a completeness criterion of less than 100% is to be expected. The following equation is used to calculate completeness:

$$Completeness = \frac{T - (I + NC)}{T} \times 100$$

Where,

T= total number of expected measurements, I= number of invalid results, and
NC= number of results not produced (e.g., spilled sample, etc.)

5.5 Representativeness

Representativeness is a measure of how well the sample reflects the matrix being sampled. Sample representativeness will be established by collecting drinking water, graywater, blackwater, and other wastewater discharge samples following EPA sampling guidelines, using proper flushing, mixing, and sterility techniques.

5.6 Comparability

Comparability is a measure of confidence with which one data set can be compared to another. It is addressed in the QA Program by:

a. Following EPA standardized sampling and analytical methods.
b. Using similar sampling and analytical methods as followed in prior activities within a monitoring project.
c. Ensuring that appropriate reporting limits are used.
d. Obtaining data of known and acceptable quality through the use of specified quality control and quality assessment procedures.

VI. PROCESS USED TO IDENTIFY CLIENT'S DATA QUALITY OBJECTIVES

It will be a requirement of the client to provide the data quality needed for their report.

VII. SOPs WITH DATES OF LAST REVISION

SOP 1, Revision 4	Fecal Coliform Membrane Filtration Method	4/6/15
SOP 2, Revision 2.5	Instrument Calibration	7/1/09
SOP 3, Revision 5	SM 9223B Chromogenic/Fluorogenic Presence/Absence	6/27/12
SOP 4, Revision 5	Quanti-tray Most Probable Number	6/27/12
SOP 5, Revision 3	ASTM D6503-99 Chromogenic/Fluorogenic Pres/Absence	6/26/12
SOP 6, Revision 7	Biochemical Oxygen Demand	1/31/14
SOP 7 Revision 5	Total Suspended Solids	1/31/14
SOP 8 Revision 2	Settleable Solids	3/25/10

SOP 9 Revision 4 pH 7/2/13
SOP 10 Revision 1 Residual chlorine 3/25/10
SOP 11 Revision 4 Chemical Oxygen Demand 4/15/13
SOP 12 Revision 2 Ammonia 4/24/13
SOP 13 Revision 4 Metals Filtration 3/25/10
SOP 14 Revision 1 Health and Safety Procedures 3/25/10
SOP 15 Revision 1 Sample Receiving 8/2/13
SOP 16 Revision 2 Heterotrophic Plate Count 6/27/12
SOP 17 Revision 1 Nitrate by Ion Selective Electrode 1/14/11
SOP 18 Revision 1 Buffered Dilution Water Preparation 11/12/11
SOP 19 Revision 1 Sterile Dilution Water Preparation 11/12/11
SOP 20 Revision 1 Tryptic Soy Broth Preparation 11/12/11
SOP 21 Revision 1 Total Dissolved Solids 4/20/11
SOP 22 Revision 2 Anions by Ion Chromatography EPA 300.0 6/12/13
SOP 23 Revision 3 Conductivity 7/2/13
SOP 24 Revision 1 Determination of Method Detection Limit 12/12/12
SOP 25 Revision 1 Turbidity 6/17/13
SOP 26 Revision 1 Color 3/15/13
SOP 27 Revision 1 Dissolved Oxygen 3/24/13
SOP 28 Revision 1 Chemical Traceability 6/13/13
SOP 29 Revision 1 Ordering Lab Supplies 1/21/14
SOP 30 Revision 1 Off-season Cruise Ship Sampling: Scheduling and Reporting 1/15/14
SOP 31 Revision 1 Fecal coliform verification 3/31/14

VIII. HEALTH AND SAMPLE INTEGRITY

The recommended procedures to ensure that both sample integrity and individual's health is not compromised during sample analysis are outlined in the list that follows.

8.1 Health

1) Wash hands prior to and following testing.

2) Store all active bacterial cultures in a dedicated reagent refrigerator, marked "For Laboratory Use Only – No Food Items."

3) Wear gloves, protective eyewear, lab coat, and closed shoes in the laboratory at all times.

8.2 Sample Integrity

1) Germicide all working benches before and after testing.

2) Use aseptic technique throughout all testing procedures.

3) Dispose of all sealed Quanti-Tray and negative microbiology plates and tests as trash. All positive microbiology plates and tests must be sterilized with a 50% bleach solution. Following sterilization, plates may be disposed of a laboratory trash can with an opaque trash liner. Plates and other waste will be incinerated using onboard incinerators when operating in remote cruise locations.

4) Sample bottles for microbiology tests must be sterile. Acquire sterile bottles from a vendor and verify their sterility or autoclave all bottles before sending out for sampling.

5) Wear clean gloves and a laboratory coat during all microbiological analyses.

IX. FIELD SAMPLING PROCEDURES

1) Sampling frequency must conform to that specified by the regulations. The collector is to be trained in sampling procedures.

2) Samples must be representative of the potable water or wastewater distribution system. Maintain a steady water flow for at least two minutes to clear the service line before sampling. For microbiology samples, collect at least a 100 ml sample volume allowing ample air space to facilitate mixing of sample when shaking. Collect approximately one Liter of sample, in a one Liter cubtainer, for tests of BOD and TSS. If the client requests analysis of SS, a separate one Liter cubtainer of sample should also be collected. Immediately after collection, enter on the sample report form (the chain of custody) the sample site, location, sample type (e.g., routine, check), date and time of collection, free chlorine residual, collector's initials and any remarks.

3) Follow applicable chain of custody procedures as per section X.10.1 and XX.10 of this manual.

4) No sample will be analyzed after holding/travel time exceeds 8 hours for both source water and wastewater fecal coliforms unless approved by the ADEC. After 8 hours holding/travel time all samples will be rejected and noted in the sample receipt log. No total coliform drinking water samples will be analyzed after holding/travel time exceeds 30 hours, unless ADEC grants a 48-hour hold time waiver for some systems for drinking water and LT2 samples. Samples collected for the tests of BOD, TSS, and SS will be rejected if samples have not been received within 48 hours of sample collection. Samples that exceed their holding time will be rejected and noted in the sample rejection log.

X. LABORATORY SAMPLE RECEIPT AND HANDLING PROCEDURES

10.1 Sample Receipt

1) The following information must be labeled on the samples: date/time, source of sample, preservative used, analyses required, name of collectors.

2) If samples are shipped to the lab, either the samples or cooler must be sealed to prevent tampering. A temperature blank must accompany the samples and must record a temperature under 10° C, but above freezing, for microbiology samples unless lower temperatures are specified in project QA plans. Samples shipped for the tests of BOD, TSS, or SS should be kept at or below 6°C. Microbiology samples must have at least a volume of 100 ml, with one inch of headspace to allow for mixing.

3) Chains of custody must be filled out completely and must match the corresponding samples. The COC must include: sample receipt date/time, source of sample, preservative used, analyses required, and client information. The chain of custody must be relinquished by the client, must include the date and time, and a personnel of the lab must accept the samples.

10.2 Handling Procedures

1) If microbiology analysis cannot be initiated in less than one hour after collection time, then refrigerate samples in the sample refrigerator at a temperature of 1° - 4° C. If BOD, TSS, and SS sample analysis cannot be initiated within 2 hours of sample collection, samples should be refrigerated at a temperature between 1° - 4°C.

2) Microbiology samples must be kept in a designated refrigerator separate from, BOD/TSS samples, standards and highly contaminated samples. In remote settings, samples will be stored in a refrigerator temporarily designated as a microbiology sample refrigerator. This refrigerator will be sterilized thoroughly with isopropyl alcohol following the completion of all sampling and analyses. Samples and media will be stored on ice until the remote refrigerator reaches the required temperature of 1°- 4° C. BOD/TSS samples should also be refrigerated, but may be stored with standards and highly-contaminated samples.

3) All EPA and ADEC samples for fecal coliforms have a holding time of 8 hours from sample collection to the start of analysis. All ADEC drinking water samples have a holding time of 30 hours from sample collection to the start of analysis, unless a 48-hour hold time waiver is granted by ADEC. Samples will be analyzed on the same day they are received. If received too late for analysis during business hours, the sample will be refrigerated overnight and analyzed early the next morning.

10.3 Maintaining Sample Documentation

All pertinent sample information will be kept on a password-protected master worksheet, from sample receipt to disposal.

10.4 Sample Rejection

1) If sample temperatures are too low or too high (frozen or >10° C), holding time is exceeded, wrong preservation is used, or custody seals have been broken, the sample must be rejected. Drinking water samples received above 10°C can be analyzed if within two hours of collection.

2) If a sample is rejected, the client is informed immediately and resampling will be scheduled, if possible.

XI. INSTRUMENT CALIBRATION AND MONITORING PROCEDURES

This section describes the quality control procedures and documentation associated with each piece of equipment used during microbiological analysis at Admiralty Environmental. All written records shall be retained for a minimum of six years.

11.1 Temperature Monitoring Device

1) Calibration of in-use glass/mercury/IR thermometers should be checked quarterly at the in-use temperature against a NIST grade reference thermometer. The date and thermometer correction should be recorded in a quality control logbook as well as on the thermometer itself.

2) NIST thermometers should be sent out for re-calibration, correction, and certification every five years. A copy of this certification should be kept in Admiralty Environmental's main office in Juneau, AK.

3) Each water bath, incubator, and refrigerator is monitored using thermometers calibrated for correction with an NIST traceable thermometer. Temperature is recorded twice a day in the corresponding log book for each unit with applicable correction. Temperatures should be recorded at least four (4) hours apart.

4) IR thermometers will be checked daily against the NIST thermometer at ambient temperature. If the observed difference is greater than 0.5 °C, the IR thermometer will be recalibrated at the in-use temperature (ambient and iced).

11.2 Balance

1) Maintenance and calibration of the laboratory balance should be conducted, at minimum, annually. All service contracts and maintenance records should be kept in Admiralty Environmental's main office in Juneau, AK.

2) Internal calibration of the laboratory balance should be performed monthly. Three Class III reference weights ranging from 1.0g to 50.0g should be used for the internal calibration. The date of calibration and correction from each reference weight should be recorded in the quality control logbook.

3) NIST Class III weights should be sent away every five years for calibration, correction, and certification. All calibration, correction, and certification records should be kept in Admiralty Environmental's main office in Juneau, AK.

11.3 Incubation Units

1) All incubation units are equipped with adjustable, digitally-controlled temperature maintenance devices. For monitoring incubator accuracy, all air incubation units have separate NIST calibrated thermometers immersed in liquid placed on shelf in use. All of the water-bath incubators have separate NIST calibrated thermometers immersed in the water bath to monitor temperature accuracy.

2) Corrected temperatures should be recorded in a bound temperature logbook twice per day, at least 4 hours apart. If an incubator temperature is found to be out of proper range, corrective actions should be taken. A description of any unusual event and action taken to

correct it should be noted in the logbook. All entries must be initialed and include the time of the temperature readings.

3) Humidity should be maintained in air incubators by keeping a beaker of water in the air incubator at all times.

4) Load testing must be performed on all microbiological incubators to ensure that sample bottles reach proper incubation temperatures within method specific defined timeframes. These tests should be performed upon purchase/receipt of a new incubator, repeated annually, and recorded in a quality control logbook.

11.4 Refrigerator

1) Microbiology refrigerators must be maintained at a temperature between 1° – 4°C and contain a thermometer graduated in 0.2°C increments with its bulb immersed in liquid. Remote onboard ship refrigerators must also meet this requirement.

2) Temperatures for the microbiology refrigerator must be recorded twice per day in a bound logbook. Each temperature recording should be separated by at least 4 hours.

3) Appropriate records for refrigeration units used in remote settings should be maintained. Temperature should be monitored using portable thermometers graduated in 0.2°C increments with its bulb immersed in liquid, calibrated against the reference NIST thermometer. Temperatures must be recorded for days in use twice per day on a lab worksheet.

11.5 Inoculatory Equipment

Heat-sterilized nickel alloy inoculating loops should be used. The inoculating loops should be sterilized by passing the loop end through the flame from an alcohol lamp for several seconds.

11.6 UV Fluorescent Lamps

To ensure analysis with UV lamps is accurate, all bulbs should be wiped monthly with a clean, soft cloth moistened with alcohol.

11.7 Membrane Filtration (MF) Equipment

1) Sterile MF filter cup units are made from disposable plastic and are purchased from a manufacturer. If the inside surfaces of the plastic funnels appear scratched, or if they leak, they are to be discarded. Volumetric graduation marks on the funnels should be verified at 50 ml and 100 ml once per lot using a 100 ml class B graduated cylinder, certified To Deliver (TD).

2) A 14X stereoscope with florescent light source may be used to count colonies.

3) Membrane filters approved by the manufacturer for Total Coliform water analysis should be used. Approval is based on data from tests for toxicity, recovery, retention, and absence

of growth promoting substances. Filters are cellulose ester, white, grid marked 47-mm diameter, and 0.45-mm pore size. Membrane filters are pre-sterilized, and individually packaged.

4) The membrane filter lot number should be recorded on the laboratory worksheet whenever MF is used.

11.8 Culture Dishes

1) The lot number of the petri dishes used for MF must be recorded on the laboratory bench sheet each time they are used.

2) Open packs of disposable dishes should be resealed between each use period.

3) Membrane filters and petri dishes should be stored in a dedicated area to prevent contamination.

11.9 Sample Containers

Sample bottles are purchased from a manufacturer as either clear plastic with screw caps containing sodium thiosulfate powder or wide mouth plastic with a snap cap and locking strap containing a sodium thiosulfate tablet. Bottle capacity is usually 120 ml (4 oz) but can range up to 150 ml or 250 ml. The sodium thiosulfate has the ability to neutralize up to 15 mg/L of residual chlorine in a 100 ml sample. Samples with chlorine levels above 15 mg/L will be rejected upon receipt.

11.10 Glassware and Plastic-ware

1) Graduated cylinders for measurement of sample volumes must have a tolerance of ± 2.5% or less. These calibrations are performed annually and must be recorded in a quality control logbook.

2) All beakers must be verified upon purchase for accurate volume markings.

11.11 Pipettes

1) All pipettes must have legible markings, and be free of chipped or etched.

2) Open packs of disposable sterile pipettes should be resealed between each use period.

3) Accuracy of fixed volume pipettes must be checked annually using a balance and recorded in the quality control logbook.

4) Pipettes delivering volumes of 10 ml or less must be accurate to within a $\pm$2.5% tolerance. Those pipettes that do not have a tolerance of $\pm$2.5% should be discarded.

11.12 IDEXX Quanti-tray sealer

To ensure that the Quanti-tray sealer is working properly, a 100 ml sample with dye should be analyzed monthly. There should be no evidence of leaking between cells. A positive sample for Colisure® may be substituted for a dye sample. These results should be noted in a quality control logbook.

11.13 Reagent Water

Each lot of commercially prepared/purchased reagent water is analyzed by the manufacturer for heterotrophic plate counts (HPC), conductivity, and chlorine residual. Results of these tests, along with the date received, date opened, and expiration date, are stored in the QC book. HPC results must be <500 cfu/ml, conductivity <2 μmhos/cm, pH between 5.5 and 7.5, and chlorine residual < 0.1mg/l.

XII. GENERAL LABORATORY PRACTICES AND QUALITY CONTROL PROCEDURES

This section outlines the general quality control practices to ensure proper handling of materials used during microbiological analyses in both laboratory and remote settings.

12.1 Sample Containers

1) To confirm sterility, one sample container should be selected at random from each lot of sterile sample bottles. Approximately 25 ml of a sterile, non-selective broth (tryptic soy, trypticase soy, or tryptone) should be added to the sample container and checked for fluorescence immediately. The bottle should then be incubated at 35° $\pm$ 0.5°C for 48 hours. The sample bottle should be checked for bacterial growth after 24 and 48 hours. If bacterial growth is observed, the entire batch of bottles must be discarded. The results should be recorded in a quality control logbook.

2) Each lot of sample containers should also be checked for autofluorescence prior to use. One sample container, selected at random, should be checked for fluorescence when it is both empty and contains distilled water. The sample container should be placed under a UV light emitting a wavelength of 365 nm. If the bottle fluoresces, the entire lot of containers should be discarded. These results should be noted in a quality control logbook.

3) To ensure the manufacturer fill-line is accurate, one bottle selected at random from each lot of sample containers should be filled with 100 ml of distilled water to ensure the accuracy to $\pm$2.5%. A calibrated balance should be used for calibration of sample containers. If the tolerance of the sample container is greater than $\pm$2.5%, the entire lot of sample containers should be discarded. Results should be recorded in a quality control logbook.

12.2 Sterile Dilution Water

1) Sterile dilution water is prepared in the laboratory by autoclaving Type I water produced by the Millipore water purification unit.

2) Each lot of sterile dilution water must be checked for sterility following autoclaving. Approximately 50 ml of sterile dilution water should be added to 50 ml of double strength non-selective broth (either tryptic soy, trypticase soy, or tryptose) and then incubated at

35± 0.5C for 48 hours. The batch should be checked for bacterial growth after 24 and 48 hours. If bacterial growth is observed, the entire lot of sterile dilution water should be discarded. The results should be recorded in a QC logbook.

12.3 Buffered Dilution Water

1) Buffered dilution water is purchased commercially from the Hach Company (cat. no. 14305-98), and produced in the laboratory by the addition of phosphate buffer reagents to Type 1 water produced by the Millipore water purification unit. All documents demonstrating that the buffered dilution water is within the required chemical parameters (listed below) should be kept on record in Admiralty Environmental's main office.

2) Upon receipt or production, each lot of buffered dilution water should be checked for sterility. Approximately 50 ml of buffered dilution water should be added to 50 ml of double strength non-selective broth (either tryptic soy, trypticase soy, or tryptose) and then incubated at 35± 0.5C for 48 hours. The batch should be checked for bacterial growth after 24 and 48 hours. If bacterial growth is observed, the entire lot of buffered dilution water should be discarded. The results should be recorded in a QC logbook.

3) The parameter limits for dilution water are as follows:

Parameter	Limits	Frequency
Conductivity	>0.5□□/cm at 25°C	Monthly by SM120.1
Total Chlorine Residual	<0.1mg/L	Monthly by SM 4500CI-G
Heterotrophic plate count	<1000 CFU/mL	Monthly by SM 9215B
Pb, Cd, Cr, Cu, Ni, Zn	<0.05 mg/l each or <0.1 mg/l collectively	Annually
Quality of reagent water	Ratio 0.8 - 3.0	Annually

12.4 Media: Fecal Coliform

1) Media for the test of fecal coliforms (m-FC) is purchased commercially as m-FC with rosalic acid and is already prepared in a sterile, aqueous state ready for testing. m-FC is stored in a media storage refrigerator at a temperature between 1° - 5°C. For remote laboratory settings, this media is shipped to the embarkation destination in a cooler with gel ice to maintain this temperature and is then placed in a refrigerator until use.

2) Each new lot of m-FC must be tested for sterility using uninoculated media and viability using both positive and negative culture controls. Standard MF procedures should be followed. The positive culture control should see bacterial growth after 24 hours, whereas the negative culture control should not see any growth. If this trend is not observed, the entire lot of m-FC should be discarded. These results should be recorded in a quality control logbook.

3) If no fecal coliform-positive result occurs during a quarter, a procedure must be performed using a known fecal coliform, and/or an E.coli-positive control to spike the sample. Results should be recorded in a quality control logbook.

4) A table summarizing culture controls follows.

Control Cultures for Microbiological Tests

Group	Positive Culture Control	Negative Culture Control
Total coliforms	Escherichia coli Enterobacter aerogenes	Staphylococcus aureus Proteus vulgaris Pseudomonas aeruginosa
Fecal coliforms	Escherichia coli Klebsiella pneumoniae (Thermotolerant)	Enterobacter aeogenes

12.5 Media: Microbiology

1) Media for the tests of total coliform, e.coli, pseudomonas, and enterococci is purchased commercially as IDEXX Colilert®, Colisure®, Pseudalert®, and Enterolert®. Each new lot of dehydrated or commercially-prepared medium should be checked for sterility and viability prior to use. Dehydrated medium should be stored in the dark between 15° - 30°C. Media being shipped to remote laboratory settings need not be refrigerated.

2) To check each new lot of dehydrated or commercially-prepared medium for sterility or viability, both positive and negative culture controls should be used. Standard presence/absence procedures should be followed. These IDEXX media should show presence after 24 hours when a positive culture control is added as sample and show absence after 24 hours when a negative culture control is added. If this trend is observed, the media is considered acceptable for use. Results should be recorded in a quality control logbook.

3) Each lot of dehydrated medium should also be checked for fluorescence prior to use as some enzyme substrate medium has been known to fluoresce. A packet of media should be dissolved in 100 mL of sterile water in a non-fluorescing container. The container should be placed under a UV light emitting a wavelength of 365 nm. If the medium exhibits faint fluorescence, the entire lot of media should be discarded.

4) A table summarizing expected results for each media follows.

Colilert

Quanti-Cult Organism	ATCC #	Expected Results
Escherichia coli	25922 or 11775	yellow, fluorescent
Klebsiella pneumoniae	31488	yellow, not fluorescent
Pseudomonas aeruginosa	10145 or 27853	clear, not fluorescent

Colisure

Quanti-Cult Organism	ATCC #	Expected Results
Escherichia coli	25922 or 11775	magenta, fluorescent
Klebsiella pneumoniae	31488	magenta, not fluorescent
Pseudomonas aeruginosa	10145 or 27853	yellow, not fluorescent

Enterolert

Quanti-Cult Organism	ATCC #	Expected Results
Enterococcus faecium	25667	fluorescent
Serratia marcescens (gram -)	31488	no fluorescence
Aerococcus viridans (gram+)	10400	no fluorescence

12.6 Media: HPC

1) Media for the test of Heterotrophic Plate Count (HPC) is commercially purchased as Idexx SimPlate®. Each new lot of dehydrated or commercially prepared medium should be checked for sterility and viability prior to use. Dehydrated medium should be stored in the dark between 15° - 30°C. Media being shipped to remote laboratory settings need not be refrigerated.

2) To check each new lot of dehydrated or commercially-prepared medium for sterility or viability, a sterile blank should be used. Standard SimPlate® for HPC procedures should be followed. The IDEXX media should show no fluorescence after 48 hours when a sterile blank control is added as sample. If this trend is observed, the media is considered acceptable for use. Results should be recorded in a quality control logbook.

XIII. ANALYTICAL PROCEDURES FOR MICROBIOLOGICAL ANALYSIS

Approved analytical methodology (SM9222D, SM9223B, ASTM D6503-99) is contained in Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998 and the ASTM Test Manual of 2005. These methods are also stated in the Total Coliform Rule (40 CFR 141.21f) and the Surface Water Treatment Requirements (40 CFR 141.74a). Alternative methods must have EPA approval. This section outlines the method quality control procedures employed by Admiralty Environmental during each method of analysis. Specific methodology is detailed in standard operating procedures on file at Admiralty Environmental and ADEC. Whenever method specific SOPs are significantly changed, a copy shall be sent to ADEC for approval.

13.1 Membrane Filter (MF) Method

1) The first filter is a quality control/sterility check (blank). This filter should be aseptically transferred to disposable sterile funnel and rinsed twice with 20-30 mLs sterile buffered water. The filter should be placed grid side up on the appropriately labeled petri-plate containing m-FC. The entire run should be invalidated if the sterile control plate has any growth after incubation.

2) When two or more analysts are performing the MF procedure, a known fecal positive sample should be analyzed monthly and each analyst should count the colonies on the same membrane. The counts should agree within ±10%. This ensures that the analysts are capable of distinguishing fecal coliform colonies. Record this data in positive-sample quality control log.

3) A known fecal coliform positive sample (*e. coli*) will be analyzed during each onboard testing event to ensure that reliable results are produced.

13.2 Enzyme Substrate Methods

1) For each manufacturer lot of media, one quality control check should be performed by inoculating sterile water containing the medium with a MUG-positive E.coli or enterococci strain, a MUG-negative coliform or enterococcus, and a non-coliform or enterococcus, and analysis of both.

2) Check sterility of each manufacturer lot of sample bottles using non-selective media such as TSB. Record result in the sample container log.

3) Check for autofluorescence of each lot of sample bottles. Check for fluorescence of both the empty sample bottle, and the bottle filled with deionized water. Place bottle in UV viewing chamber and check for autofluorescence. Note results in bottle autofluorescence log.

4) Samples to be analyzed for presence/absence of microbiologicals must be pre-warmed in a 35.0° C water bath for no more than 20 minutes or in a 44.5° C water bath for no more than 7 to 10 minutes prior to mixing with media for incubation in order to bring the sample to incubation temperature. Samples that will be analyzed for the quantitation of microbiologicals do not require this step.

13.3 Proficiency Testing

Annually, microbiologists will run ten samples including blank, positive, and negative controls for drinking water presence/absence tests, and three samples including a blank, positive, and negative control for source water/wastewater tests. Only if these samples are correctly identified will the analyst be approved for laboratory testing. These samples can be commercially purchased and evaluated by a certified PE provider. Results are recorded in a quality control logbook.

XIV. ANALYTICAL PROCEDURES FOR BOD ANALYSIS

Approved analytical methodology (SM5210) is contained in Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. Alternative methods must have EPA approval. This section outlines the method quality control procedures employed by Admiralty Environmental during the method of analysis. Specific methodology is detailed in standard operating procedures on file at Admiralty Environmental and ADEC. Whenever method specific SOPs are significantly changed, a copy shall be sent to ADEC for approval.

14.1 Initial Dissolved Oxygen (DO)

Initial DO readings must be less than 9.0 mg/L for all sample and quality control bottles. If the initial DO reading is greater than 9.0 mg/L, the sample should be emptied into a clean, one Liter HDPE bottle and shaken vigorously for approximately 15 seconds. A new DO reading should then be taken. This process should be continued until the initial DO reading is less than 9.0 mg/L.

14.2 Control Blanks

1) Each BOD run should contain two sample bottles filled to the 300 ml mark with buffered dilution water.

2) Dilution water blanks should take up no more than 0.2 mg/L of DO over the course of the 5-day incubation period.

14.3 Seeded Dilution Water

1) Each BOD run should contain at least six dilutions of seed, two of which contain the volume of seed added to each sample bottle.

2) The average DO uptake of the seeded dilution water control bottles should be between 0.6 and 1.0 mg/L.

14.4 Glucose-Glutamic Acid (GGA)

1) Three quality control bottles should be added to each run. Four milliliters of seed should be added to a bottle containing buffered dilution water and six mL of glucose-glutamic acid.

2) The final BOD, in mg/L, for the GGA quality control bottles after the 5-day incubation period should be 198 ($\pm$ 50) mg/L. If the GGA quality control bottles fall outside of the acceptable range, the data must be flagged, or the entire BOD run may be discarded and the client must be contacted for a resample.

14.5 Sample DO uptake

Each sample bottle must uptake at least 2.0 mg/L of DO to be considered in the average final BOD value. If the sample shows less than 1.0 mg/L of DO remaining in the sample solution, the value from that sample bottle may not be used toward the final BOD average value.

XV. ANALYTICAL PROCEDURES FOR TSS ANALYSIS

Approved analytical methodology (EPA 160.2) is contained in EPA-600/4-79-020 and referenced in Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. Alternative methods must have EPA approval. This section outlines the method quality control procedures employed by Admiralty Environmental during the method of analysis. Specific methodology is detailed in standard operating procedures on file at Admiralty Environmental and ADEC. Whenever method specific SOPs are significantly changed, a copy shall be sent to ADEC for approval.

15.1 Lab Control Standard

1) A lab control standard (LCS) and a lab control standard duplicate must be analyzed at least every TSS run. An additional LCS and LCS duplicate should be added after every 20 samples if a single TSS run contains greater than 20 samples.

2) LCS standards should be made from Celite. Exactly 0.1000 g of Celite is added to one L of water to make a precisely 100 mg/L LCS standard. The LCS standard must be made at least monthly.

3) LCS standards should be recovered within $\pm$ 15% of its true value.

15.2 Control Blank

1) A blank should be analyzed every run or once every 20 samples. Exactly 250 mL of sterile dilution water should be used for the TSS control blank.

2) The blank should have a final weight of less than 2 mg/L, one-half the detection limit.

15.3 Sample Dilutions

Any samples that produce final TSS values greater than 200 mg/L should be diluted and reanalyzed.

15.4 Drying Time

1) To ensure that TSS filters have been dried thoroughly, one TSS filter should be chosen at random and redried and reweighed.

2) The redried and reweighed filter must not have changed in weight by more than 4% or 0.0005 g, whichever is less. If the filter weight does not meet this requirement, all filters must be placed back in the oven and redried for an additional hour.

XVI. ANALYTICAL PROCEDURES FOR ANION ANALYSIS BY ION CHROMATOGRAPHY

Approved methods for determination of eight inorganic anions – Fluoride, Chloride, Bromide, Nitrate-N, Nitrite-N, O-Phosphate-P, Sulfate, and Thiosulfate – in drinking water, surface water, mixed domestic and industrial wastewaters, groundwater, reagent water, leachates and solids (after extraction) are found in EPA method 300.0(A) and in Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998, method 4110. The following is an outline of the method quality control procedures employed by Admiralty Environmental for this method of analysis. Refer to SOP No. 22 for specific methodology.

16.1. Calibration

Calibration Standards are purchased as a custom certified solution. The standard dilutions are kept in HDPE bottles at ≤ 4ºC and are made weekly, except for O-Phosphate-P and Nitrate-N analyses, when standards are made daily. The calibration curve must be demonstrated initially and verified at least every working day, immediately after a new calibration sequence, and following every ten samples using a mid-level calibration standard injection (CCV). When these calibration curve verification injections produce percent recovery values outside of the 90-110% range, or when there is any significant change to the instrument, the system must be recalibrated.

16.2. Assessing Analytical Performance

1) **Laboratory Reagent Blanks:** One sample vial containing only reagent water must be analyzed first with every sequence. Blanks should be processed and analyzed with sample so as to assess potential contamination from the laboratory environment. Analyte concentrations found on the reagent blanks which are higher than the MDL (see section 12.4) indicate laboratory, instrument, or reagent contamination and corrective actions must be taken before continuing analysis.

2) **Laboratory Control Standard (LCS):** Solutions of known concentrations in reagent water, and of a source other than the calibration standards. Two LCS injections must be analyzed with each sequence, after the calibration standards (if any) and/or first calibration curve verification standards. If the percent recovery of an LCS analyte exceeds the 90-110% range, or the relative percent difference of any two LCS analytes exceeds the 20% range, that analyte is considered to be out of control limits and corrective actions must be taken before analysis can continue.

3) **Matrix Spikes (MS):** One in every twenty samples must be analyzed with two duplicates spiked with the LCS. A matrix spike should contain one part LCS and 4 parts sample, (3.75 mL sample spiked with 1.25mL LCS in a 5mL sample vial). The analyte concentration of the spike must be high enough to be detected above the original sample and should not be less than four times the MDL. The recovery limits for the MDL duplicates are 80-120%, with an RPD limit of 20%.

16.3. Data Quality Control

1) Before performing any analyses, the analyst should demonstrate the ability to generate acceptable accuracy and precision with this method, using a laboratory performance standard. This data is used to calculate singular-operator bias and precision, which must fall within acceptable control limits.

2) Method Detection Limit (MDL) must be established for all analytes, using seven or eight aliquots of calibration standard dilutions, which is two to three times the estimated instrument detection limit. To determine MDL values, take seven replicate aliquots of calibration standard (same dilution level) and process them through the entire analytical method. Perform all necessary data processing and report the concentration values in the appropriate units. MDL Studies should be replicated any time there is a major operational change to the instrument, and every six months. Additionally, each operator of the

instrument should perform an MDL study to determine singular operator precision and bias.

3) If the measured concentration of any analyte is outside of the calibration range, the sample must be diluted and reanalyzed.

4) On a quarterly basis, the calibration standards and acceptable instrument performance must be verified with the preparation and analysis of a quality control standard (QCS). If determined concentrations are not within ±10% of the stated values, performance of the determinative step of the method is unacceptable. The source of this deviation must be identified and corrected before continuing with ongoing analyses.

XVI. DATA VALIDATION, REPORTING AND VERIFICATION

16.1 Data Validation

For data to pass validation all quality control items referenced within this manual and method SOPs must be satisfied. All data reports will be reviewed by another qualified analyst for accuracy. This analyst will initial the report indicating that they have reviewed the data for accuracy and completeness.

16.2 Reporting Procedures

1) Initial data will be recorded on a worksheet in permanent blue pen. Data must include the sample identification, analytical method used, analysis date and time, and must be initialed by the analyst.

2) The data on the worksheet will go through validation process. This must be done by someone other than the initial analyst.

3) Once the data passes validation it will go to reporting status, and the calculated result from the worksheet will be entered into a document or spreadsheet.

4) The reported data will be verified by an analyst comparing the original worksheet(s) to the final report, and see if any errors are present. Once this is performed, the document will go to reporting status.

5) The final report will be converted to an adobe acrobat file, and will be sent to the appropriate client(s) and/or regulator(s).

16.3 Data Corrections

If at any point an error is found, the appropriate changes must be made on the original worksheet by the original analyst. This is done by drawing one line though the error such that the original entry is visible, and adding the correction. The analyst will initial the correction and record the date of the change.

XVII. SCHEDULE OF INTERNAL AND EXTERNAL SYSTEM AND DATA QUALITY AUDITS AND INTER LABORATIORY COMPARISON

17.1 Internal Data Audits

Internal audits will be held semi-annually for the year 2009, and annually thereafter. Audits will be based on the checklist contained in the 5th Edition of the Manual for the Certification of Laboratories Analyzing Drinking Water. Audits will be performed by the laboratory manager, who will provide a written report to the President and to the files. Proficiency testing will be performed annually per analyst, as well as a micro laboratory evaluation using EPA January 2005 guidelines.

17.2 External Data Audits

External audits will be held every two years following the initial internal data audit. The external audit will be managed by the State of Alaska.

XVIII. PREVENTIVE MAINTENANCE PROCEDURES AND SCHEDULES

18.1 Instrument manuals, schedules, and documentation of equipment maintenance

1) All pertinent information will be kept on file in the equipment folder in the main office in Juneau, AK.

2) A majority of the equipment in the laboratory has a spare or backup, allowing for continuous testing if there is equipment failure.

3) Any maintenance contracts in use will be kept on file in the main file cabinet in the central office.

XIX. CORRECTIVE ACTION CONTINGENCIES

19.1 Action Response to Laboratory Results

1) Project Managers will promptly notify ADEC and the client within 24 hours of unsatisfactory results on the basis of positive results on ONPG/MUG Media or results above 200 HPC/100ml for pool and spa testing. This will be the responsibility of the lab manager/QA manager. Immediate resampling should be scheduled.

2) Project Managers will promptly notify the proper authorities (ADEC, USCG) and the client within 24 hours of unsatisfactory results (>14 fc/100 ml) on fecal coliform by membrane filtration testing for cruise ship vessel effluents. This will be the responsibility of the lab manager/QA manager. Immediate resampling should be scheduled.

XX. RECORDS OF ANALYSES AND DATA REPORTING

The laboratory will keep records of all analyses for at least five years. Actual laboratory reports may be kept, or data may be kept, or data may be transferred to electronic password protected tabular summaries, provided that the following information is included:

1) Name of system (PWSID #, if available).
2) Sample identification (if any).
3) Sample site location.
4) Sample type (e.g., routine distribution sample, repeat sample, raw or process water, other special-purpose sample).
5) Date and time of collection.
6) Analysis required.
7) Disinfectant residual.
8) Name of sampler and organization (if not the water system).
9) Sampler's initials/signature.
10) Chain of custody record for transport of sample from the system to the laboratory, including airway bills or transit reference numbers.
11) Date and time of sample receipt by the laboratory and of carrier.
12) Name or initials of person receiving the sample.
13) Laboratory sample identification.
14) Date and time analysis begins.
15) Laboratory and person(s) responsible for performing analysis.
16) Analytical technique or method used.
17) All method-specific quality control information.
18) Results of analyses.
19) Case narrative, including any quality control exceptions.

XXI. REMOTE MOBILE LABORATORY ANALYSIS

Laboratory analysts may conduct remote field analyses for any of these tests only if all of the QC procedures in this manual and the individual analysis SOPs are met. All laboratory equipment is portable, and can be shipped to remote laboratory settings in Pelican shipping cases in order to protect the equipment. Special conditions for remote laboratory analysis that must be met are as follows:

1) Media must be purchased commercially or prepared and sterilized in advance, and shipped to the remote laboratory setting under the same storage conditions.

2) Laboratory incubators with a history of adequate temperature stability must be used to ensure data quality. These will be shipped to the remote laboratory setting using insulated Pelican shipping cases to prevent damage.

3) Existing onboard refrigeration units will be used for sample and media storage. These units will be designated for chemical use only during the duration of analysis, and will be thoroughly sterilized at the conclusion of all analytical work. Samples and media will be stored on ice until the refrigeration unit reaches the required temperature range of 1° to 4°C.

4) The laboratory area must include a sink and adequate counter space, and must be secured with a key available only to onboard laboratory personnel to ensure sample integrity during analysis.

Appendix F2

Microbac QAP

Effective Date: 4/11/2014

Appendixes updated 7/27/2015-DR

Quality Assurance Plan

Revision 9.3

Prepared by:

Microbac Laboratories, Inc.

250 West 84th Drive

Merrillville, IN 46410

219-769-8378

	4/6/2014
Managing Director	Date
	4/4/2014
Quality Assurance Director	Date

Copy No.:
Issued To:
Issue Date:

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CHANGES IN THIS REVISION

- Changed ~~Interim~~ Division Manager to **Division Manager** throughout.
- Changed ~~environmental~~ samples to **client samples** throughout.
- Section 2**:** This Quality Assurance Plan has been established to serve three purposes: (1) to define for our employees, the routine systems for sample **handling;** containers, sample collection and receipt, chain of custody, documentation, analytical procedures, data validation, data reduction, reporting, and archiving,… The requirements contained within this Plan in conjunction with our appropriate Standard Operating Procedures are applicable to all sections, operations, functions, and employees of **the Microbac Laboratories, Inc – Chicagoland Division composed of the** Merrillville, Indiana, facility ~~of Microbac Laboratories, Inc.~~ and its service center in Indianapolis, Indiana… Copies of this document shall not be forwarded to Government agencies, **clients** or other groups without the authorization of Microbac **Laboratories Managing Director or Quality Assurance Director.**
- **Section 3:** Every level of management, the laboratory staff, and project ~~scientists~~ **managers** are committed to the quality assurance (QA) program described in this Quality Assurance Plan and as such ensure that the appropriate facilities and resources are available before producing any analytical results… To produce **analytical** results that are technically sound and legally defensible **by following the current laboratory standard operating procedures and this quality plan.** ~~To analyze customer samples in accordance with laboratory standard operating procedures~~
- Section 4.1: To never intentionally make false statements to, or seek to otherwise deceive, Microbac employees, management ~~or~~, clients**, regulators or accreditation bodies**;
- Updated Section 6 Accreditations and Certifications to include **Indiana State Board of Animal Health for microbiological analysis of dairy containers (18137), New York State Department of Health [NELAP] (accreditation #49179 & #49386)**, and **Washington State Department of Ecology (lab #C992).** Copies of the certificates for our current accreditations, approvals, and certifications are posted in **the laboratory and on the Microbac Laboratories, Inc website www.microbac.com.** ~~and~~ **Certification** Section 7ion.1: **ions are** maintained by the QA department.
- Section 7.1: The 12,000 square foot lab facility was designed to optimize production flow, safety, and quality control ~~while at the same time~~ **to ensure valid analytical data** ~~not invalidate or adversely affect the test results~~. Environmental conditions are controlled with a series of HVAC systems. Each area of the lab is tuned to support proper air flow and filtration ~~in order~~ to ensure proper conditions for ~~the~~ computers and instruments ~~as to~~ **and to** maintain the

integrity needed to supply acceptable calibration and test data… The air-handling system for the laboratory was specifically designed **using an assortment of fume hoods** to **protect employees and** sensitive instruments from harmful vapors, to ~~ensure that samples are not~~ **prevent** cross-~~contaminated~~ **contamination**, and to maintain appropriate temperature criteria.

- Added to Section 7.2.5: **All LIMS files and folders are stored in the Microbac Private Cloud (MPC). These files and all databases in the MPC are backed up onto two separate storage devices nightly. Additionally, these files are replicated in real time to an off-site facility.**
- Updated Section 7.2.6: **Corporate Laboratory Information Technology Staff: Laboratory Information Technology staff is responsible for computer hardware and related software utilized throughout ~~the laboratory~~ Microbac. Each Division of Microbac has direct access to IT support by utilizing the IT Helpdesk Ticket System. ~~The IT Specialist reports directly to the Laboratory Director as well as the Corporate Information Technology Manager. Key responsibilities include, but are not limited to: improving the form and function of the LIMS, maintenance and backup of the LIMS and associated databases, implementation and verification of new hardware and software programs, and maintaining the functionality of the LIMS. Information Technology staff are responsible for maintaining systems that provide proper levels of quality assurance as well as maintaining the required quality control documentation. Activities of the Information Technology staff are subject to direct review and audit by the QA/QC Department. IT Specialist Minimum Requirements: A bachelor's degree (B.S./B.A.) in Computer Science preferred; or H.S. Diploma with related discipline and/or equivalent experience equal to at least 5 years of relevant experience.~~**
- Section 8.1: Acquired by Microbac Laboratories, Inc. in March 2004, the Merrillville facility located at 250 West 84th Drive; Merrillville, IN 46410 **and its service center located at 5713 West 85th Street. Indianapolis, IN 46278, are** part of a national chain of laboratories servicing the testing needs of a variety of industries.
- Section 8.2: Updated Management Team to include**: Patrick Goodpaster** ~~Mike Chenoweth~~, Field Services Manager and added **Andrew Clifton, Senior Project Manager**.
- Section 8.3: To assess the appropriateness of the overall quality system and to introduce continuous improvement, the management team performs a review of these systems using a multifaceted approach of **weekly**, monthly, quarterly, and annual reviews as described below. **An assessment of Microbac's quality system is perform by the Managing Director, Quality Assurance Director and Production Manager during weekly scheduled meetings.** Managerial

Review **of this assessment** conducted by select members of the management team is scheduled to be carried out during the first quarter of the calendar year… **Routine** meetings of the management team address business, marketing, **field work, project management**, and safety items, as well as the suitability of policies/procedures, pertinent reports from the Managers, internal and external audits, performance testing studies, corrective/preventive actions, changes in the volume and type of work, and client feedback and complaints.

- Section 10: This section is applicable to all documents and records produced by the laboratory. Documentation practices have been established for the following aspects of the laboratory operations: Sample Receipt and Login, Sample Handling and Storage, Reagent and Standard Preparation, Sample Preparation, Equipment Performance, Instrument Preventative Maintenance, Instrument Calibration and Analysis, Data Review, Reporting, **Archiving Records** and Access to Archived Records… **Logbooks** ~~A separate logbook~~ are maintained for each analytical procedure… Record storage provides a total minimum retention of **five** ~~seven~~ years, or longer if a contract **has a** specific requirement… SOPs are the property of Microbac Laboratories, Inc and may not be copied for any non-employee without the consent of the **Managing Director or** QA Director.
- Section 10.1: Expired standards **are** ~~should be~~ discarded **according to the Sample Disposal SOP** and ~~cannot~~ **are not** used for the generation of analytical data. Standards **are** ~~shall be~~ prepared using glassware and delivering devices of known and acceptable accuracy.
- Section 10.2: When corrections to a final report **are** ~~must be~~ made after the original submission to the client, the changes **are** ~~must be~~ performed in a fashion that preserves a **record of** the original **reported** result. **The revised report will indicate** the change, reason for the change, who made the change, and when it was made.
- Section 12.1: Lots that do not meet the acceptance criteria **will not** ~~cannot~~ be used for the collection of **client samples** ~~environmental samples~~.
- Section 13.0 Subcontracting: Analyses that cannot be performed at the Microbac Merrillville facility may be subcontracted to another **approved** laboratory. Whenever possible, subcontracted analyses will be performed at a laboratory within the Microbac network. Microbac will notify our client in **writing, typically via quote for services, facsimile, or e-mail** of our intent to subcontract any analyses and when appropriate, **gain the approval of the customer prior to commencing of testing**. For verbal quotes and request for service, notification will be verbal. ~~This notification to the customer will be in writing, typically via quote for services facsimile, or e-mail. For verbal quotes and requests for service, notification will be verbal.~~
- Section 14.0 Complaints: Typically, a Senior Project Manager, a Project Manager, **Quality Assurance Director** or the Managing Director will resolve external complaints. When a complaint or inquiry involves analytical data that

results in sample reanalysis, reanalysis is performed in duplicate ~~when holding time and~~ sample volume permit. If results of the reanalysis **statistically** agree with each other as well as to the original result, the original result is considered verified and reported.

- Section 16.0, Internal Audits: The purpose of **internal** auditing is to **verify that** the lab is **following Microbac's reference method based standard operating procedures**, ~~identify whether Microbac is generating scientifically sound and defensible data.~~ **Deficiencies from these audits are discussed with the analyst and entered into the laboratory's Corrective Action System according the Deviation/Corrective Action SOP**.
- Section 18.3; Special Testing: Requests for non-standard testing will be evaluated for compliance with Microbac's policies and procedures. **Deviations from Microbac's current procedures will be recorded using client specific work instructions**… Validation of the method is documented. Documentation includes validation data, **detection and quantitation limits**, applicability, precision, accuracy, estimation of uncertainty, quality control, and calibration procedures.
- Added heading for Section 19.1: **Demonstrations of Capability**.
- Updated Section 19.2; Detection **& Quantitation** Limits. ~~Prior to the unsupervised analysis of environmental samples, analysts performing a new procedure (i.e. new to the lab or to them) must successfully perform an Initial Demonstration of Capability (IDC) study. Capability studies are applicable only to those tests where a spike solution is available. The Linear Dynamic range must be established for each element at each wavelength measured by Inductively Coupled Plasma. A LDR study is the analysis of a minimum of three standards at concentrations that exceed the normal calibration range. The LDR is the concentration where recovery deviates by more than 10% of the true value. For each new procedure, annually thereafter, and whenever a substantial change occurs in the instrumentation or procedure, an Instrument Detection Limit (IDL) study must be performed for each trace metals procedure. An IDL study is the consecutive analysis of a minimum of seven blanks. The IDL is the minimum level at which the instrument, with 99% confidence, can detect the difference between noise and signal… Documentation of all IDC, LDR, IDL, MDL, and LOD studies are retained on file in the same fashion as all other lab records. Details on the procedures for performing these studies is included in the Capability and Detection Limit Studies SOP~~… The Limit of **Quantitation (LOQ) is the lowest concentration that produces a quantitative result within specified limits of precision and bias. The LOQ is set at the concentration of the lowest initial calibration standard.** In no case **will** ~~can~~ the PQL for a given procedure be set at a concentration below that of the lowest calibration standard.

- Section 20.1.1 Calibration: Unless stated otherwise in the appropriate SOP, the lowest standard in the calibration curve must be at or below the **reporting limit** ~~PQL~~ for that analyte.
- Section 20.1.11; Matrix Spike / Matrix Spike Duplicate (MS/MSD): Samples having an indigenous concentration greater than or equal to 4 times the spiked amount are considered not applicable for spike analysis at that level. Where the sample chosen for MS/MSD analysis is one of a group of samples submitted from a site with homogeneous character and the **client requires** that the sample is reprepared and analyzed **when acceptance criteria is not met,** all samples from that Sample Delivery Group should be reanalyzed under similar conditions. Where the sample chosen for duplicate analysis is one of a group of samples submitted from a site with homogeneous character and the **client** requires that the sample is reprepared and analyzed **when %RPD does not meet criteria,** all samples from that Sample Delivery Group should be reanalyzed under similar conditions. If the acceptance criteria are not met in two separately prepared analyses, the failure is considered matrix specific for that sample and the results yielding better **%RPD** ~~recovery~~ are reported with an appropriate qualifier.
- Section 20.1.7; Glassware and Sample Containers: One piece of cleaned glassware per washed and prepared lot is checked with bromothymol blue indicator to verify the absence of alkaline or acidic residues **according the Glassware Washing SOP**. ~~Prior to being sent to clients, one container from each lot of sterilized sample containers is verified to provide sufficient dechlorination. Unsatisfactory results require that all containers from that sterilized lot must be reprepared and retested prior to being made available to clients.~~
- Added Section 20.2.9 Quanti-Tray Sealer**: Effectiveness of the IDEXX Quanti-Tray sealer is checked monthly using the Dye Test according to the Microbiology Quality Control SOP. If dye is observed outside of the wells, maintenance is performed.**
- Section 21.1-Updated qualifier list
- Section 27.0 References; 18. AOAC International Guidelines for Laboratories Performing Microbiological and Chemical Analyses of Food and Pharmaceuticals. Gaithersburg, Maryland, **March 2010** ~~2006~~. 21. **DoD Quality System Manual Version 5.0, July 2013.**
- Updated Appendixes; A, B, C, D, E, & H.

1.0 TABLE OF CONTENTS

2.0 FOREWORD

This Quality Assurance Plan has been established to serve three purposes: (1) to define for our employees, the routine systems for sample handling; containers, sample collection and receipt, chain of custody, documentation, analytical procedures, data validation, data reduction, reporting, and archiving, (2) to define for our clients, the minimum contractual conditions under which we will handle their samples, and (3) to define for our clients and our employees the systems by which our laboratory manages the continuous improvement of our data quality through the use of our Quality Policy, Quality Objectives, Audit Findings, Analysis of Data, Corrective and Preventive Actions, and Management Review. The requirements contained within this Plan in conjunction with our appropriate Standard Operating Procedures are applicable to all sections, operations, functions, and employees of the Microbac Laboratories, Inc – Chicagoland Division composed of the Merrillville, Indiana, facility and its service center in Indianapolis, Indiana. Our quality systems are based on the requirements of the various accreditation, certification, and approval programs for which we provide analytical services as well as the requirements of the analytical methods we perform and regulations/statutes applicable to the testing programs. The more stringent requirement between method, regulation, and accreditation program is applied. When it is not clear as to which is the more stringent requirement, the requirement from the method takes precedent followed by the requirement from the regulation then followed by the accreditation requirement. Microbac Laboratories provides Training and Ethics programs geared to communicate Company policies and expectations. The goal of this training is prevention of improper actions. As part of our quality systems, internal audits are conducted to provide a mechanism for the detection of improper actions.

This Quality Assurance Plan is a controlled document. As a controlled document, each paper copy is numbered on the title page. Moreover, Microbac will document and retain a list of recipients of this document. A digital copy of the latest version of the Quality Assurance Plan is located on the network server, but can only be accessed by division personnel and cannot be duplicated. Upon major revision, Microbac Laboratories will assess the list of recipients and forward controlled copies of the new revision where appropriate. All Microbac Laboratories, Inc. – Chicagoland Division employees are notified of changes made in new revisions.

Due to constant changes in the environmental laboratory industry and the Microbac commitment to continuous improvement, revisions to this Plan will be made as necessary. Major revisions, such as a change in quality control procedures or implemented quality systems, will be designated as 6.0, 7.0, etc. Minor revisions, such as an update to the employee list or equipment list, will be designated as 6.1, 6.2, etc. Details of this process are included in the SOP Revision, Reporting and Tracking of the Quality Assurance Plan.

Clients may be supplied with copies of this document in support of a specific project. This document shall not be copied for purposes other than their immediate needs regarding the particular project. If a copy of this Plan is required for a new project or an update to a current project, one should be requested from the Microbac Chicagoland QA department to ensure inclusion of the latest revision. This Plan shall not be included in a client Quality Assurance Project Plan (QAPP) without authorization by Microbac Laboratories. Copies of this document shall not be forwarded to Government agencies, clients or other groups without the authorization of Microbac Laboratories Managing Director or Quality Assurance Director.

3.0 QUALITY POLICY STATEMENT

QUALITY POLICY

Microbac Laboratories, Inc. is dedicated to supplying our customers with high-quality, cost-effective analytical and value-added services. In support of this goal Microbac will:

Provide our clients with the highest standard of service and data quality in accordance with good professional and analytical practices, documented standard operating procedures, and compliance with all requirements of applicable state, national, and international certification programs.

Continually improve all aspects of our business, including our commitment to safety, the environment, data quality, service to our clients, and cost effectiveness.

Focus on client satisfaction through employee involvement, leadership, and personal responsibility.

This Quality Policy is fully endorsed by the members of the management team. This Quality Policy is communicated to, understood by, and implemented by all personnel.

3.1 Analyst Commitment to Quality

Every level of management, the laboratory staff, and project managers are committed to the quality assurance (QA) program described in this Quality Assurance Plan and as such ensure that the appropriate facilities and resources are available before producing any analytical results.

Each analyst must adhere to and follow these listed business standards and practices:

- To produce analytical results that are technically sound and legally defensible by following the current laboratory standard operating procedures and this quality plan.
- To present services in a confidential, honest, and forth-right manner
- To assert competency for all work by utilizing adequate equipment and personnel
- To understand and follow the ethical policies and quality systems provided by management
- To operate facilities in a manner that protects the environment and the health and safety of employees and the public
- To obey all pertinent federal, state, and local laws and regulations
- To continually improve product and services quality
- To deal openly, honestly, and fairly in all business matters with employees and clients
- To provide objective and impartial judgment or opinion regardless of external influence
- To apply the necessary quality control measures to ensure accuracy and precision
- To use good laboratory practices in the analysis of samples and handling of data

4.0 ETHICS

All employees of Microbac Laboratories, Inc. are expected to conduct themselves and the business of Microbac Laboratories, Inc. in a professional and ethical manner. Microbac employees shall avoid involvement in any activities that would diminish confidence in his or her competence, impartiality, judgment, or operational integrity. The success of this Quality Assurance Plan is based on the ethical behavior of all employees. Microbac Laboratories believes that any short-term gain as a result of unethical behavior is not worth the long-term consequence. All actions and decisions must have the highest regard for the intention as well as the letter of the requirement. Microbac is always willing to accept the rigors of doing what is right, thereby creating an atmosphere free from factors influencing the quality of our product. Various efforts are put forth to help ensure that employees are free from any commercial, financial, and other undue pressures that might adversely affect the quality of their work. The various efforts towards this goal include continued Ethics training, restricting contact between our clients and the analysts analyzing their samples, fair and appropriate financial restitution and treatment of our employees, and open-door policies to the top level of corporate management.

Microbac's Ethics Policy stresses that the integrity of our data must never be compromised. The Ethics and Data Integrity Program helps to ensure the integrity of our data to meet the quality needs of our clients. In order to ensure that employees are aware of the high standards of integrity that are expected of them as Microbac personnel, each employee is required to read and sign the Ethics Policy at the time of hire. This signed copy is retained in their training file. A copy of the Microbac Laboratories Ethics and Data Integrity Agreement is provided in Section 29.0. In addition, all employees are supplied with an annual Ethics training course.

4.1 Ethical & Data Integrity Standards

All employees' annually recommit to the following conditions:

- To neither intentionally nor improperly manipulate or falsify data in any manner, including sample and quality control data, financial data or personnel information;
- To never intentionally misrepresent ones work or another person's work;
- To never intentionally make false statements to, or seek to otherwise deceive, Microbac employees, management, clients, regulators or accreditation bodies;
- To never intentionally misrepresent through improper reporting any financial data, sampling events, inspections, measurements, standard results, data, test results or conclusions through acts of commission, omission, erasure, or destruction..
- To always use Microbac authorized methods and Standard Operating Procedures for work assigned;
- To always only report data that match the actual results observed or measured.
- To never modify results unless the modification can be technically justified through a process acceptable to Microbac, provided, however, that all such modifications shall be clearly and thoroughly documented in the appropriate record including initials or signature and date.

Compliance with the Ethics and Data Integrity Agreement is required and will be strictly enforced.

4.2 Unethical Actions

The following are examples of unethical behavior, which is not supported by Microbac Laboratories, Inc. This list is not all-inclusive.

- Making up of analytical data or any other sampling and analysis data. Examples of this are reporting a result without performing the procedure, or assigning a date/time of sample collection without knowledge of the actual collection information.
- Intentional falsification of analytical or sampling data. Examples of this are the intentional, inaccurate evaluation of control limits or changing the date/time of sample collection in order not to exceed the maximum allowable hold time.
- Improper calibration or verification. Examples of this are not performing the required calibration, not performing the calibration properly, improper tuning of the GC/MS, or not performing the required continuing verification quality control.
- Intentional deviation from the approved SOP.
- Misrepresentation of analytical data. Examples of this are using a sample size or final volume in the calculation when a different sample size or final volume was actually used in the analysis, or over-dilution or under-dilution of samples or standards. This also includes falsification of standards or reagent preparation data.
- Improper peak integration (i.e. peak shaving or peak enhancing).
- Misrepresentation of the nature of a sample. This is using a sample (QC or real world) as if it were digested/extracted when it actually was not.
- Improper use of the analytical conditions. Examples of this are improperly changing settings (oven temperature, flow rate, injection volume, etc.) to assist in recovery.
- Improper clock setting.
- Intentional deletion or disposal of non-compliant or questionable data.
- Intentional omission of a required data flag(s).
- File substitution. This is the renaming of a file for use in another data set or as another sample in the same data set.
- Unnecessary changes to computer software.
- Intentional misrepresentation of reported data. This includes the date/time of analysis, method performed, analyst, certification, etc.
- Misrepresentation of credentials, including education, training, employment history, etc.

4.3 Conflict of Interest

As part of their annual Ethics training, all staff members shall be trained to the requirements and intentions of our policy regarding Conflict of Interest with the goal of understanding how this policy helps ensure that all personnel are free from external pressures and influences that may adversely affect the quality of their work.

- No employee shall have any interest, financial or otherwise, direct or indirect or engage in any business transaction or professional activity or incur any obligation of any nature, which are in substantial conflict with the proper discharge of their duties.
- No employee shall accept other employment, which will impair their independence of judgment in the exercise of their duties for Microbac Laboratories, Inc.
- No employee shall use or attempt to use their position to secure unwarranted privileges or exemptions for themselves or others.
- No gifts (except those of nominal value) may be accepted or given with respect to customers, suppliers or officials. Acceptance of any gift of cash is prohibited.

5.0 CONFIDENTIALITY

Analytical results and all associated client or project information are treated as confidential. To help ensure that analytical data and correspondence are directed only to the individuals for whom the data/information was prepared, the pertinent contact information is obtained for all clients. Requests from other firms for copies of analytical reports or project information are honored only with the consent of the original client.

Electronic transfer of data from the Chicagoland Division via telefacsimile (fax) or electronic mail systems (e-mail) will be accompanied by the following statement: “This communication is for the exclusive and confidential use of the designated recipient, and any other distribution or use is unauthorized and strictly prohibited. If you are not the designated recipient, please notify the sender immediately then delete the message from your computer or destroy the facsimile.”

Personnel and business matters internal to Microbac Laboratories are also treated as confidential. Additional information and guidance are available in the Microbac Laboratories, Inc Team Manual.

6.0 ACCREDITATIONS AND CERTIFICATIONS

Microbac Laboratories, Inc. is dedicated to producing data of a known and high quality. This position is demonstrated through participation in numerous accreditation or certification programs. Microbac has earned the following accreditations, approvals and certifications:

- The American Association for Laboratory Accreditation [A2LA] for Biological Testing, ISO/IEC 17025 (Certificate# 3045.01)
- The American Association for Laboratory Accreditation [A2LA] for Environmental Department of Defense Testing, ISO/IEC 17025 (Certificate# 3045.02)
- Illinois Environmental Protection Agency for the chemical analysis of wastewater, solid waste, and drinking water in accordance with the requirements of the National Environmental Laboratory Accreditation Program [NELAP] (accreditation #200064)
- Illinois Department of Public Health for the microbiological analysis of drinking water (registry #1755266)
- Indiana State Board of Animal Health for microbiological analysis of dairy containers (18137)
- Indiana Department of Environmental Management approved support laboratory for solid waste and wastewater analyses (BAA-0203)
- Indiana State Department of Health for the chemical analysis of drinking water (lab #C-45-03)
- Indiana State Department of Health for the microbiological analysis of drinking water (lab #M-45-8)
- Kansas Department of Health and Environment for the analysis of drinking water, wastewater, and solid hazardous waste in accordance with the requirements of the National Environmental Laboratory Accreditation Program [NELAP] (Certificate No. E-10397)
- Kentucky Department of Environmental Protection for the analysis of samples applicable to the Kentucky Underground Storage Tank program (lab #75)
- North Carolina Department of the Environment and Natural Resources for the environmental analysis for NPDES effluent, surface water, groundwater, and pretreatment regulations (certificate #597)
- New York State Department of Health [NELAP] (accreditation #49179 & #49386)
- Pennsylvania Department of Environmental Protection (lab# 68-04863).
- Washington State Department of Ecology (lab #C992)

- Wisconsin Department of Natural Resources for the chemical analysis of wastewater and solid waste (lab #998036710)

The requirements of our systems and procedures as documented in this Quality Assurance Plan are structured as to meet the requirements of the above listed accreditation and certification programs.

Copies of the certificates for our current accreditations, approvals, and certifications are posted in the laboratory and on the Microbac Laboratories, Inc website www.microbac.com. Certifications are maintained by the QA department. Accurate statements regarding the scopes and statuses of our accreditations is required as part of our professional demeanor and interactions with our clients and the public. The above listed accreditations, approvals, and certifications verify that our quality and analytical systems meet the requirements of the applicable program and do not imply endorsement by the applicable accrediting authority or certifying body.

7.0 FACILITIES

7.1 Physical Facility

The Microbac Laboratories, Inc.- Chicagoland Division's laboratory is located at 250 West 84th Drive, Merrillville, Indiana, 46410. The 12,000 square foot lab facility was designed to optimize production flow, safety, and quality control to ensure valid analytical data. Environmental conditions are controlled with a series of HVAC systems. Each area of the lab is tuned to support proper air flow and filtration to ensure proper conditions for computers and instruments and to maintain the integrity needed to supply acceptable calibration and test data. Separate and adequate areas are provided for sample preparation, analysis, reagent storage, general storage and office areas. When selecting designated areas for special work, account shall be taken of the previous use of the area. A copy of the laboratory floor plan is included in Appendix A.

The air-handling system for the laboratory was specifically designed using an assortment of fume hoods to protect employees and sensitive instruments from harmful vapors, to prevent cross-contamination, and to maintain appropriate temperature criteria. In addition, sample preparation and instrumental analyses are performed in separate rooms, with particular attention to isolation of organic vapors from the analytical area. Good housekeeping measures are taken to ensure that the laboratory facility is maintained in a clean and orderly condition. These include, but are not limited to, returning samples to the storage areas when finished, wiping the counter tops clean after use, cleaning the surface of equipment as needed, and weekly janitorial service. When environmental conditions jeopardize the results of the test and/or calibrations, the client shall be promptly notified. All affected results shall be narrated on the final report.

When performing analytical procedures in the field, care is taken to provide adequate conditions for analytical testing. These steps include using laboratory pure water generated at the main lab, approved test kits, and quality control elements similar to those employed while performing an analytical procedure at the main facility.

Individual refrigerators and walk-in style coolers are available for the segregated storage of samples from standards and reagents to eliminate cross contamination between sample types. These storage areas allow for the storage of samples according to the conditions specified in the reference methods.

The Merrillville facility is a secured facility with restricted entry. The sample receiving entrance is staffed during normal business hours. All other entrances remain locked. Visitors, clients, and maintenance personnel requiring access beyond the sample receiving entrance are required to sign-in and sign-out of a visitor logbook that is maintained in the sample receiving area. All entrances to the facility are locked after normal working hours.

Designated employees are issued keys to the facility in order to permit after-hour entry. The Managing Director keeps documentation of the employee key distribution on file. Keys are returned to the Managing Director upon termination of employment.

7.2 Information Technology

7.2.1 Laboratory Information Management System

The Laboratory Information Management System (LIMS) is one feature of the facility that enables Microbac to provide the high level of service expected by our clients. The LIMS used by the Merrillville facility and the Indianapolis Service Center is a commercial software package that manages samples and analytical data. The main functions of the LIMS include an information database, automated sample tracking, data management, customized reports, quality control evaluation and documentation, and financial accounting capabilities.

The database capabilities of the LIMS provide for the collection of client information (including multiple contact names and locations) and analysis code parameters (including reference method, holding time, analyte name, reporting limit, and quality control specifications). The sample tracking capabilities of the LIMS provide up-to-the-minute analytical status tracking of each sample and its associated test results. The data management features allow for automated data entry and calculations. The reporting features of the LIMS allow Microbac to provide various formats of reports to our clients. These reports are detailed in section 25.3 of this document. Automated quality control evaluation provides the client with accurate assessment of the data. The financial accounting features of the LIMS allow accurate invoices

to be delivered to our clients and provide a means of tracking internal costs. These features allow Microbac to better serve our clients in a cost-effective manner.

7.2.2 Computer Security and Control

Access to the computer servers, as well as the Laboratory Information Management System, (LIMS) is approved, limited, and controlled through the use of separate and unique usernames and passwords. Entering a username and password into the LIMS is equivalent to entering a signature. The security system allows users to access and modify only that information approved by the QA department and the Managing Director. The SOP Creating and Managing LIMS Users details the steps in managing system users. In addition, access to the analytical instrument software programs is controlled through the use of unique usernames and passwords, where available.

Passwords are to be kept confidential. Laboratory staff is required to log off of the system when they have completed their task.

7.2.3 Equipment Protection

The file server system is protected by the use of an uninterruptable power supply (UPS), anti-static materials, and surge protectors. Virus protection software is employed on the file servers as well as those computers with access to company-provided e-mail.

7.2.4 Software Validation

All computer software used for data handling will be validated prior to use. Validation provided by the manufacturer is sufficient. Software validation will verify correct and accurate operation, processing, manipulation, calculations, recording, and reporting. For software programs or spreadsheet applications created in-house; the Information Technology staff or QA department performs this validation before the software is made available for use to the general staff. Internal software validation is documented and records retained. Refer to the Software Installation and Validation SOP for the details of this software validation and the documentation generated.

7.2.5 Data Backup

The network, which includes the database and system files, is backed up each day. This data is stored on a retrievable storage media. A series of external hard-drives are used in a three week rotation with the most recent drive not in use is stored off-site. Appropriate computer systems/software is retained as necessary for the retrieval of electronically stored records. Hard copy or write-protected copies of data are retained where data is generated by computers not connected to the network.

All LIMS files and folders are stored in the Microbac Private Cloud (MPC). These files and all databases in the MPC are backed up onto two separate storage devices nightly. Additionally, these files are replicated in real time to an off-site facility.

System backup is documented and records retained in accordance with the Performing Computer System Backups SOP.

7.2.6 Corporate Laboratory Information Technology Staff

Laboratory Information Technology staff is responsible for computer hardware and related software utilized throughout Microbac. Each Division of Microbac has direct access to IT support by utilizing the IT Helpdesk Ticket System.

8.0 ORGANIZATION CHART AND JOB RESPONSIBILITIES

8.1 Company Structure

Acquired by Microbac Laboratories, Inc. in March 2004, the Merrillville facility located at 250 West 84th Drive; Merrillville, IN 46410 and its service center located at 5713 West 85th Street. Indianapolis, IN 46278, are part of a national chain of laboratories servicing the testing needs of a variety of industries. Robert Crookston, the Managing Director, is responsible for all aspects of the facility operations and is supported by a team of department managers that report directly to him. Sufficient personnel are made available to ensure that the ratio of supervisory personnel to non-supervisory personnel provides adequate supervision for adherence to the requirements of this Quality Assurance Plan, Standards of Accreditation, and the Standard Operating Procedures of this laboratory.

8.2 Management Authority

The management staff has the authority and resources needed to carry out their duties including the implementation, maintenance, and improvement of the management system; to identify the occurrence of departures from the management system or from the procedures for performing tests and/or calibrations, and to initiate actions to prevent or minimize such departures. The management staff is responsible for the quality of the laboratory testing services, setting laboratory policies and procedures, obtaining the necessary financial resources, and resolving conflicts. These policies and procedures document the analytical and operational activities of the laboratory. The Quality Assurance Director is responsible for monitoring the QA policies and procedures as well as documenting the quality of data reported by the laboratory. The Managing Director, Production Manager, and Quality Assurance Director are responsible for ensuring that the Corporate Quality policies and procedures as well as those found in this document and in the accreditation standards are communicated to laboratory staff and are implemented and enforced within the Division. The management team is comprised of the following staff. If, at any time, these Managers are absent from the facility, they or the Managing Director will identify appropriate personnel to temporarily perform these duties.

- Robert Crookston, Managing Director
- Donna Ruokonen, Quality Assurance Director
- Troy Goehl, Production Manager
- Patrick Goodpaster, Field Services Manager

- Kevin Falvey, Business Development Director
- Karen Ziolkowski, Senior Project Manager
- Kristen Gehlbach; Senior Project Manager
- Andrew Clifton, Senior Project Manager

8.3 Managerial Review of the Quality Systems

To assess the appropriateness of the overall quality system and to introduce continuous improvement, the management team performs a review of these systems using a multifaceted approach of weekly, monthly, quarterly, and annual reviews as described below.

An assessment of Microbac's quality system is perform by the Managing Director, Quality Assurance Director and Production Manager during weekly scheduled meetings. Managerial Review of this assessment conducted by select members of the management team is scheduled to be carried out during the first quarter of the calendar year. Following the Internal Audits SOP, the review process will assess the continuing suitability of the quality system as well as testing and/or calibration activities to ensure they provide an effective means of ongoing improvement throughout the laboratory.

Annually and whenever deemed necessary, the Quality Assurance Plan will be reviewed by laboratory management in accordance with the requirements of the SOP Revision, Reproduction, and Tracking of the Quality Assurance Plan. The purpose of this review is to ensure the compliance to applicable accreditation requirements and to make additions or deletions for necessary changes or improvements. The department managers perform the annual review. Any staff member can perform additional reviews as needed. Documentation of these reviews is maintained in the QA office. Recommendations from these reviews will be assessed and, if appropriate, implemented.

Routine meetings of the management team address business, marketing, field work, project management, and safety items, as well as the suitability of policies/procedures, pertinent reports from the Managers, internal and external audits, performance testing studies, corrective/preventive actions, changes in the volume and type of work, and client feedback and complaints.

On a monthly basis, the QA Director submits a QA Report to Management. This report is submitted to the Managing Director and Corporate Quality Department and addresses various quality assurance and quality improvement topics identified by Corporate.

8.4 Organization Chart

The organizational structure of the Chicagoland Division is provided in Appendix B. A list of personnel, education, functions, and experience is included below.

8.5 Job Responsibilities

A general description of job responsibilities is provided below for the various administrative and analytical staff. In addition to the responsibilities listed below, all employees, regardless of task or department, are required to perform and are responsible for performing their tasks in accordance with the various quality systems described in this Quality Assurance Plan. Below are the minimum requirements used to ensure competence. With the exception of those serving as a Technical Director for NELAP related accreditation. The following minimum requirements serve as a general guideline for education and experience. Training, demonstrated skills, or alternative documented experiences may be substituted at the discretion of the Managing Director. Those individuals serving as a Technical Director pursuant to our NELAP accreditation must meet the requirements of TNI EL-V1-2009-5.2.6.1.

8.5.1 Managing Director (MD)

This person is a full-time employee of Microbac Laboratories, who has overall responsibility for laboratory activities. The Managing Director is Lead Technical Director of this laboratory and exercises day-to-day supervision of laboratory operations and reporting of results in accordance with all accreditation requirements including TNI and ISO/IEC 17025 standards. The IMD ensures the implementation of corporate policies, procedures, and standard operating procedures (SOPs) to sustain an effective level of quality assurance. Key responsibilities include, but are not limited to, planning, marketing, overall supervision of personnel, monitoring the performance of the QA/QC activities, and monitoring the validity of the analyses performed and the data generated. The IMD is responsible for ensuring that all non-laboratory employees have the appropriate education or training needed to perform their duties. The Managing Director must assist in determining the availability of the lab to accept new projects. This availability includes considerations of equipment, facilities, staff, experience, etc. Moreover, this person is responsible for designating the directors and deputies of the laboratory. If, at any time, the Managing Director is absent from the facility, the Production Manager will temporarily perform these duties.

Minimum Requirements: Bachelor's degree in chemical, environmental, biological, physical or engineering sciences with at least 24 college semester hours in chemistry and two year's experience in representative analyses; 10 years practical analytical experience including two years of business management experience. Promotion into this position is at the discretion of the Microbac Corporate office.

8.5.2 Production Manager

This person is a full-time employee of Microbac Laboratories who exercises actual day-to-day supervision of laboratory operations for all areas of analysis. Under limited supervision from the Managing Director; this person directs the production operations of the laboratory and is responsible for all facets of production/operations while ensuring an effective level of quality assurance. The Production Manager, in conjunction with the Quality Assurance Director and the Group Leaders, is responsible for ensuring that laboratory employees have the appropriate education or training needed to perform their duties. The Production Manager is also responsible for providing feedback to the Managing Director in regard to personnel, Capital expenditures, and vendor performance. If, at any time, the Production Manager is absent from the facility, the Managing Director will temporarily perform these duties. Accreditation requirements would be evaluated for necessary education and experience when seeking new accreditation or when appointing a new Production Manager.

Minimum requirements: Ph.D. in analytical chemistry, biology, or closely related science; or, M.S. in analytical chemistry, biology, or a closely related field, plus five years experience; or B.S. in analytical chemistry, biology, or closely related field plus 10 years of experience.

8.5.3 Quality Assurance (QA) Director

This person is the director of all QA/QC activities who reports directly to the Managing Director as well as the Corporate Quality department. The QA Director also has direct access to the President of Microbac Laboratories, Inc. The QA Director functions independently from laboratory operations and production. As a result, this person is able to evaluate data objectively and without influence from outside factors. This person must have documented training or experience in the QA/QC procedures used in the laboratory, knowledge of the analytical procedures for which data review is performed as well as knowledge of the accreditation programs applicable to the lab. The QA Director is the main focal point for quality improvement in the laboratory and is responsible for coordinating QA/QC procedures and the data review

procedures for the entire lab. The QA Director is responsible for laboratory accreditation and performance testing (PT) samples, monitoring the corrective action process, arranging and conducting internal audits, maintaining a base of approved subcontract laboratories, and the maintenance of the Quality Assurance Plan. The decisions of the QA Director concerning data quality and data validity are final and receive the complete support of the Managing Director. Other duties include, but are not limited to, the preparation of Standard Operating Procedures (SOPs), control chart management, maintenance of the training files, and the scheduling and review of method detection limit data. If, at any time, the QA Director is absent from the facility the Managing Director will temporarily perform these duties.

Minimum Requirements: Bachelor's degree in related field plus five years of practical analytical experience including one year of technical QA experience.

8.5.4 Quality Assurance (QA) Specialist

QA Specialist report directly to the QA Director and function independently from laboratory operations and production. QA Specialist responsibilities include, but are not limited to: assisting the QA Director with updating and maintaining the laboratory's quality systems and documenting control, training files, statistical limits, and control charting. QA Specialist's also are responsible for creating upper level data packages as defined in this quality manual and the Report Generation SOP.

Minimum requirements: B.A. or B.S. in chemistry, biology, or a closely related laboratory science discipline.

8.5.5 Business Development Manager

Working with the Managing Director, the Business Development Manager will generate new sources of revenue to support the operations of the laboratory and contribute to its organic growth. This person contributes to the growth of the Company through business development activities in accordance with the Company's Ethics and Data Integrity and Team Manual. This person interprets technical results to clients and communicates capabilities of the laboratory to current and potential clients. This person explores new market areas and evaluates the feasibility of potential new business through a variety of business development strategies.

8.5.6 Senior Project Managers

This person is a full-time employee of Microbac Laboratories who works under the limited supervision of the Managing Director to oversee all aspects of project operation and personnel. This person provides strong, positive leadership to project personnel, sets project standards, goals and objectives in accordance with those established by the company. This person effectively communicates company policies to project personnel and clients. This person is responsible for the operation of projects. This person manages the daily technical operations of the project, facilitates problem-solving meetings with customers and delegates work assignments to team members, as applicable.

Minimum Requirements for Senior Project Manager: Associate's degree in chemical, environmental, biological, or physical sciences or engineering plus three years of combined laboratory and /or customer service experience.

8.5.7 Project Managers

Project Managers are responsible for coordinating projects with the clients and the Production Manager. The individual Project Managers are under the direct supervision of the Managing Director. Project Managers are responsible for overseeing the specified project requirements starting with the initial client contact through the generation of the final report. In addition, Project Managers are responsible for ensuring that all sample acceptance criteria are verified and that samples are correctly logged into the LIMS. Project Managers also review project requests, verify completeness of results, and generate the final report for submission to the client. Project Managers are given the authority of report signatories. The Managing Director and QA Director may also sign reports. Project Managers are responsible for following the established quality systems as well as maintaining the required quality control documentation.

Minimum Requirements for Project Manager: Associate's degree in chemical, environmental, biological, or physical sciences or engineering plus three years of combined educational and/or laboratory experience.

8.5.8 Sample Custodian Staff

The Sample Custodian staff is responsible for login, shipping, and receiving samples report directly to the Production Manager. The responsibilities of these staff are to receive and prepare Bottle Order Requests from the Project Managers, send approved sample containers to the clients, receive and schedule sample pick up, receive samples, log the samples into the LIMS system, and organize samples in the storage areas. The Sample Custodian staff is responsible for following the established quality systems as well as maintaining the required quality control documentation.

Minimum Requirements: High School diploma plus in-house training.

8.5.9 Group Leader

Group Leaders are responsible for producing data that meet the requirements of the Standard Operating Procedures and this Quality Assurance Plan. Group Leaders have the oversight of sub-units within the laboratory and report directly to the Production Manager. Group Leaders must be familiar with the calibration and procedures, objective of the calibrations and procedures, and assessment of results for the sections of which they are responsible. In addition, Group Leaders have responsibility for the production management of the sub-unit. Group Leaders have the authority to not approve data that does not meet the quality assurance or quality control requirements, and are responsible for following the established quality systems as well as maintaining the required quality control documentation.

Minimum Requirements: Bachelor's degree in a related field plus three years of practical analytical experience in related area.

8.5.10 Scientist II

The responsibility of these staff is to produce data that meet the requirements of the Standard Operating Procedures and this Quality Assurance Plan. This staff is responsible for duties such as method development, troubleshooting, and staff training. This staff has the authority to not approve data that does not meet the quality assurance or quality control requirements. This staff is responsible for following the established quality systems as well as maintaining the required quality control documentation.

Minimum Requirements: Ph.D. + 3 years, M.S. + 8 years, or B.S. + 15 years in chemistry, microbiology, or a closely related field.

8.5.11 Analyst II

The responsibility of these staff is to produce data that meet the requirements of the Standard Operating Procedures and this Quality Assurance Plan. This staff may also be responsible for duties such as method development, troubleshooting, and staff training. This staff has the authority to not approve data that does not meet the quality assurance or quality control requirements. This staff is responsible for following the established quality systems as well as maintaining the required quality control documentation.

Minimum Requirements: M.S., B.A./B.S. + 5 years of relevant experience, or at least 15 years of relevant experience in chemistry, biology, or closely related field.Associate's degree in a related field plus two years of practical analytical experience in related area.

8.5.12 Analyst I

This staff is responsible for sample preparation and for producing data that meet the requirements of the Standard Operating Procedures and this Quality Assurance Plan. This staff has the authority to not approve data that does not meet the quality assurance or quality control requirements. Technicians are responsible for following the established quality systems as well as maintaining the required quality control documentation.

Minimum Requirements: Associate's degree in a related field plus two years of combined educational and/or laboratory experience.

Scientist II, Analyst II, and Analyst I personnel are the primary element in the implementation of effective quality control.

8.5.13 Field Services Manager

Working under limited supervision of the Managing Director, the Field Services Manager oversees all aspects of the Field Service operation and personnel. This person is responsible for the scheduling and training of field service staff. This person effectively communicates company policies to Field Service personnel, clients, and fellow managers. This person manages the Field Services Department to ensure the quality of work completed and reported meets or exceeds quality standards.

Minimum Requirements: Ph.D., M.S., or B.S. in chemistry, microbiology, or a closely related field.

8.5.14 Field Services Staff

Field services staff report directly to the Field Services Manager. These personnel are responsible for the pick-up and delivery of samples from various client sites, and the delivery of approved sample containers to these clients, as well as the collection of samples where designated.

In cases of sample collection, the field services staff collect samples, obtain field data, and submit samples to the lab in accordance with the Standard Operating Procedure for sample collection or other applicable client or site-specific plan. The Field staff is responsible for following the established quality systems as well as maintaining the required quality control documentation.

Minimum Requirements:

Field Technician I: High school diploma plus in-house training with supplemental training provided.

Field Technician II: B.A. or B.S. degree or high school diploma and/or equivalent or at least 3 years' relevant experience.

Field Technician III: B.A. or B.S. degree plus 5 years' relevant experience; or high school diploma and/or equivalent or at least 10 years' relevant experience.

8.5.15 Administrative Assistant

These staff members are responsible for routine office activities. These activities include, but are not limited to, reception, specialized report generation, submitting reports to the client, copying, filing, document generation, and invoicing. These staff members are responsible for following the established quality systems as well as maintaining the required quality control documentation.

Minimum Requirements: High school diploma plus in-house training.

9.0 QUALITY ASSURANCE / QUALITY CONTROL

9.1 General QA/QC Responsibilities

Quality Assurance (QA) refers to those activities whose purpose is to provide the producer or user of a product or service the assurance that it meets defined standards of quality with a stated level of confidence[1]. QA practices do not guarantee the quality of the data, per se, but create an environment where a certain level of quality of the data is anticipated.

Quality Control (QC) refers to those activities whose purpose is to control the quality of a product or service so that it meets the needs of users[1]. These activities include the quality control tests performed by the analysts.

Properly understood, quality assurance begins before the sample containers are sent to the client and continues after the data is archived. Most books and articles on the analysis of any sample type state that sample collection is the most important part of the analytical process. This aspect of the analytical process must be realized and appropriately executed through proper planning between the client and the lab. The goal of this quality assurance program is to create and maintain an unequivocal sample history to verify the sample receipt, validity of the analysis, and report of the analytical data.

The requirements in this Quality Assurance Plan apply to all samples received. In cases where samples are received for compliance to another contract specific Quality Assurance Project Plan (QAPjP), Microbac will handle, analyze, and report data in accordance with those program requirements. The requirements herein apply to all personnel within the organization that directly and indirectly generate analytical results.

It is the responsibility of each individual laboratory employee to learn and perform the appropriate procedures in his daily activities. This emphasizes that quality is *everyone's responsibility*, from the support staff to the analysts, and the administrative staff to the Managing Director. While management can delegate specific duties and authority to employees, this does not relieve them from their accountability for the function or actions of their designees. Personnel at all levels are responsible for identifying quality issues or potential quality issues and initiating corrective action to solve the problem and prevent reoccurrence.

10.0 DOCUMENT / RECORD CONTROL

This section is applicable to all documents and records produced by the laboratory. Documentation practices have been established for the following aspects of the laboratory operations: Sample Receipt and Login, Sample Handling and Storage, Reagent and Standard Preparation, Sample Preparation, Equipment Performance, Instrument Preventative Maintenance, Instrument Calibration and Analysis, Data Review, Reporting, Archiving Records and Access to Archived Records. General practices are listed below. Details of these practices can be found in the applicable sections of this Plan or the applicable standard operating procedure.

Analytical data includes, at a minimum, instrument identification, analyst initials, date and time of analysis, calibration data, Sample ID, and analyte concentrations and units. Computerized printouts must contain, at a minimum, laboratory name and method reference (when available from the instrument software), lab sample number reference, analyst identification, date and time of analysis, and analytical data. Traceability data for the standards and reagents used must also be documented with the analytical or preparation data. When retained in hard copy, these printouts are maintained chronologically in binders or file storage boxes designated for each individual instrument.

For analytical procedures that do not generate instrument printouts, all data entries and calculations are manually entered into analysis logbooks. Logbooks are maintained for each analytical procedure. The required information entered into these logbooks is the same as that required for the instrument printouts. Observations, data, and calculations shall be recorded at the time they are made and shall be identifiable to the specific task. These logbooks shall be dated and signed at the time the activity was performed and by the person performing the activity. All logbook entries shall be in chronological order. All entries shall be legible and recorded in indelible black or blue ink (other colors or pencils are not appropriate). Review documentation may be recorded in an indelible color. Unused portions of a logbook page shall be “Z’d” out (or similarly marked as unused) and initialed and dated. Entries continuing on the next page should be noted as such with “continued on next page”, or a similar statement, on the bottom of the page. Entries continuing on from the previous page should be similarly noted at the top of their page.

Each logbook for manual data entry shall be bound. The cover of the book shall include the laboratory name, unique name/purpose of the logbook, logbook number, as well as the “start date” and the “end date”. All pages of bound logbooks shall be sequentially numbered. Details on preparing logbooks are contained in the Logbook Generation SOP.

All lab records as well as a copy of the final report and supporting documentation are maintained on file in such a manner that facilitates retrieval. Hardcopy records are retained at the laboratory as space permits and when necessary, are moved to permanent archive storage. Record storage provides a total minimum retention of five years, or longer if a contract has a specific requirement. This long-term archive storage is provided at an off-site location. All lab records are safely stored, held secure and in confidence to the client. Record storage procedures protect against loss to fire, theft, environmental deterioration, vermin, and electronic erasure. Lab records include, but are not limited to, QAPjPs, project correspondence, sampling records (when received), chain-of-custody records, shipping documents, obsolete Standard Operating Procedures, calibration, analytical and quality control data, data exception reports, final data reports, and audit reports. All lab records are accessible to auditing agencies. Access to the archived records is documented through the use of an access log.

Document distribution is controlled through the Master Document List maintained by the Quality Assurance Department. All controlled documents are uniquely identified with a title, revision number, and date. Document distribution is processed as a controlled or uncontrolled status. Controlled status is defined as the continuous distribution of document updates. Uncontrolled status is defined as the single distribution of the document; document updates are not distributed to uncontrolled status holders. Controlled hardcopy documents will be identified by having “Controlled Copy” written in red ink. The QA Director maintains both original, historical, and archived copies of SOPs (as well as protected electronic files); internal and external audits, management reviews, as well as records of corrective and preventive actions. Uncontrolled copies of SOPs may be distributed to clients or external agencies for evaluation purposes upon request and at the QA Director’s discretion. These copies are sent with a receipt acknowledgment and are marked to indicate that the copy is uncontrolled and that the document is proprietary; the purpose for which the copy may be used, and that it may not be used for any other purpose without written permission from Microbac Laboratories, Inc. SOPs are the property of Microbac Laboratories, Inc and may not be copied for any non-employee without the consent of the Managing Director or QA Director. The details of the document control procedures are in the Document Control SOP.

10.1 Standards and Reagent Traceability

All standards and reagents must be tracked from their initial preparation through their use in the preparation and analytical batches. Standards purchased from an outside vendor are, where available, traceable to the International System of Units (SI) through a National Measurement Institute (NMI) such as the National Institute of Standards Technology (NIST). A Certificate of Analysis, or similar document of traceability, is retained. Purchased standards may be used at their prepared and labeled concentration without further verification. Where SI traceability is not available, satisfactory performance is evidenced by successful analysis of a known quality control sample or successful analysis of a blind performance sample, as available.

Standards preparation and reagent preparation logbooks are maintained throughout the laboratory. Each logbook must be labeled with the laboratory name, unique name/purpose of the logbook, logbook number, the start date, and the end date.

Each stock standard, subsequent dilution, and prepared reagent is given a unique tracking number. When preparing dilutions of a standard the following information is included in the standards log:

- standard number
- standard name
- preparation and expiration date
- initials of the preparer
- diluent
- tracking number, concentration, and amount used of stock standard
- final volume prepared
- final concentration

The absolute expiration date of a prepared standard is that date on which the stock solution expires. In mixes where there is more than one expiration date for the stock solutions, the earliest date is chosen as the expiration date for the entire mix. Each container is labeled with standard or reagent name, concentration, tracking number, and the expiration date. Containers too small for a label with the required information are labeled with a minimum of the logbook reference number and expiration date. Expired standards are discarded according to the Sample Disposal SOP and are not used for the generation of analytical data. Standards are prepared using glassware and delivering devices of known and acceptable accuracy.

Similar information is recorded for any prepared reagent. Reagents are of analytical reagent (AR) grade or better. The reagent purity is verified upon receipt and documented. Unless specified in the method, reagents are used until they are found to not produce the expected response. The labeling requirements for standards and reagents can be found in the SOP Labeling of Standards, Reagents, Extracts, and Digestates.

Appropriate storage areas are available for the segregation and storage of all major types of chemicals. These storage areas are properly labeled to assist the laboratory staff in determining the proper chemical storage location. It is the responsibility of the laboratory staff to be familiar with the storage requirements and classification of the various chemicals.

10.2 Error Correction

Corrections to data shall not obliterate the original record by measures such as erasures, overwritten files, or markings. This is applicable to all record forms (i.e. hardcopy and electronic). Proper error correction on hardcopy records is accomplished by drawing a single line through the error. Proper error correction in electronic files is accomplished by maintaining the original and the modified records. Corrections shall be dated and initialed by the person performing the activity, and shall identify the number of the appropriate error code of explanation. Appropriate error codes are:

1. Wrong Entry
2. Math Error
3. Footnoted Explanation

The use of WhiteOut® (or similar product) is strictly prohibited on laboratory data.

When corrections to a final report are made after the original submission to the client, the changes are performed in a fashion that preserves a record of the original reported result. The revised report will indicate the change, reason for the change, who made the change, and when it was made. This is accomplished through data revision in the LIMS and re-issuance of the report to the client. Typically, the Unit Supervisor, QA Director, or responsible analyst will make the change in the LIMS. The re-issued report is identified as “Revised” (or similar) and a memo identifying the reason for the change, the initials of the employee that made the change, and the date it was made is placed in the project file. An approved signatory must sign and submit the revised report. Clients are notified, through the submittal of the revised report, as soon as

possible of any event that casts doubt on the validity of results submitted in a final report. The details for producing amended reports can be found in the Report Generation SOP.

11.0 REVIEW OF REQUESTS, TENDERS, AND CONTRACTS

The Project Managers are responsible for assisting clients in the management of their sampling and analysis programs. The laboratory shall inform the customer when the method proposed by the customer is considered to be inappropriate or out of date.

11.1 Project Assessment

The Project Manager responsible for a given client can accept work that is of a routine nature for Microbac. Each Project Manager is aware of the laboratory capabilities and is permitted to use their discretion in accepting work. Projects having the potential to impact the routine workload or exceed the lab capacity are routed through the Production Manager and, if necessary, the Managing Director prior to acceptance or proposal. The Managing Director is ultimately responsible for assessing the availability of the lab to accept new projects.

11.2 Project Management

Proper setup and handling is essential for the success of a project. Once a client is assigned to a Project Manager, this person has the responsibility for the following:

- Informing the client of our Sample Acceptance Policy
- Obtaining project specific information regarding analytes, methods, reporting limits, quality control, and report requirements (QC forms, narratives, etc.)
- Ensuring that subcontracted work is placed with an approved; accredited subcontract laboratory or with a laboratory that meets applicable statutory and regulatory requirements for performing the tests
- Review of work that is subcontracted
- Arranging the delivery and receipt of sample containers as necessary
- Arranging for sample pick-up, if requested
- Informing appropriate Unit Supervisors of incoming workload
- Monitoring sample progress in the lab
- Report generation
- Project inquiries from the client

- Communicating any potential problems to the client including any changes to the scope of work due to method changes; missed holding times; or work that must be subcontracted due to equipment failure

The laboratory will analyze those target analytes identified by the client on a project-specific basis. If project-specific information is not available, then the laboratory's default target list of analytes will be used. If any differences between the request or tender and the contract are found, the client will be notified promptly. Differences must be resolved before work commences unless the nature of the test is hold-time sensitive. Each contract shall be acceptable both to the laboratory and the customer.

The customer shall be informed of any deviation from the contract. If a contract needs to be amended after work has commenced, the same contract review process shall be repeated and any amendments shall be communicated to all affected personnel.

All correspondence between the client and the lab that establishes or modifies what is to be done on a project is documented and retained. The format of this documentation may vary from project to project and may include, but is not limited to, memos/e-mail/telefacsimile placed in the electronic work order folders. See the Project Management SOP for details.

12.0 SHIPPING AND RECEIVING

Procedures to ensure the custody and integrity of the samples begin at the time of sample collection and continue through disposal. Records concerning sample custody and condition are maintained as required in the Sample Receipt and Login SOP.

12.1 Sample Containers

Many containers are purchased certified clean while others are purchased in bulk quantity from an approved commercial vendor. Vendor certificates are maintained by the Quality Assurance Department. These containers are ready for use and require no additional monitoring prior to use. Containers that are cleaned in-house must be verified clean prior to shipment to clients in accordance with the Bottle Preparation and Shipping SOP. Lots that do not meet the acceptance criteria will not be used for the collection of client samples.

12.2 Shipping

The shipping department packages the appropriate sample bottles and a chain-of-custody (COC) form into a shipping container (typically a Coleman® style cooler). Additional cooler items may include, but are not limited to, sampling instructions and cooler custody seals. Details are included in the Bottle Preparation and Shipping SOP.

12.3 Sample Receipt

The requirements for sample receipt are included in our Sample Acceptance Policy (SAP). A copy of this policy is included in Appendix F. The SAP includes information regarding sample containers, preservatives, receipt temperature, holding time, and the Chain of Custody (COC) form. The Sample Acceptance Policy must be made available to the appropriate sample collection personnel and client project managers.

Transfer of sample custody is documented on the COC. A completed COC must include the following information and accompany all samples collected in the field for laboratory analysis. A copy of our Chain of Custody form is included in Appendix F.

- Required Sample Receipt Information
- Client name and address
- Contact person

- Name and signature of sample collector
- Sample description
- Date and time of sample collection
- Number of containers
- Matrix
- Preservative
- Requested analyses
- Relinquishing signature

The Sample Receipt department receives all samples into the laboratory. All sample containers are visually inspected for bottle breakage and other abnormalities (such as insufficient sample volume). All abnormalities and discrepancies between the sample container identification and the chain of custody form are also noted in the LIMS. The results of the cooler and sample inspections as well as container lot numbers are documented on the LIMS Cooler Inspection form. The sample receipt temperature is measured on a representative sample from each cooler using a non-contact thermometer. The acceptance criteria for receipt temperature are 0.1 – 6ºC (with the exception of samples for North Carolina DENR or Wisconsin DNR compliance, which must be received in the range of 0.1 – 4ºC). Water samples for microbiological analysis must be received <10ºC. Samples that are delivered within 2 hours of collection are considered acceptable if there is evidence that the chilling process has begun (e.g. ice or cooler packs are present). The sample control personnel sign the chain of custody form prior to sample information being logged into the LIMS. Details are included in the Sample Receipt and Login SOP.

The Project Manager will notify the client of any significant problem with a sample. The direction from the client is documented and a copy of the correspondence is provided to the client with the analytical report.

12.4 Login

All samples received at the laboratory are logged into a computerized laboratory information management system (LIMS), which assigns a unique laboratory sample number to each sample. This sample number is used to identify all subsamples, and subsequent digestates or extracts prepared from the original sample. Moreover, each container for a given sample is

issued a unique container identification number. This provides for an unequivocal link between the unique field ID and the sample container used for analysis.

Login personnel determine which analysis is required for a given sample from the information provided on the chain of custody. Using the information given on the COC and the project definition, the following details are logged into the LIMS.

- Client information
- Project name
- General comments (that appear on the report)
- Turnaround time (which calculates and enters the due date)
- Date and time received
- Temperature of sample when received
- Client sample ID
- Date and time collected
- Matrix
- Container type
- # of containers
- Storage area within the lab
- COC #
- Sample specific comments
- Analysis codes (which reference the method numbers)

The original COC, Cooler Inspection form, and any paperwork shipped with the sample is scanned into an electronic work order file folder then given to the applicable Project Manager. The Project Manager verifies the receipt of the sample, COC information, and analyses logged into the LIMS.

Labels are generated by the LIMS for each sample container. These labels are durable, water resistant, and printed with indelible ink. The labels include the following information:

- Sample number
- Client sample ID information
- Date received
- Date collected
- Storage area

- Sample specific comments
- Container ID
- Required tests from that container

Should any sample be sent to a subcontract laboratory (within our network or not), the login department will generate a new chain of custody (Sub COC) for the sample(s) sent to the subcontract lab. This chain of custody will identify the Microbac sample number so that client confidentiality is not compromised. Subcontracted sample chain of custody forms will be returned to the client with the analytical results. Details are included in the Sample Receipt and Login SOP.

12.5 Sample Storage and Disposal

Samples are stored in separate and dedicated storage areas and sample refrigerators/freezers. Separate refrigerators/freezers are available for extractable organic analyses, volatile organic analyses, general chemistry analyses, and microbiological analyses. In addition, soil samples are segregated from aqueous samples. A single, large, secure, walk-in style cooler is available for long-term storage, storage of excess sample volume, retention of "Hold" samples, secure sample requirements and other similar needs. As allowed by the reference methods, acid-preserved samples for metals analyses are not retained in cold storage. Separate areas are available for the storage of extracts and digestates. Personal food items for consumption are not allowed in the sample, standard or reagent coolers.

All cooler temperatures are monitored and documented each day of use. All sample coolers are required to store samples in the range of 0.1 – 6ºC (with the exception of samples for North Carolina DENR or Wisconsin DNR compliance, which must be stored in the range of 0.1 – 4ºC and microbiological samples which must be stored in the range of 1.0-4.4ºC). Acceptance criteria for freezers are less than -10ºC. If the temperature range is not maintained, documented corrective action and client notification is performed as needed.

The analysts remove samples from the storage coolers for analysis. After using the samples, the analyst returns them to the appropriate storage area. Internal Chain of Custody procedures (i.e. documenting the removal and replacement of samples from the storage areas) are available and utilized as required by the client.

Samples are removed from their designated storage area for disposal based upon the date of receipt. Depending on the matrix type and specific project needs, samples may be placed into long-term storage or immediately disposed. Depending upon the matrix type and characteristics of the sample, samples may be disposed of by pouring down the sink (with treatment for acidic or basic pH), as part of general refuse, as special waste, as hazardous waste, or returned to the client. The specific details of the disposal practices can be found in the Sample Disposal SOP.

13.0 SUBCONTRACTING

Analyses that cannot be performed at the Microbac Merrillville facility may be subcontracted to another approved laboratory. Whenever possible, subcontracted analyses will be performed at a laboratory within the Microbac network. Microbac will notify our client in writing, typically via quote for services, facsimile, or e-mail of our intent to subcontract any analyses and when appropriate, gain the approval of the customer prior to commencing of testing. For verbal quotes and request for service, notification will be verbal. Subcontract laboratories are acceptable if they have the ability to perform the appropriate analysis, provide Microbac Laboratories, Inc. with a documented quality system (i.e. a copy of their Quality Manual submitted to Microbac), and are currently certified/accredited, as appropriate, for the analysis in question. Analyses requiring a particular accreditation/certification will be subcontracted only to a lab that currently holds the applicable approval. The QA department maintains a list of approved subcontract laboratories.

Microbac will submit to our client the subcontracted laboratory results as received from the subcontract lab. Subcontracted sample chain of custody forms will be returned to the client with the analytical results. The laboratory shall be responsible to the customer for the quality of results from the subcontractor except in the case where the customer or a regulatory authority specifies which subcontractor is to be used.

14.0 COMPLAINTS

Complaints may come in two forms: external and internal. To help provide the best quality service to our clients, all employees are empowered to initially address external complaints. Typically, a Senior Project Manager, a Project Manager, Quality Assurance Director or the Managing Director will resolve external complaints. Managers and the Managing Director typically field and resolve internal complaints. Regardless of who fields a complaint, every effort will be given so that we can satisfy the needs of the client while meeting any applicable regulatory requirement. All complaints from clients regarding the timeliness or quality of the services provided by Microbac and the resulting resolution are documented using the External Complaint Resolution Form. The Managing Director reviews each form to ensure sufficient resolution. A copy of this form is included in Appendix K. The details of this procedure are included in the Complaint Feedback SOP. Complaints that raise doubt concerning compliance with our policies/procedures or related to data quality are forwarded to the QA office so that the issue can be promptly audited.

When a complaint or inquiry involves analytical data that results in sample reanalysis, reanalysis is performed in duplicate if sample volume permit. Duplicate reanalysis allows for the statistical resolution of conflicting or questionable results. The client or a Project Manager can initiate this reanalysis request. If results of the reanalysis statistically agree with each other as well as to the original result, the original result is considered verified and reported. If the reanalysis results do not agree as a duplicate to the original result, matrix, procedural or other effects are indicated. In this instance, all results for the sample are reviewed and the most appropriate result is reported and the report appropriately labeled. Under no circumstance shall a value obtained from an analytical batch that is in control be omitted from the report unless the decision is valid and fully documented. Post-digestion spikes (PDS) are a valuable tool in the evaluation of matrix interferences and may be used, where applicable, to evaluate the accuracy of a questioned result.

15.0 SUPPLY AND SERVICE PROCUREMENT

The procurement of equipment and supplies is controlled to ensure that the equipment and supplies used by the laboratory are of known quality and conform to the specified requirements. Control includes vendor selection, evaluation of the quality records provided by the supplier by methods such as solvent checks, and examination of items received upon delivery or completion. Purchased equipment is not used to analyze client samples until the capability and detection limit requirements identified in this Plan are performed and documented. Vendor records are maintained in the Omega LIMS. Procurement planning, supplier selection, and verification of procurement requirements are the responsibility of and approved by the Managing Director. Details of this procedure are in the Supply Procurement SOP.

16.0 INTERNAL AUDITS

The purpose of internal auditing is to verify that the lab is following Microbac's reference method based standard operating procedures, and that daily operating systems meet the requirements of this Quality Assurance Plan. Microbac performs three types of audits: performance audits, analytical procedure audits, and system audits. Details of the audit procedures and the schedule applied are included in the Internal Audits SOP. Results from the audit reports are shared with the appropriate members of the management team. Summaries of the audits are given to the Managing Director and Corporate Quality department as part of the QA Report to Management. Deficiencies from these audits are discussed with the analyst and entered into the laboratory's Corrective Action System according the Deviation/Corrective Action SOP.

16.1 Performance Audits

Performance audits are conducted periodically throughout the year. Performance audits include scheduled Proficiency Testing samples as well as unscheduled blind and double blind quality control samples (submitted via the QA department or our clients). Findings from these audits are used to evaluate the defensibility and data quality produced by the analytical system.

16.2 Analytical Procedure Audits

Audits of our analytical procedures are performed periodically throughout the year. These audits are used to evaluate the procedural steps used in the performance of the various analytical procedures performed in the lab.

16.3 Systems Audits

A systems audit is performed by the Corporate Quality department or the local QA Director on a, minimum, annual basis. The systems audit is a comprehensive review of the overall quality and measurement system. The purpose of these audits is to confirm compliance with the requirements of this Quality Assurance Plan, and to assess the applicability of the quality system to other certification and regulatory programs. Systems audits identify the presence of the necessary organization, facility, and quality systems needed to provide evidence of the laboratory's capability and competence.

17.0 CORRECTIVE ACTION

Corrective action is necessary whenever deviations from requirements of the quality system occur. There are two categories of corrective actions: system and analytical. Regardless of the category, corrective actions are documented using a Corrective Action Report (CAR) form. Documentation of each corrective action is kept on file. The forms used are monitored by the QA department to ensure that out-of-control events and actions are documented, that the corrective actions are appropriate and effective, and that the corrective actions are implemented within the agreed upon time frame. A copy of the CAR form is attached in Appendix H.

17.1 System Corrective Action

System corrective action is the result from the identification of a deficient element of our quality system. Examples include, but are not limited to, audit deficiencies and “not acceptable” ratings on a Performance Testing sample and continued failure of a particular quality control element. The QA department typically initiates the Corrective Action Reports for system corrections, although all staff has the authority to identify deficiencies in the quality system. The appropriate designee is responsible for investigating the problem and determining the corrective action needed. Regardless of who initiates a Corrective Action Report, the QA Director is responsible for monitoring the corrective action process. When the source of the problem has been identified through root cause investigation, a suggested corrective action is selected, and the CAR form is completed, evaluated and, if appropriate, approved by the Production Manager and QA Director. These ‘Quality System CARs’ are numbered by and retained in the QA office.

At the discretion of the QA office, a Stop Work Order may be issued in conjunction with an analytical or quality system CAR. The QA office issues Stop Work Orders. When issued, all appropriate staff is notified of the perceived problem. During the time of a Stop Work Order, no samples may be analyzed by that particular procedure. Upon acceptable completion of the CAR, the Stop Work Order can be lifted by the QA office and analyses resumed.

Regardless of the source or projected impact on the system failure, the following systematic approach is used in developing a suitable corrective action. The emphasis of the corrective action process is to identify the problem and prevent it from reoccurring.

- Define the problem.

- Establish the root cause of the problem.
- Determine the needed action to resolve the problem and eliminate the root cause.
- Implement a corrective action.
- Verify the corrective action has been implemented and has eliminated the problem.

18.0 TESTING PROCEDURES

18.1 Routine Testing

Microbac utilizes a wide variety of analytical methods approved for use by various regulatory agencies. Typically, a monitoring regulation or client contract requirement specifies the analytical method that must be used. The laboratory shall inform the customer when the method proposed by the customer is considered to be inappropriate or out of date.

18.2 Analytical Procedures

Laboratory-specific Standard Operating Procedures (SOP) have been developed for each routine analytical procedure in accordance with the requirements of the Preparation of Standard Operating Procedures SOP. The SOPs detail the steps performed at the Merrillville facility. Prior to introducing a new test procedure, an evaluation is made to ensure that the laboratory properly operates according to the procedure. If the standard method changes, the confirmation step must be repeated. The SOPs are uniquely named and tracked by revision number. Each analytical SOP is in the following format:

Chemical Analysis	**Biological Analysis**
1. Table of Contents	1. Table of Contents
2. Scope and Application	2. Scope and Application
3. Summary	3. Summary
4. Definitions	4. Definitions
5. Interferences	5. Interferences
6. Safety	6. Safety
7. Equipment and Supplies	7. Equipment and Supplies
8. Reagents and Standards	8. Media, Reagents and Standards
9. Sample Collection, Preservation, & Holding Times	9. Sample Collection, Preservation, & Holding Times
10. Quality Control	10. Quality Control
11. Calibration and Standardization	11. Calibration and Standardization
12. Procedure	12. Sample Preparation
13. Calculations and Data Handling	13. Procedure
14. Method Performance	14. Calculations and Data Handling
15. Instrument Maintenance	15. Major Sources of Uncertainty
16. Trouble Shooting	16. Pollution Prevention
17. Pollution Prevention	17. Waste Management and Disposal
18. Waste Management	18. References
19. References	19. Tables, Forms, Checklists, and Other Attachments
20. Tables, Forms, Checklists, and Other Attachments	

Administrative SOPs only use the sections that are applicable to the related administrative task.

18.3 Special Testing

Special testing includes analyses for which standard methods are not available or are available for a matrix other than the samples being considered. This type of work is only performed if select/appropriate individuals of the management team are convinced, on the basis of

professional judgment, that resources and expertise are sufficient to assure a reasonable probability of success. Requests for non-standard testing will be evaluated for compliance with Microbac's policies and procedures. Deviations from Microbac's current procedures will be recorded using client specific work instructions. Special testing is discussed with the customer prior to the initiation of testing in order to clearly define expectations and requirements of this approach. The customer is afforded the opportunity to review and approve the method. A validation plan and study is required before the method is authorized for use under normal reporting routines for the specific matrix involved. Validation of the method is documented. Documentation includes validation data, detection and quantitation limits, applicability, precision, accuracy, estimation of uncertainty, quality control, and calibration procedures. Permission to use alternate methods may be granted only by agreement between the Managing Director and the QA Director. This authorization is recorded and dated.

18.4 Administrative Procedures

Laboratory-specific Standard Operating Procedures (SOP) have been developed for each routine administrative (non-analytical) procedure in accordance with the requirements of the Preparation of Standard Operating Procedures SOP. The SOPs are uniquely named and tracked by revision number. Each administrative SOP is in the following format, utilizing only those sections that are applicable:

1.0 Table of Contents
2.0 Scope and Application
3.0 Summary
4.0 Definitions
5.0 Procedure
6.0 Calculations and Data Handling
7.0 References
8.0 Tables, Forms, Checklists, and Other Attachments

The QA department retains a list of the current analytical and administrative SOPs. Copies of the current SOPs are available to all personnel and to clients upon request. Deviation from these procedures requires notification of the QA office. To ensure continued suitability administrative SOPs are reviewed at a minimum of every two years. This review is documented. SOPs are named in a manner that identifies the procedure or task as well as the internal revision number of the SOP. A list of the current SOPs is available in Appendix D.

19.0 TRAINING

Proper employee training is applicable to all laboratory operations including administrative tasks, sample handling, sample analysis, and data review. The training provided is detailed in the Employee Training SOP.

Upon hire, employees receive an employee orientation, safety training, and environmental management training by the Managing Director, Quality Assurance training (which includes the QAP, confidentiality, quality control, and ethics) by the QA department, notification of employee benefits and payroll information by the Human Resources department, and initial production training by their Group Leader or other person as directed by the Production Manager. A log containing the name, signature, initials, and hire date of each employee is maintained in the QA office. This list, which provides for the identification of persons responsible for signing lab records, is signed during the Quality Assurance training.

Non-analytical job function training is also provided. This training may include, but is not limited to, sample receipt, chain of custody procedures, LIMS, section-specific QA/QC policies and procedures, data review and data reporting, waste control and disposal, and administrative and clerical job functions.

Training files are maintained for each employee. These files document their education and previous experience as well as internal training received while employed by Microbac. Training certificates are filed to document participation in any external training courses or workshops on specific equipment, analytical techniques, or laboratory procedures. Copies of initial demonstration studies and performance testing results are also kept in the QA Training Files.

To ensure that the objectives and policies of this Quality Assurance Plan are communicated to, understood by, and implemented by all laboratory personnel, all new laboratory employees are required to read the latest revision of this plan. As changes are made to the QAP, each employee is trained to these revisions, and this re-training is documented. Annual QA refresher group training is conducted for all employees to remind them of their roles and responsibilities in the quality system and in its proper maintenance. Employees are required to abide by all sections of this document. A copy of the Employee Certification section at the end of this document must be signed and returned to the QA department by each employee. This certification is retained in the employee's training file.

Prior to performing any analytical procedure, an employee must be thoroughly trained in all aspects of that procedure. The Group Leader or his designee performs this training. Documentation of this training is retained in the employee's training file. When being trained in a new procedure, analysts will serve as an apprentice with an experienced analyst or receive instruction by an instrument manufacturer or other third party training course. All analytical data generated by an employee in training (trainee) shall be reviewed and documented by the trainer, Group Leader, or the QA department prior to its approval for reporting.

19.1 Demonstrations of Capability

Prior to the unsupervised analysis of client samples, analysts performing a new procedure (i.e. new to the lab or to them) must successfully perform an Initial Demonstration of Capability (IDC) study. The Initial Demonstration for sample preparation is satisfied through the analysis of four Laboratory Control Samples and for analytical procedures through the analysis of four verification standards. Initial Demonstrations are documented with a spreadsheet report and certification statement attesting to the validity of the study. A copy of the IDC certification statement is included in Appendix L.

On-going analyst proficiency is demonstrated through one of the following options per year:

- acceptable performance of a blind sample (single blind to the analyst),
- another IDC
- successful analysis of a blind performance sample on a similar test method using the same technology (e.g., GC/MS volatiles by purge and trap for Methods 624 or 8260) would require documentation for only one of the test methods
- acceptable accuracy and precision from a minimum of four consecutive laboratory control samples or verification standards

Evaluation for employee re-training is performed whenever there is an on-going proficiency failure or when a Root Cause Investigation warrants training as Corrective Action.

19.2 Detection & Quantitation Limits

For each new procedure, annually thereafter, and whenever a substantial change (i.e. a change that affects how the test is performed or that affects the sensitivity of the instrument) occurs in the instrument or procedure, a Method Detection Limit (MDL) study must be performed. Detection limit studies are applicable to procedures that use laboratory instrumentation.

Detection limit studies are not applicable to measurements made using gravimetric, titrimetric or certain potentiometric techniques. A MDL study is the consecutive analysis of a minimum of seven standards spiked into lab pure water or an appropriate solid matrix. These standards are taken through all preparation and analytical steps of the procedure. The MDL is a statistical value defined as the minimum level at which the procedure, with 99% confidence, can detect analyte in the matrix in which it was performed. MDL studies are applicable only to those tests where a spike solution is available. The MDL data are evaluated to verify the relationship between the detection limit and the reporting limit as well as the appropriateness of the spike level used in the study. It must be understood that the detection limit may not be attainable in all real-world sample matrices.

For all Department of Defense, (DoD) work, the Limit of Detection (LOD) is determined and verified quarterly thereafter and whenever a substantial change (i.e. a change that affects how the test is performed or that affects the sensitivity of the instrument) occurs in the instrument or procedure. The laboratory shall determine the LOD for the method for each target analyte of concern in the quality system matrices. All sample-processing steps of the analytical method shall be included in the determination of the LOD. The validity of the LOD shall be confirmed by qualitative identification of the analyte(s) in a QC sample in each quality system matrix containing the analyte at no more than 2-3 times the LOD for single analyte tests and 1-4 times the LOD for multiple analyte tests. This verification must be performed on every instrument that is to be used for analysis of samples and reporting of data. An LOD study is not required for any component for which spiking solutions or quality control samples are not available, such as temperature, or when test results are not to be reported to the LOD (versus the Limit of Quantitation or working range of instrument calibration). Where an LOD study is not performed, the laboratory may not report a value below the Limit of Quantitation. Reporting limits are based upon the data generated in the Method Detection Limit studies or the limits specified in the reference method. Whenever possible, it is preferable to set the reporting limit at a Practical Quantitation Limit (PQL) of 5-10 times the MDL, however the lowest level that the routine reporting limit should be set at is a PQL of 2.2 times the Method Detection Limit.

The Limit of Quantitation (LOQ) is the lowest concentration that produces a quantitative result within specified limits of precision and bias. The LOQ is set at the concentration of the lowest initial calibration standard. In no case will the PQL for a given procedure be set at a concentration below that of the lowest calibration standard.

Reporting down to the MDL is always discouraged, as the probability for false biased data is considered too great. Due to program requirements, however, results reported to the Wisconsin DNR must be evaluated and reported down to the MDL. Reporting limits are based on an "as received" or "wet weight" basis. "Dry weight" reporting limits are increased directly proportional to the amount of solids in the sample. Reporting limits are adjusted when lesser sample size than the maximum is used.

The number of significant figures reported is limited by the precision of the analysis. As such, the number of significant figures supported by the MDL study limits the sensitivity of the PQL (see the table below). The number of significant figures reported is maintained regardless of the magnitude of the value due to concentration, dilution or unit conversion.

Guidance for Establishing Practical Quantitation Limits

If 2.2 × MDL is	**Then the PQL is at least the**
> 0 and ≤ 1 unit	Nearest multiple of 0.1 greater than that value
> 1 and ≤ 5 units	Nearest multiple of 1 greater than that value
> 5 and ≤ 10 units	Nearest multiple of 5 greater than that value
>10 and ≤ 50 units	Nearest multiple of 10 greater than that value
> 50 units	Nearest multiple of 100 greater than that value

20.0 QUALITY CONTROL

This section presents the QC requirements applicable to the analysis of client samples, as well as the methods for assessing data quality. The purpose of this QC program is to produce data of known quality that is legally defensible, satisfies applicable data quality objectives (DQOs), and meets or exceed the requirements of the SOP.

Performance of all analytical methods is monitored to assess the accuracy and precision of the procedure. Specific quality control checks are designed to provide the necessary information for method assessment. These quality control elements are the measures taken to ensure acceptable test conditions. These elements assess environmental conditions (e.g. temperature, humidity, light) as well as instrumental conditions (e.g. flow rate, detector capability) and the actual chemistry being performed. These quality controls are used to determine Measurement of Uncertainty according to the procedures found in the Estimation of Measurement Uncertainty SOP.

The following elements apply only to the chemical analyses performed in the laboratory.

20.1 Elements of Quality Control – Chemical

A preparation batch is a group of samples that are carried through an applicable preparation technique (e.g. digestion, distillation, or extraction) at the same time using the same reagents and conditions. An analytical run is group of samples that are analyzed, at the instrument level, together using the same method, reagents, and apparatus within the same time period. Typically, these are samples in the same Sequence in the LIMS. The identity of each batch and run are unambiguously recorded as a unique “Batch” or “Sequence” number so that a reviewer can identify the QC samples associated with a group of samples.

The type of QC samples and their use are identified below. The specifics regarding frequency, acceptance criteria, and corrective action are included in the tables found in Appendix E. Specifics regarding the requirements of these QC samples are detailed in the individual standard operating procedures.

20.1.1 Calibration

Instruments and support equipment are calibrated in accordance with the referenced analytical methods. Details of the calibration criteria are contained in the QC Tables in Appendix E and the

SOPs. Where available, the calibration standards and instruments are checked through the use of second source standards. Certified titrants do not require verification provided they are used within the manufacturer-specified expiration date. Unless stated otherwise in the appropriate SOP, the lowest standard in the calibration curve must be at or below the reporting limit for that analyte.

If the calibration acceptance criteria are not met, the operating curve may be narrowed by eliminating a specific point of the curve under the following conditions:

- Points may not be dropped solely to meet the acceptance criteria. There must be a justifiable reason for excluding a given standard.
- For multi-analyte curves, individual analytes may be eliminated from only the low or high points.
- For multi-analyte curves, dropping a mid-level standard requires that all analytes be eliminated from that level.
- The required minimum number of calibrated levels remains.
- All project-specific criteria are met.
- If the low-level standard is removed from the curve, the PQL must be adjusted accordingly.

20.1.2 Surrogates (SURR)

Surrogates are used to evaluate accuracy, method performance, and extraction efficiency in Organic procedures. Surrogates shall be added to client samples, quality control samples, and blanks.

For Volatile Organic Analyte (VOA) analysis, all surrogates must meet the acceptance criteria. For Semi-Volatile Organic Analyte (SVOA) analysis, one surrogate per fraction (base-neutral and acid) may be out of the acceptance criteria. Only one of the two surrogates added must meet the acceptance criteria for Pesticide and PCB analysis. One surrogate is added for analysis by HPLC and the surrogate recovery must meet the acceptance criteria. If the surrogate recovery acceptance criteria are not met, samples must be re-extracted and analyzed. If the acceptance criteria are not met in two separately prepared analyses, the failure is considered matrix specific for that sample and the results are reported with an appropriate qualifier. If the acceptance criteria are not met, reanalysis steps are limited to a single reanalysis

(must be immediate; that is without any corrective action and performed from same volume used for initial analysis).

20.1.3 Internal Standards (IS)

Internal standards are used to correct sample results affected by column injection losses, purging losses, or viscosity effects. These compounds or elements are added to client samples, quality control samples, and blanks.

Used as a diagnostic tool to monitor method and system performance, acceptance criteria are strictly applicable to only the Continuing Calibration Verification. If the acceptance criteria are not met for the CCV, appropriate instrument maintenance is performed or a new initial calibration is established.

20.1.4 Retention Time Windows

Retention time windows are used in GC, GC/MS, and HPLC analysis for qualitative identification of single peak analytes. RT windows are calculated from replicate analyses of a standard on multiple days for GC and HPLC analyses. RT windows for GC/MS analyses are ± 30 seconds.

20.1.5 Manual Integration

Manual integration may be performed to accurately calculate the concentration of a compound in GC, GC/MS, and HPLC methods when it is deemed that, in the analyst's professional opinion, the automated integration was not properly performed. Manual integration is used only when absolutely necessary for proper integration and must be performed in accordance with the Manual Integration of Chromatographic Peaks SOP. All results for manually integrated peaks are identified as such on the instrument printouts. Graphic reports of the initial integration and manually integrated peak are printed and retained with the original chromatogram.

20.1.6 Initial Calibration Verification (ICV) [QCS for the Method 1631E procedure]

Applicable to instrumental analyses, the ICV is a second source standard containing all target analytes and is analyzed immediately after each initial curve to verify the validity of the calibration. This standard must be from a separate source or lot number from that used for calibration.

If the acceptance criteria are not met for the ICV, reanalysis/corrective action steps are limited to the following. When deemed appropriate, the analyst may take lesser corrective action.

- Single reanalysis (from same volume used for initial analysis)

- Perform corrective action (e.g. prepare new standard, rinse system, etc.) followed by the analysis of another calibration verification. If acceptance criteria are not met in this second consecutive (immediate) calibration verification, then either demonstrate performance after corrective action with two consecutive successful calibration verifications, or a new initial instrument calibration must be performed.

The acceptance criteria must be met before samples can be analyzed. However, sample data associated with an unacceptable calibration verification may be reported if the verification indicates high bias and the samples indicate non-detectable concentration, or if the project DQOs are met and an appropriate qualifier is reported.

20.1.7 Initial Calibration Blank (ICB)

Applicable to all instrumental analyses except EPA Method 1631E and EPA Method 1630, GC, GC/MS, or HPLC analyses. A reagent blank is analyzed after the ICV and prior to the analysis of client samples. A blank may also be analyzed after high concentration samples to demonstrate that carryover contamination does not exist.

Samples associated with an ICB indicating high bias may be reported if the samples indicate non-detectable concentration or if the project DQOs are met and an appropriate qualifier reported. If the acceptance criteria are not met, reanalysis steps are limited to a single reanalysis.

20.1.8 Interference Check Sample (ICS)

The interference check samples (solutions A and AB) are used in inductively coupled plasma analyses to verify background and interelement correction factors.

Samples associated with an ICS indicating high bias may be reported if the samples indicate non-detectable concentration or if the project DQOs are met and an appropriate qualifier reported. If the acceptance criteria are not met, reanalysis steps are limited to a single reanalysis.

20.1.9 Method Blank (MBLK) or (BLK)

The method blank goes through all applicable preparation steps and is used to document non-contamination of the entire analytical process. In methods that require no sample preparation (i.e. neat analysis), the MBLK is the same as the ICB. In these cases a separate ICB and MBLK are not analyzed as the single analysis satisfies the instrument and procedural requirements.

The MBLK is considered a batch control parameter. Samples associated with a MBLK indicating high bias must be reprepared and analyzed. The only exceptions are samples that indicate a non-detectable concentration despite the MBLK result or where the project DQOs are met and an appropriate qualifier reported. If the acceptance criteria are not met, reanalysis steps are limited to a single reanalysis.

20.1.10 Laboratory Control Sample (LCS) or Blank Spike (BS)

The LCS is prepared with analyte-free water or applicable solid matrix. Where available, a purchased solid matrix spiked with representative analytes may be used. The LCS shall be spiked at a level less than or equal to (i.e. near) the midpoint of the calibration curve for each analyte. This QC sample shall be carried through the entire preparatory and analytical procedure to document the accuracy of the entire analytical process. In methods that require no sample preparation (i.e. neat analysis) the LCS is the same as the ICV or CCV depending on concentration. In these cases, a separate ICV/CCV and LCS are not analyzed as the single analysis satisfies the instrument and procedural requirements.

The LCS is considered a batch control parameter. Samples associated with a LCS that fails to meet the acceptance criteria for recovery must be reprepared and analyzed. The only exceptions are samples that indicate a non-detectable concentration when the LCS indicates high bias or where the project DQOs are met and an appropriate qualifier is reported. If the acceptance criteria are not met, reanalysis steps are limited to a single reanalysis.

20.1.11 Matrix Spike / Matrix Spike Duplicate (MS/MSD)

A matrix spike and matrix spike duplicate are separate aliquots of sample spiked with known concentrations of analyte. The spiking occurs prior to preparation and analysis. Samples used for the MS/MSD are chosen at random. This allows for the evaluation of all sources of a given sample matrix over time so that various matrix problems can be noted. The MS and MSD shall be spiked at a level less than or equal to the midpoint of the calibration curve, with the exception

of Semi-Volatile Organic Analyte (SVOA) samples which are spiked at levels slightly above the midpoint.

The MS/MSD are matrix-specific quality control samples and are used to assess the bias for accuracy and precision of a method in a given sample matrix. Matrix spikes are analyzed as required by the test method or as part of a systematic planning process to meet defined data quality objectives. The MS/MSD accuracy recovery is not used to assess batch control. The decision to re-prepare the entire batch is determined according to the MS/MSD Evaluation and Corrective Actions Flow Chart in Appendix E.

Samples having an indigenous concentration greater than or equal to 4 times the spiked amount are considered not applicable for spike analysis at that level. Where the sample chosen for MS/MSD analysis is one of a group of samples submitted from a site with homogeneous character and the client requires that the sample is reprepared and analyzed when acceptance criteria is not met, all samples from that Sample Delivery Group should be reanalyzed under similar conditions. If the acceptance criteria are not met in two separately prepared analyses, the failure is considered matrix specific for that sample and the results yielding better recovery are reported with an appropriate qualifier. If the acceptance criteria are not met, reanalysis steps are limited to a single reanalysis.

In batches where insufficient sample is available for the performance of a MSD, a MS may be performed on two different samples or a duplicate laboratory control sample (LCSD) should be analyzed. The MS results from the two samples or the LCSD results are used to evaluate the precision criteria.

20.1.12 Duplicates (DUP)

Applicable to analyses where MS/MSD are not available, duplicate samples are analyzed using identical recovery techniques and treated in an identical manner. Duplicate sample results are used to assess the precision of the entire analytical process. Samples used for the DUP are chosen at random. This allows for the evaluation of all sources for a given sample matrix over time.

The DUP is a matrix-specific quality control sample and is used to assess the bias of a method due to a given sample matrix. The DUP is not used to solely assess batch control. If the acceptance criteria (% RPD) are not met, the sample and its duplicate must be reprepared and

analyzed. Relative Percent Difference is calculated only where the two values are greater than or equal to 5 times the PQL. If the values are below 5 times the PQL, the acceptance criteria are ± 1 PQL of each other. If the acceptance criteria are not met, reanalysis steps are limited to a single reanalysis.

Where the sample chosen for duplicate analysis is one of a group of samples submitted from a site with homogeneous character and the client requires that the sample is reprepared and analyzed when %RPD does not meet criteria, all samples from that Sample Delivery Group should be reanalyzed under similar conditions. If the acceptance criteria are not met in two separately prepared analyses, the failure is considered matrix specific for that sample and the results yielding better %RPD are reported with an appropriate qualifier.

In batches where insufficient sample is available for the performance of a DUP, a duplicate laboratory control sample (LCSD) should be analyzed, where applicable. The LCSD results are used to evaluate the precision criteria.

20.1.13 Post-digestion Spikes (PDS)

A PDS is applicable only to digested metals analyses and those general chemistry (wet chemistry) analyses that include a preparation step (e.g. cyanide, nitrogen-ammonia, and phenolics). A post-digestion spike may be analyzed to assist in the assessment of matrix interference when the MS and MSD fail to meet the accuracy acceptance criteria. In addition, a PDS can be used as a troubleshooting tool. The spiking solution is added to a sample aliquot just prior to analysis thereby evaluating the matrix effect on the analysis process only and not the preparation portion. Samples having an indigenous concentration greater than or equal to 4 times the spiked amount are considered not applicable for spike analysis at that level.

If the MS/MSD fail to meet the accuracy acceptance criteria and the PDS is within the acceptance criteria, matrix interference should be suspected. If the MS/MSD and PDS fail to meet the accuracy acceptance criteria, matrix interference is probable and the sample, MS/MSD, and PDS should be reprepared and analyzed. A smaller sample size should be considered as means to negate the apparent matrix interference.

20.1.14 Serial Dilution (SD)

As a troubleshooting tool it may be necessary to analyze a serial dilution of a sample. The results of a 1:5 serial dilution should agree with each other within 10% (unless stated otherwise

in the reference method). These criteria are for evaluating the matrix effect in a new or unusual matrix and not for comparing results for a sample diluted because it was above the calibration range of the instrument.

20.1.15 Method of Standard Additions (MSA)

MSA is a method for the correction of interference as evidenced by the failure of the MS, MSD, and PDS. This technique may be used to report a value in cases of matrix interference. Only applicable to trace metals analyses, this procedure adds increments of the analyte to a sample to establish a response function (i.e. calibration curve) and by extrapolation determines the amount of analyte originally present in the sample.

20.1.16 Continuing Calibration Verification (CCV) [OPR in Method 1631E procedure]

For Inorganics analysis a second source standard containing all target analytes is analyzed to verify that the calibration curve remains valid. This standard must be from a separate source or lot number from that used for calibration. For Organics analysis a calibration standard is analyzed to verify that the calibration curve remains valid.

If the acceptance criteria are not met for the CCV, reanalysis/corrective action steps are limited to the following. When deemed appropriate, the analyst may take lesser corrective action.

- Single reanalysis (from same volume used for initial analysis)
- Perform corrective action (e.g. prepare new standard, rinse system, etc.) followed by the analysis of another calibration verification. If acceptance criteria are not met in this second consecutive (immediate) calibration verification, then either demonstrate performance after corrective action with two consecutive successful calibration verifications or create a new initial instrument calibration.

Sample data associated with unacceptable calibration verification may be reported if the verification indicates high bias and the samples indicate non-detectable concentration or if the project DQOs are met and an appropriate qualifier reported.

20.1.17 Continuing Calibration Blank (CCB)

CCBs are applicable to all instrumental analyses except EPA Method 1631E, GC, GC/MS, or HPLC analyses. A reagent blank is analyzed after the CCV. A blank may also be analyzed after high concentration samples to demonstrate that carryover contamination does not exist.

Samples associated with a CCB indicating high bias may be reported if the samples indicate non-detectable concentration or if the project DQOs are met and an appropriate qualifier reported. If the acceptance criteria are not met, reanalysis steps are limited to a single reanalysis.

20.1.18 Control Charts/Tabulations

Statistical data are retained in the LIMS for all quality control sample types. Charts can be generated at any time to evaluate performance. Where allowed by the reference method, laboratory generated acceptance limits are statistically prepared for ICV/CCV recovery, Surrogate recovery, LCS recovery, MS recovery for accuracy, and MSD/DUP recovery for precision. Statistical outliers are removed and a minimum of the 20 most recent data points are used to update the limits. When used, lab-generated acceptance limits are evaluated or updated on a minimum annual basis. Control limits are established at the average plus-and-minus three standard deviations ($\overline{X} \pm 3\sigma_{n-1}$), unless otherwise required in the reference method. The details of generating these limits are included in the Generation and Updating of Statistical Recovery Limits SOP.

20.1.19 Subsampling

When removing a portion of an environmental sample for analysis, the appropriate care and technique must be used in order to obtain a representative subsample. For water samples this includes thoroughly shaking the sample container in order to mix any solids. It is appropriate to shake filtered groundwater samples as any particulate in the filtrate is from the original sample. For solid and semi-solid samples this includes stirring the sample in order to homogenize any stratified layers within the sample container. The above techniques do not apply to removing an aliquot for the analysis of volatile organic compounds (VOCs).

20.2 Elements of Quality Control – Microbiology

The following elements apply only to the analyses performed in the microbiology laboratory. These elements are in addition to or take precedence over similar requirements found in other sections of this Quality Assurance Plan.

20.2.1 Lot Comparison

Prior to their use on client samples, new lots of membrane filters, new lots of media received from the vendor, and new lots of media prepared in the lab are compared against the previous lot. Using a positive control the comparison determines if the new lot is different from the old lot. Unacceptable lots cannot be used for the analysis of client samples.

20.2.2 Media and Test Kit Controls

Reference cultures used for positive and negative controls are obtained from a recognized national collection, organization, or manufacturer. New lots of test kits and media received from the vendor as well as new batches of media prepared in the lab must be evaluated prior to use on client samples. Positive and negative controls are analyzed. The positive control uses a culture that is intended to be the detected analyte of the procedure. The negative control uses a culture that is not intended to be the detected analyte of the procedure. Unacceptable lots/batches cannot be used for the analysis of client samples.

Test kits, media, solutions, and reagents are prepared, used, and stored according to a documented procedure following the manufacturer's instructions or the test method. Documentation for media prepared in the laboratory includes date of preparation, preparer's initials, type and amount of media prepared, manufacturer and lot number, final pH of the media, and expiration date. Documentation for media purchased prepared or ready-to-use includes manufacturer, lot number, type and amount of media received, date of receipt, expiration date of the media, and pH of the media. Working stock cultures are not sequentially cultured more than five times and subcultures are not used to replace reference stocks.

Several tests are performed on laboratory prepared media showing the media meets the requirements of the test. These include:

a. Productivity which shows the media is capable of growing the target organism.
b. Selectivity – shows the media is capable of differentiating between the target organism and other organisms. Some media are non-selective and this test is not necessary.
c. Sterility – shows no organisms are found in the media prior to testing
d. pH – shows the media is within the growth parameters of the test. The acceptance criteria are defined by the manufacturer's instructions.
e. Volume – for liquids requiring a specific fill volume, this test is necessary to show the proper amount is dispensed in the container. The acceptance criterion for volume-critical liquids is 2%.

20.2.3 Media Storage

Media is stored according to manufacturer's instructions or method. Media is not used outside of its expiration period unless it is re-qualified with each use according to the Quality Control section of the Microbac Laboratories, Inc. Media and Reagent Preparation SOP.

20.2.4 Media Use

Media is used according to FIFO (First In, First Out). Whenever possible, QC is performed and found acceptable prior to use. Prepared media that is undergoing QC is segregated from "working" media until it has passed QC.

20.2.5 Method Blanks (MBLK)

The method blank goes through all applicable analytical steps and is used to document non-contamination of the analytical process. This control uses sterile buffered dilution water, air, or other appropriate medium to verify the sterility of the media, equipment, and techniques used to process client samples in a particular batch.

For filtration technique, the laboratory conducts one beginning and one ending MBLK for each laboratory-sterilized filtration unit used in a filtration series of 10 or fewer samples. The filtration

series is considered ended when more than 30 minutes elapses between successive filtrations. During a filtration series, filter funnels are rinsed with three 20-30 mL portions of sterile rinse water after each sample filtration.

For pour plate technique, MBLKs of the medium are made by pouring, at a minimum, one uninoculated plate for each lot of pre-prepared, ready-to-use media and for each batch of medium prepared in the laboratory.

The MBLK is considered a batch control parameter. Samples associated with a MBLK indicating high bias must be reprepared and analyzed. The only exceptions are samples that indicate a non-detectable concentration despite the MBLK result or where the project DQOs are met and an appropriate qualifier reported.

20.2.6 Laboratory Control Samples (LCS)

The LCS goes through all applicable analytical steps. This control uses a known culture to verify the ability of the entire analytical procedure (i.e. media, equipment, and techniques) to properly identify the presence of the target organism in a particular batch of client samples.

The LCS is considered a batch control parameter. Samples associated with a failing LCS must be reprepared and analyzed (if possible). Where reanalysis is unavailable, the data reported to the client must be associated with a narrative explaining the QC failure.

20.2.7 Glassware and Sample Containers

One piece of cleaned glassware per washed and prepared lot is checked with bromothymol blue indicator to verify the absence of alkaline or acidic residues according the Glassware Washing SOP. Unsatisfactory results require that all glassware from that lot must be re-washed and re-tested prior to being used in the lab.

For all lots of glassware detergent used in the microbiology laboratory, a certificate of analysis indicating that the product has passed the Inhibitory Residue Test is obtained and filed.

Prior to being sent to clients, one container from each lot of sterilized sample containers is verified for sterility using a non-selective broth. This verification is documented and retained. Unsatisfactory results require that all containers from that sterilized lot must be re-sterilized and/or re-washed, sterilized, and re-tested prior to being made available to clients.

20.2.8 Membrane Filtration

At least one filter from each new lot of membrane filters is checked for sterility with non-selective growth media.

20.2.9 Quanti-Tray Sealer

Effectiveness of the IDEXX Quanti-Tray sealer is checked monthly using the Dye Test according to the Microbiology Quality Control SOP. If dye is observed outside of the wells, maintenance is performed.

20.2.10 Environmental Monitoring

Environmental monitoring of the Microbiology Laboratory is performed according to a schedule This testing includes air exposure testing for quantitative analysis and a swabbing program for pathogen testing according to the Microbac Laboratories, Inc. Environmental Monitoring for Microbiology SOP.

20.2.11 Analyst Quality Control

The primary analyst and each backup analyst performs a count of a count comparison plate for test methods that specify colony counts such as membrane filter or plated media. Duplicate counts are performed monthly on one positive sample for each month that the test is performed. Acceptable counts must be within 10% difference.

20.2.12 Quality Control Samples

Blind QC samples for various procedures and analytes are analyzed at a minimum annual basis. These samples are used to assess the entire analytical process including the environmental conditions of the laboratory.

20.2.13 Subsampling

When removing a portion of an environmental sample for analysis, appropriate care and technique must be used in order to obtain a representative subsample. For water samples this includes thoroughly shaking the sample container. For solid and semi-solid samples, this includes stirring the sample with a sterile spatula in order to homogenize any stratified layers

within the sample container. Regardless of the matrix, aseptic techniques must be used in procuring subsamples for analysis.

20.2.14 Incubation Times

Unless defined in the specific reference method, incubation windows are as follows:

- 12 Hour incubation (12-12.5 hours)
- 24 Hour incubation (± 2 hours)
- 48 Hour incubation (± 3 hours)
- 72 Hour incubation (± 4 hours)
- 5 Day incubation (± 6 hours)

20.3 Support Equipment

The laboratory water system includes filtration, water softening, organic removal, ion removal, and reverse osmosis to surpass the standards for Type I water as defined in Standard Methods for the Examination of Water and Wastewater. Treated water is supplied to taps located throughout the laboratory. Maintenance of the system is documented when performed. Measurements of resistivity are made and documented and corrective action taken and documented as needed. Acceptance criteria are greater than 10 Megohm-cm. Resistivity below 15 indicates the upcoming need for system maintenance. Continued monitoring of the lab pure water system is performed through the analysis of method blanks for all analytes in general and the specific achievement of the requirement of < 0.05 mg SiO_2/L. Reagent water quality is monitored monthly for chlorine residual, specific conductance, Total Organic Carbon, Ammonia Nitrogen and heterotrophic bacteria plate count. Reagent water quality is monitored annually for Microbiological Suitability, as well as heavy metals to ensure that it is free of inhibitory substances. Reagent water used in Microbiology Testing must meet the following criteria:

Chemical Test	Frequency	Maximum Acceptable Limit
- Resistivity	Weekly	>10 megohms
- Total Organic Carbon	Monthly	<1.0 mg/L
- Ammonia	Monthly	<0.10 mg/L
- Total Chlorine Residual	Monthly	<0.10 mg/L
- Heavy metals		
Single (Cd, Cr, Cu, Ni, Pb, and Zn)	Annually	<0.05 mg/L
Bacteriological Tests		
- Heterotrophic Plate Count	Monthly	<1000 cfu/mL
- Biological Suitability	Annually	<2.0 mg/L

Class I masses are recertified every 5 years by an approved certification vendor. Class I masses are used only to verify laboratory daily working weights on a semiannual schedule. The class II masses cover the range from 2 milligrams to 500 grams and are used to check balances for accuracy and precision. The QA office maintains the certificates of traceability and verification records.

Annually and as needed, SI traceable reference thermometers are used to check the thermometers used throughout the lab; this is there sole purpose. The traceable thermometers are recertified every year. The QA office maintains the certificates of traceability. Thermometers are verified at the point of use and correction factors are applied in their daily use. If a

thermometer is used at more than one point it is verified at those points which it is used. The procedure for the verification of thermometers is included in the Thermometer Calibration and Use SOP. Thermometers are graduated to enable measurement at the appropriate sensitivity. Thermometers used for microbiological analyses at 35ºC are graduated in no greater than 0.5º graduations or 0.2º graduations for use at 44.5ºC.

Balances are calibrated or verified (if unable to calibrate) at a minimum of two masses each day of use and with a third mass monthly. Calibration/verification data are recorded in logbooks each day of use and corrective action taken and documented as needed. Acceptance criteria for verification are ± 1 times the readout sensitivity (e.g. a balance reading to 0.01g has criteria of ± 0.01g). Semi-annually, all balances are serviced, cleaned and calibrated/verified by a third party contractor. The QA office maintains the certificates of traceability. The daily checks, as well as the semi-annual calibrations, verify the accuracy of the balance over the entire range of use. The procedures used for daily balance calibration are included in the SOP Daily Balance Calibrations.

pH meters have a minimum of 0.1 unit sensitivity. An Automatic Temperature Compensating (ATC) probe is used to negate the effects of temperature differences between the standards and samples. The meters are calibrated each day of use with a minimum of 2 buffers. Initial and continuing verifications are required. Acceptance criteria are ± 0.1 unit. On an annual basis, the meters are checked to assess the temperature measurement as well as the correction from the ATC probe. The procedure for these verifications included in the Thermometer Calibration and Use SOP.

Specific Conductivity meters are calibrated each day of use. Initial and continuing verifications are required. Acceptance criteria are ±10% or ±1 µmhos/cm, whichever is greater. On an annual basis, the meters are checked to assess the temperature measurement as well as the correction from the ATC feature. The procedure for these verifications is included in the Thermometer Calibration and Use SOP.

All ovens, coolers, refrigerators, freezers, and incubators are monitored on a daily basis at the point of use. The temperature of the microbiology coolers and incubators is monitored two times per day and at least 4 hours apart. Temperatures are recorded on logsheets each day of use and corrective action taken and documented as needed. Daily temperature logs document the lab name, thermometer ID, oven/cooler/etc. ID, date, corrected temperature, acceptance range, corrective action, and initials of the person measuring the temperature. The appropriate

correction factor (from comparison to the SI traceable thermometer) is applied to all thermometer readings. Glass thermometers with a correction factor greater than 3ºC will not be used in the lab.

Volumetric glassware is Class A glassware. Volumetric glassware/plasticware is used where accurate determination of volume is critical. Class B glassware/plasticware may be used provided on an annual basis the volume is verified and the glassware/plasticware marked. Volumetric glassware shall not be used for the preparation of solutions that result in an exothermic reaction or for the storage of reagents and standards. Borosilicate glassware is used if required by the analytical method certification program. The accuracy of all nonstandard labware (plastic cups, centrifuge tubes, etc.) used to measure initial sample volume, prepare dilutions, or measure the final volume of extracts or digestates must be verified and documented.

The delivery volume of manual repipetters (e.g. Eppendorf® and Oxford® style pipettes) is verified and documented on a minimum weekly basis. Verification data are recorded in logbooks and corrective action taken and documented as needed. The analysts performing this check should be varied. Acceptance criteria are ±3% difference for microbiological analysis and ±2% difference for chemical analysis. Equipment not meeting the acceptance criteria is not used in the laboratory. Details of this requirement are included in the Calibration of Manual Repipetters SOP. Glass microliter syringes are considered Class A glassware provided they come with a certificate attesting to the accuracy of the syringe. Syringes without vendor certification are verified annually and labeled with a correction factor for continued use.

Nephlometers used to measure turbidity are calibrated each day of use. Initial and continuing calibration verifications are performed and documented. Acceptance criteria are ±10.0% recovery.

The rotation rate of the tumbler units used for the Toxicity Characteristic Leaching Procedure (TCLP) and other such procedures is verified prior to use on a daily basis. Acceptance criteria are 30 ± 2 rpm. These checks are documented and any units not meeting the acceptance criteria are removed from service.

Demonstration of sterilization temperature for all autoclaves by use of a maximum registering thermometer is performed for every cycle. Biological spore strip indicators are used once a week to determine effective sterilization. Temperature sensitive tape is used with the contents of

each autoclave run to indicate that the autoclave contents have been processed. Records of autoclave operations are maintained for every cycle. Records include: date, contents, maximum temperature reached, pressure, time in sterilization mode, total run time as time in and time out, and the analyst's initials. Autoclave maintenance is performed annually and includes a pressure check and calibration of temperature device. Records of the maintenance are maintained in the Microbiology Department Maintenance Logbook. The autoclave mechanical timing device is checked quarterly against a stopwatch and the actual time elapsed documented.

Laboratory timers are verified by comparing the time to the NIST Coordinated Universal Time on an annual basis according to the Timer Verification SOP.

21.0 DEVIATION FROM POLICY OR PROCEDURE

These quality systems and this quality program are designed to meet or exceed the requirements of various certification programs, environmental compliance programs, and analytical testing requirements. To the extent possible, sample results are reported only if all quality control elements are acceptable. On occasion, however, situations occur where the "standard" requirements cannot be obtained, maintained, or simply are not applicable. In cases such as these, deviation from written policy or procedure may be acceptable. Each case is independently evaluated by the production, QA, and project management departments to assess the effect the nonconformity will have on the data quality objectives for the project. Evaluations are documented with a Corrective Action Report form. Where the data is deemed useable and reported despite the failure of a quality control element, these data are qualified and narrated in the analytical report. Approval must be gained by the Quality Assurance Department prior to reporting qualified data

21.1 Data Qualifiers

The following data qualifiers are used on the analytical and quality control reports to identify when a quality control element did not meet the applicable acceptance criteria. Additional data qualifiers may be placed on analytical data to identify miscellaneous data quality notes to the data user. The data qualifers are:

B – Analyte detected in the Method Blank at a concentration at or above the reporting limit
b- – Detected in the associated method Blank at a concentration greater than 2.2 times the MDL.
b* - Detected in the associated method Blank at a concentration greater than half the RL
E – Estimated value; Value measured above the highest point of calibration or for microbiology tests; values measured above the highest countable number per dilution.
H – Sample prepared or analyzed beyond the maximum allowable holding time
I – Matrix interference
J = Analyte concentration detected between RL and MDL (Metals / Organics)
R – Precision criteria (RPD) outside of the acceptance limits
S – Spike recovery outside of the acceptance limits
SD – Analyte diluted below the quantitation limit
U = Undetected

21.2 Analytical Corrective Action

Analytical corrective action is required when a particular laboratory quality control element fails to meet the established acceptance criteria. The technician or their Unit Supervisor typically initiates the Corrective Action Reports for analytical corrections. These forms identify the problem, any affected samples and any actions taken to meet the requirements of this plan. The CAR form is completed, evaluated and, if appropriate, approved by the Group Leader and QA department. These 'QC CARs' are used to assess the need for Narration on the analytical report and are retained on the server. CARs are monitored by the QA department to ensure that out-of-control events and actions are documented, that the corrective actions (when needed) are appropriate and effective, and that the corrective actions are implemented within the agreed upon time frame. Where corrective action is needed, corrective actions shall be to a degree appropriate to the magnitude and the risk of the problem. Procedures for Analytical Corrective Action can be found in the Processing Deviation / Corrective Action Reports; Root Cause Analysis, Corrective and Preventive Action SOP.

21.3 Quality System Corrective Action

Quality System Failures, root cause analysis, and corrective actions are monitored and tracked by the QA Department using the QS CAR form. These are for instances beyond a simple nonconformance such as an internal or external audit finding or a proficiency failure. Root cause analysis is required for all QS CARs. Procedures for Quality System Corrective Action can be found in the Processing Deviation / Corrective Action Reports: Root Cause Analysis, Corrective and Preventive Action SOP.

22.0 PREVENTIVE ACTION

Preventive Action is used to proactively identify and document areas for improvement in the laboratory. Using the Quality System Preventive Action Report Form (QS PAR), preventive actions are document much the same way as QS CARs are documented. Needed improvements and potential sources of nonconformities, either technical or concerning the management system, are identified. When improvement opportunities are identified or if preventive action is required, action plans are developed, implemented, and monitored to reduce the likelihood of the occurrence of such nonconformities and to take advantage of opportunities of improvement.

Procedures for Preventive Action can be found in the Processing Deviation / Corrective Action Reports" Root Cause Analysis, Corrective and Preventive Action SOP.

23.0 PROFICIENCY TESTING (PT)

Proficiency testing (PT) samples are used to evaluate the analytical performance and the resulting quality of the data produced. These audits are performed in addition to the routine quality control checks. Performance audits are intended to reflect, as closely as possible, the laboratory performance under normal operating conditions. The evaluation and any corrective actions are handled in accordance with the requirements of the Internal Audits SOP.

23.1 Scheduled PT Samples

The laboratory participates in a minimum of two separate PT studies each year for the drinking water, wastewater, and RCRA solids parameters for which we hold accreditations/certifications and as required by the USEPA Discharge Monitoring Report – Quality Assurance (DMR-QA) program for chemical analyses. These are single-blind studies that are scheduled approximately six months apart. One set of PT samples is analyzed annually for the environmental microbiological testing parameters for which we are certified. Other microbiological parameters in food/solid matrices are performed three times per year.

Upon receipt of the PT report, the QA department evaluates the results and distributes copies of the report to the Managing Director and Production Manager.

23.2 Non-scheduled Proficiency Samples

In addition to the routinely analyzed and scheduled PT samples, PT samples may be submitted into the lab for analysis. The necessity for these additional PT samples is at the discretion of the QA Director, upon request from the Managing Director, Production Manager or a Group Leader as a follow-up to corrective action requests from unacceptable PT results on external performance testing samples, and upon a valid request from a client. These can be submitted as single-blind or double-blind samples.

23.3 PT Sample Performance Criteria

Unless specified by the certification program, performance samples are obtained from a vendor approved by a Proficiency Testing Provider Accreditor (PTPA). PTPAs approve vendors that are able to operate a compliant program according to the requirements of The NELAP Institute (TNI) as defined in Volume 1, Module 1 of the TNI 2009 standard.

Of the PT samples analyzed, acceptable performance, as defined by the PT program, must be obtained for two of the last three samples analyzed for each field of testing. The analysis of the three rounds is limited to a maximum of eighteen months. The date analyzed for two PT samples applicable to the same field of testing must be at least 30 days apart.

The PT sample provider is authorized to release the results of all PT samples applicable to our accreditation / certification directly to our accrediting / certifying authorities.

All performance samples are logged in and handled as actual client samples. This allows for the application of the same staff, methods, preparation and analytical procedures, equipment, and facilities as real client samples.

Prior to the official release of study results from the provider, Microbac will not send a PT sample or a portion of the PT sample to another laboratory for analysis. This includes sending the sample or a portion of the sample to another facility within the Microbac network of labs. Moreover, the Chicagoland Division will not knowingly receive and analyze a PT sample or a portion of a PT sample from another laboratory including one within the Microbac network of labs. Accordingly, prior to the official release of study results from the provider, Microbac Laboratories will not communicate our results to another lab nor try to obtain the results for a PT sample from the provider or another laboratory.

The laboratory data, submitted results, and final report for all PT samples are considered laboratory records and are retained accordingly. Any LIMS-generated report for a PT sample, the report submitted to the provider, and the final report from the provider is retained in the QA office. Results identified as “Not Acceptable”, as defined by the PT program, must be investigated and appropriate corrective action taken and documented. The Corrective Action Form is used to document the failure and the corrective actions taken. The QA office maintains documentation of this investigation and the resulting corrective actions.

24.0 EQUIPMENT, SUPPLIES AND SERVICES

24.1 Major Equipment

A list of the major analytical equipment is included in Appendix G. Individual pieces of major analytical instrumentation are given a unique identification number. For every Instrument ID, the following information is logged into the Equipment List.

- Instrument type
- Description
- Manufacturer
- Software
- Model
- Serial Number
- Date purchased
- Condition upon receipt
- Equipment complies with specifications
- Date put into service
- Date out of service (when applicable)

Before being placed into service, new equipment is calibrated and verified to ensure that it meets required specifications. QA authorization is required before new equipment is used in production.

24.2 Instrument Maintenance

Routine maintenance is performed according to the manufacturers' recommended procedures. The frequency of this maintenance is based upon the manufacturer's guidance and the experience of the trained analytical staff. Only trained staff or certified third-party contractors will perform equipment and instrument maintenance or repairs. Instrument-specific logbooks are used to document the maintenance (both scheduled and non-scheduled) performed on each piece of equipment. Copies of manufacturer maintenance reports are also retained in these logbooks. At a minimum, maintenance logs will include the following information.

- Instrument ID
- Specific required maintenance items
- Operator's manual, if available

- Service records of calibration/verification/maintenance

Major instruments as well as support equipment that are generating output that does not meet the required acceptance criteria and equipment undergoing verification of service suitability must be labeled as “Out of Service” to ensure that it is not inadvertently used in production prior to QA approval. If appropriate, the power supply to the equipment should be interrupted. When an instrument problem occurs, the effect on data previously generated is evaluated, where applicable. Whenever equipment goes outside the direct control of the laboratory for repair, maintenance, or for some other purpose; the laboratory ensures that the function and calibration status of the equipment are checked and shown to be satisfactory before the equipment is returned to service.

25.0 DATA REDUCTION, VALIDATION AND REPORTING

25.1 Data Reduction

Data reduction involves the handling of raw sample data including, but not limited to, detector response, electrode potential readings, titrant volumes, and gravimetric measurements to achieve final sample concentrations. Automated systems are used for calculation and reduction wherever feasible.

25.2 Data Review

A minimum two-tier technical review of all data is performed and documented. This provides for the documentation of data review, verification, and cross-checking procedures. The details of this procedure are included in the Peer Review and Electronic "QA Validation" of Analytical Results SOP.

25.2.1 1st Level Technical Review

The Laboratory Technician performing an analysis reviews the data and is responsible for ensuring that the calculations were properly performed and the quality control requirements were met. All final calculations and the evaluation of quality control samples are performed by the LIMS. A Data Review Checklist is initiated by the Technician to document this review. Results from all measurements (including client samples and QC samples) of an in-control batch are now available for entry into the LIMS. The Data Review Checklist is then given to a peer knowledgeable with the current requirements of that analytical procedure, a Senior Technician, Group Leader, Production Manager, the QA Department, or the Managing Director.

25.2.2 2nd Level Technical Review

A peer, Senior Technician, Group Leader, Production Manager, the QA Personnel, or the Managing Director reviews the data by repeating the verification performed by the Laboratory Technician. This step is documented through use of the Data Review Checklist. Data entered into the LIMS via electronic data transfer may be reviewed electronically. Data entered into the LIMS via manual data entry must be reviewed using the raw data, where a representative number of the calculations are verified and the quality control parameters are evaluated. A Project Manager may review Field data entered into the LIMS.

Acceptable data are now available for approval in the LIMS. This is performed through the "Update Status to Reviewed" function of the LIMS. This step approves the data for release to the client. The ability to perform this approval step is limited through the select issue of rights and is controlled by use of usernames and passwords. Data not meeting the requirements of the standard operating procedure is appropriately qualified using the narrative function in the LIMS.

25.2.3 Project Manager Review

Before the data is released to the client, a Project Manager will review all final reports for appropriatness, consistency and completeness to ensure that the data meet the overall data quality objectives of the client and the project. This review is intended to verify that those analyses requested have been performed, the appropriate methods and reporting limits have been applied, the sample identification information is accurate, and the appropriate data qualifiers have been added.

25.2.4 Quality Assurance Review

In addition to the tiered review process, the quality assurance department will periodically perform data audits. These audits, required as part of our quality systems audit program, can be performed for the generation of reports that include quality control data, and as a troubleshooting measure.

25.3 Reporting

Microbac offers a variety of report packages. The details of these reports are listed below and the procedure for generating these reports found in the Report Generation SOP.

25.3.1 Level "I Std" Report – Result Summary

The basic report format is results only. This standard analytical report, accompanied by a cover letter and Work Order Summary, contains the following elements. The cover letter and summary report provide a link to the result page(s). The Project Manager responsible for the generation of the report and its contents signs the cover letter.

- Laboratory name, address, and phone number
- Title of "Analytical Results"
- Date reported

- Client name (with address on the cover letter)
- Client project ID
- Work Order and Sample number (providing a unique report number)
- Client sample identification and description
- Client-defined matrix
- Collection date and time
- Date received
- Analyte
- Result (at client-requested reporting limits and units)
- Reporting limit
- Units
- Applicable data qualifiers for blank contamination, spike recovery failure, duplicate recovery failure, and identification of values that exceed the linear range of the instrument, as applicable
- Dilution factor
- Date and time of sample preparation
- Preparation and analytical method references
- Date and time of analysis
- Analyst initials
- Page numbering

The chain of custody form and the LIMS Cooler Inspection Form are returned with each report. Any deviations from the requirements of our Sample Acceptance Policy will be noted in the final report on the Cooler Inspection Form. Quality Control deficiencies having an effect on the data, if present, are identified in a Case Narrative report generated by the LIMS.

25.3.2 Level "II Std" Report

The Level "II Std" report format includes all elements of the Level I report plus additional quality control data. The quality control data is delivered in the form of QC Summary Reports generated by our LIMS. The QC Summary Reports for a Level II report include the results for the batch controls (i.e. method blank and laboratory control sample) and the matrix controls (matrix spike, duplicate, etc).

25.3.3 Level "III" Report

The Level "III Std" report format includes all elements of the Level II report plus additional quality control data. The quality control data is delivered in the form of QC Summary Reports generated by our LIMS. The QC Summary Reports for a Level III report include the results for the batch controls as well as the instrument controls, (initial and continuing calibration verification and blank checks), tune and calibration standards.

25.3.4 Level "IV Std" Report

The Level "IV Std" report format includes all elements of the Level "III Std" report and copies of the raw data for all analyses. The QC Summary Reports for a Level "IV Std" report include the results for the instrument, batch, and matrix controls. A Case Narrative report is included for each analytical group and addresses sample receipt conditions, a hold time evaluation, calibration, instrument quality control, batch quality control, and matrix quality control. Our Level "IV" report format is compliant with the requirements of the Indiana Department of Environmental Management (IDEM) Office of Land Quality and Office of Water Quality.

25.3.5 Level "IV DoD" Report

This report format includes all elements of the Level "IV Std" report as well as a cover page and Case Narrative that meet the requirements for Department of Defense.

25.3.6 CLP-Like Reports

Our Level III and Level IV report formats can be furnished using CLP-equivalent forms. These forms are included as a replacement to the QC Summary Reports typically supplied in our data packages.

25.3.7 Electronic Data Deliverables (EDD)

Electronic data deliverables are available in various formats depending on project requirements. The content of the EDD reports is verified by the Project Manager prior to issuing the results to the client.

26.0 DEFINITIONS

Accuracy – The degree of agreement of a measured value with the true or expected value of the quantity of concern (% recovery of a known spiked analyte).

Aliquot – A measured portion of a sample, or solution, taken for sample preparation or analysis.

Analyte – The specific component measured in an analysis.

Analytical Batch – A group of samples which are analyzed, at the instrument level, together using the same method, reagents, and apparatus within the same general time period. Typically, these are samples in the same sequence in the LIMS.

Aseptic / Sterile Technique – The name given to the procedures used by microbiologists to prevent microbial contamination of themselves, which may result in infection, contamination of the environment they are working in, and contamination of the specimen they are working on, which is especially important when a pure culture is desired. It is used whenever specimens are to be transferred between media, for example, when sub-culturing. More detail may be found in the Good Laboratory Practices SOP.

Bias – The deviation of a measured value from a known or accepted value due to matrix effects or method performance. Bias may be determined quantitatively to correct measured values. Bias may be positive or negative.

Blank – An artificial sample designed to assess specific sources of laboratory contamination. There are several types of blanks, which monitor a variety of processes:

- Calibration Blank – An aliquot of the standard diluent (water or organic solvent) that is not carried through the sample preparation scheme. It is analyzed to verify that the analytical system is free from contamination. Also referred to as an instrument blank or solvent blank.
- Equipment Blank – An aliquot of lab pure water collected in the field and analyzed to determine the level of contamination introduced into the sample due to sampling technique.
- Field Blank – An aliquot of lab pure water transferred in the field and analyzed to determine the level of contamination due to environmental factors at the site.

- Method Blank – An aliquot of lab pure water or solid matrix taken through sample preparation (when required) and analysis. It is a test for contamination in sample preparation and analyses. Also referred to as a Preparation Blank.
- Trip Blank – An aliquot of lab pure water in a sample container similar to that used for the associated samples. A trip blank remains unopened throughout the sampling, handling, and transportation of the containers and samples. It is used to measure for possible cross-contamination during transport, handling, and storage. Trip Blanks are most useful in documenting contamination in the analysis of volatile organic analytes.

Breakdown – A measure of the decomposition of certain analytes (DDT and Endrin) into by-products.

Calibration – The establishment of an analytical curve based on the absorbance, response, emission intensity, or other measured characteristic of known standards. The calibration standards must be prepared using the same type and concentration of acids, solvents, or other solutions used in the sample preparation.

Calibration Factor – A measure of the gas chromatographic response of a target analyte to the mass injected. The calibration factor is analogous to the Relative Response Factor (RRF) used in GC/MS analysis.

Chain-of-custody – Procedures and associated documents designed to trace the custody of a sample(s) from the point of origin to final disposition, with the intent of legally demonstrating that custody remained intact and that tampering or substitutions were precluded.

Completeness – The percentage of measurements made which are judged to be valid measurements. The completeness goal is to generate sufficient amount of valid data based on project needs.

Confirmation – (a) In gas chromatography, an unknown compound in a sample is identified based upon its retention time on a specific chromatographic column. Because several compounds may exhibit the exact same retention time on a given column, a secondary analysis on a different column or detector is often required for additional confidence in the compound identification. (b) In microbiology, additional tests are performed on all presumptive positive colonies. Confirmation procedures include, for example, the use of MOX/Palcam plates.

Continuing Calibration Verification Standard (CCV) – A standard used to verify the continued acceptability of the initial calibration curve. A continuing calibration verification standard must be analyzed at a set frequency depending on the method requirements. When using an external calibration technique, the concentration of the continuing calibration verification standard shall be varied within the established calibration range. If an internal standard is used, only one CCV must be analyzed per analytical batch.

Control Chart – A graphical plot of test results with respect to time or sequence of measurements together with limits within which they are expected to lie when the system is in a state of statistical control.

Control Limit – The limits shown on a control chart beyond which it is highly improbable that a point could lie while the system remains in a state of statistical control.

Data Quality Objectives (DQOs) – During the planning phase of a project requiring laboratory support, the data user must establish the quality of data required from the investigation. Such statements of data quality are known as DQOs. DQOs are qualitative and quantitative statements of the data required to support specific decisions or regulatory actions. DQOs must take into account sampling considerations as well as analytical protocols.

Data Reduction – The process of transforming the number of data items by arithmetic or statistical calculation, standard curves, and concentration factors, and collating them into a more useful form.

Detection Limit – The smallest concentration/amount of some component of interest that can be measured by a single measurement with a stated level of confidence. More detail may be found in the Capability and Detection Limit Studies SOP.

- CRL – Contract-required detection limit.
- IDL – Instrument detection limit. A statistically determined detection limit used to estimate the instrument's sensitivity. The IDL is obtained by analyzing seven consecutive blanks to assess the variability of the instrument.
- LOD – Limit of Detection. An estimate of the minimum amount of a substance that an analytical process can reliably detect above background or average blank response. An LOD is analyte- and matrix-specific and may be laboratory-dependent.
- MDL – Method detection limit. The minimum concentration of a substance that can be measured and reported with a 99% degree of confidence. MDLs are determined by

analyzing a minimum of seven consecutive standards that have been processed through all preparatory steps.

Dilution – Weakening or reducing the concentration of a compound through the addition of water or a thinner. It is this laboratory's policy to use the smallest achievable dilution for the reporting of results. The dilution result should fall within the midrange of the calibration curve.

Dixon's Outlier Test – A statistical test used to measure the validity of a data point in comparison to an applicable data population. This is particularly useful with relatively small (3 to 25) data populations. Reference Use of Statistics to Develop and Evaluate Analytical Methods, Grant Wernimont, AOAC, page 156, 1985.

Double Blind Sample – A sample, of known concentration by the submitter, that is submitted in such a way that the analyst does not know its composition as a QC sample nor the concentration.

Ethical Behavior - Actions performed that exhibit right or good conduct.

Headspace – Any area in a container not completely filled by the sample, thus allowing gases to collect in that space.

Holding Time – The maximum storage time allowed between sample collection and sample analysis when the designated preservation and storage techniques are employed.

Initial Calibration Verification (ICV) – A standard used to verify the accuracy of calibration standards. Analyzed immediately following calibration and being prepared from a second source than that of the calibration standards, its known value is measured against the calibration curve. This determines the integrity of the calibration curve. This is also referred to as an external verification standard or check standard.

Interference Check Standard (ICS) – Applicable to analysis performed using ICP and consisting of two standard solutions (A and AB), the ICS is analyzed to verify that correct background and interelement corrections are being applied.

Internal Standard (IS) – An analyte not of interest as a target yet having a similar chemistry to the targets, which is added to all samples, QC samples, and calibration standards just prior to instrument analysis. Applicable to ICP and GC/MS analyses only, internal standards are used as the basis for quantitation of target compounds for GC/MS analysis.

Laboratory Control Sample (LCS) – An aliquot of laboratory pure reagent spiked with target analytes or compounds representative of target analytes. The sample is carried through the entire analytical process and analyte recovery is used to monitor method performance. Also referred to as a laboratory fortified blank (LFB).

Laboratory Control Sample Duplicate (LCSD) – An aliquot of laboratory pure reagent spiked with the identical amount(s) of target analyte(s) as the LCS. Results of the two spikes are used to assess both the bias and precision of a method with a given sample matrix.

Matrix – The component or substrate which may contain the analyte of interest. Matrices are generalized into the following:

- **Aqueous** (includes extracts from the TCLP or other extraction procedure, groundwater, surface water, wastewater, and drinking water (potable water and laboratory pure water),
- **Air** (Includes Summa Canisters, PUF cartridges and Sorbent Tues.)
- **Filter**
- **Oil** (organic liquid having <15% settleable solids)
- **Product** (Incudes any shelf stable client product.)
- **Solid** (includes sediment, sludge, and soil).
- **Sponge**
- **Swab**
- **Wipe**

Matrix Interference – The influence of the sample matrix or sample components upon the ability to qualitatively identify or quantitatively measure compounds in client samples.

Matrix Spike (MS) – An aliquot of a sample that is spiked with a known amount of target analyte(s). Recovery of the matrix spike, expressed as percent recovery, is used to assess the bias of a method in a given sample matrix.

$$\%R = (SSR - SR) * 100$$

$$\frac{SSR - SR}{SA}$$

Where: SSR = Spike sample results (mg/L)
SR = Sample result (mg/L)
SA = Spike added (mg/L)

Matrix Spike Duplicate (MSD) – An aliquot of the same sample used for the MS, spiked with the identical amount(s) of target analyte(s) as the MS. Results of the two spikes are used to assess both the bias and precision of a method with a given sample matrix.

$$\%D = \frac{(X - Y)}{X} * 100$$

where: X = value 1
Y = value 2

Method of Standard Addition (MSA) – A method in which small increments of a substance under measurement are added to a sample to establish a response function, and by extrapolation, to determine the amount of the substance originally present in the sample.

Narrative – Portion of the report that includes details and information about the sample and the analytical data. The LIMS and report structure generate different types of narratives including:

- Batch Narrative – report generated by the LIMS in which details are given for any quality control nonconformance and its effect on the data, where the nonconformance affects all samples in the batch.
- Case Narrative – report which details the number of samples received, date received, requested analyses, evaluation of holding times, and a summary of the quality control test results.
- Sample Narrative – report generated by the LIMS in which details are given for any quality control nonconformance and its effect on the data, where the nonconformance is sample specific within the batch.

Percent Difference (%D) – Used to compare two values, the percent difference indicates both the direction and the magnitude of the comparison. The percent difference may be either negative, positive, or zero. (In contrast, see relative percent difference.)

$$\%D = \frac{(X - Y)}{X} * 100$$

where: X = value 1

Y = value 2

Percent Recovery – A measure of accuracy that is calculated as the measured value relative to the true value, expressed as a percent.

$$\%R = \frac{MV}{TV} * 100$$

where: MV = measured value
TV = true value

Precision – The degree of mutual agreement characteristic of independent measurements as the result of repeated application of the process under specified conditions. It is concerned with the comparability of results from duplicate or replicate analyses (%RPD between the recoveries of two known analyte spikes, and %RSD between the recoveries of three or more measurements).

Preparation Batch – A group of samples of similar composition which are prepared together using the same method, reagents, and apparatus within a 24 hour calendar day or every 20 samples, whichever is more stringent. Typically, these are samples in the same batch ID in the LIMS.

Preservative – A reagent added to a sample, or an action used, to prevent or slow decomposition or degradation of a target analyte or a physical process. Thermal and chemical preservation may be used in tandem to prevent sample deterioration.

Relative Percent Difference (% RPD) – Used to compare two values, the relative percent difference is based on the mean of the two values, and is reported as an absolute value, i.e., always expressed as a positive number or zero. (In contrast, see percent difference.)

$$\% RPD = \frac{|X - Y| * 100}{(X + Y) / 2}$$

where: X = value 1
Y = value 2

Relative Response Factor – A measure of the relative response of an analyte compared to that of its internal standard. Relative response factors (RRF) are determined by analysis of calibration standards and are used in the quantitation of target analytes in samples. RRF is calculated as follows:

$$RRF = \frac{Ax \times Cis}{Ais \times Cx}$$

where: Ax = area of the compound of interest measured

Cis = concentration of the internal standard

Ais = area of the internal standard

Cx = concentration of the analyte of interest

Relative Retention Time (RRT) – The ratio of the retention time of a compound to that of a standard (such as an internal standard).

$$RRT = \frac{RT_c}{RT_{is}}$$

where: RT_c = Retention time for the semi-volatile target or surrogate in continuing calibration.

RT_{is} = Retention time for the internal standard in calibration standard or in a sample.

Relative Standard Deviation – Statistical parameter used to measure the variability of a data set with respect to the mean of that data set.

%RSD = (SD / mean) * 100

Reporting Limit (RL): A client-specified lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix. The RL is set at or above the LOQ.

- PQL – The Practical Quantitation Limit is the lowest concentration that can reliably be achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Typically, the PQL is a value in the range of 5 - 10 times the MDL. This is the reporting limit and is also referred to as the Estimated Quantitation Limit (EQL).
- LOQ: Limit of Quantitation. The lowest concentration that produces a quantitative result within specified limits of precision and bias. The LOQ shall be set at or above the concentration of the lowest initial calibration standard. Also referred to as Minimum Reporting Limit (MRL). LOQ Concentration should be included in calibration range.

Retention Time – The time elapsed from sample injection until the specific compound elutes or exits the chromatographic column at the detector. Each analyte has a characteristic retention time on a specific column allowing this information to be used to qualitatively identify the analytes in the sample.

Sample – A portion of material to be analyzed. Sample type can be identified by its intended use. As follows:

- Environmental Sample – Material supplied by the client for analysis.
- Laboratory QC Sample – Used in assessing the performance of the analytical system. Examples include, but are not limited to, method blanks, laboratory control samples, and calibration verification samples.
- Matrix-specific QC Sample – Used to asses the accuracy or precision of the measurement in a given sample matrix. Examples include, but are not limited to matrix spikes, duplicates, and surrogates.

Sample Delivery Group (SDG) – A unit within a single project that is used to identify a group of samples for delivery. Unless defined otherwise by the client, a SDG is a group of field samples within a project, received at one time or as defined by the client or project.

Sample Duplicate – Two aliquots of the same sample processed independently. This monitors precision of the analysis. Precision results are reported as relative percent difference (RPD).

Single Blind Sample – A sample, of known concentration by the submitter, that is submitted in such a way that the analyst does not know the concentration.

Standard Deviation - A statistical parameter that indicates the variability of a data set as centered on the mean.

$$SD = \sqrt{\sum(x_I - x_{mean})^2 / n-1}$$

Where,: x_I is an individual value

X_{mean} is the average of all values

n is the total number of values in the data set

Standard Operating Procedure (SOP) – A procedure adopted for repetitive use when performing a specific measurement or task. It may be a standard method or one developed by the client or lab.

Surrogate Compound –Compound that behaves similarly, with respect to the analytical method, as the analytes of interest but is not normally found in client samples. Applicable to GC, GC/MS, and HPLC analyses only, surrogates are often isotopic homologues of target analytes. Surrogate(s) are added to all blanks, samples, and QC samples prior to preparation and analysis. Recovery of surrogates is used to assess method performance.

27.0 REFERENCES

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11. Methods for the Determination of Inorganic Substances in Environmental Samples, USEPA, EPA/600/R-93/100, August 1993.
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19. Microbac Laboratories, Inc. Corporate Policies and Procedures Manual.
20. DoD Quality System Manual Version 4.2, 10/25/2010
21. DoD Quality System Manual Version 5.0, July 2013
22. TNI Standard EL V1 ISO 2009

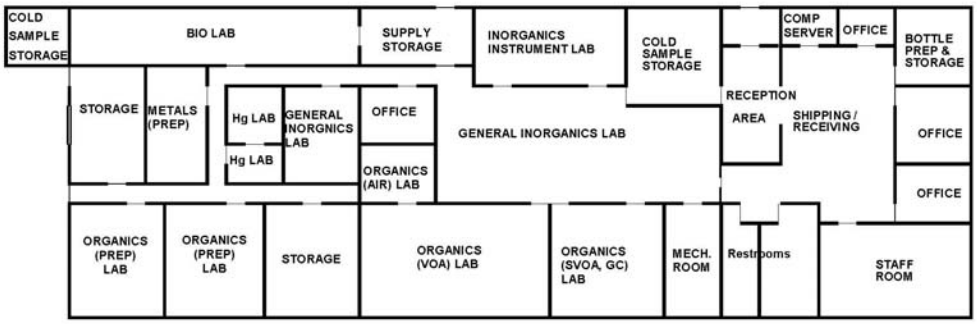
30.0 APPENDICES

The contents of the following appendices are fluid and due to their nature may be changed without necessitating a revision to this Plan. When critical to the quality of analytical results, employees are notified of the changes and documentation of this notification retained.

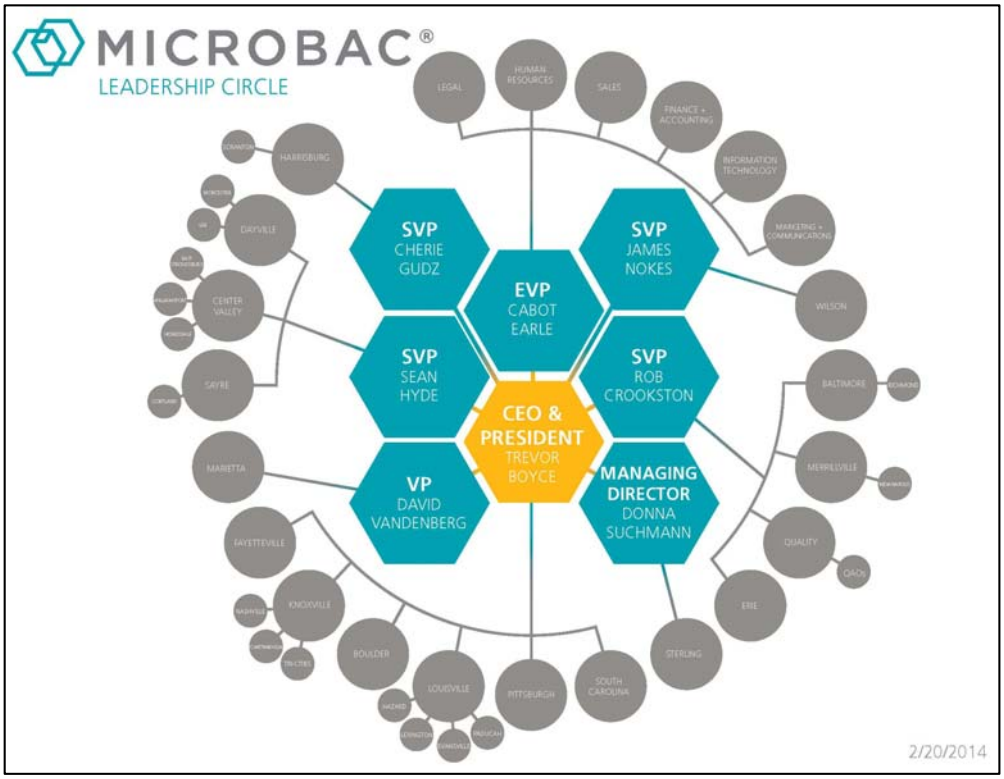
30.1 APPENDIX A – FACILITY FLOOR PLAN

MICROBAC®

Chicagoland Division
250 West 84th Drive
Merrillville, Indiana 46410



30.2 APPENDIX B – ORGANIZATION CHARTS MICROBAC LABORATORIES, INC.



MICROBAC®

Microbac Leadership Structure

Senior Executive Team (SET)

The SET formally leads Microbac through strategy development, decision-making on key issues, and by communicating key messages that keep the entire organization aligned. The SET is ultimately accountable for moving Microbac forward.

Trevor Boyce (CEO), **Chris Abruzzo**, **Rob Crookston**, **Cabot Earle**, **Gary Evans**, **Tamara Grecco**

Advisory Council (AC)

Appointed by the CEO and with a membership that will change over time, the AC is a cross-functional and representative group - including Sales and Quality - that contributes advice, champions change, and provides both functional and communications support for the SET. The Council is expected to focus on specific and critical initatives that have implications for the entire company.

James Nokes (Chair)**, Debra Elliott**, **Curt Fleming**, **Sean Hyde**, **Kip Lee**, **Rich Mason**, **Joanne Simanic**, **Brad Stawick**, **Donna Suchmann**, **David Vandenberg**, **Ron Warila**

Operations Management Team (OMT)

Consisting of members that represent Divisions and Functions within Microbac, the OMT manages and achieves P&L targets, implements change, and cascades key messages to their colleagues and the rest of the organization.

Divisions

Baltimore	**Chris Weathington** RC
Boulder	**Sean Hyde** RC, Temp
Chicagoland	**Rob Crookston** TB
Eastern PA	**Fiona Adamsky** RC
Erie	**Ron Boquist** RC
Fayetteville	**Rob Dermer** TB
Kentucky	**David Lester** RC, Temp
New England	**Ron Warila** TB
Ohio Valley	**David Vandenberg** TB
Pittsburgh	**Hesham Elgaali** RC
Sayre	**Mike Fifield** RC
Sterling	**Donna Suchmann** TB
Tennessee	**Ashley Morris** RC
Wilson	**James Nokes** TB

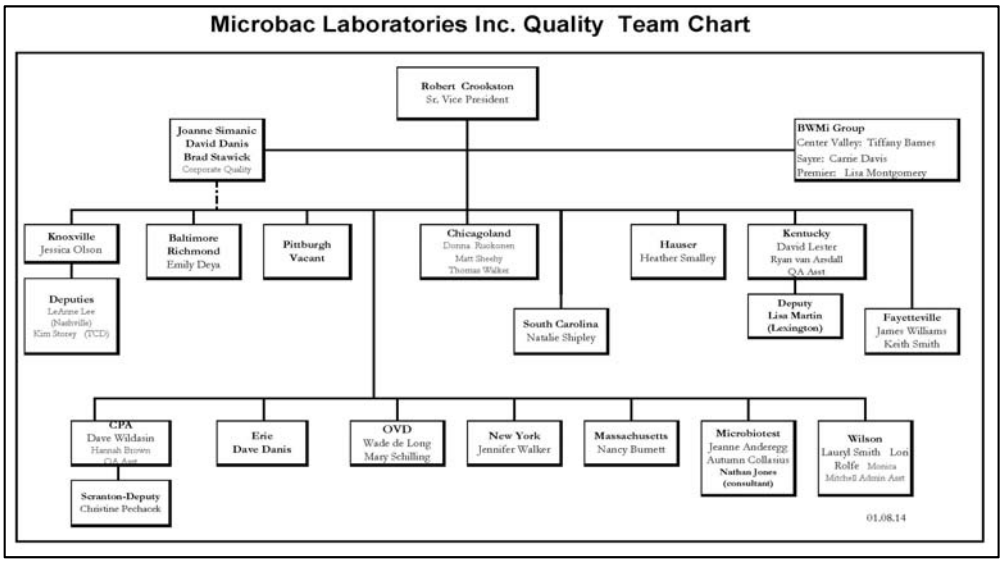
Functions

Benefits & Employee Relations	**Lynette Bauer** CE
Business Transformation	**Gary Evans** TB
Design	**Kip Lee** TB
Finance & Accounting	**Tamara Grecco** CE
Information Technology	**Curt Fleming** CE
Legal & Regulatory Affairs	**Chris Abruzzo** TB
Marketing	**Susan Shepard** CE
Quality	**Robert Crookston** TB
Safety	**Bob Gajewski** RC
Sales	**Cabot Earle** TB
Talent	**Errold Cobbins** CE

Reports to:

TB	**Trevor Boyce**	RC	**Rob Crookston**
CE	**Cabot Earle**	Temp	**Temporary position**

Updated 2015-06.25


Microbac Laboratories Inc. Quality Team Chart
Robert Crookston
Sr. Vice President
Joanne Simanic
David Danis
Brad Stawick
Corporate Quality
BWMi Group
Center Valley: Tiffany Barnes
Sayre: Carne Davis
Premier: Lisa Montgomery
Knoxville
Jessica Olson
Deputies
LeAnne Lee
(Nashville)
Kim Storey (TCD)
Baltimore
Richmond
Emily Deya
Pittburgh
Vacant
Chicagoland
Donna Ruokonen
Matt Sheehy
Thomas Walker
South Carolina
Natalie Shipley
Hauser
Heather Smalley
Kentucky
David Lester
Ryan van Arsdall
QA Asst
Deputy
Lisa Martin
(Lexington)
Fayetteville
James Williams
Keith Smith
CPA
Dave Wildasin
Hannah Brown
QA Asst
Scranton-Deputy
Christine Pechacek
Erie
Dave Danis
OVD
Wade de Long
Mary Schilling
New York
Jennifer Walker
Massachusetts
Nancy Bumett
Microbiotest
Jeanne Anderegg
Autumn Collarius
Nathan Jones
(consultant)
Wilson
Lauryl Smith Lori
Rolfe Monica
Mitchell Admin Asst
01.08.14

MICROBAC®

NAME	EDUCATION	FUNCTION	DEPARTMENT	APPLICABLE EXPERIENCE SINCE
Robert Crookston	B. S. Biology; CHMM	Managing Director	Administration	1988
Troy Goehl	B. S. Chemistry; M. A. Organizational Mgmt	Production Manager	Production	1997
Donna Ruokonen	B. A. Biology; MBA	QA Director	Quality Assurance	1998
Kevin Falvey	B. A. Social Sciences; CHMM	Business Development Manager / Waste Coordinator	Client Services	1990
Michael Chenoweth	B.S. Geology	Field Services Manager	Field Services	1992
Ronald Misiunas	M.S. Molecular Biology	Director of Client Services	Client Services	1992
Kristen Gehlbach	B. S. Biology	Senior Project Manager	Client Services	2007
Karen Ziolkowski	B. S. Medical Technology	Senior Project Manager	Client Services	1984
Carey Gadzala	High School Diploma	Project Manager	Client Services	2003
David Bryant	High School Diploma	Project Manager /Sample Custodian	Client Services	2008
Matthew Sheehy	A. S. Math; B. S. Chemistry; M. S. Chemistry	QA Specialist	Quality Assurance	2007
Judythe Samter	B. S. Biology & Chemistry	QA Specialist	Quality Assurance	1976
Carla Svetich	A. S. Accounting	QA Specialist	Quality Assurance	1990
Sang Chung	B. S. Biology; M. S. Env. Mgt.	Organics Manager	Organics	1992
Jennifer Noel	B. S. Biology	Scientist II	Organics	1998
Brian Reimink	B. S. Biology	Analyst II	Organics	2002
Amy Sheehy	B. S. Biology	Analyst II	Organics	2000
Randon Lingenfelter	B. S. Chemistry	Analyst II	Organics	2005
Diandra Lawson	B. S. Chemistry	Analyst I	Organics	2014
James Meyer	High School Diploma	Analyst I	Organic Prep	2010
Ryan Maslanka	B. S. Biology	Analyst I	Organics Prep	2014
Shon Ahrendt	B. S. Biological Sciences	Scientist II	Metals	1995
Steven Endersen	B. S. Biology; M. S. Chemistry	Analyst I	Metals	1986
Allison Grieff	B. S. Biology	Analyst II	Wet Chemistry	2010
Emily Brenan	B. S. Biology; B.S. Chemistry	Analyst I	Wet Chemistry	2012
Chase Freeland	B. S. Chemistry	Analyst I	Wet Chemistry	2015
Shannon Doyle	High School Diploma	Analyst I	Wet Chemistry	2015
Renee Clayton	B. S. Biology	Group Leader/Analyst II	Microbiology	2002
Stephanie Glass	High School Diploma	Analyst I	Microbiology	2013
Adriana Lugosan	B. S. Biology	Analyst I	Microbiology	2014
Nichole Rainwater	B. A.	Sample Custodian	Field Services	2001
Pete Petrusha	2 yr. Bachelor's Program	Field Technician III	Field Services	1995
Jim Deter	High School Diploma	Field Technician II	Field Services	1999
Bill Griffiths	High School Diploma	Field Technician II	Field Services	2000
Mike McCoy	High School Diploma	Field Technician II	Field Services	1970
Ronald Dunson	A. S. Science/Liberal Arts	Field Technician I	Field Services	1988
John Goolsby	High School Diploma	Field Technician I	Field Services	2014
Adam Hutchison	B. S. Biology	Field Technician I	Field Services	2014

Appendix D – List of Standard Operating Procedures

Following is a list of the Standard Operating Procedures. This list is revised as needed. An up-to-date list of the SOPs is available through the QA office.

TITLE	REV #	FILENAME	LAST REVIEW
Corporate & Local Policies			
Corporate Administrative			
Motor Vehicle Record Policy	3	AD-002-3	1/12/2015
Outside Testing Subcontracting Policy	1	AD-003-1	3/17/2009
Travel and Expense Policy	3	AD-004-3	6/3/2014
Corporate Misc.	*	*	
Confidentiality of Client Data	1	CQA-CONFID	12/29/2000
Total Coliform Analysis by 3M Petrifilm; Dunkin Brand Quality Assurance Plan Procedure	0	CQA-PF	6/1/2006
Customer Care Policy	2	Customer Care Policy	5/1/2007
Cell Phone Policy	1	Local POLICY	3/1/2005
Human Resources & Organizational Development	0	HR How To Manual rev 102109	10/22/2009
Corporate Element	*	*	
Updating Bids in Element LIMs	0	EL-001-0 Updating Bids in Element	
Inactivating Expired Standards in Element	0	EL-002-0	3/6/2013
Inactivating Standards in Element: Program Installation	0	EL-003-0	3/6/2013
Assigning Salesman Code in Element	0	EL-004-0 Salesman Codes in Element	
Subcontract Pricing in Element	0	EL-007-0 Sub Pricing in Element	
Element Versioned Analyses	0	EL-009-0 Element Versioned Analyses	
Creating and Converting Non-Element Transfer Files	0	EL-012-0_Non-Element Transfer	5/14/2013
Corporate Finance	*	*	
Capital Expenditure Procedure	1	F-001-1 Cap Ex Procedure 05.10	5/28/2010
Fixed Asset Policy	0	F-002-0	10/1/2003
Trade Accounts Receivable Policy & Procedure	0	F-003-0	1/1/2009
General Ledger Closing Policy	1	F-004-1	10/8/2012
Corporate Food Microbiology	*	*	
Reporting Presumptive/Positive Pathogen Results	0	FM-001-0	11/7/2011
Microbiology Sample Handling and Preparation	1	FM-002-1	5/11/2012
Culture Maintenance	1	FM-003-1	3/11/2013
Environmental Monitoring for Microbiology	0	FM-004-0	11/7/2011
Media and Reagent Preparation and Qualification	0	FM-005-0	1/2/2012
Process Control Samples and Control Charting	1	FM-006-1	3/11/2013
Equivocal Results	0	FM-007-0 Equivocal Results	3/15/2013
Housekeeping for Molecular Testing	0	FM-008-0_Housekeeping for Micro	1/7/2014
E.coli O157:H7 by 3M MDS Method	0	FM-100-0_E.coliO157_MDS	8/1/2012
Listeria by 3M MDS Method	3	FM-101-2 Listeria_MDS	8/26/2014
Listeria Monocytogenes by 3M MDS Method	0	FM-112-0a Listeria mono_MDS	1/28/2015
Salmonella by 3M MDS Method	0	FM-102-0	8/1/2012
Aerobic Plate Count - Petrifilm	1	FM-103-1_APC_Petrifilm	1/7/2014
Coliforms and E.coli Counts - Petrifilm	1	FM-104-1_TC-EC_Petrifilm	1/8/2014
Enterobacteriaceae Count - Petrifilm	1	FM-105-1_EB_Petrifilm	1/8/2014
Staphylococcus aureus Count - Petrifilm	1	FM-106-1_Staph_Petrifilm	1/8/2014
Rapid Yeast and Mold Count Petrifilm	0	FM-107-0 Y&M Petrifilm	10/3/2013
Corporate Information Technology	*	*	
Password Security Policy	0	IT-100 PasswordSecurity	8/27/2012
Internet Acceptable Use Policy	0	IT-105-0 InternetUsePolicy	10/15/2012

TITLE	REV #	FILENAME	LAST REVIEW
Change Management Policy	0	IT-115-0 Change Mgt Policy	10/15/2012
Request for Change	0	IT-116-0 RFC	10/15/2012
Creating and Managing LIMS Users	1	LIMS-Users(1)	6/12/2007
Software Installation and Validation	2	SoftwareValidation(2)	10/15/2010
Updating Email Signature and Font	1	IT-201-1 EmailSignature	5/1/2015
Corporate Quality Assurance	*	*	
Project Acceptance Protocol for GMP and GLP Regulated Industries	0	Q-001-0	3/5/2009
Ethics and Data Integrity Policy	4	Q-002-04	6/19/2015
Microbac's "Open Door" Policy	0	Q-002-03-1 Appendix ODP	11/1/2010
Manual Integration Policy	1	Q-004-1	12/12/2011
Advertising Accreditation Status	0	Q-006-0	
Using the Conformance Management System	0	Q-008-0 CAPA	3/26/2013
Administrative	*	*	
After Hours Sample Receipt	2	AfterHoursReceipt(2)	11/2/2012
Analysis Code Maintenance	1	AnalyCodeMaint(1)	11/24/2014
Analytical Data Entry – Metals Section	2	DataEntry-AnalytMetals(2)	2/11/2011
Analytical Data Entry – Organics Section	2	DataEntry-AnalytOrg(2)	3/25/2013
Analytical Data Entry – Wet Chemistry	1	DataEntry-AnalytWetChem(1)	5/15/2007
Bottle Preparation and Shipping	3	BottlePrep&Shipping(3)	1/22/2015
Calibration of Manual Repipetters	3	RepipetterCalib(3)	10/28/2014
Capability and Detection Limit Studies	6	IDC-MDL(6)	8/29/2013
Complaint Feedback	4	complaint(4)	10/22/2014
Daily Balance Calibrations	4	BalCal(4)	10/22/2014
Daily Temperature and Water System Checks	3	DailyTempWaterChecks(3)	10/22/2014
Document Control	3	DocControl(3)	10/22/2014
Employee Training	2	Training(2)	10/21/2014
Estimation of Measurement Uncertainty	3	MeasUncert(3)	10/22/2014
Field Sampling Activities	3	Field Sampling Activities(3)	10/7/2014
Filling Dewar Tanks with Liquid Nitrogen	2	LiquidNitrogenFill(2)	3/2/2015
Generation and Updating of Statistical Recovery Limits	2	StatLimits(2)	10/22/2014
Glassware Washing and Preparation	4	GlassWash(4)	10/22/2014
Good Laboratory Practices (training document)	3	GLP(3)	10/22/2014
Groundwater Sampling	2	Field_Groundwater(2)	10/26/2012
Handling Confidential Business Information	1	CBI(1)	10/31/2014
Internal Audits	5	InternalAudits(5)	9/5/2014
Internal Chain of Custody	2	ICOC(2)	10/22/2014
Labeling of Standards, Reagents, Extracts, and Digestates	3	Labeling(3)	9/9/2014
Logbook Generation	2	LogbookGen(2)	10/22/2014
Manual Integration of Chromatographic Peaks	2	ManualIntegration(2)	10/22/2014
Reporting PADEP Drinking Water Samples	0	PADEP Reporting(0)	
Peer Review and Electronic “QA Validation” of Analytical Results	2	DataEntry-QAValid(2)	6/12/2012
Performing Computer System Backups	6	ServerBackup(6)	4/2/2015
Power Outage	0	PowerOutage(0)	4/30/2015
Preparation Batch Data Entry	3	DataEntry-Prep(3)	2/21/2013
Preparation of Standard Operating Procedures	6	SOPSOP(6)	9/2/2014
Processing Deviation / Corrective Action Reports: Root Cause Analysis, Corrective and Preventive Action	2		9/11/2014

TITLE	REV #	FILENAME	LAST REVIEW
Project Management	4	ProjectManagement(4)	11/1/2012
Record Transfer	1	RecordTrans(1)	10/21/2014
Report Generation	5	Report(5)	11/2/2012
Residual Chlorine Using DPD Colorimetry and Portable Chlorine Meters	7	Cl2-330-5(7)	5/8/2015
Revision, Reproduction and Tracking of the Quality Assurance Plan	1	QAP-RevTrack(1)	2/19/2015
Sample Compositing	2	SampleComposite(2)	10/22/2014
Sample Disposal	5	SampleDisposal(5)	3/31/2015
Sample Receipt and Login	12	SampleReceipt(12)	9/11/2014
Supermarket Sanitation Sample Collection	3	Supermarket Sanitation Sample Collection(3)	2/27/2015
Supply Procurement	5	Supply Procurement(5)	11/25/2014
Thermometer Calibration and Use	5	ThermCal(5)	2/18/2015
Timer Verification Using NIST Voice Announcement of Time	0	TimerVerification(0)	10/22/2014
Total Residual Chlorine by Amperometric Titration	3	Cl2-AmpTitration(3)	5/6/2015
Organic	*	*	
Determination of Volatile Organic Compounds (VOCs)in Air Collected in Specially-Prepared Canisters and Analyzed by GC/MS	8	TO-15(8)	3/2/2015
GC/MS Determination of Volatile Organic Compounds and Volatile Petroleum Hydrocarbons	10	624-8260(10)	9/25/2014
GRO/DRO/ERO/ORO/TPH Using GC-FID	1	GRO-DRO-ERO-ORO-TPH(1)	10/30/2012
n-Hexane Extractable Materials and Silica Gel Treated n-Hexane Extractable Materials in Soils and Solids using Soxhlet Extraction	6	HEM-Soxhlet(6)	11/24/2014
Interference Clean Up for PCB Analysis	4	OrgCleanup(4)	6/30/2015
Non-halogenated VOAs using GC-FID	wh	8015(0)	10/12/2012
Organochlorine Pesticides by GC-ECD	7	608-8081(7)	1/27/2015
Polychlorinated Biphenyls (PCBs) using GC-ECD	8	608-8082(8)	11/17/2014
Preparation of Aqueous Samples using Manual Liquid-Liquid Extraction	9	AqOrgPrp3510C(9)	9/9/2014
Preparation of Non-Aqueous Samples using Sonication	9	NAqOrgPrp3550(9)	9/4/2014
Preparation of Oil Samples For the Analysis Of Polychlorinated Biphenyls (PCBs)	4	PCB-OilPrep3580A(4)	2/16/2015
Preparation of Pigment Samples for the Analysis of Polychlorinated Biphenyls (PCBs) Congeners	2	PCB Pigment Prep(2)	2/17/2015
Preparation of Solid Samples for non-Volatile Organic Analytes using Soxhlet Extraction	2	NaqOrgPrp3540(2)	2/23/2015
Preparation of Wipe Samples For the Analysis Of Polychlorinated Biphenyls (PCBs)	4	PCB-WipePrep3580A(4)	2/17/2015
Semi-Volatile Organic Compounds (SVOA) by GC-MS	13	625-8270(13)	9/12/2014
Metals	*	*	
Extraction of Inorganic Analytes Using Deionized Water	3	WaterExtraction(3)	12/9/2014
Mercury using Cold Vapor Atomic Absorption Spectroscopy (CVAAS)	11	245-7471CETAC(11)	9/12/2014
Mercury using Automatic Fluorescence Spectroscopy	5	Hg-1631(5)	3/27/2015
Metals Using Inductively Coupled Plasma Emission Spectroscopy	11	2007-6010(11)	9/25/2014
Metals by ICP-MS	4	2008-6020(4)	11/24/2015

TITLE	REV #	FILENAME	LAST REVIEW
Methyl Mercury in Water Using Distillation, Aqueous Ethylation, Purge and Trap, and CVAFS	2	MethylMercury(2)	3/27/2015
Preparation of Aqueous Samples and Extracts for Total, Total Recoverable or Dissolved Metals Analysis by Inductively Coupled Plasma Spectroscopy	12	MetAqPrp-ICPFLAA(12)	3/13/2015
Preparation of Non-Aqueous Samples for Total Metals Analysis by ICP and ICPMS	12	MetNAqPrp(12)	9/12/2014
Synthetic Precipitation Leaching Procedure for Metals, Semi-Volatile Organic Compounds, and Wet Chemistry Analytes	2	SPLP1312(2)	12/9/2014
Toxicity Characteristic Leaching Procedure for Metals and Semi-Volatile Organic Compounds	9	TCLP1311MetalSVOA(9)	2/19/2015
Toxicity Characteristic Leaching Procedure for Volatile Organic Compounds	9	TCLP1311VOA(9)	1/22/2015
Turbidity	0	Turb(0)	2/19/2015
Wet Chemistry	*	*	
Acidity	2	Acidity(2)	4/29/2015
Alkaline Digestion of Solid Matrix Samples For Hexavalent Chromium	5	Cr+6Digest(5)	11/24/2014
Alkalinity by Titration	8	Alk(8)	11/24/2014
Ammonia – Nitrogen By Automated Phenate Colorimetry	11	NH3AutoPhen(11)	3/13/2015
API Gravity and Specific Gravity 6060 using Hydrometry	1	API_Spec_Gravity(1)	11/11/2014
Biochemical Oxygen Demand and Carbonaceous Biochemical Oxygen Demand	8	BOD(8)	7/31/2013
BTU by Calorimetry	4	BTU(4)	4/29/2015
Chemical Oxygen Demand Using Manual Colorimetry	10	COD(10)	2/26/2015
Chloride by Silver Nitrate Titration	6	Cl-AgNO3(6)	7/17/2015
Color by Visual Comparison	4	Color-Visual(4)	11/18/2014
Cyanide, Total, Amenable and Weak Acid Dissociable by Midi Distillation and Automated Colorimetry	10	CN-TotalAmenWAD(10)	5/29/2014
Determination of Carbon Dioxide, Mono Ethanol Amine or Heat Stable Salts in Praxair Samples Using Titrimetry	0	HeatStableSalts(0)	11/10/2014
Determination of Specific Gravity and Density using Gravimetry	3	SpGravity(3)	10/21/2014
Dissolved Oxygen	2	DO(2)	11/18/2014
Electrometric Determination of pH	9	pH(9)	2/24/2015
Ferrous Iron using Colorimetry	2	Fe+2(2)	2/19/2015
Fluoride using Manual Ion Selective Electrode Potentiometry	3	Fluoride_manual(3)	10/22/2014
Hexane Extractable Materials by EPA Method 1664B using Solid Phase Extraction	4	HEM-SPE(4)	3/5/2015
Hexavalent Chromium Using Automated Colorimetry	8	Cr+6(8)	11/11/2014
Ignitability (Flash point) using Open Cup and Closed Cup Analysis	7	Flash(7)	2/24/2015
Low-Level Phenolics, Total Recoverable Using Chloroform Extraction and Manual Colorimetry	2	LowLevelPhenolics(2)	11/18/2014
Mechanical Analysis and Neutralizing Value for Liming Materials Using Titration	1	LimingMaterials(1)	1/28/2015
Nitrate/Nitrite, Total as Well as Individual Nitrite and Nitrate Using Automated Colorimetry	4	NO3NO2-CdRed(5)	3/13/2015
Orthophosphate Using Colorimetry	2	OPO4-3651(3)	3/13/2015
Paint Filter Liquids Test	6	PaintFilter(6)	11/11/2014
Percent Free Acid Using Titrimetry	2	FreeAcid(2)	11/11/2014

TITLE	REV #	FILENAME	LAST REVIEW
Phenolics, Total Recoverable Using Automated Colorimetry	13	Phenolics(13)	3/13/2015
Reactive Cyanide or Reactive Sulfide Preparation	6	ReactivityPrep(6)	6/15/2015
Settleable Solids by Standard Methods Method 2540 F	3	SetSolids(3)	12/9/2014
Specific Conductivity	6	SpecCond(6)	2/24/2015
Sulfate Using Turbidimetry	5	SO4Turb(5)	12/9/2014
Thiocyanate using Standard Methods method 4500-CN- M	4	Thiocyanate(4)	2/23/2015
Total Acid Number using Color-Indicator Titration	1	TAN(1)	2/19/2015
Total Dissolved Solids for Aqueous Samples	8	TDS(8)	2/23/2015
Total and Reactive Sulfide	3	Sulfide(3)	6/15/2015
Total Kjeldahl Nitrogen by EPA Method 351.2	11	TKN351(11)	5/1/2015
Total Phosphorus Using Semi-Automated Colorimetry	5	PO4-3653(5)	3/13/2015
Total Solids, Total Volatile Solids, Ash, and Total Organic Content	8	TotalSolids(8)	12/9/2014
Total Suspended Solids for Aqueous Samples	8	TSS(8)	4/29/2015
Vanadium Pentoxide by Colorimetry	1	V5(1)	12/9/2015
Volatile Acids using Titrimetry	3	VolatileAcids(3)	12/9/2014
Microbiology	*	*	
Aerobic and Anaerobic Plate Count on Food, Swabs and Environmental Surfaces	3	APC(3)	2/24/2015
Aerobic Comparative Enumeration Assay	3	AerobicCEA(3)	2/23/2015
Aerobic Plate Count in Food Products, Sponges, Pre-manufactured Products, Swabs and Environmental Surfaces Using Petrifilm	1	APCPetrifilm(1)	2/18/2015
Aerobic Plate Count Bacteria in Food and Beverage Products Using Membrane Filtration	0	APC by MF (0)	2/13/2015
DairyContainersSOP(0)	0	DairyContainers(0)	4/13/2015
DairyPetrifilmSOP(0)	0	DairyPetrifilm(0)	2/20/2015
DairyAgarSOP(0)	0	DairyAgar(0)	2/20/2015
Detection of Salmonella Spp. in Foods Using TECRA Visual Immunoassay Method	1	SalmTECRA(1)	6/30/2015
E. Coli by Membrane Filtration Using MTEC Agar	4	E. coli MF(4)	9/17/2013
E. Coli by IDEXX Quanti-tray/2000	0	E.coli by Quanti-Tray(0)	9/17/2013
Enterobacteriaceae in Food Products, Sponges, Pre-manufactured Products, Swabs and Environmental Surfaces Using Petrifilm	1	EBPetrifilm(1)	2/18/2015
Fecal Coliform Bacteria Using Membrane Filtration	5	Fecal Coliform by MF(5)	10/11/2012
Legionella Using SM Method 9260 J	6	Legionella(6)	2/17/2015
Listeria Using BioRad Rapid L.mono Method AOAC 30406	1	Listeria BioRad(1)	3/31/2015
Microbiology Quality Control	2	MicroQC(2)	2/19/2015
Pathogen Confirmation	0	PathogenConfirmation(0)	2/24/2015
Quantitative Determination of Total Coliform and E. Coli in Food Products, Swabs, Pre-manufactured Products and Environmental Surfaces	1	TCFood(1)	10/11/2012
Staphylococcus aureus In Food Samples or Food Contact Surfaces	2	Staph(2)	6/30/2015
Statistical Enumeration Of Escherichia Coli and Total Coliform Using Most Probably Number (MPN) And Total Coliform Bacteria Using Most Probable Number (MPN)	0	MPN_SOP(0)	1/3/1900
Coliform and Escherichia in Food Products, Sponges, Pre-manufactured Products, Swabs and Environmental Surfaces Using Petrifilm	1	EC_TCPetrifilm(1)	2/18/2015
Total Coliform Bacteria Using Membrane Filtration	4	Total Coliform by MF(4)	10/29/2012

TITLE	REV #	FILENAME	LAST REVIEW
Total Coliform Bacteria Using ONPG-MUG	3	Total Coliform by ONPG-MUG(3)	6/15/2015
Yeast and Mold	1	Y_M(1)	12/26/2012
Yeast and Mold in Food and Beverage Products Using Membrane Filtration	0	Y&M by MF(0)	2/13/2015

30.5 APPENDIX E – ANALYTICAL QUALITY CONTROL TABLES

The following tables contain the method specific quality control requirements, acceptance criteria, and corrective actions for the analytical procedures performed. Additional details are contained in the method-specific Standard Operating Procedure (SOP) and should be adhered to where a discrepancy exists between these written criteria and the SOP.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – ORGANIC ANALYSES		
Pesticides by EPA Method 608 and SW-846 Method 8081A		
QC Parameter	**Requirement**	**Corrective Action**
DDT / Endrin Breakdown	Evaluate 4,4'-DDT and Endrin breakdown at the beginning of each 12-hour sequence. Acceptance criteria are ≤ 15% breakdown	If acceptance criteria are not met, perform instrument maintenance and re-evaluate breakdown.
Calibration	Minimum of 5 levels for single component analytes for Method 8081A; minimum of 3 levels for Method 608. A single point calibration is performed for multi-component analytes. Acceptable linear calibration if CF %RSD ≤ 10 for Method 608 or ≤ 20 for Method 8081A .	If calibration not linear, construct a non-linear calibration curve. Correlation coefficient (r) must be ≥ 0.99 and not forced through zero
Surrogates (SURR)	Added to all QC samples and environmental samples. Acceptance criteria are the statistically generated limits listed in LIMS. Two surrogates (DCB and TCMX) are added. Only one must meet the acceptance criteria.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, re-extract and analyze. If analyses of re-extract fail to meet acceptance criteria, report results with appropriate data qualifier.
Initial Calibration Verification (ICV)	Second source standard analyzed after calibration. Acceptance criteria are the statistically generated limits listed in LIMS for Method 8081A.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.
Method Blank (MBLK)	One per extraction batch of maximum 10 samples for Method 608 and 20 samples for Method 8081A with minimum of 1 per day. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the MBLK result. Analyses applicable to our WI certification must be evaluated down to the current MDL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all quality control and environmental samples associated with the blank must be re-extracted and analyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample (LCS)	One per extraction batch of maximum 10 samples for Method 608 and 20 samples for Method 8081A with minimum of 1 per day. Acceptance criteria are the statistically generated limits listed in LIMS. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all quality control and environmental samples associated with the LCS must be re-extracted and analyzed, or sample results reported with appropriate data qualifier.
Matrix Spike (MS)	Minimum of one per 10 samples for Method 608 and 20 samples for Method 8081A with minimum of 1 per day. Acceptance criteria are the statistically generated limits listed in LIMS. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike Duplicate (MSD)	Required with each MS. If insufficient sample is available for a MSD, a duplicate LCS (LCSD) should be extracted and analyzed. Acceptance criteria are the statistically generated limits listed in LIMS.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Continuing Calibration Verification (CCV)	Calibration source standard analyzed at the beginning of each analytical sequence, after the more frequent of every 12 hours or every 20 samples, and after the last sample. Acceptance criteria are ≤ 15% difference from the initial calibration.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate. For 8081A only, if any target analyte which uses average response factor is >15% difference, the grand mean average may be employed.
Confirmation	All sample detects must be confirmed by analysis on a second, dissimilar column. Acceptance criteria are ≤ 40% difference. Confirmation may not be necessary if the sample matrix is well established through prior analysis.	If acceptance criteria are not met, evaluate the baseline for co-elution. If co-elution or no other chromatographic problems are evident, report the higher of the results. The confirmation disparity must be communicated to the data user.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – ORGANIC ANALYSES		
PCBs by EPA Method 608 and SW-846 Method 8082		
QC Parameter	**Requirement**	**Corrective Action**
Calibration	Minimum of 5 levels for Aroclors 1016 and 1260. (A minimum of 3 levels in required for Method 608.) A single point calibration is performed for the remaining Aroclors. Acceptable linear calibration if CF %RSD $\leq$ 10 for Method 608 or $\leq$ 20 for Method 8082	If calibration not linear, construct a non-linear calibration curve. Correlation coefficient (r) must be $\geq$ 0.99 and not forced through zero.
Surrogates (SURR)	Added to all QC samples and environmental samples. Acceptance criteria are the statistically generated limits listed in LIMS. Two surrogates (DCB and TCMX) are added. Only one must meet the acceptance criteria.	If acceptance criteria not met, re-extract and analyze. If analysis of re-extract fails to meet acceptance criteria, report both sets of results with appropriate data qualifier.
Initial Calibration Verification (ICV)	Second source standard including Aroclors 1016/1260 analyzed after calibration. Acceptance criteria are the statistically generated limits listed in LIMS.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.
Continuing Calibration Verification (CCV)	Calibration source standard analyzed at the beginning of each analytical sequence, after the more frequent of every 12 hours or every 20 samples, and after the last sample. The concentration is varied throughout the run. Acceptance criteria are $\pm$ 15% difference from the initial calibration.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.
Method Blank (MBLK)	One per extraction batch of maximum 10 samples for Method 608 and 20 samples for Method 8082 with minimum of 1 per day. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the MBLK result. Analyses applicable to our WI certification must be evaluated down to the current MDL.	If acceptance criteria not met, all quality control and environmental samples associated with the blank must be re-extracted and analyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample (LCS)	One per extraction batch of maximum 10 samples for Method 608 and 20 samples for Method 8082 with minimum of 1 per day. Includes Aroclors 1016/1260. Acceptance criteria are the generated limits listed in LIMS. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, all quality control and environmental samples associated with the blank must be re-extracted and analyzed, or sample results reported with appropriate data qualifier.
Matrix Spike (MS)	Minimum of one per 10 samples for Method 608 and 20 samples for Method 8081A with minimum of 1 per day. Includes Aroclors 1016/1260. Acceptance criteria are the recovery limits in Table 3 of Method 608 and the statistically generated limits listed in LIMS for Method 8082. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	If the acceptance criteria are not met, evaluate the MSD against the accuracy criteria.
Matrix Spike Duplicate (MSD)	Required with each MS. If insufficient sample is available for a MSD, a duplicate LCS (LCSD) should be extracted and analyzed. Acceptance criteria are the statistically generated limits listed in LIMS.	If the accuracy criteria are not met for the MS or MSD, and the LCS is in control, report the sample results with the appropriate qualifier. If the precision criteria are not met between the MS and MSD, report the sample results with the appropriate qualifier.
Confirmation	Sample confirmations are performed per client request. All sample detects must be confirmed by analysis on a second, dissimilar column. Acceptance criteria are $\leq$ 40% difference. Confirmation may not be necessary if the sample matrix is well established through prior analysis.	If acceptance criteria are not met, evaluate the baseline for co-elution. If co-elution or no other chromatographic problems are evident, report the higher of the results. The confirmation disparity must be communicated to the data user.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – ORGANIC ANALYSES		
Volatile Organic Compounds by EPA Method 624 and SW-846 Method 8260B		
QC Parameter	**Requirement**	**Corrective Action**
Tuning	50-ng BFB for every 12 hour sequence; acceptance criteria in table below	Repeat if criteria not met.
Calibration	Method 8260B: Minimum of 5 levels. Linear calibration if RF for CCCs <30 %RSD, average %RSD for all target compounds < 15, and SPCC criteria met SPCC criteria: ≥ 0.300 for chlorobenzene and 1,1,2,2-tetrachloroethane; ≥ 0.100 for chloromethane and 1,1-dichloroethane and bromoform. Method 624: Minimum of 3 levels. Linear calibration if %RSD <35 for each, individual analyte. If linear or quadratic regression is used, $r^2 \geq 0.990$ and not forced through zero	If calibration not linear, repeat initial calibration or the following option may be used
Surrogates (SURR)	Added to all QC samples and environmental samples. Acceptance criteria are the statistically generated limits listed in LIMS.	If acceptance criteria not met, reanalyze. If analyses fails to meet acceptance criteria, report results with appropriate data qualifier.
Internal Standards (IS)	Added to all standards, QC samples and environmental samples. Acceptance criteria for CCV are RT ± 30 seconds from last initial calibration and area within range of -50 to +100%.	Used as a diagnostic tool to monitor method and system performance. If acceptance criteria are not met for the CCV, perform instrument maintenance or perform a new initial calibration
Initial Calibration Verification (ICV)	Second source standard analyzed immediately after calibration. Acceptance criteria are the statistically generated limits listed in LIMS or 20% for DoD samples.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, terminate analysis, correct the problem, and recalibrate.
Continuing Calibration Verification (CCV)	Calibration source standard analyzed at the beginning of each analytical sequence. Acceptance criteria are the SPCC criteria for calibration and RF for CCCs < 20% difference from initial calibration for Method 8260. Method 624 does not require the analysis of a CCV standard but, rather, evaluates the continuing integrity of the calibration using the LCS. Samples evaluated per DoD require an ending CCV. Acceptance criteria for ending CCV is 50% difference from initial calibration.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.
Method Blank (MBLK)	One per batch of maximum 20 samples with minimum of 1 per day. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the MBLK result. Analyses applicable to our WI certification must be evaluated down to the current MDL. Samples evaluated per DoD requirements must be evaluated down to ½ times the MRL and qualified if the concentration exceeds ½ times the MRL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, terminate analysis, correct the problem, and recalibrate. Sample results may be reported with appropriate data qualifier.
Laboratory Control Sample (LCS) **[QC Check Sample for Method 624]**	One per batch of maximum 20 samples with a minimum of 1 per day. Acceptance criteria are the statistically generated limits listed in LIMS. Acceptance criteria for samples evaluated per DoD requirements are the QSM statistical limits. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, terminate analysis, correct the problem, and recalibrate. Sample results may be reported with appropriate data qualifier.
Matrix Spike (MS)	Minimum of one per 20 samples with minimum of 1 per day analyzed. Acceptance criteria are the statistically generated limits listed in. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike Duplicate (MSD)	Required with each MS. If insufficient sample is available for a MSD, a duplicate LCS (LCSD) should be analyzed. Acceptance criteria are the statistically generated limits listed in LIMS. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits.	If the acceptance criteria are not met, sample results may be reported with appropriate data qualifier.

BFB (4-BROMOFLUOROBENZENE)
KEY IONS and ION ABUNDANCE CRITERIA
METHODS 624 / 8260B

Method 624 / 8260B Tune Criteria	
Mass	Ion Abundance Criteria
50	15 – 40% of mass 95
75	30 – 60 % of mass 95
95	Base peak, 100% relative abundance
96	5 – 9 % of mass 95
173	< 2 % of mass 174
174	> 50 % of mass 95
175	5 – 9 % of mass 174
176	> 95 but < 101 % of mass 174
177	5 – 9 % of mass 176

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – ORGANIC ANALYSES		
Volatile Organic Compounds by EPA Method TO-15		
QC Parameter	**Requirement**	**Corrective Action**
Tuning	50-ng BFB for every 24 hour sequence; acceptance criteria in table below	Repeat if criteria not met.
Calibration	Minimum of 5 levels. Criteria are that RSD < 30% for each analyte with the exception that two analytes may be greater than 30% but must be < 40%.	If calibration does not meet criteria, repeat initial calibration.
Surrogates (SURR)	Added to all quality control samples, blanks and samples. Acceptance criteria are the nominal limits listed in the appropriate test code in LIMs. These limits are based on the Audit Accuracy criteria in the reference method.	Surrogate standards that fail to meet the acceptance criteria may be reported with appropriate data qualifier. Surrogate Standards that fail are automatically flagged in LIMs with a "S" qualifier.
Internal Standards (IS)	Added to all standards, QC samples and environmental samples. Acceptance criteria for CCV are RT $\pm$ 20 (0.33-minutes) of the mean retention time over the calibration range for each internal standard.	Used as a diagnostic tool to monitor method and system performance. If acceptance criteria are not met for the CCV, perform instrument maintenance or perform a new initial calibration.
Initial Calibration Verification (ICV)	Second source standard analyzed immediately after calibration. Acceptance criteria are the statistically generated limits listed in LIMS. Acceptance criteria are a response <30% deviation from the initial calibration standard. If linear regression was used to assess the linearity of the initial calibration, percent drift is used in place of percent deviation. Two compounds are allowed above the 30% deviation but must be less than 40%.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, terminate analysis, correct the problem, and recalibrate.
Continuing Calibration Verification (CCV)	A mid-level calibration source standard that must be analyzed at the beginning of each analytical sequence following an acceptable instrument tune. The 24- hour analytical sequence begins with the injection of BFB, continues through the analysis of the CCV, samples and QC samples. Acceptance Criteria are a RF^2 < 30% Deviation from the calibration standard.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.
Method Blank (MBLK)	Analyzed with each analytical sequence. The acceptance criteria are the Internal Standard criteria as well as <PQL for the target analytes. Samples evaluated per DoD requirements must be evaluated down to ½ times the MRL and qualified if the concentration exceeds ½ times the MRL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, terminate analysis, correct the problem, and recalibrate. Sample results may be reported with appropriate data qualifier.
Laboratory Control Sample (LCS)	A Second Source Standard that must be prepared and analyzed with each analytical sequence. Acceptance criteria are a response <30% deviation from the initial calibration standard. Acceptance criteria for samples evaluated per DoD requirements are the QSM statistical limits. Two compounds are allowed above the 30% deviation but must be less than 40%.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, terminate analysis, correct the problem, and recalibrate. Sample results may be reported with appropriate data qualifier.
Laboratory Control Sample Duplicate (LCSD)	A Second Source Standard that must be prepared and analyzed with each analytical sequence. Acceptance criteria are a response <30% deviation from the initial calibration standard. Two compounds are allowed above the 30% deviation but must be less than 40%. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits. Relative Percent Difference of LCSD from LCS is ≤ 25%. Replicate Precision criteria based audit accuracy criteria in reference method.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, terminate analysis, correct the problem, and recalibrate. Sample results may be reported with appropriate data qualifier. LCSDs that fail to meet the accuracy acceptance criteria are automatically flagged in LIMs with a "S" qualifier. Those that fail to meet the precision acceptance criteria are automatically flagged in LIMS with a "R" qualifier.
Duplicate	Must be performed with each analytical sequence. Acceptance criteria are the nominal limits listed in the appropriate test code in LIMs.	If acceptance criteria is not met, sample results may be reported with appropriate data qualifier.

BFB (4-BROMOFLUOROBENZENE)
KEY IONS and ION ABUNDANCE CRITERIA
METHOD TO-15

Method TO-15 Tune Criteria	
Mass	**Ion Abundance Criteria**
50	8 – 40% of mass 95
75	30 – 66 % of mass 95
95	Base peak, 100% relative abundance
96	5 – 9 % of mass 95
173	< 2 % of mass 174
174	50 – 120 % of mass 95
175	4 – 9 % of mass 174
176	93 – 101 % of mass 174
177	5 – 9 % of mass 176

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – ORGANIC ANALYSES		
Semi-Volatile Organic Compounds by EPA Method 625, SW-846 Method 8270C and TO-13A		
QC Parameter	**Requirement**	**Corrective Action**
Tuning	625: 50-ng DFTPP for every 24 hour sequence. 8270: 50-ng DFTPP for every 12 hour sequence. Acceptance criteria listed in table below Benzidine and Pentachlorophenol tailing factors evaluated every 12 hours. Acceptance criteria are <3 and <5, respectively DDT degradation after every TUNE. Acceptance criteria is <20%	Repeat if criteria not met.
Calibration	Method 8270C: Minimum of 5 levels. Linear calibration if RF for SPCCs > 0.050, %RSD for CCCs < 30, and average %RSD of all compounds < 15. Method 625: Minimum of 3 levels. Linear calibration if %RSD <35 for each, individual analyte.	If calibration not linear, repeat initial calibration is analyzing by Method 625. If analyzing by Method 8270C, the following options may be used Averaging. If the %RSD of all (target and non-target) compounds is < 15, the calibration can be considered acceptable and the average RF^1 used.
Surrogates (SURR)	Added to all QC samples and environmental samples. Acceptance criteria are the statistically generated limits listed in LIMS. One B/N and one Acid fraction surrogate may be out without corrective action necessary	If acceptance criteria not met, re-extract and analyze. If analysis of re-extract fails to meet acceptance criteria, report both sets of results with appropriate data qualifier.
Internal Standards (IS)	Added to all standards, QC samples and environmental samples. Acceptance criteria for CCV are RT $\pm$ 30 seconds from last initial calibration and area within range of -50 to +100%.	If acceptance criteria are not met for the CCV, perform instrument maintenance or perform a new initial calibration
Initial Calibration Verification (ICV)	Second source standard analyzed after calibration. Acceptance criteria are the statistically generated limits listed in LIMS or 20% for DoD samples.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.
Continuing Calibration Verification (CCV)	Calibration source standard analyzed at the beginning of each analytical sequence. Acceptance criteria are RF^1 for SPCCs $\geq$ 0.050 and RF^1 for CCCs < 20% difference from initial calibration for Method 8270C, and $\leq$ 20% difference from the initial calibration for Method 625. Samples evaluated per DoD require an ending CCV. Acceptance criteria for ending CCV is 50% difference from initial calibration.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.
Method Blank (MBLK)	One per extraction batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are <PQL or <5% of sample concentration. Analyses applicable to our WI certification must be evaluated down to the current MDL. Samples evaluated per DoD requirements must be evaluated down to ½ times the MRL and qualified if the concentration exceeds ½ times the MRL.	If acceptance criteria not met, all quality control and environmental samples associated with the blank must be re-extracted and analyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample (LCS)	One per extraction batch of maximum 20 samples with minimum of 1 per day. Acceptance criteria are the statistically generated limits listed in LIMS. Acceptance criteria for samples evaluated per DoD requirements are the QSM statistical limits. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, all quality control and environmental samples associated with the blank must be re-extracted and analyzed, or sample results reported with appropriate data qualifier.
Matrix Spike (MS)	Minimum of one per 20 samples with minimum of 1 per day. Acceptance criteria are the statistically generated limits listed in LIMS. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	If the acceptance criteria are not met, evaluate the MSD against the accuracy criteria.
Matrix Spike Duplicate (MSD)	Required with each MS. If insufficient sample is available for a MSD, a duplicate LCS (LCSD) should be extracted and analyzed. Acceptance criteria are the statistically generated limits listed in LIMS. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits.	If the accuracy criteria are not met for the MS or MSD, and the LCS is in control, report the sample results with the appropriate qualifier. If the precision criteria are not met between the MS and MSD, report the sample results with the appropriate qualifier.

(DECAFLUOROTRIPHENYLPHOSPHINE)

KEY IONS and ION ABUNDANCE CRITERIA

Method 625 / 8270C Tune Criteria	
Mass	**Ion Abundance Criteria**
51	30 - 60% of mass 198
68	< 2% of mass 69
69	Present
70	< 2% of mass 69
127	40 - 60% of mass 198
197	< 1% of mass 198
198	Base peak, 100% relative abundance
199	5 - 9% of mass 198
275	10 - 30% of mass 198
365	> 1% of mass 198
441	Present but less than mass 443
442	> 40% of mass 198
443	17 - 23% of mass 442

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – METALS ANALYSES		
EPA Method 200.7 and SW-846 Method 6010B		
QC Parameter	**Requirement**	**Corrective Action**
Calibration	Minimum of blank and one standard. Correlation Coefficient Criteria is r $\geq$ 0.998 using two integrations per analysis	Correct problem, then repeat ICAL
Initial Calibration Verification (ICV)	Second source standard analyzed after calibration. Acceptance criteria are the RSD of two integrations < 5%, as well as the method-defined limits of 95.0 to 105% recovery for Method 200.7 and 90.0 – 110% recovery for Method 6010B. Samples with a non-detect concentration may be reported if the ICV fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate or report sample results with appropriate data qualifier.
Initial Calibration Blank (ICB)	Analyzed after the ICV. Acceptance criteria are <PQL or <10% of sample concentration. Drinking water requirements require <2.2 times the MDL. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL. Samples evaluated per DoD requirements must be evaluated down to ½ times the MRL and qualified if the concentration exceeds ½ times the MRL	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.
Interference Check Standard (ICS)	Analyze solutions A and AB must be analyzed at the beginning and end of each analytical run for 200.7 and at the beginning of each analytical run for 6010B... Acceptance criteria for Solution A are 80.0 – 120% recovery for the spiked elements and <PQL for the others. Acceptance criteria for Solution AB are 80.0 – 120% recovery for the spiked elements. Samples with a non-detect concentration may be reported if the ICS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.
Continuing Calibration Verification (CCV)	Second source standard analyzed after every 10 samples and after the last sample. Concentration is different that of the ICV. Acceptance criteria are the method-defined limits of 90.0 – 110% recovery with the RSD of two integrations < 5%. Samples with a non-detect concentration may be reported if the CCV fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate
Method Blank (MBLK)	One per digestion batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are <PQL or <10% of sample concentration. Drinking water requirements require <2.2 times the MDL. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL.. Samples evaluated per DoD requirements must be evaluated down to ½ times the MRL and qualified if the concentration exceeds ½ times the MRL	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the MBLK must be re-digested and analyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample (LCS)	One per digestion batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are the method-defined limits of 85.0 – 115% recovery for Method 200.7 and 80.0 – 120% recovery for Method 6010B aqueous controls. Acceptance criteria are the vendor supplied limits for solid matrix controls. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be re-digested and analyzed, or sample results reported with appropriate data qualifier.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – METALS ANALYSES		
EPA Method 200.7 and SW-846 Method 6010B *Continued*		
QC Parameter	**Requirement**	**Corrective Action**
Matrix Spike (MS)	Minimum of one per 10 samples for 200.7 or one per 20 samples for 6010 with minimum of 1 per day analyzed. Acceptance criteria are the method-defined limits of 70.0 – 130% recovery for Method 200.7 and 75.0 – 125% recovery for Method 6010B. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike Duplicate (MSD)	Required with each MS. If insufficient sample is available for a MSD, a duplicate LCS (LCSD) should be extracted and analyzed. Acceptance criteria are the accuracy criteria for the MS and $\leq$ 20.0% RPD for precision. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits. Samples with a non-detect concentration may be reported if the MSD fails to meet the accuracy acceptance criteria with a positive bias.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Post Digestion Spike (PDS)	As needed for matrix interference evaluation. Acceptance criteria are the method-defined limits of 85.0 – 115% recovery for Method 200.7 and 80.0 – 120% recovery for Method 6010B. Samples with a non-detect concentration may be reported if the PDS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, a matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.
Serial Dilution (SD)	If the analyte concentration is sufficiently high, (> factor of 50 above the instrument detection limit in the original solution for 200.7 or > a factor of 10 for 6010, but <90% of the linear limit), an analysis of a 1+4 dilution should agree (after correction for the fivefold dilution) within ±10% of the original determination.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.
A Contract Required Quantitation Limit Check Standard (CRL)	Daily, after one-point ICAL the CRL must be analyzed in each analytical run. This is a low-level calibration check standard which is a reference standard that contains a quantity of analyte one to two times the reporting limit. The CRL confirms the accuracy of measurements at or near the RL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.
Linear dynamic range or high-level check standard	Every 6 months	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – METALS ANALYSES		
EPA Method 200.8 and SW-846 Method 6020A		
QC Parameter	**Requirement**	**Corrective Action**
Tune / Pre-calibration Checks	The following checks are required prior to daily instrument calibration. • Resolution Check: 0.65amu at 10% peak height (equivalent to 0.75amu at 5% peak height) using the Tune Solution. • Mass Calibration Check: measured mass value must be $\pm$ 0.1amu from the "true" unit mass using the Tune solution. • Daily Performance Check: using a minimum of 5 replicate analyses of the Tune Solution, acceptance criteria are RSD < 5%. • Sensitivity Checks: Using the data from the Daily Performance Check, at 10ppb, Mg > 20,000 cps, Rh > 150,000 cps, Pb > 50,000 cps. • Background Checks: Using the data from the Daily Performance Check, <30 cps at mass 220. • %Double-Charged Check: Using the data from the Daily Performance Check, the Ba^{+2}/Ba ratio must be $\leq$ 3%. %Oxides Check: Using the data from the Daily Performance Check, the CeO/Ce ratio must be $\leq$ 3%.	Resolution Check & Mass Cal Check: If acceptance criteria are not met, stop analysis, perform appropriate instrument maintenance then repeat. • Daily Performance Check: If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, perform appropriate instrument maintenance then repeat. • Sensitivity Check: If the acceptance criteria are not met, perform appropriate instrument maintenance (inspect/clean cones and/or perform AutoLens calibration) then repeat. • Background Check: If the acceptance criteria are not met, perform appropriate instrument maintenance (detector voltage settings likely too high) then repeat. • %Double-Charged Check: If the acceptance criteria are not met, perform appropriate instrument maintenance (likely need to decrease nebulizer flow) then repeat. %Oxides Check: If the acceptance criteria are not met, perform appropriate instrument maintenance (likely need to decrease nebulizer flow) then repeat.
Calibration	Minimum of blank and one standard. Correlation Coefficient Criteria is r $\geq$ 0.998 using three integrations per analysis.	Correct problem and repeat calibration.
Internal Standards (IS)	Added to all standards, QC samples and environmental samples. Acceptance criteria are relative to the calibration standard. For Method 200.8, the criteria for instrument control standards are 60.0 – 125% recovery. For Method 6020A, the criteria for instrument control standards are >30% recovery.	If acceptance criteria are not met a single reanalysis may be performed at the discretion of the analyst. Instrument control standards failing to meet the criteria are indicative of an instrument problem requiring that the analysis be stopped, appropriate maintenance performed and the instrument recalibrated. Matrix controls and environmental samples failing to meet the criteria are indicative of matrix interference requiring sequential dilutions until the acceptance criteria are met.
Initial Calibration Verification (ICV)	Second source standard analyzed after calibration. Acceptance criteria are the RSD of two integrations < 5%, as well as the method-defined limits of 95.0 to 105% recovery for Method 200.8 and 90.0 – 110% recovery for Method 6020A. Samples with a non-detect concentration may be reported if the ICV fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate or report sample results with appropriate data qualifier.
Initial Calibration Blank (ICB)	Analyzed after the ICV. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL. Acceptance criteria are <PQL or <10% of sample concentration. Drinking water requirements require <2.2 times the MDL. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL. Samples evaluated per DoD requirements must be evaluated down to ½ times the MRL and qualified if the concentration exceeds ½ times the MRL	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.
Interference Check Standard (ICS)	Analyze solutions A and AB at the beginning of each analytical batch. Acceptance criteria are 80.0 – 120% recovery for the Internal Standards relative to the calibration standard. Samples with a non-detect concentration may be reported if the ICS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – METALS ANALYSES		
EPA Method 200.8 and SW-846 Method 6020A *continued*		
QC Parameter	**Requirement**	**Corrective Action**
Continuing Calibration Verification (CCV)	Second source standard analyzed after every 10 samples and after the last sample. Concentration is different that that of the ICV. Acceptance criteria are the method-defined limits of 90.0 – 110% recovery. Samples with a non-detect concentration may be reported if the CCV fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate or report sample results with appropriate data qualifier.
Continuing Calibration Blank (CCB)	Analyzed after the CCV. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL. Acceptance criteria are <PQL or <10% of sample concentration. Drinking water requirements require <2.2 times the MDL. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL. Samples evaluated per DoD requirements must be evaluated down to ½ times the MRL and qualified if the concentration exceeds ½ times the MRL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.
Method Blank (MBLK)	One per digestion batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria the same as that required for the ICB. Acceptance criteria are <PQL or <10% of sample concentration. Drinking water requirements require <2.2 times the MDL. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL. Samples evaluated per DoD requirements must be evaluated down to ½ times the MRL and qualified if the concentration exceeds ½ times the MRL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the MBLK must be re-digested and analyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample (LCS)	One per digestion batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are the method-defined limits of 85.0 – 115% recovery for aqueous control samples. Acceptance criteria are the vendor supplied limits for solid matrix controls. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be re-digested and analyzed, or sample results reported with appropriate data qualifier.
Matrix Spike (MS)	Minimum of one per every 10 samples for 200.8 or one per 20 samples for 6020 with minimum of 1 per day analyzed. Acceptance criteria are the method-defined limits of 70.0 – 130% recovery. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike Duplicate (MSD)	Required with each MS. If insufficient sample is available for a MSD, a duplicate LCS (LCSD) should be extracted and analyzed. Acceptance criteria are the accuracy criteria for the MS and ≤ 20.0% RPD for precision. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits. Samples with a non-detect concentration may be reported if the MSD fails to meet the accuracy acceptance criteria with a positive bias.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs
Post Digestion Spike (PDS)	As needed for matrix interference evaluation. Acceptance criteria are the method-defined limits of 75.0 – 125% recovery. Samples with a non-detect concentration may be reported if the PDS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, a matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.
Serial Dilution (SD)	If the analyte concentration is within the linear dynamic range of the instrument and sufficiently high (minimally, a factor of at least 100 times greater than the concentration in the reagent blank, an analysis of a fivefold (1+4) dilution must agree within ± 10% of the original determination for 6020 analysis	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, a matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.
A Contract Required Quantitation Limit Check Standard (CRL)	Daily, after ICAL the CRL must be analyzed in each analytical run. This is a low-level calibration check standard which is a reference standard that contains a quantity of analyte one to two times the reporting limit. The CRL confirms the accuracy of measurements at or near the RL	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – METALS ANALYSES		
NIOSH 7300 Method per DoD requirements for ICP		
QC Parameter	**Requirement**	**Corrective Action**
Calibration	Minimum of blank and one standard. Correlation Coefficient Criteria is r $\geq$ 0.995 using two integrations per analysis	Correct problem and repeat calibration.
Initial Calibration Verification (ICV)	Second source standard analyzed after calibration. Acceptance criteria are the method-defined limits of 90.0 – 110% recovery. Samples with a non-detect concentration may be reported if the ICV fails to meet the acceptance criteria with a positive bias.	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate or report sample results with appropriate data qualifier.
Initial Calibration Blank (ICB)	Analyzed after the ICV. Acceptance criteria are <LOD or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier
Continuing Calibration Verification (CCV)	Second source standard analyzed after every 10 samples and the last sample. Concentration is different that that of the ICV. Acceptance criteria are the method-defined limits of 90.0 – 110% recovery. Samples with a non-detect concentration may be reported if the CCV fails to meet the acceptance criteria with a positive bias	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate or report sample results with appropriate data qualifier. Flagging is only appropriate in cases where the samples cannot be reanalyzed
Initial Calibration Blank (ICB)	Analyzed after every ten samples and the last sample. Acceptance criteria are the same as required for the ICB.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.
Method Blank (MBLK)	No analytes detected > ½ RL and greater than 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results. For common laboratory contaminants, no analytes detected > RL	Problem must be corrected. Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed
Laboratory Control Sample (LCS)	One per digestion batch of maximum 20 samples with minimum of 1 per day analyzed Acceptance criteria are the vendor supplied limits. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be re-digested and analyzed, or sample results reported with appropriate data qualifier.
Post Digestion Spike (PDS)	As needed for matrix interference evaluation. Acceptance criteria are the method-defined limits of 85.0 – 115% recovery. Samples with a non-detect concentration may be reported if the PDS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, a matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.
Serial Dilution (SD)	If the analyte concentration is sufficiently high, (> a factor of 10, but <90% of the linear limit), an analysis of a 1+4 dilution should agree (after correction for the fivefold dilution) within ±10% of the original determination.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.
A Contract Required Quantitation Limit Check Standard (CRL)	Daily, after one-point ICAL the CRL must be analyzed in each analytical run. This is a low-level calibration check standard which is a reference standard that contains a quantity of analyte one to two times the reporting limit. The CRL confirms the accuracy of measurements at or near the RL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate
Linear dynamic range or high-level check standard	Every 6 months	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – METALS ANALYSES		
Mercury by OSHA 145, EPA 245.1 and SW-846 7470A and 7471B		
QC Parameter	**Requirement**	**Corrective Action**
Calibration	Minimum of blank and five standards. Correlation Coefficient Criteria is r $\geq$ 0.995	Correct problem and repeat calibration.
Initial Calibration Verification (ICV)	Second source standard analyzed after calibration. Acceptance criteria are the method-defined limits of 90.0 – 110% recovery (95 – 105% for DW). Samples with a non-detect concentration may be reported if the ICV fails to meet the acceptance criteria with a positive bias	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate or report sample results with appropriate data qualifier
Initial Calibration Blank (ICB)	Analyzed after the ICV. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL. Acceptance criteria are <PQL or <10% of sample concentration. Drinking water requirements require <2.2 times the MDL. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL. Samples evaluated per DoD requirements must be evaluated down to ½ times the MRL and qualified if the concentration exceeds ½ times the MRL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier
Continuing Calibration Verification (CCV)	Second source standard analyzed after every 10 samples and the last sample. Concentration is different that that of the ICV. Acceptance criteria are the method-defined limits of 80.0 – 120% recovery (90 – 110% for DW and DoD). Samples with a non-detect concentration may be reported if the CCV fails to meet the acceptance criteria with a positive bias	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate or report sample results with appropriate data qualifier.
Initial Calibration Blank (ICB)	Analyzed after every ten samples and the last sample. Acceptance criteria are the same as required for the ICB. Acceptance criteria are <PQL or <10% of sample concentration. Drinking water requirements require <2.2 times the MDL. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL. Samples evaluated per DoD requirements must be evaluated down to ½ times the MRL and qualified if the concentration exceeds ½ times the MRL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier
Method Blank (MBLK)	One per digestion batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are the same as that required for the ICB. Acceptance criteria are <PQL or <10% of sample concentration. Drinking water requirements require <2.2 times the MDL. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL. Samples evaluated per DoD requirements must be evaluated down to ½ times the MRL and qualified if the concentration exceeds ½ times the MRL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the MBLK must be re-digested and analyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample (LCS)	One per digestion batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are 85.0 – 115% recovery for waters (85 – 115% for DW). Acceptance criteria are the vendor supplied limits for solid matrix controls. Acceptance criteria samples evaluated per DoD requirements are the QSM statistical limits. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be re-digested and analyzed, or sample results reported with appropriate data qualifier
Matrix Spike (MS)	Minimum of one per 20 samples with minimum of 1 per day analyzed. Acceptance criteria are 75.0 – 125% recovery (70 – 130% for DW, 80 – 120% for Solid samples and QSM statistical limits for DoD). Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike Duplicate (MSD)	Required with each MS. If insufficient sample is available for a MSD, a duplicate LCS (LCSD) should be extracted and analyzed. Acceptance criteria are 75.0 – 125% recovery for accuracy (70 – 130% for DW, 80 – 120% for Solid samples and QSM statistical limits for DoD). and $\leq$ 20.0% RPD for precision. Samples with a non-detect concentration may be reported if the MSD fails to meet the accuracy acceptance criteria with a positive bias.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs
Post Digestion Spike (PDS)	As needed for matrix interference evaluation. Acceptance criteria are 85.0 – 115% recovery. Samples with a non-detect concentration may be reported if the PDS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, a matrix interference should be expected. If acceptable to the project data quality objectives, samples results

		may be reported with appropriate data qualifier.
Serial Dilution (SD)	If the analyte concentration is sufficiently high, (> a factor of 10, but <90% of the linear limit), an analysis of a 1+4 dilution should agree (after correction for the fivefold dilution) within ±10% of the original determination.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, a matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – METALS ANALYSES		
Methyl Mercury by EPA 1630		
QC Parameter	**Requirement**	**Corrective Action**
Calibration	Seven non-zero standards. Calibration Factor <15% RSD with the PQL level standard within 65 – 135% recovery.	Correct problem and repeat calibration.
Calibration Blank	Analyzed after the ICV. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL.	If acceptance criteria are not met, recalibrate.
Ongoing Precision & Recovery (OPR)	Calibration standard analyzed after calibration as well as at the end of the analytical run (or every 12-hour sequence, whichever is more frequent). Acceptance criteria are the method-defined limits of 67 – 133% recovery. Samples with a non-detect concentration may be reported if the OPR fails to meet the acceptance criteria with a positive bias.	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate or report sample results with appropriate data qualifier.
Quality Control Sample (QCS)	Second source standard analyzed after calibration. Acceptance criteria are the nominal limits of 70 – 130% recovery. Samples with a non-detect concentration may be reported if the QCS fails to meet the acceptance criteria with a positive bias	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate or report sample results with appropriate data qualifier.
Method Blank (MBLK)	Three per batch. Acceptance criteria are <PQL or less than 1/10 of the sample concentration. Samples with a non-detectable concentration may be reported regardless of the MBLK result.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, environmental samples associated with the MBLK must be re-digested and analyzed, or sample results reported with appropriate data qualifier.
Matrix Spike (MS)	One per batch per general matrix type of of maximum 10 samples with minimum of 1 per day analyzed. Acceptance criteria are the method defined limits of 65-135 %R for accuracy. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike Duplicate (MSD)	Required with each MS. Acceptance criteria are the method defined limits of 35 RPD for precision.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – METALS ANALYSES		
Mercury by EPA 1631E		
QC Parameter	**Requirement**	**Corrective Action**
Calibration	Three system blanks and five standards. Calibration Factor <15% RSD with the PQL level standard within 75 – 125% recovery.	Correct problem and repeat calibration.
System Blank	Three system blanks. Acceptance criteria are <PQL each and as an average with a standard deviation <0.1.	If the acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, stop analysis and recalibrate or report data with an appropriate qualifier.
Ongoing Precision & Recovery (OPR)	Calibration standard analyzed after calibration as well as at the end of the analytical run (or every 12-hour sequence, whichever is more frequent). Acceptance criteria are the method-defined limits of 77 – 123% recovery. Samples with a non-detect concentration may be reported if the OPR fails to meet the acceptance criteria with a positive bias.	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate or report sample results with appropriate data qualifier.
Quality Control Sample (QCS)	Second source standard analyzed after calibration. Acceptance criteria are the nominal limits of 77 – 123% recovery. Samples with a non-detect concentration may be reported if the QCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate or report sample results with appropriate data qualifier.
Method Blank (MBLK)	A minimum of three Method Blanks must be prepared and analyzed with each batch of maximum 20 aqueous samples or at least one Method Blank for each batch of maximum 20 solid samples with a minimum of one per day. The average blank acceptance criteria for aqueous samples is < 0.2ng/L. The acceptance criteria for solid matrix samples is < PQL	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, environmental samples associated with the MBLK must be re-sampled and analyzed, or sample results reported with appropriate data qualifier.
Matrix Spike (MS)	Minimum of one per 10 samples per site (lab to run a minimum of 1 per 10 per day analyzed). Acceptance criteria are 71 – 125% recovery. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs
Matrix Spike Duplicate (MSD)	Required with each MS. Acceptance criteria are 71 – 125% recovery for accuracy and ≤ 24.0% RPD for precision. Samples with a non-detect concentration may be reported if the MSD fails to meet the accuracy acceptance criteria with a positive bias.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.

GENERAL QUALITY CONTROL REQUIREMENTS – WET CHEMISTRY				
	General Gravimetric Techniques		General Titrimetric Techniques	
QC Parameter	**Requirement**	**Corrective Action**	**Requirement**	**Corrective Action**
Calibration	Daily balance 2-point calibration or verification with Class II masses.	Repeat calibration.	Not applicable. Use purchased "standard" titrants before their expiration date.	
Initial Calibration Verification (ICV)	Not applicable.		Not applicable.	
Initial Calibration Blank (ICB)	Not applicable.		Not applicable.	
Method Blank (MBLK)	One per batch. Acceptance criteria are <PQL or less than 1/10 of the sample concentration. Samples with a non-detectable concentration may be reported regardless of the MBLK result.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the MBLK must be reanalyzed, or sample results reported with appropriate data qualifier.	One per batch. Acceptance criteria are <PQL or less than 1/10 of the sample concentration. Samples with a non-detectable concentration may be reported regardless of the MBLK result.	
Laboratory Control Sample (LCS)	Where available, one per batch of maximum 20 samples with minimum of 1 per day analyzed. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be reanalyzed, or sample results reported with appropriate data qualifier.	One per batch of maximum 20 samples with minimum of 1 per day analyzed. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be reanalyzed, or sample results reported with appropriate data qualifier
Laboratory Control Sample Duplicate (LCSD)	Replaces the DUP when sufficient sample volume is not available. Acceptance criteria and corrective action for accuracy are the same as for the LCS. Acceptance criteria and corrective action for precision are the same as for the DUP.		Replaces the DUP when sufficient sample volume is not available. Acceptance criteria and corrective action for accuracy are the same as for the LCS. Acceptance criteria and corrective action for precision are the same as for the DUP.	
Matrix Spike (MS)	Not applicable.		Where applicable, one per batch of maximum 20 samples with minimum of 1 per day analyzed. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.

GENERAL QUALITY CONTROL REQUIREMENTS – WET CHEMISTRY *Continued*				
	General Gravimetric Techniques		General Titrimetric Techniques	
QC Parameter	**Requirement**	**Corrective Action**	**Requirement**	**Corrective Action**
Matrix Spike Duplicate (MSD)	Not applicable.		Required with each MS. Unless method-specified, acceptance criteria are lab generated RPD limits for precision.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Duplicate (DUP)	Minimum of one per 20 samples with a minimum of one per day analyzed. Unless method-specified, acceptance criteria are lab generated RPD limits for concentrations $\geq$ 5X the PQL. For samples < 5X the PQL, acceptance criteria are $\pm$ 1 PQL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, the sample and the DUP must be re-analyzed, or sample results reported with appropriate data qualifier.	When MS/MSD are not applicable, minimum of one per 20 samples with a minimum of one per day analyzed. Unless method-specified, acceptance criteria are lab generated RPD limits for concentrations $\geq$ 5X the PQL. For samples < 5X the PQL, acceptance criteria are $\pm$ 1 PQL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, the sample and the DUP must be re-analyzed, or sample results reported with appropriate data qualifier.
Continuing Calibration Verification (CCV)	Not applicable.		Not applicable.	
Continuing Calibration Blank (CCB)	Not applicable.		Not applicable.	

GENERAL QUALITY CONTROL REQUIREMENTS – WET CHEMISTRY				
	General Colorimetric Techniques		General Potentiometric Techniques	
QC Parameter	**Requirement**	**Corrective Action**	**Requirement**	**Corrective Action**
Calibration	Minimum of blank and four standards. Correlation coefficient criteria is $r \geq 0.995$.	Correct problem and repeat calibration..	Minimum of blank and four standards. Correlation coefficient criteria is $r \geq 0.995$.	Correct problem and repeat calibration.
Initial Calibration Verification (ICV)	Second source standard analyzed after calibration. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the ICV fails to meet the acceptance criteria with a positive bias.	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate.	Second source standard analyzed after calibration. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the ICV fails to meet the acceptance criteria with a positive bias.	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate.
Initial Calibration Blank (ICB)	Analyzed after the ICV. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.	Analyzed after the ICV. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier
Method Blank (MBLK) Not applicable to analyses without a preparation step. In these cases, the MBLK = ICB/CCB.	One per preparation batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are the same as that required for the ICB.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the MBLK must be re-prepared and analyzed, or sample results reported with appropriate data qualifier.	One per preparation batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are the same as that required for the ICB.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the MBLK must be re-prepared and analyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample (LCS) Not applicable to analyses without a preparation step. In these cases, the LCS = ICV/CCV.	One per preparation batch of maximum 20 samples with minimum of 1 per day analyzed. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be re-digested and analyzed, or sample results reported with appropriate data qualifier.	One per preparation batch of maximum 20 samples with minimum of 1 per day analyzed. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be re-digested and analyzed, or sample results reported with appropriate data qualifier.

GENERAL QUALITY CONTROL REQUIREMENTS – WET CHEMISTRY *Continued*				
	General Colorimetric Techniques		General Potentiometric Techniques	
QC Parameter	**Requirement**	**Corrective Action**	**Requirement**	**Corrective Action**
Laboratory Control Sample Duplicate (LCSD)	One per batch per general matrix type of maximum 20 samples with minimum of 1 per day analyzed. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.	One per batch per general matrix type of maximum 20 samples with minimum of 1 per day analyzed. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike (MS)	One per batch per general matrix type of maximum 20 samples with minimum of 1 per day analyzed. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.	One per batch per general matrix type of maximum 20 samples with minimum of 1 per day analyzed. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike Duplicate (MSD)	Required with each MS. Unless method-specified, acceptance criteria are lab generated RPD limits for precision.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.	Required with each MS. Unless method-specified, acceptance criteria are lab generated RPD limits for precision.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Post Digestion Spike (PDS)	As needed for matrix interference evaluation. Acceptance criteria are same as used for MS recovery. Samples with a non-detect concentration may be reported if the PDS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.	As needed for matrix interference evaluation. Acceptance criteria are same as used for MS recovery. Samples with a non-detect concentration may be reported if the PDS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.

GENERAL QUALITY CONTROL REQUIREMENTS – WET CHEMISTRY *Continued*				
	General Colorimetric Techniques		General Potentiometric Techniques	
QC Parameter	**Requirement**	**Corrective Action**	**Requirement**	**Corrective Action**
Continuing Calibration Verification (CCV)	Second source standard analyzed at the beginning of each analytical batch, after every 10 samples and after the last sample. Concentration is varied throughout the run. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the CCV fails to meet the acceptance criteria with a positive bias.	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate. For chemistries with daily calibration, an alternative is to reprocess the analytical batch.	Second source standard analyzed at the beginning of each analytical batch, after every 10 samples and after the last sample. Concentration is varied throughout the run. Unless method-specified, acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the CCV fails to meet the acceptance criteria with a positive bias.	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate. For chemistries with daily calibration, an alternative is to reprocess the analytical batch.
Continuing Calibration Blank (CCB)	Analyzed with the CCV. Acceptance criteria are the same as that required for the ICB.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.	Analyzed with the CCV. Acceptance criteria are the same as that required for the ICB.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.

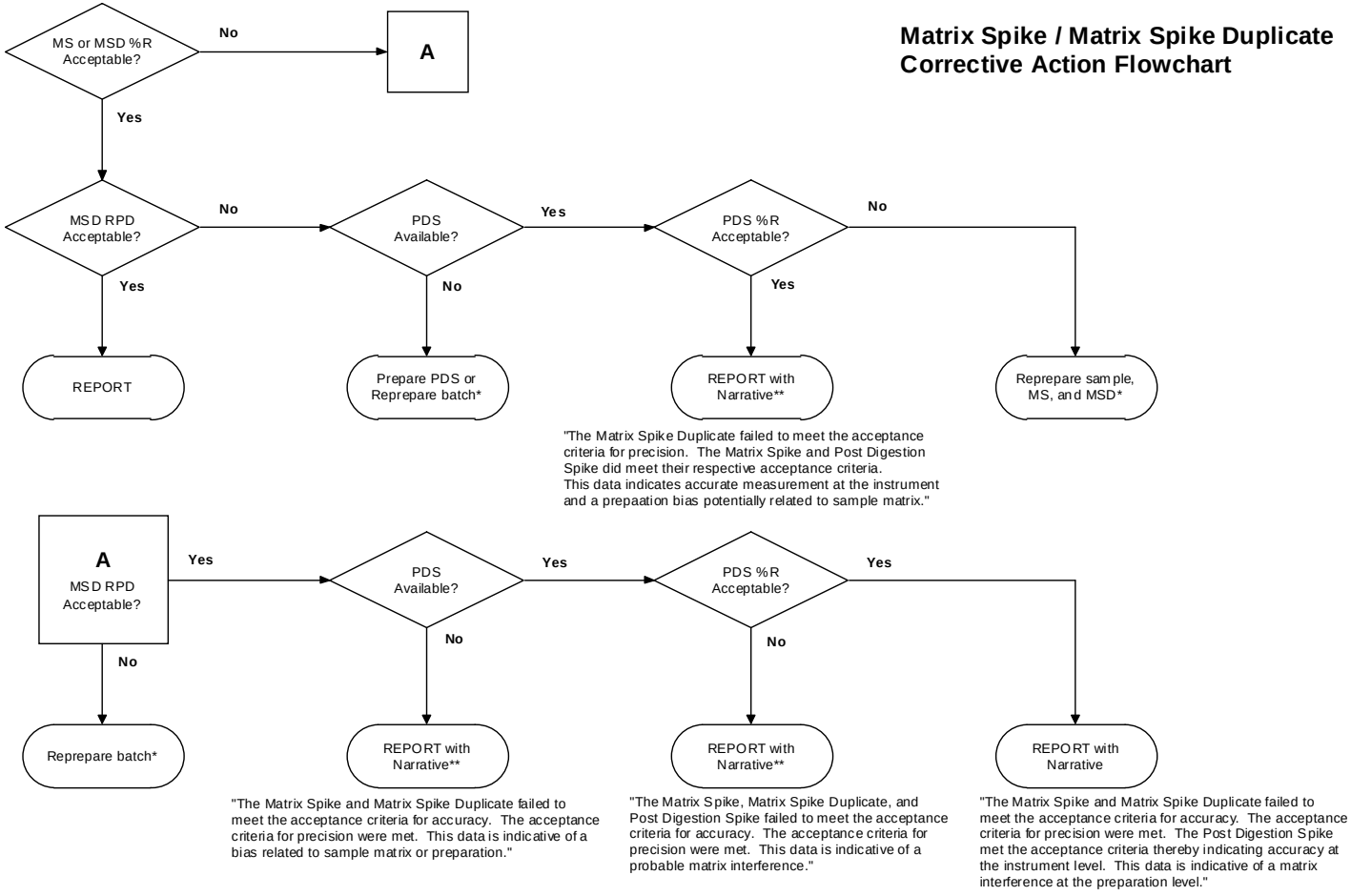
METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – WET CHEMISTRY		
Cyanide by EPA Method 335.4, SW-846 Method 9012B, and Standard Methods 4500-CN C,E - 1999		
QC Parameter	**Requirement**	**Corrective Action**
Calibration	Minimum blank and 4 standards. Correlation coefficient criteria is r ≥ 0.995. New curve prepared daily for automated colorimetry.	Repeat calibration.
Initial Calibration Verification (ICV)	Second source standard analyzed after calibration. Acceptance criteria are 85.0 to 115% recovery (90 – 110% for Method 335.4).	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.
Initial Calibration Blank (ICB)	Analyzed after the ICV. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.
Method Blank (MBLK)	One per batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are the same as that required for the ICB.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the MBLK must be reanalyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample (LCS)	One per batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are 90.0 – 110% recovery. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be reanalyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample Duplicate (LCSD)	Replaces the MSD when sufficient sample size is not available. Acceptance criteria and corrective action for accuracy are the same as for the LCS. Acceptance criteria and corrective action for precision are the same as for the MSD.	
Matrix Spike (MS)	One per batch per general matrix type of maximum 10 samples with minimum of 1 per day analyzed. Acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike Duplicate (MSD)	Required with each MS. Acceptance criteria are ≤ 20.0% RPD for precision.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Post Digestion Spike (PDS)	As needed for matrix interference evaluation. Acceptance criteria are same as used for MS recovery. Samples with a non-detect concentration may be reported if the PDS fails to meet the acceptance criteria with a positive bias	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.
Continuing Calibration Verification (CCV)	Second source standard analyzed at the beginning of each analytical batch, after every 10 samples and after the last sample. Concentration is varied from that of the ICV. Acceptance criteria are 85.0 – 115% recovery (90 – 110% for Method 335.4).	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate. For daily calibration, an alternative is to reprocess the analytical batch.
Continuing Calibration Blank (CCB)	Analyzed with the CCV. Acceptance criteria are the same as that required for the ICB.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – WET CHEMISTRY		
Phenolics by EPA Method 420.2 and SW-846 Method 9066		
QC Parameter	**Requirement**	**Corrective Action**
Calibration	Minimum blank and 4 standards. Correlation coefficient criteria is $r \geq 0.995$. New curve prepared daily.	Repeat calibration.
Initial Calibration Verification (ICV)	Second source standard analyzed after calibration. Acceptance criteria are lab generated recovery limits.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.
Initial Calibration Blank (ICB)	Analyzed after the ICV. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.
Method Blank (MBLK)	One per batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are the same as that required for the ICB.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the MBLK must be reanalyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample (LCS)	One per batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be reanalyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample Duplicate (LCSD)	Replaces the MSD when sufficient sample size is not available. Acceptance criteria and corrective action for accuracy are the same as for the LCS. Acceptance criteria and corrective action for precision are the same as for the MSD.	
Matrix Spike (MS)	One per batch per general matrix type of maximum 10 samples with minimum of 1 per day analyzed. Acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike Duplicate (MSD)	Required with each MS. Acceptance criteria are lab generated precision limits.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Post Digestion Spike (PDS)	As needed for matrix interference evaluation. Acceptance criteria are same as used for MS recovery. Samples with a non-detect concentration may be reported if the PDS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.
Continuing Calibration Verification (CCV)	Second source standard analyzed at the beginning of each analytical batch, after every 10 samples and after the last sample. Concentration is varied from that of the ICV. Acceptance criteria are lab generated recovery limits.	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate. For daily calibration, an alternative is to reprocess the analytical batch.
Continuing Calibration Blank (CCB)	Analyzed with the CCV. Acceptance criteria are the same as that required for the ICB.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – WET CHEMISTRY		
Hexavalent Chromium by SM 3500-Cr B-2009, SW-846 Method 3060A and 7196A		
QC Parameter	**Requirement**	**Corrective Action**
Calibration	Minimum blank and 3 standards. Correlation coefficient criteria is r $\geq$ 0.995. New curve prepared every 6 months for manual colorimetry and daily for automated colorimetry.	Repeat calibration.
Initial Calibration Verification (ICV)	Second source standard analyzed after calibration. Acceptance criteria are 90.0 to 110% recovery.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate.
Initial Calibration Blank (ICB)	Analyzed after the ICV. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.
Method Blank (MBLK)	Applicable to the analysis of solids samples only. One per batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are the same as that required for the ICB.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the MBLK must be reanalyzed, or sample results reported with appropriate data qualifier.
Laboratory Control Sample (LCS)	Applicable to the analysis of solid samples only. One per batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are 80.0 – 120% recovery. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be reanalyzed, or sample results reported with appropriate data qualifier.
Matrix Spike (MS)	Must be prepared and analyzed with every ten samples per matrix and a minimum of one per batch of 10 or fewer samples. Acceptance criteria are 85.0 – 115% recovery for waters and 75.0 – 125% recovery for, both, soluble and insoluble spike types on solid samples. Samples with a non-detect concentration may be reported if the MS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike Duplicate (MSD)	Required with each MS. Acceptance criteria are $\leq$ 20.0% RPD for precision.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Insoluble Matrix Spike (MS2)	One Insoluble Matrix Spike (MS2), is required for all solid matrix batches of 20 or fewer samples with a minimum of one per day.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix.
Post Digestion Spike (PDS)	Applicable to the analysis of solid samples only. Analyze if the MS/MSD fail to meet the acceptance criteria for accuracy with a low bias. Acceptance criteria for the PDS are 85.0 – 115% recovery.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, matrix interference should be expected. If acceptable to the project data quality objectives, samples results may be reported with appropriate data qualifier.
Continuing Calibration Verification (CCV)	Second source standard analyzed at the beginning of each analytical batch, after every 10 samples and after the last sample. Concentration is varied from that of the ICV. Acceptance criteria are 90.0 – 110% recovery.	If acceptance criteria are not met, reanalyze. If reanalysis fails to meet the acceptance criteria, recalibrate. For daily calibration, an alternative is to reprocess the analytical batch.
Continuing Calibration Blank (CCB)	Analyzed with the CCV. Acceptance criteria are the same as that required for the ICB.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.

METHOD SPECIFIC QUALITY CONTROL REQUIREMENTS – WET CHEMISTRY		
Hexane Extractable Materials by EPA Method 1664B		
QC Parameter	**Requirement**	**Corrective Action**
Calibration	2-point calibration or verification at 2 mg and 1000 mg with Class S masses before initial and final weightings. Acceptance criteria are 2 mg ± 10% (1.8 – 2.2 mg) and 1000 mg ± 0.5% (995 – 1005 mg).	Repeat calibration.
Laboratory Control Sample (LCS) / Ongoing Precision Recovery (OPR)	One per batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are lab generated recovery limits obtained from data meeting the method specified limits of 78.0 – 114% recovery for HEM and 64.0 – 132% recovery for SGT-HEM. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the LCS must be reanalyzed, or sample results reported with appropriate data qualifier.
Initial Calibration Blank (ICB)	Analyzed after the ICV. Acceptance criteria are <PQL or <10% of sample concentration. Samples with a non-detectable concentration may be reported regardless of the ICB result. Analyses applicable to our WI certification must be evaluated down to the current MDL.	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, recalibrate, or sample results reported with appropriate data qualifier.
Method Blank (MBLK)	One per batch of maximum 20 samples with minimum of 1 per day analyzed. Acceptance criteria are <PQL. Samples with a non-detectable concentration may be reported regardless of the MBLK result. Analyses applicable to our WI certification must be evaluated down to the current MDL	If acceptance criteria not met, reanalyze. If reanalysis fails to meet acceptance criteria, all environmental samples associated with the MBLK must be reanalyzed, or sample results reported with appropriate data qualifier.
Matrix Spike (MS)	One per 20 samples from a given collection point. Acceptance criteria are lab generated recovery limits obtained from data meeting the method specified limits of 79.0 – 114% recovery for HEM and 64.0 – 132% recovery for SGT-HEM. Samples with a non-detect concentration may be reported if the LCS fails to meet the acceptance criteria with a positive bias.	Evaluate the accuracy recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.
Matrix Spike Duplicate (MSD)	Required with each MS. Acceptance criteria are lab generated recovery limits. Samples with a non-detect concentration may be reported if the MSD fails to meet the accuracy acceptance criteria with a positive bias.	Evaluate the precision recoveries of the MS/MSD according to the flow chart at the end of this Appendix. Factors affecting the decision to reprepare a sample or to report data with a qualifier include, but are not limited to, available sample, holding time, and project DQOs.

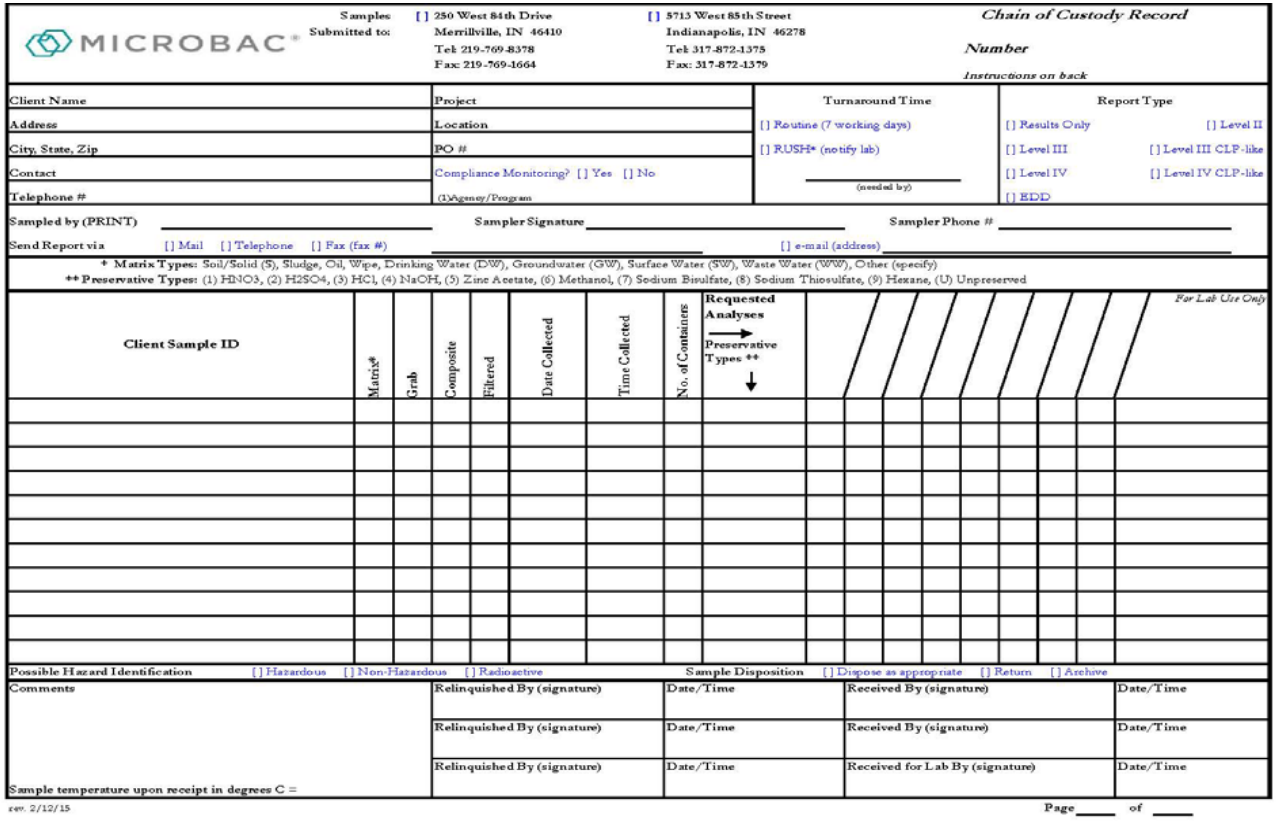
30.6 APPENDIX F – MATRIX SPIKE / MATRIX SPIKE DUPLICATE CORRECTIVE ACTION FLOWCHART



* Use lesser sample amount for MS/MSD sample. If the sample is part of a client specific Sample Delivery Group, all samples in the SDG must be reprepared and analyzed in a similar manner.
** Professional judgement should be used in determining when to report data with a narrative or to reanalyze the sample/batch.

30.7 APPENDIX G – CHAIN OF CUSTODY AND SAMPLE ACCEPTANCE POLICY

Copies of the Chain of Custody form and our Sample Acceptance Policy are on the following pages.



MICROBAC

Samples Submitted to:
[ ] 250 West 84th Drive, Merrillville, IN 46410, Tel: 219-769-8378, Fax: 219-769-1664
[ ] 5713 West 85th Street, Indianapolis, IN 46278, Tel: 317-872-1375, Fax: 317-872-1379

Chain of Custody Record
Number
Instructions on back

Client Name	Project	Turnaround Time	Report Type
Address	Location	[ ] Routine (7 working days)	[ ] Results Only [ ] Level II
City, State, Zip	PO #	[ ] RUSH* (notify lab)	[ ] Level III [ ] Level III CLP-like
Contact	Compliance Monitoring? [ ] Yes [ ] No	_____ (needed by)	[ ] Level IV [ ] Level IV CLP-like
Telephone #	(1)Agency/Program		[ ] EDD

Sampled by (PRINT) _____ Sampler Signature _____ Sampler Phone # _____

Send Report via [ ] Mail [ ] Telephone [ ] Fax (fax #) _____ [ ] e-mail (address) _____

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

Client Sample ID	Matrix*	Grab	Composite	Filtered	Date Collected	Time Collected	No. of Containers	Requested Analyses → Preservative Types ** ↓	For Lab Use Only

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive — Sample Disposition [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments	Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
	Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
Sample temperature upon receipt in degrees C =	Relinquished By (signature)	Date/Time	Received for Lab By (signature)	Date/Time

rev. 2/12/15 Page ____ of ____

MICROBAC®

Sample Acceptance Policy

Chain of Custody:
A chain of custody MUST accompany all samples received at the laboratory. The following information on the Chain of Custody must be complete: client name and address, sample collector's name, sample description/identification, matrix, date and time of collection, number of containers, preservative and requested analysis. Any missing receipt information will be documented in the final report. The laboratory will analyze those target analytes identified by the client on a project-specific basis. If project-specific information is not available, then the laboratory's default target list of analytes will be used.

Sample Containers:
Upon receipt at the laboratory sample containers will be evaluated to ensure that all of the containers are intact, that the container type meets the requirement of the specific analytical method, and that the bottles are properly filled.

Preservatives:
Chemical preservatives are required by many analytical methods in order to render a specific analyte stable until analysis can be performed. Chemical preservatives are to be added AT THE TIME OF SAMPLING (either added directly or via pre-preserved bottles), unless it is unsafe to do so.

Transport/Receipt Temperature:
Many of the analytical methods utilized require that samples be kept cool during sample transport. Microbac will assess and document the receipt temperature of each cooler received at the laboratory. Where thermal preservation is required, the receipt temperature must be in a range of 0.1 – 6°C unless receipt is made on the same day of sampling and an attempt has been made to cool the samples.

Holding Time:
Samples should be provided to the laboratory as soon as possible after collection to ensure that analysis can be performed within the method specified Holding Time. Upon receipt at the laboratory, the sample date and time as well as the required chemistries will be evaluated to identify if any of the samples may be past the maximum holding time.

If it is determined that a container or sample condition has been compromised, is inappropriate for the requested analysis, improperly filled, improperly preserved or received outside of the required temperature range or received with inadequate holding time available, your Microbac Project Manager will be notified.

In the event that the container condition is deemed significant to adversely affect the integrity of the samples and analysis, your Microbac Project Manager will contact you for direction. Provided sample integrity is maintained, analysis will proceed as normal. Documentation of this decision will be provided to you as part of the Cooler Inspection form in the final report.

Alternate procedures must be made available to Microbac in writing prior to sample receipt. Samples will be evaluated against these alternate requirements and appropriate documentation made in the final report. Please make certain that this policy information is made available to the applicable sample collectors.

In the absence of a written agreement to the contrary, submission of samples constitutes an acceptance by the Client of Microbac's Sample Acceptance Policy.

CD0249 SampleAccepPolicy042815

30.8 APPENDIX H – EQUIPMENT LIST

Lab ID	Manufacturer	Description	Model No.	Serial No.
Column5	Column6	Column7	Column8	Column9
FREEZER 5	WHIRLPOOL	REFRIGERATOR	-------	VSG3371680
COOLER 8	TRUE	COOLER - REACH-IN	GDM-72	1-2908805
COOLER 25	HOTPOINT	REFRIGERATOR	-------	LD778660
VOA 1	HP	GC	5890 SERIES PLUS	3115A34915
VOA 1	TEKMAR	PT	3000	96242020
VOA 1	TEKMAR	AS - MULTI-MATRIX	SOLATEK 72	US01155002
VOA 5	HP	GC	5890 SERIES II	2938A24766
VOA 5	TEKMAR	PT	3100	
VOA 5	TEKMAR	AS - MULTI-MATRIX	SOLATEK 72	US02056033
VOA 2	HP	GC	6890	US00006069
VOA 2	TEKMAR	PT	3000	93347001
VOA 2	TEKMAR	AS - MULTI-MATRIX	SOLATEK 72	US01151001
OVEN 4	FISHER SCIENTIFIC	OVEN	ISOTEMP 500	70700184
BAL 4	OHAUS	BALANCE	NAVIGATOR N12120	1122260997
	ENTECH	DILUTER	4600A	-------
TO-15 OVEN -2	BARNSTEAD	OVEN	3513	10034124
TO-15 CANISTER CLEANER-2	ENTECH	CANISTER CLEANER	3100	152
TO-15 CANISTER CLEANER-1	ENTECH	CANISTER CLEANER	3100A	1121
TO-15 OVEN -1	BARNSTEAD	OVEN	3513	1104-9675
TO-15-1	HP	GC	5890 SERIES II	3336A56641
TO-15 PRE-CONCENTRATOR-1	ENTECH	CONCENTRATOR	7100A	1207
TO-15 CANISTER AUTOSAMPLE	ENTECH	AS	7016CA	1226
TO-15 CANISTER AUTOSAMPLE	ENTECH	AS	7016CA	1227
TO-15 PRE-CONCENTRATOR-2	ENTECH	CONCENTRATOR	7100A	1107
TO-15-2	HP	GC	5890 SERIES II	3341A48250
SVOA 4	HP	GC	5890 SERIES II	3336A52601
SVOA 4	HP	AS	7673	3348A37145
SVOA 2	HP	GC	5890 SERIES II	3235A45051
SVOA 2	HP	AS	7673	3401A37489
SVOA 1	AGILENT TECHNOLOGIES	GC	7890A	CN72444336
SVOA 1	AGILENT TECHNOLOGIES	AS	7683B	-------
SVOA 3	AGILENT TECHNOLOGIES	GC	7890A	CN72244159
SVOA 4	HP	MSD	5972	3549A03138
SVOA 3	AGILENT TECHNOLOGIES	AS	7683B SERIES	-------
ECD-2	HP	GC/ECD/ECD	5890 SERIES II	3108A34009
ECD-2	HP	AS	7673	-------
FID-2	HP	GC/FID/FID	5890	272BA12416
FID-2	HP	AS	7673	
SVOA 1	AGILENT	MSD	5975 C	-------

	TECHNOLOGIES			
SVOA 3	AGILENT TECHNOLOGIES	MSD	5975C	-------
FREEZER-2	WHITE WESTINGHOUSE	REFRIGERATOR	-------	RTF11865
FREEZER-1	FRIGIDAIRE	FREEZER	-------	-------
VOA 1	HP	MSD	5973	3114A02148
VOA 5	HP	MSD	5972	2905A11924
VOA 2	HP	MSD	5973	US63810248
TO-15-1	HP	MSD	5972	3435A01875
TO-15-2	HP	MSD	5972	3341A01289
		HOOD/ENCLOSURE	-------	-------
BAL 2	METTLER	BALANCE	AE 100	G80020
BAL-10	METTLER	BALANCE	AE 100	SV03515
OVEN-3	FISHER SCIENTIFIC	OVEN	ISTOTEMP 750F	40700148
HOOD EF-1	FISHER HAMILTON	HOOD - 8 FT	-------	-------
HOOD EF-2	FISHER HAMILTON	HOOD - 8 FT	-------	-------
FURNACE-3	THERMOLYNE	FURNACE	6000	1.06E+12
FURNACE-2	THERMOLYNE	FURNACE	1400	1.05E+12
TKN DIGESTOR-1	LACHAT	BLOCK DIGESTOR	BD-46	1800-373
OVEN-2	PRECISION	OVEN - DRYING	45EG	699071588
BOMB-1	PARR	CALORIMETER	1341EB	6889
	FISHER SCIENTIFIC	STIRRER - ELECTRONIC	2008	-------
SPEC-3	THERMO ELECTRON	SPECTROPHOTOMETER	GENESYS 10	2G2J235006
HOOD EF-3	FISHER HAMILTON	HOOD - 6 FT	-------	-------
	THERMOLYNE	HOT PLATE	MIRAK	8.47E+11
DISTILLATION UNIT F	WESTCO	DISTILLATION UNIT - EASY	1182	-------
COD DIGESTOR-1	BIOSCIENCE	REACTOR - COD	-------	COD-B418
COD DIGESTOR-2	HACH	REACTOR - COD	45600	900301873
DISTILLATION UNIT A	KONTES	MANIFOLD	MIDVAP 3000	2499
COOLER-23	KENMORE	REFRIGERATOR	-------	5233851
INCUBATOR-11	TRUE	COOLER - REACH-IN	T-49	1-3473595
BOD-METER-1	YSI	METER - OXYGEN	5100	03C0683AB
	BRANSON	CLEANER - ULTRASONIC	1510	-------
	CETAC	AS	ASX-520	
LACHAT-1	LACHAT	ANALYZER - FLOW INJECTION	QUICK CHEM 8000	A83000-466
	CETAC	AS	ASX-500	-------
LACHAT-2	LACHAT	ANALYZER - FLOW INJECTION	QUICK CHEM 8000	A83000-1842
ICPMS-2	CETAC	AS	ASX-520	-------
INCUBATOR-12	LAB-LINE	INCUBATOR	IMPERIAL II	876
HOOD EF-10	FISHER HAMILTON	HOOD - 4FT	-------	-------
COOLER-20	GENERAL ELECTRIC	REFRIGERATOR	SMR04DAMAWW	HD319326

FLASHPOINT-2	PENSKY-MARTENS	FLASHPOINT TESTER	CLOSED CUP	5532
FLASHPOINT-1	PENSKY-MARTENS	FLASHPOINT TESTER	CLOSED CUP	1082
AUTOCLAVE UNIT A	MARKET FORGE	AUTOCLAVE	STERILMATIC	226045
INCUBATOR-9	SHEL-LAB	INCUBATOR	31	58231
BAL-6	METTLER	BALANCE - TOP LOADER	BB-300	58817
BAL-5	AND	BALANCE - ANALYTICAL	HR-120	12200102
	BROOKS RAND	APPARATUS - MERCURY	MDS	-------
CVAF-3	BROOKS-RAND	MERCURY DISTILLATION SYSTEM	5200	-------
HOOD EF-11	FISHER HAMILTON	HOOD - 4FT	-------	-------
	ENVIRONMENTAL EXPRESS	HOOD/ENCLOSURE	AIRLITE	-------
	ENVIRONMENTAL EXPRESS	HOOD/ENCLOSURE	AIRLITE	-------
	ENVIRONMENTAL EXPRESS	HOOD/ENCLOSURE	AIRLITE	
	ENVIRONMENTAL EXPRESS	HOOD/ENCLOSURE	AIRLITE	-------
COOLER-26	HOTPOINT	REFRIGERATOR	-------	-------
COOLER-24	KELVINATOR	REFRIGERATOR	TPK180JNOW	LA13212881
COOLER-17	GENERAL ELECTRIC	REFRIGERATOR	TB12MCC	TC612479
COOLER-27	HOTPOINT	REFRIGERATOR	-------	LG735141
INCUBATOR-1	FISHER SCIENTIFIC	INCUBATOR - BOD	307C	61200348
	LAB-LINE	STIRRER - MULTI	MISTRAL	-------
VISCBATH-1	CANNON	BATH - CONSTANT TEMPERATURE	-------	0752-A4900
HOOD EF-9		HOOD - 6FT	SUPREME AIRFLOW	-------
HOOD EF-8	DURALAB	HOOD	-------	-------
CENTRIFUGE-1	IEC	CENTRIFUGE	CENTRA-HN	24850640
HOOD EF-7	FISHER HAMILTON	HOOD - 8 FT	-------	-------
RV-3	LABCONCO	EVAPORATOR	RAPIDVAP N2	-------
TURBOVAP-2	CALIPER LIFE SCIENCES	EVAPORATOR	TURBO VAP II	-------
HOOD EF-6	DURALAB	HOOD - 6FT	-------	-------
HOOD EF-5	DURALAB	HOOD - 6FT	-------	-------
TURBOVAP-1	ZYMARK	EVAPORATOR	TURBO VAP II	TV9445N5817
CENTRIFUGE-2	FISHER SCIENTIFIC	CENTRIFUGE	228	600802
COOLER-14	KELVINATOR	REFRIGERATOR	-------	-------
COOLER-13	FRIGIDAIRE	REFRIGERATOR	-------	-------
COOLER-15	WHITE WESTINGHOUSE	REFRIGERATOR	MRT18BRBW2	LA44003267
INCUBATOR-5	THERMO ELEMENTAL	INCUBATOR - MECHANICAL CONVENTION	6LM	106872-101
INCUBATOR-6	NAPCO	INCUBATOR - WATER JACKETED	-------	-------
COLONY COUNTER-1	NEW BRUNSWICK	COLONY COUNTER	C-110	18961

MICROSCOPE-3	LEITZ	MICROSCOPE	LABORFLUX D	41581
MICROSCOPE-2	FISHER SCIENTIFIC	MICROSCOPE	STEREOMASTER II	SPT-ITH
INCUBATOR-4	HACH	INCUBATOR - CULTURE	16E	701597
	FISHER SCIENTIFIC	SHAKER	GENIE 2	-------
BATH-2	PRECISION	WATER BATH - COLIFORM	253	9401-401
ISE-2	FISHER SCIENTIFIC	PH METER	4-STAR	B22958
ISE-3	THERMO ELECTRON	PH METER	ORION 3 STAR	B02053
HOT BLOCK-1	ENVIRONMENTAL EXPRESS	HOT BLOCK	EE54	-------
HOT BLOCK-2	ENVIRONMENTAL EXPRESS	HOT BLOCK	EE54	-------
CONDMETER-1	ENVIRONMENTAL EXPRESS	HOT BLOCK	EE54	-------
BAL-13	AND	BALANCE	EK-610	P-1865371
HOTPLATE-3	THERMOLYNE	HOT PLATE	MIRAK	8.47E+11
CVAF-2	CETAC	AS	X520-L	-------
CVAF-3	BROOKS-RAND	ANALYZER - MERCURY	MERX Model III	10917601
CVAF-3	BROOKS-RAND	GC/PYROLYSIS UNIT	-------	10902501
CVAF-3	BROOKS-RAND	PT	-------	10902401
CVAF-3	BROOKS-RAND	AS	-------	4841A13779
Oven-5	PRECISION	Oven	OV700F	2043090730136
CVAF-2	CETAC	ANALYZER - MERCURY	M-8000	90802QM8
INCUBATOR-14	VWR	INCUBATOR	20/20	1081707
	KYSOR	WALK IN COOLER	-------	-------
	TAFCO	COOLER - WALK-IN	-------	-------
	CULLIGAN	WATER TREATMENT - OSMOSIS SYSTEM	SERIES E	-------
	NANOPURE	WATER SYSTEM	-------	-------
BAL-14	AND	TOP LOADING BALANCE	EK-1200i	EP1876645
INCUBATOR-15	VWR	INCUBATOR	20/20	6050210
HOT BLOCK-3	ENVIRONMENTAL EXPRESS	HOT BLOCK	SC100	6083CECW2833
BAL-15	THOMAS SCIENTIFIC	TOP LOADING BALANCE	TSXB4200C	V43611
ISE-4	THERMO ELECTRON	PH METER	ORION 250A	11336
BAL-11	AND	BALANCE	EK-610	P1843484
BAL-12	AND	BALANCE	EK-610	P1843482
INCUBATOR-16	PRECISION	INCUBATOR	6LM	601052-168
TUMBLER-1	Bodine Electric Company	Tumbler	42R5BFC1-E3	0685XTDC0070
TUMBLER-2	Bodine Electric Company	Tumbler	42R5BFC1-E3	0685YRFT0032
TUMBLER-3	Bodine Electric Company	Tumbler	42R5BFC1-E3	0685ZSFA0033
TUMBLER-4	Associated Design and Mfg. Co.	Tumbler	NA	1044
TUMBLER-5	Associated Design and Mfg. Co.	Tumbler	NA	1113
HOT BLOCK-4	DuPont	Dry Block Heater	184 10 150	1038 25056

FLOW METER - 1	OMEGA	0-25 psi		278209-3
FLOW METER - 2	OMEGA	0-150 psi		278145
	HP	PRINTER	LASER	
	COMPAQ	SERVER	-------	-------
	NORTEL NETWORKS	PHONE HANDSETS (6)	-------	-------
	CORNING	STIRRER	-------	-------
		NITROGEN TANK (5)	-------	-------
		GAS CYLINDERS (11)	-------	-------
	ISCO	SAMPLERS (5)	-------	-------
		TUMBLER UNIT - 8 PLACE (3)	-------	-------
	ACER	COMPUTER	4504L	-------
	GLAS-COL	SOXHLETS (15)	-------	-------
	GATEWAY	COMPUTER	E-4500D	-------
	FISHER SCIENTIFIC	SOFTWARE - CHEMSTATION	-------	-------
	RESTEK	CANISTERS (12)	SUMMA	-------
	RESTEK	CANISTERS, 1L (3)	TO-CAN	-------
	RESTEK	CANISTERS, 1L (9)	TO-CAN	-------
	THERMO SCIENTIFIC	HOT PLATE	CIMAREC	TC612479
	GATEWAY	COMPUTER	E-4500D	
		ICE MACHINE	-------	-------
	GATEWAY	COMPUTER	S-732M	
	RESTEK	CANISTERS, 1L (10)	SUMMA	-------
	RESTEK	CANISTERS, 0.4L (4)	SUMMA	-------
	RESTEK	CANISTERS, 6L (32)	SUMMA	-------
	GATEWAY	COMPUTER	M685	-------
	RHODES PLUMBING	WATER TANK - 50 GALLONS	-------	-------
	GRAINGER	WORKBENCHES	-------	-------
	ADOBE	SOFTWARE - PHOTOSHOP	-------	-------
	PROJECT RESOURCE SOLUTION	PHONE SYSTEM	-------	-------
	CDW DIRECT	ORACLE SYSTEM	-------	-------
	THERMOLYNE	STIRRER	7200	-------
	DELL	SERVER (2) - RACK	-------	2900/SC 1435
	PROMIUM	LIMS - LICENSE (15)	-------	-------
	AGILENT	PUMP - TURBO	G2589-89062	-------
MICROWAVE-1	KENMORE	MICOWAVE OVEN	564.889851	4K8009563
BATH-6	THOMAS SCIENTIFIC	WATER BATH, 28 LITER, DIGITAL, 120V, 50/60HZ	WD28G11B	2K1210792
COLONY COUNTER-2	3M	PETRIFILM PLATE READER		3202
STOMACHER-1	MICROBIOLOGY INTERSCIENCE	BAG MIXER	400P	1203211574
MDS-1	3M	MOLECULAR DETECTION SYSTEM	MDS100	SMA291
TURB-1	HACH	TURBIDIMETER	2100P	
BAL-16	METTLER	BALANCE - ANALYTICAL	AL104	1233260003

ICP-1	THERMO ELEMENTAL	ICP-AES	6000 Series	IC5D20130616
ICP-1	THERMO ELEMENTAL	AS	ASX-520	121259A520
ICP-1	THERMO ELEMENTAL	CHILLER	THERMOFLEX 900	110410801130117
CVAA-4	CETAC	QUICK TRACE HG ANALYZER	M7600	S011301Q76
CVAA-4	CETAC	AS	ASX-520	101246A520
VOA 6	TEKMAR	AS - MULTI-MATRIX /PT	15-000-1000	US13352006
VOA 6	TEKMAR	MSD	5977	US1346L220
VOA 6	TEKMAR	GC	7890	CN13483102
VOA 7	TEKMAR	AS - MULTI-MATRIX /PT	15-000-1000	US14037002
VOA 7	TEKMAR	MSD	5977	
VOA 7	TEKMAR	GC	7890	1352306
DISTILLATION UNIT B	KONTES	MANIFOLD	MIDVAP 3000	
DISTILLATION UNIT C	KONTES	MANIFOLD	MIDVAP 3000	
Q-TRAY-3	IDEXX LABORATORIES	QUANTI-TRAY SEALER	MODEL 2X	03801-04-303
ECD-4	AGILENT TECHNOLOGIES	AS	7693	CN14180016
ECD-4	AGILENT TECHNOLOGIES	GC/ECD/ECD	7890b	CN14243051
ICPMS-2	PERKIN ELMER	ICP-MS	ELAN 9000	AJ13090912
ICPMS-2	POLY SCIENCE	CHILLER	-------	109BD1146
ECD-5	AGILENT TECHNOLOGIES	AS	7693	CN14180022
ECD-5	AGILENT TECHNOLOGIES	GC/ECD/ECD	7890b	CN14243103
AUTOCLAVE UNIT C	MARKET FORGE	AUTOCLAVE	STERILMATIC	102914MB056S
FID-3	HP	GC/FID	5890	3235A46039
FID-3	HP	AS	7673	3114A25824
ISE-5	ORION	PH METER	STAR	X23377
ICPMS-3	CETAC	AS	ASX-520	71325
ICPMS-3	PERKIN ELMER	ICP-MS	Nexion 350X	85XN4121201
ICPMS-3	POLY SCIENCE	CHILLER	WHISPERCOOL	2F114C0088
COOLER-28	RCA	COOLER	MTX14CYDRAD	LL758736

30.9 APPENDIX I – EXAMPLE DEVIATION / CORRECTIVE ACTION (QC CAR) FORM

QC CAR # 4541

Deviation / Corrective Action Report

Date Initiated: 1/14/2010 4:59:44 PM
Initiated By: Donna Ruokonen
Date Submitted: 1/14/2010 5:00:03 PM
Submitted By: Donna Ruokonen

Analyte

Batch/Run ID:

Affected Sample ID's:

Problem/Deficiency:

Root Cause & Details: Undetermined

Corrective Action Taken: None

Preventive Action: None

Dept Manager Approval: Date:

QA Dept. Approval: Date:

Case Narrative: None Required Date:

Verification: None Required

30.10 APPENDIX J – QUALITY SYSTEM CORRECTIVE ACTION (QS CAR) FORM

MICROBAC

Conformance Management System

Corrective Action Report 5419

Site	Chicagoland	Initiated By	Ruskonen, Donna	Date Initiated	4/29/2015 4:40 PM
Record Type	Audit Finding	Repeat Finding	No	Due Date	5/29/2015
Sample Related	No	Root Cause Required	Yes	Verification Due Date	
				Status	New
Agency	American Association for Laboratory Accreditation			Priority	Medium
Assigned To					
Summary Description	Audit Finding				
Detail Description	This is an example non-conformance report.				
Immediate Correction	Immediate corrective actions would be shown here.				
QA Approved By				Completed	
LD Approved By		MD Approved By			

LIMS Client	Contact Name	Contact Date	Contacted By	Contact Notes	Followup Required

Department
Organics

LIMS Work Order

Investigations

Investigation Status	Investigated By	Investigation Date	Investigation Description
Assigned		4/29/2015	This is where the investigation will be documented.

Root Causes

Root Cause Category	Root Cause Description
Analyst Error	This is where results of the root cause analysis will be recorded.

Corrective Actions

Corrective Action	Corrective Action Status	Assigned To	Approved By	Approved Date	Implementation Due	Completion Date	Manager Approved
4964	Started						No
	Corrective actions will be documented here.						

Attachments

Attachment Type	Attached By	Attach Document

Verifications

Verification Date	Verification Comment	Issue Resolved
4/7/2015 12:00 AM	This is a Test Verification	Yes

30.11 APPENDIX L – EXTERNAL COMPLAINT RESOLUTION FORM

Microbac Laboratories, Inc.

External Complaint Resolution Form

Client Information		Microbac Information	
Company Name:		Received By:	
Location:		Received Date:	
Representative:		Responsible for Response:	

Issue(s) Discussed:

Suggestions or actions taken (circle one) to resolve this instance:

Suggestions or actions taken (circle one) to prevent reoccurrence:

Completed By: Date:

Managing Director Review

Additional actions to be taken:

Client Verification (if available):

Approved by:

Date:

Original to External Complaint file

Copy to appropriate client or project file

30.12 APPENDIX M – INITIAL DEMONSTRATION OF CAPABILITY (IDC) REPORT

Microbac Laboratories, Inc.

Initial Demonstration of Capability (IDC) Certification Statement

Date:
Analyst:

Matrix: Aqueous, Drinking Water, Non Aqueous Liquid, Solid
Method Number:
Analyte:

We, the undersigned, CERTIFY that:

1 The analyst(s) identified above, using the cited test method(s), which is in use at this facility for the analyses of samples under the National Environmental Laboratory Accreditation Program, have met the Demonstration of Capability.

2 The test method(s) was performed by the analyst identified on this certification.

3 A copy of the test method(s) and laboratory-specific SOPs are available for all personnel on-site.

4 The data associated with the demonstration of capability are true, accurate, complete and self-explanatory (1).

5 All raw data (including a copy of this certification form) necessary to reconstruct and validate these analyses have been retained at the facility, and that the associated information is well organized and available for review by authorized assessors.

Section Manager's Name	Signature	Date
Quality Assurance Officer's Name	Signature	Date

True: Consistent with supporting data
(1) Accurate: Based on good laboratory practices consistent with sound scientific principles/practices.
Complete: Includes the results of all supporting performance testing.
Self-explanatory: Data properly labeled and stored so that the results are clear and require no additional explanation.

31.0 ETHICS AND DATA INTEGRITY AGREEMENT

(An example copy of the Agreement from our Ethics and Data Integrity Policy is on the following page. A copy of this Agreement is signed and returned upon employment.)

Microbac Laboratories, Inc.
Ethics and Data Integrity Policy
ID: Q-002-03

MICROBAC LABORATORIES, INC.
ETHICS AND DATA INTEGRITY AGREEMENT

I. I,_____, hereby state that I understand the high standards of integrity required of me with regard to the duties I perform and the data I report in connection with my employment at Microbac Laboratories, Inc.

II. I hereby acknowledge that I have been formally instructed to consider Quality as the most important aspect of all my job responsibilities and requirements. I have reviewed and understand this Ethics and Data Integrity Policy. I acknowledge that I have been formally instructed to be honest in the production and reporting of data/information.

III. I hereby agree, that in the performance of duties related to my position at Microbac Laboratories, Inc.:

- I will neither intentionally nor improperly manipulate or falsify data in any manner, including sample and quality control data, financial data or personnel information;
- I will not intentionally represent another's individual work as my own, nor represent my work as that of another;
- I will not intentionally make false statements to, or seek to otherwise deceive, Microbac employees, management or clients;
- Through acts of commission, omission, erasure, or destruction, I will not intentionally misrepresent through improper reporting any financial data, sampling events, inspections, measurements, standard results, data, test results or conclusions.
- I will use Microbac authorized methods and Standard Operating Procedures for work assigned to me;
- I will only report data that match the actual results observed or measured and I will not modify results unless the modification can be technically justified through a process acceptable to Microbac, provided, however, that all such modifications shall be clearly and thoroughly documented in the appropriate record and include my initials or signature and date.

IV. I hereby agree to inform Microbac Laboratories, Inc. of any accidental reporting of non-authentic data in a timely manner, whether in person or through the Open Door Policy (opendoor@microbac.com or http://hrconnect.microbac.com).

V. I hereby agree to inform immediately Microbac Laboratories, Inc. of any operational events inconsistent with policy or standard operating procedures which result in non-authentic data.

VI. I hereby understand that the willful disregard or failure to comply with the terms set forth within this document will result in a detailed investigation that could lead to severe disciplinary action, including but not limited to, termination of employment and criminal and/or civil prosecution.

_____
(Typed or Printed Name)

_____ _____
(Signature) (Date)

2 of 2

32.0 EMPLOYEE CERTIFICATION

By signing below, I certify that I have read, understand, and will abide by the current revision of this Plan. Not with the intention of placing more importance on any given section of the Plan, I understand the significance of the following sections.

- Analyst Commitment to Quality (Section 3.1). I understand the dedication Microbac Laboratories puts forth in providing data of a known and high quality. I will abide by this commitment and notify management if I identify areas for improvement.

- Ethics (Section 4.0). I have signed and returned a copy of the Ethics and Data Integrity Agreement. I understand the position Microbac has taken towards ethics and data integrity and will not intentionally deviate from the written requirements and intent of the Agreement.

- Conflict of Interest (Section 4.3). I understand the steps that Microbac has taken to ensure that all personnel are free from external pressures and influences that may adversely affect the quality of their work. I attest that I understand the conflict-of-interest agreement and will adhere to these requirements.

- Confidentiality (Section 5.0). I understand the position Microbac has taken towards the confidentiality of its clientele, their data, and the operations of the laboratory. I will make every effort to not knowingly divulge any confidential information to the public.

- The Quality Assurance Plan in its entirety. I understand that this manual defines the quality systems of the Microbac Merrillville facility as well as its service center(s).

_____
Employee Name

_____ _____
Signature Date

Appendix F3

Admiralty Environmental COCs

Admiralty Environmental
641 W. Willoughby Ave., Ste 301
Juneau, AK 99801 (907)
463-4415 fax (480) 247-4476

CHAIN OF CUSTODY/TRANSMITTAL RECORD
PAGE 1 OF 1

PROJECT NAME:	**CBJ Wastewater** **Mendenhall Treatment Plant Permit # AK- 002295-1**													**ADEC Compliance**				**AE**	
REPORT TO:	**City and Borough of Juneau** E-mail: karen.sewell@juneau.org jim.westcott@juneau.org rico.tempel@juneau.org		**PHONE#:**	**(907) 586-0393**															
ADDRESS:	**2009 Radcliffe Road** **Juneau, AK 99801**		**SAMPLED BY:**																
					# of Bottles	**BOD and TSS**	**Fecal Coliform**											**Field Results**	
DATE	**TIME**	**SITE DESCRIPTION /IDENTIFIER**		**MATRIX**														**pH**	**Temp**	**D.O.**	
		MWTP Effluent 24hr Composite		**H_2O**																	
		MWTP Influent 24hr Composite		**H_2O**																	
		MWTP IPS Influent 24hr Composite		**H_2O**																	
		MWTP Effluent Grab		**H_2O**																	

Comments:

Reliquished by: (signature)	**Reliquished by: (print)**	**Date:**	**Time:**
Recieved by: (signature)	**Received by: (print)**	**Date:**	**Time:**
Reliquished by: (signature)	**Reliquished by: (print)**	**Date:**	**Time:**
Recieved by: (signature)	**Received by: (print)**	**Date:**	**Time:**

Section to be completed by receiving laboratory

Temp (°C): _____ _____
Thermo ID#: _____ _____
Condition of Custody seal: _____ _____
Initialed By: _____ _____
Shipped Via: _____ _____

Sample Receipt:

	Yes /No
Bottles Intact:	
Sufficient Sample Volume:	
Labels Agree with COC:	
Holding Time Met:	
Problems:	

Admiralty Environmental
641 W. Willoughby Ave., Ste 301
Juneau, AK 99801 (907)
463-4415 fax (480) 247-4476

CHAIN OF CUSTODY/TRANSMITTAL RECORD
PAGE 1 OF 1

PROJECT NAME: **CBJ Wastewater**
Juneau-Douglas Treatment Plant Permit # AK- 002321-3

ADEC Compliance

AE

REPORT TO: **City and Borough of Juneau**
E-mail: karen.sewell@juneau.org
jim.westcott@juneau.org
rico.tempel@juneau.org

PHONE#: **(907) 586-0393**

ADDRESS: **2009 Radcliffe Road**
Juneau, AK 99801

SAMPLED BY:

DATE	TIME	SITE DESCRIPTION /IDENTIFIER	MATRIX	# of Bottles	BOD and TSS	Fecal Coliform								Field Results pH	Temp	D.O.	
		J-D WTP Effluent 24hr Composite	**H_2O**														
		J-D WTP Influent 24hr Composite	**H_2O**														
		J-D WTP Effluent Grab	**H_2O**														

Comments:

Reliquished by: (signature)	Reliquished by: (print)	Date:	Time:
Recieved by: (signature)	Received by: (print)	Date:	Time:
Reliquished by: (signature)	Reliquished by: (print)	Date:	Time:
Recieved by: (signature)	Received by: (print)	Date:	Time:

Section to be completed by receiving laboratory

Temp (°C): _____ _____
Thermo ID#: _____ _____
Condition of Custody seal: _____ _____
Initialed By: _____ _____
Shipped Via: _____ _____

Sample Receipt:

	Yes /No
Bottles Intact:	
Sufficient Sample Volume:	
Labels Agree with COC:	
Holding Time Met:	
Problems:	

Admiralty Environmental
641 W. Willoughby Ave., Ste 301
Juneau, AK 99801 (907)
463-4415 fax (480) 247-4476

CHAIN OF CUSTODY/TRANSMITTAL RECORD
PAGE 1 OF 1

PROJECT NAME: **CBJ Wastewater**
Auke Bay Treatment Plant Permit # AKG-57-2004

ADEC Compliance

AE

REPORT TO: **City and Borough of Juneau**
E-mail: karen.sewell@juneau.org
jim.westcott@juneau.org
rico.tempel@juneau.org
catherine.carlson@juneau.org

PHONE#: **(907) 586-0393**

ADDRESS: **2009 Radcliffe Road**
Juneau, AK 99801

SAMPLED BY:

DATE	TIME	SITE DESCRIPTION /IDENTIFIER	MATRIX	# of Bottles	BOD and TSS	Fecal Coliform								Field Results pH	Temp	D.O.	
		A-B WTP Effluent 24hr Composite	**H_2O**														
		A-B WTP Influent 24hr Composite	**H_2O**														
		A-B WTP Effluent Grab	**H_2O**														

Comments:

Reliquished by: (signature)	Reliquished by: (print)	Date:	Time:
Recieved by: (signature)	Received by: (print)	Date:	Time:
Reliquished by: (signature)	Reliquished by: (print)	Date:	Time:
Recieved by: (signature)	Received by: (print)	Date:	Time:

Section to be completed by receiving laboratory

Temp (°C): _____ _____

Thermo ID#: _____ _____

Condition of Custody seal: _____ _____

Initialed By: _____ _____

Shipped Via: _____ _____

Sample Receipt:

Yes /No

Bottles Intact: _____

Sufficient Sample Volume: _____

Labels Agree with COC: _____

Holding Time Met: _____

Problems: _____

Admiralty Environmental
641 W. Willoughby Ave., Ste 301
Juneau, AK 99801
(907) 463-4415 fax (480) 247-4476

CHAIN OF CUSTODY/TRANSMITTAL RECORD

PROJECT NAME: **CBJ Water**
Salmon Creek Water Filtration Plant Permit # AKG-380005

ADEC Compliance

AE

REPORT TO: **City and Borough of Juneau**
E-mail: evan.champion@juneau.org
steve.locks@juneau.org
samantha.stoughtenger@juneau.org

PHONE#: **(907) 586-0393**

ADDRESS: **2009 Radcliffe Road**
Juneau, AK 99801

SAMPLED BY:

DATE	TIME	SITE DESCRIPTION /IDENTIFIER	MATRIX	# of Bottles										Field Results			
														pH	Temp	D.O.	
		SCWFP Grab	H_2O														

Comments:

Reliquished by: (signature)	Reliquished by: (print)	Date:	Time:
Recieved by: (signature)	Received by: (print)	Date:	Time:
Reliquished by: (signature)	Reliquished by: (print)	Date:	Time:
Recieved by: (signature)	Received by: (print)	Date:	Time:

Section to be completed by receiving laboratory

Temp (°C):			
Thermo ID#:			
Condition of Custody seal			
Initialed By:			
Shipped Via:			

Sample Receipt:

	Yes /No
Bottles Intact:	
Sufficient Sample Volume:	
Labels Agree with COC:	
Holding Time Met:	
Problems:	

Appendix F4

CBJ/Admiralty Environmental Contract

MR 16-051
Admiralty Environmental, LLC
Laboratory Services Testing Contract

PART I: PARTIES

This contract is between the City and Borough of Juneau, Alaska, a municipal corporation in the State of Alaska, hereafter "City" or "CBJ," and Admiralty Environmental Management Services, LLC, a corporation organized under the laws of the State of Alaska (with its principal place of business in Alaska), and licensed to do business in the State of Alaska, hereafter "Contractor."

PART II: CONTRACT ADMINISTRATION

All communications concerning this contract shall be directed as follows, any reliance on a communication with a person other than that listed below is at the party's own risk. Notices required under this contract must be in writing and personally delivered or sent to the address shown below, or by facsimile, and will be effective upon receipt.

City & Borough of Juneau:
Attn: Samantha Stoughtenger,
Wastewater Utility Superintendent
City and Borough of Juneau, Alaska
155 South Seward Street
Juneau, AK 99801
Phone: (907) 586-0393
Fax: (907) 789-1681

Contractor:
Attn: David Wetzel, Co-Owner
Admiralty Environmental, LLC
641 W. Willoughby Ave., Suite 301
Juneau, AK 99801
Phone: (907) 463-4415
Fax: (907) 247-4476

PART III: CONTRACT DESCRIPTION

This contract is identified as MR 16-051 Admiralty Environmental, LLC, Laboratory Testing Services Contract. The following appendices are attached and are considered a part of this contract, as well as any exhibits or attachments incorporated by reference or attached to those appendices.

Appendix A: Scope of Work, Term, and Compensation
Appendix B: Standard Provisions
Appendix C: Insurance

If in conflict, the order of precedence shall be: this document, Appendix A, B, and then C.

PART IV: CONTRACT EXECUTION

CBJ and Contractor agree and sign below. This contract is not effective until signed by the CBJ. Contractor represents that the person signing below on its behalf has the authority to do so and that it is a valid and binding contract enforceable in accordance with its terms.

CBJ:
Date: 8/10/15
By: Kimberly A. Kiefer
Kimberly A. Kiefer
City and Borough Manager

Contractor:
Date: August 6, 2015
By: David Wetzel, Co-Owner
David Wetzel, Co-Owner
Admiralty Environmental, LLC

Content Approved by: _____ 8/7/2015 _____, Public Works Director

Form Approved by: Jane E. Sebens 8/6/2015 _____, Law Department

Risk Management Review: _____ 8/14/15 _____, Risk Management

APPENDIX A: SCOPE OF WORK, TERM, AND COMPENSATION

1. SCOPE OF WORK

A. CBJ Wastewater Testing

Contractor will provide analytical testing services for the CBJ's Wastewater Utility Division in accordance with the US Environmental Protection Agency (EPA) and Alaska Department of Environmental Conservation (ADEC) standards to include up to a 5-day a week test cycle schedule for Mendenhall Treatment Plant (MTP) and a 3-day a week test cycle schedule for both the Juneau-Douglas Treatment Plant (J-DTP) and the Auke Bay Treatment Plant (ABTP).

Contractor will provide appropriate containers for all samples collected, as well as for occasional source control samples.

CBJ will be responsible for following EPA protocol to procure, transport and deliver all samples to the Contractor's testing facility.

Contractor is to conduct all testing and reporting per the standards established by the appropriate regulatory agency along with approved analytical methods. All analyses must use EPA approved testing methods that can achieve a reporting limit less than the effluent limit. For a parameter without an effluent limit, the Contractor must use the test method approved under Code of Federal Regulation Title 40 (40 CFR) Part 136, adopted by reference at 18 AAC 83.010, with the most sensitive method detection limit necessary for compliance monitoring. Any variance from specified approved standard methods must be pre-approved in writing by the CBJ and ADEC. The Contractor must submit a written request to the CBJ Contract Administrator describing the proposed variance and explaining the necessity for the variance.

Contractor will prepare and deliver the EPA's DMR QA Laboratory Performance Evaluation (PE) Study annual report test results to the appropriate Contract Administrator at least 2 weeks prior to the PE Study deadline established by EPA.

Contractor will deliver all test results to the CBJ Contract Administrator no later than 12 calendar days after the date samples are delivered to the Contractor, with the exception of test results for samples delivered on and after the 26th of any month, in which case the test results shall be delivered by the 7th day of the following month. If such data is not provided to CBJ by the 7th day of the following month, the Contractor will provide written documentation to CBJ explaining the Contractor's tardy delivery of the results; such documentation shall be available for review by CBJ, who may forward that information to ADEC.

Test result reports for non-routine analyses, such as trace metals, TCLPs, Priority Pollutants, and Total Petroleum Hydrocarbons, are due to the CBJ Contract Administrator no later than 21 calendar days after the date the samples are delivered to the Contractor.

Contractor will maintain a current copy of each CBJ ADEC NPDES discharge permit on file. Any test result exceeding the CBJ's permitted/regulated limits for total suspended solids, BOD_5, or fecal coliform shall be reported to the CBJ Contract Administrator as soon as results are confirmed. Test result reports shall include the facility name and associated ADEC NPDES discharge permit number:

Mendenhall Wastewater Treatment Plant
MTP Permit # AK-002295-1

Juneau-Douglas Wastewater Treatment Plant
J-DTP Permit # AK -002321-3

Auke Bay Wastewater Treatment Plant
ABTP Permit # AKG-57-1000

The CBJ may, in the future and upon written notice to Contractor, adjust the sampling schedule as needed.

B. CBJ Drinking Water Testing

Contractor will also provide analytical testing services for the CBJ's Water Utility Division, to assist the CBJ in complying with the Alaska Department of Environmental Conservation's ("ADEC") drinking water requirements. Appendix A, Attachment 1 outlines the sampling frequency of the various drinking water tests, which are required by ADEC at the time of the signing of this contract, and the subject of this contract.

Contractor will provide analytical testing services of CBJ's water, receiving water sampling in accordance with EPA standards to include, as determined by the CBJ, up to a 7-day a week test cycle schedule for the CBJ's Water Utilities Division (for example Coliform tests which are 30 samples monthly).

Contractor will provide all bottles, trip-blanks, kits, and all other items for CBJ to collect and provide samples to Admiralty for water testing. CBJ will be responsible for following EPA protocol to procure, transport, and deliver all samples to the Contractor's testing facility.

Contractor is to conduct all testing and reporting per the standards established by the appropriate regulatory agency along with approved analytical methods. Any variance from specified approved standard methods must be pre-approved by the City. The Contractor must submit a written request to the City's Contract Administrator describing the variance and explaining the necessity for the variance.

The Environmental Protection Agency's DMR QA Laboratory Performance Evaluation (PE) Study annual report test results must be submitted by Contractor to the appropriate Contract Administrator at least 2 weeks prior to the PE Study deadline established by EPA.

Contractor must report test results to the CBJ Contract Administrator no later than 10 business days from the date samples were delivered, and in no case past the 7th day of the following month, such lead time being necessary for CBJ to complete the monthly reports due to the regulatory agency. Turnaround times for non-routine test results are due no later than 21 days from the date the samples were delivered. The single exception is for any procedures for which these time limits are technically unfeasible, in which case the Contractor is required to consult with the CBJ Contract Administrator regarding an alternative deadline. In addition, any results that are outside CBJ's permitted/regulated limits are to be reported to the CBJ Contract Administrator as soon as results are confirmed. Reports shall reference the facility's name and the associated permit number:

Both parties will coordinate and work together to ensure the purposes of this contract and ADEC's requirements are met.

2. TERM

The effective date of this contract shall be the date it is signed by the CBJ, and it shall remain in effect until June 30, 2016, unless earlier terminated by mutual written agreement of the parties, or as otherwise provided by this contract. This contract may be renewed for additional one-year periods, at the sole discretion of the CBJ, and by mutual written agreement.

3. COMPENSATION AND TERMS OF PAYMENT

Contractor shall submit separate itemized monthly invoices for wastewater and drinking water analytical testing services performed, at the rates and per the terms set out in:

Appendix A, Attachment 2 (2015 Analytical Testing Pricing Schedule)
Appendix A: Attachment 3 (2015/16 Proposal for CBJ Wastewater Plant)
Appendix A, Attachment 4 (2015-2016 CBJ Water Utility Analysis Proposal)

In the event of a conflict between the attachments, Attachments 3 and 4 shall take precedence over Attachment 2. Invoices shall be paid within __ days of receipt and approval.

APPENDIX B: STANDARD PROVISIONS

1. CONTRACTUAL RELATIONSHIP. The parties intended that an independent contractor relationship will be created by this contract. The CBJ is interested only in the results to be achieved as provided in this agreement. The conduct and control of the work will lie solely with the Contractor. Contractor is not considered to be an agent or employee of the CBJ for any purpose, and the employees of Contractor are not entitled to any benefits that CBJ provides for CBJ employees. CBJ does not agree to use the Contractor exclusively. Contractor does not agree to work for CBJ exclusively.

2. PERSONNEL, EQUIPMENT AND SUPPLIES. Except as provided in the Scope of Work, the Contractor represents that it has or will secure at its own expense all personnel, equipment, and supplies required in performing the work under this contract. All of the work required hereunder will be performed by the Contractor or under its supervision. None of the work covered by this Contract shall be subcontracted except as provided in the Scope of Work.

3. CONTRACTOR QUALIFICATIONS. Contractor warrants that it is fully qualified and is licensed under all applicable local, state, and federal laws to perform its obligations under this contract.

4. INSURANCE REQUIREMENTS. Contractor has secured and agrees to keep and maintain in full force and effect, at its own expense, the insurance approved by CBJ Risk Management as outlined in Appendix C. All insurance required under this contract shall name the CBJ as an additional insured, except with respect to any required Professional Liability or Workers Compensation policies. At least 30 days prior to the cancellation, non-renewal or reduction in the amount of coverage, contractor shall provide written notice to the CBJ's Risk Management. The Contractor's insurance shall be primary and any insurance maintained by the CBJ shall be non-contributory. If the Contractor maintains higher limits than shown below, the CBJ shall be entitled to coverage for the higher limits maintained by the Contractor. Each policy shall be endorsed to waive all rights of subrogation against the CBJ by reason of any payment made for claims under the above coverage, except Workers Compensation and Professional Liability.

a. ***Deductibles and Self-Insured Retentions.*** Any deductibles and self-insured retentions must be declared to and approved by the CBJ. The CBJ may require the Contractor to provide proof of ability to pay losses and related investigations, claim administration and defense expenses within the retention.

b. ***Claims-Made Policies.*** If any of the required policies provide coverage on a claims-made basis:

1. The Retroactive Date must be declared and must be before the date of the contract or the beginning of the contract work.

2. Insurance must be maintained and evidence of insurance must be provided ***for at least one (1) year after completion of the contract work.***

3. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with the Retroactive Date prior to the contract effective date, the Contractor must purchase **"extended reporting"** coverage for a minimum of one (1) year after completion of the contract work.

5. CHANGES. The CBJ may, from time to time, require changes in the scope of services to be performed under this contract. Such changes, including any increase or decrease in the amount of the Contractor's compensation, must be mutually agreed upon in writing before they will be regarded as part of this contract. No claim for additional services, not specifically provided in this contract, performed or furnished by the Contractor, will be allowed, nor may the Contractor do any work or furnish any material not covered by the contract unless the work or material is ordered in writing by the CBJ.

6. NO ASSIGNMENT OR DELEGATION. The Contractor may not assign or delegate any interest in this contract without the prior written consent of the CBJ. Contractor may assign its rights to any payment under this contract without the prior written consent of CBJ; however, notice of any such assignment or transfer shall be furnished promptly to CBJ by Contractor.

7. TERMINATION FOR CONVENIENCE. The CBJ may, by prior written notice, terminate this agreement at any time, in whole or in part, when it is in the best interest of the CBJ. In the event that this contract is terminated by the CBJ for convenience, as opposed to termination for cause, the CBJ is liable only for payment in accordance with this agreement for work accomplished prior to the effective date of the termination.

8. DEFAULT AND TERMINATION FOR CAUSE. If Contractor fails to perform a material obligation under this contract, the CBJ may consider the Contractor to be in default (unless caused an event, circumstance, or act of a third party that is beyond Contractor's reasonable control) and may assert a default claim by giving Contractor a written and detailed notice of default. The Contractor shall cure the default within the time frame identified in the notice of default, or, if the default is not curable within the time frame specified, provide a written cure plan acceptable to the CBJ, which shall not be unreasonably withheld. Contractor will begin implementing the cure plan immediately after receipt of notice that the CBJ approves the plan. The CBJ's payment obligations shall be held in abeyance until the default is cured.

If Contractor fails to cure the default, unless otherwise agreed in writing, the CBJ may terminate any unfulfilled portion of this Agreement. In the event of termination for default, the Parties may agree that the CBJ's remedy be limited to recovering from Contractor all actual, reasonable costs incurred in securing the work described in Appendix A. The CBJ agrees to mitigate damages to the extent required by law, and to provide Contractor with detailed invoices substantiating the charges.

9. INSPECTION AND RETENTION OF RECORDS. The CBJ may inspect, in the manner and at reasonable times it considers appropriate, all of Contractor's facilities, records and activities having any relevance to this contract. Contractor shall retain financial and other records relating to the performance of this contract for a period of six years, or until the resolution of any audit findings, claims or litigation related to the contract.

10. EQUAL EMPLOYMENT OPPORTUNITY. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, marital status, changes in marital status, pregnancy or parenthood. Contractor shall include these provisions in any agreement relating to the work performed under this agreement with contractors or subcontractors.

11. CHOICE OF LAW, JURISDICTION. The Superior Court for the State of Alaska, First Judicial District at Juneau, Alaska shall be the exclusive jurisdiction for any action of any kind and any nature arising out of or related to this Agreement. Venue for trial in any action shall be in Juneau, Alaska. The laws of the State of Alaska shall govern the rights and obligations of the parties. Contractor specifically waives any right or opportunity to request a change of venue for trial pursuant to A.S. 22.10.040.

12. COMPLIANCE WITH LAWS AND REGULATIONS. Contractor shall, at Contractor's sole cost and expense, comply with all applicable requirements of federal, state, and local laws, ordinances and regulations now in force, including safety, environmental, immigration, and security enactments, or which may be subsequently enacted. Contractor warrants that it has obtained and is in full compliance with all required licenses, permits, and registrations regulating the conduct of business within the State of Alaska and the CBJ, and shall maintain such compliance during the effective term of this agreement.

13. PAYMENT OF TAXES AND OBLIGATIONS TO CBJ. As a condition of this contract, the Contractor shall pay all federal, state, and local taxes incurred by the Contractor and shall require their payment of any subcontractor or any other persons in the performance of this contract. Contractor shall not be delinquent in the payment of taxes, or any other obligation, to CBJ during the performance of this contract. Satisfactory performance of this paragraph is a condition precedent to payment by the CBJ under this contract.

14. CONFLICT OF INTEREST. Contractor warrants that no employee or officer of the CBJ has violated the conflict of interest provisions of CBJ code regarding this contract. Contractor also warrants that it has not solicited or received any prohibited action, favor or benefit from any employee or office of CBJ, and that it will not do so as a condition of this contract. If the Contractor learns of any such conflict of interest, the Contractor shall without delay inform the CBJ and Borough Attorney or CBJ's representative for this contract.

15. INDEMNIFICATION. The contractor agrees to defend, indemnify, and hold harmless CBJ, its employees, volunteers, consultants, and insurers, with respect to any action, claim, or lawsuit arising out of or related to the Contractor's performance of this contract, without limitation as to the amount of fees, and without limitation as to any damages, cost or expense resulting from settlement, judgment, or verdict, and includes the award of any attorneys' fees even if in excess of Alaska Civil Rule 82. This indemnification agreement applies to the fullest extent permitted by law and is in full force and effect whenever and wherever any action, claim, or lawsuit is initiated, filed, or otherwise brought against CBJ relating to this contract. The obligations of Contractor arise immediately upon actual or constructive notice of any action, claim, or lawsuit. CBJ shall notify Contractor in a timely manner of the need for

indemnification, but such notice is not a condition precedent to Contractor's obligations and is waived where the Contractor has actual notice.

16. OWNERSHIP OF DOCUMENTS. All designs, drawings, specifications, notes, artwork, and other work developed in the performance of this contract become the sole property of the CBJ and may be used by the CBJ for any other purpose without additional compensation to the Contractor. The Contractor agrees not to assert any rights and not to establish any claim under the design patent or copyright laws. The Contractor, for a period of three years after final payment under this contract, agrees to furnish and provide access to all retained materials at the request of the CBJ. Unless otherwise directed by the CBJ, the Contractor may retain copies of all the materials.

17. IDENTIFICATION OF DOCUMENTS. All reports, maps, and other documents completed as a part of this contract, other than documents exclusively for internal use within the CBJ, shall carry a CBJ notation or logo as directed by the CBJ.

18. APPLICABILITY OF ALASKA PUBLIC RECORDS ACT. Contractor acknowledges and understands that the CBJ is subject to the Alaska Public Records Act (AS 40.25.120) and that all documents received, owned or controlled by the CBJ in relation to this Contract must be made available for the public to inspect upon request, unless an exception applies. It is Contractor's sole responsibility to clearly identify any documents Contractor believes are exempt from disclosure under the Public Records Act by clearly marking such documents "Confidential." Should the CBJ receive a request for records under the Public Records Act applicable to any document marked "Confidential" by Contractor, the CBJ will notify Contractor as soon as practicable prior to making any disclosure. Contractor acknowledges it has five (5) calendar days after receipt of notice to notify the CBJ of its objection to any disclosure, and to file any action with any competent court Contractor deems necessary in order to protect its interests. Should Contractor fail to notify the CBJ of its objection or to file suit, Contractor shall hold the CBJ harmless of any damages incurred by Contractor as a result of the CBJ disclosing any of Contractor's documents in the CBJ's possession. Additionally, Contractor may not promise confidentiality to any third party on behalf of the CBJ, without first obtaining express written approval by the CBJ.

19. ENTIRE AGREEMENT. This Agreement, including all appendices and exhibits, constitutes the entire agreement of the Parties regarding the subject matter of the agreement and supersedes all previous agreements, proposals, and understandings, whether written or oral, relating to this subject matter.

20. SEVERABILITY. If a court of competent jurisdiction renders any part of this agreement invalid or unenforceable, that part will be severed and the remainder of this agreement will continue in full force and effect.

21. WAIVER. Failure or delay by the CBJ to exercise a right or power under this agreement will not be a waiver of the right or power. For a waiver of a right or power to be effective, it must be in a writing signed by the CBJ. An effective waiver of a right or power will not be construed as either a future or continuing waiver of that same right or power, or the waiver of any other right or power.

APPENDIX C: INSURANCE

INSURANCE REQUIREMENTS. The Contractor has provided certification of proper insurance coverage to the City and Borough of Juneau, attached as Appendix C, Attachment 5.

Contractor agrees to maintain insurance as follows at all times while this contract is in effect, including during any periods of renewal.

Commercial General Liability Insurance. The Contractor must maintain Commercial General Liability Insurance in an amount it deems reasonably sufficient to cover any suit that may be brought against the Contractor. This amount must be at least one million dollars ($1,000,000.00) per **occurrence**, and two million dollars ($2,000,000.00) aggregate. **The CBJ will be named as an additional insured on this policy for work performed for the CBJ.**

Workers Compensation Insurance. If required by Alaska Statute (*see* Alaska Statute 23.30), the Contractor must maintain Workers Compensation Insurance to protect the Contractor from any claims or damages for any bodily or personal injury or death which may arise from services performed under this contract. This requirement applies to the Contractor's firm, the Contractor's subcontractors and assignees, and anyone directly or indirectly employed to perform work under this contract. The Contractor must notify the City as well as the State Division of Workers Compensation immediately when changes in the Contractor's business operation affect the Contractor's insurance status. Statutory limits apply to Workers Compensation Insurance. The policy must include employer's liability coverage of one hundred thousand dollars ($100,000.00) per injury and illness, and five hundred thousand dollars ($500,000.00) policy limits. Contractor also agrees to provide evidence of Longshore and Harbor Worker's Insurance and Jones Act coverage if applicable to the work required. **If the contractor is exempt from Alaska Statutory Requirements, the contractor will provide written confirmation of this status in order for the CBJ to waive this requirement. The policy shall be endorsed to waive subrogation rights against the CBJ.**

Comprehensive Automobile Liability Insurance. The coverage shall include all owned, hired, and non-owned vehicles to a one million dollar ($1,000,000.00) combined single limit coverage. **CBJ will be named as an additional insured on this policy for work performed for the CBJ.**

Professional Errors and Omissions Liability Insurance. The Contractor must maintain coverage appropriate to the profession. The limit shall be at least $1,000,000 per claim.

Monitoring Summary for JUNEAU

Public water system ID#AK2110342 **Population: 30948** **February 27, 2015**

Community Water System, Surface water

	Requirement	Required Sampling Frequency	Last Sample	Next Sample
	COLIFORM (TCR)	30 sample(s) monthly	02/17/2015	March 2015
	Sanitary Survey	Every 3 years	10/24/2012	2015
DS001 DS JUNEAU DISTRIBUTION SYSTEM				
	TTHM & HAA5 (DBP2)	4 sample(s) quarterly	01/12/2015	See stage 2 sampling detail information below
	LEAD AND COPPER	30 sample(s) every 3 years	08/02/2013	2016
TP001 TP FOR SALMON CREEK RESERVOIR				
	SOC	1 sample(s) quarterly	11/16/2004	2014-2016 Waiver Approved
	VOC	1 sample(s) annually	10/14/2013	Overdue; Collect ASAP
	NITRATE	1 sample(s) annually	12/08/2014	2015
	RADIUM 226 AND 228	1 sample(s) per 9 year cycle	07/09/2007	Between 2008 and 2016
	TOTAL GROSS ALPHA	1 sample(s) per 9 year cycle	07/09/2007	Between 2008 and 2016
	INORGANICS	1 sample(s) per 9 year cycle	08/11/2010	Between 2011 and 2019
	ARSENIC - SINGLE	1 sample(s) per 9 year cycle	12/08/2014	Between 2020 and 2028
TP002 TP FOR LAST CHANCE BASIN WELLS				
	SOC	1 sample(s) quarterly	08/09/2005	2014-2016 Waiver Approved
	NITRATE	1 sample(s) annually	12/08/2014	2015
	VOC	1 sample(s) per 3 year period	11/29/2012	Between 2014 and 2016
	RADIUM 226 AND 228	1 sample(s) per 9 year cycle	07/09/2007	Between 2008 and 2016
	TOTAL GROSS ALPHA	1 sample(s) per 9 year cycle	07/09/2007	Between 2008 and 2016
	INORGANICS	1 sample(s) per 9 year cycle	08/11/2010	Between 2011 and 2019
	ARSENIC - SINGLE	1 sample(s) per 9 year cycle	10/14/2013	Between 2020 and 2028

Stage 2 Sampling Detail Information - Sample frequency listed in requirements above

Contaminant	Location	Sample Count	Sample Dates
DBP2	THANE PLANT	1	January, April, July, and October
DBP2	LYNN CANAL FIRE STATION	1	January, April, July, and October
DBP2	N. DOUGLAS BLEEDER VALVE	1	January, April, July, and October
DBP2	LYNN ELLEN STATION	1	January, April, July, and October

Operator Report

Requirement	Location	Sampling Frequency	Last Report	
CHLORINE	Distribution System	Same time/place as routine TCR sample	02/01/2015	Test and record daily. Send reports to ADEC on the last day of the month (before the 10th day of the following month).
CHLORINE	Entry Point - TP001	Daily	12/01/2014	
CHLORINE	Entry Point - TP002	Daily	12/01/2014	
COLIFORM (TCR)	Raw Water	5 samples per week		

Compliance Schedules			
		Due	Comments
DBP2			
	DBP- COMPLIANCE MONITORING PLAN	10/01/2013	
EPR			
	EPR-ERP/PMP CERTIFICATION BIENNIAL UPDTE	12/31/2016	
CCR			
	CCR - SUBMITTAL	07/01/2015	
	CCR - CERTIFICATION PAGE	10/01/2015	

**NSF = No sample found

1) Periods are three years in length. The current period is 1/1/2014 - 12/31/2016 and the next period will be 1/1/2017 - 12/31/2019. Cycles are nine years in length. The current cycle is from 1/1/2011 - 12/31/2019 and the next cycle is 1/1/2020 - 12/31/2028.
2) Periods for radionuclides (gross alpha, radium 226/228, and uranium) are three or six years in length. The current 6 year period is 01/01/2014 - 12/31/2019, the next 6 year period will be 01/01/2020 - 12/31/2025. Cycles for radionuclides are nine years in length. The current cycle is from 01/01/2008 - 12/31/2016 and the next cycle is 01/01/2017 - 12/31/2025.
3) WL (well) or TP (treatment plant) is the entry point to the distribution system, except for raw water samples and WL (well) is the raw water tap. DS (distribution system) is the home and buildings that receive water from a piped water system.
4) Water quality parameters are tested in order to conduct a corrosion control study. Please contact your engineer, health corporation, or certified laboratories for assistance.
5) Water systems with multiple water sources that do not combine before entering the distribution must take one sample from each entry point to the distribution and may do a composite sample according to 18AAC80.325(17), 18AAC80.315(4).
6) SOC waiver renewal forms are due every three year period. SOC waiver, new and renewal, forms can be found at http://www.dec.alaska.gov/eh/dw/publications/forms.html.
7) Each public water system is required to have a water operator (or operators) certified at or above the drinking water treatment and drinking water distribution level assigned to the system. To check on current level of certification for your water operator please see the Alaska Certified Water/Wastewater Operator Database maintained by the Division of Water: https://myalaska.state.ak.us/dec/water/opcert/Home.aspx?p=OperatorSearch. If you have questions regarding the water system level or the operator certification level please contact Operator Certification at 907-465-1139 or at dec.water.fco.opcert@alaska.gov.

Monitoring summaries reflect sampling information the Drinking Water Program receives from certified laboratories and public water systems. If you notice any errors in this data, please contact your local ADEC Drinking Water Program office. Public water systems are responsible for compliance with monitoring requirements.

Monitoring summary completed by Alyssa Murphy, Environmental Program Specialist/ADEC. If you have any questions please contact ADEC at (907) 262-3403 or 1-866-956-7656 Email: alyssa.murphy@alaska.gov Fax: (907) 262-2994.

Sincerely,

Alyssa Murphy
Environmental Program Specialist

Admiralty ENVIRONMENTAL
641 W. Willoughby Ave., Suite 301 Juneau, AK 99801 (907) 463-4415 (480) 247-4476 (fax)

2015 Analytical Testing Price Schedule – CBJ Wastewater

Drinking Water Testing

Arsenic	$60
Asbestos	$300
Carbamates	$195
Cyanide	$135
Diquat	$215
Dioxins	$550
EDB and DBCP	$150
Endothall	$195
Enterococci (enumeration)	$65
Fecal coliform (enumeration) LT2	$75
Fluoride	$65
Glyphosate	$215
Gross Alpha and Beta	$150
Haloacetic Acids (HAA5)	$255
Herbicides	$240
Heterotrophic Plate Count (HPC)	$75
Home Well Test (Arsenic, nitrate, TC)	$205
HPC Pool/Spa (HPC/TC/e. coli)	$110
Lead and Copper	$65
Mercury	$70
Metals in drinking water (Fe, Mn, etc.)	$60 ea.
Nitrate	$65
Nitrite	$65
Nitrate plus Nitrite (preserved)	$85
Pesticides and PCB's	$235
Phase II/V Inorganics	$455
Phase II/V Organics	$2150
Primary/Secondary Inorganics	$985
Pseudomonas (enumeration)	$65
Radium 226	$195
Radium 228	$215
Semivolatile Organics (SOC)	$385
Total coliform/*e.Coli* presence/absence	$60
Total coliform/*e.Coli* enumeration	$65
Total coliform/ *e.Coli* 24-hr verbal report	$90
Total coliform/ *e.Coli* 24-hr email report	$120
Total Dissolved Solids	$50
Total Organic Carbon	$135
Total Radiologicals	$675
Total Trihalomethanes (TTHM)	$150
Uranium	$120
Volatile Organic Compounds (VOC)	$215

Materials Testing

Asbestos % by PLM (solids), 2-day TAT	$155
Asbestos % by PLM (solids), 5-day TAT	$105
Asbestos Point Count (1000), 2-day TAT	$390
Asbestos Point Count (1000), 5-day TAT	$260
Lead in paint	$100
Paint Filter Test	$65

Wastewater/Soil Testing

AK 101 GRO (water or soil)	$140
AK 101 GRO/BTEX(water or soil)	$195
AK 102 DRO (water or soil)	$205
AK102/103 DRO/RRO (water or soil)	$215
Alkalinity	$50
Ammonia	$65
Biochemical Oxygen Demand (BOD, CBOD)	$98
BTEX	$110
Bromine	$30
Chloride in water	$60
Chloride in soil	$75
Chemical Oxygen Demand (COD)	$65
Color	$35
Conductivity	$35
Dissolved Oxygen (DO)	$35
Enterococci (enumeration)	$65
Ethylene/Propylene Glycol	$160
Fecal coliform in water (2-dilution enumeration)	$75
Fecal coliform in soil (2-dilution enumeration)	$95
Fecal coliform, additional dilution	$10 ea.
Fluoride in water	$60
Glycols (ethylene and propylene)	$170
Hardness	$55
Metals	$65/1st,$17/add.
Mercury	$70
Mercury, low level	$120
Nitrate	$60
Nitrite	$60
Nitrate plus Nitrite (preserved)	$75
Oil and Grease	$85
Oil and Grease w/silica gel cleanup	$100
Orthophosphate	$60
PAH (polynuclear aromatic hydrocarbons)	$395
PCB's	$170
pH	$30
Priority Pollutants	$1215
Residual Chlorine (Total and Free)	$30
Settleable Solids (SS)	$40
SOC	$385
Sulfate in water	$60
Sulfate in soil	$75
Thiosulfate	$60
TCLP Metals (RCRA 8)	$340
Total Aromatic Hydrocarbons (TAH)	$370
Total Aqueous Hydrocarbons (TAqH)	$395
Total Dissolved Solids	$50
Total Kjeldahl Nitrogen (TKN)	$70
Total Petroleum Hydrocarbons	$170
Total Phosphorus	$65
Total Solids	$60
Total Suspended Solids (TSS)	$50
Total Volatile Solids	$60
Turbidity	$30
UV Transmittance	$30
VOC	$275

Admiralty ENVIRONMENTAL
641 W. Willoughby Ave., Suite 301 Juneau, AK 99801 (907) 463-4415 (480) 247-4476 (fax)

2015 Analytical Testing Price Schedule

Other items

Metals filtration	$25
Onsite water sampling	$100/hr
Percent moisture/solids conversion	$25
Quality Assurance Plan development	$1000
Sample Composite Fee	$25
Septic System Dye Test	$420
Stream Flow Measurement	$40
Well Inspection (no tests)	$300
Well Sterilization	$450
Airport and Juneau port courier fee	$30
City and Borough of Juneau sales tax	5%
Rush Fee markup, 24 hour	100%
Rush Fee markup, 48 hour	75%
Rush Fee markup, 3-day	50%
Rush Fee markup, 5-day	25%

Admiralty ENVIRONMENTAL
641 W. Willoughby Ave., Suite 301
Juneau, AK 99801
Phone (907) 463-4415

Proposal for CBJ Wastewater Plant

Proposed 2015/16		**15% Discount for all sites**	
	Total	Discount	Extended total
MWTP	$93,703.00	$14,055.45	$79,647.55
Mendenhall River	$5,582.00	$837.30	$4,744.70
JDTP	$35,854.00	$5,378.10	$30,475.90
ABTP	$36,049.00	$5,407.35	$30,641.65
AB Mix Zone	$570.00	$85.50	$484.50
Source Control	$34,950.00	$5,242.50	$29,707.50
Total[1]	$206,708.00	$31,006.20	$175,701.80

Addendum for all scenarios:
Fecal Coliform Results: Email notification 24 hours (No Add'l Charge)
Three dilutions will be performed on all fecal coliform samples to give upper reporting limit of 6000 fc/100ml
Immediate Email notification if permit limit exceeded for fecal coliform, BOD, and TSS
Reports are due to client within 12 calendar days or by 7th of following month (see contract Appendix A for non-routine test)
Report turn-around fees:

1-day: ~~100%~~ **50%**
3-day: ~~50%~~ **WAIVED**
5-day: ~~25%~~ **WAIVED**

Preparation of bottle kits and field documentation, sample preservation and handling included.

[1] "Total" based on 8/13/14 spreadsheet describing number and type of analyses required, as provided by CBJ Wastewater Utility, and indicated same levels for 2015

Admiralty
ENVIRONMENTAL
641 W. Willoughby Ave., Suite 301 Juneau, AK 99801
(907) 463-4415

2015 - 2016 CBJ Water Utility Analysis Proposal

Admiralty Environmental proposes to continue providing analytical services for the City and Borough of Juneau Public Works Department/Water Utility to satisfy ADEC drinking water testing requirements. The enclosed pricing covers the anticipated amount of testing through June 30, 2016. Comprehensive services offered by Admiralty Environmental include:

- All bottles, sampling materials, and equipment
- Analysis of effluent samples by certified laboratories
- All associated administrative costs, including materials and shipping
- Timely data reporting to client and/or regulatory agencies

Unit costs for analytical tests are as follows:

CBJ Public Works – Water Utility	# Samples	Unit Price	Total Price
Total Coliform (P/A)	450	$60.00	$27,000.00
Total Coliform (MPN)	200	$65.00	$13,000.00
Total Coliform (MPN) weekend	50	$95.00	$4,750.00
TTHM/HAA5	4	$405.00	$1,620.00
Old Inorganics	1	$985.00	$985.00
New Inorganics	1	$455.00	$455.00
Nitrate	1	$65.00	$65.00
Revised Radionuclides (Gross Alpha, Radium, Uranium)	1	$675.00	$675.00
Volatile Organic Compounds	1	$215.00	$215.00
VOC Trip blank testing	1	$215.00	$215.00
Total Organic Carbon	12	$135.00	$1,620.00
			$50,600.00
		- 10% discount	-$5,060.00
		Total	$45,540.00

Please contact me if you have any questions, and we look forward to continued work with you.

Best Regards,

David Wetzel
Admiralty Environmental

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 07/07/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Reuben Willis 720 W Willoughby Ave State Farm Juneau, AK 99801	**CONTACT NAME:** Pamela Whillock-Olliff **PHONE (A/C, No, Ext):** (907) 586-2027 **FAX (A/C, No):** **E-MAIL ADDRESS:** pamela.whillock-olliff.rlfv@statefarm.com
	INSURER(S) AFFORDING COVERAGE / **NAIC #** **INSURER A :** State Farm Mutual Automobile Insurance Company / **25178**
INSURED COTE, DIANA & WETZEL, DAVID DBA ADMIRALTY ENVIRONMENTAL 641 W WILLOUGHBY AVE STE 301 JUNEAU AK 99801-1771	**INSURER B :** **INSURER C :** **INSURER D :** **INSURER E :** **INSURER F :**

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY COMMERCIAL GENERAL LIABILITY CLAIMS-MADE OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY PRO-JECT LOC						EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ $ $ $ $ $
A	**AUTOMOBILE LIABILITY** ANY AUTO ALL OWNED AUTOS HIRED AUTOS SCHEDULED AUTOS NON-OWNED AUTOS	Y		**070 3729-A31-02** **009 2851-B09-02I** **037 1972-E31-02M**	**01/31/2015** **02/09/2015** **05/31/2015**	**07/31/2015** **08/09/2015** **11/30/2015**	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ $ 2,000,000 $ 2,000,000 $ 1,000,000
	UMBRELLA LIAB OCCUR **EXCESS LIAB** CLAIMS-MADE DED RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICE/MEMBER EXCLUDED? **Y / N** **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A					WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ $ $

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER

City & Borough of Juneau Alaska
155 S Seward St
Juneau, AK 99801

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 3/18/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Dustin Roberts	
Shattuck and Grummett Insurance 301 Seward St. Juneau AK 99801	PHONE (A/C, No, Ext): (907)586-2414	FAX (A/C, No): (907)586-3770
	E-MAIL ADDRESS: dustin@sginc.com	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : Illinios Union Ins Company	
INSURED	INSURER B : American Interstate Insurance	
Admiralty Environmental, LLC 641 W. Willoughby Ave. Suite 301 Juneau AK 99801	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** CBJ **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [X] POLICY [ ] PRO-JECT [ ] LOC	X		G24377052 003	3/17/2015	3/17/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 50,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
	AUTOMOBILE LIABILITY [ ] ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS [ ] HIRED AUTOS [ ] NON-OWNED AUTOS						COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ $ $ $
	[ ] UMBRELLA LIAB [ ] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [ ] RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N [y] (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		RAWCAK2022242014	5/8/2014	5/8/2015	WC STATU-TORY LIMITS [X] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
A	Professional Liability			G24377052 003	3/17/2015	3/17/2016	Occurrence Aggregate	1,000,000 2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

This Certificate is a representation of the named insured's coverage as of the date shown. Shattuck & Grummett Insurance makes no representation that these coverage's comply with or fully satisfy any insurance or indemnity requirements in any contract, written, oral, or implied.

CERTIFICATE HOLDER

City & Borough of Juneau
155 South Seward Street
Juneau, AK 99801

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

John Grummett/JOHN

Workers Compensation And Employers Liability Insurance Policy Information Page

WCIP American Interstate Insurance Co. - 24759
2301 HWY 190 WEST
DERIDDER, LA 70634
3374639052

Home Office

NCCI Carrier Code24759

Current Policy Number: RAWCAK2399882015
Renewal of Policy : RAWCAK2303122014
Business Market : Assigned Risk

1. Named Insured And Address:

Admiralty Environmental LLC
641 W. Willoughby Ave, Ste 301
JUNEAU, AK 99801

Agent Name and Address

SHATTUCK GRUMMETT, INC. (A/R)
301 SEWARD STREET
JUNEAU, AK 99801

Telephone : (907)723-4415
Risk ID:
FEIN: 202344832
Entity of Insured : LLC

Telephone: (907)586-2414
Producer Number: 00009429

SIC Code: 8999

2. Policy Period: This policy period is from 05/08/2015 To 05/08/2016

*12:01 A.M. Standard Time At The Insured's Mailing Address.

3. Coverage:

A. Worker's Compensation Insurance: Part One Applies to the Worker's Compensation Law of the states listed here:
AK

B. Employer's Liability Insurance: Part Two Applies to work in each state listed in item 3A. The limits of our liability under Part Two Are:

Bodily Injury By Accident	$ 1,000,000	Each Accident
Bodily Injury By Disease	$ 1,000,000	Policy Limit C. Refer to Residual Market Limited Other States Insurance Endorsement WC000326A
Bodily Injury By Disease	$ 1,000,000	Each Employee

C. Other States Insurance. Part Three of the policy applies to the states, if any, listed here:
None

D. This policy includes these endorsements and schedules : (See Attached Schedule of Endorsements)

4. Premium: The premium for this policy will be determined by our Manuals of Rules, Classifications, Rates and Rating Plans. All information required below is subject to verification and change by audit.

Sub Total:	
Other Charges/Credits Subject to Mod:	
Deductibles:	
Total Premium Subject To The Experience Modification:	
Modified Premium:	
Other Charges/Credits Not Subject to Mod:	
Schedule Rating Factor:	
Premium Discount (If Applicable):	
Expense Constant Charge:	
Other Coverage Charges	
Total Estimated Annual Premium:	
Taxes, fees and surcharges:	

*** Please Note:**

This is the summary information for this policy. Please see the additional attached pages for a more detailed listing.

Please see the declaration's addendum page for any state mandated taxes, fees or surcharges.

Interim adjustments to premium, if any, shall be made: Annual

Minimum Premium:
Downpayment:

Name of Producer: SHATTUCK GRUMMETT, INC. (A/R)
Servicing Office: DERIDDER, LA
Customer Acct#: 01148829
Date: 05/19/2015 10:31:25 AM

Countersigned By _____ 05/19/2015
Authorized Representative Date

THIS INFORMATION PAGE WITH THE WORKERS COMPENSATION AND EMPLOYERS LIABILITY INSURANCE POLICY AND ENDORSEMENTS, IF ANY, ISSUED TO FORM A PART THEREOF, COMPLETES THE ABOVE NUMBERED POLICY

ABWHITE
WC 00 00 01 A (1/99)

WCIP American Interstate Insurance Co. - 24759
2301 HWY 190 WEST
DERIDDER, LA 70634

Policy Holder: Admiralty Environmental LLC
641 W. Willoughby Ave, Ste 301
JUNEAU, AK 99801

Policy No. : RAWCAK2399882015
Policy Period : 05/08/2015 -05/08/2016
Submission ID : 0000799667

Agent: SHATTUCK GRUMMETT, INC. (A/R)

Schedule of Endorsements

1	AIIC-WC-J (4/2015)	AIIC WC Policy Jacket (not applicable in AZ, CA, FL)
2	AIIC202	Schedule of Locations -AIIC
3	AIIC203	Schedule of Named Insureds-AIIC
4	WC000000C	WC Policy Form
5	WC000001A	WC & Employers Liability Information Page (Dec)
6	WC000001B	State Premium Calculation
7	WC000106A-3	USL&H Coverage End (not applicable in CA)
8	WC000201B	Maritime Cover End
9	WC000203	Voluntary Compensation Maritime Coverage Endorsement
10	WC000308(4/84)	Officer Exclusion (not applicable in CA)
11	WC000326A(2/97)	A/R Other States End
12	WC000403(4/84)	Experience Rating Modification Factor Endorsement
13	WC000414(7/90)	Ownership Chg Not (not applicable in CA)
14	WC000419	Premium Due Date End. (not applicable in CA)
15	WC000422B	Terrorism Risk Insurance Prg ReAuthorization Act Disclosure
16	WC540301	AK Limit of Liab End
17	WC540401	AK Assigned Risk Premium Surcharge Endorsement
18	WC540403	AK Residual Market Safe Workplace Incentive Premium Credit

WCIP American Interstate Insurance Co. - 24759
2301 HWY 190 WEST
DERIDDER, LA 70634

Policy Holder: Admiralty Environmental LLC
641 W. Willoughby Ave, Ste 301
JUNEAU, AK 99801

Policy No. : RAWCAK2399882015
Policy Period : 05/08/2015 -05/08/2016
Submission ID : 0000799667

Agent: SHATTUCK GRUMMETT, INC. (A/R)

Schedule of Endorsements

19	WC540601	AK Install Option
20	WC540601A	AK Install Option
21	WC540602	AK Cancel/Nonrenew
22	WC890600A	Policy Info. Page Endorsement

Appendix G1

Bio-Aquatic Testing QA/QC Manual

Bio-Aquatic Testing, Inc.

Quality Control/Quality Assurance Manual

Bio-Aquatic Testing, Inc.

2501 Mayes Road Suite 100
Carrollton, TX 75006

President:	Chris Robason	Phone: (972) 242-7750 ext. 25
QA Officer:	Christina Henderson	Phone: (972) 242-7750 ext. 12

Revision: 14

Effective Date: July 1, 2014

Lab Director/President: Chris Robason

QA Officer: Christina Henderson

Lead Technical Director: Paul Fletcher

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AMS-CH

The State of Texas

Secretary of State

CERTIFICATE OF INCORPORATION

OF

BIO-AQUATIC TESTING, INC.
CHARTER NUMBER 01044495

THE UNDERSIGNED, AS SECRETARY OF STATE OF THE STATE OF TEXAS, HEREBY CERTIFIES THAT ARTICLES OF INCORPORATION FOR THE ABOVE CORPORATION, DULY SIGNED AND VERIFIED HAVE BEEN RECEIVED IN THIS OFFICE AND ARE FOUND TO CONFORM TO LAW.

ACCORDINGLY THE UNDERSIGNED, AS SUCH SECRETARY OF STATE, AND BY VIRTUE OF THE AUTHORITY VESTED IN THE SECRETARY BY LAW, HEREBY ISSUES THIS CERTIFICATE OF INCORPORATION AND ATTACHES HERETO A COPY OF THE ARTICLES OF INCORPORATION.

ISSUANCE OF THIS CERTIFICATE OF INCORPORATION DOES NOT AUTHORIZE THE USE OF A CORPORATE NAME IN THIS STATE IN VIOLATION OF THE RIGHTS OF ANOTHER UNDER THE FEDERAL TRADEMARK ACT OF 1946, THE TEXAS TRADEMARK LAW, THE ASSUMED BUSINESS OR PROFESSIONAL NAME ACT OR THE COMMON LAW.

DATED JULY 13, 1987

Secretary of State

Supporting Documents for Bio-Aquatic Testing's Standard Operating Procedures and Quality System

1. All current Federal Registers, EPA and state issued permits, state regulations, state biomonitoring plans, and client orders. Papers that are client-specific (permits, test schedule forms, etc.) are filed in the Permits File. Papers containing general information (state regulations, letters from the USEPA regarding changes in protocol, etc.) are kept in the Regulations Notebook.

2. EPA Method manuals:

   a. EPA/821/R-02/012, October 2002, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 5th Edition.*
   b. EPA/821/R-02/013, October 2002, *Short-Term Methods For Estimating The Chronic Toxicity of Effluents And Receiving Water To Freshwater Organisms, 4th Edition.*
   c. EPA/821/R-02/014, October 2002, *Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Water To Marine And Estuarine Organisms, 3rd Edition.*
   d. EPA/600/6-91/003, Methods *For Aquatic Toxicity Identification Evaluations, Phase I: Toxicity Characterization Procedures, 2nd Edition.*
   e. EPA/600/R-92/080, September 1993 *Methods For Aquatic Toxicity Identification Evaluations, Phase II: Toxicity Identification Procedures For Samples Exhibiting Acute And Chronic Toxicity*
   f. EPA/600/R-92/081, September 1993, *Methods For Aquatic Toxicity Identification Evaluations, Phase III: Toxicity Confirmation Procedures For Samples Exhibiting Acute And Chronic Toxicity.*
   g. EPA/600/R-94/025, June 1994, *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods.*
   h. EPA/823/B-94/001, February 1994, *Interim guidance on Determination and Use of Water-Effect Ratios for Metals.*
   i. EPA/620/R-95/008, August 1995, *Environmental Monitoring and Assessment program (EMAP) Laboratory Methods Manual Estuaries.*
   j. EPA/823/B-98/004, Febuary1998, *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. –Testing Manual.*
   k. EPA/600/R-95/136, August 1995, *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms.*

3. Current NELAC Quality Systems

4. Current ACIL Publications

5. EPA QA/G-5, or most recent release thereof.

6. EPA QA/G-7, or most recent release thereof.

Statement of Confidentiality

Bio-Aquatic Testing and its entire staff commit themselves to providing environmental services that meet the needs of our clients, comply with and satisfy EPA protocols and requirements, and keep pace with modern technologies and practices.

We use toxicology data for many purposes including compliance with regulatory requirements, determination of the presence, concentration, and movement of toxic materials in the environment, potential effects upon or protection required for aquatic life, and the actions necessary for disposal or treatment of toxic materials. We may use data to support a broader based projects involved with site characterization and/or remediation, on-site treatment, or health and safety protection of personnel and the public.

It is in our client's best interests that we maintain confidentiality between the laboratory and the client, except when an identified toxic problem may adversely affect the health and safety of our personnel and the public. Upon any such occurrence, we will notify our clients immediately for remediation prior to any other action.

In the Event of Company Termination

Should Bio-Aquatic Testing cease business operations, management will send a written notice to all current and former clients with whom we have done business within the previous ten years, and whose records we hold on file. The notice will specify that Bio-Aquatic Testing will no longer accept acute or chronic samples after a specified date.

All currently running projects will be completed, reported, and billed as usual. Bio-Aquatic Testing will retain only essential personnel during the final project completion phase.

All data, after transcription from the raw bench sheets, is stored in an electronic format. All hard copies of client records will be destroyed, but the electronic versions will be stored according to the data storage time frame required by NELAC. The president of the company will be in charge of securing the data for storage.

In the Event of the Sale of the Company to another Party

Unless the new owner decides to conclude the biomonitoring aspect of the laboratory, all records and information will pass to the new owner, and their staff will be responsible for complying with the requirements for continued certification and business operations.

If the new owner decides to conclude biomonitoring, the previous owner and management will make recommendations for the distribution and storage of data and insure that clients are fully entitled to their information.

Quality Policy Statement

Bio-Aquatic staff and management are committed to ensuring the integrity of our data and meeting the quality needs of all of our clients. Bio-Aquatic Testing and its employees pledge to manage our business according to the following principals and objectives:

1. We wish to create an environment that provides consistent high quality data through integrity, honest, and accountability at all levels of operation. We achieve this through dependable, well-trained, and courteous personnel.

2. We will strive to foster an atmosphere of personal responsibility and mutual respect to insure that our employees have an equitable environment of efficient communication between management and all employees.

3. We are dedicated to providing accurate, impartial, and legally defensible data while maintaining the trust and confidence of our employees and clients.

4. Bio-Aquatic Testing will only take on projects that we feel we have adequate equipment and staff to complete successfully.

5. Our lab will comply with all pertinent federal, state, and local regulations. We will also meet all clients' requirements for any work charged to our competency, and will do no less than deal openly, honestly, and fairly with everyone.

6. We will conduct our business on the principle that we will treat others as they would prefer to be treated.

7. We will maintain leadership, technical innovation, and proficiency that enhance the quality and value of our work.

8. We will endeavor to provide employees with guidelines and an understanding of the ethical and quality standards that they must uphold to maintain the integrity of our reputation and business.

9. We will strive to adhere to all the requirements of NELAC.

All employees are required to read and sign that they understand the above statements and will strive to work in such a manner as to achieve them. The "Ethics and Data Integrity Commitment" is a document that will be maintained as a record of each employee's agreement to abide by the above values and assist management in achieving those goals. The document also outlines many of the specific responsibilities that our employees will maintain.

Introduction to Quality Assurance and Quality Control

Biological Monitoring (biomonitoring) is a laboratory method used to monitor and evaluate effluents for their impact on receiving waters. This method is important for controlling toxic pollutants in the nation's waters. Toxic effects are measured by observing the response of an organism exposed at different concentrations of a substance over specified durations.

The goal of this document is to keep the amount of variation inherent in biological testing to a minimum. The procedures contained herein allow the laboratory to meet specific toxicity requirements and guidelines. Although it is impossible to measure a true value for every test performed, our goal is to reduce the random variation by setting quality control standards and monitoring them with quality assurance practices.

In order to deliver high quality data continually, we analyze each sample the same way using the same method, follow the same techniques learned throughout the extensive and continual training program, and strive to consistently produce accurate and precise data.

Each technician is responsible for performing QC procedures on a daily basis, unless otherwise necessary or noted in the SOPs. The QA Office periodically reviews technician actions and inspects all QC logs according to the schedule designated throughout the SOPs and QAM for missing data or discrepancies.

Quality Assurance/Quality Control Plan

Objectives

To reflect the established quality assurance/quality control program for Bio-Aquatic Testing, Inc.

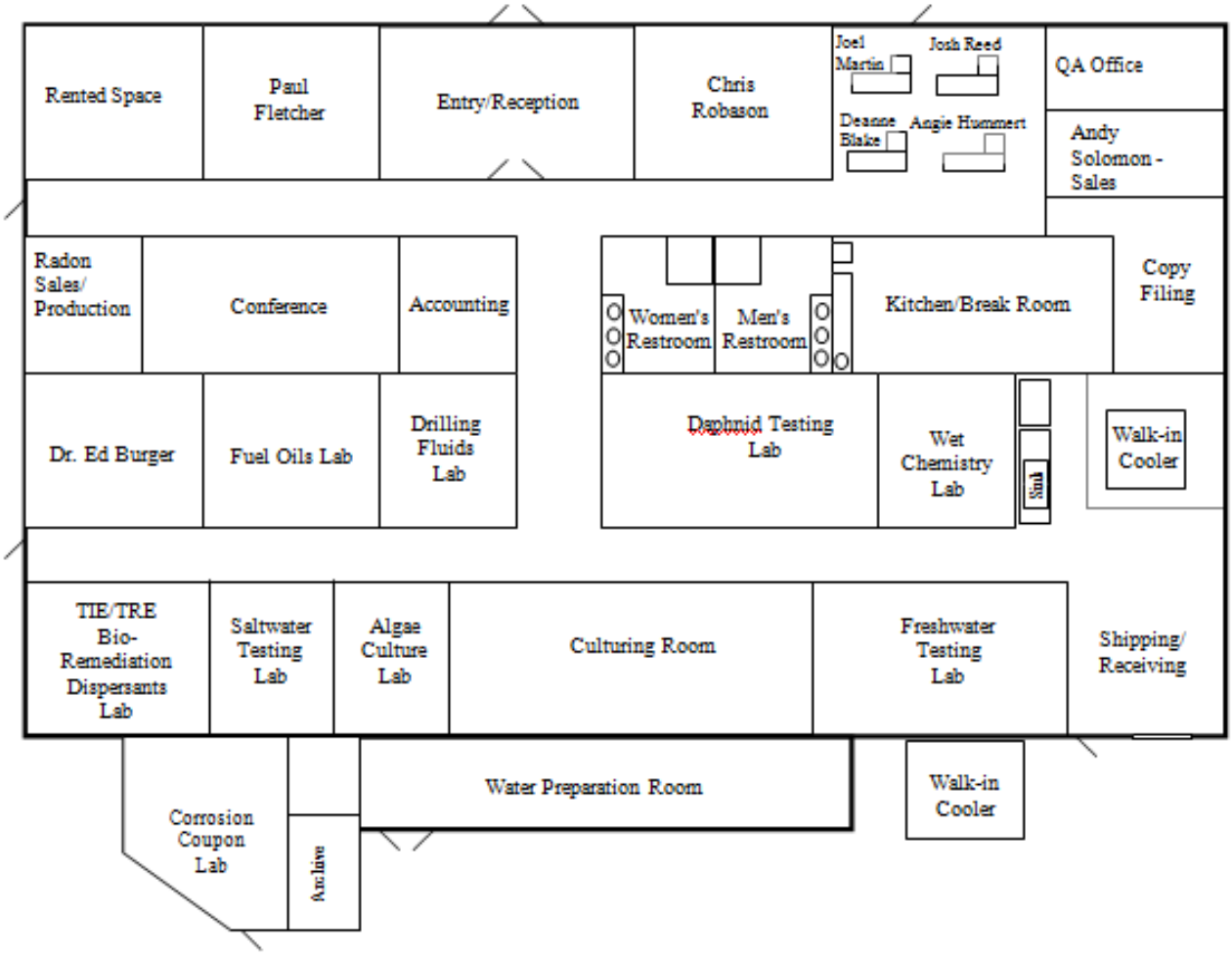
Program Highlights

Bio-Aquatic Testing's quality assurance/quality control plan encompasses every aspect of quality assurance. By upholding and maintaining the following data quality objectives, the program insures that laboratory personnel and equipment generate quality data at all times:

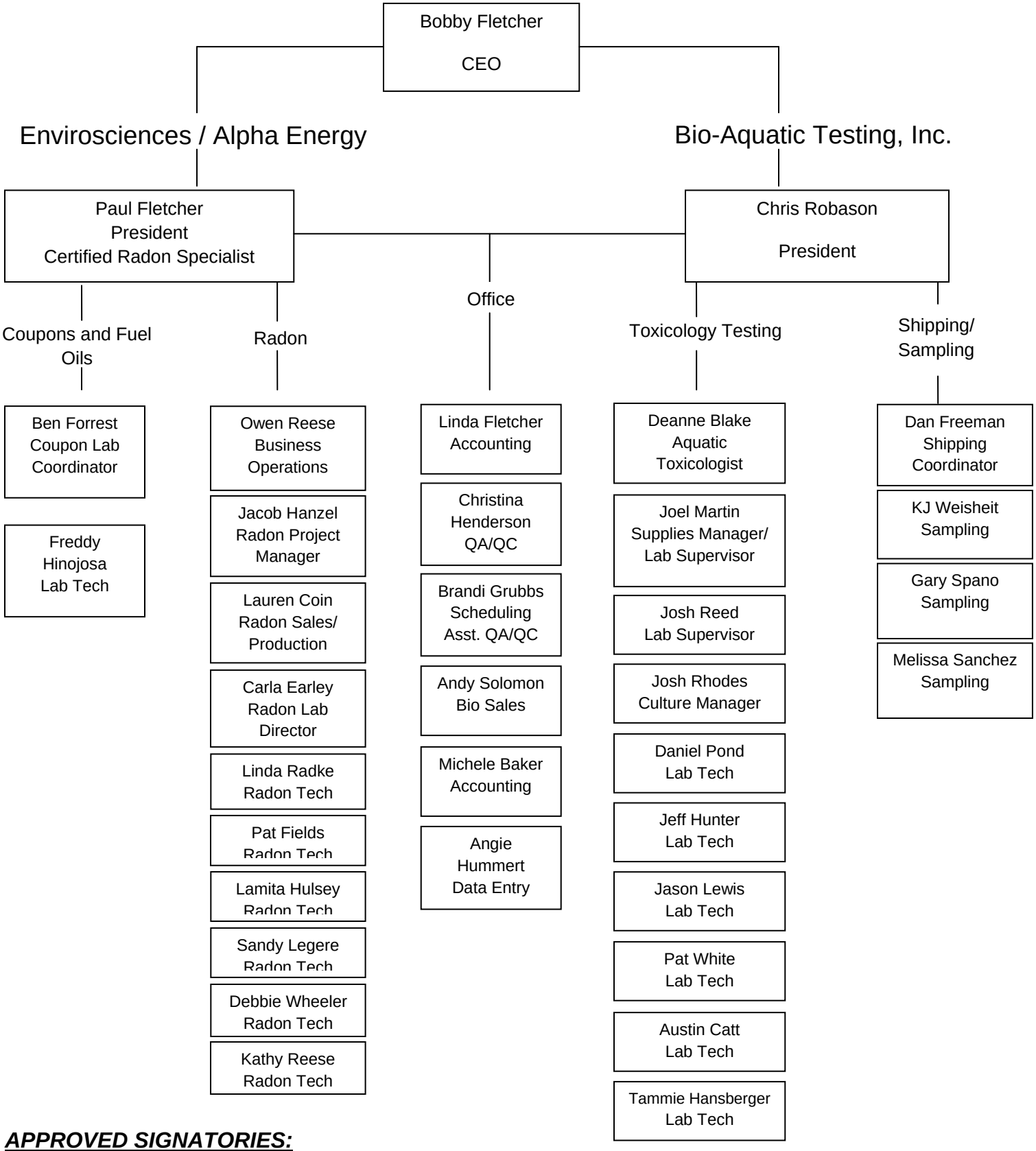
- Retain well-trained laboratory personnel who follow proper testing methodology and procedures.
- Maintain an appropriate laboratory facility, which provides sufficient space, proper lighting, clean air, and required temperatures.
- Maintain the required laboratory equipment and supplies to the highest standards: including documenting laboratory instrument and equipment performance, calibration, and maintenance and analyzing quality control standards to insure the use of high quality reagents and correct chemical techniques.
- Protect the integrity of all received samples by following proper sample custody procedures.
- Maintain healthy cultures and test organism sensitivity by observing organism behavior and appearance, tracking reproduction, and performing monthly reference toxicant tests as well as yearly participation in the EPA DMR-QA studies when conducted by the EPA.
- Insure the use of quality food sources by performing food tests on lot numbers prior to use in culture and testing programs.
- Record all data promptly, legibly, and make corrections so as not to obscure the original entry and verify computer entries by comparing output to handwritten data.
- Use only approved and appropriate statistical programs to analyze data.
- Support all work performed by the laboratory with documented standard operating procedures.
- Maintain all original data and records in a protected archive system for a minimum of 5 years (10 years as required by LDEQ).
- Comply with the Environmental Protection Agency, the Food and Drug Administration, Good Laboratory Practices, and NELAC requirements.
- Maintain reference materials, including method manuals and standards list within the QA Office.
- Review the Quality System on an annual basis to reflect any updating or changes necessary to accommodate the workload of the company.

Layout of the Laboratory

Facilities Diagram
13,600 ft.^{2}



Organization of Laboratory Personnel



APPROVED SIGNATORIES:

Chris Robason-President & Lab/Technical Director
Christina Henderson-QA Manager
Paul Fletcher-Supervisor/Technical Director

Laboratory Personnel Identification and Minimum Education Requirements

The following are the personnel titles and general duties of all the positions at Bio-Aquatic Testing:

Laboratory Manager/Technical Director – Responsible for scheduling tests, sampling, and overseeing all aspects of the laboratory; the final review of all reports before submission to the client; mediating complaints from clients; as well as communicating problems that arise. Responsible for overseeing all technical aspects and day-to-day operations of the laboratory including the appropriateness of lab equipment, personnel training, data management, and storage, QA/QC and reporting of results; certifies that personnel with appropriate educational and/or technical backgrounds perform all tests for which the laboratory is accredited.

Education Requirements: Bachelor's degree, in a related science field with at least 2 years of experience in environmental analysis and a minimum of 16 hours of biological science. A Master's degree may substitute for 1 year of experience. (Exception: those designated as Technical Directors that qualify under the "grandfather" clause)

QA Manager/Officer – Responsible for overseeing the quality system and its implementation as well as all QC procedures undertaken by the technicians; insures the proper training and technique of all lab personnel, is responsible for overseeing corrective actions, and for periodic lab and employee audits; reviews all reports, logbooks, and records to make sure they are correct and/or current, and he or she maintains and updates the quality manual and standard operating procedures.

Education Requirements: Bachelor's degree, preferably in a related science field with at least 2 years of experience in environmental analysis. They must have exceptional organizational skills and attention to detail.

Senior Aquatic Toxicologist – Responsible for overseeing all TIE/TRE and Bio-Remediation projects and researching or troubleshooting aquatic life issues in the laboratory or for clients' projects; performs final review of data for proper statistical analysis or anomalies. Any QC and/or maintenance of equipment for the instruments used in their areas are also his or her responsibility.

Education Requirements: Master's degree or degree candidate in a related science field with at least 2 years of experience in environmental analysis.

Aquatic Toxicologist – Responsible for assisting in TIE/TRE and Bio-Remediation projects and researching or troubleshooting aquatic life issues in the laboratory or for clients' projects. Any QC and/or maintenance of equipment for the instruments used in their areas are also his or her responsibility.

Education Requirements: Bachelor's degree in a related science field with at least 2 years of experience in environmental analysis. A Master's degree may substitute for 1 year of experience.

Culture Manager – Responsible for preparing all laboratory culture waters and dilution waters; culture all marine organisms used in testing, the freshwater minnows, algae, and YTC; insure the health and acceptability of all cultured organisms, including monitoring feeding regimes, water quality, and appropriate QC checks outlined in the culturing SOPs. Any QC and/or maintenance of equipment for the instruments used in their areas are also his or her responsibility.

Education Requirements: Bachelor's degree in a related science field with at least 2 years of experience in environmental analysis.

Sampling Technician – Responsible for all field-sampling duties and insuring proper sample handling and integrity during shipment or transport to the laboratory. Any QC and/or maintenance of equipment for the instruments used in their areas are also his or her responsibility.

Education Requirements: High school degree or GED equivalent

Lab Technician I – May participate in glassware and container prep, test area maintenance, and culture maintenance under the direction of a more senior staff member; may be responsible for receiving samples and other shipments, as well as for shipping out sampling containers and equipment to the client, ensuring their arrival in time for sampling.

Education Requirements: Enrolled in high school, high school graduate, or GED equivalent. College degree candidate preferred.

Lab Technician II – In addition to the duties listed under Lab Technician I, this person may be responsible for the following: receiving, checking-in, and analyzing samples, test dilution preparation, beginning and ending tests, test change-out and renewal, wet chemistries, culturing and feeding of the Artemia used as food in testing, and dry weight analysis upon test completion. Any QC and/or maintenance of equipment or instruments used in their testing areas are also their responsibility. May aid the Culture Manager in his or her duties mentioned above or complete any of those responsibilities under the Culture Manager's direction. May perform data entry and report writing duties as needed. Specifically, any Cladoceran testing technician is responsible for culturing the Cladoceran organisms used in testing.

Education Requirements: Enrolled in high school, high school degree or GED equivalent, technical degree, plus at least one year of experience. College degree candidate with a science focus or background candidate preferred.

Lab Technician III & Lab Supervisor – Including all duties of Technician I and II, may additionally be assigned training and supervision of new lab technicians.

Education Requirements: Bachelor's degree, technical degree plus 2 years of experience, or high school degree or GED equivalent plus 4 years of experience.

Scheduling Coordinator – Responsible for planning the annual master schedule and overseeing shipping.

Education Requirements: Bachelor's degree, technical degree, high school degree, or GED equivalent. Excellent organizational skills is a requirement.

Office Manager – Responsible for binding, copying, filing, and mailing completed reports to the clients; handles all payroll, accounts payable, and accounts receivable.

Education Requirements: Bachelor's degree, technical degree, high school degree, or GED equivalent. Accounting experience and customer service experience preferred.

Supplies Manager – Responsible for obtaining lab supplies including equipment, reagents, and maintenance supplies; documents supply arrival, the dates opened, and expiration dates and maintains this information on file for traceability.

Education Requirements: High school degree or GED equivalent, technical degree, plus at least one year of experience. College degree candidate preferred, with a science focus or background.

Quality Control for the Signature List

Objectives

Provide a current and historical listing of employee signatures and initials.

Attaining Objectives (Refer to SOP 12.3)

The following objectives are the duties of the QA Officer or Laboratory Director

1. The QA Office will maintain an alphabetically organized employee signature and initial list.
2. New employees must sign the signature list within the first week of employment.
3. The QA Office will update the signature list every three years for all employees.

Quality Assurance and Countermeasures for Non-Attainment

- The Laboratory Director will review the QA Office on an annual basis for discrepancies.
- If the Laboratory Director finds discrepancies, the QA Office will be reviewed and possibly replaced.

Laboratory Audits and Data Audits of Quality Control Logs

Objectives

To reflect the procedures followed and the documentation requirements for routine laboratory audits and data audits of the quality control logs by the Quality Assurance Officer (QA).

Procedures

1. Quality Control Logs – audited monthly by QA and monitored by the QA Office
    a. In order to make sure that the technicians are filling out and filing QC data logs, the following QC records will be reviewed approximately once a month:
        - Testing room environmental parameters (temperature, lighting, etc.)
        - Culture room environmental parameters
        - Refrigerator, Drying Oven, Dessicator logs
        - All instrument calibration and maintenance logs
        - Water preparation and unit logs
        - Culture tracking
        - Water quality and preparation tracking

2. Laboratory Inspections
    a. At anytime during a scheduled workday, the QA Office may perform in-lab inspections of the technicians and/or procedures in order to compare the approved standard operating procedure and required regulations with the actual procedure performed in the lab.
    b. The QA Office will attempt to perform at least one lab inspection per week.

3. Personnel Audits
    a. The QA Office will audit the laboratory on an annual basis and document the results. The audit could include verbal, written, observational, or other forms of testing over standard procedures
    b. New employees will be monitored/inspected weekly for the first month while in training. A training log will be kept on their progress. Monitoring will continue on a monthly basis for the first year of employment.
    c. The QA Office will maintain an internal file for each employee that will contain the employee's audits, reviews, and training records.
    d. The QA Office will also keep documentation of any corrective actions taken pertaining to the QA/QC in this manual; any CA involving an employee will also be documented by the QA Office in the employee's file.

4. Reports to Management
    a. The findings from the above audits and inspections will be reflected in a report to management. If the QA Office deems the finding critical and needs immediate action, they may verbally inform management prior to giving management the regular report.

5. Managerial audits will occur on an annual basis.

Quality Control for Data Integrity and Ethics

Objectives

- Assure valid data of known and documented quality.
- Include signed training and dated integrity documentation for all laboratory employees, periodic monitoring of actual data integrity, and documented data integrity procedures.
- Insure that monitoring tools are used to prevent and discourage unethical practices.
- Provide tools to employees for reporting unethical behavior.

Attaining Objectives

1. Managers uphold standards by supporting and enforcing data integrity procedures and by signing and dating the data integrity procedure training forms.
2. Management annually reviews and updates data integrity procedures and evidence of inappropriate actions through regularly scheduled internal audits. Management also monitors the procedures periodically through in-depth data review, records review, or other thorough check processes.
3. The mechanism for confidential reporting of ethics and data integrity issues includes unrestricted access to senior management, an assurance that personnel will not be treated unfairly for reporting instances of ethics and data integrity breaches, and anonymous reporting.
4. Through training and review of quality system documents, employees understand that any infractions of the laboratory data integrity procedures will result in a detailed investigation that could lead to serious consequences such as immediate termination or civil/criminal prosecution.
5. Any potential data integrity issue is handled confidentially until a follow-up evaluation, full investigation, or other appropriate actions have been completed and the issues clarified. Inappropriate activities are documented, including disciplinary actions, corrective actions, and notifications to clients, if applicable.
6. Any determination for a detailed investigation of data integrity issues must be communicated to senior management. Allegations are investigated and remain confidential to the extent necessary.
7. All employees must attend data integrity training upon hire and annually thereafter.
8. All staff must attend the initial data integrity training and the annual refresher course and sign the attendance sheet and ethics agreement. This demonstrates that all staff members have participated and understand their data integrity obligations.
9. Senior management signs and dates data integrity training records.
10. Management insures that contracted technical or support personnel, when used, are trained to the laboratory's quality system and data integrity procedures, competent to perform the assigned tasks, and appropriately supervised.

Quality Assurance and Countermeasures for Non-Attainment

- If a discrepancy is discovered, but not documented, the corresponding technician will be reprimanded, and asked to document any deviations pending final approval.
- Without sufficient documentation and reasoning, a test may be determined invalid, and re-testing at the lab's expense will occur.

Quality Control for Integrity/Ethics Training

Objectives

Insure that all employees are trained in their ethical responsibilities

Attaining Objectives

These objectives are the duties of Lab Management.

Employee integrity and ethics training will include:

- The organizational need for truthfulness and full disclosure in all analytical reporting
- How and when to report data integrity issues
- Record keeping
- Discussion regarding all data integrity procedures
- Data integrity training documentation
- In-depth data monitoring
- Data integrity procedure documentation
- Improper data manipulations
- Adjustments of instrument time clocks
- Inappropriate changes in concentrations of standards
- The importance of proper written narration on the part of the analyst with respect to those cases where analytical data may be useful, but are in one sense or another partially deficient
- Written ethics agreements
- Examples of improper practices

Quality Assurance and Countermeasures for Non-Attainment

- If a discrepancy is discovered, but not documented, the corresponding technician will be reprimanded or face other potential consequences including termination or criminal prosecution.
- Follow-up with any reported activity through audit or investigation.
- Report any activities to the client that would affect the outcome of their work.

Ethics Policy and Data Integrity Commitment (form in QAM attachments)

I _____ (print name), state that I have read and understand the high ethical standards that I must uphold as an employee of Bio Aquatic Testing, Inc. I am committed to performing my duties to the best of my ability while at the same time maintaining the level of integrity and quality of data for which our company is known. I understand that lab inspections, data audits, personnel reviews and other in depth data monitoring tools may be used to access my compliance.

I agree that in the performance of my duties for Bio-Aquatic Testing and its clients, I shall strive to always conform to the following ethical standards and will report immediately to the Quality Assurance Office or an appropriate supervisor any information regarding the misrepresentation of data, or other inappropriate lab behavior that includes, but is not limited to:

1. Altering an instrument, computer, or clock for an inappropriate purpose.
2. Altering the contents of logbooks and/or datasheets to misrepresent data.
3. Forging or misrepresenting a technician's identity.
4. Changing raw data or reporting false or fake data.
5. Altering calibration procedures or standards to produce a certain result.
6. Failure to comply with standard operating procedures without proper documentation and approval.
7. Disposing of or deleting electronic data files or hard copies of raw data.
8. Engaging in any practice that ultimately misrepresents data or narratives in any way.
9. Failure to report any observed violation of the above standards by fellow employees.
10. Failure to maintain client confidentiality.

I will not knowingly participate in any of the above activities and will not tolerate such unethical practices by others. I also understand that Bio-Aquatic Testing will strictly enforce confidentiality in such matters. I am responsible for seeking approval to report data that may deviate from standard operating procedures or methods.

If I am unsure of how to handle data generated by me, I am responsible for seeking the advice and approval of the Quality Assurance Manager or Lab Director. I agree to seek such information within 24 hours of the discovery.

I understand that if I knowingly participate in any unethical or prohibited activity that I am subject to disciplinary action that may include termination of my employment with Bio-Aquatic Testing, and that I may face individual prosecution from the appropriate authorities and possibly imprisonment.

My signature affirms my understanding of the consequences of violating this agreement as well as my commitment to its intent.

_____ _____

Employee Signature Date

_____ _____

QA or TD Signature Date

Quality Control for Corrective and Preventative Actions

Objectives

- Effectively link any deviation requiring corrective/preventative action to its origin.
- Thoroughly document corrective/preventative actions.
- Quickly communicate to the client all corrective actions that cast doubts on the accuracy of data.
- Effectively implement corrective/preventative actions and follow-up and evaluate these actions using the audit process.

Attaining Objectives (Refer to SOP 12.5)

The following objectives are the duties of all laboratory staff:

1. Identify problems, non-conformances, or incidents and document them as soon as possible along with the method of discovery and any associated dates or record numbers. Sources of discovery may include audits, staff observation, inspections, data trends, managerial review, etc.
2. Describe documented actions in detail so that it can be easily followed by an outside observer. Include relevant evidence, such as effects noticed or observations made, the data in question, etc., where applicable. The Lab Director or QA Office is then responsible for evaluating if the documentation is sufficient and will provide immediate response or initiate further root cause investigations.
3. Document and assign steps to be taken to collect additional data if further investigation is warranted to identify the root cause.
4. Analyze the resultant data from the investigation and develop an action plan and implementation scheme. Assign and record the action steps to take.
5. Review corrective actions at least annually during the internal audit process.

Quality Assurance and Countermeasures for Non-Attainment

- Review actions periodically for completeness and traceability, at a minimum during internal audits and managerial review. If a discrepancy is discovered, the corresponding party will be reprimanded for non-conformance.
- Notify clients and appropriate authorities where required when test data may be called into question without sufficient documentation and reasoning.

Quality Control for Complaint Handling

Objectives

Insure complaints are received and handled in a courteous and professional manner to the client's satisfaction.

Attaining Objectives (Refer to SOP 12.6)

The following objectives are the duties of all laboratory staff:

1. Complaints, when they occur, typically go through the employee who takes the call or receives the mail. Most complaints are received verbally and are handled over the phone. All complaints should be documented as completely as possible.

2. Technicians are encouraged and empowered to courteously listen to grievances and determine if he or she can rectify the situation by him or herself. The problem could be a simple reporting error in a document, sample coolers that did not arrive, or various other possibilities.

3. If the technician is unsure about a solution or feels they cannot adequately handle the problem themselves, they will record as much information that the client is willing to disclose then report it to the Lab Director or QA Officer. If the Lab Director or QA Officer cannot handle the complaint right away, then the information gathered will be written and submitted via a message and the client will be told that the complaint will be handled as soon as possible.

4. Once the Lab Director is made aware of a situation, he can then assess the situation, communicate directly to the client, and develop a solution. He can then instruct personnel as to the best solution and they can perform the necessary steps or he can take the necessary steps himself.

Quality Assurance and Countermeasures for Non-Attainment

- On an annual basis, Bio-Aquatic testing sends a performance and satisfaction evaluation survey to our clients to help us rate our service and garner comments and/or suggestions.

- Bio-Aquatic Testing also posts laminated reminders in designated or appropriate areas that address common complaints or specific client requests such as faxing COCs or performing additional routine or special non-routine testing.

- Management will reprimand the employee(s) responsible if complaints are not being addressed correctly.

Quality Control for Training

Objectives

- Insure that employees are adequately trained for their respective lab tasks.
- Monitor employees continuously to keep skills current and identify any area(s) that require retraining.

Attaining Objectives (Refer to SOP 12.3)

These objectives are the duties of the QAO, Lab Directory, assigned training mentors:

1. The QA Office trains or assigns new employees a training mentor. Mentors must be classified as veteran employees and must be already certified to perform the task to be trained. The QA Office maintains training records. The QAO will confer with the mentor/trainer during the training process to ascertain proficiency. The Technical Director must certify that the employee is allowed to perform the assigned task and has final authority.
2. The QA Office audits new employees once a week for the first full month of service and monthly for at least the first year of employment.
3. In addition to annual DOC for test methods, new employees must demonstrate capability upon hire.
4. Veteran employees are individually audited semi-annually and as a unit through DOC and reference toxicity training.
5. Audit records are maintained for each employee and the unit as a whole. Non-conformances and required corrective actions are documented separately unless the QAO or Lab Director determines immediate corrective action is applicable.
6. Veteran employees must review applicable procedures and SOP documents for any areas identified for retraining.
7. Lab and training meetings will cover new SOPs and procedure revisions.
8. If corrective action is required, reference the handling of corrective actions above.

Quality Assurance and Countermeasures for Non-Attainment

- The QAO will monitor the employee using previous audits to insure continued compliance.

Quality Control for Contracting Analytical and Other Services

Objectives

- Insure that any contracted laboratory used by Bio-Aquatic Testing has adequate facilities, methodology, standards, and traceability to perform the analysis required.
- Insure that any other contracted service, such as shipping companies, couriers, or sub-contracting, can make certain that delivery times, handling, and adequate services are rendered.

Attaining Objectives (Refer to SOP 12.7)

The following objectives are the duties of the Lab Director:

1. The Lab Director will contract with analytical laboratories and request proper disclosure of their certifications, methodology, services, and traceability and will determine if Bio-Aquatics needs and standards are met before conducting any business with proposed laboratories.
2. The Lab Director will contract with shipping companies such as FedEx, UPS, and intermediate couriers where necessary, provided sample delivery times are met and samples are handled with care and precaution.
3. The same care and consideration will be taken with any other sub-contracted work.

Quality Assurance and Countermeasures for Non-Attainment

- The Lab Director will determine the best course of action when considering a contracted service.
- The Lab Director may file complaints and seek a new service if standards are not met.

Quality Control for New Projects

Objectives

- Review all new work so that requirements are clearly defined, to insure that the laboratory has adequate resources (time, equipment, supplies, and personnel), accreditations, and capabilities, and that the test method is applicable to the customer's needs.
- Insure that all work receives adequate attention without shortcuts that may compromise data quality.

Attaining Objectives

The following objectives are the duties of all lab staff:

1. Contracts for new work may be in the form of formal bids, signed documents, verbal, or electronic communication.

2. Any employee can accept new work for routine biomonitoring projects that fall under our current methods and species tested. Employees must check the availability of organisms, scheduling, and request the client's permit prior to accepting new work.

3. The QA Office, Lab Director, or Technical Director reviews the permit and confirms if the laboratory has the required certifications, that it can meet the client's data quality and reporting requirements, and that the lab has the capacity to meet the client's turnaround needs.

4. The Lab Director, QA Office, or Technical Director must review projects that fall under our scope of capabilities but have a new protocol or species before accepting the project. Once the laboratory accepts the project, the client receives a quote for the cost of services.

5. For new, complex, or large projects, the Lab Director or Technical Director must gather the necessary staff to evaluate the following:

    a. Contractual obligations, bonding issues, and payment terms
    b. Method capabilities, analyte lists, reporting limits, and quality control limits
    c. Turnaround time feasibility
    d. QA/QC issues, including certification and accreditation
    e. Formal laboratory quote
    f. Final report formatting and electronically deliverable documents
    g. Time required to keep the sample in-house
    h. Final sample disposal requirements

Quality Assurance and Countermeasures for Non-Attainment

- The Lab Director or Technical Director has final say on a project's feasibility. The lab maintains records for every contract or work request including pertinent discussions with a client relating to the client's requirements or the results of the work during the period of the contract's execution.
- The Lab Director maintains copies of all signed contracts.

Quality Control for Deviation from Standard Operating Procedures

Objectives

- Insure that any deviation is well documented.
- Insure that deviations only occur where absolutely necessary or for valid, defensible reasons.
- Insure that all explanations for deviations are communicated to the appropriate authority and to the client.

Attaining Objectives

The following objectives are the duties of all laboratory staff:

1. Technicians must document any deviation in testing procedures on the raw data sheets. Approval will be sought from a supervisor before any course of action is taken.
2. All documented deviations must be reported to the QA Office or Lab Director before a report is submitted for writing.
3. The Lab Director or QA Office will determine if the documentation is sufficient to properly explain the necessity of the deviation.
4. The laboratory will seek consultation with a governmental reporting authority if uncertainly remains as to the validity of the data.
5. Clients will be notified of what to expect in the report and be made aware of any other changes in reporting that must result.

Quality Assurance and Countermeasures for Non-Attainment

- If a discrepancy is discovered, but not documented, the corresponding technician will be reprimanded and asked to document any deviations pending final approval.
- Without sufficient documentation and reasoning, a test may be determined invalid and re-testing at the lab's expense will occur.
- If sufficient reasoning is documented, the final reporting authority may still rule data invalid and demand re-testing.
- Data that is reported with undocumented deviations may be ruled as falsifying records and could result in an employee's termination in violation of our ethical policy and/or other legal repercussions.

Quality Control for Document Handling

Objectives

Insure that logbooks, SOPs, the QA/QC manual, reports, and other pertinent internal documentation is maintained and secure.

Attaining Objectives (Refer to SOP 10.2)

The following objectives are the duties of the QA Officer:

1. The QA Office maintains all logbooks not kept near the designated workstation and maintains a record of the location of each logbook. The QA Officer audits all logbooks according to the frequency established in the QA/QC plan.
2. The QA Office maintains employee audit and training information in employee files.
3. In order to insure all copies are current, individual copies of SOP's are made only with the approval of the QA Office. Old copies must be returned or discarded before new updated copies are released.
4. Individual report document handling is discussed in the relevant Quality Control section of this manual. Refer to this section for procedures on the handling of report documents.
5. The QA Office maintains and tracks proficiency testing documentation.
6. Data that is not current, but is less than 5 years old, is clearly separated, filed, and placed into storage on the premises and labeled by year for easy access. LDEQ reports are kept for 10 years.
7. Data that is outdated is discarded. Hard data is shredded and discarded, and electronic data is purged, though electronic data may be kept for longer than five years, if space allows.
8. Computer stored data is backed up daily on the premises and weekly offsite.
9. Only report writers, the senior toxicologist, management, and the QA Officer have full access to clients' reports
10. Archived data is maintained in a temperature-controlled room free from animal influence and tracked via an access/removal log.

Quality Assurance and Countermeasures for Non-Attainment

- Computer login names and passwords are used for security purposes to prevent entry into our systems.
- The main server system, which holds all of our files, is kept in a secured room to which only management has access. This room remains locked during business hours unless maintenance is required. The main server is also protected by a firewall and daily back up.
- The QA Officer is responsible for maintaining records, insuring that back-ups occur as scheduled, and that document copies are kept current to insure all technicians are following the correct procedures.

Quality Control for Data Handling

Objectives

- Make sure data sheets and other pertinent test information is filed into the appropriate test folders for transport to the report writing desk and data analysis personnel.
- Insure data transcription from raw data sheets to the computer database is accurate and that all data is analyzed following the recommended EPA protocol.

Attaining Objectives (Refer to SOP 10.2)

The following objectives are the duties of the report writer(s) and reviewer(s):

1. Technicians review raw data sheets daily during testing for possible errors, and should document those errors as completely as possible. If the error has no precedence, the QA Office will be told and will help resolve the matter.
2. Following test completion, technicians place data sheets into the test folder, and transport them to the report writing personnel. After the report writer enters the data, writes the report, and completes statistical analysis, the QA Office, the senior toxicologist and the Lab Director all examine the report for accuracy and completeness.
3. If errors arise, the report writer receives the report once again to make corrections. A corrected report is reviewed a second time before being sent to the Office Manager for billing and distribution to the client.
4. If no errors arise, each of the three reviewers signs off on the report.
5. Statistical software packages used by report personnel are EPA approved.
6. The Office Manager assembles, prints (if a hard copy is required), and files a hard copy of the report for laboratory records. She then sends the completed report to the client along with the necessary invoices via domestic courier or postal service.
7. Electronic reports are sent to a client-specified email address in a password protected file format to prevent data tampering. A computer disk copy is also saved, and all data is backed up daily and offsite weekly.

Quality Assurance and Countermeasures for Non-Attainment

- Raw data, hard copy, and computer disk copies are compared for exactness.
- Two or three different reviewers inspect each report to make sure no errors slip through.
- If excessive mistakes are found, or similar mistakes continually occur, the QA Office will review the procedures of the report personnel and retrain if necessary.
- If data is continually missing from the test folder, whether from incompleteness or misplacement, the QA Office may have to retrain or call a meeting with laboratory technicians.

Quality Control for Data Review

Objectives

- Insure raw data contains no discrepancies or inconsistencies when tests are completed.
- Insure that data analysts use the correct statistical analysis programs on the test data.
- Insure that data entry clerks enter all data correctly so that it matches the raw data sheets.

Attaining Objectives (Refer to SOP 12.4)

The following objectives are the duties of the Senior Toxicologist or QA Office:

1. After a report is completed by the Report Writer, the Senior Toxicologist or QA Office reviews the data using a written form and verifies that the printed report and data exactly match the raw data on survival, weights, temperatures, dilution series, NOEC and LOEC values, chains of custody, testing requirements and parameters, as well as analytical test results and chemistries; the statistical analysis run on the raw data is correct; and that the table forms accurately reflect the critical dilution, coefficient of variation values, and other information from the test itself.
2. The Senior Toxicologist or QA Office will mark any mistakes or corrections explicitly, and return the report to the Report Writer.
3. The Report Writer corrects the errors and then passes the report to the Laboratory Director for a third review.
4. Once the report is certified for completeness, the review form is signed and filed with the report hard copy. The file is placed in the Office Manager's inbox for filing and distribution to the client.

Quality Assurance and Countermeasures for Non-Attainment

- Should the Toxicologist or QA Office consistently find the same types of errors, it will be reported to the Lab Director and the three of them will sit down with the Report Writer and review the problems with him or her. Reviews will be documented on the employee's internal record.
- If the problems continue, the Report Writer will be re-trained or face dismissal.

Quality Control for Reporting Subcontracted Analytical Results

Objectives

- Make sure generated reports are included in the general report body in the appropriate order.
- Insure data is precise and accurate by reviewing calibration and detection limit information.
- Insure that data generated followed recommended EPA methodology.

Attaining Objectives

The following objectives are the duties of the Lab Director and report personnel:

1. The Office Manager or Lab Directory typically receives all results, usually electronically, by mail or by fax. The Lab Director reviews results for accuracy, completeness, and quality control.

2. If the data does not pass review, the Lab Director contacts the analytical laboratory to discuss discrepancies and have corrections made if necessary. If the validity of the results comes into question, whether from expected results, suspected lab error, or incorrect methods, the Lab Director may request that the tests be re-run for comparison.

3. After review, the final results are sent in their entirety in the format sent from the analytical laboratory.

4. Only final results are reported to the client and filed with the client's report, but all test results are kept on file in the Office Manager's office or stored electronically.

Quality Assurance and Countermeasures for Non-Attainment

- If a complaint is filed about analytical results reporting, the Lab Director must mediate.
- If continual errors occur from a contracted analytical service, a new service may be sought or the Lab Director may need to contact the management staff of the analytical lab for discussion.

Quality Control for Electronically Reported Data

Objectives

- Make sure only the designated recipient receives generated reports.
- Insure data is received intact and in a manner sufficient to prevent data tampering.

Attaining Objectives (Refer to SOP 10.6)

The following objectives are the duties of the Lab Director and report personnel:

1. Faxed results, forms, or reports are sent with a cover page indicating the name of the fax recipient, date, number of pages, as well as contact information for the lab.
2. Successful faxes generate a report that is reviewed to insure that the fax successfully transmitted.
3. Emailed results are sent via a secure email service in a password protected PDF format to prevent data tampering along with a confirmation of receipt. Once the email is received, a second email is sent back to the lab confirming who received the email and the time and date of delivery.
4. Occasional follow up phones calls may need to be made to make sure faxes or emails have been received.
5. The Officer Manager or Scheduling Coordinator will periodically contact facilities for personnel changes to insure that only current designated personnel are receiving results. The client, however, has ultimate responsibility for reporting facility personnel and contact information changes.

Quality Assurance and Countermeasures for Non-Attainment

- The Lab Director oversees the general security of the laboratory's email features.
- The QA Office insures that personnel are properly trained on report faxing and emailing procedures.
- If security and confidentiality of reports cannot be achieved, then electronic reporting of documents must be reviewed and possibly terminated.

Quality Control for Proficiency Testing

Objectives

- Insure that proficiency test results are submitted on time and performed at least annually. Currently providers only offer WET testing as part of the EPA DMRQA Study once per year.
- Insure all proficiency testing is carried out within the confines of the quality control system and in accordance with all current SOPs and EPA methodology.
- Make sure accurate records are retained for review by accrediting authorities, clients, and the EPA.
- Insure that standards for proficiency testing are only ordered from EPA recognized and NVLAP certified providers.

Attaining Objectives (Refer to SOP 12.1)

The following objectives are the duties of all laboratory staff, as proficiency testing involves all aspects of the lab:

1. At the start of the study, the QA Office organizes a summary binder.

2. The QA Office oversees all proficiency testing in the lab. He or she receives samples and prepares for test set-up. The QA Office observes that accurate testing procedures and quality control measures are followed.

3. Testing technicians are responsible for initiation, the day-to-day change-out, renewal, and ending of proficiency program tests, as proficiency testing requires that those that routinely perform the work participate in conducting the study.

4. After the point is reached where a client would normally be sent the report, the QA Office gathers all data and testing folders, and organizes the study binder. The QA Office then summarizes the data points and submits the results to the provider of the proficiency study standards.

5. Once the lab analyzes the standards, the test endpoints are reported to the standards provider and the client. Clients are required to submit their own copy or release the data electronically to the standards provider. The test provider will then review the study endpoints and report acceptability of results to the lab and the client.

Quality Assurance and Countermeasures for Non-Attainment

- The Lab Director oversees the general progression of the study while the QA Office insures that personnel are properly trained on all aspects of the study that pertain to their work.
- If any of the testing endpoints do not match the criteria for the study, a corrective action response may be necessary and re-testing may be required.

Quality Control for Reference Toxicity Testing

Objectives

- Insure that laboratory cultured organisms are healthy and within an acceptable, pre-defined lethal and sub-lethal response range.
- Demonstrate that the laboratory is capable of performing satisfactory toxicity tests.
- Demonstrate the laboratory personnel have the ability to obtain consistent and precise results.

Attaining Objectives (Refer to SOP 12.1)

The following objectives are the duties of all testing laboratory technicians:

1. The laboratory must conduct at least one acceptable test per month using a reference toxicant with a known range of response for each in-house cultured organism and toxicity method used in the laboratory.
2. For purchased organisms used immediately, a concurrent reference toxicity test must be run on the received batch.
3. The lab will plot reference toxicant test data monthly using the appropriate software. Plots are available to all personnel and are used for detecting trends, warning limits, and out of control limits. The lab will conduct retests for all tests exceeding warning levels and out of control limits.
4. New lab personnel will demonstrate proficiency after training by conducting initial lab QC tests and then reference toxicant tests. After demonstrating proficiency in the lab QC and reference toxicity tests, the training technician, QA Office, and Technical Director will certify and monitor new personnel for two weeks while they are directly working with effluent and chemical toxicity.
5. All other QC procedures (location, technique, photoperiod, feeding, etc.) for reference toxicity testing are observed, as would be for an effluent toxicity test.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office insures that laboratory personnel follow proper procedures.
- If reference toxicants have expired, the lab purchases new toxicants.
- The QA Office and culture technician review culture systems and make corrections if necessary.
- If in-house organisms continue to exceed warming and control limits, the lab will purchase new brood stock.

Quality Control for Sample Integrity

Objectives

To insure that sample integrity is maintained from the time of sample collection through analysis.

Attaining Objectives (Refer to SOPs 3.1 – 3.3)

The following objectives are the duties of the sample custodian or designated lab technician:

1. Every sample shipped to clients contains a copy of our sample acceptance policy:

Required temperature range of 4°C ± 2. Ship samples with ice.

Rinse the sample container with a portion of sample before final collection. Fill containers completely to minimize headspace. Compress air out of cube containers before closing.

Properly seal containers. Insure that the sample lid is fixed tightly with no leaks, to prevent contamination during shipping.

Include completed Chain of Custody document.

Samples received out of hold time will not be used without regulatory authority. Follow sample holding guidelines:

1. **The first chronic sample must be used within 36 hours from last portion collected. Each following sample must be used within 72 hours, from the last portion collected.**
2. **Acute samples must be used within 36 hours from the last portion collected.**

2. The sample custodian clearly marks the facility and outfall on the sample containers before shipping. Samples are pre-assigned a unique ID number on the COC that accompanies the sample containers.

3. The sampling technician onsite must keep sub-sample bottles in ice throughout the sampling period and immediately seal grab samples and pack them with ice. He or she seals sample buckets in tamper-proof containers before shipping along with the chain of custody which he or she must complete with sample date, time, and signature. Samples must be returned to the lab in tightly taped-closed ice chests, to protect against spillage during shipping or transport.

4. The sample custodian at the lab receives the sample in the shipping/dock area. Using the chain of custody, he logs the sample into the computer database, prepares the database for data entry, and prints out the necessary set-up forms and raw data sheets. He then labels a test folder and places all sheets inside.

5. He then takes the folder and sample into the test prep area. He signs the chain of custody with his initials, the date and time of receipt, checks the sample for hold time violations, takes the temperature, looks the sample container over for its integrity, and records all of the above on the chain of custody sheet. All chains of custody are filed into the test folder, which remain in the wet chemistry lab throughout the test.

6. After a lab technician prepares the sample, he or she places any remaining sample in the storage cooler which is maintained at a temperature of 4±2°C.

Quality Assurance and Countermeasures for Non-Attainment

- Any signs of tampering, improper temperature upon receipt, expired hold times, or sampling discrepancies are immediately reported to the QA Office and then documented and invalidated if necessary. The client is immediately notified and another sample scheduled for collection.

- If lab personnel do not follow SOP procedures, the QA Office and Lab Director will review the procedures with personnel as necessary in addition to the semi-annual review.

Quality Control for Sample Collection

Objectives

- Collect representative samples of effluents and receiving waters for use in toxicity testing.
- Prevent the addition of artificial toxicity during collection, shipment, or storage.
- Minimize chemical/biological changes in the collected samples.

Attaining Objectives (Refer to SOP 8.1)

The following objectives are the duties of any designated field personnel:

1. Sample location and types of samples (grab versus composite) are identical to those specified in the permit. Documentation accompanies all samples.
2. Designated field personnel collect sufficient volumes of samples to perform the required toxicity testing and chemical tests specified in the permits.
3. Field technicians are responsible for collecting effluent flow data and compositing the samples so that the sample is representative.
4. Sampling equipment (tubing and containers) is prepared following the guidelines for equipment cleaning outlined in the SOPs.
5. Sampling technicians completely fill sample containers to eliminate airspace between contents and lid.
6. Auto-samplers are locked at all times.
7. Composite samples are chilled during collection. Both grab and composite samples are chilled immediately after collection. Samples remain chilled throughout transport to the lab.
8. Samples are held at 4±2 degrees Celsius until used.
9. Sample holding times are followed as specified in the client's permits.
10. Insure that sampling equipment functions properly.

Quality Assurance and Countermeasures for Non-Attainment

- Prior to dispatching assigned field personnel, the Lab Director obtains permits and thoroughly discusses sampling requirements with personnel responsible for sampling.
- The QA Officer and Lab Director discuss and review cleaning procedures with personnel prior to dispatch.
- QA Office/Lab Director reviews chain of custody documentation, sample collection, holding, temperatures, and login procedures. If objectives are not met, sample is certified as invalid, and fresh samples are collected.

Quality Control for Sample Disposal

Objectives

- Dispose of samples of effluents, receiving waters, products, and hazardous materials using the appropriate procedures.
- Keep samples on hand for the entire length of each test and for at least one month following (presuming that sample remains after sub sample collection and dilutions preparation).
- Store samples at the correct temperature.

Attaining Objectives (Refer to SOP 3.1)

The following objectives are the duties of the sample custodian and testing technicians:

1. Samples from ongoing tests are kept in the inside walk-in cooler. Each week samples from completed tests are rotated to the outside storage cooler and placed according to week.
2. Samples greater than two weeks old are disposed of, unless otherwise requested by the client.
3. Disposal of effluent and receiving water samples takes place in the sample docking/receiving area. Treated effluent and receiving water sample buckets are dumped into the disposal sink to be collected in the city water system for additional treatment. Non-treated effluents, such as influent samples, are disposed of in the same way to be treated in the city sanitary system.
4. Container buckets are rinsed to remove excess sample, and then disposed of through normal trash collection.
5. Product samples are returned to the sender using safety precautions and packaging to be disposed of by the producer/owner of the sample.
6. Chemicals, reagents, and drilling fluid samples that have expired or are ready for disposal are collected and stored until collected and disposed of through an outside professional disposal company.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office and Lab Director discuss and review disposal procedures with personnel prior to dispatch.
- The QA Office/Lab Director designate trained personnel to dispose of samples that are disposed of on site.
- Lab Management designates personnel to return products and discusses the correct procedures for shipping.
- Technicians must notify Lab Management when hazardous or non-routine chemicals and samples are ready for disposal. Management will then contact the professional disposal company.

Quality Control for Chain of Custody Procedures

Objectives

Maintain accurate records that can be used to trace the possession and handling of samples from the moment of collection through analysis.

Attaining Objectives (Refer to SOP 3.1)

The following objectives are the duties of the sample custodian or designated lab technicians:

1. Computer generated chain of custody forms accompany all sample containers, are filled out with the sampling information by the client or sampling personnel, and shipped back to the lab. Copies are the responsibility of the facility/client or are provided at the client's request.
2. The sample custodian verifies that the form has arrived with the sample and makes the necessary report or documentation if it has not. He must also check the completeness of the chain of custody.
3. Chain of custody forms must include the following:
    - The unique laboratory I.D. number used to reference all aspects of a test
    - Date and time of sample collection
    - Type of sample and means of collection
    - Source of sample
    - Name of sampler
    - Analysis required
    - Means of sample transportation
    - Signature of sampler, transporter (if applicable, meaning transport via an intermediary and not a commercial shipper), recipient
4. If the technician or custodian cannot correct a discrepancy, then the QA Office or Lab Director may find it necessary to notify the client so that the error can be corrected. Information added to the COC by a technician must be clearly identifiable and initialed.

Quality Assurance and Countermeasures for Non-Attainment

- Once notified, the QA Office will research missing information on a chain of custody and will verify all information on the chains for errors on a weekly or more frequent basis depending on the workload.
- If the QA Office or technician cannot document possession and handling of a sample from the time of collection to the time of use in the lab, the sample is certified as invalid, justification is made, and a new sample must be collected.

Quality Control for Submitting Subcontracted Analytical Samples

Objectives

- Make sure analytical samples are transported to the contracted analytical laboratory in a timely manner for holding time consideration.
- Insure that the appropriate sample preparation requirements, such as preservation and sub-sample collection, are performed prior to release to the analytical lab.
- Fill out the chain of custody form for the analytical samples for the correct analysis. Complete the analytical sample logbook.
- Call for sample pick-up or ship the sample following normal sample shipping procedures.

Attaining Objectives (Refer to SOP 3.4)

The following objectives are the duties of the sample custodian or designated lab technician:

1. Upon receiving analytical samples, the designated lab technician must fill out the analytical logbook. The logbook carries a unique ID for each sample, the type of analysis required, and to which analytical laboratory the sample will be sent.
2. After determining the type of analysis necessary, the technician checks samples for the correct distribution of sub-samples and adds preservatives if necessary.
3. If the sample requires that sub-samples be produced, the technician portions the sample into the correct number of aliquots of the correct size. If preservatives are necessary, they are added to the sample.
4. The technician labels each sub-sample using the provided client and collection information and analysis required (if several types of analysis and sub-samples are being sent off at the same time).
5. The technician prepares an analytical chain of custody using all available information.
6. The technician then ships the sample in the appropriate packaging and at the correct temperature, or stores it on site in a designated sample area (in the inside walk-in cooler) until the contracted analytical lab picks up the samples.

Quality Assurance and Countermeasures for Non-Attainment

- When analytical results are returned to the lab, they are checked for completeness and correctness. A copy of the COC must be returned with each set of results.
- The QA Office reviews the analytical logbook for completeness and correctness.
- If continual errors occur for samples designated for a contracted analytical service, personnel retraining may be necessary.

Quality Control for Laboratory Water

Objectives

- Laboratory culture water meets all requirements necessary to sustain organism survival, growth, and reproduction in cultures and test controls.
- Laboratory water used as dilution water in tests meets all requirements necessary when used in place of receiving water.
- Laboratory water meets all requirements for use in preparation of standards.
- Laboratory water meets all requirements for use as final glassware and sample container rinse water.

Attaining Objectives (Refer to SOPs 4.1 – 4.6)

The following objectives are the duties of the culture lab specialist or designated lab technicians:

1. Prior to reconstitution, all water used in culturing and testing is put through a reverse osmosis procedure, deionized, and filtered for bacteria. This takes place in the culture lab.
2. The water is annually analyzed for metals, toxic organics, and pesticides, or rechecked whenever organisms fail to meet minimum acceptability due to suspected water contamination.
3. Deionization cartridges (anion, cation, pre-filter, and activated carbon) are replaced every three months. Replacement is more frequent than manufacturer's recommendation.
4. RO, deionized water is reconstituted using reagent grade chemicals. Chemicals for water reconstitution are weighed on certified balances.
5. Reconstituted water is analyzed for hardness, alkalinity, conductivity, DO, and pH, prior to first use and on a weekly, if not more frequent basis, for consistency. This is done in the wet chemistry lab. UV sterilization is also employed.

Quality Assurance and Countermeasures for Non-Attainment

- If necessary, the QA Office reviews and corrects methods for attaining QC objectives as well as the SOP.
- The OA Office, for verification of analysis and acceptability, monitors records for culture water.
- Suspect water is discarded and containers and the collection system are cleaned according to recommendations by the manufacturer, by an outside contractor, or by SOPs where required. After the suspect water is disposed of, new water is collected and prepared.
- New water is subject to the same analysis and quality control as previously stated.

Quality Control for Species Verification

Objectives

- Verify stock to the species level for lab records annually.
- Verify all newly acquired stocks to the species level for lab records, or acquire proof of verification for lab records.

Attaining Objectives (Refer to SOP 12.7)

The following objectives are the duties of the QA Officer or the Lab Director:

1. Verify culture stocks to the species level on an annual basis, either using in-house personnel or a sub-contracted source.
2. Perform species verification on new breeding stock or request proof of verification from the supplier.
3. Keep all species verification documentation on file in the QA Office.

Quality Assurance and Countermeasures for Non-Attainment

- The Lab Director will inquire with the QA Office if verification is not obtained and determine the proper course of action to be taken. The QA Officer may be retrained or replaced.

Bio-Aquatic Testing: Scope of Tests

Bio-Aquatic Testing is an interdisciplinary company offering comprehensive environmental services to the public and private sectors including but not limited to municipal facilities, engineering companies, industrial facilities, and regulatory agencies.

Environmental Toxicology

- Toxicity Identification/Reduction Evaluations
- NPDES Biomonitoring (Freshwater and Marine)
- EPA Method 1003 (AZ Certified)
- Sediment Toxicity Testing (EPA-600-R-94-025)
- Drilling Fluids Toxicity Testing
- Synthetic Based Drilling Fluids Toxicity Testing
- Superfund Site Toxicity Testing
- Chemical-Specific/New Product Toxicity Studies
- Bio-accumulation/Bio-Concentration Studies
- Ambient Toxicity Testing
- Echinoderm Fertilization Testing

*NELAC Accredited Bio-Monitoring Methods: Acute Freshwater and Marine Methods According to EPA-821-R-02-012***	*NELAC Accredited Bio-Monitoring Methods: Chronic Freshwater and Marine Methods According to EPA-821-R-02-013 and 014***
1. EPA 2000 (AZ, OK, and AR Certified) 2. EPA 2000 (AZ, OK, and AR Certified) 3. EPA 2006 4. EPA 2007 5. EPA 2021 (AZ, OK, and AR Certified)	1. EPA 1000 (AZ, OK, and AR Certified) 2. EPA 1002 (AZ, OK, and AR Certified) 3. EPA 1006 4. EPA 1007

**Relevant certificates are displayed outside the technical director's office.

Environmental Consulting

- Toxicity Identification/Reduction Evaluations
- Pretreatment Program Support
- Permitting Assistance
- Toxin Management Program Assistance
- Agency Liaison
- Response to Compliance Orders
- Design of Environmental Studies
- Environmental Audits and Assessments

Water Quality Assessments

- Biological Assessments of Streams and Rivers
- Site-Specific Water Quality Studies
- Ambient Toxicity testing
- Water Resource Modeling (Surface Water/Ground Water/Storm Water)
- Monitoring/Sampling Study Design

NCP Program Testing

- Baffled Flask Dispersant Test
- Revised Standard Dispersant Toxicity Test
- Bio-Remediation Agent Effectiveness Test

Quality Control for General Test Set-Up

Objectives

- Appropriate sized test chambers are in the correct testing room and labeled as outlined in the test method SOPs.
- Numbers of replicate containers match permit specifications.
- Contamination does not occur during dilution preparation.
- Test solutions are at the proper temperature prior to organism loading.
- Dissolved oxygen and pH in test solutions are within range of guidance manual recommendations (or adjusted if applicable).
- Correct organisms of the specified age are used in the tests.
- Number of organisms per replicate matches the permit specifications.

Attaining Objectives

The following objectives are the duties of the testing technicians:

Visual Checks Prior to Solution Preparation

1. Refer to the test set-up form provided in the test folder to find the following information:
    - Test start date
    - Client/lab ID number
    - Chlorination/dechlorination status
    - Dilution series
    - Dilution water requirements
    - Length of test
    - Species used in test

2. Check test chambers in testing room for:
    - Lab ID
    - Dilution percentage
    - Replicate letter

3. Check the testing room for labeled culture dishes containing appropriate organisms. If they are not already there, obtain organisms of the correct species and age from the culture manager or designated culture technician.

4. If a discrepancy is found, make the appropriate adjustment or documentation.

Quality Control for General Test Set-Up (Cont.)

Effluent Checks Prior to Solution Preparation

- Dilutions are prepared according to SOP 3.3.
- Dilution bottles containing prepared solutions are placed in a water bath and warmed to the correct test temperature, within 1-degree Celsius. The temperature is checked prior to moving the bottles into the testing rooms. Dilution bottles must be at the correct temperature prior to test initiation and test renewal.
- Dissolved oxygen will be checked as well as initial pH. Both are continuously checked throughout the length of the test once daily. Residual chlorine and ammonia are also checked at receipt.
- If dissolved oxygen levels are below 4.0 mg/L, notify the QA Office or Lab Director, and aerate the sample as determined by the test method SOP.

General Test Solution and Organism Loading

1. Pour appropriate volumes of solution into test chambers from test bottles. Start with the control and work from the next lowest dilution to the highest dilution. Insure test bottle labels match the dilution percentage and lab ID of the test chambers.
2. Check culture containers in testing room for appropriate species and age. The culture technician does the labeling of the culture trays.
3. Load test chambers according to test method SOP loading specifications.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office reviews procedures periodically and corrects techniques if necessary. The Office also verifies that tests are set up correctly on a daily basis, depending on the workload.
- Performance evaluations are conducted annually. Personnel audits are conducted semi-annually. They are conducted more frequently in the case of new employees for the first several months of employment to assess accurate training and adherence to appropriate testing methods.

Quality Control for Dilution Preparation

Objectives

- Sample holding times have not been exceeded.
- Test set-up form accurately reflects permit specifications.
- Effluent dilutions are identical to those specified in the permit.
- Correct effluent containers are used.
- Effluent is analyzed and prepared correctly prior to dilution making.
- Sample containers, dilution bottles, and test chambers are labeled correctly.
- Dilutions are measured accurately.

Attaining Objectives (Refer to SOP 3.3)

The following objectives are the duties of the designated testing technicians:

Prior to Dilution Preparation

1. The Lab Director must have a copy of the latest discharge permit prior to test initiation and have updated the database to contain this information, since this generates the test set-up form that the lab technicians use for reference. Clients must inform the lab of any permit requirement changes.
2. Tests must be initiated no later than thirty-six hours past the end of the sampling period indicated on the chain of custody for the first sample. Subsequent samples cannot exceed a 72-hour holding time.
3. If holding times are exceeded, notify the QA Office or Lab Director.
4. Obtain clean dilution bottles from the storage area marked "clean," or clean them according to SOP 9.1 standards prior to use. Inspected the bottles and if in doubt, question the technician who washed them or clean them again just in case.
5. Label each bottle with printed bottle labels with the lab ID, or distinguishing project number, along with the dilution percentage to be put into that bottle and the sample number. If printed labels are unavailable, a permanent marker and tape may be substituted with the same required information.

Dilution Preparation

1. Test dilutions are made according to the test set-up form in the test folder. All dilutions are prepared in the wet chemistry lab.
2. Obtain the proper effluent sample container from the sample custodian. Check for the following in permanent ink on the sample container or lid:

Quality Control for Dilution Preparation (Cont.)

- Project name/client
- Lab ID number
- Sample number
- Date received
- Filtration if necessary
- Residual chlorine has been checked and the results recorded on the sample container and COC. If chlorine was detected, check for appropriate dechlorination procedure, if required
- Sample has been aerated if required
- Sample pH has been adjusted if required

3. Calculate the amounts of effluent and dilution water needed per concentration.

4. Make dilutions using the following steps
   - Cylinders are cleaned before use, in between samples, or a fresh, clean cylinder is obtained.
   - Dilutions are made from the lowest concentration to the highest.
   - All measurements must be made from the bottom of the meniscus.
   - Measurements must be taken to one more decimal place than is marked on your measuring instrument (graduation markers).
   - Measurements of the total amount needed must be measured using the appropriate devices
   - 0.1 - 10 mL must be measured in disposable pipettes
   - 10 - 100 mL must be measured in 100 mL graduated cylinders
   - >100 mL may be measured in 500, 1000, or 2000 mL graduated cylinders.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office reviews COC documents for completeness. If incomplete, the QA Office makes sure the client is contacted and insures that the missing information is added.
- The Lab Director or QA Office makes sure that the test database is current with scheduling information and current permit data.
- The QA Office checks test labeling, dilution bottle labeling, and other test set-up requirements for discrepancies at the end of the workday and makes corrections as necessary and addresses the issue with the lab technician responsible.
- The QA Office conducts periodic performance evaluations. Results are documented and personnel are retrained if necessary.
- If QC objectives are just not being met sufficiently, the QA Office may invalidate a test, notify the client, and have the test rescheduled.

Quality Control for Dilution/Test Renewal

Objectives

- Correct sample containers are selected.
- Correct dilutions are prepared.

Attaining Objectives (Refer to SOP 3.3)

The following objectives are the duties of the testing technicians:

1. The sample custodian numbers samples on the dilution containers with a permanent marker upon sample arrival.
2. The sample custodian or lab technician removes the correct sample from the walk-in cooler or the shipping area and places the container in the wet chemistry lab.
3. Dilutions are prepared according to the set-up form from the test folder.
4. Dilution preparation is conducted identically to the previous procedures.
5. Discrepancies are brought to the attention of the QA Office or Lab Director.

Quality Assurance and Countermeasures for Non-Attainment

- Samples are not used with discrepancies until checked and approved by the QA Office.
- The OA Office invalidates a test if deficiencies are not correctable. Reasons for invalidating a test will be recorded.

Quality Control for Testing/Culturing Physical Parameters

Objectives

- Physical parameters must meet testing/culturing requirements to minimize interference from external factors.
- External physical parameters must not cause excessive stress to organisms or introduce artificial toxicity into the tests or cultures.

Attaining Objectives

The following objectives are the duties of the testing technicians:

1. Testing rooms and the culture room have independent heating/cooling systems controlled by a programmable thermostat.
2. Testing/Culture rooms are maintained at a sufficient temperature to keep test solutions at 25^{o} C $\pm$ 1^{o} C or as specified in the EPA method. Temperature monitoring occurs in two separate locations in each room using two static calibrated thermometers, and a continuous temperature monitoring device. Technicians record temperatures daily and download continuous monitor data quarterly. Thermometers are calibrated to an NIST thermometer quarterly.
3. Air used in aquariums, carboys, and test chambers originate from a filtered, oil-free air blower kept in a chemical and effluent free area.
4. Testing and culture rooms are thoroughly insulated to maintain temperature for several hours in the event of power failure.
5. Rooms are automatically regulated on a photoperiod of 16 hours of light and 8 hours of dark or 14 hours of light and 10 hours dark in the case of drilling fluids, or continuously in the case of algae and fertilization tests.
6. Light intensity is periodically monitored using a calibrated light meter. Testing room light intensity is kept at required standards.
7. Cultures are fed at approximately the same time in the AM and PM daily.
8. Aquarium cleaning is alternated between tanks weekly to prevent system disturbance.

Quality Assurance and Countermeasures for Non-Attainment

- Physical parameter records are inspected by the QA Office and Lab Director on a regular basis and corrected if necessary.

Quality Control for Testing/Culturing *Ceriodaphnia dubia*

Objectives

- Provide an adequate diet to sustain healthy, reproducing, organisms over extended periods of time.
- Maintain water quality to sustain healthy reproducing organisms over extended periods of time.
- Insure that water/effluent hardness variation does not affect reproduction.
- Initiate tests and new cultures with neonates of the acceptable age range and quantity.
- Insure that weak neonates (including males) do not influence test survival/reproduction statistical results.
- Maintain minimal variability in organism sensitivity over time to insure reproducibility in lethal and sub-lethal response.
- Insure laboratory personnel can obtain consistent, precise results in *C. dubia* effluent toxicity tests.

Attaining Objectives (Refer to SOPs 1.2 and 2.7)

The following objectives are the duties of the Cladoceran testing technicians:

1. Insure that all Cladoceran culturing and testing occur in the Cladoceran-testing lab.
2. Feed *C. dubia* a consistent concentration of *Selenastrum capricornutum* cells (3×10^7 cells/mL) plus a YTC mixture daily.
3. Individual cultures of *C. dubia*; survival and reproduction are recorded and changed out daily.
4. See SOP 2.7 for selection of test organisms.
5. Initiate tests following a randomized block test design.
6. Monitor organisms' lethal and sub-lethal responses monthly using reference toxicants. *C. dubia* response and successive toxicity values are plotted and examined to determine whether or not results are within prescribed limits.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office reviews documents for proper QC checks. If discrepancies are found, food and water are discarded and new solutions prepared.
- The QA Office subjects Cladoceran-testing technicians to periodic performance evaluations. Results are documented and personnel are retrained if necessary.

Quality Control for Testing/Culturing *Daphnia pulex* and *Daphnia magna*

Objectives

- Provide an adequate diet to sustain healthy, reproducing, organisms over extended periods of time.
- Maintain water quality to sustain healthy reproducing organisms over extended periods of time.
- Initiate tests and new cultures with neonates of the acceptable age range and quantity.
- Maintain minimal variability in organism sensitivity over time to insure reproducibility in lethal and sub-lethal response.
- Insure laboratory personnel can obtain consistent, precise results in *D. pulex* and *D. magna* effluent toxicity tests.

Attaining Objectives (Refer to SOPs 1.1 and 2.8)

The following objectives are the duties of the Cladoceran testing technicians:

1. Insure that all Cladoceran culturing and testing occur in the Cladoceran-testing lab or designated area for *D. magna*.
2. Feed *D. pulex* and *D. magna* a consistent concentration of *Selenastrum capricornutum* cells (3×10^7 cells/mL) plus a YTC mixture daily.
3. Culture *D. pulex* and *D. magna en mass.* Organisms are changed out daily and neonates are collected for testing, grow-outs, or discarded.
4. Only adult *D. pulex* and *D. magna* are transferred daily at approximately the same time into new culture containers. This limits the age of neonates for test initiation to less than 24 hours. Any remaining neonates are discarded.
5. See SOP 2.8 for selection of test organisms.
6. Initiate tests with a disposable pipette beginning with the control up to the highest concentration to avoid contamination.
7. Monitor organisms' lethal responses monthly using reference toxicants. *D. pulex* and *D. magna* responses and successive toxicity values are plotted and examined to determine whether or not results are within prescribed limits.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office reviews documents for proper QC checks. If discrepancies are found, food and water are discarded and new solutions prepared.
- The QA Office subjects Cladoceran-testing technicians to periodic performance evaluations. Results are documented and personnel are retrained if necessary.

Quality Control for Testing/Culturing *Pimephales promelas*

Objectives

- Provide an adequate diet to sustain healthy, reproducing, organisms over extended periods of time.
- Maintain water quality to sustain healthy reproducing organisms over extended periods of time.
- Control laboratory environmental conditions to maintain healthy, reproducing organisms.
- Initiate tests using adequate numbers of larvae from a diverse gene pool.
- Maintain minimal variability in organism sensitivity over time to insure reproducibility in lethal and sub-lethal response.
- Insure laboratory personnel can obtain consistent, precise results in *P. promelas* effluent toxicity tests.

Attaining Objectives (Refer to SOPs 1.1, 1.3, and 2.5)

The following objectives are the duties of the culture room technician and designated testing technicians:

1. Insure that all *P. promelas* testing takes place in the freshwater testing lab and that all culturing takes place in the culture room.
2. Feed *P. promelas* brood organisms a diverse diet of flake food and frozen brine shrimp. Rinse thawed brine shrimp with DI water prior to feeding.
3. Feed cultures in the AM and PM seven days a week.
4. Renew approximately 80% percent of culture water weekly. Monitor representative tanks for DO, pH, ammonia, and temperature twice a week. Water renewal occurs daily in hatch-out containers.
5. All culture water used in the systems is deionized, reconstituted water, which has been aerated prior to use.
6. Maintain a segregated culture area.
7. Chemicals are not permitted in the culture room, unless specifically designated for use in the room and approved by the QA Office, Culture Manager, and/or Lab Director.
8. Use an oil-free, filtered air compressor to segregated aeration of tanks and hatch-out containers.
9. Culture room temperature is continuously monitored and adjusted as needed, using an independent thermostat and heating/cooling unit.
10. Photoperiod of 16 hours light/8 hours dark is auto controlled.
11. Maintain a minimum of 28 reproducing tanks.
12. Maintain a mass culture system for the purpose of organism rotation and replacement, as well as for grow-outs.
13. Maintain male: female ratio, productivity, and organism age for each tank.

Quality Control for Testing/Culturing *Pimephales promelas* (Cont.)

14. Periodically obtain breeding age or grow out organisms and isolate them for a period of time before introducing them into the culture system.

Tests

1. Feed P. promelas larvae live, less than 24-hour old Artemia twice per day, once in the AM and once in the PM. Tests are not fed in the last twelve hours before termination.
2. Artemia cysts are analyzed for metals and pesticides with each new lot of food, and certified for non-detectable levels or no toxicity.
3. Renew test chambers daily with fresh effluent/dilution water, as required.
4. Through daily wet chemistries (in addition to the continuous monitoring of room temperatures and the daily two-point monitoring), DO, pH, and temperature in the testing room is monitored every 24-hours in both test and renewal water.
5. Use only RO, deionized, reconstituted water as test dilution water, unless using a true control.
6. Maintain a segregated testing room.
7. Do not bring chemicals into the testing room.
8. If needed, aerate test chambers using aquarium air pumps and/or an oil free filtered air compressor.
9. An independent thermometer and heating/cooling until continually monitors and adjusts the test room temperature.
10. Photoperiod of 16 hours light/8 hours dark is auto controlled.
11. Culture technicians assign larvae used in tests a unique culture code used to track egg source.
12. Culture technicians harvest eggs daily (excluding weekends), date hatch-out containers, and assign the larvae pool a unique culture number, designating date, year, hatch-out date, and type of incubation.
13. Place larvae in testing chambers according to the SOPs.
14. Monitor organisms' lethal and sub-lethal responses monthly using reference toxicants. *P. promelas* responses and successive toxicity values are plotted and examined to determine whether or not results are within prescribed limits.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office reviews documents for proper QC checks. If discrepancies are found, food and water is discarded and new solutions prepared.
- The QA Office subjects testing technicians to periodic performance evaluations. Results are documented and personnel are retrained if necessary.

Quality Control for Culturing/Testing *Americamysis bahia (Mysidopsis bahia)*

Objectives

- Provide an adequate diet to sustain healthy, reproducing, organisms over extended periods of time.
- Maintain water quality to sustain healthy reproducing organisms over extended periods of time.
- Control laboratory environmental conditions to maintain healthy, reproducing organisms.
- Initiate tests using adequate numbers of juveniles from a diverse gene pool.
- Maintain minimal variability in organism sensitivity over time to insure reproducibility in lethal and sub-lethal response.
- Insure laboratory personnel can obtain consistent, precise results in *A. bahia* effluent toxicity tests.

Attaining Objectives (Refer to SOPs 1.1, 1.4, and 2.6)

The following objectives are the duties of the culture lab specialist or designated lab technicians:

1. Insure that all *A. bahia* testing takes place in the saltwater testing lab and that all culturing takes place in the culture room.
2. Feed *A. bahia* brood organisms a diet of less than 24-hour old live Artemia twice daily, once in the AM and once in the PM.
3. Feed cultures in the AM and PM seven days a week.
4. Renew approximately 80% percent of culture water weekly. Monitor representative tanks for DO, pH, ammonia, and temperature weekly.
5. All culture water used in the systems is deionized, reconstituted water, which has been aerated prior to use. It is salted with high-quality synthetic sea salts to the appropriate salinity.
6. Maintain a segregated culture area.
7. Chemicals are not permitted in the culture room, unless specifically designated for use in the room and approved by the QA Office, Culture Manager, and/or Lab Director.
8. Use an oil-free, filtered air compressor to segregated aeration of tanks and hatch-out containers.
9. Culture room temperature is continuously monitored and adjusted as needed, using an independent thermostat and heating/cooling unit.
10. Photoperiod of 16 hours light/8 hours dark is auto controlled.
11. Maintain a minimum of four reproducing tanks.
12. Maintain male: female ratio, productivity, and organism age for each tank.

Quality Control for Culturing/Testing *Americamysis bahia (M. bahia)* (Cont.)

13. Periodically obtain breeding age or grow out organisms and isolate them for a period of time before introducing them into the culture system.

Tests

1. Feed *M. bahia* larvae live, less than 24-hour old Artemia twice per day, once in the AM and once in the PM. Use proper judgment on the amount of food, depending on the start date of the test and the activity of the mysids, due to their cannibalistic nature. Tests are not fed in the last twelve hours before termination.
2. Artemia cysts are analyzed for metals and pesticides with each new batch of food, and certified for non-detectable levels.
3. Through daily wet chemistries (in addition to the continuous monitoring of room temperatures and the daily two-point monitoring), DO, pH, and temperature in the testing room is monitored every 24-hours in both test and renewal water.
4. Use only RO, deionized, reconstituted water as test dilution water.
5. Maintain a segregated testing room.
6. Do not bring chemicals into the testing room.
7. If needed, aerate test chambers using aquarium air pumps and/or an oil free filtered air compressor.
8. An independent thermometer and heating/cooling until continually monitors and adjusts the test room temperature.
9. Photoperiod of 16 hours light/8 hours dark is auto controlled.
10. Culture technicians assign juveniles used in tests a unique culture code.
11. Culture technicians harvest juveniles daily (excluding weekends), date the aging containers, and assign the juvenile pool a unique culture number, and designated collection date.
12. Place juveniles in testing chambers according to the SOPs using a 2 by 2 mesh screen.
13. Monitor organisms' lethal and sub-lethal responses monthly using reference toxicants. *M. bahia* responses and successive toxicity values are plotted and examined to determine whether or not results are within prescribed limits.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office reviews documents for proper QC checks. If discrepancies are found, food and water is discarded and new solutions prepared.
- The QA Office subjects testing technicians to periodic performance evaluations. Results are documented and personnel are retrained if necessary.

Quality Control for Testing/Culturing *Menidia beryllina*

Objectives

- Provide an adequate diet to sustain healthy, reproducing, organisms over extended periods of time.
- Maintain water quality to sustain healthy reproducing organisms over extended periods of time.
- Control laboratory environmental conditions to maintain healthy, reproducing organisms.
- Initiate tests using adequate numbers of juveniles from a diverse gene pool.
- Maintain minimal variability in organism sensitivity over time to insure reproducibility in lethal and sub-lethal response.
- Insure laboratory personnel can obtain consistent, precise results in *M. beryllina* effluent toxicity tests.

Attaining Objectives (Refer to SOPs 1.1, 1.5, and 2.10)

The following objectives are the duties of the culture room technician and designated testing technicians:

1. Insure that all *M. beryllina* testing takes place in the saltwater testing lab and that all culturing takes place in the culture room.
2. Feed *M. beryllina* brood organisms a diverse diet of flake food and frozen brine shrimp. Rinse thawed brine shrimp with DI water prior to feeding.
3. Feed cultures in the AM and PM seven days a week.
4. Renew approximately 80% percent of culture water weekly. Monitor representative tanks for DO, pH, ammonia, and temperature daily. Water renewal occurs daily in aging containers.
5. All culture water used in the systems is deionized, reconstituted water, which has been aerated and salted with high quality synthetic sea salts (to maintain appropriate salinity) prior to use.
6. Maintain a segregated culture area.
7. Chemicals are not permitted in the culture room, unless specifically designated for use in the room and approved by the QA Office, Culture Manager, and/or Lab Director.
8. Use an oil-free, filtered air compressor to segregated aeration of tanks and hatch-out containers.
9. Culture room temperature is continuously monitored and adjusted as needed, using an independent thermostat and heating/cooling unit.
10. Photoperiod of 16 hours light/8 hours dark is auto controlled.
11. Maintain a minimum of five reproducing tanks is maintained.
12. Maintain male: female ratio, water quality, productivity, and organism age for each tank.
13. Periodically obtain breeding age or grow out organisms and isolate them for a period of time before introducing them into the culture system.

Quality Control for Testing/Culturing *Menidia beryllina* (Cont.)

Tests

1. Feed *M. beryllina* larvae live, less than 24-hour old Artemia twice per day, once in the AM and once in the PM. Tests are not fed in the last twelve hours before termination.
2. Artemia cysts are analyzed for metals and pesticides with each new batch of food, and certified for non-detectable levels.
3. Renew test chambers daily with fresh salted effluent/dilution water.
4. Through daily wet chemistries (in addition to the continuous monitoring of room temperatures and the daily two-point monitoring), DO, pH, and temperature in the testing room is monitored every 24-hours in both test and renewal water.
5. Use only RO, deionized, reconstituted water as test dilution water.
6. Maintain a segregated testing room.
7. Do not bring chemicals into the testing room.
8. If needed, aerate test chambers using aquarium air pumps and/or an oil free filtered air compressor.
9. An independent thermometer and heating/cooling until continually monitors and adjusts the test room temperature.
10. Photoperiod of 16 hours light/8 hours dark is auto controlled.
11. Culture technicians assign juveniles used in tests a unique culture code.
12. Culture technicians harvest juveniles daily (excluding weekends), date the aging containers, and assign the juvenile pool a unique culture number, and designated collection date.
13. Place juveniles in testing chambers according to the SOPs. Take extreme care when loading menidia into test chambers as they are sensitive to disturbance and handling.
14. Monitor organisms' lethal and sub-lethal responses monthly using reference toxicants. *M. beryllina* responses and successive toxicity values are plotted and examined to determine whether or not results are within prescribed limits.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office reviews documents for proper QC checks. If discrepancies are found, food and water is discarded and new solutions prepared.
- The QA Office subjects testing technicians to periodic performance evaluations. Results are documented and personnel are retrained if necessary.

Quality Control for Testing/Culturing *Leptocheirus plumulosis*

Objectives

- Provide an adequate diet to sustain healthy, reproducing, organisms over extended periods of time.
- Maintain water quality to sustain healthy reproducing organisms over extended periods of time.
- Control laboratory environmental conditions to maintain healthy, reproducing organisms.
- Initiate tests using adequate numbers of juveniles of the appropriate size from a diverse gene pool.
- Maintain minimal variability in organism sensitivity over time to insure reproducibility in lethal and sub-lethal response.
- Insure laboratory personnel can obtain consistent, precise results in *L. plumulosis* effluent toxicity tests.

Attaining Objectives (Refer to SOP 1.9)

The following objectives are the duties of the culture room technician and designated testing technicians:

1. Insure that all *L. plumulosis* testing and culturing takes place in the drilling fluids lab.
2. Feed *L. plumulosis* brood organisms a diet of tetramin fish flakes, alfalfa powder, wheat grass, and Neo-Novum shrimp maturation food.
3. Feed cultures after water changes twice a week.
4. Renew approximately 80% percent of culture water weekly. Monitor representative tanks for DO, pH, ammonia, and temperature twice per week. Water renewal occurs daily in aging containers.
5. All culture water used in the systems is deionized, reconstituted water, which has been aged, aerated, and salted with high quality synthetic sea salts (to maintain appropriate salinity) prior to use.
6. Maintain a segregated culture area.
7. Drilling fluids room temperature is continuously monitored and adjusted as needed, using an independent thermostat and heating/cooling unit.
8. Photoperiod of 14 hours light/10 hours dark is auto controlled.
9. Maintain a minimum of four reproducing systems is maintained.
10. Maintain male: female ratio, water quality, productivity, and organism age for each tank.
11. Periodically obtain breeding age or grow out organisms and isolate them for a period of time before introducing them into the culture system.

Tests

1. Do not feed *L. plumulosis* once a test begins.
2. Do not renew test chambers.

Quality Control for Testing/Culturing *Leptocheirus plumulosis* (Cont.)

3. Through daily wet chemistries (in addition to the continuous monitoring of room temperatures and the daily two-point monitoring), DO, pH, and temperature in the testing room is monitored every 24-hours in both test and renewal water.

4. Aerate test chambers using aquarium air pumps and/or an oil free filtered air compressor.

5. An independent thermometer and heating/cooling until continually monitors and adjusts the test room temperature.

6. Photoperiod of 14 hours light/10 hours dark is auto controlled.

7. Culture technicians assign juveniles used in tests a unique culture code.

8. Place juveniles in testing chambers according to the SOPs using a 2 by 2 mesh screen

9. Monitor organisms' lethal and sub-lethal responses monthly using reference toxicants. *L. plumulosis* responses and successive toxicity values are plotted and examined to determine whether or not results are within prescribed limits.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office reviews documents for proper QC checks. If discrepancies are found, food and water is discarded and new solutions prepared.

- The QA Office subjects testing technicians to periodic performance evaluations. Results are documented and personnel are retrained if necessary.

Quality Control for Testing/Culturing *Selenastrum capricornutum*

Objectives

- Consistently culture and maintain pure *S. capricornutum* cells in the laboratory in excess of daily needs.
- Provide an adequate diet containing the same approximate amount of cells per mL.

Attaining Objectives (Refer to SOP 1.10 and 2.2)

The following objectives are the duties of the culture room technician and designated testing technicians:

1. Insure that all culturing takes place in the algae lab.
2. Thoroughly clean jugs, glassware, and flasks prior to inoculation.
3. Use purchased *S. capricornutum* slants or stocks (purchased every three to six months) to initiate two or three batch cultures weekly, or more depending on demand. Feed the batches a high quality growth medium.
4. Concentrate each batch. Add DI water to achieve the appropriate density of $3x10^7$ cells/ml for Cladoceran testing and $1x10^6$ cells/ml for algae tests. Measure the density using a hemocytometer.
5. Dilute algae to stock concentration for testing.

Tests

1. Do not feed algae cells or renew test chambers once a test begins.
2. Through daily wet chemistries (in addition to the continuous monitoring of room temperatures and the daily two-point monitoring), DO, pH, and temperature in the testing room is monitored every 24-hours in surrogate test chambers.
3. Hand-shake test vessels twice daily
4. Measure light intensity at test initiation and end. Maintain a photoperiod of 24 hours continuous light.
5. Place organisms into test chambers using an automatic pipette to insure consistency of inoculation.
6. Monitor organisms' growth responses monthly using reference toxicants. *S. capricornutum* responses and successive toxicity values are plotted and examined to determine whether or not results are within prescribed limits.

Quality Assurance and Countermeasures for Non-Attainment

- With QA Office approval, technicians purchase new algae slants and document their purchase and arrival.
- Technicians must notify the QA Office if inadequate amounts of algae are being cultured. In this case, more cultures must be started or purchased from a reputable source. The QA Office will determine the cause of and correct the deficiency to prevent future shortages.
- To maintain quality, bad batches of algae are discarded and re-cultured.

Quality Control for Testing Echinoderm Fertilization

Objectives

- Consistently use quality gametes for testing, whenever possible, by microscopic examination prior to use.
- Insure gametes are collected and used in the timeframe required by the method.
- Use a sperm to egg ratio that promotes adequate fertilization without sacrificing test sensitivity.
- Maintain minimal variability in organism sensitivity over time to insure reproducibility in fertilization response.
- Insure laboratory personnel can obtain consistent, precise results in effluent and reference toxicity tests.
- Maintain an adequate laboratory environment to insure proper environmental testing conditions.

Attaining Objectives (Refer to SOP 1.12 & 1.15)

The following objectives are the duties of the designated testing technicians:

1. Use only high quality natural seawater or synthetic seawater (where allowable) for dilution water.
2. If spawning is induced via hand agitation, wash hands or change gloves between organisms to avoid pre-fertilization. If inducing spawning by injection, wash or change needles between organisms. If inducing spawning via electrical stimulation, immediately separate the sexes about identification.
3. Examine gametes for color, size, maturity, and motility prior to pooling for test stock. Maintain documentation of organism gamete quality.
4. When diluting gamete stock for test initiation, confirm definitive values prior to test initiation.
5. Use sperm optimization trials for *T. gratilla* testing with each test batch.
6. Use gametes within four hours of collection.
7. Use appropriate environmental chambers or laboratory temperatures to insure test temperature requirements of each method are met.
8. No test feeding or renewals are required.
9. Test initiation of sperm and eggs is accomplished within two minutes from the first to last tube.
10. Choose a preservative type and strength that ends fertilization without sacrificing egg membrane integrity.
11. Lab technicians must be able to consistently and appropriately identify fertilized versus unfertilized eggs.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office reviews documents for proper QC checks and test validity. If discrepancies are found, data is reevaluated for qualified as necessary or invalidated.
- The QA Office subjects testing technicians to periodic performance evaluations. Results are documented and personnel are retrained if necessary.

Quality Control for Culturing *Marine Platymonas*

Objectives

- Consistently culture and maintain pure *Marine Platymona* cells in the laboratory in excess of daily needs.
- Use *Marine Platymonas* to feed and change rotifers (which are fed to young *M. beryllina* until they are old enough to subsist on a diet of only Artemia) for use in saltwater culturing, as well as for keeping *M. beryllina* tanks green.

Attaining Objectives (Refer to SOP 2.13)

The following objectives are the duties of the culture room technician and designated testing technicians:

12. Insure that all culturing takes place in the algae lab.
13. Thoroughly clean jugs, glassware, and flasks prior to inoculation.
14. Use purchased *Marine Platymonas* slants or stocks (purchased every three to six months) to initiate three or four batch cultures weekly, or more depending on demand. Feed the batches a high quality growth medium. This provides enough food to fill approximately 3 (3.5 gallon) buckets with saltwater algae.
15. Use approximately a half a bucket for feeding and water changes.

Quality Assurance and Countermeasures for Non-Attainment

- With QA Office approval, technicians purchase new algae slants and document their purchase and arrival.
- Technicians must notify the QA Office if inadequate amounts of algae are being cultured. In this case, more cultures must be started or purchased from a reputable source. The QA Office will determine the cause of and correct the deficiency to prevent future shortages.
- To maintain quality, bad batches of algae are discarded and re-cultured.

Quality Control for Culturing Yeast - Fish Chow – Wheat Grass Mixture (YTC)

Objectives

- Consistently culture and maintain YTC in the laboratory in excess of daily needs.
- Mix YTC with freshwater *Selenastrum* and culture water to feed *Cladoceran* organisms.

Attaining Objectives (Refer to SOP 2.3)

The following objectives are the duties of the culture room technician and designated testing technicians:

1. Insure that all culturing takes place in the algae lab.
2. Thoroughly clean funnels, glassware, and flasks prior to use.
3. Follow mixing procedures from the SOP, paying careful attention to the amounts and parts of each of the three ingredients in YTC.
4. Initiate cultures depending on demand. Since YTC can be frozen for up to three months, culturing is sporadic.
5. Obtain the YTC ingredients from approved sources and keep them from contamination.

Quality Assurance and Countermeasures for Non-Attainment

- The designated technician purchases new ingredients when necessary and document their purchase and arrival.
- Technicians must notify the QA Office if inadequate amounts of YTC are available or being cultured. In this case, more cultures must be started or purchased from a reputable source. The QA Office will determine the cause of and correct the deficiency to prevent future shortages.
- To maintain quality, bad batches of YTC are discarded and re-cultured.

Quality Control for Freshwater Invertebrate Food Preparation

Objectives

Provide a consistent, nutritionally complete diet for freshwater invertebrates to sustain healthy, reproducing organisms over an extended period of time.

Attaining Objectives (Refer to SOP 2.1)

The following objectives are the duties of the Cladoceran lab technician:

1. Insure that all food preparation and mixture takes place in the Cladoceran lab.
2. Feed freshwater invertebrates a consistent concentration of *S. capricornutum* plus YTC in the following ratio: 300mL YTC, 700 mL concentrated *S. capricornutum*. Prepare the mixture in an appropriately cleaned, accepted glass or plastic 1000mL cylinder.
3. Following QC protocols, prepare and mix all algae and YTC with properly prepared reconstituted culture water. This culture water is certified as acceptable, annually.
4. Prepared food will not be used more than 7 days, as YTC will go bad.
5. Refrigerate food mixture in the Cladoceran refrigerator when not in use. Gently shake mixture and allow warming to room temperature prior to feeding.
6. Use a repeating syringe to carefully dispense food to avoid dipping the tip into a test and cross-contaminating.

Quality Assurance and Countermeasures for Non-Attainment

- Monitor and record neonate production in culture cups daily. If productivity drops, the QA Office will review food preparation methods as well as the food itself. Algae cells are checked as well as the food preparation date for possible expiration. If discrepancies are found, food is discarded and new food is prepared.
- Food tests are run on new batches of food, as they are cultured or when they are purchased from outside sources. The new batches are statistically compared to food currently in use before using new food in the lab.

Quality Control for Food and Lab Water Testing

Objectives

- Perform tests for toxic organics and metals on both new Artemia cyst lots and synthetic lab water on an annual basis or whenever organism results fail to meet minimum acceptability requirements.
- Test new food lots against current food lots for survival, growth, and reproduction, when applicable.
- Test water and food lots if a major problem arises in the testing or culturing of organisms.

Attaining Objectives (Refer to SOP 12.2)

The following objectives are the duties of the QA Officer or the Lab Director:

1. The QA Officer or the Lab Director will contract with an analytical laboratory annually for testing of dry food lots and synthetic lab water for toxic organics and metals and any time that major water related problems occurs during testing or culturing.

2. Run all new food lot tests concurrently with tests conducted on current food lots. Statistically compare and analyze test results against tests conducted on current food lots. If no statistically significant differences exist between lots or batches of food, the food will be deemed acceptable for use.

3. The QA Office will keep the documented results on file in the appropriate logbook.

Quality Assurance and Countermeasures for Non-Attainment

- The Lab Director will inquire with the QA Office if verification on lab water or food is not completed and determine the proper course of action to be taken. The QA Officer may be retrained or replaced.

Quality Control for Product Traceability

Objectives

- Insure that ordering and receipt of chemicals and reagents, equipment, and maintenance supplies occurs in an organized and timely fashion.
- Maintain pertinent reorder information.
- Maintain a current record of ordering from approved vendors, receipt dates, dates opened or in use, and expiration dates.
- Request traceability documentation whenever possible

Attaining Objectives (Refer to SOP 12.7)

The following objectives are the duties of the Supplies Manager or QA Officer:

1. One person will be designated as the supplies manager and be responsible for ordering all lab chemicals, reagents, and other necessary products.
2. Upon receipt, enter date received, size, quantity, vendor, product numbers, and lot information, date opened, where used, and expiration dates into a computer record.
3. Monitor all reagents and chemicals so that reorder takes place and new products arrive before the expiration date.
4. Monitor all new equipment, equipment maintenance, and update the master list of equipment as necessary.
5. Insure that any new equipment, reagents, or standards used in calibration are NIST certified or reagent grade.
6. Insure that each bottle is labeled with the date received, date opened, and the expiration date, if applicable.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office will periodically keep track of and monitor the Supply Manager’s log for accuracy and completion.
- The QA Office will periodically examine laboratory products to insure objectives are met. Personnel not following procedures will be reviewed and possibly replaced. Such information will be documented in the employee audit log.

Quality Control for Glassware Use

Objectives

Prevent the introduction of artificial toxicity into testing/culturing environments from glassware.

Attaining Objectives (Refer to SOP 9.1)

1. Glassware cleaning takes place in the respective labs or in the general sink in the shipping dock storage area.
2. Each lab is provided with separate equipment to prevent the need for multiple labs to use the same equipment.
3. Glassware is stored and segregated in the glassware storage area.
4. Clean dirty glassware with an extensive cleaning including a detergent and tap water rinse, DI water rinse, 20% HCL rise, another DI rinse, and if necessary, an acetone rinse followed by another DI rinse.
5. Soak new glassware overnight in 20% HCL then rinse with DI water.
6. Prepare dilutions in graduated cylinders beginning with the lowest effluent concentration proceeding to the highest.
7. Discard the plastic test chambers after one use.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office examines procedures and makes corrections if necessary.
- HCL rinse solutions are changed frequently to prevent the solutions from losing potency.
- The QA Office periodically observes the glassware preparation personnel for proper procedure and retrains them if necessary.

Quality Control for Storage Refrigerators

Objectives

Insure that stored samples are kept at a consistent temperature of 4ºC ± 1.

Attaining Objectives (Refer to SOP 7.10)

The following objectives are the duties of the sample custodian or the designated lab technician:

1. The lab will schedule period maintenance, such as the addition of Freon to insure appliance performance.
2. Assure temperature consistency through daily QC checks.
3. Use a calibrated thermometer to read the refrigerator temperature.
4. File completed monthly temperature sheets in a bound notebook.

Quality Assurance and Countermeasures for Non-Attainment

- The laboratory will purchase new equipment if temperatures cannot be maintained.
- If the fridge must be repaired or replaced, samples will be kept in ice chests under ice or moved to the back-up walk-in cooler.
- All repairs and replacements will be documented.
- The QA Office reviews the QC log to verify daily checks.

Quality Control for the Drying Ovens

Objectives

Insure that the ovens maintain optimum performance and a constant temperature of 60º ± 2 or other required temperature. The ovens are located in the dry weight lab and the drilling fluids lab.

Attaining Objectives (Refer to SOP 7.3)

The following objectives are the duties of the designated lab technician:

1. Use the ovens according to manufacturer recommendations.
2. Assure temperature consistency through daily QC checks using a calibrated thermometer. He or she will check temperatures when placing organisms in and removing organisms from the oven.
3. Document temperatures and adjustments, if necessary, on posted forms.
4. File completed monthly temperature sheets in a bound notebook.

Quality Assurance and Countermeasures for Non-Attainment

- The laboratory will purchase new equipment if temperatures cannot be maintained.
- If the ovens must be repaired or replaced, organisms will be dried in a back-up oven.
- Document all repairs and replacements.
- The QA Office reviews the QC log to verify daily checks.

Quality Control for Measurement Traceability

Objectives

- All equipment used that affects the quality of test results are calibrated prior to being put into service and on a continuing basis. These calibrations are traceable to national standards of measurement where available.
- Reference standards are standards of the highest quality available.
- Reference materials are substances that have concentrations that are sufficiently well established to use for calibration or as a frame of reference.
- The laboratory handles and transports reference standards and materials in a way that protects their integrity.

Attaining Objectives (Refer to SOP 12.7)

The following objectives are the duties of the Supplies Manager or QA Officer:

1. All equipment that affects the quality of test results are calibrated according to the minimum frequency suggested by the manufacturer, by regulation, by method, or as needed.
2. Reference standards, such as ASTM Class 1 weights, are used for calibration only and for no other purpose unless it is shown that their performance as reference standards will not be invalidated.
3. Reference standards, such as ASTM Class 1 weights, are calibrated by an entity that can provide traceability to national or international standards.
4. Reference materials, where commercially available, are traceable to national standards of measurement, or to Certified Reference Materials, usually by a Certificate of Analysis.
5. Internal reference materials, such as working standards or intermediate stock solutions, are checked as far as technically and economically possible.
6. Reference standard and material integrity is protected by separation from incompatible materials and/or minimizing exposure to degrading environments or materials.
7. Reference standards and materials are stored according to manufacturer’s recommendations and separately from working standards or samples.

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office will periodically keep track of and monitor the Supply Manager’s log for accuracy and completion.
- The QA Office will insure handling and calibration of reference standards and materials through internal audits.

Quality Control for General Equipment Requirements

Objectives

- Provide all the necessary equipment required for the correct performance of the scope of environmental testing presented in this Quality Manual.

- All equipment and software used for testing and sampling is capable of achieving the accuracy required and complies with the specifications of the environmental test method as specified in the laboratory SOP.

- Insure procedures are available for safe handling, transport, storage, use and planned maintenance of measuring equipment to ensure proper functioning and in order to prevent contamination or deterioration. Request traceability documentation whenever possible.

Attaining Objectives (Refer to SOP Sections 6.0 & 7.0)

The following objectives are the duties of the Supplies Manager, QA Officer, or Lab Director:

1. Equipment should be operated by authorized technicians only.

2. Up-to-date instructions on the use and maintenance of equipment (including any relevant manuals provided by the manufacturer of the equipment) are readily available for use by laboratory personnel.

3. All equipment is calibrated or checked before being placed into use to ensure that it meets laboratory specifications and the relevant standard specifications. If calibration factors are required, they will be recorded and posted on the instrument.

4. Equipment that has been subject to overloading, mishandling, giving suspect results, or been shown to be defective or outside specifications is taken out of service, isolated to prevent its use, or clearly labeled as being out of service until it has been shown to function properly. If it is shown that previous tests are affected, then procedures for non-conforming work are followed.

5. When equipment is needed for a test that is outside of permanent control of the laboratory, the lab ensures the equipment meets the requirements of this manual prior to its use by inspecting or otherwise testing it.

6. Each item of equipment and the software used for testing and significant to the results is uniquely identified and records of equipment and software are maintained. This information includes the following:

    a) identity of the equipment and its software;

    b) manufacturer’s name, type identification, serial number or other unique identifier;

    c) checks that equipment complies with specifications of applicable tests;

    d) current location;

    e) manufacturer’s instructions, if available, or a reference to their location;

f) dates, results and copies of reports and certificates of all calibrations, adjustments, acceptance criteria, and the due date of next calibration;

g) maintenance plan where appropriate, and maintenance carried out to date; documentation on all routine and non-routine maintenance activities and reference material verifications;

h) any damage, malfunction, modification or repair to the equipment;

i) date received and date placed into service (if available); and

j) condition when received, if available (new, used, reconditioned).

Quality Assurance and Countermeasures for Non-Attainment

- The QA Office will periodically keep track of and monitor the equipment log for accuracy and completion.
- The QA Office will periodically examine laboratory equipment to insure objectives are met. Personnel not following procedures will be reviewed and possibly replaced. Such information will be documented in the employee audit log.

Quality Control for Support Equipment

Objectives

- Insure all support equipment is maintained in proper working order and records are kept of all repair and maintenance activities, including service calls.

Attaining Objectives (Refer to SOP Sections 6.0 & 7.0)

The following objectives are the duties of the designated lab technician:

1. Support equipment such as balances, ovens, refrigerators, freezers, and water baths are checked with a NIST traceable reference if available, each day prior to use, to ensure they are operating within the expected range for the application for which the equipment is to be used.
2. Verify instrument performance according to manufacturer recommendations prior to first use.
3. Use a certified standards or reference material to calibrate instruments as specified in the instrument SOP. If calibration factors are required, they will be recorded and posted on the instrument.
4. Calibration references should be determined based on the range of test material, and should bracket above and below.
5. Always use fresh reagent for calibration procedures that require solutions.
6. Verify instrument calibrations with a traceable second source where required.
7. Where an instrument calibration is found unacceptable, the calibration must be performed a second time. If acceptable calibration cannot be achieved, the instrument should be taken out of service until achieved, or replaced.
8. Document all calibrations and any associated maintenance or repair in the instrument logbook.

Quality Assurance and Countermeasures for Non-Attainment

- Check expiration dates on standards and reagents
- The QA Office will insure that proper procedures and methods are followed and will retrain technicians as necessary.

Quality Control for pH Meters, DO Meters, Conductivity Meters, and Balances

Objectives

Accurately measure weights, pH, DO, salinity, and conductivity.

Attaining Objectives (Refer to SOPs 6.0 and 7.0)

The following objectives are the duties of the designated lab technician:

1. Calibrate instruments and verify that the instrument meets manufacturer recommendations prior to use. Regard the manual carefully.
2. Use two or three points continuously to calibrate, unless otherwise noted in the relevant instrument's SOP. Some instruments, such as the DO meter, are calibrated internally with correction factors.
3. Calibrate DO meters, pH meters, conductivity meters and balances prior to each use according to their respective SOP.
4. Document measurements and maintenance on the designated forms in the appropriate QC notebook.

Quality Assurance and Countermeasures for Non-Attainment

- Follow the troubleshooting guidelines in the SOPs if calibration cannot be obtained. If the guidelines do not correct the problem, the instrument may need to be serviced or replaced. Document these events.
- Calibrate balances annually. Document the calibration on each balance.
- Certify calibration weights annually.
- Monitor logbooks to insure that technicians follow QC practices, procedures, and methods. Personnel not following procedures will be retrained.

Quality Control for pH Measurements

(Analytical Certification Compliance)

Objectives

Accurately measure the pH level in a sample using the certified method, correct probe and equipment.

Attaining Objectives (Refer to SOP 1.13 & 6.15)

The following objectives are the duties of the designated lab technician:

1. Properly label samples for analytical analysis separate from WET test chemical analysis.
2. Use appropriate glassware, containers, and sample preservation methods.
3. Measure the pH level using the designated equipment in the TIE Room.
4. Verify instrument performance according to manufacturer recommendations and SOP prior to use.
5. Use reagent grade buffers and solutions to calibrate instruments.
6. Always use fresh reagents to perform calibrations.
7. Check samples for pH promptly upon receipt and record the measurement on the designated log form.
8. Run a performance duplicate check with every 10 samples with a minimum of one per batch, if less than 10 are run. Calculate the RPD, and insure that it is less than 20%.
9. Run a continuing calibration verification (CCV) sample check with every 10 samples with a minimum of one per batch. If less than 10 samples are analyzed, run the check at the end of the batch. Insure that the RPD between the CCV and the initial second source calibration check or previous CCV is less than 20%.
10. Check the analysis system with blind Proficiency Tests every six months and Certified Reference Standards in the quarters that are not checked with PTs.
11. Use of certified reference standards may be done more frequently if necessary to verify changes in equipment, personnel, or for annual demonstration of capability.

Quality Assurance and Countermeasures for Non-Attainment

- Check expiration dates on standards and reagents.
- Discard old solutions and calibrate with fresh solutions.
- Follow the troubleshooting guidelines in the SOPs if calibration cannot be obtained. If the guidelines do not correct the problem, the instrument may need to be serviced or replaced. Document these events.
- The QA Office will insure that proper procedures and methods are followed and will retrain technicians as necessary.

Quality Control for Residual Chlorine Measurements and Dechlorination

Objectives

- Accurately measure residual chlorine in samples.
- Accurately dechlorinate samples when necessary.
- Insure that the dechlorination agent is not delivered in quantities that may result in toxicity.

Attaining Objectives (Refer to SOPs 6.3 and 6.4)

The following objectives are the duties of sample custodian or the designated lab technician:

1. Only measure chlorine and dechlorinate samples in the wet chemistry lab.
2. Verify instrument performance according to manufacturer recommendations prior to use.
3. Use a certified standard to calibrate instruments.
4. Use fresh reagents when titrating.
5. Check samples for chlorine promptly upon receipt and record the measurement on the chain of custody.
6. Use appropriate glassware and containers.
7. Residual chlorine should not exceed 2.0 mg/L (the ideal measurement is less than 0.1 mg/L). Conduct dechlorination when allowed or specified by the client's permit.
8. Use the posted dechlorination formula and instructions.

Quality Assurance and Countermeasures for Non-Attainment

- Check expiration dates on standards and reagents.
- Discard old solutions and titrate with fresh solutions.
- Use only the correct dechlorination agents. Notify the QA Office if appropriate agents are not available.
- The QA Office will insure that proper procedures and methods are followed and will retrain technicians as necessary.

Quality Control for Total Ammonia Measurement

Objectives

Accurately measure the level of total ammonia in a sample using the correct probe and equipment.

Attaining Objectives (Refer to SOP 6.12 and 6.14)

The following objectives are the duties of sample custodian or the designated lab technician:

1. Measure total ammonia in the wet chemistry lab.
2. Verify instrument performance according to manufacturer recommendations prior to use.
3. Use a certified standard to calibrate instruments.
4. Use fresh reagents to perform measurements.
5. Check samples for ammonia promptly upon receipt, if designated by the client or the client's permit, and record the measurement on the chain of custody.
6. Use appropriate glassware and containers.

Quality Assurance and Countermeasures for Non-Attainment

- Check expiration dates on standards and reagents.
- Discard old solutions and calibrate with fresh solutions.
- The QA Office will insure that proper procedures and methods are followed and will retrain technicians as necessary.

Quality Control for Ammonia Measurements

(Analytical Certification Compliance)

Objectives

Accurately measure the ammonia level in a sample using the certified method, correct probe and equipment.

Attaining Objectives (Refer to SOP 1.14 & 6.20)

The following objectives are the duties of the designated lab technician:

1. Properly label samples for analytical analysis separate from WET test chemical analysis. Use appropriate glassware, containers, and sample preservation methods.
2. Measure the ammonia level using the designated equipment in the TIE Room. Verify instrument performance according to manufacturer recommendations and SOP prior to use.
3. Establish the Limit of Detection and Limit of Quantitation at least annually.
4. Use reagent grade buffers and solutions to calibrate instruments. Always use fresh reagents to perform calibrations.
5. Check samples for ammonia promptly upon receipt or preserve for future measurements up to 28 days. Record measurements on the designated log form.
6. Measure a performance blank with every sample batch and whenever the lab distilled water is replaced with new.
7. Run a performance duplicate check with every 10 samples with a minimum of one per batch, if less than 10 are run. Calculate the RPD, and insure that it is less than 20%.
8. Run a continuing calibration verification (CCV) sample check with every 10 samples with a minimum of one per batch. If less than 10 samples are analyzed, run the check at the end of the batch. Insure that the RPD between the CCV and the initial second source calibration check or previous CCV is less than 20%.
9. Run a matrix spike sample check with every 10 samples with a minimum of one per batch. If less than 10 samples are analyzed, run the check at the end of the batch. Calculate the percent recovery (%R) Insure that the %R is between 80-120%.
10. Check the analysis system with blind Proficiency Tests every six months and Certified Reference Standards in the quarters that are not checked with PTs. Use of certified reference standards may be done more frequently if necessary to verify changes in equipment, personnel, or for annual demonstration of capability.

Quality Assurance and Countermeasures for Non-Attainment

- Check expiration dates on standards and reagents. Discard old solutions and calibrate with fresh solutions.
- Follow the troubleshooting guidelines in the SOPs if calibration cannot be obtained. If the guidelines do not correct the problem, the instrument may need to be serviced or replaced. Document these events.
- The QA Office will insure that proper procedures and methods are followed and will retrain technicians as necessary.

Quality Control for Alkalinity Measurement

Objectives

Consistently measure alkalinity within 10% of the actual value while following the correct titration methods.

Attaining Objectives (Refer to SOP 6.6)

The following objectives are the duties of sample custodian or the designated lab technician:

1. Measure alkalinity in the wet chemistry lab.
2. Use certified buffers and reference standards to calibrate instruments.
3. Use fresh reagents when titrating.
4. Check samples for alkalinity promptly upon receipt and record the measurement in the logbook. Enter the measurements from the logbook into a computer database.
5. Use appropriate glassware and containers.
6. Before each use, check the titration buffer potency with a known alkalinity standard.
7. Use a calibrated pH meter.

Quality Assurance and Countermeasures for Non-Attainment

- Check expiration dates on standards and reagents.
- Discard old solutions and calibrate with fresh solutions.
- The QA Office will insure that proper procedures and methods are followed and will retrain technicians as necessary.

Quality Control for Hardness Measurement

Objectives

Consistently measure hardness within 10% of the actual value while following the correct titration methods.

Attaining Objectives (Refer to SOP 6.5)

The following objectives are the duties of sample custodian or the designated lab technician:

1. Measure hardness in the wet chemistry lab.
2. Use certified buffers to calibrate instruments.
3. Check buffers through the use of prepared standards.
4. Use fresh reagents when titrating.
5. Check samples for hardness promptly upon receipt and record the measurement in the logbook. Enter the measurements from the logbook into a computer database.
6. Use appropriate glassware and containers.
7. Before each use, check the titration buffer potency with a known hardness standard.

Quality Assurance and Countermeasures for Non-Attainment

- Check expiration dates on standards and reagents.
- Discard old solutions and titrate with fresh solutions.
- The QA Office will insure that proper procedures and methods are followed and will retrain technicians as necessary.

Quality Control for the Light Meter

Objectives

Insure the proper illumination of test rooms.

Attaining Objectives (Refer to SOP 7.9)

The following objectives are the duties of the designated lab technician:

1. Calibrate the light meter annually and verify that the instrument meets manufacturer recommendations prior to use.
2. Check light intensity in two locations in each testing room quarterly.
3. Document measurements in the bound notebook.

Quality Assurance and Countermeasures for Non-Attainment

- Replace the light meter if it cannot be calibrated properly.
- The QA Office will monitor the notebook to insure that proper procedures and methods are followed and will retrain technicians as necessary.

Quality Control for Thermometers

Objectives

Accurately measure temperatures.

Attaining Objectives

The following objectives are the duties of the designated lab technician:

Mercury and Digital Thermometers (Refer to SOP 7.5)

1. Use NIST thermometers for general thermometer calibration, except for the HOBO water temp pro.
2. Use thermometers according to manufacturer recommendations.
3. Calibrate thermometers quarterly, or according to manufacturer instructions.
4. Document calibrations in a bound notebook.

Continuous Temperature Monitors (Refer to SOP 7.12)

1. Use thermometers according to manufacturer recommendations.
2. Calibrate thermometers to NIST standards prior to first use.
3. Document deployments in a bound notebook.

Quality Assurance and Countermeasures for Non-Attainment

- Replace thermometers if they cannot be calibrated properly.
- Calibrate NIST thermometers annually.
- The QA Office will monitor the notebook to insure that proper procedures and methods are followed and will retrain technicians as necessary.

Quality Control for the Water Bath

Objectives

Warm samples to the proper temperature prior to test initiation and renewal.

Attaining Objectives (Refer to SOP 7.7)

The following objectives are the duties of the designated lab technician:

1. Follow manufacturer recommendations.
2. Maintain the correct water level for the pump.
3. Check bath temperature daily to insure that the water stays warm.

Quality Assurance and Countermeasures for Non-Attainment

- If problems occur, check the heating device, pump, and plumbing. Replace as necessary.
- Check water levels. Refill the bath if levels are too low. If levels are consistently too low, remind technicians to keep levels correct.
- The QA Office will monitor staff to insure that proper procedures and methods are followed and will retrain technicians as necessary.

Major Equipment List

Refrigerators/Freezers

Drying Ovens

Desiccators

Hanna Chlorine Specific Ion Meter #711

Hanna High Range Ammonia Meter #96733

SPER Scientific Light Meter

Thermometers

Water Bath

Orion pH Electrodes

Hanna pH Checkers

Orion Digital Conductivity Meter 130A

Orion 5-Star Portable Multimeter

Orion Versa Star Benchtop Multiparameter Meter (2)

Orion High Peformance Ammonia ISE Electrode

Orion RDO Probe

Orion Conductivity Probe

HOBO Water Temp Pro continuous temperature recorder

Refractometer

Hemocytometer

Reverse Osmosis Unit

DI Units

Water Pumps

Hood Ventilation

Turbo meter Wind speed Meter

UV/VIS Spectrophotometer

Sampling Units

The NELAC Compliant Equipment log is stored in a separate electronic file.

Appendix H1

AmTest Inc. QAM

AMTEST

LABORATORIES

13600 NE 126th Pl., Suite C
Kirkland, WA 98034
www.amtestlab.com

Quality Manual

Revision 11.5
Effective Date: August 2015

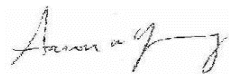
Approved by:

Recoverable Signature

X 

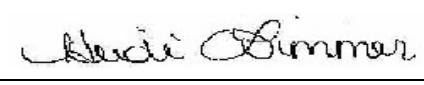
Kathy Fugiel
Lab Director/President
Signed by: Aaron Young

Recoverable Signature

X 

Aaron Young
Lab Manager
Signed by: Aaron Young

Recoverable Signature

X 

Heidi Limmer
QA/QC Manager
Signed by: Aaron Young

Signature Page

AmTest Lab

The undersigned have read this Quality Assurance Plan and understand the requirements set forth in it. By signing this document, these individuals acknowledge their responsibility to follow the procedures outlined. The annual review of this manual is mandatory for all employees and will be construed as training for all matters contained within.

Name: (Please Print)	Signature:	Initials:	Date:	Dept.

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QA Plan Elements

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FIGURES

TABLES

Separate Attachments

ACRONYMS

AMU	Atomic Mass Unit
AOAC	Association of Analytical Communities
ASTM	American Society for Testing and Materials
BETX	Benzene, Ethyl benzene, Toluene and Xylenes
BFB	Bromofluorobenzene used for mass spectral tuning
BOD	Biochemical Oxygen Demand
BNA	Base/Neutral, Acid Extractable
CBOD	Carbonaceous Biochemical Oxygen Demand
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
CHO	Chemical Hygiene Officer
CHP	Chemical Hygiene Plan
CLP	Contract Laboratory Program
cm	centimeter
COD	Chemical Oxygen Demand
CV	Coefficient of Variation
CVAAS	Cold Vapor Atomic Absorption Spectrometry
DF	Dilution Factor
DOE	Department of Ecology
EPA	Federal Environmental Protection Agency
FDA	Food and Drug Association
GC	Gas Chromatograph
GC/MS	Gas Chromatograph/Mass Spectrometry
GLP	Good Laboratory Practice
Hz	Hertz
I.D.	Internal Diameter
ICV	Initial Calibration Verification
ID	Identification
IR	Infrared
IS	Internal Standard
IUPAC	International Union of Pure and Applied Chemistry
L	Liter
LCS	Laboratory Control Samples
LFB	Laboratory Fortified Blank
LIMS	Laboratory Information Management System
LM	Laboratory Manager
LOD	Limit of Detection
LOQ	Limit of Quantitation
m	meter
MDL	Method Detection Limit
MS	Mass Spectrometry
MSD	Matrix Spike Duplicate or Mass Selective Device
MW	Molecular Weight

NELAP	National Environmental Laboratory Accreditation Program
NIST	National Institute for Standards and Technology
NPDES	National Pollution Discharge Elimination System
NTU	Nephelometric Turbidity Units
OSHA	Occupational Safety and Health Administration
PDF	Portable Document Format
PE	Performance Evaluation
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion
PQL	Practical Quantitation Limit
PSDDA	Puget Sound Dredged Disposal Analysis
PT	Proficiency Testing
QA/QC	Quality Assurance/Quality Control
QAP	Quality Assurance Plan
QCS	Quality Control Sample
QM	Quality Manual
RF	Radio Frequency; Response Factor
RFA	Rapid Flow Analysis
RL	Reporting Limit
RPD	Relative Percent Difference
RRT	Relative Retention Time
RSD	Relative Standard Deviation
RT	Retention Time
S/N	Signal-to-Noise Ratio
SD	Standard Deviation
SIM	Selective Ion Monitoring
SOP	Standard Operating Procedure
TCLP	Toxicity Characteristic Leaching Procedure
TNI	The NELAC Institute
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
WADOE	Washington State Department of Ecology
ZHE	Zero Headspace Extraction

1.0 INTRODUCTION, SCOPE AND APPLICABILITY

1.1 INTRODUCTION

AmTest Laboratories mission is to provide legally defensible and scientifically credible analytical and technical support to its clients. AmTest is an analytical laboratory that offers a myriad of testing services in: air quality, environmental, industrial, biological, and petroleum fields. AmTest's management is committed to generating data of the highest quality necessary for fulfilling the mission of the laboratory.

1.2 SCOPE

AmTest Laboratories is a full service environmental laboratory which provides chemical and microbiological analytical support to the following:

a) Water & wastewater management districts
b) Local and state agencies
c) Personal and investigative testing
d) Engineering Firms

This laboratory also provides chemical and microbiological analytical consulting services to the above listed programs.

1.3 APPLICABILITY

This document serves as the Quality Manual (QM) for the Chemistry and Microbiology section of AmTest Laboratories.

2.0 REFERENCES

See Appendix F

3.0 TERMS AND DEFINITIONS

The relevant definitions from The NELAC Institute Standard, Volume 1, Module 2, Section 3.0 are the preferred references. See the TNI Standard. Definitions related to this document that are used differently or do not exist in the above references are defined in the text.

4.0 MANAGEMENT REQUIREMENTS

4.1 ORGANIZATION

4.1.1 AmTest Laboratories is accredited by the Washington State Department of Ecology (DOE) with laboratory ID number C554. The laboratory is located at 13600 NE 126th Pl., Suite C, Kirkland, WA 98034. The telephone number is (425) 885-1664. The Washington Department of Health (WADOH) number for the lab is 066.

4.1.2 This Quality Manual (QM) in conjunction with the Standard Operating Procedures (SOPs) provides guidance for the laboratory operations and serves as the document that defines the criteria necessary to meet the standards of TNI. This QM details the activities and evaluation criteria necessary to ensure that analytical data meet the requirements of our customers, WA-DOE and TNI. This QM also documents procedures intended to ensure that all data are of high and known quality in order to meet the scientific objectives of the lab.

4.1.3 The management system described in this document applies to all chemistry and microbiology tests performed at the facility described in 4.1.1. However, if a portion of a project cannot be completed by this facility, prior customer approval is obtained before being sent out.

4.1.4 The responsibilities of key personnel are outlined in Section 4.2 of the QM. These responsibilities are performed by the key personnel identified or delegated representatives.

4.1.5 AmTest Laboratories:

a) Conducts an annual management review according to SOP 2.04, *Quality System Management Review*, to ensure the maintenance of data integrity, quality and efficiency.

b) Requires that all laboratory employees are responsible and conduct themselves in a manner that does not impact the competence and operational integrity of the laboratory as outlined in SOP 2.05, *Code of Ethics*.

c) The laboratory cannot guarantee the confidentiality of reports transmitted electronically or by facsimile.

d) Has a data integrity training program (See section 5.2.6).

e) Has a defined organizational structure including quality management, support services and technical operations, see Figure 4.1 (Laboratory Organizational Chart).

f) Maintains job descriptions for all employees. See Figure 4.1 for the responsibilities of key personnel.

g) Annually reviews and updates (if necessary) all SOPs. The protocol for updating and reviewing SOPs is described in SOP 2.03, *Guidance for Writing Standard Operating Procedures (SOPs)*, and in SOP 2.04, *Quality System Management Review*. Any updates to SOPs must have the approval of the Lab Manager and QA Officer and must conform to the policies of the laboratory. It is the responsibility of the laboratory supervisors to ensure proper documentation demonstrating that their employees have read, understood and are using the latest versions of SOPs and that this is documented in the employees training file. The latest official versions of SOPs are located on the AmTest Cloud and are accessible to all analysts throughout the laboratory and with the QC Manager. Laboratory analysts are required to successfully analyze initial and on-going demonstrations of capability according to Appendix B, section 6.0.

h) Has a full-time designated QA/QC Manager. See section 4.2.3 for a description of responsibilities.

i) Have alternate supervisors who, in the absence of key management personnel, are assigned to assume their responsibilities. In the absence of the Laboratory Director the Lab Manager will assume said duties.

j) Has ethics training described in section 5.2.6 emphasizing the importance of the activities of each employee and the ramifications of them not performing their responsibilities according to laboratory procedures and policies.

4.1.6 A Quality System Management Review takes place annually to ensure that management holds regular staff meetings to discuss quality issues, workload and staffing issues and other items of importance to the laboratory. Necessary changes to the quality system as a consequence of performance on proficiency samples or audits are discussed for incorporation and implementation. See SOP 2.04, *Quality System Management Review*, for further information.

4.2 MANAGEMENT SYSTEM

4.2.1 Description

The laboratory is comprised of Chemistry and Microbiology laboratories and a Laboratory Support Section. Each section is managed by the Lab Manager who reports directly to the Lab Director.

CHEMISTRY

The Chemistry Section is divided into two subsections: organic analysis and inorganic analysis. The section is headed by the Lab Manager, who is responsible for both the technical and administrative direction of the Section. The Lab Manager and the QA/QC Manager are committed to the QA program described in this plan. See Figure 4.1 for the organizational structure.

The analysts in the Chemistry subsections are responsible for ensuring they are aware of the objectives and requirements of the QM and SOPs and that data submitted to the QA Manager or Lab Manager meet these requirements. The inorganic subsection is divided into two work groups; water chemistry and trace metals. The organics subsection consists of the volatiles, semi-volatiles and pesticide work groups.

MICROBIOLOGY

This Section is headed by a Program Administrator, who is responsible for both the technical and administrative direction of the Section. The Program Administrator and the QA/QC Manager are committed to the QA program described in this plan. Figure 4.1 contains the labs organizational structure.

The analysts in the Microbiology section are responsible for ensuring they are aware of the objectives and requirements of the QM and SOPs and that data submitted to the QA Manager or Lab Manager meet these requirements.

Laboratory Support Section

The Laboratory Support Section (LSS) is composed of three groups; data support, laboratory quality assurance and sample support. Each of these groups is supervised by the Lab Manager who reports directly to the Lab Director.

4.2.2 Quality Policy Statement

AmTest Laboratories primary objective is to ensure that all of the analytical data generated and reported is scientifically valid, legally defensible and of known accuracy and precision.

All of the analyses performed at AmTest meet the following criteria:

1) Methods and procedures conform to the specifications and requirements of the appropriate regulatory agencies (EPA, WADOE, FDA, PSDDA, OSHA, WS L&I). As such, these methods are validated and available in the documents of the EPA, AOAC, ASTM, BAM and Standard Methods.

2) When applicable, all measures of precision, accuracy, representativeness, and comparability are reported in the data package.

3) All data is reviewed relative to the quality control plan. Corrective actions are implemented when the analytical data fails to meet established quality control criteria.

4) Standard operating procedures are developed and implemented in order to ensure that good quality data is collected.

5) All final reports are reviewed in order to meet the client's objectives with respect to quality, completeness, and price.

4.2.3 Management Commitment

AmTest Laboratories management is committed to generating data of the highest quality necessary for fulfilling the mission of the laboratory and satisfying customer expectations.

Laboratory Management

The Laboratory Director/President and Lab Manager must have earned a minimum of a BA or BS in chemistry or related field and five years of laboratory experience. Both authorities share responsibility for all laboratory activities including the Quality Assurance/Quality Control program.

Kathy Fugiel, B.S.: Laboratory Director/President
The Director supervises all of the administrative and technical activities for AmTest Lab.
The Director/President responsibilities include:

- Future development
- Fiscal policy
- Project management
- Client relations
- HR policy
- Hiring and training staff
- Lab accreditation
- Produce and certify client reports

Aaron Young, B.S.: Laboratory Manager
The Lab Manager is responsible for overseeing the daily operations of AmTest Lab including:

- Helping lab staff with production issues (workload, troubleshooting, reporting data)
- Technical support to customers
- Coordinate projects to meet specific customer needs
- Training staff
- Monitor QA/QC performance
- Lab accreditation
- Produce and certify client reports

Heidi Limmer, B.S.: QA/QC Manager
The Quality Assurance Officer must have earned a minimum of a BA or BS in science and three years of laboratory experience. The QA Officer reports directly to the laboratory management. The primary responsibility of this office is to independently assess the quality of the data that is generated. This evaluation is made by use of internal quality control check samples and the review of outside performance evaluation studies. Any recommendations to improve the quality assurance program are made directly to the laboratory management.

Specific responsibilities and authoritative functions of the QA Manager include:

- Develops and reviews quality control programs including statistical procedures and techniques, which will help meet the quality control standards at a minimum cost.
- Monitors quality assurance activities to determine conformance with the guidelines established in the laboratory and departmental QA/QC manuals.
- Evaluates new ideas and current developments relative to the fields of quality control and quality assurance, and recommends means for the implementation.
- Coordinates schedules for all quality assurance checking procedures
- Evaluates data quality and maintains records on related quality control charts and other pertinent information.
- Coordinates and/or conducts quality assurance investigations (intra and inter laboratory programs).

Special duties assigned to the QA Manager include:

- Oversees the maintenance of department Laboratory Standards Books and reviews them (quarterly) to ensure they are uniform, clear, and traceable to time, action, and person.
- Reviews the overall Quality Control effort and provides a quarterly QA report to the Laboratory Management.
- Reviews all QC charts (bi-annual) to ensure that the quality of the data is maintained over time. Makes recommendations based upon these trends in order to consistently provide data that is of the highest quality.
- Maintains a database of Corrective Actions.
- Maintains a file of all laboratory accreditation information.
- Reviews all laboratory notebooks (quarterly) to insure that the information is uniform, clear, and precise.

Department Supervisors

The Department Supervisors must have earned a BA or BS in chemistry or microbiology and have acquired three years of lab experience. They are responsible for the data production, evaluation, and the preparation of the final reports. Additional responsibilities include staff training, method

development, establishment of quality control procedures, and implementation of the quality assurance program. These supervisors report to the management and work in coordination with the quality assurance office to ensure production of the highest quality data.

Technical Staff

All technical staff is responsible for the following parameters regardless of laboratory department:

- SOP's and referenced Methods must be read. (If necessary note any changes or updates on printed copy of SOP).
- Maintain and properly use instruments.
- Keep instrument maintenance, data and standards notebooks up-to-date.
- Keep lab area clean.
- Clean and maintain all lab ware you use.
- Keep instrument information and data properly filed so management can locate.

Other responsibilities and required training of the technical staff are dependent upon position in the lab. They are responsible for the production of the data using approved analytical methods. It is also a responsibility of the analysts to carry out all the quality control procedures and to pay strict attention to the control limits that are defined by the methods. A thorough understanding of the QA program is a requirement for its overall success. The largest impact upon the quality of the data clearly rests with the individuals that generate it. Personnel who operate ion chromatographs (IC), gas chromatographs (GC), inductively coupled plasmas (ICP), mass spectrophotometers (MS) and other instruments of comparable complexity are required to get specialized training for their instrument. Training can be from the equipment manufacturer, on-line, professional organization or other qualified training facility. All employees are responsible to maintain their training files and certificate of capability for each method they perform.
All analysts are required to pass Demonstration of Capability (DOC) study, MDL's (Method Detection Limit) study, QC and PT samples to demonstrate their ability to produce acceptable results.

Sample Custodian

The Sample Custodian must have received at least a high school diploma. The Lab Manager supervises the Sample Custodian.

Specific duties of the Sample Custodian include:

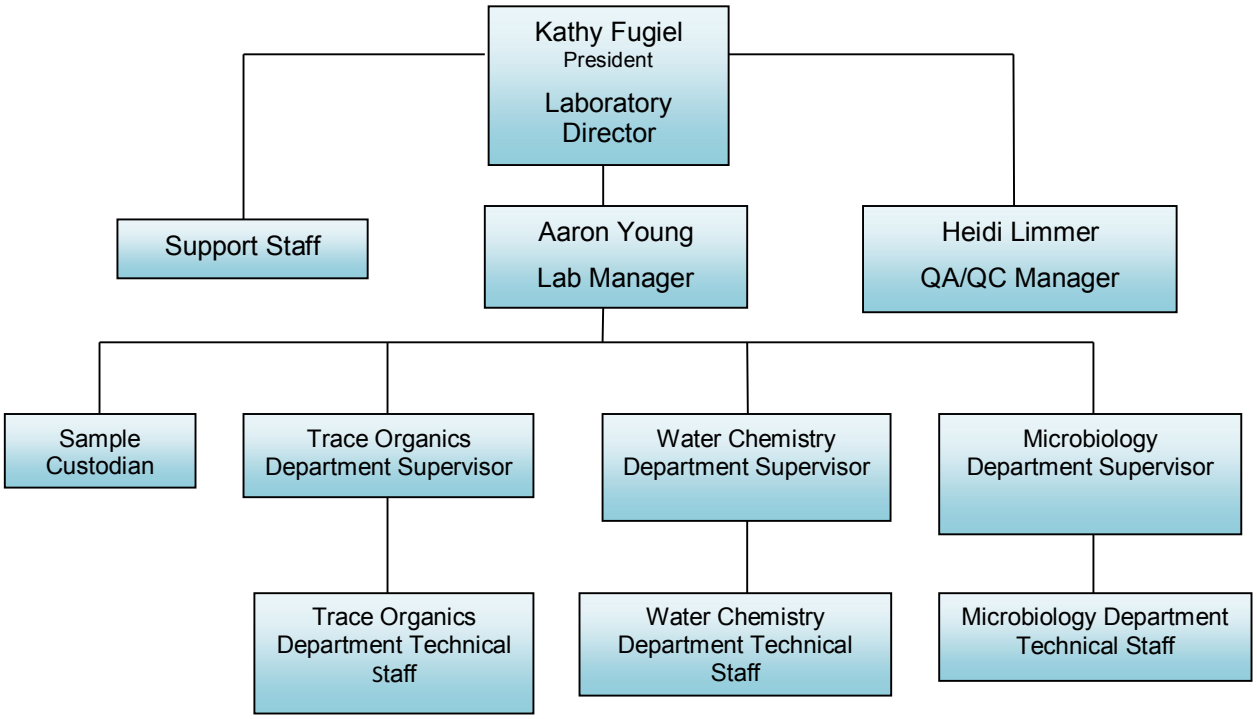
- Logging in samples and maintaining proper chain of custody protocols
- Documenting non-conformances
- Maintaining sample storage facilities
- Coordinating sample disposal
- Packing and shipping sample containers to clients
- Tracking all samples sent to sublet labs
- Customer contact and service

AmTest Laboratories actively encourages its employees to expand and refine their jobs skills and knowledge through participation in a variety of educational programs. Time off is granted to attend seminars and training sessions put on by instrument manufacturers, regulatory agencies, professional business and scientific organizations, etc. Additionally AmTest conducts in-house training on related topics and also encourages education through a tuition reimbursement program.

A record of specialized training received by or given by the staff is kept in the Personnel Training folders.

Figure 4.1

Laboratory Organizational Chart



4.2.4 Meeting Customer Requirements

Samples should be scheduled with the laboratory prior to acceptance of the samples by the laboratory. The decision to formally accept samples is based on the client's expectations for analytical methods, turnaround times, laboratory capacity and sensitivity. All scheduled work is reviewed by the Lab Manager and/or Lab Director prior to approval for receipt by the laboratory. Samples are accepted for analysis by logging them into the LIMS and assigning Lab numbers and requested tests.

See SOP 3.18, *Tracking Priority Projects*, for details on how priority projects are handled and clients are kept informed of progress.

The customer is notified of any non-conformances that may affect the integrity of the data. The samples are analyzed unless the customer requests otherwise or the nature of the non-conformance makes analysis impractical. Data from compromised samples are flagged with the appropriate

qualifier(s) or comments and a non-conformance report is issued with the report. The Laboratory non-conformance system procedures are described in SOP3.19, *Non-Conformance/Corrective Action Reporting.*

Significant deviations from standard policies or practices of the laboratory are reported to the client and documented with the analytical reports. Any samples that are prepared or analyzed beyond accepted holding times have a statement stamped with the data alerting the client to the fact that tests were conducted after the sample had expired. Similarly, the failure of any quality control checks is communicated with the data, directing the client to the Quality Control Report for details of failures. Data qualifiers are used to alert clients of quality control problems and expired holding times.

Accepted samples that were improperly preserved are documented in the LIMS, in analytical reports and/or in a LIMS non-conformance report. All other significant observations that do not conform to accepted practices or policies are documented and reported along with analytical results. Sample integrity such as improper temperature and pH preservation, insufficient volume, leaking or broken bottles, etc., are entered into a non-conformance report in the LIMS as well as documented on a log-in check form with the sample custodian initials.

4.2.5 Technical and Supporting Procedures

The laboratory SOPs are divided into 8 groups, those for Log-In, QA/QC, General Lab, Water Chemistry, RFA, Trace Metals, Trace Organics and Microbiology. The only location at which current revisions of all SOPs should be accessed is on the AmTest Cloud. The versions stored on the Cloud are locked so only management has access to make revisions. Printed copies are used to make noted revisions by analysts then given to the QA Manager to update annually. The format of the SOPs is detailed in SOP 2.03, *Guidance for Writing Standard Operating Procedures (SOPs)*.

4.2.6 The responsibilities of all managers within AmTest can be found in the appropriate job descriptions detailed in section 4.2.3. Personnel authorized to certify reports are stipulated in these job descriptions.

4.2.7 All laboratory personnel are required to annually review and update (if necessary) all SOPs that pertain to the work they perform with the laboratory (SOP 2.04, *Quality System Management Review*). See section 4.1.5 (g) for further information on notifying personnel of system changes.

4.2.8 Additional Management System Requirements

4.2.8.1 See section 5.2.6 for a description of the Laboratory Data Integrity System.

4.2.8.2 The QA/QC Manager is responsible for keeping the Laboratory QM up to date. The QM is reviewed and revised at least annually and posted to the AmTest Cloud. Revisions are approved with lab management for incorporation into the QM by the QA Manager. The posted version is the latest official version of the QM. Revisions of the QM are archived and easily accessible on AmTest Cloud.

4.2.8.3 This QM along with the laboratory SOPs detail AmTest's Quality System for the laboratory. This document contains all of the mandatory information required by Section 4.2.8.3 of the TNI standards Volume 1, *Management and Technical Requirements for Laboratories Performing Environmental Analysis*, Module 2: Quality System Requirements.

4.2.8.4 This QM contains or references all of the topics in Section 4.2.8.4 of the TNI standards Volume 1, *Management and Technical Requirements for Laboratories Performing Environmental Analysis*, Module 2: Quality System Requirements.

4.2.8.5 SOPs addressing all activities of the laboratory including all test methods and supporting activities may be found on AmTest Cloud. All of the required topics in 4.2.8.5 (f) of the TNI standards are in or referenced in the test method SOPs.

4.3 DOCUMENT CONTROL

4.3.1 AmTest SOP 2.03, *Guidance for Writing Standard Operating Procedures (SOPs)*, describes how SOPs are created, revised and approved. This SOP details where the current SOPs are maintained and archived.

Record archiving procedures are found in SOP 3.21, *Records Maintenance and Storage*. Archived records include raw laboratory data, laboratory notebooks, final reports, administrative files, personnel records, purchase requisitions and purchase orders.

4.3.2 Document Approval and Issue

4.3.2.1 The procedure by which an SOP is implemented or revised is as follows:

- The analyst involved in carrying-out the procedure prepares a draft SOP detailing methodology.
- The draft is reviewed by the Lab Manager and submitted to the QA Manager for final review and formal editing.
- The QA Manager posts the final SOP to the Cloud as a locked Word document. The name of the person(s) authorizing the SOP (Lab Manager and QA Manager) is noted on the front cover of the SOP, the revision number, revision date, name of person responsible for changes and description of change(s) are recorded in the Revision Record section of SOP. The SOP expiration date will be set one year from the date the version was revised.
- To revise an existing SOP, handwritten notes are made as to changes required on a printed copy of the to-be- revised SOP and submitted to the QA Manager. The changes are determined to be minor or major. Minor revisions are those which do not involve modification to the method, while major revisions indicate the method has been altered. A change in procedure that produces results that are incomparable with those reported before the method was modified would also justify a major revision. All SOPs must contain a Revision Record made during the revision period. The Record must include the date of any significant edits and should indicate the pertinent SOP section(s) that have been edited.

Note: In cases where a specific SOP version has been certified and subsequently undergoes a major revision, additional steps are required. The analyst submitting the revision must also submit a method validation package and the appropriate paperwork for requesting WADOE certification of the new SOP version. The Lab Manager is responsible for ensuring that analysts are trained on new or revised SOPs. The QA Manager is responsible for replacing old SOPs with the new versions. The only official versions of SOPs are those that reside on the laboratory Cloud or with QA Manager.

4.3.2.2 Revisions to the QM are submitted by analysts involved in carrying-out the procedure. The proposed revisions are reviewed by lab management and, if acceptable, forwarded to the QA Manager. The QA Manager evaluates the changes for compliance with laboratory policies and procedures and quality assurance issues and then is responsible for posting the revised manual.

4.3.3 Document changes

See section 4.3.2 for how changes are implemented to SOPs and QM.

4.4 REVIEW OF REQUESTS, TENDERS AND CONTRACTS

4.4.1 Contract/order review is an integral part of AmTest Laboratories. All contract/orders are reviewed and accepted only if the requirements are clear and understood, and the laboratory has the capability and capacity to meet full customer expectations. The criteria used to review and accept projects are described below. Upon receiving a request from a client the AmTest Project Manager obtains specific project information. The information includes but is not limited to the following:

- The project description (and purpose if needed)
- The analyses requested
- The sample matrices
- The number/frequency of the samples
- Completion expectations

The AmTest Project Manager evaluates the information. If AmTest is able to accept the work then the AmTest Project Manager provides the following information in writing (or by e-mail) to the client:

- A list of the analytical methods the Lab will use.
- Information on whether the Lab has WADOE certification for the method(s)
- The detection limit and quantitation limits for the method(s)
- The costs of the analyses (if applicable)
- Additional information upon request, such as non-NELAP proficiency studies and quality assurance/control information.

Once the client and the Lab mutually agree upon the project then the AmTest Project Manager obtains the account information.

4.4.2 Records of reviews, including any significant changes, are maintained.

4.4.3 The review will also include information on analyses that need to be subcontracted to another laboratory.

4.4.4 Communications are maintained with the client from request/quote through commencement of work. This includes informing the client of any deviation from the contract or agreement.

4.5 SUBCONTRACTING OF ENVIRONMENTAL TESTS

Samples that need to be sent out to another contract laboratory will show transfer to said lab in the LIMS custody record. A Chain-of-Custody form should be filled out with the following information; AmTest Project Manager's name authorizing the work, a list of sample ID's and requested analyses with turnaround time, the date/time the samples were sent out and the identity of the custodian responsible. Samples along with copies of the field information (if available) and the Chain-of-Custody form are delivered to the contract lab. The delivery person and the recipient at the contract lab must sign the Chain-of-Custody form indicating the transfer date and time.

See SOP 3.02, *Sublet Tests*, for further details.

4.6 PURCHASING SERVICES AND SUPPLIES

4.6.1 A list of approved suppliers for the purchase of supplies and services is maintained by the Purchasing Agent. The laboratory maintains an inventory list of chemicals and supplies commonly used for analyses performed in the laboratory. See SOP 3.04, *Purchasing of Supplies*. This SOP includes procedures on how to place an order for supplies. SOP 3.01, *Reagents* describes the procedures necessary to ensure the quality of the purchase, checking that the proper quality and quantity was received and describes how the reagent(s) are stored if needed to maintain quality.

4.6.2 Purchased services, supplies and consumable materials are not used until an inspection is performed to ensure compliance with purchasing specifications.

4.6.3 The quality of items being ordered is specified prior to the purchase. This applies to the specifications of durable goods such as laboratory instrumentation and software. Similarly, the lab orders consumables, such as chemical reagents, of known quality (purity) from reputable vendors. The quality of the chemical is specified by "grades" that conform to industry standards prior to their purchase. For example, the American Chemical Society (ACS) Reagent Grade chemicals, Trace Metal Grade acids, UHP Grade gases, etc.

4.6.4 If a chemical or consumable ordered by the lab is found to be of poor quality, then the lab will find an alternative supplier that can meet the required specifications.

4.7 SERVICE TO THE CLIENT

4.7.1 AmTest Laboratories does its utmost to meet its clients' needs, including:

- Allowing customers access to the laboratory to witness testing when requested.
- Preparing, packaging and dispatching test items and reports as required by our customers for verification purposes.
- Advising, guiding and communicating with our customers on technical matters, providing opinions and interpretations for tests performed or to be performed.
- Communicating to our customers any major deviations in testing being performed. See SOP 3.19, *Non-Conformance/Corrective Action Reporting*.
- Communicating to customers any delays that may result in the customers not receiving their test results in a timely manner.

- Notifying customers of any event that casts doubt onto the validity of results supplied to them.

4.7.2 The laboratory solicits customer feedback from its customers using a survey attached to emails and is available on our website (www.amtestlab.com). Feedback from our clients by other channels is encouraged throughout the year to improve our operations. Feedback from the customer survey is maintained by the QA Manager; while direct feedback is maintained by the Lab Director.

4.8 COMPLAINTS

AmTest Laboratories is committed to resolving complaints and implementing suggestions for improvement. All informal complaints, suggestions or requests for information are directed to the appropriate Project Manager for resolution. Formal written complaints are directed to the correct Project Manager and, after investigation and resolution, are responded to in writing. Also see section 4.11 for Corrective Action.

4.9 CONTROL OF NON-CONFORMING ENVIRONMENTAL TEST WORK

(See SOP 3.19, *Non-Conformance/Corrective Action Reporting*).

4.9.1 Significant deviations from the laboratories policies and procedures, as outlined in the Quality Manual and SOPs, are not approved without appropriate documentation. Significant deviations from standard policies or practices by the laboratory are reported to the client and documented with the analytical reports. Any samples that are prepared or analyzed beyond accepted holding times have a statement stamped with the data alerting the client to the fact that tests were conducted after the samples had expired. Also, the failure of any quality control check is communicated with the data, directing the client to the Quality Control Report for details of the failures.

4.9.2 Where non-conformances are indicative of systematic errors, the corrective action procedures described in section 4.11 are instituted.

4.10 IMPROVEMENT

AmTest is committed to continually improving the quality management system by:

- Multi-tier and electronic review process (see SOP 3.10, *Final Data Review* and SOP 3.20, *Job Level Authorization Checklist*)
- Internal and external audits
- Systematically evaluating quality data and updating allowable acceptance criteria
- Participating in laboratory inter-comparisons
- Performing quality system management reviews (see SOP 2.04, *Quality System Management Review*)

4.11 CORRECTIVE ACTION

4.11.1 General

Corrective actions for the chemistry section are described in the method SOPs. A list of method SOPs sorted by subsection or category can be found later in Appendix C or on the Cloud.

Corrective actions and notification protocols for the microbiology section are listed in Table 4.1. Corrective actions are initiated based on either internal QC checks, data validation by a reviewing authority or performance audits. Outside sources such as performance evaluation studies, as well as recommendations by WADOE may initiate corrective actions. Data sheets for Performance Test (Audit Samples) are to be peer reviewed before data is officially entered into appropriate website. This will help to insure errors, such as transcription errors, are caught before becoming official record. See SOP 3.19, *Non-Conformance Reporting System*, for additional information on initiating corrective actions.

4.11.2 Cause Analysis

All non-conformances are evaluated to determine the root cause. Many factors are taken into consideration in the evaluation and the cause may not be directly attributable to laboratory operations. Non-conformance causes, where identified, are documented in non-conformance reports and stored within the Laboratory Information Management System (LIMS). Where necessary, re-training and/or changes to SOPs are implemented to address controllable errors.

4.11.3 Selection and Implementation of Corrective Actions

The details of identifying corrective actions and remedies taken are detailed in SOP 3.19. The likely causes of a given problem are first identified and then corrective actions put into place to alleviate the problem. The extent of the corrective actions required is evaluated against the seriousness of the non-conformance. All corrective actions are administered within a reasonable time frame.

4.11.4 Monitoring

All corrective actions are documented and monitored to ensure compliance with the laboratory's policy and procedures. Corrective action (CA) for instruments are noted in specific instrument maintenance log, while CA for analysis are noted on QC forms or in test specific notebook.

4.11.5 Additional Audits

The effectiveness of any corrective actions is evaluated during routine internal and performance audits. Additional audits are scheduled to address non-conformances that will not allow the laboratory to meet their established operating protocols.

4.11.6 All actions taken under this section are documented.

4.12 PREVENTATIVE ACTION

4.12.1 All maintenance or repair to equipment is documented in a laboratory notebook or stored in computer file. Documentation includes a description of the problem(s), work performed, date and

analyst's initials. See section 5.5.6 for details. See Table 4.2 for Preventative Maintenance information.

4.13 CONTROL OF RECORDS

4.13.1 General

4.13.1.1 For a description of laboratory records, see SOP 3.21, *Records Maintenance and Storage*. Records associated with QA activities including external and internal audits, certification records and PT studies are filed in a dedicated quality assurance filing cabinet.

4.13.1.2 All records are legible, easily accessible and stored in a manner that will minimize loss, damage or deterioration. The lab continues to maintain client access to electronic and paper records for a period of not less than 7 years after the completion of the laboratory project (see SOP 3.21 for details).

4.13.1.4 LIMS electronic records are copied onto a backup USB drive daily.

The laboratory maintains archived documents, such as paper records and laboratory notebooks, in labeled boxes, in a specific location in the laboratory. Copies of pertinent raw and processed data may be maintained in electronic and paper format. All paper records are maintained in a temperature and humidity controlled environment with fire suppression equipment available.

4.13.2 Technical Records

4.13.2.1 Most of the data generated by the laboratory during the analytical testing process is in the form of electronic records. Those data consist of raw data files generated by analytical instrumentation, chromatography acquisition software, etc. as well as processed and final database records residing in the Laboratory Information Management System (LIMS).

All raw data files, including processed chromatography data and formatted, processed instrument files are stored on instrument computers. Those files are organized by file type and date of generation and are copied onto backup CDs or USB drives at least quarterly. Software and hardware systems will be maintained to ensure that raw data are available for a period of not less than seven (7) years after completion of the laboratory project. Records maintained shall allow the re-creation of the calibration and test procedures and personnel responsible for the different aspects of the test procedure. See SOP 3.21, *Records Maintenance and Storage*, for complete details.

4.13.2.2 The nature and intent of all documentation are clearly established and all records are captured at the time of generation.

4.13.2.3 Entry errors on paper records are not obliterated or erased. Corrections are made by marking a single line through the error so that it is legible. The marked error is initialed and dated and a reason for the correction is noted when the cause is not obvious or due to simple transcription errors. See Figures 4.4 Microbiology bench sheets and logs. Access to electronic records is restricted and where possible an electronic audit trail is maintained for write access only.

4.13.3 Additional Records

a) Documentation of Sample History

Sample Custody

The custody of a sample is defined as one of the following:

- It is in the sampler's or transferee's actual possession;
- It is in the sampler's or transferee's view, after being in his/her physical possession;
- It was in the sampler's or transferee's physical possession and then he/she secured it or placed in a designated secure area to prevent tampering.

Routine Custody

For most projects AmTest provides sampling containers to its clients. A Packing List (see Figure 4.2) is filled out with requested bottles by the sample custodian and if requested shipped with the containers. Samples are collected by the client utilizing procedures identified within their field QA Plans. After collection, the samples are shipped to the lab by common carrier or are hand-delivered by the client. See SOP 1.04, *Sample Containers*.

Legal Chain-of Custody

For legal chain-of-custody samples, a chain-of-custody form is used in addition to, or instead of, a sample submittal form although the submittal form can also provide legal chain-of-custody information. See examples of the chain-of-custody record in Figure 4.3. For any given sampling event, custody Records are kept with the other field paperwork in the event folder at all times until the analysis is complete. A copy is sent with the final report to the customer while the original is kept in the section file with the report. See SOP 3.22, *Documenting Evidentiary Chain-of-Custody within AmTest Laboratory*, for complete details.

Sample Custody Policy

See section 5.8 under Handling Samples and Test Items and SOP 1.03, *Log-in and Tracking Samples*.

Once a sample is logged in, a custody log is automatically created for that sample in the LIMS. This log tracks the sample's movement throughout the lab, from sample receipt to complete analysis.

After samples have been analyzed and the final analysis reports are issued to the customer, samples are either disposed of properly (see Table 4.3, *Laboratory Waste Disposal Procedures*), returned to the client, or (in the case of legal samples) stored until the client approves disposal or transfer of the sample(s). For routine sample disposal the sample custodian notes the date and initials the printed sample log.

Inter-laboratory Custody

See section 4.5 for a description of custody for samples sent to a sub-contract laboratory.

To gain access to the LIMS, each employee is assigned an analyst number. Analysts are required to use the LIMS icon labeled **LIMS Analyst**, while management uses the LIMS labeled **LIMS Administration**. The **LIMS Analyst** limits what actions can be performed by the analyst. **LIMS Administration** allows full access to client, sample and reporting information.

b) Laboratory records are maintained to ensure their availability for a minimum of seven (7) years after completion of the laboratory project.

c) Records are made available to the accreditation body.

d) AmTest SOP 3.21, *Records Maintenance and Storage*, clarifies that software and hardware systems are maintained to ensure that raw data are available for a period of not less than seven (7) years after completion of the laboratory project.

e) Copies of pertinent raw and processed data are maintained in electronic and/or paper format. Records retained include:

- A test method description and reference Sample ID
- Instrument identification
- A reference to the method SOP describing calculations on the raw data, verification of reported results and QC assessment
- Method performance and quality control expectations
- Analysts signatures, initials or electronic identification
- Documentation to support all aspects of sample handling to include preparation, cleanup, incubation periods, weights and instrument readouts
- Test results and record of responsible parties for laboratory records
- Documentation supporting reagent and standard history
- Calibration and calibration acceptance criteria
- Proficiency Test Results
- Record of demonstration of capability for all analysts

f) All hand written records are recorded in permanent ink and any errors in the documents are struck through with a single line and marked with the analysts' initials. If the reason for the correction is not obvious an explanation is provided.

g) In the event AmTest Laboratories ceases operation, all records will be turned over to the Laboratory Director and all clients will be notified.

4.14 INTERNAL AUDITS

Internal system audits of the laboratory systems are conducted as described below. In addition, internal performance audits are initiated to help resolve problems and confirm the efficiency of the testing system.

4.14.1 The laboratory QA Manager conducts internal system audits on select laboratory systems. These internal audit procedures follow these general guidelines:

- Selected systems are audited annually.
- The QA and Lab Managers conduct the audits.
- The audit consists of ordering a Performance Evaluation (PE) sample, tracking of the sample through the system, evaluation of sample results and a follow-up laboratory audit.
- System components to be audited include, but are not limited to:
  - (i) All documentation associated with sample and data handling.
  - (ii) Use of established, approved procedures as outlined in this QM.
  - (iii) Proper execution of established procedures.
  - (iv) Sample and data handling activities including:
    - [a] All sample log-in and disposal
    - [b] Sample preparations
    - [c] Method calibrations
    - [d] Sample analysis
    - [e] Data reduction, validation and reporting
    - [f] Preventative maintenance and repair procedures
    - [g] Standard and reagent preparations and storage
    - [h] Sample and waste disposal
    - [i] Container and labware decontamination
    - [j] QC management practices and assessment of analytical precision, accuracy and sensitivity.

4.14.2 See examples of typical audit checklists, Figure 4.6. A report is completed identifying deficiencies and corrective actions to be taken.

4.14.3 Deficiency lists and associated corrective action orders are formally distributed to responsible staff. Corrective actions are taken in a timely manner and all customers are notified in writing if the laboratory results were impacted.

4.14.4 Subsequent checks are made to verify the implementation and effectiveness of the corrective actions. Details are provided in section 4.11.

4.14.5 Additional items:

- The laboratory notifies clients immediately upon the identification of the need for corrective actions that affected the generated data.
- Management ensures that effective corrective actions have been instituted within the agreed upon time frame.
- Internal audits as described in this section are conducted annually.

4.15 MANAGEMENT REVIEWS

4.15.1 Management reviews are conducted according to SOP 2.04, *Quality System Management Review*. The QA Manager prepares a report summarizing the completion of items 4.14.1 through 4.14.5 including the completion date and responsible personnel for each of the activities. This report includes a summary of corrective or preventative actions, the results of inter-laboratory comparisons or proficiency tests, QC activities or staffing issues.

4.15.2 Management generates Performance reports daily and Efficiency and Spending reports weekly.

4.16 DATA INTEGRITY INVESTIGATIONS

See Section 5.2.6 for a description of the data integrity program. All investigations are conducted in a confidential manner. Investigations are documented and affected clients are notified.

5.0 TECHNICAL REQUIREMENTS

5.1 GENERAL

5.1.1 The laboratory recognizes that many factors affect the correctness and reliability of the tests that the laboratory performs, including:

- human factors
- accommodation and environmental conditions
- test methods and validation
- equipment
- measurement traceability
- sampling
- handling of test items

5.1.2 The laboratory takes into account these factors in developing test procedures, personnel training and equipment selections.

5.2 PERSONNEL

5.2.1 All laboratory personnel are required to maintain SOPs that pertain to the work they perform within the laboratory and laboratory analysts must perform initial and continuing demonstrations of proficiency according to Section 4.1.5 (g).

Qualifications for personnel performing specific tasks are based on education, experience and training procedures. All personnel must meet established minimum requirements to perform their assigned tasks of performing tests, evaluating results and certifying results. Personnel do not perform tests unsupervised without passing minimum training requirements. Position descriptions are maintained for each position and contain the minimum qualifications required for employment (see Section 5.2.4)

Managers responsible for interpreting results are knowledgeable of the test procedures, the intent of their use and typical interferences, requirements for their use and the significance of deviations from accepted protocols.

5.2.2 Personnel training are conducted according to SOP 2.06, *Laboratory Training System and Records Management*. All analysts engaged in analytical work are encouraged to complete additional training in method requirements for assigned analyses.

5.2.3 All tests performed by AmTest analysts are employed by AmTest Laboratories. Procedures for subcontracting environmental tests are provided in Section 4.5.

5.2.4 Summaries of the responsibilities of the laboratory personnel may be found in Section 4.1.5 (f) of this manual. Job descriptions are maintained for each position by the Lab Director.

The job/position descriptions include, where appropriate:

- Planning and performing tests
- Evaluation of test results
- Reporting opinions and interpretations
- Method modification and development and validation of new methods
- Qualifications and training programs
- Expertise and experience required
- Managerial duties

5.2.5 AmTest management ensures the competency of all who operate equipment, perform tests, evaluate results and sign test reports. Adequate supervision is provided for staff undergoing training. Personnel performing specific tasks are qualified on the basis of education, training, experience and/or demonstrated skills, as required.

5.2.6 Data Integrity Training

All employees of AmTest Laboratories are held to high professional ethical standards in the performance of their duties. All employees are required to read, understand and sign the 'Ethics Statement' attesting to their commitment to honesty and integrity in performance of their duties. In addition, all employees are required to attend an annual ethics training class. Improper, unethical or illegal actions will be dealt with according to the AmTest Employee Manual.

a) See SOP 2.05, *Code of Ethics*, for additional information.
b) The annual training includes protocols for reporting ethics issues, providing examples of ethical violations and reviewing the consequences of unethical behavior and resources where

additional information can be referenced. Training is updated each year, if necessary, to address current issues. All attendees of the training course are required to update their training files signifying they participated in the course.

5.3 ACCOMMODATION AND ENVIRONMENTAL CONDITIONS

5.3.1 Environmental controls in the laboratory are appropriate for the tests being performed. Environmental conditions that can affect test results are listed in the relevant SOPs. For each area that requires a controlled environment, the conditions are documented. Environmental factors such as light, temperature, ventilation and space are considered to allow tests to be performed safely and effective.

5.3.2 Environmental conditions are maintained to meet test procedure requirements and are controlled so as not to invalidate test results or increase measurement uncertainty. If it is determined that test results are being adversely impacted by the test conditions, the tests are terminated, corrective actions instituted and clients are notified of any impacted data.

5.3.3 The physical location of activities will be such that potential contamination will be minimized.

5.3.4 Access to all laboratories is restricted to authorized personnel and approved visitors. Visitors are supervised at all times.

5.3.5 All laboratory areas are maintained in a clean and orderly manner.

5.4 ENVIRONMENTAL TEST METHODS AND METHOD VALIDATION

5.4.1 Table 5.1 contains a listing of all chemistry analytes, preparative and analytical methods, matrices, accuracy and precision targets derived from LCSs or method requirements and MDL's/PQL's. Modifications to methods in Table 5.1 are summarized in the method SOPs. Details concerning the procedures used for validating methods and determining MDLs/PQLs are described in SOP 2.07, *Demonstration of Capability for Method, Instrument and Lab Staff*.

Table 5.2 contains the listing of all microbiology parameters and their associated matrices, methods and QA targets. Modifications to methods in Table 5.2 are summarized in the method SOPs.

MDLs are set such that the risk of reporting a false positive is less than 1%. MDLs are determined using the method specified in the Federal Register, 40 CFR Part 136 Appendix B, using LCSs prepared near the estimated detection limit as surrogates to estimate methodological noise for censored methods (e.g., chromatographic methods which censor analytical noise) or, for uncensored methods, using actual method blanks to directly measure methodological noise. Where the possibility exists for significant systematic bias from sample preparation and handling or from the analytical determinative step (typically inorganic analyses), bias is taken into account when calculating detection limits. Published MDLs may be set higher than experimentally determined MDLs to (1) avoid observed positive interferences from matrix effects or common reagent contaminants or (2) for reporting convenience (i.e., to group common compounds with similar but slightly different experimentally determined MDLs). MDLs are determined in a suitable analyte-free matrix when possible. For certain analytes and matrices, no suitable, analyte-free matrix may be available. In those cases, MDLs are determined in the absence of any matrix, but in the presence of all

preparatory reagents carried through the full preparatory and determinative steps. LOD verification procedures may be found in SOP 3.23, *Limit of Detection Verification*.

Practical Quantitation Limits (PQLs) are set at 3 to 5 times the reported MDL unless otherwise noted. Because PQL level checks are required, the practicality of the preparation of standards using commercial analytical mixes may dictate to some extent the reported PQL. Generally the PQL is not set at less than 3 times the MDL. However, in some instances, systematic bias (e.g., analyte background in reagents, etc.) necessitates that the reported MDL be elevated to levels that are readily quantifiable. In those instances, the PQL may be set at a level less than 3 times the reported MDL.

Except where specified in individual methods, the QA targets for all inorganic analytes are to be within the range of 80-120% for accuracy and <20 RPD for precision, unless laboratory-generated data indicate that tighter control limits can be routinely maintained. This convention was adopted due to the fact that targets set according to historical data are usually less stringent. The organic QA targets are likewise statutory in nature. Warning and control limits for organic analyses are initially set for groups of compounds based on preliminary method validation data. When additional data is available, the QA targets may be reconsidered. All QA targets are routinely re-evaluated at least annually (and updated, if necessary) against laboratory generated data to insure targets continue to reflect realistic, methodologically achievable goals.

The sources for these methods may be found in:

EPA

- Methods for Chemical Analysis of Water and Wastes; USEPA Office of Research and Development, Cincinnati, OH, 3/83; EPA 600/4-79-020.
- Methods for the Determination of Metals in Environmental Samples, USEPA Office of Research and Development, Washington DC, 6/91, EPA/600/4-91/010.
- Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, SW-846; USEPA Office of Solid Waste and Emergency Response, Washington DC.
- Code of Federal Regulations, Title 40, Part 136; U.S. Government Printing Office, Washington DC, July 2004.
- Methods for the Determination of Nonconventional Pesticides in Municipal and Industrial Wastewater; USEPA Office of Water, Washington DC, 8/93.
- Military Standard, 2041D (SH) Notice 2, Control of Detrimental Materials
- Test Methods for the Examination of Composting and Compost, August 2001.
- The American Association of State Highway and Transportation Officials Designation: T 288-12

FDA

- Bacteriological Analytical Manual (BAM), Rev 8, 1995, some updated Feb. 2013.

APHA-AWWA-WPCF

- Standard Methods for the Examination of Water and Wastewater, 18th, 19th, 20th Editions
- Standard Methods for the Examination of Water and Wastewater, online Edition.
- Association of Analytical Communities (AOAC), Official Methods of Analysis of AOAC International.

SOPs address all applicable aspects of the testing procedures including sample handling, transport, storage, preparation, calibration, test procedures, statistical techniques for evaluating data and measurement uncertainty.

5.4.2 Selection of Methods

The laboratory employs published analytical methods or methods that have been recognized to meet the needs of the client and is appropriate for the tests being conducted. Guidance will be provided by the laboratory when there is a question about the test method to be used. The laboratory will notify the client when an inappropriate method is requested.

5.4.3 When a new test method must be developed, validation procedures are followed as described in EPA and Standard Method sources mentioned above.

5.4.4 When it is necessary to use methods not covered by standard methods, the non-standard method will be subject to agreement with the customer and will include a clear specification of the customer's requirements and the purpose of the test and/or calibration. The non-standard method will be extensively validated to make sure the laboratory can perform to the customer's needs. The laboratory will record the results observed, the procedure used for the validation and a statement as to whether the method is fit for the intended use.

5.4.5 See 5.4.4 above.

5.4.6 For quantitative laboratory measurements, statistical quality control measures are used within AmTest to estimate the uncertainty associated with analytical methods. See SOP 3.24, *Estimation of Measurement Uncertainty*, for a complete discussion.

5.5 CALIBRATION REQUIREMENTS

5.5.1 All necessary equipment to perform the tests and associated calibrations for the methods in Table 5.1 are under the control of AmTest Lab management, and described in the lab's SOPs.

Instrumentation utilized by the microbiology laboratory for the determination of test parameters in Table 5.2 is described in the lab's Microbiology SOPs. Calibration requirements for lab instruments in Microbiology department are listed in Table 5.3.

5.5.2 The laboratory ensures that all equipment and associated software used by the laboratory meet the accuracy requirements and specifications of the test methods before being placed in service.

5.5.3 Supervisors ensure that all personnel have received adequate training on the use of laboratory equipment and that manufacturer's instruction manuals are easily accessible.

5.5.4 All equipment and instrument software, when necessary, is uniquely identified.

5.5.5 Records are maintained for all equipment and associated software including:

- Identity of the piece of equipment and associated software
- Checks that equipment meet specifications
- Location of the equipment
- Calibration records
- Maintenance logs

5.5.6 All maintenance or repair to equipment is documented in laboratory logbooks. Documentation includes a description of the problem(s), work performed, date and analyst's initials. Sample analyses' plans for instrument failure or maintenance are handled in this order: use backup instrument (if available), delay the analysis if holding time can be met, postpone the scheduled sampling or send samples to contract laboratory.

5.5.7 Any equipment found to be unserviceable is tagged with an "Out of Service" tag if it is shared by multiple analysts or will be out of service for an extended period. If the damaged equipment is used only by a single analyst and the condition is temporary (a service call has been made), then the supervisor may elect to notify staff directly rather than tag the equipment.

5.5.8 All support equipment requiring calibration is labeled or otherwise documented to indicate that calibration has been performed and when it is next due.

5.5.9 The calibration of all instruments will be verified following instrument maintenance.

5.5.10 See the calibration procedures in the associated test SOPs that detail the type of checks and the frequency to verify continued calibration.

5.5.11 Any allowable correction factors, e.g. thermometer calibrations, which require the readout to be adjusted, will be clearly labeled and positioned for easy access by the analyst.

5.5.12 Only authorized personnel are allowed access to the laboratory to avoid tampering with the instrumentation.

5.5.13 Additional Requirements and Clarifications

5.5.13.1 Support Equipment (i.e. balances, ovens, refrigerators, etc.)

- All support equipment is maintained in proper working order.
- Maintenance or repair to equipment is documented in a laboratory logbook. Documentation includes a description of the problem(s), work performed, date and analyst's initials.
- Calibration procedures for support equipment are found in SOP 2.08, *Gravimetric Analysis: Analytical Weight and Balance Calibration*, and the test SOPs.
- Calibration checks are conducted against nationally recognized standards.
- Calibrations or verifications are checked against the required specifications for the use of the equipment. If the calibration or verification results are not within the required specifications equipment is removed from service until repairs can be made.

- Correction factors to be applied associated with the results of any thermometers are clearly labeled and positioned for easy access by the analysts.
- Pipets are calibrated at least quarterly according to SOP 3.16, *Using and Calibrating Pipettors*.

5.6 MEASUREMENT TRACEABILITY

5.6.1 This section of the ISO standard (2005) is not applicable to environmental testing.

5.6.2 This section of the ISO standard (2005) is not applicable to environmental testing.

5.6.3 Reference Standards and Reference Materials

5.6.3.1 Reference Standards

Standard sources, preparation frequency, storage and traceability are detailed in the method SOPs and Table 5.4.

5.6.3.2 Where possible, Reference Materials are traceable to NIST or EPA.

5.6.3.3 Intermediate checks

Continuing calibration checks are conducted according to the technical SOPs.

5.6.3.4 Standards are stored as specified in Table 5.4 and the method SOPs.

5.6.4 Additional Requirements and Clarifications

5.6.4.1 The laboratory participates in WADOE proficiency testing. The Lab Manager and QA Manager oversee the proficiency testing program.

5.6.4.2 All purchased reagents and solvents are dated upon receipt. The reagents and solvents are also dated by the analyst with the date they are opened. Analysts are responsible for keeping track of expiration dates and when getting low on reagents, standards or solvents. Commonly used laboratory consumables such as gloves, centrifuge tubes, pipette tips etc. are maintained by Purchasing Agent. The preparations of laboratory standards from primary stock standards, neat compounds or reagents are documented in laboratory notebooks. Standards, reference materials and reagents shall not be used after their expiration dates unless their reliability is verified by the laboratory. Table 5.5 lists the location and storage of reagents used by the Chemistry and Microbiology departments.

5.7 COLLECTION OF SAMPLES

AmTest Laboratories does not provide field sampling services. The laboratory does provide sample containers (sampling kits) to its customers on request.

5.7.1 Sampling details such as the choice of container materials, sample volumes, preservation techniques and holding times for analytes are described in SOP 3.17, *Manual on the Collection and Preservation of Samples* (technical) or Sample Collection Procedures (for homeowners).

5.7.2 Deviations from documented sampling procedures are documented in the field as comments on the submittal form which is part of the chain-of-custody for the samples. Depending on the nature of the deviation, the change is recorded as a non-conformance and a non-conformance report is included with the sample report. The sample data will be rightfully qualified by the laboratory to accurately reflect the nature of the deviation.

5.7.3 All submittal forms include the date and time of sample collection. Deviations from documented sampling procedure are documented at collection as described in section 5.7.2.

5.8 HANDLING SAMPLES AND TEST ITEMS

5.8.1 See section 4.13.3 (a) and SOP 1.03, *Log-in and Tracking of Samples*. All calibration standards, whether purchased or prepared are tracked in analysts notebooks. Calibration standards are disposed of upon expiration (see section 5.6.4.2) while samples are disposed approximately 2 months after reporting data.

5.8.2 Sample location can be tracked from LIMS workstations by determining which analyst last had the sample. Samples are stored in limited areas, separate from all standards and reagents:

a) Air conditioned room: metal samples and others not requiring refrigeration.
b) Log-in walk-in refrigerator
c) Microbiology refrigerator
d) Semi-volatile sample refrigerator
e) VOC sample refrigerator

5.8.5 Additional Requirements – Documentation

For both chemistry and microbiology, each sample is assigned a unique sample identification number with the format YYA-#, where YY is the last two numbers of year sample submitted, A refers to chemistry lab sample, while M refers to microbiology sample and # is an accession number assigned by LIMS. Sample ID number is written on appropriate sample in permanent felt tip marker (Sharpie™).

5.8.6 Sample Acceptance Policy

Samples arriving at AmTest Laboratories are evaluated at the time of receipt. The sample must meet certain requirements in order to be processed in the laboratory. If some of the requirements are not met, the customer is notified of the discrepancy by the log-in staff and a Non-conformance comment is noted on COC. For Microbiology samples, log-in staff contacts the Micro. Department staff with notification of the types of samples received.

The Log-in staff member inspects the samples for damage and sustained holding conditions and, if anything is improper, notes it on the chain-of custody or drinking water form. For short hold samples, the analyst is informed and appropriate action is taken. Samples must meet the following requirements or they will be subject to rejection:

- The labels and writing on the containers must be waterproof so that the containers can be correctly identified upon receipt at the lab.
- There must be a unique identifier on each container.

- The information on the submittal form must coincide with that on the containers. Examples of the submittal form supplied by AmTest Laboratories are given in Figure 4.3. The minimum information required includes:
  a) a unique sample location/field ID combination
  b) the date and time of sample collection
  c) the collector's name
  d) Customer/Project information for billing and report mailing
  e) a sample matrix
  f) the analyses requested

- The containers must be preserved properly.
- The samples must be collected in the appropriate type of container.
- There must be sufficient volume for analysis
- The samples must be delivered to the lab with sufficient time remaining for the laboratory to meet analytical holding times.

If the information provided is insufficient to correctly process the samples an effort is made to reach the collector by phone. If the information cannot be obtained in a timely manner, the samples are subject to rejection.

5.8.7 Sample Receipt Protocols

5.8.7.1 At the time of receipt, log-in staff checks the temperature of the sample(s) inside the cooler(s). The log-in staff verifies the submittal form information against the sample bottles; any discrepancies are resolved. The pH of preserved samples is checked by a sample custodian prior to sample log-in. The sample is checked for sufficient volume. Sample integrity such as improper temperature and pH preservation, insufficient volume, leaking or broken bottles etc., are entered into a non-conformance report in the LIMS as well as documented on the chain-of-custody form with the log-in staffs initials. The VOC vials are checked for the presence of bubbles by log-in staff.

5.8.7.2 See section 4.2.4 for procedures associated with non-conformance that may affect data quality.

5.8.7.3 The samples are logged into the LIMS with all the information listed above from the submittal form plus the following:

- mode of sample delivery (e.g. common carrier, Federal Express, client, etc.) and delivery date
- field comments (if available)
- lab comments (if available)
- sample storage location in the laboratory
- name of the log-in person
- type of sample (soil, water, drinking water, misc)

Samples are assigned to analysts by the generation of worklists or backlog reports as appropriate.

SOP 3.17, *Manual on Collection and Preservation of Samples* describes the list of acceptable sample containers, preservation techniques and holding times for samples received by the laboratory.

5.8.7.4 Copies of the submittal form and any field sheets are scanned into the LIMS computer and the file is named using the sample ID number. The originals of the submittal form, bench sheet and other related documents are given to the appropriate Project Manager to be filed when analyses is complete.

5.8.7.5 Sample custody procedures are described in section 4.13.3. Figure 4.3 shows examples of submittal forms used as transmittal forms for routine sample custody and documentation of custody. The information on the submittal form must coincide with that on the sample containers and include elements listed in section 5.8.6.

5.8.8 Legal chain-of-custody procedures are described in section 4.13.3.

5.8.9 Additional Requirements – Sample storage and disposal

Samples, sample fractions, extracts and digestates are stored according to the method SOPs storage instructions. The manner of storage prevents cross contamination and isolates the samples from standards, reagents and food.

Completed samples that have been reviewed are disposed of. Samples flagged as hazardous are disposed of according to Table 4.3. Nonhazardous aqueous samples are poured down the sink flushing with plenty of tap water. Non-hazardous solid samples are disposed of in the garbage. Disposal of all samples is documented on the LIMS Log-in sheet with the sample custodian's name and date.

5.9 QUALITY ASSURANCE FOR ENVIRONMENTAL TESTING

5.9.1 The laboratory has an established quality control program for monitoring the performance of test methods conducted under this manual. The types of quality control (QC) checks and the frequency at which they are performed are listed in the method or test SOPs. A batch of samples consists of 20 or fewer samples that are prepared and/or analyzed in a single run.

The QC objectives are considered when selecting methods and in evaluating the capability of the laboratory to handle sample loads that meet the QC objectives.

a) Calibration standards are checked against certified reference materials or other independently prepared standards where available.

b) The laboratory is a participant in performance testing studies. See section 5.6.4.1.

c) Replicate analyses are used to evaluate precision. Precision is expressed by the relative percent difference (RPD) to compare duplicate samples/spikes A and B and is based on the formula:

$$RPD\ (\%) = \frac{|A - B|}{(A + B)} \times 100$$

Precision may be determined from duplicate authentic samples, from duplicate LCSs or from matrix spike duplicates. Where RPDs are calculated based on matrix spike duplicates, A and B represent the raw results of the spiked sample (spike plus the background).

d) The accuracy of the test method is assessed in terms of percent recovery for LCSs (fortified blanks) and matrix spikes to evaluate matrix impact.

Percent Recoveries for an LCS (LFB = lab fortified blank) is calculated as:

$$\% \text{ Recovery} = \frac{SC}{EV} \times 100$$

or for Matrix Spikes as

$$\% \text{ Recovery} = \frac{SC - UC}{EV} \times 100$$

where:

SC = Concentration in the spiked sample
UC = Concentration in the unspiked sample (in the case of results below the MDL for the unspiked sample zero is used as the concentration)
EV = Expected value

5.9.2 Control charts are used to monitor quality control samples, duplicates and matrix spike duplicates. The laboratories control charts are based on Shewhart control charts with ± 3 standard deviations. Warning and control limits are calculated when at least seven or more data points are available.

They may be updated when:

a) a minimum of at least 7 new data points are available;
b) significant changes are made to the instrument or analytical method;
c) the charts have not been updated in the last 6 months.

The user selects at least 7 new, or most recently generated data points (accuracy or precision). The LIMS program calculates control limits based on approximately three standard deviations from the mean. In general, the laboratory utilizes method or laboratory defined control limits for reporting data (i.e., statutory control limits). Those statutory limits may be modified utilizing statistical information collected over time. The precision and recovery data are used for the diagnosis of analytical problems.

Standard deviation, mean, upper and lower control limits are calculated using the following equations (also see SOP #3.24, *Estimation of Measurement Uncertainty*):

a) Standard Deviations equation

$$S = \sqrt{\left[\sum^{n}_{i-1} P^2_i - (\sum^{n}_{i-1} P_i)^2 / n\right]/n-1}$$

where:

S = standard deviation
n = total number of point
P_i = the value for each point

b) The mean is calculated as the average of all points:

$$X = \frac{\sum^{n}_{i=1} X_i}{n}$$

c) For recovery, the upper and lower control limits are based on a 99% confidence level.

$UCL = P + t_{0.99}S$
$LCL = P - t_{0.99}S$

Where $t_{0.99}$ is student's t factor for 99% confidence, respectively.

5.9.3 Essential Quality Control Procedures

(a) Standard Quality Controls

Standard quality controls include the following essential controls:

i) Positive and negative controls (LCS and method blanks)
ii) Controls to evaluate the variability, repeatability of the test (replicates/duplicates)
iii) Test method accuracy (calibrations, continuing calibrations, certified reference materials, PT studies and matrix spikes)
iv) Measures to evaluate test method capability

- Detection Limit Studies
- Determination of Quantitation Limits
- Range of applicability

Method Detection Limits (MDL and Practical Quantitation Limits (PQL))

The Method Detection Limit (MDL) and Practical Quantitation Limit (PQL) are defined and used for the same objectives in all analyses. However, because of differences in the nature of various analyses, the calculation procedures vary; nevertheless, the underlying principles and concepts are applied uniformly. Described below are the most representative procedures used in this laboratory. Details of calculations for each analytical method may be found in the laboratory's SOPs.

- The MDL is defined as the minimum concentration of an analyte that can be measured by the method with 99% confidence of its presence in the sample matrix. For measurements that always produce a measureable analytical signal in method blanks (e.g., inorganic parameters) that are near or above the signal produced at an estimated detection limit, MDLs may be determined from a sample containing analytes of interest and carried through the preparation procedure. A sample is analyzed, if the measured level of analyte(s) is in the recommended range of 1 to 5 times (for Standard Methods) or 2-3 times (for EPA Methods) the estimated detection limit. The sample is then analyzed 6 more times. If the measured level of analyte(s) is less than the estimated detection limit then a known amount of analyte(s) is added to bring the level between the estimated detection limit. If the measured level is greater than 5 times (for Standard Methods) or 3 times (for EPA Methods) the estimated detection limit there are two options:
  1) Another sample is found with lower levels of analyte(s) or
  2) Dilute sample with reagent water.

See the next paragraph for how to calculate MDL value.

For measurements that do not produce an analytical signal in method blanks (e.g., organic parameters and some inorganic parameters) MDLs are established by preparing a laboratory standard (analyte(s) in reagent water) at a concentration of 1 to 5 times the estimated IDL for Standard Methods or 2 to 3 times for EPA Methods, per 40 CFR part 136 Appendix B. Seven replicates of the laboratory standard are analyzed and the MDL is determined by multiplying the students T value (t = 3.14 for seven replicates) by the resulting standard deviation of the measured concentrations of the replicates. Calculate the MDL as follows:

$$MDL = (t) \times (S)$$

where:

t = students' t value for a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom [t = 3.14 for seven replicates]
S = standard deviation of the replicate analyses

Note: Tables 5.1 and 5.2 are updated annually so the MDLs used by the laboratory may sometimes vary with those listed in both tables.

- The PQL is the lowest level of concentration that can be reliably achieved within specified limit of precision and accuracy during routine laboratory operating conditions. This laboratory sets the PQLs at 3 to 5 times the MDL depending on the method of analysis and the analyte, unless otherwise specified.
- A System Performance Check is defined as the procedure in which a standard consisting of one or more analytes is introduced into the analytical system to verify its performance (response, peak shapes, retention times or spectra) meets the minimum acceptable criteria. See SOP 3.23, *Limit of Detection Verification*.

v) All chemical reagents and standards are purchased from reputable vendors with the proper specifications to grade and purity to ensure performance within the appropriate and test method specifications. Table 5.5 refers to reagent storage.

vi) Selectivity is evaluated by employing method requirements and practices established by the laboratory detailed in the test SOPs to confirm responses to the analyte. Checks used include dual column confirmation, inter-element interference checks, retention time windows, mass spectral tuning and method blanks.

vii) All test conditions are monitored and documented where required by the method to ensure constant, consistent and documentable conditions.

(b) QA targets and their use are provided in Tables 5.1 and 5.2. QC data are considered acceptable if the following conditions are met:

Lower Control Limit (LCL) ≤ QC Result ≤ Upper Control Limit (UCL)

Each analyst is responsible for assuring that the results of each analytical measurement has all the required QC results and that said results have been evaluated. The analyst is responsible for checking calculations, completing sample preparation, calibration, analyses and instrument logs. All written records and logs must be made using indelible ink and must include the analyst's signature or initials. The front inside cover must contain the signature, printed name and initials of any analyst that uses a log or notebook. Any corrections to written records must be made using a single strikeout of the original entry. The corrected entry must be dated and initialed by the individual making the correction. No correction fluid or obliterations will be allowed to written records.

The Lab Manager or the Lab Director is responsible for reviewing worklists for completion and correctness prior to authorizing the individual results or release.

The data verification procedures consist of all the QC validations and calculation checks discussed above. In addition, the value of all data is evaluated by the nature of the sample, the inter-relationship among the parameters and the historical values if available, etc. Any discrepancy or inconsistency will initiate a recheck of data or reanalysis of the sample(s).

5.10 REPORTING RESULTS

5.10.1 Test results are reported accurately, clearly and objectively and contain all method required information, reporting requirements of the TNI standards and requirements of WADOE.

5.10.2 Test reports contain all of the information required in 5.10.2 of ISO/IEC 17025:2005.

Once all the samples within a project have been reviewed by the analysts, the managers are responsible for reviewing and authorizing the project for release. After the project is authorized, reports are generated within LIMS.

Once the review is completed, the report is certified in LIMS. After certification of reports, one copy of the project analysis report is printed with an electronic signature and retained, with the original submittal form, in the laboratory. A *.pdf file of the signed report is automatically created and, along with a *.pdf of the sample submittal form, and any associated paperwork (e.g. reports received from a subcontract laboratory), the complete report is transferred to a computer directory accessible to the

client. All final sample results with associated QC data are archived together in the LIMS committed database and can be retrieved in the future if necessary.

If any analyses or preparations exceed holding time before completion, the results are automatically qualified. See SOP 3.25, *Reporting Qualified Data*, for the laboratory data qualification policies. Results associated with quality control data that are outside the acceptance criteria are qualified with"#".

An appropriate comment is used to qualify results whenever:

1) batch or sample specific quality control results for an analyte cannot be realistically assessed (e.g., due to excessive analyte levels in a matrix spike);
2) quality control data indicate the uncertainty associated with the measurement(s) is outside acceptable limits;
3) sample matrix presents an unusual challenge to a method or instrument. The decision to qualify a result on these factors is at the discretion of the authorizing supervisor and must comply with SOP 3.25, *Reporting Qualified Data*.

5.10.3 Test Reports

5.10.3.1 Content in addition to the requirements of 5.10.2

a) Any deviations from the test method or any conditions affecting the reported results are described in the final report.

b) Any non-conformances to the procedures in this manual or to the test method are identified in a report comment or a non-conformance report. See SOP 3.19, *Non-Conformance Reporting System*.

c) If requested, a quality report is produced including results for method blanks, laboratory control samples (accuracy and precision), matrix spikes (accuracy and precision), surrogates (accuracy) and calibration verification samples (accuracy).

d) See SOP 3.24, *Estimation of Measurement Uncertainty*, for reporting of measurement uncertainty. All reports indicate that uncertainty associated with the analytical results can be estimated from the reported quality assurance results and from published test performance acceptance criteria.

e) See section 5.10.5 below for opinions and interpretations.

f) Additional information required by specific methods and clients will either be provided in the report as deemed necessary or communicated directly to the client.

5.10.3.2 An electronic copy of the report, along with copies of the submittal form is provided to the customer or submitting agency. Sampling records and comments are limited to the submittal forms provided by the sampling party or agency to the laboratory.

5.10.4 Calibration Certificates as addressed in ISO 17025 are not applicable to environmental testing.

5.10.5 Laboratory test data will be qualified according to SOP 3.25, *Reporting Qualified Data*. Upon request, lab managers can assist clients in interpreting data reported by the lab. Such consultation will be conducted (and documented where appropriate) directly with the client.

5.10.6 Analyses performed by a subcontract laboratory are clearly identified on the test report. See section 4.5 for additional information.

5.10.7 Electronic Transmission of Results

Although the laboratory may transmit data in various electronic formats to clients upon request, the laboratory considers that only the report with a signature represents the official analysis report.

5.10.8 Report contents are uniform and designed to present the required test information to the client so it is easy to read and understand.

5.10.9 Amendments to Test Reports

Required amendments to test reports will consist of a recreation of the entire report. The amended report is identified as such and the original report is referenced.

5.10.10 Exceptions

All reports are created following the same procedures. Abbreviated reports are not created for any sample analyzed by the laboratory.

5.10.11 Additional Requirements

a) A preparation and analysis log is included with each test indicating the prep and analysis data of each sample. If the activity (preparation or sampling) has a holding time of 72 hours or less the time of the activity is included.

b) Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight value. This information is provided in the remarks section of the analytical report.

c) Numeric results outside of the calibration range, where possible, are diluted and re-analyzed. In situation where this is not possible the reported results will be qualified according to established laboratory data qualification protocols. See SOP 3.25, *Reporting Qualified Data*.

APPENDIX A

ROLES AND RESPONSIBILITIES FOR THE LABORATORY

The implementation of safety, security and chemical hygiene procedures is the responsibility of all laboratory staff. The following subsections describe specific safety and chemical hygiene responsibilities for AmTest Laboratories. It is the responsibility of all laboratory staff and their managers to know and follow the provisions of this plan. Responsibilities are listed by title.

1.1 Laboratory Director

The Laboratory Director is responsible for ensuring that this administrative practice is followed by all users and that resources and support are provided for the implementation of this plan and the requirements outlined therein. The following tasks are the responsibility of the Laboratory Director:

- Responsible for the health and safety of personnel.
- Responsible to ensure all recognized hazards are promptly addressed.
- Interact with laboratory management and personnel to ensure that CHP (Chemical Hygiene Plan) procedures are understood and followed and assistance or resources are provided as needed.

1.2 Laboratory Manager

The Laboratory Manager (LM) is responsible for the daily operation of the laboratory and daily execution of the Chemical Hygiene Plan as it relates to the laboratory's activities. The following tasks are the responsibility of the Laboratory Manager:

- Ensure that the lab has required safety supplies and equipment necessary to handle emergency situations (e.g. chemical spills).
- Ensure that staff is familiar with the CHP and routinely follow the requirements and procedures.
- Ensure that safety equipment is checked and ready for use.
- Ensure that security requirements are met as specified in the Security Plan.

1.3 Chemical Hygiene Officer

The Chemical Hygiene Officer (CHO) position is held by an individual who has the knowledge and competence to develop and implement this plan, as qualified by appropriate levels of education, training and experience. The CHO must have the ability to use appropriate equipment and testing procedures to anticipate, identify and evaluate health, safety and environmental hazards, as well as the ability to suggest means for reducing those risks. The following tasks are the responsibility of the CHO:

- Develop, implement, technical support and review of the Chemical Hygiene Plan (CHP) in conjunction with the Laboratory Manager.

- Responsible for the CHP with full authority to prepare and enforce safety policies.
- Investigate reports or situations of non-conformance with CHP requirements.
- Audit the laboratory functions for compliance with the CHP and Occupational Safety and Health (OSHA) regulations and other requirements for laboratory procedures.
- Determine the level and type of personnel protection equipment (PPE) required for the various procedures performed in case of emergency situation or clean-up.

APPENDIX B

CHEMISTRY ESSENTIAL QUALITY CONTROLS

1.0 INTRODUCTION

This section details the Quality Controls used by AmTest Laboratories for chemical testing. Observance of the Quality System detailed in the Quality Manual will ensure that all the QC checks addressed in this appendix are being followed.

2.0 SCOPE

This section lists the essential quality control procedures performed by AmTest Laboratories for all testing where applicable. Additional requirements detailed in the applicable regulations, tests are also followed.

3.0 TERMS AND DEFINITIONS

The relevant definitions from The NELAC Institute Standard, Volume 1, Module 2, Section 3.0 are the preferred references. See TNI Standard. Definitions related to this document that are used differently or do not exist in the above references are defined in the text.

4.0 METHOD SELECTION

AmTest primarily uses Standard Methods and EPA Methodologies (where available) acceptable to our clients and in compliance with regulatory requirements. Supporting information may be found in section 5.4 on environmental methods and method validation.

Test method quality controls, QC outlined in the test SOPs and other requirements are followed for all tests where applicable. If no QC exists in a method used by the laboratory, checks are instituted from a similar method where available.

5.0 METHOD VALIDATION

5.1 Validation of Methods

a) Methods are validated by performing MDL determinations, evaluating precision and bias, analysis of Performance Test (PT) sample and employing and achieving method criteria for checks such as mass spectral tuning and retention time windows. See SOP 2.07, *Procedure and Policy for Method and Instrument Validation*.

b) New methods, non-standard methods and laboratory designed methods are validated to confirm that the methods are fit for the intended use. The validation procedures are conducted according to SOP 2.07.

5.2 Method Detection Limit and Quantitation

Procedures are documented for each quality system matrix.

5.2.1 All sample processing and analysis steps are included in the test determination and are documented. Test methods utilized by the laboratory will provide a MDL that meets the objectives of the analytical project.

a) The MDL is determined for each matrix/technology/analyte by the protocol stipulated in the test method or appropriate regulation. In the absence of this information it is performed as detailed in Section 5.4 and 5.9.3 of the general requirements module.

b) The MDL verification is conducted according to SOP 3.23.

c) An MDL study is not to be conducted if spiking solutions or QC samples are not available.

d) The MDL is determined in a matrix free of interferences, where available.

e) The MDL is performed each time there is a change in how the method is performed or when an instrumentation change impacts the sensitivity of the method.

f) The MDL is verified annually for each matrix, technology and analyte.

5.2.2 Limit of Quantitation

The established Limit of Quantitation (LOQ) shall be the same as or above the MDL.

5.3 Evaluation of Precision and Bias

(a) Precision and bias is evaluated according to SOP #3.24, *Estimation of Measurement Uncertainty*. Initial precision targets are established from the demonstration of capability or method validation and limits may be updated as more data is generated.

(b) Procedures for assessing precision and accuracy for non-standard methods are described in QA Manual, Sections 5.4 and 5.9 and the QC from the SOPs associated with the individual tests. If there are variations on how the QC is assessed due to the unique nature of the tests they are discussed in the appropriate SOP. Precision and bias are evaluated against test method, client or contractual targets and laboratory established targets. Precision and bias are evaluated over varying analyte concentrations defined as high, mid, or low, depending on what portion of the calibration curve the check concentration falls. The assessment of precision and bias is done independently for each quality system matrix and each analyte is assessed through the entire measurement system.

(c) The range of applicability is determined as detailed in QA Manual, Section 5.4.

(d) Method validation protocols detailed in SOP 2.07, *Procedure and Policy for Method and Instrument Validation*, are also used for precision and bias assessments.

5.4 Evaluation of Selectivity

All analytical method and checks identified in the associated test procedure SOPs are used to evaluate selectivity. These checks include, but are not limited to, mass spectral tuning, retention time windows, second column confirmation, interference checks and method blanks.

6.0 DEMONSTRATION OF CAPABILITY

6.1 General

Demonstrations of Capability (DOC) are documented electronically in Certification Statement and in SOP 2.07. All supporting data related to the demonstration of capability is retained and easily accessible.

6.2 Initial DOC

Initial demonstration of capability are performed for all analytes and methods prior to use of the method and if there are any changes in instrument type, personnel, test method or anytime the test method has not been performed by the laboratory or analyst in a 12 month period.

6.2.1 Records of the initial demonstration of capability include at a minimum the requirements of section 1.6, Volume 1, Module 4 of the TNI standard.

6.2.2 Procedures for conducting the Initial Demonstration of Capability

a) The Initial Demonstration of Capability is performed as stipulated in section 1.6.2, Volume 1, Module 4 of the TNI standard.

b) The test is repeated for either the failed analyte(s) or all of the parameters of interest when there is a failure of one or more of the established test acceptance criteria.

c) Repeated failures trigger corrective actions to remedy problems with the measurement system.

d) An initial demonstration of capability is performed whenever an analyte is added to an existing accredited test method.

6.3 On-going DOC

6.3.1 On-going demonstration of capability is conducted annually (at least once every 12 months) by laboratory analysts by successfully analyzing either:

a) another initial DOC;

b) a blind sample (single blind) or successful analysis of a blind performance sample;

c) four consecutive laboratory QC or laboratory control samples (LCS);

d) greater than 95% success rate for all LCS samples (N>20) analyzed in a prescribed period within the previous 12 months; for example, depending on the analysis, the prescribed period could be a month, a quarter (3 months) or 6 months;

e) 95% confidence limits for all LCS samples reported by an analyst during a prescribed period within the previous 12 months that fall within the long-term statistical limits established for the method (and within required method performance limits, if available);

f) no more than one LCS failure ($5 < N \leq 20$) in the previous 12 months;

g) an authentic sample that has been analyzed by another trained analyst.

If an analyst fails to demonstrate on-going capability using the criteria listed above, then the analyst must complete a successful initial DOC to demonstrate capability.

6.3.2 Documentation for only one test method is maintained for similar test methods using the same technology. For example, EPA test method 1311 (TCLP) and 1312 (SPLP) are considered similar methods because they differ only in the leaching solution. For some methods it is not feasible or practical to include all analytes in the blind performance samples, LCSs or authentic sample. If an analyst is demonstrating on-going capability using one of those samples and an analyte was not added or present in the sample, the analyte must still be reported by the analyst. Acceptability of results for analytes not added or present in on-going capability demonstration sample shall be based on the Lab Manager's judgment (either using non-detection as a criterion or, if the amount is judged to be a co-contaminant, based on comparability of results produced by other experienced analysts).

7.0 TECHNICAL REQUIREMENTS

7.1 Initial Calibration

7.1.1 Calibration and standardization procedures, frequencies and documentation protocols for instrumentation are found in the technical SOPs found on the AmTest "Cloud".

It is the laboratory's policy that method calibration requirements will be followed if more stringent than those described in this manual.

Protocol for Determining the Test Method Range of Applicability:

During the development of new test methods and during initial demonstrations of capability (method validation studies), an evaluation will be made of the dynamic range over which the method is applicable. That evaluation will take into consideration the type of calibration protocol (linear, nonlinear), the change in sensitivity over the tested calibration region, the detection limit of the method and the limit of quantitation. Once a valid range of applicability is established, calibration standards will be used to bracket the range over which quantitation will occur. Results reported from data that were generated outside the determined range of applicability will be flagged as estimates (unless the sample was diluted prior to analysis in order to bring concentrations within the established test method range of applicability).

During the establishment of the test method range of applicability, calibration standards will be prepared and analyzed over the estimated or published range of applicability. If a linear calibration protocol is to be used, either a) the correlation coefficient of the calibration values plotted against their respective response factors must be greater or equal to 0.995, b) the relative response factors (response factor/calibration value) over the range of calibration must have a relative standard deviation of less than or equal to10% or c) conditions for linearity specified in the applied, published method must be met. If the above conditions are not met, either the linear dynamic range must be decreased until those conditions are met or a non-linear calibration protocol must be used. Whenever a non-linear calibration protocol is utilized, a minimum of 5 calibration points must be defined for a second order fit; a third order fit requires a minimum of 6 calibration points. When using non-linear calibration procedures, loss in sensitivity ($\triangle$ response/$\triangle$ concentration) can occur at high concentrations. To ensure that data results are not reduced in regions of poor sensitivity, control standards must be analyzed at the highest point of the nonlinear calibration curve during method validation and must meet the reference method acceptance criteria for calibration. The lower limit of

the test method range of applicability is normally established at the method detection limit. The initial demonstration of capability includes establishment of the method detection limit and lower limit of quantitation.

7.2 Continuing Calibration

Acceptance criteria for continuing calibration are outlined in the laboratory's technical SOPs. These criteria follow the requirements described in Section 1.7.2 of the 2009 TNI Standard, Volume 1, Module 4.

7.3 Quality Control

Quality control checks are detailed in the test SOPs and QC SOPs associated with the test type. The QC types addressed are:

7.3.1 Negative Controls

a) Method blanks are analyzed with the same procedure and test conditions as the test samples and are used to assess possible contamination during the sample preparation and processing steps. Corrective actions associated with a contaminated blank will include reprocessing the associated batch samples or qualifying all of the associated prep batch samples according to the procedure given in SOP 3.25, *Reporting Qualified Data*.

b) Method blanks are performed at a minimum of one per prep batch and consist of a quality system matrix that is similar to the associated samples that are known to be free of the analytes of interest. In instances when no readily available and economical analyte free matrix can be identified at the levels of detection required to satisfy client objectives laboratory grade water will be used.

c) Method blanks are not applicable to certain tests.

7.3.2 Positive Controls

7.3.2.1 The LCS (Laboratory Control Sample = LFB-Laboratory Fortified Blank) is taken through the entire preparation and analysis procedure and the results are compared against established acceptance criteria. Results outside of the acceptance criteria are re-analyzed or qualified according to SOP 3.25.

7.3.2.2 LCSs are performed at a minimum of one per preparation batch. LCSs are not applicable to analytes for which no spiking solutions are typically available such as total suspended solids, total dissolved solids, color and turbidity.

7.3.2.3 The LCS is prepared by spiking a known concentration of analyte into a quality system matrix known to be free of the analyte of interest or it may be a media containing a verified concentration of the analyte. The analytes to be spiked are those specified by the test method or in the absence of this information in the method:

a) The analytes selected represents the chemistries and elution patterns of the reported components.

b) For multi-component tests the number of analytes spiked conforms to the TNI Standard and the laboratory ensures that all targeted compounds are spiked over a two year period.

7.3.3 Sample Specific Controls

These controls document the effect of the matrix on the method performance and are not a measure of laboratory performance. The results of these control samples are evaluated and documented.

7.3.3.1 Matrix Spike; Matrix Spike Duplicates

a) Corrective actions for results outside of routine performance specifications include qualifying the impacted sample. See SOP 3.25, *Reporting Qualified Data*.

b) The procedure for determining the spiked analytes is the same as for the LCS given in section 7.3.2.3 above.

7.3.3.2 Matrix Duplicates

These are sample duplicates that are taken through the entire analytical process – except for in-bottle digestions (e.g. some low-level mercury analyses) where a sample is split into matrix duplicates after digestion. These checks are only performed when there is a good chance that the target analyte is present. The RPD of the duplicates is calculated and compared to established acceptance criteria or method requirements.

7.3.3.3 Surrogate Spikes

Surrogates are added prior to extraction and are used for all appropriate tests. The surrogates used represent the chemistries of the targeted compounds of the method. Results are compared to method requirements and historical laboratory performance. Corrective actions include qualifying the individual samples when surrogate recoveries are outside of the established range.

7.3.4 Protocols for data reduction are in Section 5.9.3 (a) (v) of the general requirements module and the individual test and supporting SOPs. All data reduction procedures are documented.

7.3.5 Reagent Quality, Water Quality and Checks

(a) Reagent grade chemicals are used for all tests where the test method does not specify the reagent purity. Reagent purity requirements within the test method are followed. All purchased reagents and solvents are dated upon receipt.

(b) Water sources are monitored through the use of method blanks. Corrective actions are immediately taken when blank contamination is attributable to the water source.

(c) Titrant concentrations are verified and documented according to procedures identified in the test method SOPs.

7.3.6 Selectivity is evaluated by following all required checks within the test method and the AmTest test SOP.

7.4 Data Acceptance/Rejection Criteria

7.4.1 Negative Controls – Each method blank is evaluated to determine the impact on the associated sample batch. See the test method SOPs and SOP 3.25, *Reporting Qualified Data* for corrective actions and documentation associated with method blank contamination.

7.4.2 Positive Controls – LCSs

a) The result of the LCS is calculated according to Section 5.9 of the QA Manual and compared against established acceptance criteria. The result of the calculation is documented.

b) The protocol for allowable marginal overage is described as follows: "If a large number of analytes are in the LCS, it becomes statically likely that a few will be outside control limits. This may not indicate that the system is out of control, therefore corrective action may not be necessary," from *Section 1.7.4.2 of the 2009 TNI Standard, Volume 1, Module 4*. Further details are provided in SOP 3.25, *Reporting Qualified Data*.

7.4.3 Sample Specific Controls

a) Matrix Spike; Matrix Spike Duplicate

Percent recovery from matrix spikes and relative percent difference from duplicate matrix spikes are calculated as detailed in Section 5.9 of the QA Manual. The results of these calculations are documented and compared against established acceptance criteria.

b) Matrix Duplicates

Precision is evaluated using the calculation for RPD in Section 5.9 of the QA Manual. Results are documented and compared against established acceptance criteria.

c) Surrogate Spikes

The recoveries of surrogates are calculated according to the formula given in Section 5.9 of the QA Manual. Results are documented and acceptance criteria are established based on the test method or a documented internal procedure. Results are evaluated for the effect on individual samples.

7.5 Sample Handling

a) Samples requiring thermal preservation are monitored to meet the preservation requirements referenced in Section 5.8.7 and in Table 5.9. Samples that are delivered to the laboratory on the same day of sample collection and have not had adequate time to achieve the required temperature are considered acceptable if they are received on ice. This is documented as part of the sample receipt procedure.

b) See section 5.8.6, for the laboratory sample acceptance policy and AmTest SOP 1.03, *Sample Log-in and Tracking*.

APPENDIX C

TABLE OF SOP'S

SOP TITLE	SOP #	METHOD
1 Series - Log-In		
Color	1.00	SM 2120 B (2001) Ed.Rev (2011)
Conductivity	1.01	SM 2510 B (1997) Ed. Rev (2011)
pH	1.02	EPA 150.1, EPA 9045 D & SM 4500-H+B (2000)
Log-In and Tracking	1.03	
Sample Containers	1.04	
Sample Storage	1.05	
Turbidity	1.06	EPA 180.1
Procedure to Determine How Corrosive Soil pH is Using pH	1.07	AASHTO (T 289-91) & ASTM E29
pH of Soil using a Calcium Chloride Solution	1.08	Dept. of Sustainable Natural Resources
Reduction-Oxidation Potential by Electrode	1.09	Redox Potential by DK Nordstrom & FD Wilde
2 Series – QA/QC		
QC – Inorganic Chemistry	2.00	SM 1020, 2020, 3020, 4020 & 5020 (2011)
QC – Microbiology	2.01	SM 9020 (2011)
QC – Trace Organics	2.02	SM 6020 (2011)
Writing an SOP	2.03	EPA QA/G-6
Quality System Management Review	2.04	
Code of Ethics	2.05	
Laboratory Training System & Records Management	2.06	
D.O.C. for Method, Instrument and Lab Staff	2.07	
Gravimetric Analysis: Analytical Weight & Balance Calibration	2.08	ASTM, EPA
Customer Complaints	2.09	
3 Series - Lab		
Glassware Cleaning	3.00	
Reagents	3.01	
Sublet Tests	3.02	
Calibration of Thermometers	3.03	
Purchasing of Supplies	3.04	
Preventative Maintenance Logs	3.05	
Standards Preparation Notebooks	3.06	
Laboratory Notebooks	3.07	
Internal Audits	3.08	
Analytical Reports	3.09	

SOP TITLE	SOP #	METHOD
Final Data Review	3.10	
Security of Data	3.11	
Method Validation	3.12	
Out-of-Control Events for Mechanical Devices	3.13	
Thermometers	3.14	USGS Method NFM 613C
Data Loggers	3.15	
Using and Calibrating Pipettors	3.16	
Manual on Collection & Preservation of Samples	3.17	
Tracking Priority Projects	3.18	
Non-Conformance/Corrective Action Reporting	3.19	
Job Level Authorization Checklist	3.20	
Record Maintenance & Storage	3.21	
Documenting Evidentiary Chain of Custody within AmTest Laboratory	3.22	
Limit of Detection Verification	3.23	
Estimate of Measurement Uncertainty	3.24	
Reporting Qualified Data	3.25	
Determination of Percent Dry Solids	3.26	SM 2540 G
4 Series - Water Chemistry		
Acidity	4.00	SM 2310 B (1997) Ed. Rev (2011)
Alkalinity	4.01	SM 2320-B (1997) Ed. Rev (2011)
Chlorophyll A & Pheophytin A	4.02	SM 10200 H (2011)
Total/Residual Chlorine	4.03	EPA 330.5
Chemical Oxygen Demand (COD)	4.04	EPA 410.4 (1993)
Surfactants CTAS	4.05	SM 5540 B (2005) Ed. Rev (2011)
Dissolved Oxygen	4.06	SM 4500-O B-F (2001) Ed. Rev (2011)
Hexavalent Chromium	4.07	SM 3500-Cr B (2011) & EPA 7196A (Soil)
Nitrite	4.09	SM 4500-NO_2 B (2000) Ed. Rev (2011)
Nitrogen Series	4.10	EPA 351.2 & SM 4500-N_{org}, SM 4500-N Ed. Rev (2011)
Ortho Phosphate	4.11	SM 4500-P E (1999) Ed. Rev (2011)
Settleable Solids	4.12	SM 2540-Solids F Ed. Rev (2011)
Silica-Low	4.13	SM 4500-Silica C (1997) Ed. Rev (2011)
Sulfide	4.14	SM 4500 S^{2-} D (2000) Ed. Rev (2011)
Sulfide – Low (titration)	4.15	SM 4500 S^{2-} F (2000) Ed. Rev (2011) / EPA 9030M (Solids)
Sulfite	4.16	SM 4500-SO_3^{2-} B (2000) Ed. Rev (2011)
Surfactants –MBAS	4.17	SM 5540 C (2000) Ed. Rev (2011)
Tannin & Lignin	4.18	SM 5550 (2010)

SOP TITLE	SOP #	METHOD
Total Dissolved Solids (TDS)	4.19	SM 2540 C (1997) Ed. Rev (2011)
Total Kjeldahl Nitrogen (TKN)	4.20	EPA 351.2 Rev. 2 (1993) / SM 4500N_{org} C (Solids) Ed. Rev (2011)
Total Organic Carbon (soils)	4.21	EPA 9060/PSP
Total Organic Carbon (water)	4.22	SM 5310 B (2000) Ed. Rev (2011)
Total Solids	4.23	SM 2540- Solids B (1997) Ed. Rev (2011)
Total Suspended Solids (TSS)	4.24	SM 2540-Solids D (1997) Ed. Rev (2011)
Total Volatile Solids	4.25	SM 2540-Solids G (1997) Ed. Rev (2011)
Caffeine	4.26	AOAC Method 960.25
Ferrous Iron	4.27	SM 3500-Fe B Ed. Rev (2011)
Fluoride (Probe)	4.28	EPA 340.2 (1974)
Karl Fisher H_2O	4.29	ASTM D1533
Sulfate (Turbidimetric)	4.30	EPA 375.4 & SM 4500-SO_4^{2-} E Ed. Rev (2011)
Determination of Detrimental Material by Leaching/CVAA	4.31	ASTM D516 and DOD MIL-STD-2041D, Notice2, 10/18/02
Fluoride by Fusion	4.32	EPA 13B
Volatile Suspended Solids	4.33	SM 2540-Solids E (1997) Ed. Rev (2011)
UV 254	4.34	SM 5910 (2010)
TOC DOC UV254	4.35	EPA 415.3 Rev. 1 (2003); SM 5310B (2000); SM 5020 (2011); SM 1050B (1995)
Laboratory Soil Resistivity	4.36	AASHTD Design: T288-12 (2012)
Old IC Instrument Instructions	4.37	
Flash Point	4.38	EPA 1020B (2002), DOE Designating Dangerous Waste (2009)
Vector Attraction Reduction (VAR)	4.39	EPA 503B
5 Series - RFA		
Ammonia as Nitrogen	5.00	EPA 350.1 Rev. 2 (1993) & SM 4500-NH_3 G (Soils) (2011)
Chloride	5.01	SM 4500-Cl E (1997) Ed. Rev. (2011)
Cyanide by Automated or Manual Colorimetry	5.02	SM 4500-CN E, G & I (1999) Ed. Rev (2011) & EPA 9012 (Solids)
Free Cyanide	5.03	EPA 9016
Fluoride	5.04	SM 4500-F^- E (1997) Ed. Rev (2011)
Nitrate-Nitrite	5.05	EPA 353.2 & SM 4500-NO3 F (2000) (Soils) Ed. Rev (2011)
Phenol	5.06	EPA 420.4 (1993) & EPA 9065 (Solids)
Total Phosphorus	5.07	SM 4500-P E (manual) F (automated and solids) Ed. Rev (2011)
Total Persulfate Nitrogen	5.08	SM 4500-N C, SM 4500-NO_3^-& EPA 353.2

SOP TITLE	SOP #	METHOD
6 Series - Trace Metals		
ICP	6.00	EPA 200.7 / EPA 6010 (Solids)
ICP-MS	6.01	EPA 200.8 / EPA 6010 (Solids)
6020A ICP-MS	6.02	EPA 6020A
Lead in Paint ICP	6.03	ASTM E1613
Cation Exchange Capacity	6.04	EPA 9081
Hardness	6.05	SM 2340 B
TCLP	6.06	EPA 1311
Mercury by Cold Vapor	6.07	EPA 245.1 & EPA 7470 (H_20), 7471B (Soils) & SM 3112B
7 Series - Trace Organics		
Extraction 552	7.00	EPA 552.2
552.2 – HAA	7.01	EPA 552.2
Extraction 608 PCB's and Pesticides	7.02	EPA 608, 3510C, 3520C
Extraction 615 Herbicides	7.05	EPA 615
Extraction 622	7.07	EPA 622
Extraction 625	7.08	EPA 625
W625 – SIM	7.09	EPA 625 / EPA 8260SIM (Solids)
Extraction 8080	7.10	EPA 8080A, 8081B, 8082A
GC-Polychlorinated Biphenyls (PCBs) S8082	7.11	EPA 8082 (Solids)
8015 – mod Glycols	7.12	EPA 8015
GCMS-NWTPHD	7.13	EPA 8015 B (Solids)
Extraction 8141	7.14	EPA 8141B
Extraction 8151	7.15	EPA 8151A
GC-Chlorinated Herbicides S8151	7.16	EPA 8151 A (Solids)
Extraction 8270	7.17	EPA 8270
GCMS-8270D SemiVOC	7.18	EPA 8270D (Solids)
Extraction TPHD	7.19	EPA 3520 & EPA 3510
Extraction TPHDS	7.20	Analytical Method Petroleum Hydrocarbons
GCMS – NWTPHG	7.21	EPA NWTPH-Gx
1664 – Oil and Grease	7.22	EPA 1664
Grain Size/Particle Size	7.23	ASTM D422
IC (A)	7.24	EPA 300.0 / EPA 9056 (Solids)
Making & Documenting Organic Stock & Working Solutions	7.25	
Alumina Clean-up	7.26	EPA 3610 B
Sulfur Clean-up	7.27	EPA 3660 B
NWTPH-HCID	7.28	WA State DOE, Publication # ECY 97-602

SOP TITLE	SOP #	METHOD
524.2 VOC DW	7.29	EPA 524.2
624/8260 Waste Water/Soil VOC	7.30	EPA 624 / EPA 8260B (Solids) (1996)
8081 Chlorinated Pesticides	7.31	EPA 8081 (Solids)
Manual Peak Integration	7.33	USEPA OLM 4.2
GC 608 Procedure	7.34	EPA 608
GC 615 Herbicides	7.35	EPA 615
Bomb Preparation	7.36	ASTM D808-81, EPA 5050, Parr Manual No. 205M
8 Series - Microbiology		
Total Coliform in Water by Membrane Filtration	8.01	SM 9222 B (2006) Ed. Rev (2011)
Total Coliforms in Water and Solids by MTF using LTB and EC Medium	8.02	SM 9221 B, C, E1 (fecal), F (E. coli) (2006) Ed. Rev (2011)
Enzyme Substrate Coliform Test	8.03	SM 9223 B (2004) Ed. Rev (2011) & Colilert
Salmonella in Biosolids	8.04	EPA 1682
Fecal Coliform in Water by Membrane Filtration	8.05	SM 9222 D (2006) Ed. Rev (2011)
Fecal Coliform in Biosolids by MTF using A1 Medium	8.06	SM 9221 E2 (2006) Ed. Rev (2011)
Total Fecal Coliform in Biosolids by MTF using LTB and EC Medium	8.07	SM 9221 B, C, E1(fecal, F (E. coli) (2006) Ed. Rev (2011)
HPC in Water by Membrane Filtration	8.08	SM 9215 D (2004) Ed. Rev (2011)
HPC in Water by Pour Plate	8.09	SM 9215 B (2004) Ed. Rev (2011)
Biochemical Oxygen Demand	8.10	SM 5210 B (2010) Ed. Rev (2011)
Autoclave Instructions	8.11	
Washing Supplies and Equipment	8.12	SM 9040
Fecal Enterococcus in Water by MTF	8.13	SM 9230 B (2007) Ed. Rev (2011)
Fecal Enterococcus in Water by MF	8.14	SM 9230 C (2007) Ed. Rev (2011)
Proficiency Testing for Accreditation	8.15	Dept. of Ecology
E. coli 0157:H7 in Food Products	8.16	BAM Chapter 1 and AOAC Method 996.09
Lactobacillus	8.17	
LAL Endotoxin	8.18	Biowhittaker insert and Pyrogent insert by Cambrex
Salmonella in Food and Environmental Samples	8.19	AOAC Method 989.13, BAM Chapter 5 and “Using 1-2 Test” by BioControl Systems
Yeast & Mold for Food by Pour Plate	8.20	BAM Chapter 18
Staphylococcus aureus	8.21	BAM Chapter 12
Aerobic Plate Count by Pour Plate	8.22	BAM Chapter 3
Anaerobic Plate Count by Pour Plate	8.23	BAM Chapter 3
Microbiology Routine Techniques and Procedures	8.24	
Yeast & Mold for Food by Spread Plate	8.25	BAM Chapter 18

SOP TITLE	SOP #	METHOD
Aerobic Plate Count by Spread Plate	8.26	BAM Chapter 3
Anaerobic Plate Count by Spread Plate	8.27	BAM Chapter 3
Listeria in Food & Environmental Samples	8.28	BAM Chapter 10, AOAC method 997.03
Vibrio parahaemolyticus	8.29	BAM Chapter 9
Vibrio hollisae aka Grimontia hollisae	8.30	BAM Chapter 9
Nutraceutix – Total Lactic Count	8.31	Nutraceutix method
Enzyme Substrate Coliform Test (Colisure P/A)	8.32	SM 9223 B (2004)

APPENDIX D

EQUIPMENT

Equipment includes:

GC/MS Hewlett Packard 5890 Series II (semi-volatile) with autosampler (HP 7673A)
Hewlett Packard 6890 Series GC System (VOA), Agilent 5973 Network Mass Selective Detector and Centurion Autosampler

GC Hewlett Packard 5890 GC with FID detector (2)
Hewlett Packard 5890 GC with ECD detector (2)

ICP/MS Thermo Fisher X-Series 2

CETAC Mercury Analyzer M 7600 with autosampler

Flame Atomic Absorption Perkin Elmer 603 AA

Inductively Coupled Plasma Spectrometer ThermoFisher iCAP6500

Ion Chromatograph Thermo Scientific Dionex ICS-1600 with autosampler Dionex AS-DV and

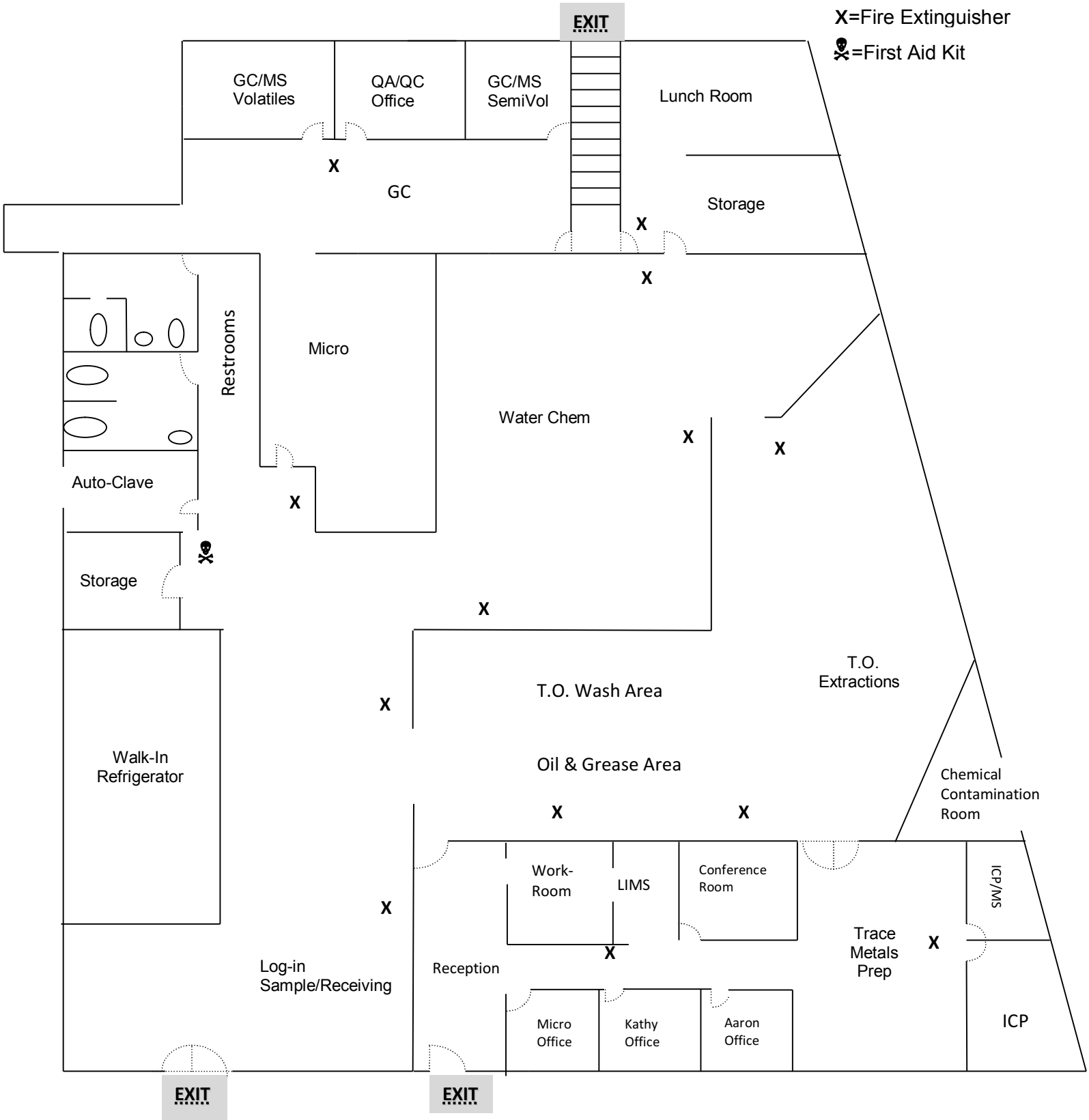
Total Organic Carbon Analyzer Dohrman DC 180 (Soils Module)
Shimadzu TOC-V CSH with autosampler (Water samples)

UV/VIS Spectrometers Shimadzu UV/VIS 160 Serial #123149

Flow Analyzer ez kem/O•I•Analytical Modules 503 and 509 with autosampler XYZ ez kem/AIM 1250

Miscellaneous Mettler Analytical Balances (5)
Autoclaves - Large Capacity (1)
Ovens - Drying (10)
Muffle Furnaces (1)
Incubators (7)
Microscopes – Polarizing, Phase (5)
Walk-in Coolers (1)
Refrigerators (8)
Freezers (2)

APPENDIX E
LABORATORY FLOOR PLAN



APPENDIX F

REFERENCES

1. "Definition and Procedure for the Determination of the Method Detection Limit-Revision 1.11", 40 CFR Part 136, Appendix B.
2. Handbook for Analytical Quality Control in Water and Wastewater. EPA 600/4-79-019. March 1979
3. Methods for Chemical Analysis of Water and Wastes, USEPA Office of Research and Development, Rev. 3/83. Cincinnati, OH; EPA 600/4-79-020.
4. Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, SW-846; USEPA Office of Solid Waste and Emergency Response, Washington, D.C.
5. Standard Methods for the Examination of Water and Wastewater (designated SM), American Public Health Association, Washington, DC, 1995.
6. Code of Federal Regulations, Title 40, Part 136; U.S. Government Printing Office, Washington, D.C., July 2004.
7. TNI Standard, Volume 1, Module 4: Quality Systems and Chemical Testing, Weatherford, TX, September 2010.
8. TNI Standard, Volume 1, Module 2: Quality Systems General Requirements, Weatherford, TX, September 2010.
9. 2003 NELAC Standard, Chapter 5: Quality Systems, July 2005.
10. Florida Department of Environmental Protection: Quality Manual, Tallahassee, FL, January 2012.
11. ISO/IEC 17025: 2005; General requirements for the competence of testing and calibration laboratories.

APPENDIX G

REVISION RECORDS

Origination Date 1989 (no electronic copy)

Revisions 1.0 through 6.0
The status of the electronic files and originals of these versions is unknown.

Revision 7.0 February 2009by Kathy Fugiel
A copy of the Quality Assurance Manual was generated in PDF format and received an updated ethics statement**.**

Revision 7.1 March 2010 by Kathy Fugiel
The Quality Assurance Manual underwent the annual review. The instrument list and approved methods were updated.

Revision 8.0 July 22, 2011 by Kathy Fugiel
The QA/QC Manual underwent a significant upgrade to conform to NELAC as to anticipate future NELAC Accreditation.

Revision 9.0 December 6, 2012 by Heidi Limmer
The manual was entirely re-formatted to follow ISO 17025 and NELAC formats and requirements.

Revision 10.0 December 8, 2014 by Heidi Limmer
Removed unnecessary information from section 4.8 and 4.11.4. Updated SOP section and Appendix D Equipment section.

Revision 11.0 January 26, 2015 by Heidi Limmer
Update Lab Floor Plan, add Micro SOP 8.32 to Appendix C, correct various grammatical errors, update section 4.7.2, 4.13.4, 4.13.3, 4.14.5, 5.8.6, 5.8.7.3 and update Bottle Request Form (Fig 4.2)

Revision 11.5 August 31, 2015 by Heidi Limmer/Kathy Fugiel
Correct address on front page and update Appendix D.

Figure 4.2

DW_____ Env._____
Bus._____ Individual_____

SAMPLE CONTAINER REQUEST

AMTEST LABORATORIES

Client:_____ Up Front/Shipped On:_____

Shipping
Address:_____ Prepared By:_____
_____ **Date Needed:**_____
Pick-up Date:_____

Contact:_____

Phone:_____ # of Coolers Needed:_____

Number Needed	Container Type/Preservative	Container Size Requested (Circle size)			Analytes to Test for
	Non-Pres. Plastic	1L	500mL	250mL	
	Plastic w/ EDTA		250mL	125mL	Fecal Bac-T
	Glass Amber bottle, Glass Amber VOA	1L	250mL	40mL	
	Plastic w/ HNO_3		250mL		Trace Metals
	Plastic HNO_3 RINSED		250mL		Dissolved Metals
	Plastic w/ H_2SO_4		250mL		
	Plastic w/ NaOH		100mL		Cyanide
	Plastic w/ ZnOAc		100mL		Sulfide
	TOC - Glass Clear VOA w/ HCl		40mL		TOC
	Phenol – Amber glass VOA w/ H_2SO_4		40mL		Phenol
	VOC – Glass Clear VOA w/ HCl _____**Chlorinated** _____**Non-Chlorinated**		40mL		VOC (EPA 524.2)
	HAA – Amber glass w/ NH_4Cl		250mL		HAA5 (EPA 552.2)
	THM – Glass Clear VOA w/ Ascorbic Acid (ASCA)		40mL		THM
	DO – Plastic Winkler Bottle		250mL		Dissolved Oxygen
	Jug		2L		
	Jar – Plastic		500mL		
	Jar – Glass	1L	500mL	200mL	

Comments:_____

_____

Cooler(s): Yes No #_____ Blue Ice: Yes No C.O.C. Form(s): Yes No #_____

Trip Blank(s): Yes No #_____ Bag Sample Sets: Yes No

Figure 4.3

AMTEST LABORATORIES

AmTest Chain of Custody Record

13600 NE 126th PL, Suite C, Kirkland, WA 98034
Ph (425) 885-1664 Fx (425) 820-0245
www.amtestlab.com

Figure 4.3

Chain of Custody No. 18880

Client Name & Address:	Invoice To:
Contact Person:	Invoice Contact:
Phone No:	PO Number:
Fax No:	Invoice Ph/Fax:
E-mail:	Invoice E-mail:
Report Delivery: (Choose all that apply) Mail / Fax / Email / Posted Online	Data posted to online account: YES / NO Web Login ID:
Special Instructions:	
Requested TAT: **(Rush must be pre-approved by lab)** Standard RUSH (5 Day / 3 Day / 48 HR / 24 HR)	Temperature upon Receipt:

Project Name:		Date Sampled	Time Sampled	Matrix	No. of containers	Analysis Requested									
Project Number:															
AmTest ID	Client ID (35 characters max)														QA/QC

Collected/Relinquished By:	Date	Time	Received By:	Date	Time
Relinquished By:	Date	Time	Received By:	Date	Time
Relinquished By:	Date	Time	Received By:	Date	Time

COMMENTS:

Figure 4.4 – Microbiology Logs

Microbiology **Year 20**

Glass and Plastic ware spot pH Checks:
Spot check batches of clean glassware for pH reaction. To test clean glassware for an alkaline or acid residue, add a few drops of 0.04% Bromthymol Blue (BTB) indicator solution and observe the color reaction. If any result other than Blue-green (neutral pH), glassware will need to re-cleaned.

Date	Initial	Plastic ware/Glassware/Miscellaneous	Blue-green (neutral)	Blue (alkaline)	Yellow (acid)
		Sample bottle/ Dilution bottle/			
		Sample bottle/ Dilution bottle/			
		Sample bottle/ Dilution bottle/			
		Sample bottle/ Dilution bottle/			
		Sample bottle/ Dilution bottle/			
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		Sample bottle/ Dilution bottle/			
		Sample bottle/ Dilution bottle/			
		Sample bottle/ Dilution bottle/			

Figure 4.4 - continued

Date/Time Samples Taken to get to Temp/Initial:				BOD BENCHSHEET (BOTTLE METHOD)					Date/Time DO(0)/Initial:			Cal(0):	
Seed Control		pH Slope		_____ BOD (Indicate which) _____ CBOD					Date/Time DO(5)/Initial:			Cal(5):	

A	B	C	D	E	F	G	H	I	J	K	L	N	P
				In 300-mL Bottle		All DOs below in mg/L						BOD below in mg/L	
Sample	pH 6.5-7.5	Temp Deg C	Bottle #	mLs Sample	mLs Seed	DO Initial	DO 5-Day	DO Drop G-H	Seed Corr* SCF X F	orr DO Dro I-J	Dil. Factor 300 /E	Bottle BOD K X L	Reported BOD
Blank #1 (Note #1)			1										
Seed Control (Note #2)			2a 2b	300 1000									
GGA Std 1 (198mg/L)			3										
GGA Std 1 (198mg/L)			4										
GGA Std 1 (198mg/L)			5										
			6										
			7										
			8										
			9										
			10										
			11										
			12										
			13										
			14										
			15										
			16										
			17										
			18										
			19										
			20										
			21										
			22										
			23										
			24										

*** Calculation of Seed Correction Factor (SCF)**

I ÷ F for Seed Control = _____ mg/L ÷ _____ mL seed

SCF = _____ mg/L DO per mL seed

Note #1 - QC Test - DO depletion should be <0.2 mg/L
Note #2 - Use enough seed to make DO drop at least 2.0 mg/L
Note #3 - Use enough seed to make seed correction 0.6 to 1.0 mg/L

Comments:

Checked by/date:

Figure 4.4 - continued

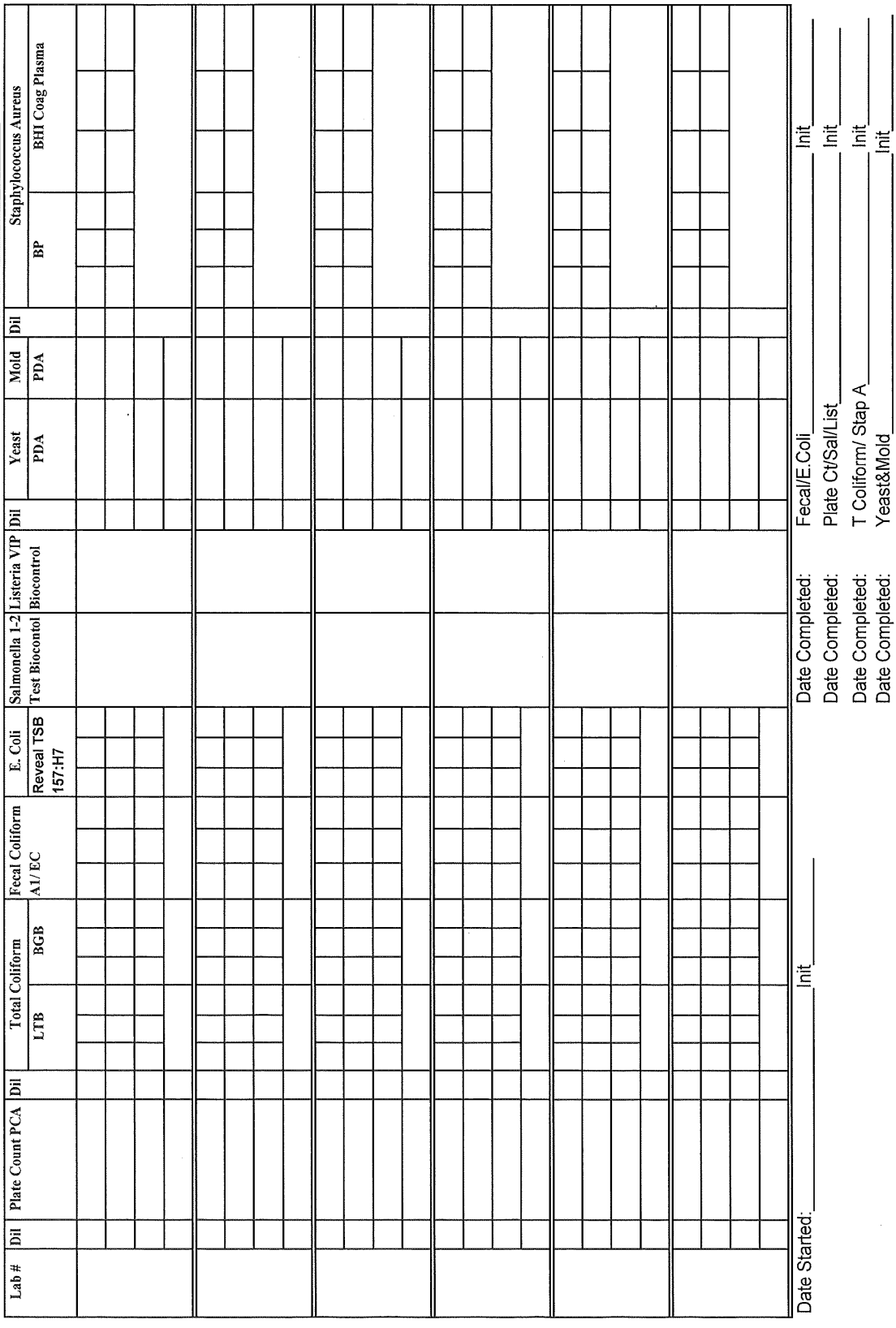

Figure 4.5 – Chemistry Preparation Log

Acid Digest Worklist Worklist Number: 6906 3/27/13 CG

Analyst: CG Analysis Date:
Extraction#: {10001} Name: Acid Dig. (Tot Metals)

Position	Log Number	Client	Shelf #	Result	C.F.	
1.	13-A003510	HAM QA	70	_____/_____		LIC:
2.	13-A003511	HAM	70	_____/_____		LIC:
3.	13-A003512	HAM	70	_____/_____		LIC:
4.	13-A003513	HAM	70	_____/_____		LIC:
5.	13-A003532	PCC	71	_____/_____		LIC:
6.	13-A003533	PCC	71	_____/_____		LIC:
7.	13-A003534	PCC	71	_____/_____		LIC:
8.	13-A003535	PCC	71	_____/_____		LIC:
9.	13-A003537	PCC	71	_____/_____		LIC:
10.	13-A003538	PCC	71	_____/_____		LIC:
11.	Blank			_____/_____		LIC:
12.	Spike			_____/_____		LIC:
13.	Mspkdup			_____/_____		LIC:
14.	SRM#			_____/_____		LIC:
15.	13-A003539	PCC QA	71	_____/_____		LIC:
16.	13-A003540	PCC	71	_____/_____		LIC:
17.	13-A003541	PCC	71	_____/_____		LIC:
18.	13-A003542	PCC	71	_____/_____		LIC:
19.	Blank			_____/_____		LIC:
20.	Spike			_____/_____		LIC:
21.	Mspkdup			_____/_____		LIC:
22.	SRM#			_____/_____		LIC:

Figure 4.5-Chemistry Prep. Logs

(20) SAMPLE

Figure 4.6

LABORATORY FACILITY EVALUATION CHECKSHEET

Laboratory: Auditor:
Date of Audit:

Facility CHK, DOC
8/21/00

Person Interviewed:

FACILITIES	Yes	No	Comments
General Condition			
Is laboratory clean, free from dust, drafts, and extreme temperature variations?	____	____	_____
Is laboratory well ventilated?	____	____	_____
Are work areas free from clutter? Good housekeeping?	____	____	_____
Are exits marked?	____	____	_____
Does each room have at least two exits?			
Space			
Are at least 15 linear feet of free bench space available per person?	____	____	_____
Does the facility have at least 150 ft ^{2}/person?	____	____	_____
Is space provided for:			
Administrative functions?	____	____	_____
Clerical work? Files?	____	____	_____
Instruments (separate rooms preferable away from sample preparation)?	____	____	_____
Storage of supplies and reagents?	____	____	_____
Vented storage for volatile organics?	____	____	_____
Refrigerated storage for samples?	____	____	_____
Chain-of-custody samples?	____	____	_____
Eating and drinking?	____	____	_____

LABORATORY FACILITY EVALUATION CHECKSHEET

Laboratory:
Date of Audit: Auditor:

	Yes	No	Comments
Exhaust Fume Hoods			
Do they have a minimum face velocity of 75 ft/minute with sash fullyopen?	____	____	_____
Are separate hoods used for organics, inorganics, perchloric acid digestion, and radiochemical materials?	____	____	_____
Is each hood vented independently?	____	____	_____
Is a specialty designed hood available for use with perchloric acid?	____	____	_____
Independent Exhaust Systems			
Is a hood system placed over autoclaves?	____	____	_____
Are special exhaust systems provided for:			
Atomic absorption spectrophotometers, ICP-AES	____	____	_____
Muffle furnaces	____	____	_____
Drying Ovens	____	____	_____
Gas Chromatographs, GC/MS	____	____	_____
Solvent storage cabinets	____	____	_____
Soxhlet extraction apparatus	____	____	_____
General Utilities			
Water—			
Is water prepared by appropriate procedures (distillation, ion exchange, RO) for the purpose to which it is to be used: chemical, inorganic or organic,microbiological, or biological?	____	____	_____
Water is ASTM Type (I, II or III)?	____	____	_____

LABORATORY FACILITY EVALUATION CHECKSHEET

Laboratory:
Date of Audit: Auditor:

	Yes	No	Comments
Compressed Air —			
Is it free from oil, water, particulate matter?	____	____	_____
Electrical Services —			
Is there adequate lighting?	____	____	_____
Is there proper grounding of instrumentation and equipment?	____	____	_____
Is there constant voltage for instruments?	____	____	_____
SAFETY			
Is there a safety manual available to all employees?	____	____	_____
Have all employees read and initialled it?	____	____	_____
Is eating and drinking prohibited in laboratory areas?	____	____	_____
Are eyewashes and overhead safety showers available in strategic locations?	____	____	_____
Are first aid kits available and emergency medical arrangements made?	____	____	_____
Are adequate fire extinguishers available, fully charged, and serviced periodically?	____	____	_____
Are gas cylinders well secured?	____	____	_____
Are gas cylinders stored properly?	____	____	_____
Are toxic materials stored and handled properly?	____	____	_____
Is contaminated (and potentially infectious) waste segregated from other wastes?	____	____	_____
Are microbiological and biological samples and wastes autoclaved or properly decontaminated before disposal or reuse?	____	____	_____

LABORATORY FACILITY EVALUATION CHECKSHEET

Laboratory:
Date of Audit: Auditor:

	Yes	No	Comments
SAFETY (Continued)			
Are chemical samples and wastes adequately disposed?	____	____	_____
Are radiochemical samples and wastes adequately disposed?	____	____	_____
Are provisions made to properly handle spills? Are proper pipetting devices provided?	____	____	_____
Is personnel protective equipment adequate for the laboratory operation?	____	____	_____
Have personnel had first aid courses?	____	____	_____