Cruise Line International Association - Alaska

Discharge of Effluents in Certain Alaska Waters by Cruise Vessel Operations

Quality Assurance Project Plan
For
Sampling and Analysis of Treated Sewage and Graywater
From
Commercial Passenger Vessels

Revision 14, 2024 Cruise Season

Submitted to fulfill certain requirements of
33 CFR 159 United States Title 33 Code of Federal Regulations Part 159
and Alaska Statute 46.03.460 – 46.03.490 and 18 AAC 69

Effective April 1, 2024 – March 31, 2025

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Approval Page

CLIA-Alaska

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Printed Name

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Signature Date

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Printed Name

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Signature Date

Project QA Officer

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Printed Name

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Signature Date

ADEC Project Manager

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Printed Name

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Signature Date

USCG, Captain of the Port

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Printed Name

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Signature Date

Revision Number ___
Revision Date: _____

This document control information will appear in the upper right corner of each page of the Quality Assurance Project Plan (QAPP). Each revision of the QAPP will be assigned a revision number obtained by adding 1 (one) to the previous revision number.

On the bottom of each page will be found:
Cruise Ship Wastewater Monitoring # Quality Assurance Project Plan

Term of QAPP

This Quality Assurance Project Plan will remain in effect until March 31, 2025 unless the U.S. Coast Guard and or Alaska Department of Environmental Conservation notify the other parties in writing that a new plan is required. If necessary, a new approval page with updated contact information and signatures may be submitted as an appendix to this plan. This QAPP document is valid for all USCG regulatory compliance sampling both within Alaska waters during the Alaska season and outside Alaska waters during the offseason.

Acronyms/Abbreviations Used

ADEC	Alaska Department of Environmental Conservation
BNA	Base/Neutrals, Acids
BOD	Biochemical Oxygen Demand – 5-day test
CFR	Code of Federal Regulations
CLIA	Cruise Line International Association
COC	Chain of Custody
COD	Chemical Oxygen Demand
COTP	Captain of the Port (USCG)
DMR	Discharge Monitoring Report
DOW	Department of Water
EPA	Environmental Protection Agency
HDPE	High Density Polyethylene
HCl	Hydrochloric Acid
H_2SO_4	Sulfuric Acid
HNO_3	Nitric Acid
MDL	Method Detection Limit
MQO	Measurement Quality Objective
MSD	Marine Sanitation Device
NaOH	Sodium Hydroxide
OB	Overboard
%R	Percent Recovery
PQL	Practical Quantitation Limit (Minimum Reporting Level)
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
RQ	Reportable Quantity per 40 CFR part 302
SM	Standard Methods
SW-846	Solid Waste Methods
SOP	Standard Operating Procedures
TSS	Total Suspended Solids
UAS	University of Alaska, Southeast
USCG	U.S. Coast Guard
VOCs	Volatile Organic Chemicals
VSSP	Vessel Specific Sampling Plan

Management and Contractors

Cruise Lines International Association Alaska

The Cruise Lines International Association Alaska (CLIA-Alaska) represents the large cruise line companies undergoing wastewater testing in Alaska. Individual CLIA-Alaska members are funding the sampling and analysis program for their own respective vessels through independent project management firms. All CLIA-Alaska member line cruise ships that operate in Alaska waters will follow the provisions of this QAPP.

Individual Vessel Representatives

The responsibility for adherence to the provisions of this QAPP plan rests with the owner or operator as per federal regulation 33 CFR 159.317 (a) (1). Failure of vessel owners and operators (including contractors/subcontractors to vessel owners/operators) to follow the provisions of this QAPP plan may result in enforcement actions against the vessel owners and operators by the State of Alaska under AS 46.03.

Small Cruise Ships and Alaska Marine Highway System

Small cruise ship companies and the Alaska Marine Highway System (AMHS) may choose to follow this QAPP, or they may submit their own QAPP to the Alaska Department of Environmental Conservation (ADEC) to satisfy obligations under Alaska Statute 46.03 and 18 AAC 69.025.

Small cruise vessels are not required to sample according to the USCG requirements.

CLIA-Alaska Project Manager

The CLIA-Alaska Project Manager (authorized Contractors) is responsible for ensuring that individual project components are executed in a timely and appropriate fashion. However, it is the vessel owner or operator that is responsible for compliance. Responsibilities include:

- Submitting results within the time frame specified by law and this document.
- Communicating project information to the United States Coast Guard (USCG), ADEC, and cruise lines.
- Assuring that all project participants have necessary training.
- Fielding questions and requests for information that arise during and after the project.
- Managing the financial aspect of the project, including the determination of billing and payment mechanisms.

Sampling Team Leader

The contract sampling team leader will coordinate and oversee all unannounced and continued compliance sampling, except for random sampling by the USCG. The Vessel Specific Sampling Plan (VSSP) must be submitted by the vessel owner or operator to the ADEC and USCG Sector Juneau prior to sampling.[1] The ADEC will forward the approved VSSP to the sampling manager. The

[1] ADEC: 21 days before sampling, 18 AAC 69.030
USCG: w/in 30 days of initial entry, 33 CFR 159.317(a)(3)

sampling team will design and keep confidential a sampling schedule only available to ADEC and USCG. Vessel operators will not be aware of the timing of sample collection for the two unannounced sampling events. Random sampling will be under the control of the USCG Sector Juneau. The sampling team leader will be available if random sampling takes place as the USCG directs.

Samplers are responsible for sample collection, sample integrity and custody, field measurements, and accurate notes. The sampler must verify that the vessel is discharging overboard during the unannounced sampling events. The owner or operator will make the VSSP available to samplers. The samplers will use the VSSP to determine if discrepancies exist. If discrepancies do exist on the VSSP, the sampler is to report them immediately to ADEC and the USCG. The sampler will provide a compilation of field notes, deviations from VSSP or QAPP plans (if applicable), and Chain of Custody to the laboratory personnel, Project Manager, and the Project Quality Assurance Officer upon completion of all sampling.

The sampler will notify the ADEC project manager 36 hours prior to the sampling event. This gives ADEC time to audit the sampling event.

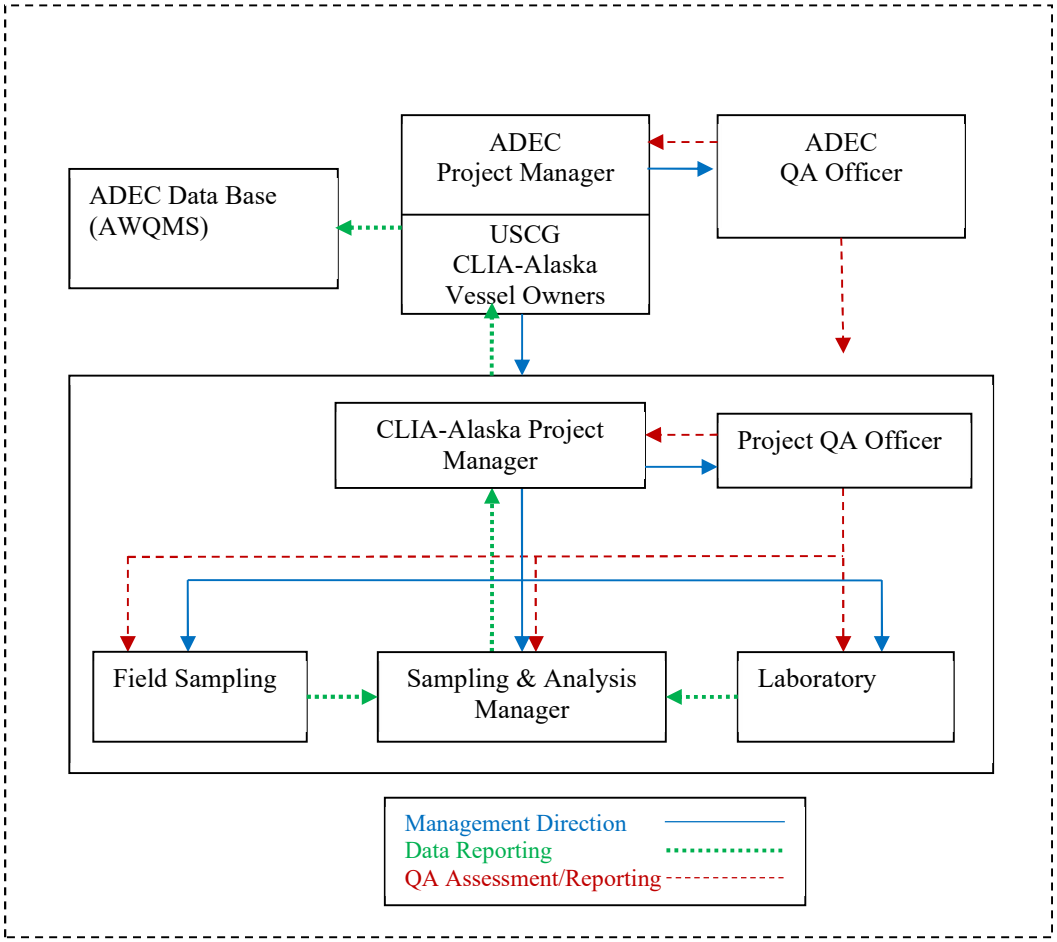
Wastewater Analysis Laboratory

USCG accepted laboratories must be utilized for the USCG required sampling events per 33CFR159.317(a)(6). USCG Headquarters (CG- ENG-3) has implemented standards for acceptance and promulgated a list of accepted laboratories which can be found online at http://cgmix.uscg.mil/EQLabs/EqLabsSearch.aspx. Guidance for the laboratory acceptance process is available from the USCG Sector Juneau. In order to obtain USCG acceptance, a laboratory must: affirm and attest to the fact that the company (including its officials, employees, and associates) is not owned or controlled by a manufacturer, vendor, or supplier of a marine device that may be used in treatment of the ships' waste water system or any other ship board system including promotion of the same as described in 46 CFR 159.010-3, or any cruise line corporation or subsidiaries thereof; attest that it is not dependent on USCG acceptance to remain in business; demonstrate that it performs all testing conducted under the supervision and assurance of its laboratory Quality Assurance/ Quality Control Manager who has sufficient experience in wastewater testing and attest that all analyses are performed per 46 CFR 159.010-3(a)(1) & (2); and provide current certifications for testing and attest to the fact that their facilities are adequate to perform the required tests. In circumstances when a USCG accepted lab cannot be used, the affected Cruise Line must verbally notify the USCG Sector Juneau for confirmation of an exception if they want to use the lab results for continuous compliance. To receive this one-time exemption, the Cruise Line must notify the USCG Sector Juneau within 72-hours after the sample is submitted to the non-USCG accepted lab. Every effort should be made to notify the USCG before submission, or the sample results may not be accepted and become invalidated. For the test results to remain valid, the lab used for the one-time exemption must apply to the USCG within 45 days following the sampling event and subsequently become a USCG Accepted Laboratory. USCG Sector Juneau can be notified 24-hours a day via the Sector Command Center at 907-463-2980. Written follow up or email, if needed, can be submitted via email to AKSampleResults@uscg.mil.

Laboratories performing bacterial analysis for samples collected within Alaska for the purposes of meeting requirements under the ADEC General Permit must have current State of Alaska Drinking

Water Laboratory Certification for fecal coliform. Laboratories performing chemistries for samples collected within Alaska for the purposes of meeting requirements under the ADEC General Permit must (1) have current Drinking Water certification with the State of Alaska for chemistries or (2) be a current NELAC or Washington State Department of Ecology certified laboratory for applicable water/wastewater analytes of interest. Due to the short hold time for microbiological samples (8 hours), all microbiological samples must be analyzed by a DEC drinking water certified laboratory within Alaska for the analytes of interest. Any lab performing bacterial or chemical analyses on samples collected within Alaska must demonstrate acceptable performance in an annual external blind Performance Test sample for each wastewater analyte and method of interest by self-enrolling in a NELAC accredited PT vendor program, with PT results mailed directly to both the ADEC QA Officer and the Project QA Officer.

Figure 1. Program Organizational and Data Flow Chart



Laboratory Quality Assurance Officer

The Laboratory QAO is responsible for QA/QC of laboratory analyses and will verify and validate all data (Figure 1).

Project Quality Assurance Officer

The Project Quality Assurance (QA) Officer is an independent individual (independent of management, fiscally and managerially) that ensures that that ALL laboratories, sampling teams, data analysis and reporting functions follow the laboratory's quality assurance program guidelines, this QAPP, and the VSSP. The Project QA Officer works independently to ensure quality of the data and reports all audit findings and recommendations for improvement directly to ADEC, USCG, and CLIA Alaska (Figure 1). The QA Officer is also responsible for performing follow-up assessments in a timely manner to ensure that corrective actions were enacted, and all problems were resolved. The Project QA Officer's responsibilities may not be parceled out to different individuals. However, the Project QA Officer may request technical assistance from technical experts where specific expertise is needed to fulfill QAPP QA requirements (e.g., on-site technical audit of lab performing GCMS and/or ICPMS analyses of cruise ship samples, etc.).

USCG COTP

The USCG COTP will use data gathered in accordance with this plan to determine continuous compliance with federal law (Figure 1).

ADEC Project Manager

The ADEC project manager manages the program to meet the requirements in the Alaska statute, regulation, and the approved QAPP (Figure 1).

ADEC Quality Assurance Officer

The ADEC QA Officer will review the QAPP to determine if it meets the State of Alaska's objectives for the data collection effort (Figure 1). At ADEC discretion, the ADEC QA Officer may review/audit data results and perform or coordinate data quality assessments (e.g., sampling, laboratory, and data audits, etc.).

Purpose

This document is prepared and submitted to fulfill certain requirements of United States Title 33 Code of Federal Regulations 159.317, Alaska Statute 46.03.460-46.03.490, and 18 AAC 69.025. Vessel owners may discharge treated sewage into Alaska waters less than one nautical mile from shore at a speed of less than six knots under 33 CFR 159.309(a)(1)-(4). Vessel owners will provide notification to the USCG for permission to discharge continuously into Alaska waters under the guidelines of 33 CFR 159.309(b)(1). Samples submitted to the USCG for initial discharge and ensuing continuous discharge under 33 CFR 159.309(b)(5) must also follow this QAPP.

Prior to any such discharge of treated sewage, the owner, operator or master, or other person in charge of a cruise vessel, will provide to the USCG Sector Juneau test results from at least five samples taken from the vessel, representative of the effluent to be discharged, on different days over a 30-day period, or more, which confirm that the water quality of the effluents proposed for discharge complies with all limits included in 33 CFR 159. These samples must be evenly distributed within this 30-day period whenever logistically possible or on an extended period over 30 days. The samples will be taken in a manner that seeks to capture a typical wastewater discharge while still meeting the fecal coliform 8-hour holding time.

Samples must be collected and analyzed using land-based or mobile facilities that are accepted by the USCG. Results from sampling must be submitted to the USCG Sector Juneau as a new application for continuous discharge for the next year season no earlier than 120 days and no later than 30 days prior to anticipated discharge into Alaska waters. Once satisfied, the USCG Sector Juneau (at the request of vessel representative) may send a letter of notification confirming intent of the vessel to discharge continuously into Alaska waters as defined in 33 CFR 159 for the calendar year of application. Upon receipt of the letter, the vessel owner shall demonstrate continued compliance while operating in Alaska waters through sampling and testing of the effluent for parameters listed in 33 CFR 159.309(b) at a frequency of two samples per calendar month. Each two adjacent sampling events must be separated by at least 24 hours, but it is recommended that there be a one-week (7 days) separation and/or the sampling events be spread out over the period when the ship is in Alaska waters. Each sampling event will include valid samples for all required analytes of interest. Any sample missing a valid analyte will be resampled as per the guidelines in Table 1. The USCG Sector Juneau may witness all continued compliance sampling events. All sample results for the parameters indicated above must be within the stated limits of 33 CFR 159.309(b) and must meet the data quality guidelines of this QAPP document to be considered valid.

Vessel owners can maintain continuous discharge certification while outside of Alaska waters by sampling and testing of the effluent for parameters listed in 33 CFR 159.309(b) at a frequency of two samples per 60-day period, and there cannot be greater than a 60-day period between any two samples. Samples must be collected and analyzed using either land-based or mobile facilities that are accepted by the USCG. In the event an accepted USCG lab is unavailable, the vessel may request use of a particular lab for consideration via USCG Sector Juneau. The vessel owner will be requested to provide certain proof of accreditations or certification of the lab submittals and will

allow a visit to the lab by the USCG COTP or designee at the discretion of the USCG. USCG will make the final determination as to the acceptance of the laboratory and will notify the vessel owner.

Results for continued compliance testing that have received final laboratory review and exceed the effluent limits in 33 CFR 159.309(b) must be immediately reported to the USCG Sector Juneau. The vessel owner will initiate corrective action by investigating and rectifying the cause of the exceedance; and resampling of the effluent to demonstrate that the effluent meets the limits in 33 CFR 159.309(b). Representative samples may be taken from the sampling point identified in the approved VSSP while the vessel is holding discharge and diverting effluent to a holding tank to demonstrate compliance with effluent limits while not discharging overboard. The USCG Sector Juneau may direct the vessel to retain onboard all effluents in certain situations due to continued exceedances of the effluent limits in 33 CFR 159.309(b) either within or outside of Alaska waters or failure to present data for sampling and testing of the effluent for parameters listed in 33 CFR 159.309(b) at the required frequency.

The local USCG Sector Juneau has established a requirement of a minimum of two sampling (including the conventional and priority pollutants) events per vessel in a season (twice per season samples) while operating in the applicable waters of Alaska, and that these two sampling events are unannounced to the vessel beforehand. The number of samples in a sampling event is based upon the ship configuration, vessel wastewater management practices, and the wastewater quantities discharged while the sample team is onboard.

Sample Location Information:
All compliance samples must be taken in accordance with the approved VSSP and must be taken at a point in the system directly before being discharged overboard**.** Sample ports must be within 50 feet of the point of overboard discharge.

Sample Frequency for Twice per Season Samples:
Both twice per season samples will be tested for conventional and priority pollutants in order to concurrently fulfill USCG and ADEC General Permit sampling requirements. Repeat sampling due to logistical or laboratory failures, replicate samples, any other required samples will be scheduled as deemed necessary by the Sampling Team Leader.

Additional Sample(s):
ADEC: Additional sampling events (twice per month samples) are required for vessels operating under the General Permit issued by the State of Alaska. A "sampling event" is the collection of representative samples[2] of each wastewater type being discharged within Alaska waters.

USCG: In addition to the twice per season samples, the USCG Sector Juneau may also direct the sampling team to conduct unscheduled random sampling for conventional and/or priority pollutants as directed in 33 CFR 159.317(5) at any time that they determine that additional samples are needed or necessary. This sampling will be scheduled at the request of the USCG Sector Juneau and will also be unannounced.

[2] The VSSP for each vessel will list the proper location and timing of wastewater sampling required to obtain a sample representative of wastewater discharged to AK waters.

Additional Sampling Notification:
The USCG will inform the sampling project manager 24 hours in advance to request any random sampling events. ADEC will be notified about these events by USCG Sector Juneau and will be invited for participation.

Lab reports must clearly state whether the sampling was conducted:

- to obtain certification for continuous discharge (typically performed outside of State of Alaska waters)
- to maintain continued compliance for continuous discharge (twice per month)
- to satisfy 33 CFR 159.317 and AS 46.03.465 (twice per month and twice per season)

The lab will submit the sample results directly to ADEC and USCG, but the owner/operator (Permittee) is responsible for meeting submittal deadlines.

Applicability

This QAPP specifies the minimum requirements for sampling and analysis of treated sewage and/or graywater and other wastewaters as defined in AS 46.03.490, for vessels that are members of the CLIA-Alaska. This QAPP is also applicable for any commercial passenger vessel that discharges treated sewage, graywater and/or other wastewater in the applicable waters of Alaska as defined in 33 CFR 159.305 and the waters of the Alexander Archipelago as defined in AS 46.03.490. All sampling events required by 33 CFR 159 and AS 46.03 shall be conducted in accordance with this QAPP and can be combined to complete requirements for both regulatory programs.

Owner or operators must comply with the requirements in 33 CFR 159, 40 CFR 136.3, AS 46.03.460-46.03.490, 18 AAC 69, 18 AAC 70 and this plan.

Each participating ship will be sampled within 30 days of initial entry into Alaska waters and subject to unannounced treated sewage and graywater sampling and analysis for conventional and priority pollutants (twice per season samples) as determined by the USCG Sector Juneau and ADEC. The second twice per season sampling event must occur at least 21 days after the first sampling event. Twice per month samples must be taken on separate calendar days and must be taken at least 24 hours apart. The USCG Sector Juneau Inspectors & ADEC may board vessels at any time to perform sampling inspections as necessary to implement 33 CFR 159 and AS 46.03.

This QAPP covers sampling and analysis for the parameters listed in Table 5. A sample that fails to provide valid results for all required pollutants will not be counted as an acceptable sample for purposes of meeting the sampling requirements defined in this QAPP, unless resampling is performed as outlined in Table 1.

If the fecal coliform result exceeds the vessel's permitted limits, an owner/operator may resample and retest within 30 days of the original sampling. The monthly limit for fecal coliform will be calculated by using the geometric mean of all samples taken during a calendar month. All sample events must be at least 24 hours apart. (18 AAC 69.070). For fecal coliform results that are above the quantifiable

range of the analytical test and reported as 'too numerous to count' (TNTC), an immediate resample of the effluent producing these results will be collected if possible and analyzed using higher dilutions as per the analytical method. Effluent streams that produce TNTC results will be analyzed using these higher dilutions for the remainder of the season in order to increase the probability of obtaining quantifiable results.

Blind Replicate Samples

Blind replicate samples will be collected at a minimum rate of 10% of the total number of samples collected for the project. Of these replicates, a minimum of 10% of the total number of twice per season samples collected for the project must be included as part of the total number of replicates. Selection of sampling events to be replicated will be randomized to assess precision for all ships monitored within the program.

The purpose of the blind sample replicates is to assess sampling and laboratory error and to assess overall method variability. Precision between the sample and its replicate will be determined by calculating the relative percent difference between the two samples, in the same way that precision is measured between two laboratory-fortified blanks or a matrix spike/matrix spike duplicate. The use of replicate samples extends the test of precision to the sampling method itself. The use of blind samples provides a test of the laboratory and is used to assess total bias or analytical errors not detected by the laboratory (e.g., a false positive). No information will be provided to the laboratory analysts that would disclose the replicate nature of the samples to the laboratory staff. The samples will be analyzed by the same lab and for the same parameters.

Overall project precision (field measurements, sample collection and laboratory precision) is assessed by collecting blind (to the laboratory) replicate (paired) samples at the same sample collection point. The samples will be collected into a transfer container to limit temporal variance in the sample results. Transfer containers must be certified clean for laboratory use and must not contain any preservatives. The sampler will need to collect a cubitainer (up to 10 liters) of wastewater and thoroughly mix it. The sampler should then pour the contents of the cubitainer into individual sample bottles. Samples for the analyses of volatile organics (VOC's), semivolatile organics (SOC's), oil and grease, and fecal coliforms will be collected directly into the appropriate sample containers without use of a transfer container to limit volatilization of analytes (VOC), adhesion of organics (SOC, O&G), and to maintain sample sterility (fecal coliform). The first sample measured/dispensed is designated as the primary sample and the second (paired) sample, the replicate sample. The primary sample is the official laboratory result. The "replicate" sample result is only used to assess/report overall project precision. Replicate measurements must include both field measurements (e.g., total chlorine residual, temperature, pH) as well as samples collected for subsequent laboratory analysis (e.g., total recoverable metals, dissolved metals, NH3, PAH, VOC's, etc.). This is to ensure overall sample representativeness when evaluating precision results.

Data Quality Objectives (DQO's) and Criteria for Measurement Data

Data Quality Objectives (DQOs) are qualitative and quantitative statements derived from the DQO Process that:

- Clarify the monitoring objectives.
- Define the appropriate type of data.
- Specify the tolerable levels of decision errors for the monitoring program.

Measurement Quality Objectives

Measurement Quality Objectives (MQOs) are a subset of 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 QAPP field and laboratory data for the project. MQO's are defined in terms of Precision, Bias, Representativeness, Detectability, Completeness, and Comparability.

Detectability

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).

- 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 (IDL) can be used.

- The PQL or RL is the minimum value that can be reported with confidence (usually some multiple of the MDL).

Sample data measured below the RL is reported as ND or non-detect. Sample data greater than the MDL but below the PQL or RL are not reported for this project. Sample data measured above the PQL or RL is reported as reliable data unless otherwise qualified per the specific sample analysis. Individual analyte MDL and PQL limits are listed in Table 6.

Precision

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 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:

$$RPD = 100*(\left| A-B \right| /((A+B)/2))$$

and is expressed as a percentage. X_1 = first (primary) sample measurement and X_2 = second (replicate) sample measurement. Precision limits for specific analytes are listed in Table 6.

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

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 i^{th} replicate

$\overline{X}$ = mean of replicate measurements

N = number of replicates

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 Quality Assurance Manual. Calculations for laboratory precision are the same as above.

Bias (Accuracy)

Overall bias for this QAPP 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 expressed as percent recovery (%R). Bias criteria for %R vary depending on the analyte and the method. %R is normally determined using known traceable laboratory standards. Acceptance limits for Bias for each analyte are listed in Table 6.

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:

$$\%R = \left(\frac{Analyzed\ \ Value}{True\ Value} \right) \times 100$$

Laboratory bias acceptance criteria limits must be within the respective EPA approved method criteria limits and as specified in the respective contract laboratory's Quality Assurance Manual. Analyte specific acceptance criteria limits vary dependent upon the measurement method. Each contracted laboratory will maintain on file with the Project QA Officer and the ADEC QA Officer a current Quality Assurance Manual (including all appropriate method SOPs (standard operating procedures), electronic copies requested).

Field laboratory and data quality audits and 3rd party performance evaluation (PT) samples are independent (external) means to assess measurement bias for the monitoring project.

Completeness

Completeness is the measure of how planned measurements for each constituent actually resulted in valid reported data. It is expressed as a percentage of the total number of samples collected. Completeness is not intended to represent the number of samples that are required to be collected for each ship; it is strictly a data validation tool utilized once the sampling season has ended. The completeness criterion for this project is 80 percent of the compiled analytical data per each analytical parameter for each vessel participating in the program. Because of the variety of vessels and discharges sampled, 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. Completeness also extends to the total sample analytes composing each sampling event. Completeness will be predicated on a 100 % valid analytes/sampling event. The following equation is used to calculate completeness:

$$Completene\ \ ss = \frac{T - (I + NC)}{T} \times 100$$

Where,

T = Total number of expected measurements

I = Number of invalid results

NC = Number of results not produced (e.g., spilled sample, etc.)

Representativeness

Representativeness is a measure of how well the sample reflects the typical wastewater effluent. Sample representativeness will be established by collecting cruise ship graywater, blackwater, and other wastewater discharge samples following VSSP. The owner and operator are responsible for developing and submitting VSSPs to both agencies for each vessel participating in the program.

The treatment system effluent will be considered representative for the two unannounced samples only if the vessel normally discharges continuously. If the vessel normally stores the wastewater in holding tanks before discharging, the effluent from the holding tank will be sampled. The VSSP is designed to ensure that consistent sampling methods are followed and that samples are collected from appropriate and representative locations at appropriate times. A picture will be taken of each sampling event. Also, the identifying sample date, time, vessel, and sampling port will be recorded for each sampling event. These actions will ensure and document each sample was collected from the VSSP specified sampling port.

If a twice per season sampling event does not yield valid results for all parameters, the following table will be used to guide the resampling process. The table provides groupings for resampling events. Resampling events must be continued until valid results are yielded for all target parameters collected during the resampling event.

Table 1. Analyte Groupings for Resampling

Group #1	Group #2	Group #3	Group #4	Group #5
Field Measurements *	Bacteria/Nutrients	Oxygen Demand	Metals	Organics
pH	Fecal Coliform	BOD	Metals, total recoverable	VOCs
Chlorine (total and residual)	Ammonia, Total	COD	Metals, dissolved	BNAs
Temperature	Alkalinity	TOC	Specific conductance	
	Nitrate	Total Suspended Solids	Hardness	
	Nitrate + Nitrite	Settleable solids		
	TKN			
	Phosphorous, Total			
*Field Measurements are required for every sample event, including resample events.				
All resampling events will require the re-measurement of group 1 parameters.				

Vessel operation that differs from the VSSP may result in State of Alaska and/or the USCG rejection of samples.

Comparability

Comparability is a measure of confidence with which one data set can be compared to another. It is addressed in the plan by 1) following the EPA methods listed in Table 6; 2) by using similar sampling and analytical methods as followed in last year's monitoring project; 3) ensuring that appropriate reporting limits are used; and 4) obtaining data of known and acceptable quality using specified QC measures and QA assessment procedures.

Because of the different source types found on different vessels (e.g., a holding tank on some ships may contain both blackwater and graywater, while on others it may only contain graywater), careful definition of discharge types will be made in the VSSP. It is essential that these definitions be carried through to the end data user, as these differences could erroneously bias data interpretation.

The sampling team must make full use of ship records and logs, especially the Graywater and Sewage Discharge Record Book which includes the latitude and longitude at the beginning and end of discharge, identifying tanks, estimating volumes, and calculating discharge rates (if any) at the time the sample is drawn. When tanks are equipped with tank volume measurement instrumentation (gauge reading/ recording system) the readings from such system will be recorded in the field notebook. If the vessel is discharging continuously during the sampling event the sampler does not need to record latitude and longitude at the beginning and end of discharge, identifying tanks, estimating volumes of those tanks. The sampler needs to identify which treatment unit is discharging and the discharge rate. The vessel speed and longitude/latitude must be obtained by the sampler when the sample is taken. Information added to the VSSP or changes to the VSSP during the sampling event must be recorded

on the VSSP, COC, or in the field notes and must accompany the samples to the lab and be provided to the project data recipients as part of the complete unannounced sampling report.

Special Training Requirements/Certification

Samplers will be trained in sampling methods, sample handling, chain of custody, and field measurements as outlined in 40 CFR 136. Additionally, samplers will receive appropriate training through their employer or their employer's designee, in any necessary shipboard safety procedures.

Laboratories used for USCG compliance purposes must be USCG accepted laboratories under the guidelines of 33CFR 159.317(a)(6). Laboratories used for ADEC compliance purposes will have a current Alaska Department of Environmental Conservation Drinking Water certification for microbiologicals or inorganics or home state or provincial equivalent. Laboratory analysts will be trained in accordance with each laboratory's QA Plan and Standard Operating Procedures (SOPs). Records of current certification, analyst training, and the laboratory QA documents listed above will be made available to the CLIA-Alaska Project Manager, the Project QA Officer, and the ADEC Project Manager. Laboratories will only employ approved methods of testing as outlined in 40 CFR 136.3 and referenced in Appendices C-E and that meet a detection limit below the applicable Alaska Water Quality Standard or permitted value.

Table 2. Specialized Training and Certification

Specialized Training/Certification	Samplers and Sample Team Leader	CLIA-Alaska PM	Project QAO	Analysts	Lab QA Manager
CLIA-Alaska QAPP and requirements and responsibilities for personnel	**X**	**X**	**X**	**X**	**X**
Cruise ship Effluent Water sampling techniques	**X**	**X**	**X**		
Project documents (VSSPs, discharge logs, permits, etc.)	**X**	**X**	**X**	**X**	**X**
Instrument calibration and QC activities for field measurements	**X**	**X**	**X**		**X**
Instrument calibration and QC activities for laboratory measurements			**X**	**X**	**X**
QA principles including laboratory specific QA Plan and SOPs		**X**	**X**	**X**	**X**
Chain of Custody procedures for samples and data	**X**	**X**	**X**	**X**	**X**
Handling and Shipping of Hazardous Goods	**X**	**X**	**X**	**X**	**X**
Specific EPA Approved Analytical Method Training for measurement performed or responsible for reviewing/approving	**X**	**X**	**X**	**X**	**X**
ADEC Microbiological Drinking Water Certification				**X** [1]	
[1] Certification for specific micro analysis is limited to the individually certified lab analyst.					

Documentation and Records

Vessel Sample Identification

Samples (e.g., the sample bottle(s)/analyte(s)) must be identified clearly on the chain of custody and sample bottles and in the field notebook. Blind sample(s) identification must have its own discrete identification (e.g., number / letter convention). Additional sample information to be recorded in the field notebook is listed in Appendix A. For example, a sample from the overboard discharge from the *M/V HYPOTHETICA* will be identified as "OB Discharge Port A," as the description with associated dates and times. The Sample ID should clearly state where the sample was taken. All samplers should use the same sample ID system. For continuous discharges with one discharge point, identify and record the discharge point notation (port ID) from the VSSP. The sampler should fill out the checklist in Appendix A.

Field Reports (Required for all regulatory compliance samples)

Field notes will be collected in bound field notebooks with numbered pages or recorded on pre-printed forms with specific information pertaining to the sampling event. Onboard staff will witness the sampling and will initial the field notes. Included in the field notes for each sample are:

- Vessel name
- Sample date and time
- Sampling personnel,
- Shipboard assistants,
- Latitude/longitude and speed at time of discharge being sampled,
- Field measurements: pH, free chlorine, total chlorine, and temperature,
- Discharge flow rates,
- Samples collected,
- Nature of sample: Composite or Grab,
- Waste type: blackwater, graywater, or mixed,
- Deviations from VSSP and/or QAPP,
- Unusual conditions and explanation of data anomalies,
- Signature or initials by vessel crew in the field notes indicating the sample port is correct,
- Copy of the vessel Discharge record for the sampled discharge

Cruise ship operators maintain a sewage and graywater discharge record book (or electronic log) that records the date, times, volumes, and vessel location (latitude and longitude) for each wastewater discharge. These records will be provided to the sampler. The sampler will collect and submit the discharge logs and field notes to the USCG, ADEC and company representative in final laboratory reports.

Laboratory Records

Upon completion of laboratory analysis, laboratory data review, and data validation, the laboratory will issue a full report in an electronic format describing the results of analysis for each sample submitted. Prior to issuance of the analytical report to the vessel's representatives, ADEC, and the USCG Sector Juneau, the laboratory's QA manager will review and approve the report.
All reports will be submitted electronically to ADEC at dec.wq.cruise@alaska.gov and to the USCG at AKSampleResults@uscg.mil.

Submission of final sample results will also be submitted to the ADEC Electronic Data Management System (EDMS). EDMS is the primary submission portal for vessel owner/operators to comply with terms of the ADEC GP. https://dec.alaska.gov/water/edms

The final laboratory reports will identify whether a sample was taken to satisfy 33 CFR 159.317 and or AS 46.03.465 or done to seek USCG approval for discharge without distance or speed limitations or is a continuous discharge compliance sample. Analytical data will be reported in PDF format along with a Level III electronic data deliverable (EDD) in Excel format.

Components of the analytical report include:

- A short summary sheet discussing the sampling event and results.
- Sample information: ship name, sample names, waste type, date and time collected.
- Parameter name and method reference.
- Analytical result.
- Method Detection Limit and Practical Quantitation Limit (reporting limit).
- Date and time of sample preparation and date and time of analysis.
- Quality control information: blank results, spiked blank or laboratory control standard recovery, matrix spike/spike duplicate recoveries, relative percent differences between duplicate spike analyses.
- Chain of custody.
- Information documenting whether holding times were met.
- Case Narrative of deviations from methods, procedural problems with sample analysis, holding time exceedances, and any additional information that is necessary for describing the sample. This narrative should explain when results are outside the precision and accuracy required and the corrective actions taken to rectify these QC problems.
- Field notes and records on discharge flow rates and holding tank volumes.
- Discharge log (photocopy or photo) provided by ship staff containing the discharge entry associated with the sampling event.
- Cooler receipt forms, including information on each lab receiving samples.
- Photograph of sampling port taken during sampling event.
- Latitude and longitude information pertaining to each sample including which overboard port the waste was discharged through and the speed the vessel was traveling.
- Explanation of data abnormalities.
- A completed checklist containing all components of sampling (Appendix A).
- A completed checklist containing all components analysis and reporting (Appendix B).
- Electronic data file containing all Level III laboratory results in Excel format.
- *(FOR ADEC ONLY) If applicable, a notification that this sample is a resample under 18 AAC 69.070*

Components of the Level III Electronic Data Deliverable include:

- Laboratory name
- Project ID
- Ship name
- Sample ID
- Laboratory sample ID
- Matrix
- Sample date
- Analysis preparation date
- Analysis date
- Analytical batch ID
- Analytical method code
- Analytical method name
- Analyte name
- Analyte CAS #
- Surrogate presence
- Analytical result
- Detection limit (MDL)
- Reporting limit (PQL)
- Units
- Dilution factor
- Matrix spike level
- Percent recovery
- Control limits
- Analyst ID

Each individual analysis, as well as associated quality control analyses, will be represented by one row of the Excel spreadsheet, with information for the above bulleted items represented in individual columns.

Information to be included in the analytical report is outlined in Appendix B.

Reports to ADEC and USCG

The CLIA-Alaska Project Manager approves and certifies that the data meets the ADEC/USCG QAPP defined acceptable valid data reporting criteria. Any problems with data will be addressed as well as what specific corrective actions were taken to remedy the problem in a timely manner, and how to avoid future reoccurrences. Complete sample data reports will be delivered to ADEC within 21 days of completion of laboratory analysis. Complete sample data reports will be delivered to USCG within 15 days of sample collection for conventional analytes and within 30 days of sample collection for priority pollutant analytes. All permit/regulatory exceedances must be reported to ADEC and USCG within 24 hours of receiving analytical data that has passed final laboratory QA review.

Chain of Custody

The original chain of custody form will accompany the sample to the laboratory. When portions of the sample are sent to another laboratory (e.g., for many of the priority pollutants), a copy of the chain of custody will be made and this will accompany the samples. At each transfer of the sample, the transfer will be indicated on the chain of custody form. The person listed on the Chain of Custody should have full sight, or be in control of the sample, at all times until the COC is relinquished by that person and received by the next party signed on the COC.

A copy of the original chain of custody will be included with the final report including the COC transferring samples to other labs. Electronic scanned copies in PDF form are sufficient.

Table 3. Project Documents and Records

Categories	Record/Document Types	Location
Site Information	Annual Approved VSSPs	ADEC Office
	Approved QAPP	ADEC Office
Environmental Data Operations	Field/Sampling Notebooks	STL Office
	Field/Sampling Method SOPs	STL Office
	Sample collection/measurement records	CLIA-Alaska PM Office
	Sample Handling & Custody Records	PM Office
	Chemical labels, MSDS sheets	STL Office
	Inspection/Maintenance Records	
	Lab data (sample, QC, and calibration) including data entry forms	Project Laboratories
Raw Data	Raw Data Packages	Project Laboratories
Data Reporting	Lab Analysis Reports	CLIA-Alaska PM Office / ADEC PM
	Project data summary reports	Project QA Officer / ADEC PM
	Inspection reports	CLIA-Alaska PM Office / ADEC PM
	Data management plans/flowcharts	CLIA-Alaska PM Office
Data Management	Data algorithms	Project QA Officer
	Data quality assessments	Project QA Officer /ADEC PM
	Field audits	Project QA Officer /ADEC PM
	Lab audits	Project QA Officer /ADEC PM
	QA reports/corrective action reports	Project QA Officer / ADEC PM
	Performance Evaluation Samples	Project Laboratories
	Data quality assessments	Project QA Officer /ADEC PM
Quality Assurance	Field audit reports	Project QA Officer / ADEC PM
	Lab audit reports	Project QA Officer / ADEC PM
	QA reports/corrective action reports	Project QA Officer / ADEC PM
	Performance Evaluation Samples	Project QA Officer / ADEC PM

Sampling Process Design

Each discharging vessel will need to have an ADEC approved Vessel Specific Sampling Plan (VSSP) onboard, along with a valid QAPP. The VSSP will include the following (at minimum):

- Vessel name.
- Passenger and crew capacity of ship.
- Daily water usage estimates; daily and per individual.
- Locations and capacities for treated sewage, graywater, and other wastewater tanks.
- Type of wastewater treatment systems.
- Each discharge pump type and rate.
- Vessel schematic of discharge ports and corresponding sampling ports.
- Description of discharges, including anticipated flow rates and tank volumes.
- Table containing type of discharge, type of sample (grab or composite), parameters (conventional or priority pollutants), location on the vessel where each sample is to be collected, and special circumstances.
- Narrative description of the time at which each sample is to be taken based upon circumstances that will yield a sample most likely to be representative of the average discharge that passes through the location where the sample is taken.
- Description of standards the owner/operator will use to determine a deviation from the plan.

Each VSSP will be dated, and a copy will be provided to the CLIA-Alaska Project Manager, the cruise ship owners / operators, the ADEC Project Manager, and the USCG. The VSSP will be submitted to the USCG Sector Juneau and the ADEC Project Manager within 30 days of each vessel's initial entry into Alaska waters. Vessel owners/operators must obtain an ADEC approved VSSP prior to sampling.

The purpose of providing the VSSP to the CLIA-Alaska Project Manager and the cruise ship companies prior to sampling is to provide certainty that consistent sampling methods are followed and that samples are collected from appropriate and representative discharge locations. Deviations from the sampling plan may occur; these will be noted in the field notes and notification will be given to ADEC and USCG Sector Juneau within 72 hours of the sampling event. Strong justification must be provided for the deviation, along with an explanation of how the deviation could affect sample results. The explanation must also clarify if the deviation will become the routine procedure or just a one-time deviation based upon circumstances.

Sampling Method Requirements

Sample Collection Procedures

Specific sampling techniques for each vessel will be detailed in the VSSP. The following general guidelines are listed to provide consistency among the vessels utilizing this QAPP.

Samples will reflect a representative discharge of treated blackwater, graywater and other wastewaters into applicable waters of Alaska from a functional marine sanitation device, other treatment system, a holding tank or some combination as specified in the VSSP. In port sampling, in compliance with ADEC sampling events, will be conducted only if the vessel is certified to discharge in port. If samples must be taken while the ship is underway, care will be taken to ensure sample representativeness and homogeneity. See VSSP for further details on sampling.

Prior to sampling, vessel crew may elect to sterilize the port with alcohol or heat. Sterilization method will be noted on the sample field sheet. If no notation is made it is assumed that no sterilization occurred immediately prior to sampling.

[Optional Sterilization] The effluent discharge port may be sterilized with a minimum 70% alcohol (isopropyl, methanol, or denatured ethanol) solution. The sample port should remain in contact with the alcohol for at least 1 minute, followed by sample flush of the discharge line. The alcohol will only be used once for port sterilization (i.e., alcohol may not be reused for future sample port sterilization). If heat sterilization is performed, the sampling port must be flushed and allowed to return to normal operating temperature before VOC sample fractions are collected.

A volume of water equal to at least ten times the volume of the sample discharge line will first be discharged into a bucket or similar container to clear the line of standing water and possible contamination.

Samplers will ensure that proper sampling techniques are followed, adequate notes are taken during the sampling event, and proper sample custody is maintained. One sampler may be sufficient for all in-port sampling events. Samplers may work in teams of two if applicable for sampling events that must be performed while the vessel is underway. Samplers may be accompanied by sampling auditors and/or witnesses from regulatory agencies for both in-port and underway sampling events.

Samplers will wear disposable gloves, protective clothing and safety eyewear and will observe precautions while collecting samples, remaining aware of the potential biohazard present.

Samplers will contain all solid and liquid wastes generated during sampling (used gloves, paper towels, chlorine test waste, overflow from filling of VOC sampling vials, etc.) and remove it from the ship at the conclusion of the sampling event.

Samplers will take care not to touch the insides of bottles or lids/caps during sampling.

Samples will be listed as “grab” on the Chain of Custody form, unless two discrete samples are combined, at which point they will be listed as “composite”.

Bottles will be lab certified and will not require rinsing with sample. When sample bottles are pre-preserved, bottles must never be rinsed but will be filled only once with sample. Due to potential contamination issues, field tests for pH and temperature may not be performed directly in a bottle to be used for other analytes of interest.

The required field tests will be performed prior to sampling to determine if residual chlorine is present. This will dictate the preservation procedures for the VOC and BNA analyses.

The practical quantitation limit for chlorine testing using field equipment is 0.1 mg/L. Field colorimeters must be readable to at least 0.05 mg/L. Any values observed below this 0.1 mg/L will be recorded as actual readings on the field notes but as <0.1 mg/L final data reports.

Sample fractions for microbiology will be cooled immediately in an ice-water bath and then placed into a cooler containing frozen blue ice or ice and water mixture to maintain a sample temperature of 0 - 10° C. Temperature will be measured and recorded at the time of sample collection from a temperature blank of similar size to the microbiology sample placed in the same cooler as the microbiology samples. The temperature of the temperature blank will also be measured upon sample receipt at the laboratory to an accuracy of 0.1° C and a note shall be made on the chain of custody of the temperature of the cooler contents upon arrival at the laboratory. Samples received with any indication of ice formation are unacceptable and the sample will be flagged accordingly. Sample fractions for all other temperature sensitive analytes will likewise be cooled immediately in an ice-water bath and then placed into a cooler containing frozen blue ice or ice and water mixture to maintain a sample temperature of 0 - 6° C. Blue ice will only be used if transportation of samples on a commercial aircraft does not allow for the use of an ice and water mixture. Temperature will be measured and recorded at the time of sample collection from a temperature blank placed in the same cooler as the other temperature sensitive samples. The temperature of the temperature blank will also be measured upon sample receipt at the laboratory to an accuracy of 0.1° C. A note shall be made on the chain of custody of the temperature of the cooler contents upon arrival at the laboratory.

Samples will be delivered to the laboratory as soon as possible after sampling. In some cases, this may not allow enough time for sample fractions to cool to temperatures within specified limits before samples are received at the laboratory. Samples received with temperatures above specified limits will be considered acceptable if the samples were delivered to the laboratory on ice and within two hours of sample collection. Samples received with any indication of ice formation are unacceptable and all samples with such conditions will be flagged accordingly. The sample receipt lab thermometer must be readable to 0.01° C and accurate to 0.1° C (40 CFR 136.3).

Sample bottles will be filled sequentially. Bottles will normally be filled to the shoulder of the bottle, leaving a small space for expansion and mixing. VOC bottles will not be intentionally over-filled but carefully filled to achieve a convex meniscus at the top of the bottle, with no air bubbles present; when the VOC lid is screwed on a small volume of water will be displaced and no air will be present in the bottle. The time elapsed for filling all bottles for a sampling event shall not exceed 30 minutes.

EPA guidelines in 40 CFR 136 require that samples to be analyzed for dissolved metals must be filtered and preserved with nitric acid within 15 minutes after sample collection. Except for the sample pump, all dissolved metals filtration apparatus will be certified clean single use. The sample pump will be cleaned in accordance with the SOP between sampling events.

Table 4. Field QC Samples

Field Quality Control Sample	Measurement Parameter	Frequency	QC Acceptance Criteria Limits
Trip Blank	VOCs	1 per cooler containing VOC sample fractions	≤ individual VOC MDLs see Table 3, MQO
Temperature Blank	Temperature (Fecal Coliform)	1 per cooler containing fecal coliform sample fractions	Temp blank ≤ 10.0°C, no indication of freezing
Temperature Blank	Temperature (All other temp sensitive analytes)	1 per cooler containing temperature sensitive sample fractions other than fecal coliform	Temp blank ≤ 6.0°C, no indication of freezing
Blind sample replicate	All analytes collected during twice per season sampling events	Minimum of 10% of total number of twice per season sampling events	See precision criteria listed in Table 3, MQO
Blind sample replicate	All analytes collected during twice per month sampling events	Minimum of 10% of total number of project sampling events	See precision criteria listed in Table 3, MQO
Field Replicate Measurement	pH, temperature, chlorine	With every blind sample replicate	See precision criteria listed in Table 3, MQO
Calibration Check Standards that bracket expected range of measurements	pH, Chlorine residual total/free	Prior to and on day of use	See accuracy criteria listed in Table 3, MQO

Table 5. Required Sample Containers, Preservations, Holding Times, and Sample Types

LAB PARAMETER	CONTAINER	PRESERVATION	MAXIMUM HOLDING TIME	MINIMUM REPRESENTATIVE VOLUME
Total Suspended Solids	P, FP, G	Cool, ≤6° C, do not freeze	7 days	100 ml
Settleable Solids	P, FP, G	Cool, ≤6° C, do not freeze	48 hours	1000 ml
Biochemical Oxygen Demand-5 day	P, FP, G	Cool, ≤6° C, do not freeze	48 hours	1000 ml
Ammonia – Total	P, FP, G	Cool, ≤6° C, H_2SO_4 to pH <2, do not freeze	28 days	400 ml
Chemical Oxygen Demand	P, FP, G	Cool, ≤6° C, H_2SO_4 to pH <2, do not freeze	28 days	50 ml
Specific Conductance	P, FP, G	Cool, ≤6° C, do not freeze	28 days	100 ml
Fecal Coliforms	Sterile PA, G	Cool, ≤10° C, 0.0008% $Na_2S_2O_3$, do not freeze	8 hours [1]	100 ml
Alkalinity	P, FP, G	Cool, ≤6° C, do not freeze	14 days	100 ml
pH	P, FP, G	None	<15 minutes in field	25 ml
Oil and Grease	G	Cool, ≤6° C, HCL, H_2SO_4 to pH <2, do not freeze	28 days	1000 ml
Total Organic Carbon	P, FP, G	Cool, ≤6° C, HCl, H_2SO_4 or H_3PO_4 to pH<2, do not freeze	28 days	50 ml
Total Kjeldahl Nitrogen	P, FP, G	Cool, ≤6° C, H_2SO_4 to pH <2, do not freeze	28 days	500 ml
Total Phosphorus	P, FP, G	Cool, ≤6° C, H_2SO_4 to pH <2, do not freeze	28 days	50 ml
Temperature	P, FP, G	None	Analyze ASAP in field	1000 ml
Chlorine Residual	P, G	None	<15 minutes in field	100 ml
Chlorine Free	P, G	None	<15 Minutes in field	100 ml
Hardness	P, FP, G	$HN0_3$ or H_2SO_4 to pH <2	6 months	100 ml
Nitrate (NO_3) Nitrite (NO_2)	P, FP, G	Cool, ≤6° C Do not freeze	48 hours	100 ml
Nitrate/Nitrite [2]	P, FP, G	Cool, ≤6° C, do not Freeze, H_2SO_4 to pH<2	28 days	100 ml
BNA [3]	G, FP-lined cap	Cool, ≤6° C, do not freeze, 0.008% $Na_2S_2O_3$ or ascorbic acid if residual chlorine is detected above 0.1 mg/L	7 days until extraction, 40 days after extraction	1000 ml

LAB PARAMETER	CONTAINER	PRESERVATION	MAXIMUM HOLDING TIME	MINIMUM REPRESENTATIVE VOLUME
VOCs (except acrolein, acrylonitrile, and 2-chloroethyl vinyl ether)	G, FP-lined septum	Cool, ≤6° C, do not freeze, 0.008% $Na_2S_2O_3$ or ascorbic acid if residual chlorine is detected above 0.1 mg/L, HCl to pH <2, sample filled to convex meniscus, no air volume in vial before sealing	14 days	Each sample collected in duplicate 40ml vials
2-chloroethyl vinyl ether	G, FP-lined septum	Cool, ≤6° C, do not freeze, 0.008% $Na_2S_2O_3$ or ascorbic acid if residual chlorine is detected above 0.1 mg/L	7 days	40 ml vial
Acrolein and Acrylonitrile	G, FP-lined septum	Cool, ≤6° C, do not freeze, pres. HCl to pH 4-5, 0.008% $Na_2S_2O_3$ or ascorbic acid if residual chlorine is detected above 0.1 mg/L	3 days if no acid preservative, 14 days if pH is 4-5	40 ml vial
Total Aromatic & Total Aqueous Hydrocarbons [4]	See BNA's and VOCs			
Total Mercury (CVAA)	P, FP, G	HNO_3 to pH <2 at time of collection, do not freeze	28 days	100 ml
Total Recoverable Metals	P, FP, G	HNO_3 to pH <2 at time of collection, do not freeze	6 months	100 ml
Dissolved Metals [5]	P, FP, G	Filtration w/0.45 micron filter within 15 min of collection, HNO_3 to pH <2 immediately following filtration, do not freeze	6 months	100 ml
P = polyethylene, FP = fluoropolymer, G = glass, PA = autoclavable plastic				

Table 5 Notes:

[1] Holding time reference: 29806 Federal Register / Vol. 77, No. 97 / Friday, May 18, 2012 / Rules and Regulations

[2] Nitrate and nitrite can be analyzed individually in an unpreserved fraction or analyzed together in a fraction preserved with H2SO4. Results will be reported as nitrate plus nitrite regardless of preservation decision.

[3] Additional volume of sample is required for matrix spike determination during the BNA analysis. The sampling team will take an additional 2L of sample from all priority pollutant replicate sampling events for this purpose to provide matrix spike data at a frequency of 10% for project related samples.

[4] Total Aromatic and total Aqueous Hydrocarbons will be calculated from the BNA and VOC results.

[5] Only Cu required for 2 events /month: full suite sampling (conventional & priority) for 2 events per year.

Sample containers will normally be pre-preserved by the laboratory. Analyses can be consolidated into containers of matching sample preservation if adequate sample volume is collected for all tests.

A 1-liter unpreserved bottle is sufficient to provide enough sample for the tests of BOD, TSS, pH, specific conductance, and alkalinity. A 1-liter bottle preserved with sulfuric acid is sufficient to provide enough sample for the tests of ammonia, COD, total phosphorus, and TKN. The tests of settleable solids, oil and grease, and BNA require a full liter of sample for extraction and cannot be consolidated with other tests.

The sampler must measure the chlorine level with respect to preservation of the VOC and BNA samples. If chlorine residual is detected above 0.1 mg/L during field measurement of chlorine, ascorbic acid provided by the lab will be added in the field to the BNA sample bottles following collection until no chlorine is detected. The lab will provide VOC decanting bottles with ascorbic acid. When chlorine is detected, the VOC sample will be added first to the decanting bottle, and then will be decanted into the VOC vials. Shaded areas indicate tests required for twice per month sampling for ADEC general permit compliance. All analytes in the table are required for twice per season samples. *Additional volume of sample is required for matrix spike determination during the BNA analysis. The sampling team will take an additional 2L of sample from all priority pollutant replicate sampling events for this purpose to provide matrix spike data at a frequency of 10% for project related samples.

Sample Handling and Custody Requirements

Sample Custody

Samples and sample containers will be maintained in a secure environment, from the time the bottles leave the laboratory until the time the samples are received at the laboratory. The laboratories will maintain custody of bottles and samples using their normal custody procedures.

Blind field replicates will be identified with discrete sampling labels and recorded as blind field replicates in the sampler's field notebook.

To maintain the secure environment for samples on board ship and during transport, samples must be: 1) in the sampler’s possession (line of sight); or 2) in a cooler sealed with signed and dated friable evidence tape or packing tape equivalent on opposing sides of the cooler; or 3) in a locked cooler for which only the sampler has the key. When the cooler is sealed, the method of securing the samples must be such that tampering with samples or bottles is not possible: The cooler must be secured so that the lid cannot be removed without breaking the evidence tape or cutting the lock, so that tampering would be evident.

Transfer of samples will be accomplished using the laboratory’s chain of custody form. When samples are transferred between personnel, such transfer will be indicated on the chain of custody form with signature, date, and time of transfer. The chain of custody will remain with the samples until received by the laboratory.

At any time during sample transfer, if custody is broken, a note must be made on the chain of custody form accompanying the sample. Upon receipt at the laboratory, the laboratory sample custodian will make note if a breach of custody has occurred (for example, if a custody seal has broken during transport).

Sample Temperature and Condition

Samples will be held at 0 - 10° C (do not freeze) for microbiological samples and 0 - 6° C for all other temperature sensitive samples. The sampler will fill a 1-liter HDPE bottle with the effluent sample to serve as a representative temperature blank. A temperature blank will be placed into each cooler at the same time as the first sample and will accompany all samples and will be measured at the laboratory upon receipt of the samples to verify the temperature. The temperature of this blank will be recorded on the chain of custody at the time of sampling and upon receipt of the sample at the lab to demonstrate the initial and final temperature of the sample. Samples received with any indication of ice formation are unacceptable.

To maintain the temperature, extra blue ice will be kept frozen on-board ship or ship ice will be used. Blue ice or ship ice will be exchanged just before shipment of samples to the lab and may be exchanged more frequently during the sampling trip, as required.

Some samples may be at a temperature near body temperature (37° C) at time of sample collection. This temperature encourages growth of fecal coliform bacteria and thus these samples must be cooled as quickly as possible, without freezing them. The sample bottles for microbial testing shall be placed in a water bath containing ice cubes provided on board ship. The bottles should be immersed in the water to the shoulder, rotated frequently, and ice should be added/water drained off as the ice melts for at least one hour or until the sample reaches a temperature of <10° C. The sampler will fill a 120 ml HDPE bottle with the effluent sample to serve as a representative temperature blank. The temperature of this blank will also be recorded on the chain of custody at the time of sampling and upon receipt of the sample at the lab to demonstrate the initial and final temperature of the microbial sample. This temperature blank must also be measured /documented as being above freezing upon receipt with no indication of freezing of samples and temperature blank. To ensure custody of these samples that may not be able to be sealed in the cooler until the temperature is lowered, these bottles can be sealed with custody tape individually, as necessary.

In no event will samples be placed in refrigerators meant for human food or beverages.

Sample Holding Times

Sample holding times are as described in Table 5 above. Planned sample shipping schedules will allow for the meeting of these holding times.

The most critical holding time will be that of fecal coliforms, which is defined by EPA as 8 hours to commencement of analysis. To meet this holding time, a stringent scheduling effort will be required by the laboratory and sampling team. If the normal discharge pattern is altered to adhere to this holding time, a note will be made of the change in the field notes and in the final quality control review.

Sample Disposal

Samples collected for analysis shall be held by the laboratory for not less than six months from the sample collection date, or for an extended time period on an individual basis as directed by the USCG and ADEC prior to the six-month date, with the exception of samples that have a biological component.

Analytical Methods and Quality Control Requirements

Water quality analytical methods that will be used throughout this project are listed in Table 6. Changes to analytical methods require ADEC approval prior to implementation. All methods used for this project must be contained in Appendix C. Only approved methods for water/wastewater (not drinking water) will be used for the analysis of microbiological and all other sample analytes. Any lab performing analytical work on samples collected within Alaska must provide a current electronic copy of their approved Quality Assurance Manual (and respective measurement method SOPs) to the ADEC QA Officer as well as the Project QA Officer. These documents must specify calibration and quality control criteria, practices and procedures that are essential in the review, validation, verification, and reporting of sample result data. Lab and field QA/QC results and their acceptance limits used to verify and validate respective sample data will be reported with each data report. Sample results provided to ADEC and USCG will include this information.

The USCG requires the analytical report within 15 calendar days after the sampling date for conventional pollutant analyses. The USCG requires the analytical report within 30 calendar days from the sampling date for priority pollutant analysis and associated conventional pollutant analyses from the same sampling event. The ADEC requires conventional and priority pollutants reports within 21 days of completion of laboratory analysis.

The MDL referred to in Table 6 is a statistically derived method detection limit, typically arrived at by repeat analyses performed by the laboratory, with a statistical EPA-defined calculation then performed (40 CFR 136 Appendix B). It is sometimes method-defined (as in BOD). The PQL (Practical Quantitation Limit) is the level at which the laboratory QA department is confident in reporting data. Because the MDL is statistically derived, data can be detected at and near the MDL that may not be accurate and are frequently false positives. For this reason, many labs do not report at the MDL but report at some level, often about 3 times greater than the MDL (varies by lab to ensure statistical confidence). The MDLs and Reporting Limits are usually laboratory-specific standards and are not tied to compliance limits and are not regulatory action levels. The MDL and PQL values in this document reflect typical laboratory performance at the present time and will serve as general targeted levels for this project. PQL values must be lower than compliance levels for any parameters with defined effluent limits in the ADEC General Permit. Actual data reporting levels may change due to ongoing detection limit studies and sample dilution due to matrix interferences. Percent recovery (accuracy) limits are directed by the official laboratory methods, or in the absence of such directives, are derived from laboratory performance. Current targeted guidelines for MDLs, RLs (minimum levels, PQL), and precision and accuracy requirements for the project are listed in the following table.

Table 6. Project Measurement Quality Objectives

PARAMETER	Analytical Methods	MDL (mg/L)	PQL (mg/L)	PRECISION (RPD, RSD)	BIAS (% Recovery)
Conventional Pollutants					
Alkalinity	SM 2320 B-2011	1.13	5	<20%	90 - 100 %
Ammonia – Total	EPA 350.1 Hach 10205	0.147	0.5	<20%	80 - 120 %
Biochemical Oxygen Demand	EPA 405.1 SM 5210	2	2	<20%	70 - 130 %
Chemical Oxygen Demand	EPA 410.4 Rev 2.0	11	28	<20%	85 - 115 %
Chlorine Residual (total/free)	SM 4500-Cl (G)	0.1	0.1	<20%	N/A
Fecal Coliforms	SM 9222 D	1 FC/100 ml	2 FC/100 ml	Analyzed but no precision criteria	N/A
Hardness	SM 2340 B-2011	0.43	20	<20%	75 - 125 %
Nitrate	EPA 300.0	0.014	0.1	<20%	90-110 %
Nitrate plus Nitrite	EPA 350.1 EPA 300.0	0.014	0.1	<20%	90-110 %
Oil and Grease	EPA 1664B	1.4	5	<18%	78-114%
pH	SM 4500 EPA 150.1	0.10 standard units	0.10 standard units	<20%	N/A
Settleable Solids	SM 2540 F	0.10 (ml/L)	0.10 (ml/L)	<20%	N/A
Specific Conductance	SM 2510 B-1997 EPA 120.1	1.68µm Hos/cm	5 µmHos/cm	<20%	85 - 115 %
Total Kjeldahl Nitrogen	EPA 351.2 Rev 2.0 Hach 10242	0.44	5	<20%	85 - 115 %
Total Organic Carbon	SM 5310C	0.22	1	<20%	85 - 115 %
Total Phosphorus	EPA 365.1 Rev 2.0	0.064	0.3	<20%	90-110%
Total Suspended Solids	EPA 160.2 SM 2540D	1	4	<20%	85 - 115 %

LAB PARAMETER	Method	MDL (ug/L)	PQL (ug/L)	PRECISION (RPD)	BIAS (% Recovery)
Priority Pollutants					
Total Recoverable Metals (Total)					
Antimony	EPA 200.8 Rev 5.4	0.52	1	<20%	85 - 115 %
Arsenic	EPA 200.8 Rev 5.4	0.27	1	<20%	85 - 115 %
Beryllium	EPA 200.8 Rev 5.4	0.11	1	<20%	85 - 115 %
Cadmium	EPA 200.8 Rev 5.4	0.1	0.5	<20%	85 - 115 %
Chromium	EPA 200.8 Rev 5.4	0.28	1	<20%	85 - 115 %
Copper	EPA 200.8 Rev 5.4	0.18	1	<20%	85 - 115 %
Lead	EPA 200.8 Rev 5.4	0.26	1	<20%	85 - 115 %
Mercury (Total)	EPA 245.1 Rev 3.0	0.2	0.2	<20%	85 - 115 %
Nickel	EPA 200.8 Rev 5.4	0.23	1	<20%	85 - 115 %
Selenium	EPA 200.8 Rev 5.4	0.56	1	<20%	85 - 115 %
Silver	EPA 200.8 Rev 5.4	0.053	1	<20%	85 - 115 %
Thallium	EPA 200.8 Rev 5.4	0.1	1	<20%	85 - 115 %
Zinc	EPA 200.8 Rev 5.4	2.0	5	<20%	85 - 115 %
Dissolved Metals					
Antimony	EPA 200.8 Rev 5.4	0.52	1	<20%	85 - 115 %
Arsenic	EPA 200.8 Rev 5.4	0.27	1	<20%	85 - 115 %
Beryllium	EPA 200.8 Rev 5.4	0.11	1	<20%	85 - 115 %
Cadmium	EPA 200.8 Rev 5.4	0.1	0.5	<20%	85 - 115 %
Chromium	EPA 200.8 Rev 5.4	0.28	1	<20%	85 - 115 %
Copper	EPA 200.8 Rev 5.4	0.18	1	<20%	85 - 115 %
Lead	EPA 200.8 Rev 5.4	0.26	1	<20%	85 - 115 %
Nickel	EPA 200.8 Rev 5.4	0.23	1	<20%	85 - 115 %
Selenium	EPA 200.8 Rev 5.4	0.56	1	<20%	85 - 115 %
Silver	EPA 200.8 Rev 5.4	0.053	1	<20%	85 - 115 %
Thallium	EPA 200.8 Rev 5.4	0.1	1	<20%	85 - 115 %
Zinc	EPA 200.8 Rev 5.4	2.0	5	<20%	85 - 115 %

LAB PARAMETER	Method	MDL (ug/L)	PQL (ug/L)	PRECISION (RPD)	BIAS (% Recovery)
VOCs					
1,1,1,2-Tetrachloroethane	EPA 624.1	0.11	2	<30%	75.1-116%
1,1,1-Trichloroethane	EPA 624.1	0.12	1	<30%	70-130%
1,1,2,2-Tetrachloroethane	EPA 624.1	0.31	1	<30%	60-140%
1,1,2-Trichloroethane	EPA 624.1	0.24	1	<30%	70-130%
1,1-Dichloroethane	EPA 624.1	0.17	1	<30%	70-130%
1,1-Dichloroethene	EPA 624.1	0.12	1	<30%	50-150%
1,1-Dichloropropene	EPA 624.1	0.15	1	<30%	80-132%
1,2,3-Trichlorobenzene	EPA 624.1	0.59	1	<30%	66.1-126%
1,2,3-Trichloropropane	EPA 624.1	0.36	1	<30%	64.4-110%
1,2,4-Trichlorobenzene	EPA 624.1	0.31	1	<30%	73-124%
1,2,4-Trimethylbenzene	EPA 624.1	0.34	1	<30%	90-130%
1,2-Dibromo-3-Chloropropane	EPA 624.1	0.19	2	<30%	61.7-113%
1,2-Dichlorobenzene	EPA 624.1	0.38	2	<30%	65-135%
1,2-Dichloroethane	EPA 624.1	0.28	1	<30%	70-1305%
1,2-Dichloropropane	EPA 624.1	0.22	1	<30%	35-165%
1,3,5-Trimethylbenzene	EPA 624.1	0.29	1	<30%	86-1260%
1,3-Dichlorobenzene	EPA 624.1	0.47	2	<30%	70-130%
1,3-Dichloropropane	EPA 624.1	0.24	1	<30%	80-120%
1,4-Dichlorobenzene	EPA 624.1	0.53	2	<30%	65-135%
2,2-Dichloropropane	EPA 624.1	0.25	1	<30%	65.6-156%
2-Butanone	EPA 624.1	0.33	2	<30%	56.7-121%
2-Chloroethyl Vinyl Ether	EPA 624.1	0.66	2	<30%	1-225%
2-Chlorotoluene	EPA 624.1	0.29	1	<30%	87-137%
2-Hexanone	EPA 624.1	0.47	5	<30%	44.7-116%
4-Chlorotoluene	EPA 624.1	0.28	1	<30%	81-1210%
4-Isopropyltoluene	EPA 624.1	0.54	1	<30%	86.6-132%
4-Methyl-2-Pentanone	EPA 624.1	0.38	1	<30%	49.4-116%
Acetone	EPA 624.1	0.38	5	<30%	51.8-114%
Acrolein	EPA 624.1	3.97	10	<30%	50.7-121%
Acrylonitrile	EPA 624.1	3.65	10	<30%	62.6-128%
Benzene	EPA 624.1	0.14	1	<30%	65-135%
Bromobenzene	EPA 624.1	0.18	1	<30%	72.4-112%
Bromochloromethane	EPA 624.1	0.20	1	<30%	68.5-125%
Bromodichloromethane	EPA 624.1	0.16	1	<30%	65-135%

LAB PARAMETER	Method	MDL (ug/L)	PQL (ug/L)	PRECISION (RPD)	BIAS (% Recovery)
Bromoform	EPA 624.1	0.12	1	<30%	70-130%
Bromomethane	EPA 624.1	0.83	2	<30%	15-185%
Carbon Disulfide	EPA 624.1	0.59	2	<30%	29.3-150%
Carbon Tetrachloride	EPA 624.1	0.14	1	<30%	70-130%
Chlorobenzene	EPA 624.1	0.14	1	<30%	65-135%
Chloroethane	EPA 624.1	0.30	2	<30%	40-160%
Chloroform	EPA 624.1	0.21	1	<30%	70-135%
Chloromethane	EPA 624.1	0.94	2	<30%	0-205%
Cis-1,2-Dichloroethene	EPA 624.1	0.19	1	<30%	82-122%
Cis-1,3-Dichloropropene	EPA 624.1	0.13	1	<30%	25-175%
Dibromochloromethane	EPA 624.1	0.13	1	<30%	70-135%
Dibromomethane	EPA 624.1	0.28	1	<30%	73.2-113%
Dichlorodifluoromethane	EPA 624.1	0.33	2	<30%	10-168%
Ethylbenzene	EPA 624.1	0.15	1	<30%	60-140%
Hexachlorobutadiene	EPA 624.1	2	2	<30%	77.8-144%
Iodomethane	EPA 624.1	0.35	1	<30%	50-150%
Isopropylbenzene	EPA 624.1	0.26	1	<30%	87.4-124%
m&p Xylenes	EPA 624.1	0.30	2	<30%	88.9-120%
Methylene Chloride	EPA 624.1	0.41	2	<30%	60-140%
n-Butylbenzene	EPA 624.1	0.68	1	<30%	85.7-160%
n-Propylbenzene	EPA 624.1	0.34	1	<30%	80.6-133%
O-Xylene	EPA 624.1	0.12	1	<30%	87-117%
sec-Butylbenzene	EPA 624.1	0.33	1	<30%	90-144%
Styrene	EPA 624.1	0.11	1	<30%	74.1-116%
tert-Butyl Methyl Ether	EPA 624.1	0.31	2	<30%	64.5-113%
tert-Butylbenzene	EPA 624.1	0.48	1	<30%	86.1-132%
Tetrachloroethene	EPA 624.1	0.15	1	<30%	70-130%
Toluene	EPA 624.1	0.15	1	<30%	70-130%
Trans 1,2-Dichloroethene	EPA 624.1	0.14	1	<30%	70-130%
trans-1,3-Dichloropropene	EPA 624.1	0.20	1	<30%	50-150%
trans-1,4-Dichloro-2 Butene	EPA 624.1	0.40	2	<30%	50-150%
Trichloroethene	EPA 624.1	0.15	1	<30%	65-135%
Trichlorofluoromethane	EPA 624.1	0.15	1	<30%	50-150%
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 624.1	0.21	5	<30%	50-150%
Vinyl Acetate	EPA 624.1	0.32	1	<30%	55-126%
Vinyl Chloride	EPA 624.1	0.258	2	<30%	5-195%

LAB PARAMETER	Method	MDL (ug/L)	PQL (ug/L)	PRECISION (RPD)	BIAS (% Recovery)
BNA (Base/Neutrals and Acids) [1]					
1,2-Diphenylhydrazine	EPA 625.1	1.0	10	<30%	40-140%
2,4,5-Trichlorophenol	EPA 625.1	0.76	10	<30%	40-140%
2,4,6-Trichlorophenol	EPA 625.1	0.74	10	<30%	40-140%
2,4-Dichlorophenol	EPA 625.1	0.61	10	<30%	40-140%
2,4-Dimethylphenol	EPA 625.1	0.68	10	<30%	32-119%
2,4-Dinitrophenol	EPA 625.1	0.3	50	<30%	28.7-110%
2,4-Dinitrotoluene	EPA 625.1	0.47	10	<30%	48-110%
2,6-Dinitrotoluene	EPA 625.1	0.57	10	<30%	10-153%
2-Chloronapthalene	EPA 625.1	0.71	10	<30%	30.5-122%
2-Chlorophenol	EPA 625.1	0.72	10	<30%	35-110%
2-Methylnaphthalene	EPA 625.1	0.69	10	<30%	38-110%
2-Methylphenol	EPA 625.1	0.76	10	<30%	30.4-70.4%
2-Nitroaniline	EPA 625.1	0.49	10	<30%	40-140%
2-Nitrophenol	EPA 625.1	0.91	10	<30%	40-140%
3&4-Methylphenol	EPA 625.1	0.83	10	<30%	32.6-63.7%
3,3'-Dichlorobenzidine	EPA 625.1	1.3	50	<30%	47-145%
3-Nitroaniline	EPA 625.1	0.8	10	<30%	38-110%
4,6-Dinitro-2-methylphenol	EPA 625.1	0.34	25	<30%	40-140%
4-Bromophenyl Phenyl ether	EPA 625.1	0.67	10	<30%	53-127%
4-chloro-3-methylphenol	EPA 625.1	0.76	20	<30%	42-110%
4-Chloroaniline	EPA 625.1	0.69	10	<30%	32-126%
4-Chlorophenyl methylsulfone	EPA 625.1	10	10	<30%	30-170%
4-Chlorophenyl Phenyl ether	EPA 625.1	0.69	10	<30%	32-126%
4-Nitroaniline	EPA 625.1	1.0	10	<30%	40-140%
4-Nitrophenol	EPA 625.1	0.83	50	<30%	10-50%
Acenaphthene	EPA 625.1	0.012	10	<30%	36-110%
Acenaphthylene	EPA 625.1	0.003	10	<30%	33-110%
Anthracene	EPA 625.1	0.007	10	<30%	40-115%
Benzidine	EPA 625.1	20	50	<30%	30-170%
Benzo (A) Anthracene	EPA 625.1	0.004	10	<30%	44-110%
Benzo (A) Pyrene	EPA 625.1	0.006	10	<30%	17-163%
Benzo (B) Fluoranthene	EPA 625.1	0.006	10	<30%	52-125%
Benzo (g,h,i) Perylene	EPA 625.1	0.005	10	<30%	34-110%
Benzo (K) Fluoranthene	EPA 625.1	0.007	10	<30%	40-110%

Benzoic Acid	EPA 625.1	0.5	5.0	<30%	13.8-43.3%
LAB PARAMETER	**Method**	**MDL (ug/L)**	**PQL (ug/L)**	**PRECISION (RPD)**	**BIAS (% Recovery)**
Benzyl Alcohol	EPA 625.1	0.66	10	<30%	40-140%
Bis (2-Chloroethoxy) methane	EPA 625.1	0.85	10	<30%	40-140%
Bis (2-chloroethyl) ether	EPA 625.1	0.77	10	<30%	29.1-110%
2'2-Oxybis (1-chloropropane)	EPA 625.1	0.68	10	<30%	25-121%
Bis (2-Ethylhexyl) Phthalate	EPA 625.1	1.2	10	<30%	30-140%
Butyl Benzyl Phthalate	EPA 625.1	0.91	10	<30%	10-152%
Chrysene	EPA 625.1	0.006	10	<30%	36-110%
Dibenzo (a,h) Anthracene	EPA 625.1	0.006	10	<30%	40-116%
Dibenzofuran	EPA 625.1	0.68	10	<30%	40-140%
Diethyl Phthalate	EPA 625.1	1.3	10	<30%	5-114%
Dimethyl Phthalate	EPA 625.1	0.68	10	<30%	10-144%
Di-N-Butyl Phthalate	EPA 625.1	0.82	10	<30%	40-140%
Dimethyl Phthalate	EPA 625.1	1.3	10	<30%	10-144%
Di-N-Butyl Phthalate	EPA 625.1	0.82	10	<30%	40-140%
Di-N-Octyl Phthalate	EPA 625.1	0.7	10	<30%	25.9-110%
Fluoranthene	EPA 625.1	0.005	10	<30%	26-137%
Fluorene	EPA 625.1	0.004	10	<30%	35-110%
Hexachlorobenzene	EPA 625.1	0.96	10	<30%	40-140%
Hexachlorocyclopentadiene	EPA 625.1	0.4	10	<30%	11-110%
Hexachloroethane	EPA 625.1	1.0	10	<30%	14.1-76.7%
Indeno (1,2,3-CD) Pyrene	EPA 625.1	0.004	10	<30%	42-120%
Isophorone	EPA 625.1	0.8	10	<30%	21-196%
Napthalene	EPA 625.1	0.006	10	<30%	29-110%
Nitrobenzene	EPA 625.1	0.79	10	<30%	35-180%
N-Nitrosodimethylamine	EPA 625.1	0.91	10	<30%	25.7-49.4%
N-Nitrosodi-N-Propylamine	EPA 625.1	0.99	10	<30%	39-110%
N-Nitrosodiphenylamine	EPA 625.1	0.72	10	<30%	31-110%
Pentachlorophenol	EPA 625.1	0.31	50	<30%	33-110%
Phenanthrene	EPA 625.1	0.007	10	<30%	37-110%
Phenol	EPA 625.1	0.37	10	<30%	10-50%
Pyrene	EPA 625.1	0.005	10	<30%	47-124%

[1] Quality control analyses for BNA contain an abbreviated list of applicable compounds. These compounds are changed annually by the laboratory on a 3-year rotation.

Instrument/Equipment Testing, Inspection, Maintenance, and Calibration

Field instruments include a hand-held pH meter, chlorine residual colorimeter instrument, and a probe thermometer. These must be certified against a laboratory method for pH and chlorine and NIST certified thermometer. All field kits must have certified instruments. The temperature, pH, and chlorine certification and calibration must be documented in the field notes.

The analysis of chlorine in the field will be used for the official analytical result. Maintenance of the chlorine residual test kit includes keeping the sample vial rinsed after sample measurement, keeping the vial clean and free of fingerprints and oils, and keeping the colorimeter itself clean. An extra sample vial will be kept with the test kit in case of breakage or scratches to the sample vial. The field kit should be checked against the lab kit twice per season. The colorimeter must be verified at a minimum frequency of once per week with a secondary standard that ensures the colorimeter optics are optically aligned and set to the correct wavelength frequency. Secondary standards are available from instrument manufacturers. Should the colorimeter fail a secondary QC check standard, the colorimeter will be recalibrated prior to use. Calibration and QC check standard results will be documented and maintained by the monitoring group performing the analysis.

The analysis of pH in the field will be used for the official analytical result. A pH meter shall be used that ensures the most accurate reading possible in the expected range of pH values. This meter will be calibrated at a minimum frequency of once per week and preferably each day prior to sample analysis. The laboratory will supply reference buffers to the sampling team for field verification of the pH meter on each day of use. Buffers used for pH meter verification should span the expected range of sample pH measurements. If pH meter measurements are not within 0.1 pH units of the reference buffer's stated value, the sampler must recalibrate the meter using appropriate standards.

Temperature at or shortly after sample collection will be measured using either a NIST traceable temperature probe or with an independent thermometer readable to an accuracy of 0.1°C. The validity of the temperature probe will be checked early and late in the season against a current NIST or NIST traceable thermometer certified at a certified laboratory; differences between the temperature probe and the certified thermometer will be documented in the final quality assurance review of the data. Infrared probes are not to be used to measure temperatures as they only measure surface temperatures and not the actual sample temperature.

Laboratory instrument operation and calibration procedures are detailed in the QA Plans and SOPs from the certified laboratories. Copies of these plans will be provided electronically from the lab managers to the Project QA Officer and the ADEC QA Officer.

Inspection/Acceptance Requirements for Supplies and Consumables

All sample containers, tubing, filters, etc. provided by a laboratory or by commercial vendor, will be certified clean for the analyses of interest. The sampling manager/person will make note of the information on the certificate of analysis that accompanies sample containers to ensure that they meet the specifications and guidance for contaminant-free sample containers for the analyses of interest. Except for the sample pump, all dissolved metals filtration apparatus will be certified clean single use. This process will be documented in an SOP in which the sampler has been trained. Sample pumps will not come in

contact with the filtered media and each sample pump will be appropriately cleaned after each use to prevent contamination.

No standard solutions, buffers, or other chemical additives will be used beyond expiration dates. It is the responsibility of the sampling manager or his/her designee to keep appropriate records, such as logbook entries or checklists, to verify the inspection/acceptance of supplies and consumables and restock these supplies and consumables when necessary.

Sample bottles will be lab certified and will not require rinsing with sample. Sample transfer containers will be lab certified clean, will be single use and contain no preservatives.

Samplers will visually inspect sample bottles prior to sample collection. If any issues are noted in the inspection (cracked bottles, missing lids, expired bottles, etc.) which could compromise sample integrity, the sampler will replace the compromised bottles. If replacement bottles are not available, the sampler will note the issues on the COC form. If replacement bottles are not equivalent to the original bottles, discrepancies will be recorded on the COC form and field notes.

Contracted and sub-contracted laboratories will follow procedures in their laboratory's QA Plan and SOPs for inspection/acceptance of supplies and consumables.

Inspection/Acceptance Requirements (Non-Direct Measurements)

Historical data for this project includes only 17 years of monitoring, so data acceptance criteria will not be required for historical data acceptance.

Onboard ship data to be recorded includes vessel location and speed and discharge flow rate. The data will be recorded as reported by shipboard staff in the Graywater and Blackwater Discharge Record Book and through direct observation by the sampling team.

Data Management

The success of a monitoring project relies on data and their interpretation. It is critical that data be:

- Of known quality,
- Reliable,
- Aggregated in a manner consistent with their prime use, and
- Accessible to a variety of users.

Quality Assurance/Quality Control (QA/QC) of data management begins with the raw data and ends with a defensible report, preferably through the computerized messaging of raw data.

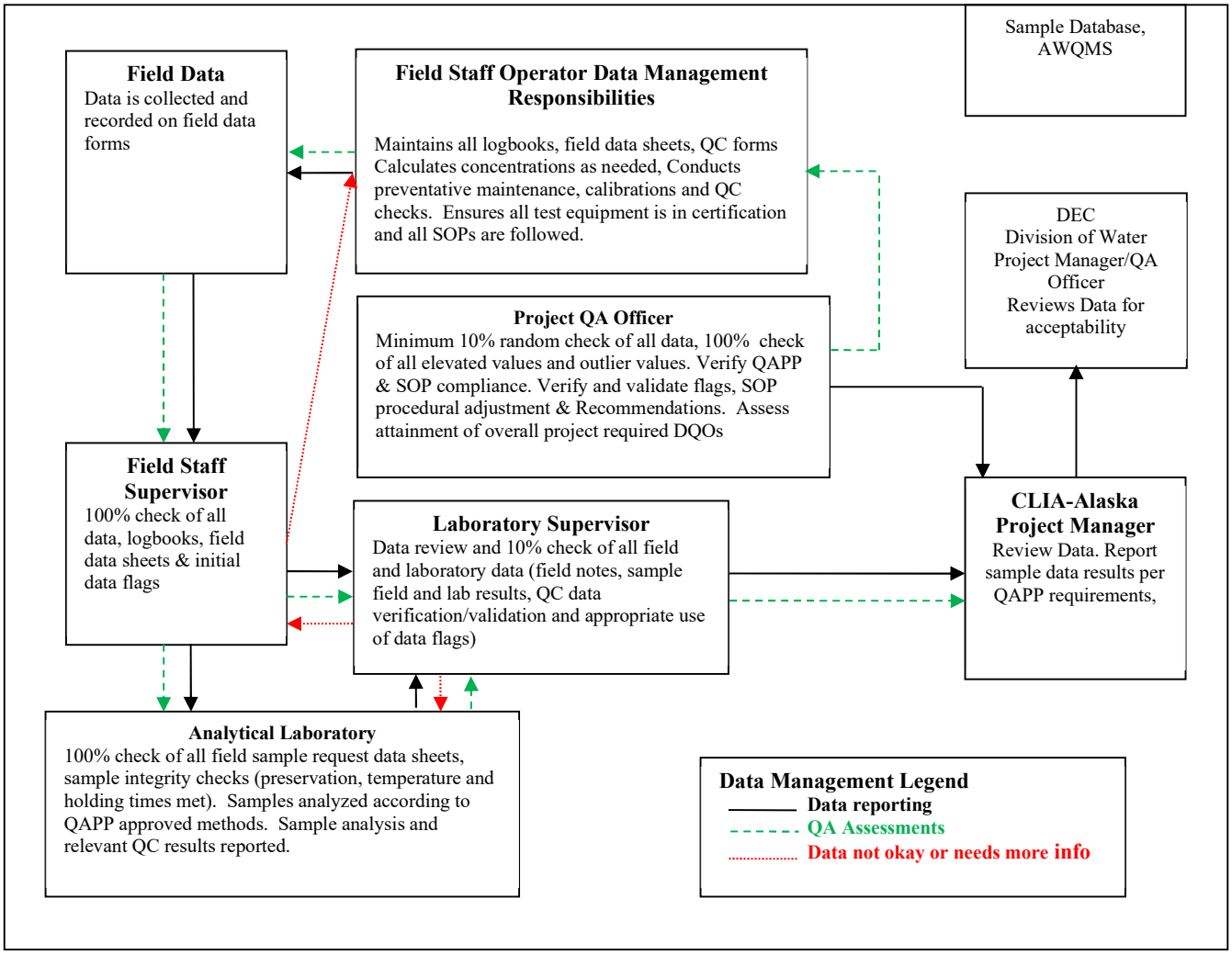
Data management encompasses and traces the path of the data from generation to final use or storage (e.g., from field measurements and sample collection/recording through transfer of data to computers (laptops, data acquisition systems, etc.), laboratory analysis, data validation/verification, QA assessments and

reporting of data of known quality to the respective office within ADEC Division of Water. It also includes/discusses the control mechanism for detecting and correcting errors.

Various people (see Appendix D) are responsible for separate or discrete parts of the data management process (Figure 2):

- The field samplers are responsible for field measurements/sample collection and recording of data and subsequent shipment of samples to laboratories for analyses. They assemble data files, which includes raw data, calibration information and certificates, QC checks (routine checks), data flags, sampler comments and meta data where available. These files are assembled and forwarded for secondary data review by the sampling supervisor.
- Laboratories are responsible to comply with the data quality objectives specified in the QAPP and as specified in the laboratory QAP and method specific SOPs. Validated sample laboratory data results are reported to the Sampling Manager and the CLIA-Alaska Project Manager.
- Secondary reviewers (sampling coordinator/project manager) are responsible for QC and verification and validation of field and laboratory data and data reformatting as appropriate for the intended ADEC data storage database and reporting validated data to the project manager.
- The Project QA officer is responsible for performing routine independent reviews of data to ensure the monitoring projects data quality objectives are being met. Findings and recommended corrective actions (as appropriate) are reported directly to project management.
- The CLIA-Alaska Project Manager is responsible for final data certification.
- The CLIA-Alaska Project Manager will report data directly to the USCG, the ADEC Project Manager and the individual cruise lines after thorough review by the Laboratory QA Manager within the regulatory time limits.
- The Lab Project Manager will not be placed in the position of determining whether an analytical result represents a violation of federal or state laws or regulations.

Figure 2. Data Management Flow Chart



Assessment/Oversight

Assessments and Response Actions

Assessments are independent (of management) evaluations of the monitoring project that are performed by the Project QA Officer or his/her designee. At a minimum the Project QA Officer is responsible for: on-site field assessments, laboratory audits, performance evaluation samples, blind sample replicates (precision samples), data reviews and end of cruise ship season data quality assessments (Table 7).

Field Assessments

The Project QA Officer will perform a field sampling audit on a minimum of two randomly selected sampling events during the project to evaluate the performance of the sampling team. The Project QA Officer must notify ADEC 36 hours prior to the audit to observe if desired. Follow-up field audits may be necessary pending audit findings. The initial field sampling audit will be conducted within 30 days of project initiation, with the second audit occurring midway through the project. Each audit will concentrate on sampling technique, sample handling, field records, field testing methods, chain of custody, and adherence to vessel specific sampling plans and the QAPP. The Project QA Officer will do a verbal on-site debriefing of assessment findings to sampling personnel. The QA Officer will issue a draft field assessment to sampling personnel and the CLIA-Alaska PM within one week of assessment for confirmation/verification by the auditee of audit findings. The Project QA Officer will issue the final assessment report to the CLIA-Alaska PM, ADEC QA Officer and ADEC PM within two weeks of the assessment. The USCG and ADEC may also participate in random onboard field assessments of the sampling effort. The Project QA Officer and CLIA-Alaska Project Manager will be advised in a timely manner of the results of each USCG or ADEC onboard field assessment.

Laboratory Assessments

Laboratories are subject to periodic and extensive audits by regulatory agency personnel as part of their certification. Reports of most recent 3rd party laboratory technical systems audits, EPA Drinking Water and Water/Wastewater Blind Performance Evaluation Samples demonstrating competence in the respective methods will be made available to the ADEC Project Manager, ADEC QA Officer, and the Project QA Officer prior to analysis of samples. The Project QA Officer will review any recent and pertinent technical systems audit reports of the analytical laboratories involved in this project.

The Project QA officer will use technical system audit report findings and recommendations to design an on-site technical systems audit of the project laboratories (in consultation with and support from technical experts at ADEC). The technical systems audit must be performed within the first 30 days of project initiation so any recommended enhancements to laboratory operations can be implemented early in the project. The Project QA Officer must notify the ADEC Project manager at least 36 hours prior to audit of the audit date to give the ADEC the opportunity to observe if desired. The ADEC may perform additional lab audits for labs analyzing commercial passenger vessel samples.

Based upon review and acceptable performance of recent lab audits and Performance Evaluation sample results, the Project QA Officer may recommend that a technical systems audit is not warranted. If the ADEC Project Manager and ADEC QA Officer disagree, the on-site lab technical audit must be performed.

The ADEC Project Manager and ADEC QA Officer will be notified in advance and invited to participate in any audit, and a report of these findings will be presented to the ADEC Project Manager and the Lab Project Manager. Any deficiencies noted by the auditor will be corrected immediately, and the Lab Manager will note these changes in a corrective action report to the Project QA Officer and ADEC Project Manager. The Project QA Officer will also perform a technical systems audit on two sampling events to evaluate laboratory log-in, sample handling, preservation, and storage procedures.

Laboratories performing testing under this program must also participate in a DMR-QA (Discharge Monitoring Report Quality Assurance) performance sample study once annually with results sent directly to the Project QA Officer and the ADEC QA Officer for all wastewater parameters (chemistry and microbiology) analyzed under this program.

Precision and Bias

Precision blind sample replicates will be collected on a minimum of 10% of the total number of samples collected for the project. Of these replicates, a minimum of 10% of the total number of twice per season samples collected for the project must be included as part of the total number of replicates. The purpose of the blind sample replicates is to assess sampling and laboratory error and to assess overall method variability. Precision between the sample and its replicate will be determined by calculating the relative percent difference between the two samples, in the same way that precision is measured between two laboratory-fortified blanks or a matrix spike/matrix spike duplicate. The use of replicate samples extends the test of precision to the sampling method itself. The use of blind samples provides a test of the laboratory and is used to assess bias or analytical errors not detected by the laboratory (e.g., a false positive). Every effort will be made to ensure that the labeling of the samples does not disclose the replicate nature of the samples to the laboratory. The samples will be analyzed by the same lab and for the same parameters. Replicate samples will be evaluated as individual precision pairs, and overall measurement precision will be evaluated for each parameter for the monitoring season as an aggregate of the pair analyses. Results of the replicate analysis will be monitored by the Project QA Officer and submitted to the ADEC Project Manager. Acceptance criteria limits for precision samples are listed in Table 6, Project Measurement Quality Objectives.

Bias/Accuracy Matrix spike duplicates will be performed by laboratories analyzing the samples. Acceptance criteria limits for bias are listed in Table 6, Project Measurement Quality Objectives.

Table 7. Project Assessments

Assessment Type/Auditor	Measurement Parameters	Frequency	Acceptance Criteria Limits
On-site Sampling Audit/Project QAO	On-site measurement parameters and laboratory parameters	2/monitoring season	Site technicians in compliance with QAPP on-site measurement methods and sampling protocols, sample site meets VSSP design criteria
3rd Party PT Sample Audit/Project QAO	Laboratory parameters	Annually	Analytes within PT study limits
On-site Technical System Laboratory Audit/Project QAO	Laboratory parameters	Annually if determined necessary by ADEC	
Blind Sample Replicate Assessment/Project QAO	On-site measurement parameters and laboratory parameters	All Blind Sample Replicates	See Project MQOs (Table 6)
Data Quality Audits/ Project QAO	Laboratory parameters	20% of reported data	All sample data results evaluated against analyte specific QA/QC criteria limits
End of Season Summary QA Assessment Report/ Project QAO	On-site measurement parameters and laboratory parameters	Annually at end of Cruiseship Season	See Project MQOs (Table 6)

Corrective Action

The CLIA-Alaska Project Manager will notify the Project QA Officer and ADEC project manager within 7 days, if errors are noted by the laboratory or sampling personnel. The Project QA Officer will then notify the Lab Project Manager and the party responsible for the error of the deficiency and will recommend methods of correcting the deficiency. The responsible party will then immediately correct the problem and will send those corrections via email to the Project QA Officer, the CLIA-Alaska Project Manager, and ADEC Project Manager. The Project QA Officer will conduct a follow-up assessment to ensure recommended corrective actions are routinely being followed.

All revised reports/documents will be clearly labelled as revised and include the revision date in red. A brief description of the change should be included on the first page or described in the accompanying email distribution.

Reports to Management

The Project QA Officer will issue audit reports in accordance with the following guidelines (Table 8):

- All reports will contain page numbers (i.e., page x of x). If tables are split, repeat table headers at the top of the following page. Include the laboratory report that is the subject of the audit in the submission of the audit (if applicable).
- Field sampling audits--Verbal on-site debriefing of audit findings to sampling personnel, and as outlined in Table B. Draft field audit report issued to sampling personnel and CLIA-Alaska Project Manager within one week of audit. Final audit report to CLIA-Alaska Project Manager and ADEC Project Manager within 2 weeks of end of audit. The CLIA-Alaska Project Manager will forward all corrective action reports to the ADEC Project Manager when completed.
- Technical laboratory audit—Verbal on-site debriefing of audit findings to laboratory personnel, and Lab Project Manager. Draft technical systems audit report to CLIA-Alaska Project Manager and ADEC Project Manager within 1-2 weeks of end audit (depending upon depth and extent of audit). Final technical systems audit report to CLIA-Alaska Project Manager and ADEC Project Manager within 2 – 4 weeks of end of audit (depending upon depth and extent of audit). CLIA-Alaska WCCA Project Manager will forward all corrective action reports to the ADEC Project Manager when completed.
- Blind Sample Replicate Assessment—Draft report findings within one week of receiving/verifying results to Laboratory QA officer, CLIA-Alaska Project Manager, and ADEC Project Manager. A final report will be issued to these same personnel within one month of the Project QA Officer's receipt of the results.

By November 30th, the Project QA Officer will issue an End of Season Report to the CLIA-Alaska Project Manager, USCG, ADEC Project Manager, ADEC QA Officer. This report will detail findings, problems and resolutions, data reliability, and recommendations for future monitoring.

Table 8. QA Reports to Management

QA Report Type	Contents	Presentation Method	Report Issued by
On-site Sampling Audit Report	Description of audit methods and results including and any recommendations	Written text and tables, charts, graphs displaying results	Project QA Officer
3rd Party PT Audit Report	Description of PT study results, methods of analysis and any recommendations	Written text and tables, charts, graphs displaying results	Project QA Officer
On-site Technical System Laboratory Audit Report	Description of audit methods and results including and any recommendations	Written text and tables, charts, graphs displaying results	Project QA Officer
Blind Sample Replicate Assessment Report	Evaluation of blind sample replicate results including an evaluation against project MQOs and recommendations for improvements.	Written text and tables, charts, graphs displaying results	Project QA Officer
Corrective Action Report	Description of problem(s); recommended action(s) required; time frame for feedback on resolution of problem(s)	Written text/table	Project QA Officer
Response to Corrective Action Report	Description of problem(s); description/date corrective action(s) implemented and/or scheduled to be implemented	Written text/table	CLIA-Alaska Project Manager
Follow up Response to Corrective Action Report	Description of problem(s); description/date corrective action(s) taken; verification corrective actions implemented, corrected problems and are routinely being followed.	Written text/table	Project QA Officer
Data Quality Audits	20% Independent review of all sample data packages including verification of correct sample collection, analysis and reporting; summary of data audit results; findings; and any recommendations	Written text and charts, graphs displaying results	Project QA Officer
End of Season QA Summary Report to Management	Project summary; evaluation and summary of data completeness, precision, and bias; listing/summary of parameters exceeding permit limits, problems detected; corrective actions taken; recommendations for future monitoring operations.	Written text and charts, graphs displaying results	Project QA Officer

Data Validation and Usability

Data Review, Verification, and Validation

During the project, the Project QA Officer will review at least 20% of field notes and laboratory data packages of the twice per season samples to detect correctable problems for the remainder of the study. The first data review must be submitted by June 15 of each year to correct any system problems early in the season. The other data reviews must be equally spaced throughout the season. Upon receipt of these completed data packages from the CLIA-Alaska Project Manager, the Project QA Officer will review data and field notes to verify that this QAPP was followed. Items reviewed will include:

- Comparison of dated vessel specific sampling plans with the QAPP to assure that the correct samples were taken.
- Comparison of dated sampling plans with field notes and custody forms to assure that planned samples were collected.
- Review of field notes and data to assure that information specified in the QAPP has been recorded.
- Review of laboratory data packets, particularly the QA/QC laboratory sheets.

Any problems noted will be immediately brought to the attention of the Lab Project Manager who will take appropriate corrective action as necessary. The ADEC Project Manager will also be notified. This data review must be completed and submitted to the ADEC within 40 days of the sampling event. Any review made outside the date will not be accepted.

Reconciliation with Data Quality Objectives

The Project QA Officer will reconcile the data from this project with the Measurement Quality Objectives defined in this document following the validation and verification methods stated above. If an overall assessment of these elements cannot ensure that the data are of sufficient quality to meet objectives, then additional evaluation of raw data will be performed.

Bibliography

Documents referenced during the preparation of this document include:

1. April 13 *Alaska Cruise Ship Initiative Wastewater Work Group Protocol for Voluntary Wastewater Monitoring Program in 2001*.
2. *NWCCA Cruise Ship Wastewater Monitoring 2012 Quality Assurance Project Plan,* April 10, 2012.
3. *EPA Requirements for QA Project Plans (QA/R-5)*, EPA/240/B-01/003 March 2001.
4. US Code of Federal Regulations; including 33 CFR 159 and 40 CFR 136.
5. *Water Quality Standards Handbook, Second Edition*, EPA-823-B-94-005a, August 1994.
6. *Compilation of the U.S. Environmental Protection Agency's Water Quality Criteria for the Priority Toxic Pollutants*, ADEC, September 1997.
7. *Methods for Chemical Analysis of Water and Wastes*, Environmental Protection Agency, Environmental Monitoring Systems Laboratory - Cincinnati (EMSL-CI), EPA-600/4-79-020, Revised March 1983 and 1979 where applicable.
8. *Standard Methods for the Analysis of Water and Wastewater*, 21st Edition, APHA/AWWA/WEF.
9. *EPA Test Methods for Evaluating Solid Wastes. Physical/Chemical Methods (SW-846).* 3rd Edition Update 2B, January 1995.
10. *Manual for the Certification of Laboratories Analyzing Drinking Water,* 5th Edition EPA-815-R-05-004, January 2005.
11. *State of Alaska Department of Environmental Conservation Large Commercial Passenger Vessel Wastewater Discharge General Permit No. 2009DB0026,* State of Alaska Department of Environmental Conservation, 2010.

Appendix A: Alaska Cruise Ship Sampling Checklist for Events Within Alaska

Vessel Name _____
Sampler Name_____
Date _____
Sampling Event ID # _____

I. Notification
- ☐ ADEC Project Manager notified 36 hours prior to the sampling event

II. Type of Sampling
- ☐ Twice per month (announced)
  - ☐ USCG Continuous Compliance Parameters
  - ☐ ADEC General Permit Parameters (dissolved metals and ammonia)
  - ☐ If second continuous compliance sample for month, must be at least 24 hours after first sample
- ☐ Twice per season (unannounced)
  - ☐ If second twice per season sample, must be at least 21 days after the first sampling event
- ☐ Other (Example Re-sampling after exceedance of discharge limitations under 18 AAC 69.070 or 33 CFR 159)

III. Sampling Notes (to include:)
- ☐ Vessel name
- ☐ Names of sampling personnel
- ☐ Names of shipboard assistants
- ☐ Signature or initials and date by the vessel crew in the field notes indicating that the sample port is correct (VSSP)
- ☐ Sample ID clearly stating where the sample was taken (VSSP specified collection point)
- ☐ Sample date and times recorded on COC
- ☐ Field measurements: pH, chlorine residual, and temp recorded on COC
- ☐ Records collected on discharge flow rates and holding tank volumes ☐ Nature of sample recorded (composite or grab)
- ☐ Waste type recorded (blackwater, graywater, or mixed)
- ☐ Total time of sample collection recorded (report as deviation if >30 minutes)
- ☐ If deviations from VSSP and/or QAPP noted, reported date and time, to ADEC/USCG
- ☐ If unannounced sampling, sampler verified that vessel is discharging
- ☐ Latitude/longitude and speed at time of discharge being sampled is recorded
- ☐ Copy of the Discharge record for the sampled discharge included
- ☐ Chain of custody properly completed
- ☐ Photograph of sample collection point taken during sampling event, including date, time, and sampling port ID
- ☐ Samples delivered to laboratory within holding times for analyses

Appendix A1: Alaska Cruise Ship Sampling Checklist for Events Outside Alaska Waters

Vessel Name _____
Sampler Name_____
Date _____
Sampling Event ID # _____

I. Notification

- ☐ USCG Continuous Compliance Parameters

II. Sampling Notes (to include:)

- ☐ Vessel name
- ☐ Names of sampling personnel
- ☐ Names of shipboard assistants
- ☐ Signature or initials and date by the vessel crew in the field notes indicating that the sample port is correct
- ☐ Sample ID clearly stating where the sample was taken
- ☐ Sample date and times recorded on COC
- ☐ Field measurements: pH, chlorine residual, and temp recorded on COC
- ☐ Nature of sample recorded (composite or grab)
- ☐ Waste type recorded (blackwater, graywater, or mixed)
- ☐ If deviations from VSSP and/or QAPP noted, reported date and time, to ADEC/USCG
- ☐ Copy of the Discharge record for the sampled discharge included
- ☐ Chain of custody properly completed
- ☐ Photograph of sample collection point taken during sampling event, including date, time, and sampling port ID
- ☐ Samples delivered to laboratory within holding times for analyses

Appendix B: Alaska Cruise Ship Data Review Checklist

Vessel Name _____
Date_____
Location_____
Sampling Team_____
Laboratory_____

Sample Type:

- ☐ Continued Compliance (twice per month)
- ☐ ADEC General Permit (twice per month)
- ☐ Twice per season

Final Report Package Includes:

- ☐ Analytical Report
- ☐ Ship name
- ☐ Sample ID's
- ☐ Sample date and time collected
- ☐ Parameter names and method references
- ☐ Analytical results including analytical methods used for every parameter
- ☐ Method Detection Limits (MDL's)
- ☐ Practical Quantitation Limits (PQL's/reporting limits)
- ☐ Date and time of sample preparation
- ☐ Date and time of analysis
- ☐ Verification that holding times were met
- ☐ Quality control information for lab and field test results: blank results, spiked blank of laboratory control standard recovery, matrix spike/spike duplicate recoveries, relative percent differences between duplicate spike analyses and acceptance limits
- ☐ Case narrative describing deviations from methods, procedural problems with sample analysis, explanation of data abnormalities, and any additional information that is necessary for describing the sample. This narrative should state that either all DQOs/MQOs were met or explain why they were not. Any corrective actions taken to rectify QC problems in a timely manner will be noted. Indication that sample is a resample, if applicable
- ☐ Chain of custody form including copies of Chain of Custodies transferring samples to other laboratories
- ☐ Cooler receipt forms with temperature indicated
- ☐ Discharge logs covering time of sampling. (For recirculated samples, provide discharge logs back to the time of last discharge)
- ☐ Field notes, including discharge flow rates and time elapsed for sample collection not to exceed 30 minutes of bottle fill duration.
- ☐ Latitude and longitude information pertaining to each sample including which overboard port the waste was discharged through and the speed the vessel was traveling
- ☐ Completed sampling checklist
- ☐ Completed data review checklist
- ☐ Photograph of sampling port indicating date, time, and sample port ID
- ☐ Electronic data file containing all lab results in Excel or .xmls format

Appendix C: ADEC Approved Methods for Cruise Ship Testing

1. Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998, published jointly by the American Water Works Association, the American Public Health Association, and the Water Environment Federation.
2. Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983.
3. EPA Test Methods for Evaluating Solid Wastes. Physical/Chemical Methods (SW-846). 3rd Edition Update 2B, January 1995.
4. Methods for Determination of Inorganic Substance in Environmental Samples, EPA/600/R-93-100, August 1993.
5. Methods for the Determination of Metals in Environmental Samples, EPA/600/4-91-010, June 1991.
6. Methods for the Determination of Metals in Environmental Samples, Supplement I, EPA/600/R-94-111, May 1994.
7. Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, December 1988.
8. Methods for the Determination of Organic Compounds in Drinking Water, Supplement I, EPA/600/4-90/020, 1990.
9. Methods for the Determination of Organic Compounds in Drinking Water, Supplement II, EPA/600/R-92/129, August 1992.
10. Methods for the Determination of Organic Compounds in Drinking Water, Supplement III, EPA/600/R-95/131, August 1995.
11. Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater Appendix A to Part 136. 40 CFR, Part 136, Revised as of July 1, 1995.
12. EPA 600 Series - Methods for the Determination of Non-conventional Pesticides in Municipal and Industrial Wastewater - Volume 1 - EPA-821-R-93-010-A, August 1993, Revision 1.

Appendix D: Distribution List

NAME	POSITION	CONTACT INFORMATION
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