

**2006 Operating Season  
Quality Assurance/Quality Control Plan  
For  
Sampling and Analysis of Treated Sewage and  
Graywater  
From  
Large Commercial Passenger Vessels**

*Submitted to fulfill certain requirements of  
38 M. R. S. A. §423-D, and 06-096 CMR Chapter 532*

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# 1. PURPOSE AND APPROVAL

By submission of this standard QA/QCP, representatives of LCPV owners or operators have elected to follow this generic QA/QCP in order to satisfy the obligations of 38 MRSA § 423-B, CMR Chapter 532 and the LCPV General Permit.

By signing and submitting this document to the Maine Department of Environmental Protection we commit to following all the requirements of this QA/QCP as it relates to wastewater sampling, operations and records management pursuant to the requirements of W008222-5Y-A-N, the Large Commercial Passenger Vessel General Permit. Further, we understand that this generic plan may be used in place of a QA/QCP developed specifically by either the vessel owner or operator but that the vessel owner or operator may opt to develop a customized QA/QCP as long as it addresses the items addressed by the generic plan and is submitted to the Department for review and approval at least 90 days prior to the vessel entering Maine waters. We understand that deviation from the procedures described in this plan may result in enforcement action by the State of Maine.

We also understand that the QA/QCP does not take the place or alleviate the need for a Vessel Specific Sampling Plan (VSSP). The VSSP will be submitted to the Department for review and approval at least 30 days prior to the vessel entering Maine's waters.

Vessel Representative

\_\_\_\_\_  
Signature Date

MEDEP Project Manager

\_\_\_\_\_  
Signature Date

MEDEP Quality Assurance Officer

\_\_\_\_\_  
Signature Date

## **Distribution List**

A copy via electronic format of each revision will be distributed to the following individuals:

### **Individual**

Pamela Parker  
Malcolm Burson  
Vessel Representatives  
Local Vessel Agent

### **Organization**

MEDEP Project Manager  
MEDEP Quality Assurance Officer  
Individual Companies  
Individual Companies

## 2. Acronyms/Abbreviations Used

BNA	Base/Neutrals, Acids
BOD	Biochemical Oxygen Demand – 5-day test
CFR	Code of Federal Regulations
COC	Chain of Custody
COD	Chemical Oxygen Demand
COTP	US Coast Guard Captain of the Port
DQO	Data Quality Objective
EPA	Environmental Protection Agency
HDPE	High Density Polyethylene
HCl	Hydrochloric Acid
H <sub>2</sub> SO <sub>4</sub>	Sulfuric Acid
HNO <sub>3</sub>	Nitric Acid
LCPV	Large Commercial Passenger Vessel
MEDEP	Maine Department of Environmental Protection
MDL	Method Detection Limit
MSD	Marine Sanitation Device
NaOH	Sodium Hydroxide
%R	Percent Recovery
PQL	Practical Quantitation Limit (Minimum Reporting Level)
QA	Quality Assurance
QA/QCP	Quality Assurance/Quality Control Plan
QMP	Quality Management Plan
QC	Quality Control
RPD	Relative Percent Difference
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 Maine, Southeast
USCG	U.S. Coast Guard
VOCs	Volatile Organic Chemicals
VSSP	Vessel Specific Sampling Plan

### **3. Responsibilities and Management**

#### **A. Vessel Representatives/Owner or Operator**

The QA/QCP that a vessel operator chooses to follow will be indicated in the vessel's documentation. The responsibility for adherence to the provisions of this QA/QCP rests with the owner or operator. Failure of vessel owners and operators to follow the provisions of this QA/QCP may result in enforcement action by the State of Maine under 38 M.R.S.A § 414-A.

The vessel representative oversees the sampling and is responsible for compliance with this QA/QCP. Responsibilities include the following.

- Ensuring coordination among vessel crew, samplers, lab, and MEDEP.
- Communicating necessary information to sampler, lab, and MEDEP.
- Assuring that vessel participants have necessary training.
- Fielding questions and requests for information that arise during and after sampling.
- Attaching field notes to sample results, chain of custody (COC) and providing MEDEP with any deviations from the QA/QCP or VSSP.

#### **B. Sampling Manager and Team**

The sampling manager will design a tentative sampling schedule to demonstrate compliance with the requirements of CMR Chapter 532(3)(D). The sampling manager will submit the schedule to MEDEP with the VSSP. The sampling manager or his or her deisnee will with notify MEDEP a minimum of 36 hours prior to sampling. This notice gives MEDEP the opportunity to audit the ship's sampling procedures.

The sampling manager will be responsible for sample collection, sample integrity and custody, field measurements, and accurate notes. A compilation of field notes, deviations from the VSSP or QA/QCP, and a COC will be provided to the vessel representative and the MEDEP Project Manager.

#### **C. Lab Manager/Wastewater Analysis Laboratory**

As required by the State of Maine under 22 M.R.S.A §567 data submitted to programs administered by the DEP will be generated from laboratories certified pursuant to CMR Chapter 263. A certified lab will be retained to analyze samples according to their individual lab Quality Assurance Plan, and using EPA-approved analytical methods. A list of Maine certified labs is available at [http://www.maine.gov/dep/blwq/topic/vessel/lab\\_list.pdf](http://www.maine.gov/dep/blwq/topic/vessel/lab_list.pdf). To confirm a lab is currently certified, contact the Maine Lab Certification Program at 207-287-1929.

The Lab Manager will be responsible for ensuring that individual project components are executed in a timely and appropriate fashion and that the data will be verified and validated before it leaves the laboratory.

#### **D. MEDEP Project Manager**

The MEDEP project manager is responsible for managing the program to meet the requirements in the Maine statute, regulation, and the approved QA/QC plan.

#### **E. MEDEP Quality Assurance Officer**

The MEDEP Quality Assurance Officer will review the QA/QCP to determine if it meets the State of Maine's quality control standards.

### **4. Purpose**

This document is prepared and submitted to fulfill requirements of Maine Statute 38 M.R.S.A. § 423-B and CMR Chapter 532 that require periodic effluent sampling and analysis to demonstrate compliance.<sup>1</sup>

### **5. Requirements**

This QA/QCP specifies the minimum requirements for sampling and analysis of treated graywater or a combination of treated graywater/blackwater discharged into the coastal waters of Maine for the 2006 operating season. All sampling events will be conducted in accordance with this QA/QCP and the VSSP. The owner/operator will provide documentation certifying their compliance with the standards in CMR Chapter 532(3)(D)

#### **A. Pollutants**

This QA/QCP covers sampling and analysis for the parameters listed below. MEDEP may also require analysis of priority pollutant parameters under CMR Chapter 532 (5)(5). A sample that fails to provide valid results for all required pollutants will not be counted as an acceptable sample.

#### Conventional pollutants:

Total Suspended Solids (SS)	pH
Biochemical Oxygen Demand (BOD)	Fecal Coliform
Total and Residual Chlorine	

#### Priority Pollutants (may be required randomly)

- Base/Neutrals, Acids
- Total Aromatic and Total Aqueous Hydrocarbons using BNA and VOC data
- Volatile Organic Chemicals (VOCs)
- Trace Metals (Total Recoverable and Dissolved)

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<sup>1</sup>The VSSP for each vessel will list the proper location and timing of wastewater sampling. The samples will be taken in a manner that seeks to capture a typical wastewater discharge while still meeting the fecal coliform test requirements.

### Blind Duplicate Samples

*Blind sample duplicates will be collected on a minimum of 10% of the total number of samples or four samples total, whichever number is greater. All blind samples will be analyzed for conventional pollutants.*

The purpose of the blind sample duplicates is to assess sampling and laboratory error and to assess overall method variability. Precision between the sample and its duplicate 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 duplicate 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 duplicate nature of the samples to the laboratory staff. The samples will be analyzed by the same lab and for the same parameters.

The sampler will need to take a cube (10 liters) of wastewater and thoroughly mix it. The sampler will then pour the contents into individual sample bottles.

### Quality Objectives and Criteria for Measurement Data

Data Quality Objectives (DQOs) are quantitative and qualitative objectives that define usable data for meeting the requirements of this project. DQOs define the quality of services provided by the laboratory and are used in the quality assurance review of the field and laboratory data. Review of the quality control (QC) data against the DQOs determines if the data are fully usable, considered estimates, or rejected as unusable.

#### **B. Quantitative DQOs**

The quantitative DQOs for this project include reporting limits, precision, accuracy, and completeness.

#### Reporting Limits

Reporting limits are determined by laboratory-provided or method-specified minimum levels, or by interim minimum levels where reporting limits at or near water quality criteria are not obtainable.

#### Precision

Precision is the ability to replicate the measurement. It is expressed as Relative Percent Difference (RPD). Acceptance criteria for RPD are analysis-specific and are defined by the laboratories. RPD is normally determined by matrix spike duplicates or by laboratory-fortified blank duplicates. The calculation for RPD is:

$$((X_1 - X_2) / ((X_1 + X_2)/2))100,$$

and is expressed as a percent.  $X_1$  = first sample measurement and  $X_2$  = second sample measurement.

### Accuracy

Accuracy is the closeness of the measurement to the true level of the variable. Accuracy is expressed as percent recovery (%R). Acceptance criteria for %R vary depending on the method. %R is normally determined by the use of known traceable laboratory control standards.

### Completeness

Completeness is a measure of how many planned measurements for each constituent actually resulted in usable data. It is expressed as a percentage of the total number of samples collected. The completeness criterion for this project is 80 percent. 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.

## **C. Qualitative DQOs**

The qualitative DQOs are representativeness and comparability.

### Representativeness

Representativeness is a measure of how well the sample reflects the typical wastewater effluent. Sample representativeness will be established by collecting LCPV graywater, blackwater, and other wastewater discharge samples following vessel specific sampling plans (VSSP). The owner and operator will be 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.

Vessel operation that differs from the VSSP may result in State of Maine 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 EPA standardized sampling and analytical methods; 2) ensuring that appropriate reporting limits are used; and 3) obtaining data of known and acceptable quality through the use of specified QC measures and QA data assessment.

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. Information added to the VSSP or changes to the VSSP during the sampling event will be recorded on the VSSP, COC, or in the field notes and will accompany the samples to the lab and be provided to the project data recipients as part of the complete report.

### Special Training Requirements/Certification

Samplers will be trained in sampling methods, sample handling, COC, 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 will have a current Maine Department of Human Services Laboratory Certification. To confirm a lab is currently certified, contact the Maine Lab Certification Program at 207-287-1929.

## **D. Documentation and Records**

### Sample schedule and Vessel/Sample Identification

The sample manager will include a tentative schedule in the VSSP and will notify MEDEP of its intent to sample at least 36 hours prior to sample collection.

Samples will be identified clearly on the COC and sample bottles. For example, a sample from the Treatment System #1 from the *M/V Hypothetica* will be identified as "Treatment System #1" as the description with associated dates and times. The Sample ID will clearly state where the sample was taken. All samplers will use the same sample ID system. From continuous discharges with one discharge point, the sample ID "Discharge Port -1" is appropriate. The sampler will fill out the checklist in Appendix A.

### Field Records (Required for both unannounced and continued compliance samples)

Field notes will be collected in bound field notebooks with numbered pages. The field notes will coincide or reference the Sewage and Graywater Record Book. On-board staff will witness the sampling and will initial the field notes. Included in the field notes for each sample are:

- Vessel name (e.g., *Hypothetica*),
- Sampling personnel,
- Shipboard assistants,
- Signature or initials by the vessel crew in the field notes indicating that the sample port is correct,
- Sample date and times,
- Records on discharge flow rates (always)
- Samples collected,
- Nature of sample: Composite or Grab,

- Waste type: blackwater, graywater, or mixed,
- Deviations from VSSP and/or QA/QCP,
- Unusual conditions and explanation of data anomalies, and
- Latitude/longitude or UTM's and speed at time of discharge being sampled.

### 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. The laboratory's QA manager will review and approve the report prior to issuance of the analytical report to the vessel's representatives, and MEDEP,

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.
- 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.
- A copy of the COC.
- Holding times met or not.
- 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 will explain when results are outside the precision and accuracy required and the corrective actions taken to rectify these QC problems.
- Discharge logs and field notes.
- Cooler receipt forms.
- Explanation of data abnormalities.
- A completed checklist containing all components of sampling, analysis, and reporting.

### Chain of Custody

The original COC 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 COC will be made and will accompany the samples. At each transfer of the sample, the transfer will be indicated on the COC form. The person listed on the COC will have full sight or 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 COC will be included with the final report.**

## 6. Sampling Process Design

Each VSSP will be dated and a copy will be provided to the MEDEP Project Manager. The VSSP will be submitted to the MEDEP Project Manager within 30 days of each vessel's initial entry into the coastal waters of Maine. The MEDEP will approve the VSSP prior to sampling. After the first sampling event on a vessel, the VSSP may be updated. If it is updated, copies of the updated sampling plan will also be provided to the Project Manager, the vessel's owner or operator, and MEDEP before the second round of sampling occurs. This plan needs to be approved by MEDEP. The plan will include, as a minimum, the following.

- (a) The vessel name.
- (b) The passenger and crew capacity of the vessel.
- (c) The estimated average daily water use per individual of the vessel.
- (d) The estimated total water use for the vessel per day
- (e) The type, capacity, and location of each wastewater treatment system \*
- (f) The capacity and location of each holding tank for treated blackwater.\*
- (g) The capacity and location of each holding tank for graywater. \*
- (h) The capacity and location of each holding tank for combined treated sewage and graywater. \*
- (i) The location capacity, pump rate, and associated wastewater system(s) of each discharge port. \*
- (j) Location of discharge and sampling ports in detail sufficient for them to be located during an inspection.
- (k) A narrative description of the time at which each sample will be to be taken based upon the circumstances that will yield a sample most likely to be representative of the average discharge that passes through the location where the sample will be taken.
- (l) A table documenting:
  - (i) The discharge type;
  - (ii) Whether the type of sample to be collected is grab or composite;
  - (iii) Parameters to be tested for each sample; and
  - (iv) The location on the vessel where each sample is to be collected.
- (m) A description of the standards the owner or operator will use to determine a deviation from the plan.

\* May be presented in table format.

### A. 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 QA/QCP.

Samples will reflect a representative discharge of treated graywater and graywater/blackwater combinations into applicable waters of Maine from an operable marine sanitation device or other treatment system. Care will be taken to assure sample representativeness and homogeneity. See VSSP for further details on sampling.

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

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

Samples will be listed as “grab” on the COC form.

Bottles will be pre-cleaned and will not require rinsing with sample. When sample bottles are pre-preserved, bottles will never be rinsed but will be filled only once with sample.

Samples will be cooled immediately in an ice-water bath to 4° C and then placed into a cooler containing frozen blue ice or ice and water mixture to maintain a sample temperature of 4 +/-2° C. Temperature will be measured and recorded at the time of sample collection and a note will be made of the temperature of the cooler contents upon arrival at the laboratory.

Sample bottles will be filled sequentially. Bottles are normally filled leaving a small space for expansion and mixing. VOC bottles will be filled leaving 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. Filtering for dissolved metals will be performed immediately upon receipt at the laboratory followed by preservation through acidification. Table 1 provides details on sample requirements.

**TABLE 1 Sample Containers, Preservations, Holding Times, and Sample Types**

LAB PARAMETER	CONTAINER	PRESERVATION	HOLDING TIME	Grab or Composite	Sample Timing/ Collection
<b>Conventional Pollutants</b>					
Total Suspended Solids	From BOD bottle	4° C	7 days	Grab Only	Dependent upon vessel (see individual vessel sampling plan)
Settleable Solids	1 liter HDPE, white label	4° C	48 hours	Grab Only	
Biochemical Oxygen Demand	1 liter HDPE, white label	4° C	48 hours	Grab Only	
Ammonia – Total	250 ml HDPE, yellow label	H <sub>2</sub> SO <sub>4</sub> , pH <2, 4° C Lab pre-preserved	28 days	Grab Only	
Chemical Oxygen Demand	From ammonia bottle	H <sub>2</sub> SO <sub>4</sub> , pH <2, 4° C Lab pre-preserved	28 days	Grab Only	
Specific Conductance	From BOD bottle	4° C	28 days	Grab Only	
Fecal Coliforms	100 ml sterile plastic	Sodium Thiosulfate, 4° C	6 hours	Grab Only	
Alkalinity	From BOD bottle	4° C	14 days	Grab Only	
pH	100 ml HDPE and from BOD bottle	4° C	ASAP In field and lab	Grab Only	
Oil and Grease	1 liter glass	H <sub>2</sub> SO <sub>4</sub> , pH <2, 4° C Lab pre-preserved	28 days	Grab Only	
Total Organic Carbon	2 40-ml VOC vials	H <sub>2</sub> SO <sub>4</sub> , pH <2, 4° C Lab pre-preserved	28 days	Grab Only	
Total Nitrogen	500 ml HDPE, yellow label	H <sub>2</sub> SO <sub>4</sub> , pH <2, 4° C Lab pre-preserved	28 days	Grab Only	
Total Phosphorus	From ammonia bottle	H <sub>2</sub> SO <sub>4</sub> , pH <2, 4° C Lab pre-preserved	28 days	Grab Only	
Temperature	From pH Bottle	N/A	ASAP in field	Grab Only	

LAB PARAMETER	CONTAINER	PRESERVATION	HOLDING TIME	Grab or Composite	Sample Timing/ Collection
Chlorine Residual	From pH bottle	N/A	ASAP In field	Grab Only	
<b>Priority Pollutants</b>					
BNA	1 liter glass	4° C; Sodium Thiosulfate if residual chlorine is present.	7 days until extraction	Grab Only	Dependent upon vessel (see individual vessel sampling plan)
VOCs	3 40-ml VOC vials	HCl, 4° C; Sodium Thiosulfate if residual chlorine is present	14 days until analysis	Grab Only	
Total Aromatic and Total Aqueous Hydrocarbons	See BNAs and VOCs				
Total Recoverable Metals	1 liter HDPE	HNO <sub>3</sub> , pH <2, 4° C	28 days Hg/ 6 mos. Others	Grab Only	
Dissolved Metals		Filtration w/0.45 micron filter in lab, HNO <sub>3</sub> , pH <2	6 months	Grab Only	

Sample containers will normally be pre-preserved by the laboratory. If chlorine residual is detected during field measurement of chlorine, sodium thiosulfate provided by the lab will be added in the field to the BNA and PCB sample bottles until no chlorine is detected. The lab will provide decanting bottles with sodium thiosulfate. When chlorine is detected, the sample will be added first to the decanting bottle, and then decanted into the VOC vials.

## B. 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 duplicates will be identified with discrete sampling labels and recorded as blind field duplicates in the sampler's field notebook.

To maintain the secure environment for samples on board ship and during transport, samples will be: 1) in the sampler's possession (line of sight); or 2) in a cooler sealed with signed and dated friable evidence tape 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 will be such that tampering with samples or bottles is not possible. The cooler will 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 COC form. When samples are transferred between personnel, such transfer will be indicated on the COC form with signature, date and time of transfer. The COC will remain with the samples, sealed inside the cooler, until received by the laboratory.

At any time during sample transfer, if custody is broken, a note will be made on the COC 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  $4 \pm 2^{\circ}$  C. A one liter temperature blank will be placed into the 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 COC upon receipt of the sample at the lab.

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 ( $37^{\circ}$  C) at time of sample collection. This temperature encourages growth of fecal coliform bacteria and thus these samples will be cooled as quickly as possible, without freezing them. The sample bottles for microbial testing will be placed in a water bath containing ice cubes provided on board ship. The bottles will be immersed in the water, rotated frequently, and ice will be added/water drained off as the ice melts for at least one hour until the sample reaches a temperature of  $4^{\circ}$  C. 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 may samples be placed in refrigerators meant for human food or beverages.

### Sample Holding Times

Sample holding times are as described in Table 1 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 six hours. 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 in order 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 will be held by the laboratory for not less than six months from the sample collection date, or as directed by the Coast Guard and MEDEP.

### **C. Analytical Methods and Quality Control Requirements**

The MEDEP requires the analytical report within 15 days after the sampling date for conventional pollutant analyses. The MEDEP requires conventional and priority pollutants reports within 21 days of completion of laboratory analysis. Analytical methods are to be performed according to certified wastewater analysis methods and that the quality control requirements (blanks, blank spikes, matrix spikes and duplicates) are to meet the method or laboratory control limits whichever are more stringent. All analytical methods will be approved methods pursuant to 40 CFR 136.3.

### **D. Inspection/Acceptance Requirements for Supplies and Consumables**

Sample bottles will be visually inspected prior to sampling. If problems with bottles are noted, such as a cap that has fallen off an empty bottle, note of the problem will be made on the COC form.

Spare parts will be available for all equipment used. Standard Reference Materials and test kit reagents used in sampling will be checked to ensure that they are within expiration dates.

### **E. Inspection/Acceptance Requirements (Non-Direct Measurements)**

On-board ship data to be recorded includes tank volume and pumping rate data from ship tracking systems and any documented occurrence of seawater influx.

### **F. Data Management**

Data Management includes accurate field notebook entries, completed Chain-of-Custody forms and laboratory data management documents. Laboratory data management procedures and processes are described in the Laboratory's Quality Management Plan. The Vessel Representative will report data directly to the MEDEP Project Manager after thorough review by the laboratory QA manager within the regulatory time limits.

## **7. ASSESSMENT/OVERSIGHT**

### **A. Assessments and Response Actions**

#### Field Assessments

MEDEP may perform a field sampling audit on randomly selected sampling events during the project in order to evaluate the performance of the sampling team. Follow-up field audits may be necessary pending audit findings. Each audit will concentrate on sampling technique, sample handling, field records, field testing methods, and adherence to vessel specific sampling plans and the QA/QCP. MEDEP will send these audit reports to the vessel representative within 14 days of audit. These reports will include corrective actions, if necessary.

#### Laboratory Assessments

Laboratories are subject to periodic and extensive audits by regulatory agency personnel as part of their certification. Reports of these audits will be made available to the MEDEP Project Manager, and the MEDEP Quality Assurance Officer if requested. The MEDEP QA Officer

may review any recent and pertinent technical systems audit reports of the analytical laboratories involved in this program.

### Duplicates

Blind sample duplicates will be collected on a minimum of 10% of the total number of samples or four samples total, whichever number is greater. All will be analyzed for conventional pollutants, but only half will be analyzed for priority pollutants. The purpose of the blind sample duplicates is to assess sampling and laboratory error and to assess overall method variability. Precision between the sample and its duplicate 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 duplicate 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 duplicate nature of the samples to the laboratory. The samples will be analyzed by the same lab and for the same parameters. Results of the duplicate analysis will be monitored by the vessel representative and the MEDEP Project Manager.

MEDEP may submit a sample that contains a known concentration of analytes prepared and certified by a different laboratory. The MEDEP will compare the results from the lab from the certified sample results to determine the laboratory performance.

The MEDEP may submit two trip blank samples over the course of the sampling season. The trip blanks check to see if any outside contamination occurs during the sampling and analyzing process.

### Corrective Action

The laboratory or sampling manager will notify the MEDEP project manager if errors are noted by the laboratory or sampling personnel. The responsible party will immediately correct the problem and will send those corrections via e-mail to the vessel representative and the MEDEP Project Manager.

## **B. Reports to Management**

The Vessel Representative will issue reports in accordance with the following guidelines:

- All sample results and backup information.
- Blind duplicate samples—Draft report findings within one week of receiving/verifying results to the MEDEP Project Manager.

The MEDEP Project Manager will submit the results of the any QA/QC audit reports to the Vessel Representative

## **8. DATA VALIDATION AND USABILITY**

### **A. Data Review, Verification, and Validation**

During the general permit term, the MEDEP Project Manager or their designee will review field notes and laboratory data packages to detect correctable problems for the remainder of the permit.

Upon receipt of completed data packages from the Vessel Representative, the MEDEP Project Manager will review data and field notes to verify that this QA/QCP was followed. Items reviewed will include:

- Comparison of dated vessel specific sampling plans with the QA/QCP 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 QA/QCP 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 Vessel Representative who will take appropriate corrective action as necessary.

### **B. Reconciliation with Data Quality Objectives**

The MEDEP Project Manger will reconcile the data from this program with the requirements 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.

## **9. BIBLIOGRAPHY**

Documents referenced during the preparation of this document include:

1. Northwest CruiseShip Association *2005 Operating Season Quality Assurance/Quality Control Plan for the Sampling and Analysis of Treated Sewage and Graywater from Commercial Passenger Vessels.*
2. July 27, 2000 *Cruise Ship Wastewater Monitoring Southeast Alaska 2000 Quality Assurance Project Plan*
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.
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*, Alaska Department of Environmental Conservation, September 1997.

## Appendix A

### 2006 Cruise Ship Sampling Checklist

Vessel Name \_\_\_\_\_

Sampler Name \_\_\_\_\_

Date \_\_\_\_\_

#### I. Notification

- MEDEP project manager notified 36 hours prior to the sampling event

#### II. Type of Sampling

- Conventional pollutants only (unannounced)
- Conventional and priority pollutants. (unannounced)
  - If second unannounced sample, will be at least 21 days after the first sampling event.

#### III. Sampling Notes (to include:)

- Vessel name
- Names of sampling personnel
- Names of shipboard assistants
- Signature or initials 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
- Records collected on discharge flow rates
- Sample ports within 50 feet of the point of overboard discharge
- Nature of sample recorded (composite or grab)
- Waste type recorded (blackwater, graywater, or mixed)
- If deviations from VSSP and/or QA/QCP noted, reported to MEDEP
- If unannounced sampling, sampler verified that vessel is discharging
- Latitude/longitude and speed at time of discharge being sampled is recorded (only for underway sampling),
- Copy of the Discharge record for the sampled discharge included (unannounced only)
- COC properly completed
- Samples delivered to laboratory within holding times for analyses