DATA COLLECTION SURVEY FOR POLLUTION PREVENTION, CONTROL, AND TREATMENT METHODS FOR LARGE CRUISE SHIPS OPERATING IN ALASKA WATERS

As authorized by AS 46.03.464, the Cruise Ship Wastewater Science Advisory Panel (Panel) was established and charged with assisting and advising the Commissioner of the Alaska Department of Environmental Conservation (ADEC) in preparing a report that summarizes:

(1) methods of pollution prevention, control, and treatment in use and the level of effluent quality achieved by commercial passenger vessels;
(2) additional economically feasible methods of pollution prevention, control, and treatment that could be employed to provide the most technologically effective measures to control all wastes and other substances in the discharge; and
(3) the environmental benefit and cost of implementing additional methods of pollution prevention, control, and treatment identified under subsection (2), above.

AS 46.03.464(c). In order for the Panel to prepare this report, and for the Commissioner to prepare a subsequent required report to the Alaska Legislature in accordance with AS 46.03.464(d), ADEC is, pursuant to AS 46.03.465(h), requesting that you provide information responsive to this survey.

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PURPOSE OF THE SURVEY

ADEC, in conjunction with the Science Advisory Panel (Panel,) intends to use the information collected in this survey to assess the potential for the vessel to meet Alaska Water Quality Standards at the point of discharge or to achieve incremental improvements above 2010 limits towards that goal, and estimate the costs and benefits associated with implementing pollution prevention, control, and treatment methods. This information will:

1) Allow the Panel to provide an informed report to the ADEC Commissioner, who will in turn report to the Legislature as mandated in AS 46.03.464; and
2) Inform the development of the next Large Commercial Passenger Vessel General Permit to be issued by ADEC in 2013, and assist the Department in providing support for the effluent limits included in that permit.

Not All Questions Will Be Applicable to Every Vessel

ADEC prepared this survey to be applicable to a variety of vessels and treatment systems; therefore, not all of the questions will apply to every vessel. Complete each applicable item in the survey. If a question is not applicable to your company or vessel, write "NA."

CONFIDENTIALITY OF INFORMATION

If you believe that any information that you are providing in response to this survey should be treated as confidential information and exempt from public disclosure under AS 40.25.120 or other law or regulation, please clearly mark that information "confidential" and provide a full explanation of the specific reason(s) that the information should be exempt from disclosure. Claiming the information is confidential and exempt from disclosure does not mean the information is automatically exempt, or even that ADEC will conclude it is exempt. The Department will consider the reasons you provide for the claimed exemption, and will notify you as to whether the Department concurs.

WHEN AND WHERE TO RETURN THE SURVEY

All cruise lines that receive this survey must respond to it within 60 days of receiving it. Failure to timely respond in accordance with the survey's instructions may result in fines and other sanctions, as provided by law.

If you wish to request an extension or discuss a delivery schedule for a company with multiple vessels, you must do so in writing within 21 days of receipt of this survey. Blanket requests for extensions will not be considered. Written requests may be e-mailed to Melissa Goldstein at melissa.goldstein@alaska.gov or may be mailed to her at the address below.

Extension requests will be evaluated on a case-by-case basis. Submittal of an extension request to DEC does **not** alter the due date of your survey unless and until DEC agrees to the extension and establishes a new date.

Please submit the signed original and an electronic version of survey responses to:

Dr. Melissa Goldstein
Alaska Department of Environmental Conservation
Commercial Passenger Vessel Environmental Compliance Program
410 Willoughby Ave., P.O. Box 111800
Juneau, AK 99811-1800
melissa.goldstein@alaska.gov

GENERAL INSTRUCTIONS

Read all question-specific instructions. Carefully read any instructions for specific questions.

Mark responses for each question. Fill in the appropriate response(s) to each question. Please use **black ink** or **type** in the spaces provided. Answer the questions in sequence unless you are directed to SKIP. Do not leave an entry blank if the answer is zero. **If a question is not applicable, write "NA."**

Include any clarifying attachments. If additional attachments are required to clarify a response, please place the associated question number and your vessel name in the top right corner of each page of the attachments. The following list contains examples of items which may need to be included as attachments to this survey:
– Cruise line brochure, pamphlet, general description;
– Sailing route map;
– Piping and sewage and graywater treatment flow diagrams;
– Manufacturers specifications;
– Hard copy summaries of analytical data collected from monitoring locations;
– Discharge logs;
– Discharge practices outline;
– Wastewater treatment operation and maintenance logs;
– Electronic analytical data collected from monitoring locations; and
– Pollution prevention or management practices.

Provide best estimates when data are not available. ADEC intends that responses to all questions be based upon available data and information. Please provide the best estimates possible based on your best professional judgment when data and information are not available. If you provide an estimate, note the methods that were used to make the estimate on the "Comments" page (page 3, A-2) along with the question number to which the estimate refers. You are not required to perform new or non-routine tests or measurements solely for the purpose of responding to this survey.

You may need to make copies of some pages before responding. Some pages in the survey will need to be photocopied before you respond. Indicate how many copies of the page you are submitting by writing "Copy _____ of _____" in the top right corner.

Pay close attention to the measurement units requested (e.g., cubic meters [m^3], kilograms [kg]). Report answers in the units that are specified, unless the question requires you to specify the units. Alternatively, if your records are kept in different units (e.g., gallons instead of cubic meters), you may report in those units. In this case, BE SURE TO INDICATE WHAT UNITS YOU ARE USING.

Questions? If you have any questions regarding the completion of this survey, please contact Melissa Goldstein at melissa.goldstein@alaska.gov or (907)465-5278.

BE SURE TO RETAIN A COPY OF THE COMPLETED SURVEY FOR YOUR RECORDS.

CERTIFICATION STATEMENT

The individual responsible for directing or supervising the preparation of the survey must read and sign the Certification Statement listed below. The certifying official must be a responsible corporate official or his/her authorized representative.

The Certification Statement should be completed and signed if this cruise vessel operated in the navigable waters of the United States within the State of Alaska during calendar year 2011.

Certification Statement

I certify that the attached survey, completed for the referenced vessel, was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. The information submitted is, to the best of my knowledge and belief, accurate and complete and responsive to the survey instructions. In those cases where the requested information was not available, the information provided is based on best professional judgment and provides best estimates. I am aware that there are significant penalties for submitting a false statement or failing to comply with this survey, including the possibility of civil penalties (AS 46.03.760(f)) and/or criminal penalties (AS 46.03.790.)

_____ _____

Signature of Certifying Official Date

_____ (____)_____

Printed Name of Certifying Official Telephone Number

_____

Title of Certifying Official

_____

Cruise Line Name

_____

Cruise Vessel Name

SECTION A: GENERAL INFORMATION

A-1. Provide the following primary contact information for the technical information supplied in this questionnaire:

Primary Contact Name: _____

Title: _____

Telephone Number: _____

Fax Number: _____

E-Mail Address: _____

Convenient time to call: _____

Street Address or Post Office Box: _____

City, State Zip Code: _____

A-2. Please identify any comments for this survey. Cross reference by question number. If you need additional space, please photocopy this page before writing on it, and number each copy in the top right corner.

Question Number	Comments

A-3. During calendar year 2011, how many days did this cruise vessel operate in Alaska waters?

_____ Days.

A-4. Was this amount of time in Alaskan waters: (specify)

- ☐ typical of previous years
- ☐ higher than previous years
- ☐ lower than previous years
- ☐ 2011 was first year of operation in Alaskan waters

A-5. Do you plan to operate this cruise vessel in waters in and near Alaska in calendar year 2013?

☐ Yes ☐ No

If yes, do you plan to discharge treated wastewater within Alaska waters during 2013?

☐ Yes ☐ No

A-6. Do you plan to make any modifications within the next 4 years (before 2016) to the current advanced wastewater treatment system (AWTS) operated onboard this cruise vessel?

☐ Yes ☐ No

If yes, please fill in the table below.

Type of Modification		**Calendar Year(s) Modification to occur**
Upgrade of existing AWTS	☐ Yes ☐ No	
Add-on to existing AWTS	☐ Yes ☐ No	
Replacement of existing AWTS	☐ Yes ☐ No	

SECTION B: WASTEWATER SOURCES

Section B requests information on graywater and sewage sources, flows, and destinations. This information will be used to outline the vessel's wastewater generation, collection, and treatment practices and to evaluate possible pollution prevention, control, and treatment options.

If you provide an estimate, note the methods that were used to make the estimate on the "Comments" page (page 3, A-2) along with the question number to which the estimate refers.

B-1. Indicate the destination for each wastewater source.

Wastewater Source Description	To Graywater WWT System?	To Sewage WWT System?	To Other? (Specify)
Example: Photo lab sinks	☐**Yes** ☒**No**	☐**Yes** ☒**No**	**Drains to waste container for transfer onshore as hazardous waste**
Galley (e.g., food preparation, food pulper, restaurants, and bars)	☐Yes ☐No	☐Yes ☐No	
Dishwasher	☐Yes ☐No	☐Yes ☐No	
Bath (e.g., tub, shower, and sinks)	☐Yes ☐No	☐Yes ☐No	
Laundry	☐Yes ☐No	☐Yes ☐No	
Launderette	☐Yes ☐No	☐Yes ☐No	
Dry cleaning floor drains	☐Yes ☐No	☐Yes ☐No	
Dry cleaning spent solvent	☐Yes ☐No	☐Yes ☐No	
Dry cleaning wastewater (condensate separator water)	☐Yes ☐No	☐Yes ☐No	
Sewage from toilets, urinals, and other human waste receptacles	☐Yes ☐No	☐Yes ☐No	
Bilge water	☐Yes ☐No	☐Yes ☐No	
Ballast water	☐Yes ☐No	☐Yes ☐No	
Desalination brine	☐Yes ☐No	☐Yes ☐No	
Pool and whirlpool water	☐Yes ☐No	☐Yes ☐No	
Refrigeration and air conditioner condensate	☐Yes ☐No	☐Yes ☐No	
Salon and day spa water	☐Yes ☐No	☐Yes ☐No	
Photo lab sinks	☐Yes ☐No	☐Yes ☐No	
Photo lab floor drains	☐Yes ☐No	☐Yes ☐No	
Engine room shop sinks	☐Yes ☐No	☐Yes ☐No	
Engine room shop floor drains	☐Yes ☐No	☐Yes ☐No	
Non-engine room shop sinks (e.g,. upholstery, wood working, carpentry)	☐Yes ☐No	☐Yes ☐No	
Non-engine room shop floor drains (e.g,. upholstery, wood working, carpentry)	☐Yes ☐No	☐Yes ☐No	

Wastewater Source Description	To Graywater WWT System?	To Sewage WWT System?	To Other? (Specify)
Medical facility sinks	☐Yes ☐No	☐Yes ☐No	
Medical facility floor drains	☐Yes ☐No	☐Yes ☐No	
Chemical storage area sinks	☐Yes ☐No	☐Yes ☐No	
Chemical storage area floor drains	☐Yes ☐No	☐Yes ☐No	
Other wastewater (specify source):	☐Yes ☐No	☐Yes ☐No	

B-2. Please identify the typical flow rates for each sewage and graywater source.

Sewage and Graywater Source	Typical Total Flow Rate
Galley (e.g., food preparation, food pulper, restaurants, and bars)	m^3/day
Dishwasher	m^3/day
Bath (e.g., tub, shower, and sinks)	m^3/day
Laundry	m^3/day
Sewage from toilets, urinals, and other human waste receptacles	m^3/day
Other - please describe: _____	m^3/day
Other - please describe: _____	m^3/day

B-3. Provide the vessel's total average sewage and graywater holding capacities in hours.

Sewage: _____ hrs

Graywater: _____ hrs

B-4. Did you transfer **untreated** graywater or sewage to shore side facilities in Alaska in 2011?

☐ Yes
☐ No

If yes, what was the average unit cost of **untreated** wastewater transfers in Alaska in 2011?

_____ ($ per m^3)

B-5. Provide the total volume of **untreated** graywater or sewage transferred to shore side facilities in Alaska in 2011.

Wastewater Description	Volume Transferred in 2011 (m^3)
Galley (e.g., food preparation, food pulper, restaurants, and bars)	
Dishwasher	
Bath (e.g., tub, shower, and sinks)	
Laundry	
Sewage from toilets, urinals, and other human waste receptacles	
Other - please describe: _____	
Other - please describe: _____	

B-6. Did you transfer **treated** graywater or sewage to shore side facilities in Alaska in 2011?

☐ Yes ☐ No

If yes, what was the average unit cost of **treated** wastewater transfers in Alaska in 2011?

_____ ($ per m^3)

B-7. Provide the volume of **treated** graywater or sewage transferred to shore side facilities in Alaska in 2011.

Wastewater Description	Volume Transferred in 2011 (m^3)
Galley (e.g., food preparation, food pulper, restaurants, and bars)	
Dishwasher	
Bath (e.g., tub, shower, and sinks)	
Laundry	
Sewage from toilets, urinals, and other human waste receptacles	
Other - please describe: _____	
Other - please describe: _____	

SECTION C: EXISTING WASTEWATER TREATMENT SYSTEM DESIGN AND OPERATING PARAMETERS

Section C requests information on graywater and sewage treatment technologies used onboard this cruise vessel. Specifically, the information requested in this section includes design and operating specifications; sources of influent; chemical additions; operating and maintenance procedures; and discharge practices. This information will be used to evaluate technology options and develop cost estimates.

If you provide an estimate, note the methods that were used to make the estimate on the "Comments" page (page 3, A-2) along with the question number to which the estimate refers.

NOTE: If the vessel has more than one wastewater treatment system, photocopy Questions C-1 through C-9 before writing on them. In addition, if a treatment system is a split system (i.e., the system is made up of more than one treatment unit) please answer questions C-1 through C-9 for each UNIT of the system. An example would be an AWTS that has a starboard treatment unit and a port treatment unit.

WASTEWATER TREATMENT SYSTEM # _____

C-1. Provide the wastewater treatment system name below.

_____

C-2. Wastewater treatment system manufacturer _____

C-3. Is this wastewater treatment system batch or continuous?

- ☐ Batch
- ☐ Continuous *(Skip to Question C-6)*

C-4. On average how many batches per day did this wastewater treatment system treat in 2011?

_____ average batches per day

C-5. What was the typical batch volume treated by this wastewater treatment system in 2011?

_____ m^3/batch

C-6. What was the average volume treated per operating day by this wastewater treatment system in 2011?

_____ m^3/day

WASTEWATER TREATMENT SYSTEM # _____ (cont.)

C-7. Indicate in the following table where your vessel operated this wastewater treatment system in 2011. Please be sure you have one response per cell in this table.

Vessel Location	Do you operate this wastewater treatment system at all times in the following locations?		
Within 1 nm from shore in Alaska waters	☐ Yes	☐ No	☐ Other
Outside 1 nm from shore In Alaska waters	☐ Yes	☐ No	☐ Other
Outside Alaska waters, but within 12 nm of Alaska shore	☐ Yes	☐ No	☐ Other
During Alaska cruises, but outside 12 nm of Alaska shore	☐ Yes	☐ No	☐ Other
Within 3 nm of shore of U.S. States other than Alaska	☐ Yes	☐ No	☐ Other
Outside 3 nm of shore of U.S. States other than Alaska	☐ Yes	☐ No	☐ Other

Explain any responses of "other" in the table above.

_____

_____

C-8. a. How much time (i.e., days) was this wastewater treatment system **operated** in 2011?

_____ days in 2011

AND

b. How much time (i.e., days) was this wastewater treatment system **operated** in Alaska waters in 2011?

_____ days in Alaska waters in 2011

WASTEWATER TREATMENT SYSTEM # _____ (cont.)

C-9. Indicate in the following table where your vessel discharged from this wastewater treatment system in 2011. Please be sure you have one response per cell in this table.

Vessel Location	Did this wastewater treatment system discharge at any time in the following locations?		
Within 1 nm from shore in Alaska waters	☐ Yes	☐ No	☐ Other
Outside 1 nm from shore In Alaska waters	☐ Yes	☐ No	☐ Other
Outside Alaska waters, but within 12 nm of Alaska shore	☐ Yes	☐ No	☐ Other
During Alaska cruises, but outside 12 nm of Alaska shore	☐ Yes	☐ No	☐ Other
Within 3 nm of shore of U.S. States other than Alaska	☐ Yes	☐ No	☐ Other
Outside 3 nm of shore of U.S. States other than Alaska	☐ Yes	☐ No	☐ Other

Explain any responses of "other" in the table above.

_____

_____

C-10. a. How much time (in hours) did this wastewater treatment system **discharge** outside Alaska waters, but within 12 nm of Alaska shore in 2011?

_____ hours in 2011

AND

b. How much time (in hours) did this wastewater treatment system **discharge** in Alaska waters in 2011?

_____ hours in Alaska waters in 2011

SECTION D: WASTEWATER GENERATION, COLLECTION,AND TREATMENT COSTS

Section D requests information on the costs for each graywater and/or sewage treatment system (including holding tanks) onboard this cruise vessel. Specifically, the information requested in this section includes capital costs and operating costs (in U.S. Dollars) for the wastewater treatment system, space availability on the cruise vessel, and power generation.

NOTE: If you have more than one wastewater treatment system, photocopy Questions D-1 through 13 before writing on it, and indicate the Wastewater Treatment System #. In addition, if a treatment system is a split system (*i.e.*, the system is made up of more than one treatment unit) please answer questions D-1 through D-13 for each UNIT of the system. An example would be an AWTS that has a starboard treatment unit and a port treatment unit.

WASTEWATER TREATMENT SYSTEM # _____

D-1. Complete the table below for the **original** costs associated with each graywater and/or sewage treatment systems identified in this survey, including the collection and holding tanks (include the year each cost was incurred). *Only include costs for wastewater treatment systems that treat graywater and sewage*. If you have data for costs itemized differently, complete the table below using best engineering estimates and provide the additional data as an attachment.

Type of Cost	Project	Cost	Year Cost Incurred
Direct	***Purchased equipment*** (includes all equipment for the installation or upgrade: mechanical equipment; electrical equipment; spare parts and noninstalled equipment spares; freight charges; taxes, insurance, and duties)	$	
	Purchased equipment installation (includes installation of all equipment: electrical equipment, mechanical equipment, structural supports, insulation, and paint)	$	
	Instrumentation and control (includes purchase, installation, and calibration)	$	
	Piping (includes cost of pipe, pipe hangars, fittings, valves, insulation, and installation)	$	
Indirect	***Engineering costs*** (includes process design and general engineering, drafting, cost engineering, consulting fees, supervision, inspection)	$	
	Construction expenses (includes construction tools and equipment; permits, taxes, insurance)	$	
	Contractor's fees (includes contractor costs for procurement, handling, and oversight)	$	
	Contingency actually expended (to compensate for unpredictable events such as storms, floods, strikes, price changes, errors in estimates, design changes (unexpected retrofit costs), etc.)	$	
	Total capital cost for project	$	

WASTEWATER TREATMENT SYSTEM # _____ (cont.)

D-2. In the table below, apportion the "purchased equipment" and "purchased equipment installation" costs provided in Question D-1 among the wastewater treatment units (e.g., biological treatment, membrane filtration, ultraviolet disinfection). If data are not readily available in this format, use best engineering estimates.

Major Piece of Wastewater Treatment System	Purchased Equipment Cost	Installation Cost	Year Cost Incurred
	$	$	
	$	$	
	$	$	
	$	$	
	$	$	
	$	$	
	$	$	
	$	$	
TOTAL:	$	$	

D-3. What date was the wastewater treatment system installed? _____/____ (mm/yy)

What date did the wastewater treatment system begin operations? _____/____ (mm/yy)

D-4. Provide actual operating and maintenance (O&M) costs paid and rates for this wastewater treatment system during calendar year 2011. Include operating labor, maintenance labor, maintenance equipment and contracted services, sampling/monitoring costs, chemical costs, and sludge, oil, or other residual transfer fees.

O&M Category	2011 Cost	Rate
Ship's labor (operating and maintenance)	$	$_____ per/hr (average rate of labor)
Training Costs (specific to operations of wastewater treatment system)	$	$_____ per/hr (average rate of labor)
Contractor labor (operating and maintenance)	$	$_____ per/hr (average rate of labor)
Maintenance: equipment and materials (e.g., spare parts, replacement equipment)	$	

O&M Category	2011 Cost	Rate
Maintenance: contracted services (e.g., contractors, vendors)	$	
Costs for laboratory analysis	$	
Chemical costs	$	
Wastewater transfer (i.e., at shore-side facility)	$	$_____ per m^3
Sludge transfer	$	$_____ per m^3
Other sludge transfer, if other classifications apply to your area *(specify type)*:	$	$_____ per m^3
Oil transfer (specify source):	$	$_____ per m^3
Other treatment residual *(specify)*:	$	$_____ per m^3
Energy Costs	$	$_____ per _____ mW $_____ per _____ kW
Other *(specify)*:	$	$_____ per m^3 (if applicable)
Other *(specify)*:	$	$_____ per m^3 (if applicable)
Total	**$**	

D-5. The wastewater aeration process used for the AWTS is fundamental to ammonia reduction performance. Please provide information on how the aeration process is performed on this vessel, including the operations and maintenance of the aeration system.

_____

_____

_____

_____

WASTEWATER TREATMENT SYSTEM # _____ (cont.)

D-6. Is the aeration system designed and operated according to the AWTS Vendor recommendations?

☐ Yes ☐ No

D-7. Have you made any recent changes to the aeration system on this vessel in an attempt to improve ammonia reduction performance of the AWTS?

☐ Yes ☐ No

D-8. Are you currently researching aeration system modifications that could improve ammonia reduction performance of the AWTS installed on this vessel?

If yes, what estimated costs would be incurred to implement an improved aeration of tanks as set out by the AWTS Vendor?

Installation Costs $_____ (USD)

Operational Costs $_____ per year (USD)

D-9. Provide information on any modifications from the original as-built vendor specifications and/or greater than 24 hour shut downs which have occurred to this wastewater treatment system since 2004. Modifications may include the replacement, upgrade, or addition of one or more wastewater treatment system components. Explain why treatment system components have been replaced, upgraded, or added (*e.g.*, compliance with wastewater permit.) I f the treatment system was shut down, please explain why. Include the costs for these modifications or shutdowns.

Shut Down or Modification?	Date Range (mm/dd/yy – mm/dd/yy)	Treatment System Affected	Reason	Cost (USD)
☐ Shut Down ☐ Modification				$
☐ Shut Down ☐ Modification				$
☐ Shut Down ☐ Modification				$
☐ Shut Down ☐ Modification				$

WASTEWATER TREATMENT SYSTEM # _____ (cont.)

D-10. Provide information on any modifications from the original as-built vendor specifications and/or greater than 24 hour shut downs planned to occur to this wastewater treatment system during the next five years (2012 through 2016). Explain why the treatment system will be replaced, upgraded, or added. If the treatment system will be shut down, please explain why. Include the estimated costs for these modifications or shutdowns.

Shut Down or Modification?	Year Planned	Treatment System Affected	Reason	Cost (USD)
☐ Shut Down ☐ Modification				$
☐ Shut Down ☐ Modification				$
☐ Shut Down ☐ Modification				$
☐ Shut Down ☐ Modification				$

D-11. Provide information on any modifications to the sewage or graywater generation, piping, or collection/holding systems (other than treatment) since 2004. Modifications may include the replacement, upgrade, rerouting, or addition of system components. Explain why the components have been replaced, upgraded, rerouted, or added (e.g., reroute graywater sources from overboard discharge to graywater collection and holding tanks). Include the costs for these modifications.

Modification	Date	Reason for Modification	Cost (USD)
			$
			$
			$
			$

WASTEWATER TREATMENT SYSTEM # _____ (cont.)

D-12. Provide information on any modifications for the sewage or graywater generation, piping, or collection/holding systems (other than treatment) planned to occur during the next five years (2012 through 2016) in order to reduce ammonia and/or dissolved metals in effluent. Explain why the systems will be replaced, upgraded, rerouted, or added. Include the estimated costs for these modifications.

Planned Modification	Year Planned	Reason	Cost (USD)
			$
			$
			$
			$

D-13. In the table below, provide the location and dimensions of the spaces housing the wastewater treatment system(s) (excluding all holding tanks). Include space needed to support the wastewater treatment system, such as on-board laboratory space and/or chemical/equipment storage space. In addition, provide the wastewater treatment system components housed in each space. All wastewater treatment system components indicated in Section 3 and/or ancillary equipment should be included in this table. Assign each space a name (*e.g.*, Space #1).

Space Name	Location on Cruise Vessel	Dimensions	Treatment System Components Housed in this Space
		_____ Length (m) _____ Width (m) _____ Height (m)	
		_____ Length (m) _____ Width (m) _____ Height (m)	
		_____ Length (m) _____ Width (m) _____ Height (m)	
		_____ Length (m) _____ Width (m) _____ Height (m)	

WASTEWATER TREATMENT SYSTEM # _____ (cont.)

D-14. Is space available to install add-on wastewater treatment system components in or near the space housing the wastewater treatment system?

☐ Yes ☐ No *(Go to Question D-15)*

In the table below, provide the dimensions of the areas of the spaces housing the wastewater treatment system(s) available to install additional wastewater treatment units, if required.

Space Name	Dimensions of Area Available to Install Additional Wastewater Treatment System Components
	_____ Length (m) _____ Width (m) _____ Height (m)
	_____ Length (m) _____ Width (m) _____ Height (m)
	_____ Length (m) _____ Width (m) _____ Height (m)
	_____ Length (m) _____ Width (m) _____ Height (m)

D-15. If you had to install add-on wastewater treatment system components, indicate below the location and dimensions of spaces, including spaces elsewhere on the cruise vessel where wastewater treatment system components might be installed. This space could include space currently occupied by obsolete equipment. In addition, provide whether the space has access to utilities and the distance of the space from the current wastewater treatment system.

Location on Cruise Vessel	Dimensions of Space	Access to Utilities?	Distance from Current Wastewater Treatment System	Wastewater Treatment System No.
	_____ Length (m) _____ Width (m) _____ Height (m)	☐ Yes ☐ No	_____ m	
	_____ Length (m) _____ Width (m) _____ Height (m)	☐ Yes ☐ No	_____ m	
	_____ Length (m) _____ Width (m) _____ Height (m)	☐ Yes ☐ No	_____ m	
	_____ Length (m) _____ Width (m) _____ Height (m)	☐ Yes ☐ No	_____ m	
	_____ Length (m) _____ Width (m) _____ Height (m)	☐ Yes ☐ No	_____ m	
	_____ Length (m) _____ Width (m) _____ Height (m)	☐ Yes ☐ No	_____ m	

WASTEWATER TREATMENT SYSTEM # _____ (cont.)

D-16. Would it be feasible for this ship to install additional wastewater treatment system components specific to ammonia and/or dissolved metals removal, in terms of available space?

☐ Yes

☐ No

If you answered no, please explain the limiting factors:

_____

_____

_____

_____

_____

_____

D-17. If additional AWTS components were to be installed in the future, how much power generation capacity is available on the ship to operate those additional components?

__ _____ kW/hour

SECTION E: POLLUTION PREVENTION METHODS

Section E requests information to evaluate the status of current pollution prevention methods used onboard this cruise vessel, identify pollution prevention technologies, and quantify the performance of the methods. The information will identify specific methods that may be described by the Panel.

If you provide an estimate, note the methods that were used to make the estimate on the "Comments" page (page 3, A-2) along with the question number to which the estimate refers.

E-1. Pollution Prevention Methods

Please list environmental management, pollution prevention, or waste reduction methods implemented to reduce concentrations of pollutants in effluent during the 2011 cruise season.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

E-2. For each pollution prevention method listed above, please answer the following questions (make a copy of this and the following page for each method.)

(a) Identify the list number from E-1 and describe method: _____

_____

_____

(b) Was the method employed year-round or only while the vessel was operating in Alaska waters?

☐ Year-round ☐ Only in Alaska waters

(c) List affected cruise vessel process(es) and wastewater streams:_____

_____

_____

(d) List targeted pollutants: _____

_____

_____

(e) Cost and/or savings of implementing method: $ _____

Cost of installation/implementation $_____

Net change in operating costs as a result of the method: $_____

(f) What was the reduction in the quantity of wastewater generated as a result of this method?

_____ m^3/day

(g) What was the reduction in the quantity of fresh (potable) water requirements as a result of this method?

_____ m^3/day

E-2. (cont.) Method number from E-1: _____

(h) Did the method result in a change in chemicals/pollutants discharged in wastewater?

☐ Yes ☐ No *(Go to Question E-3)*

(i) What was the change in chemicals/pollutants discharged in wastewater?

Chemical/Pollutant	***Increase* or *Decrease* in Quantity Discharged?**	**Change in Quantity?**
	☐ increase ☐ decrease	_____ kg/day _____ liters/day
	☐ increase ☐ decrease	_____ kg/day _____ liters/day
	☐ increase ☐ decrease	_____ kg/day _____ liters/day

(i) What was the change in the quantity of solids generated?

Solid	***Increase* or *Decrease* in Quantity Discharged?**	**Change in Quantity?**
	☐ increase or ☐ decrease	_____ kg/day
	☐ increase or ☐ decrease	_____ kg/day
	☐ increase or ☐ decrease	_____ kg/day

E-3. Implementation of Future Pollution Prevention Practices

Do you plan on implementing any pollution prevention, pollution management, or waste reduction practices in the future? If so, please list below.

Practice	Scheduled Implementation (date)
_____	_____
_____	_____
_____	_____

SECTION F: POLLUTION DISCHARGE PRACTICES

Section F requests information to evaluate the pattern of discharge practices for this cruise vessel, identify pollution control methods, and quantify the performance of the practices. The responses will inform ADEC about holding alternatives used by the vessel to meet permitted standards.

F-1. Describe your **treated** wastewater discharge practices while operating in waters in and near Alaska. Please check all that apply and indicate the reasons this cruise vessel uses this method.

☐ Discharge wastewater in waters in and near Alaska only when more than 1 nautical mile from shore while traveling at more than 6 knots _____

_____

☐ Continuous discharge of wastewater in waters in and near Alaska _____

_____

☐ Hold wastewater for discharge outside Alaska waters (outside 3 nm) _____

_____

☐ Other _____

_____

F-2. Is the **treated** wastewater reused?

☐ Yes
☐ No

If yes, for what?

_____

_____

If no, state the reason(s) the treated wastewater is not reused.

_____

_____

F-3. If shore-side treatment facilities were available, would you off-load wastewater to them instead of using the vessel's wastewater treatment system?

☐ Yes
☐ No

Explain why or why not.

_____

_____

F-4. At approximately what unit cost would use of shore-side facilities become prohibitive?

$ _____ per m^3

F-5. How do you view your vessel's wastewater discharge patterns:

☐ A manageable part of doing business in Alaska

☐ A burden to setting an ideal cruise itinerary

☐ A significant disruption to business operations

☐ An operational compromise that reduces overall profits

☐ Other - Please describe: _____

F-6. Does receiving a continuous discharge approval help ease the burden of managing wastewater during Alaska cruises? If so, how?

_____

_____

F-7. Do existing state or federal wastewater regulations affect this vessel's itineraries? If so, please describe how.

_____

_____

_____

F-8. Do existing state or federal wastewater regulations affect this vessel's discharge practices? If so, please describe how.

_____

_____

_____

F-9. Do you foresee making changes to this vessel's itineraries based on meeting Alaska wastewater permit conditions in the future? Please explain why or why not.

_____

_____

_____

F-10. Do you foresee making changes to this vessel's discharge practices based on meeting Alaska wastewater permit conditions in the future? Please explain why or why not.

_____

_____

_____

F-11. Please provide any further comments you wish to share with ADEC regarding this vessel's wastewater discharge strategies.

_____

_____

_____

_____

_____

SECTION G: BEST AVAILABLE CONTROL TECHNOLOGY EVALUATION

Section G requests information needed to evaluate methods for pollution prevention, control, and treatment using a Best Available Control Technologies (BACT) framework. Please provide your best estimates of feasibility and cost for pollution prevention, control, and treatment options.

Treatment options consist of add-on polishing units to reduce concentrations of ammonia, dissolved copper, dissolved nickel, and dissolved zinc to Alaska Water Quality Standards (AWQS) at the point of discharge. In addition, a worksheet is provided in the event your plans include replacing the AWTS for an individual ship.

Please complete the gray areas of each worksheet with the most accurate information or estimates available.

G-1: Influent/Effluent Information
G-2: Add-on Wastewater Treatment Options
G-3: Pollution Prevention Methods
G-4: Pollution Control Methods
G-5: Replacement Wastewater Treatment System Options

Best Available Technology Evaluation
G-1: Influent/Effluent Information

Instructions:

In the table below, ADEC's Cruise Ship Program used information provided with the Notice of Intent for General Permit 2009DB0026 to outline effluent concentrations that are typically discharged from the ship. Please provide influent concentrations and removal percentages for pollutants listed below; this will allow ADEC to better understand the performance of the AWTS currently installed on the ship. AS 46.03.362

Name of Permitted Operator/Vessel:
Maximum Passenger + Crew Capacity:_____
Existing WWT System:
Design Capacity:
Maximum BW Generation:___Maximum GW Generation:
Average Discharge Flow rate:_____Maximum Discharge Flow rate:

Pollutant	AWQS	Influent Mass Loading, pounds per day operated (provide range and average)	Influent Concentrations (provide range and average of potential influent concentrations)	Average 2011 Effluent Concentrations (n=X)	Removal (Percent)
Ammonia	**1.0 mg/l**				
Copper	**3.1 µg/l**				
Nickel	**8.2 µg/l**				
Zinc	**81.0 µg/l**				
BOD	**60 mg/l Limit, Maximum**				
TSS	**150 mg/l Limit, Maximum**				

Pollutant	AWQS	Influent Mass Loading, pounds per day operated (provide range and average)	Influent Concentrations (provide range and average of potential influent concentrations)	Average 2011 Effluent Concentrations (n=X)	Removal (Percent)
Fecal Coliform	**43 per 100 milliliters Limit, Maximum**				
Residual Chlorine	**0.0075 mg/l Limit, Maximum**				

GW = Gray Water
BW = Black Water
AWQS = Alaska Water Quality Standards

Best Available Technology Evaluation
G-2: Add-on Wastewater Treatment (WWT) Options

Instructions: Please provide information on add-on wastewater treatment (WWT) technologies that are intended to meet Alaska Water Quality Standards at the point of discharge or to improve effluent quality for ammonia and dissolved metals. Add-on WWT technologies are defined here as wastewater treatment systems (or components) that can be added on to and enhance the removal performance of an existing advanced wastewater treatment system (AWTS.)

Name of Permitted Operator/Vessel: **Individual Cruise Ship**

Pollutant	**Add-On WWT Options**						
	Potential Add-On WWT Technology	**Estimated Additional Removal (%) – Technical Effectiveness**	**Estimated design capacity (m^3/day)**	**Technical Feasibility** **Please rate from of 0 (low) to 10 (high). Use last page to explain rating.**	**Est. Capital Cost (USD)** **From Note 1, below**	**Est. Annual O&M Cost (USD/yr)** **From Note 2, below**	**Rank Options as First, Second, etc. based on feasibility and cost.**
Ammonia	1. Membrane Process						
	2. Adsorption						
	3. Other (specify)						
Copper	Based on this data, no add-on treatment needed for copper						

Pollutant	Add-On WWT Options						
	Potential Add-On WWT Technology	**Estimated Additional Removal (%) – Technical Effectiveness**	**Estimated design capacity (m^3/day)**	**Technical Feasibility Please rate from of 0 (low) to 10 (high). Use last page to explain rating.**	**Est. Capital Cost (USD) From Note 1, below**	**Est. Annual O&M Cost (USD/yr) From Note 2, below**	**Rank Options as First, Second, etc. based on feasibility and cost.**
Nickel	1. Membrane Process						
	2. Ion Exchange (IX) Polishing-On-ship Regeneration						
	3. (IX) Polishing-Load & Dispose of Resins						
	4. Other (specify)						
Zinc	1. Membrane Process						
	2. Ion Exchange (IX) Polishing-On-ship Regeneration						
	3. (IX) Polishing-Load & Dispose of Resins						
	4. Other (specify)						

In the space below, please provide your reasoning for the technical feasibility ratings you have assigned to the options above. Reference a specific add-on treatment option, where applicable.

Feasibility is a subjective rating of the practicality of the technology in terms of engineering and other operational aspects. For example, is there adequate space, capacity and power to operate add-on technologies?

Cost Calculation Tables (please photocopy and fill out Notes 1 and 2 for each Add-on WWT Option listed in the table above.)

Note 1

Type of Cost	Capital Costs	Cost (USD)
Direct	***Purchased equipment*** (includes all equipment for the installation or upgrade: mechanical equipment; electrical equipment; spare parts and noninstalled equipment spares; freight charges; taxes, insurance, and duties)	$
	Purchased equipment installation (includes installation of all equipment: electrical equipment, mechanical equipment, structural supports, insulation, and paint)	$
	Instrumentation and control (includes purchase, installation, and calibration)	$
	Piping (includes cost of pipe, pipe hangars, fittings, valves, insulation, and installation)	$
Indirect	***Engineering costs*** (includes process design and general engineering, drafting, cost engineering, consulting fees, supervision, inspection)	$
	Construction expenses (includes construction tools and equipment; permits, taxes, insurance)	$
	Contractor's fees (includes contractor costs for procurement, handling, and oversight)	$
	Contingency actually expended (to compensate for unpredictable events such as storms, floods, strikes, price changes, errors in estimates, design changes (unexpected retrofit costs), etc.)	$
	Total capital cost for option	$

Note 2

O&M Category	Estimated Annual Cost (USD)	Rate (USD)
Ship's labor (operating and maintenance)	$	$_____ per/hr (average rate of labor)
Training Costs (specific to operations of wastewater treatment system)	$	$_____ per/hr (average rate of labor)
Contractor labor (operating and maintenance)	$	$_____ per/hr (average rate of labor)
Maintenance: equipment and materials (e.g., spare parts, replacement equipment)	$	
Maintenance: contracted services (e.g., contractors, vendors)	$	
Costs for laboratory analysis	$	
Chemical costs	$	
Wastewater transfer (i.e., at shore-side facility)	$	$_____ per m^3
Sludge transfer	$	$_____ per m^3
Other sludge transfer, if other classifications apply to your area *(specify type)*:	$	$_____ per m^3
Oil transfer (specify source):	$	$_____ per m^3
Other treatment residual *(specify)*:	$	$_____ per m^3
Energy Costs	$	$_____ per _____mW $_____ per _____kW
Other *(specify)*:	$	$_____ per m^3 (if applicable)
Other *(specify)*:	$	$_____ per m^3 (if applicable)
Total O&M Costs	**$**	

Best Available Technology Evaluation
G-3: Pollution Prevention Methods

Instructions: Please provide information regarding pollution prevention methods that are capable of reducing the amount of ammonia and dissolved metals in cruise ship wastewater and help your vessel achieve compliance with AWQS at the point of discharge. Prevention methods are defined here as those measures that reduce the amount of a pollutant that enters wastewater streams that are subsequently discharged from the cruise ship. Examples include banning ammonia based cleaners and substitution of piping material.

Name of Permitted Operator/Vessel: **Individual Cruise Ship**

Pollutant	**Prevention Methods**						
	Method capable of reducing amount of pollutant entering wastewater	**Method currently in use? (yes/no)**	**Reduction with Prevention Method (%) – Technical Effectiveness**	**Technical Feasibility Please rate from 0 (low) to 10 (high). Use next page to explain rating.**	**Implementation Feasibility Please rate from 0 (low) to 10 (high). Use next page to explain rating.**	**Estimated Annual Cost (USD)**	**Rank Methods as First, Second, etc.**
Ammonia	1. Product Substitution						
	2. Other (specify)						
	3. Other (specify)						
Copper	1. Product Substitution						
	2. Management of water hardness						

Pollutant	Prevention Methods						
	Method capable of reducing amount of pollutant entering wastewater	**Method currently in use? (yes/no)**	**Reduction with Prevention Method (%) – Technical Effectiveness**	**Technical Feasibility Please rate from 0 (low) to 10 (high). Use next page to explain rating.**	**Implementation Feasibility Please rate from 0 (low) to 10 (high). Use next page to explain rating.**	**Estimated Annual Cost (USD)**	**Rank Methods as First, Second, etc.**
	3. Substitute piping material						
	4. Other (specify)						
Nickel	1. Product Substitution						
	2. Management of water hardness						
	3. Substitute piping material						
	4. Other (specify)						
	5. Other (specify)						
Zinc	1. Product Substitution						
	2. Management of water hardness						

Pollutant	Prevention Methods						
	Method capable of reducing amount of pollutant entering wastewater	**Method currently in use? (yes/no)**	**Reduction with Prevention Method (%) – Technical Effectiveness**	**Technical Feasibility Please rate from 0 (low) to 10 (high). Use next page to explain rating.**	**Implementation Feasibility Please rate from 0 (low) to 10 (high). Use next page to explain rating.**	**Estimated Annual Cost (USD)**	**Rank Methods as First, Second, etc.**
	3. Substitute piping material						
	4. Other (specify)						
	5. Other (specify)						

Feasibility Questions for Prevention—Use in determining technical feasibility and implementation feasibility (please photocopy this page and fill out for each prevention method listed in the table above.)

Prevention Method: _____	Steps/Action Items	Costs (USD) Please indicate whether it is a one-time cost or ongoing (annual)
List of Steps/Actions needed to implement prevention method.	1.	
	2.	
	3.	
	4.	
	5.	
Steps that are in place or could be implemented at minimal cost.	1.	
	2.	
	3.	
	4.	
	5.	
Steps that are infeasible and why.	1.	
	2.	
	3.	
	4.	
	5.	

In the space below, please provide your reasoning for the technical and implementation feasibility ratings you have assigned to the methods above. Reference a specific pollution prevention method, where applicable.

Technical Feasibility:
Implementation Feasibility:

Best Available Technology Evaluation
G- 4: Pollution Control Methods

Instructions: Please provide information on pollution control methods for ammonia and dissolved metals in cruise ship wastewater. Control methods are defined here as those measures that reduce the amount of pollutant in wastewater discharged by this vessel into Alaska waters. Examples may include treating partial waste streams and holding for discharge outside of permit limits, and discharge to an on-shore treatment system.

Name of Permitted Operator/Vessel: **Individual Cruise Ship**

Pollutant	Control Methods							
	Method capable of reducing the amount of pollutants discharged	**Method currently in use? yes/no**	**Currently/expected to apply to what Percentage (%) of treated sewage?**	**Currently/expected to apply to what Percentage (%) of treated graywater?**	**Technical Feasibility Please rate on from 0 (low) to 10 (high). Use next page to explain rating.**	**Implementation Feasibility Please rate from 0 (low) to 10 (high). Use next page to explain rating.**	**Estimated Annual Cost (USD)**	**Rank Methods as First, Second, etc.**
Ammonia	1. Treat and Hold for Off-shore discharge.							
	2. Discharge to On-shore treatment system							
	3. Other (specify)							

Pollutant	Control Methods							
	Method capable of reducing the amount of pollutants discharged	**Method currently in use? yes/no**	**Currently/expected to apply to what Percentage (%) of treated <u>sewage</u>?**	**Currently/expected to apply to what Percentage (%) of treated <u>graywater</u>?**	**Technical Feasibility Please rate on from 0 (low) to 10 (high). Use next page to explain rating.**	**Implementation Feasibility Please rate from 0 (low) to 10 (high). Use next page to explain rating.**	**Estimated Annual Cost (USD)**	**Rank Methods as First, Second, etc.**
Nickel	1. Treat and Hold for Off-shore discharge.							
	2. Discharge to On-shore treatment system							
	3. Other							
Zinc	1. Treat and Hold for Off-shore discharge.							
	2. Discharge to On-shore treatment system							

Feasibility Questions for Control—Use in determining technical feasibility and implementation feasibility (please photocopy this page and fill out for each control method listed in the table above.)

Control Method: _____	**Steps/Action Items**	**Costs (USD)** **Please indicate whether a one-time or ongoing cost (annual.)**
List of Steps/Actions needed to implement control method.	1.	
	2.	
	3.	
	4.	
	5.	
Steps that are in place or could be implemented at minimal cost.	1.	
	2.	
	3.	
	4.	
	5.	
Steps that are infeasible and why.	1.	
	2.	
	3.	
	4.	
	5.	

In the space below, please provide your reasoning for the technical and implementation feasibility ratings you have assigned to the methods above. Reference a specific pollution control method, where applicable.

Technical Feasibility:
Implementation Feasibility:

Best Available Technology Evaluation
G-5: Replacement Wastewater Treatment Systems

Instructions: Please provide information on new installations of advanced wastewater treatment systems (AWTS) that are potentially capable of producing cruise ship effluent that meets AWQS at the point of discharge, including those for ammonia and dissolved metals.

Name of Permitted Operator/Vessel: **Individual Cruise Ship**

1. What was the expected economic life of your current AWTS when it was originally installed? _____ **years**

2. What is its current expected economic life, taking modifications and upgrades into consideration?

Please describe in detail:_____

_____

_____

_____

_____

3. Have you considered or researched a replacement AWTS that would be capable of producing effluent that meets AWQS at the point of discharge for all pollutants, including ammonia and dissolved metals? ☐ Yes ☐ No

If yes, please answer the following questions regarding the replacement AWTS considered/researched:

Please describe the system in detail:_____

_____

_____

_____

Make and Model _____

_____

Design Capacity (m^3/day) _____

Percentages of treated: Graywater: _____ Blackwater: _____

Total percentage of all wastewater treated: _____

Please provide the estimated Removal Efficiency (%) that the replacement AWTS described above can achieve for the following pollutants:

Pollutant	Removal Efficiency (%)	Performance Guarantee? Yes/No	Conditions of Guarantee
Ammonia			
Dissolved Copper			
Dissolved Nickel			

Dissolved Zinc			
BOD			
TSS			
Fecal coliform			
Chlorine			

Technical Effectiveness **Please rate from 0 (low) to 10 (high).** **Use next page to explain scoring.**	**Implementation Feasibility** **Please rate from 0 (low) to 10 (high).** **Use next page to explain scoring.**	**Est. Capital Cost of Replacement AWTS (USD)** **(From Note 1, below)**	**Est. Annual O&M Cost for Replacement AWTS (USD per year)** **(From Note 2, below)**

In the space below, please provide your reasoning for the technical effectiveness and implementation feasibility ratings you have assigned to the replacement AWTS above.

Technical Effectiveness:
Implementation Feasibility:

Cost Calculation Tables for replacement AWTS considered.

Note 1

Type of Cost	Capital Costs	Cost (USD)
Direct	***Purchased equipment*** (includes all equipment for the installation or upgrade: mechanical equipment; electrical equipment; spare parts and non-installed equipment spares; freight charges; taxes, insurance, and duties)	$
	Purchased equipment installation (includes installation of all equipment: electrical equipment, mechanical equipment, structural supports, insulation, and paint)	$
	Instrumentation and control (includes purchase, installation, and calibration)	$
	Piping (includes cost of pipe, pipe hangars, fittings, valves, insulation, and installation)	$
Indirect	***Engineering costs*** (includes process design and general engineering, drafting, cost engineering, consulting fees, supervision, inspection)	$
	Construction expenses (includes construction tools and equipment; permits, taxes, insurance)	$
	Contractor's fees (includes contractor costs for procurement, handling, and oversight)	$
	Contingency actually expended (to compensate for unpredictable events such as storms, floods, strikes, price changes, errors in estimates, design changes (unexpected retrofit costs), etc.)	$
	Total capital cost for replacement AWTS	$

Note 2

O&M Category	Estimated Annual Cost	Rate (USD)
Ship's labor (operating and maintenance)	$	$_____ per/hr (average rate of labor)
Training Costs (specific to operations of wastewater treatment system)	$	$_____ per/hr (average rate of labor)
Contractor labor (operating and maintenance)	$	$_____ per/hr (average rate of labor)
Maintenance: equipment and materials (e.g., spare parts, replacement equipment)	$	
Maintenance: contracted services (e.g., contractors, vendors)	$	
Costs for laboratory analysis	$	
Chemical costs	$	
Wastewater transfer (i.e., at shore-side facility)	$	$_____ per m^3
Sludge transfer	$	$_____ per m^3

O&M Category	Estimated Annual Cost	Rate (USD)
Other sludge transfer, if other classifications apply to your area *(specify type)*:	$	$_____ per m^3
Oil transfer (specify source):	$	$_____ per m^3
Other treatment residual *(specify)*:	$	$_____ per m^3
Energy Costs	$	$_____ per _____mW $_____ per _____kW
Other *(specify)*:	$	$_____ per m^3 (if applicable)
Other *(specify)*:	$	$_____ per m^3 (if applicable)
Total O&M Costs	**$**	