

2007 Assessment of Cruise Ship Environmental Effects in Washington



April 2008

Publication Number 08-10-032



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Prepared by:

Amy Jankowiak
Washington State Department of Ecology
Water Quality Program

February 2008
Publication Number 08-10-032

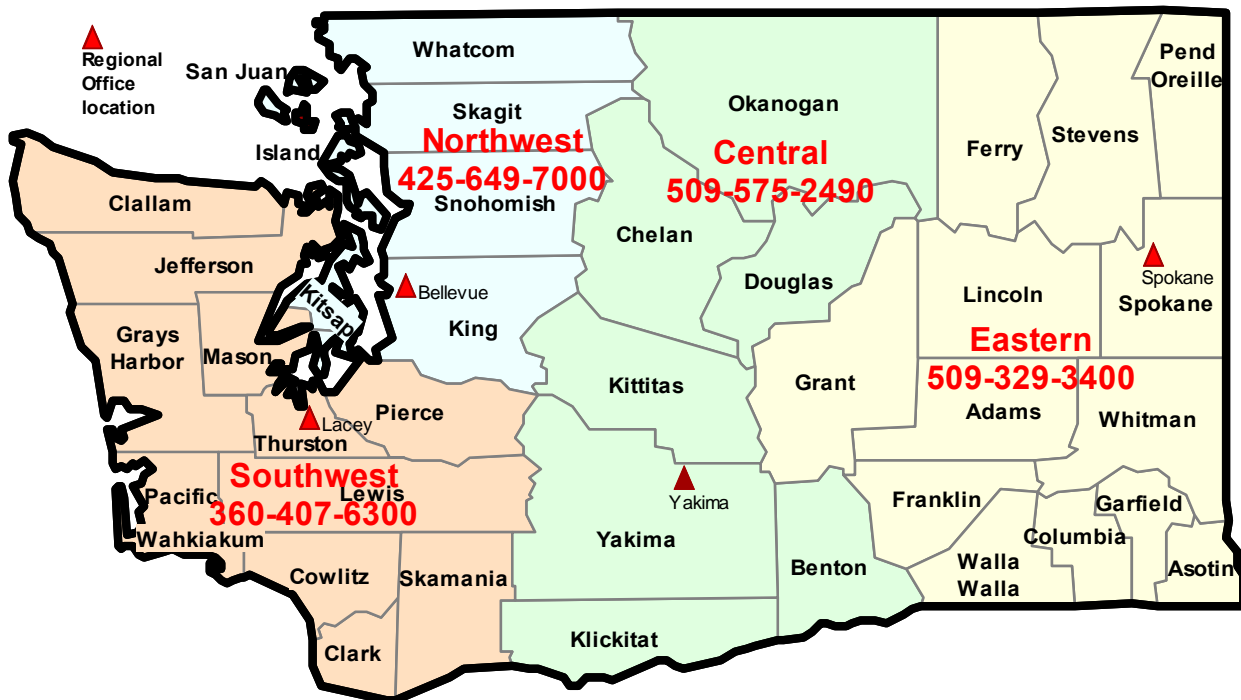
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For more information contact:

Department of Ecology
Water Quality Program
Northwest Regional Office
3190 - 160th Ave. SE
Bellevue, WA 98008-5452

Telephone: 425-649-7000

Headquarters (Lacey) 360-407-6000



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EXECUTIVE SUMMARY

A Memorandum of Understanding (MOU) between Department of Ecology (Ecology), the NorthWest CruiseShip Association (NWCA), and the Port of Seattle was signed on April 20, 2004. This MOU covers large passenger ships that are members of the NWCA. It does not cover ships such as Alaska Marine Highway ferries, shipping vessels, small passenger ships or boats.

The MOU prohibits discharges of both black and gray water to Washington State waters from all cruise ships except discharges treated with advanced wastewater treatment systems (AWTS) and when stringent requirements are met. Such systems are being installed in cruise ships serving the Alaska market as required by the state of Alaska. AWTS provide treatment that meets or exceeds Alaska's requirements under federal law.

The MOU defines the subject waters as being consistent with Washington marine waters. It requires sampling and monitoring of wastewater discharges and allows for vessel inspections by Ecology. The MOU includes additional elements, such as:

- Sewage sludge (biomass) discharges are prohibited within 12 nautical miles from shore and within the Olympic Coast National Marine Sanctuary.
- Specific sampling regimen, testing and reporting are required.
- Advanced notification and documentation are required from ships planning to discharge via an AWTS.
- Cruise ships must comply with Washington's more restrictive hazardous-waste laws, are prohibited from dumping garbage into state waters, and may only discharge oily bilge water per regulation.

The MOU has been amended each season to incorporate needed clarifications. MOU amendments finalized on May 25, 2007:

1. Changed all references to the International Council of Cruise Lines (ICCL) to the Cruise Line International Association (CLIA), as the association has changed.
2. Added language about the interagency agreement for cost recovery and references the appendix.
3. Changed the prohibited areas for the discharge of residual solids (sludge or biomass) to the entire Olympic Coast National Marine Sanctuary (not just part of it).
4. Clarified language to allow for inspections of all vessels for compliance with the MOU, whether approved for discharge or not.
5. Clarified language that all vessels approved for discharge agree to the sampling requirements set forth in the MOU—not just those actually discharging.

The MOU continues to be a valuable tool in meeting the goal of protecting Washington's marine waters from cruise-ship waste water. The requirement for discharges to be treated with AWTS ensures only high quality effluent is discharged. The requirement to allow vessels to be inspected leads to increased compliance. The need to understand the requirements of the MOU has called for increased communication between Ecology and the cruise lines and vessel staff.

Most cruise lines and vessels operating under the MOU were in compliance throughout the 2007 season. Some notable successes include the following:

- Sampling results for conventional pollutants continue to show excellent effluent quality
- Whole effluent toxicity (WET) test results evaluation has begun with a group of stakeholders to evaluate and discuss the testing protocols, results, and guidelines.
- A work group has been formed to consider options for sewage sludge handling.

The cruise-ship MOU has resulted in several benefits to Washington's environment:

1. It ensures that we have a water-quality strategy in place for large passenger vessels.
2. It increases Ecology's understanding of the operational practices of the cruise industry, and increases the cruise industry's understanding of the environmental concerns in Washington.
3. It forges a new and valuable partnership between state regulators, the cruise industry and other interested parties.
4. It doesn't lessen the state's authority to enforce Washington's water quality laws.

Admittedly, the MOU also has its limitations:

1. Compliance is voluntary.
2. Enforceability is limited to those federal and state water quality laws that continue to apply to cruise ships.
3. Applicability is limited. Cruise ships that do not make a port call while in Washington waters or are not a member of the NorthWest CruiseShip Association are not covered by the MOU.
4. Concerns regarding air quality are not addressed.

The Department of Ecology recommends that:

1. The MOU continues to be used as a complement to environmental regulations until regulations specific to cruise ship waste management in Washington State are put in place.
2. Ecology continues to inspect ships that discharge in waters subject to the MOU, including looking closely at wastewater management and the management of other waste streams.
3. The parties of the MOU continue to work together on evaluating the testing protocols, results, and testing guidelines for whole effluent toxicity and make recommendation on how to proceed.
4. Ecology, King County representatives, cruise line representatives, and the Port of Seattle continue to work together in evaluating options for sewage sludge handling.
5. Ecology, the cruise lines, and the Washington State Department of Health work together to amend the MOU incorporating the recommendations from the Department of Health report.
6. The cruise lines conduct a thorough review of records on an ongoing basis throughout the season as well as at the end of the season to evaluate compliance and all recommendations made in Ecology inspection reports are implemented.

1. Introduction

1.1 Assessment report

The purpose of this report is to assess the performance of the cruise industry for environmental impacts to state waters for the 2007 cruise season. The goals of this report are to:

1. Analyze the overall compliance with the Memorandum of Understanding.
2. Evaluate the performance of the advanced wastewater treatment systems.
3. Make recommendations in relation to the matters discussed in the report.

This report also presents general background information and detailed appendices of wastewater sampling data. Issues and concerns related to the discharge of bilge and ballast water are beyond the scope of this report.

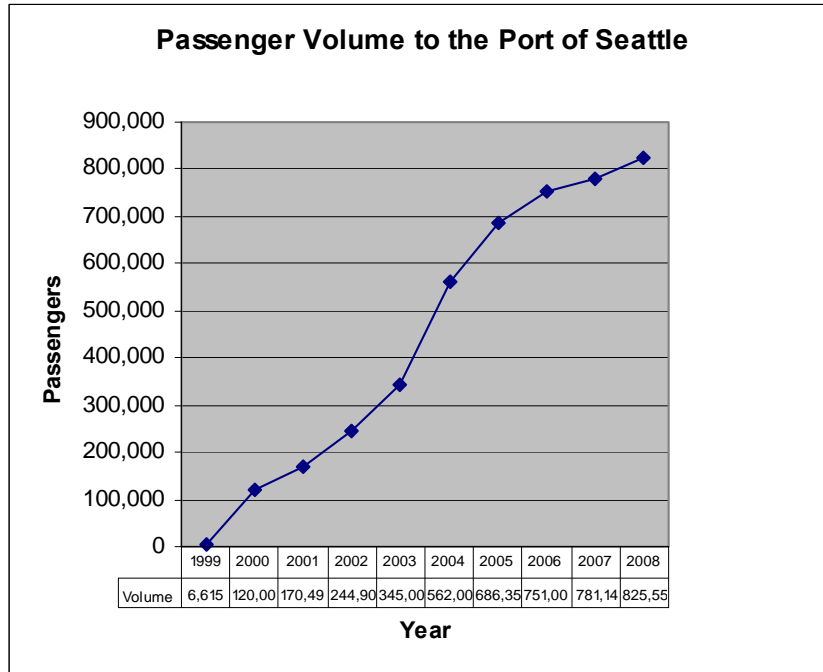
1.2 Cruise industry operations in Washington State

Cruise ships are typically grouped into two categories—large or small vessels. Large vessels hold overnight accommodations for 250 passengers or more. Small vessels hold overnight accommodations for 50-249 passengers.

Celebrity Cruises, Holland America Line, Norwegian Cruise Line, Princess Cruises, and Royal Caribbean Cruises Ltd. operated regularly scheduled cruises of large ships between Seattle and Alaska. Most of these large ships have a capacity of about 1,800 to 4,000 persons on board. Regent Cruises' SEVEN SEAS MARINER made one call to Seattle in 2007 and American West's EMPRESS OF THE NORTH made two calls. Alaska's Marine Highway runs regular cruises out of Bellingham to Alaska. The ships have a passenger/crew capacity of about 175 to 225.

This report centers on the operations of the large cruise ships that are covered under a Memorandum of Understanding (MOU); however, more is being learned about the operations of the smaller passenger vessels. Some smaller cruise lines, such as CruiseWest and Linblad Expeditions, run cruises on the Columbia and Snake Rivers, Puget Sound, and in British Columbia and Alaska. Linblad Expeditions also runs cruises through the San Juan Islands.

Large cruise ships have operated out of Seattle since 1999. The cruise business is one of the fastest growing business segments at the Port of Seattle. The Port has two berths suitable for large vessels at Terminal 30 and one at Pier 66. Sailings departed Seattle on Fridays, Saturdays, Sundays, and occasionally on other weekdays between the end of April 2007 and the beginning of November 2007. The figure below shows the rising number of passengers enjoying Alaska-bound cruises since 1999.



Source: Port of Seattle Cruise Seattle web site.
2008 values are projected estimates

Figure 1: Passenger Volume

Cruise ships operate under a rather ambiguous set of environmental standards. Cruise ships and their wastewater treatment systems are excluded from many of the U.S. environmental laws and regulations that land-based industries must meet. This is due the international nature of the cruise industry. As cruise ships are exempt from the federal Clean Water Act (CWA), Ecology has lacked information regarding potential environmental impacts of the cruise industry in Washington.

Several other environmental standards may apply to certain vessels. The United States Coast Guard (USCG) certifies marine sanitation devices to meet certain operational standards for performance but does not monitor wastewater effluent quality. Large ships operate under International Convention for the Prevention of Pollution from Ships (MARPOL), an environmental treaty drafted by the International Maritime Organization (IMO). Annex IV of MARPOL addresses the disposal of sewage. The U.S. did not sign Annex IV; therefore, it is not mandatory that ships follow Annex IV in the United States. Most large ships have adopted the “Cruise Industry Waste Management Practices and Procedures” put forth by the Cruise Lines International Association (CLIA).

The NorthWest CruiseShip Association (NWCA) consisted of the following member lines during the 2007 season:

1. Carnival Cruise Lines
2. Celebrity Cruises
3. Crystal Cruises
4. Holland America Line
5. Norwegian Cruise Line
6. Princess Cruises
7. Regent Seven Seas Cruises
8. Royal Caribbean International
9. Silversea Cruises

In 2007, 98 percent of port calls by large vessels to Seattle were made by NWCA member ships. Table 1 below depicts the member lines, the ships visiting Seattle, the number of port calls and the number of persons on board.

Table 1: 2007 Cruise Ships Calling to Ports in Washington

Vessel Operator	Vessel Name	2007 Number of Port Calls ¹	Total Persons on Board ²
NWCA MEMBERS			
Celebrity Cruises	<i>Mercury</i>	16	2779
Celebrity Cruises	<i>Summit</i>	1	3409
Holland America Line	<i>Amsterdam</i>	20	2027
Holland America Line	<i>Noordam</i>	21	2718
Holland America Line	<i>Ooesterdam</i>	21	2648
Holland America Line	<i>Zaandam</i>	1	2107
Holland America Line	<i>Zuiderdam</i>	1	2648
Norwegian Cruise Line	<i>Norwegian Pearl</i>	20	4230
Norwegian Cruise Line	<i>Norwegian Star</i>	22	4000
Norwegian Cruise Line	<i>Norwegian Sun</i>	0	3400
Princess Cruise Line	<i>Golden Princess</i>	21	3660
Princess Cruise Line	<i>Sun Princess</i>	21	2820
Royal Caribbean	<i>Radiance of the Seas</i>	1	3360
Royal Caribbean	<i>Serenade of the Seas</i>	2	2950
Royal Caribbean	<i>Vision of the Seas</i>	19	3200
Total		187	
NON NWCA MEMBERS			
Regent Cruises	<i>Seven Seas Mariner</i>	1	1200
American West	<i>Empress of the North</i>	2	320

190

¹ Numbers come from Port of Seattle 2007 Cruise Ship Sailing Schedule and the Port of Seattle staff.

² Numbers come from Alaska DEC 2007 Large Ship Wastewater Treatment and Discharge Status. Actual # of passengers/crew may vary.

The Port of Seattle's schedule for 2008 includes a total of 207 port calls from the following vessels: Celebrity Cruises INFINITY, Celebrity Cruises MERCURY, Celebrity Cruises MILLENIUM, Holland America Line AMSTERDAM, OOSTERDAM, VOLENDAM, WESTERDAM AND ZAANDAM, Norwegian Cruise Line PEARL and STAR, Princess Cruises GOLDEN PRINCESS, and STAR PRINCESS, Royal Caribbean RHAPSODY OF THE SEAS, and SERENADE OF THE SEAS, and Regent Cruises SEVEN SEAS MARINER. All of the vessels with exception of the SEVEN SEAS MARINER which is scheduled for one port call are part of the NorthWest CruiseShip Association.

1.3 Memorandum of Understanding summary

On April 20, 2004, a Memorandum of Understanding (MOU) between Ecology, the NorthWest CruiseShip Association (NWCA) and the Port of Seattle was signed. The MOU covers ships that are members of the NWCA, and therefore does not cover ships such as the Alaska Marine Highway ferries, or any of the small ships. The MOU bans cruise-ship wastewater discharges (black and gray water), except from vessels with advanced treatment systems (AWTS). AWTS provides treatment that meets or exceeds Alaska's requirements under federal law. The MOU allows continuous discharge in Washington waters from these AWTS with stringent provisions. Sewage sludge (biomass) may only be discharged more than 12 miles from shore and not within the Olympic Coast National Marine Sanctuary. The MOU specifies a sampling regime, testing, reporting and limit requirements, and requires advanced notification

and documentation from ships planning to discharge. The MOU also specifies that the ships comply with Washington's more restrictive hazardous waste laws and stipulates that garbage may not be discharged in state waters.

May 25, 2007 MOU amendments included:

1. Changing all references to the International Council of Cruise Lines (ICCL) to the Cruise Line International Association (CLIA).
2. Adding language about the interagency agreement for cost recovery and references the appendix.
3. Changing the prohibited areas for the discharge of residual solids (sludge or biomass) to the entire Olympic Coast National Marine Sanctuary (not just part of it).
4. Clarifying language to allow for inspections of all vessels for compliance with the MOU, whether approved for discharge or not.
5. Clarifying language that all vessels approved for discharge agree to the sampling requirements set forth in the MOU—not just those actually discharging.

The MOU and related documents are available on Ecology's website at:
http://www.ecy.wa.gov/programs/wq/wastewater/cruise_mou/index.html.

A copy of the current MOU (Amendment No.3) is included in Appendix A.

1.4 MOU funding

Ecology, the Port of Seattle, the NWCA and its member lines finalized a process via an agreement to recover costs incurred by Ecology associated with implementing the MOU. A funding agreement for the 2006 and 2007 seasons were signed and employed. A similar agreement for the 2008 season is being finalized and should be in place prior to the start of the 2008 sailings.

2. MOU requirements

2.1 Description of requirements

Applicability of MOU

The MOU applies to cruise ships that are part of the NorthWest CruiseShip Association (NWCA) and only to those member ships making a call at a port in Washington. NCWA member ships that do not make a port call in Washington are not subject to the provisions of the MOU while transiting off the Washington coast. All the ships subject to the MOU are engaged in cruise itineraries greater than one day duration.

Great care was taken in developing the geographic area in which the terms of the MOU apply. Washington's definition of "waters of the state" reaches to the international border with Canada. The cruise industry agreed to recognize Washington's definition of state waters for the purposes of the MOU. The "Waters subject to this MOU" are defined as including the Puget Sound and the Strait of Juan de Fuca south of the international boundary with Canada. Off the west coast of Washington, "Waters subject to this MOU" include the belt of seas measured from the line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters, and extending seaward a distance of three miles, as illustrated in Appendix iii of the MOU. The

definition of the “waters subject to this MOU” is inclusive of the marine waters of the state as defined in Washington law. See Figure 2 below.

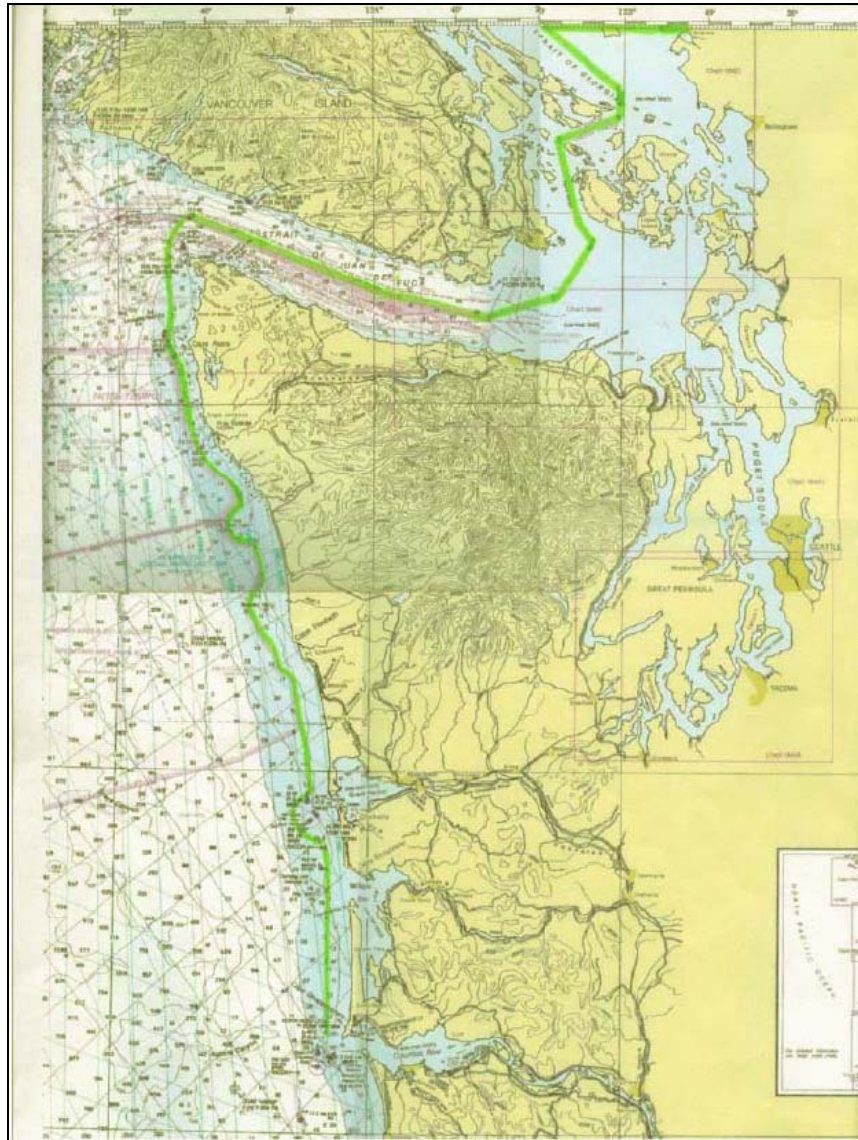


Figure 2: Map of “Waters subject to this MOU”

Wastewater discharges

The MOU defines “blackwater” as wastes from toilets, urinals, medical sinks, and other similar facilities, and “graywater” as including drainage from dishwasher, shower, laundry, bath, galley drains, and washbasin drains.

Advanced wastewater treatment systems (AWTS) are systems that meet the higher standards and testing regime as set out in federal law, Title XIV, Certain Alaska Cruise Ship Operations, Section 1404(c). The AWTS are systems such as the Zenon and Hamworthy membrane biological reactor ultrafiltration system, the Scanship biological reactor and ultrafiltration system, and the Rochem reverse osmosis ultrafiltration system. Table 2 identifies the type of treatment in use during the 2007 season by NWCA member ships.

Table 2: 2007 Vessels and Wastewater Treatment

Vessel Operator	Vessel Name	Blackwater (BW) Treatment System Manufacturer	Graywater (GW) Treatment System Manufacturer	Type of Treatment System
NWCA MEMBERS				
Celebrity Cruises	MERCURY	Biopure/Rochem	Mixed with BW	Non AWTS: Biopure is a marine sanitation device. AWTS: Rochem is a reverse osmosis ultrafiltration system used occasionally.
Celebrity Cruises	SUMMIT	Hamann/Lazarus	None	Hamann/Lazarus is dilution and filtration system
Holland America Line	AMSTERDAM	MSD	Unknown	Marine Sanitation Device
Holland America Line	NOORDAM	Rochem	Rochem	AWTS: Rochem BW is a bioreactor and ultrafiltration; AWTS: Rochem GW is reverse osmosis ultrafiltration system.
Holland America Line	OOSTERDAM	Rochem	Rochem	AWTS: Rochem BW is a bioreactor and ultrafiltration; AWTS: Rochem GW is reverse osmosis ultrafiltration system.
Holland America Line	ZAANDAM	Zenon	Mixed with BW	AWTS: Zenon is a bioreactor and membrane ultrafiltration system.
Holland America Line	ZUIDERDAM	Rochem	Rochem	AWTS: Rochem BW is a bioreactor and ultrafiltration; AWTS: Rochem GW is reverse osmosis ultrafiltration system.
Norwegian Cruise Line	NORWEGIAN PEARL	Scanship	Mixed with BW	AWTS: Scanship is a biological reactor and ultrafiltration system.
Norwegian Cruise Line	NORWEGIAN STAR	Scanship	Mixed with BW	AWTS: Scanship is a biological reactor and ultrafiltration system.
Norwegian Cruise Line	NORWEGIAN SUN	Scanship	Mixed with BW	AWTS: Scanship is a biological reactor and ultrafiltration system.
Princess Cruise Line	GOLDEN PRINCESS	Hamworthy Bioreactor	Mixed with BW or held	AWTS: Hamworthy is a biological reactor and ultrafiltration system.
Princess Cruise Line	SUN PRINCESS	Hamworthy Bioreactor	Mixed with BW or held	AWTS: Hamworthy is a biological reactor and ultrafiltration system.
Royal Caribbean	RADIANCE OF THE SEAS	Unknown	Unknown	Unknown
Royal Caribbean	SERENADE OF THE SEAS	Scanship	Mixed with BW	AWTS: Scanship is a biological reactor and ultrafiltration system.
Royal Caribbean	VISION OF THE SEAS	Hydroxyl	None	AWTS: Hydroxyl is an activated oxidation process
NON NWCA MEMBERS				
Regent Cruises	SEVEN SEAS MARINER	Hamworthy Reactor	Mixed with BW	AWTS: Hamworthy is a biological reactor and ultrafiltration system.
American West	EMPRESS OF THE NORTH	Orca	Chlorine	Macerator chlorinating system

The MOU prohibits discharges of untreated blackwater and untreated graywater within waters subject to the MOU from any type of treatment system. The MOU also bans discharges of treated blackwater and treated graywater unless treated with an AWTS which meets the Alaska requirements and under these terms:

- The ships are allowed to discharge \geq one nautical mile away from its berth and \geq 6 knots with the submittal of documentation prior to discharge.
- The ships are allowed to discharge within one nautical mile of berth with further documentation and provisions including 24-hour continuous turbidity or equivalent monitoring, emergency shutdown for treatment upsets, and ultraviolet light disinfection immediately prior to discharge.

All ships discharging within waters subject to the MOU must:

- Sample the effluent once per month while in Washington using a Washington state-certified laboratory.
- Meet the limitations on discharge as set in Alaska regulation.
- Split samples with Ecology upon request.
- Conduct Whole Effluent Toxicity (WET) testing once every two years for homeported vessels and once every 40 calls for other vessels.
- Provide test results provided to Alaska.
- Notify Ecology prior to sampling and allow Ecology to conduct inspections to verify compliance with the MOU (all vessels).
- Notify Ecology of any material changes made to the system.

The MOU prohibits the discharge of residual solids from the treatment system (sludge or biomass) in waters subject to the MOU, within 12 nautical miles from shore, and within the Olympic Coast National Marine Sanctuary. Residual solids are defined as including grit or screenings; ash generated during the incineration of sewage sludge; and sewage sludge. Sewage sludge is solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works and includes scum or solids removed in advanced wastewater treatment processes. Ecology, the Port of Seattle, and representatives from the NorthWest CruiseShip Association and individual cruise lines, as well as other interested stakeholders met in January 2008 to evaluate all of the options available for biomass management including discharging as currently allowed, incinerating on-board, and landing biomass ashore for treatment and beneficial use. Another meeting is being planned and scheduled for early March of 2008.

The discharge of oily bilge water is prohibited if not in compliance with applicable federal and state laws. Vessels typically discharge at less than 15 parts per million, and some are more stringent at 10 or five parts per million.

Hazardous waste

Per the MOU, Washington and the NWCA agreed to a uniform application procedure for the EPA national identification number under the Resource Conservation and Recovery Act (RCRA). The MOU details that Washington has the right to inspect all records upon request for hazardous waste management. NWCA member lines shall provide an annual report regarding the total hazardous waste offloaded in Washington. NWCA agrees to comply with the guidelines for certain waste streams per Washington regulations. Only Princess Cruises offloaded hazardous waste in Seattle in 2007 and did so per WAC 173-303-240.

Solid waste

The discharge of solid waste (garbage) is prohibited in waters subject to the MOU.

2.2 Alaska requirements and certification

The U.S. Congress enacted Title XIV – Certain Alaskan Cruise Ship Operations in December 2000. The law creates wastewater standards for vessels. The regulations to implement the law (AS 46.03.460 – AS 46.03.490 and 18 AAC 69) became effective in July 2001 and November, 2002, and are enforced by the United States Coast Guard. Under the legislation, large cruise ships may discharge blackwater and graywater in Alaska while underway and law allows continuous discharge of blackwater and graywater that meet more stringent standards through a certification process. A ship approved by the U.S. Coast Guard to discharge continuously must sample their wastewater twice per month.

All of the cruise ships subject to the Washington Cruise MOU are also subject to the Alaska requirements.

3. Documentation of discharges from advanced wastewater treatment systems per the MOU

3.1 Documentation required

Discharges \geq one nautical mile and six knots

Documentation is required for discharges from an AWTS occurring one nautical mile or more away from a ship's berth. The ship must be moving at a speed at or greater than 6 knots. The documentation must identify the type of treatment system in use on the ship, include schematic diagrams of the system and show that the system is certified by the United States Coast Guard.

Discharges within one nautical mile (continuously)

When the discharge occurs within one nautical mile of berth, in addition to the above documentation, the cruise ship operator must submit the following documentation:

1. Vessel specific information on how the ship's system meets 24-hour continuous turbidity or equivalent monitoring.
2. Documentation of system design that demonstrates emergency shut-down capacity;
3. Documentation that all treated effluent will receive final polishing with ultraviolet light immediately prior to discharge.
4. Copies of water quality test results for the past six months.
5. A vessel specific plan that identifies storage capacities and notification procedures.

3.2 Approvals

Ship(s) receiving approval to discharge one mile or more from berth while traveling at a speed of 6 or more knots:

The Holland America Line NOORDAM submitted documentation requesting approval to discharge at one mile or more from berth while traveling at a speed of six or more knots. The vessel received approval to discharge on August 13, 2007.

Ships receiving approval to discharge while at berth or at a distance less than one nautical mile from berth (continuously):

The Norwegian Cruise Line NORWEGIAN PEARL and NORWEGIAN STAR submitted documentation that the systems were certified by the USCG for continuous discharge in Alaska for the 2007 season. Schematics and other documentation were also provided. Ecology staff reviewed the documentation and on May 3, 2007, sent a letter detailing approval for continuous discharge. While the NORWEGIAN SUN did not call to a port in Washington, Norwegian Cruise Lines requested and received approval for continuous discharge for the vessel as it moves through Washington waters. Approval was granted on September 4, 2007.

The Princess Cruise Line GOLDEN PRINCESS and SUN PRINCESS submitted documentation that the systems were certified by the USCG for continuous discharge in Alaska for the 2007 season. Schematics and other documentation were also provided. Ecology staff reviewed the documentation and on May 3, 2007, sent a letter detailing approval for continuous discharge.

Table 3: 2007 Approval to Discharge

Vessel Operator	Vessel Name	Discharging in Washington ¹ ≥ 1nm from berth and ≥ 6 knots		Discharging in Washington ¹ continuously (at berth or within 1 nm of berth)		Date Approved
		BW	GW	BW	GW	
Celebrity Cruises	MERCURY	NO	NO	NO	NO	NA
Celebrity Cruises	SUMMIT	NO	NO	NO	NO	NA
Holland America Line	AMSTERDAM	NO	NO	NO	NO	NA
Holland America Line	NOORDAM	YES	YES	NO	NO	August 13, 2007
Holland America Line	OOSTERDAM	NO	NO	NO	NO	NA
Holland America Line	ZAANDAM	NO	NO	NO	NO	NA
Holland America Line	ZUIDERDAM	NO	NO	NO	NO	NA
Norwegian Cruise Line	NORWEGIAN PEARL	YES	YES	YES	YES	May 3, 2007
Norwegian Cruise Line	NORWEGIAN STAR	YES	YES	YES	YES	May 3, 2007
Norwegian Cruise Line	NORWEGIAN SUN	YES	YES	YES	YES	September 4, 2007
Princess Cruise Line	GOLDEN PRINCESS	YES	YES	YES	YES	May 3, 2007
Princess Cruise Line	SUN PRINCESS	YES	YES	YES	YES	May 3, 2007
Royal Caribbean	RADIANCE OF THE SEAS	NO	NO	NO	NO	NA
Royal Caribbean	SERENADE OF THE SEAS	NO	NO	NO	NO	NA
Royal Caribbean	VISION OF THE SEAS	NO	NO	NO	NO	NA

BW = Black Water; GW = Gray Water; NA = not applicable

¹ The term Washington waters refers to the "waters subject to this Memorandum of Understanding (MOU)" as defined in the MOU signed April 20, 2004 and as amended.

4. Sampling per the MOU

4.1 Sampling required

Alaska requires twice-monthly sampling for conventional pollutants. Per the MOU, the vessels that are approved for discharge are required to sample the quality of the treated effluent using a Washington state-certified laboratory at least one time per month while at port in Seattle during each cruise season. The cruise lines must use the sampling requirements set up by the USCG, Captain of the Port, Southeast Alaska Policy for conventional pollutants continued compliance monitoring regime. Parameters sampled include pH, biochemical oxygen demand (BOD), fecal coliform, total suspended solids (TSS), and residual chlorine (RC).

Whole effluent toxicity (WET) testing is required once every 2 years for homeported vessels (20 or more calls/turnarounds per season) and once per 40 port calls or turnarounds for all other vessels. WET testing guidelines were developed specifically for cruise ships by Ecology and are available on Ecology's website on cruise ships.

http://www.ecy.wa.gov/programs/wq/wastewater/cruise_mou/wet_testing_guide_6-3-04.pdf

Ecology did not receive any WET test reports for sampling taken in the 2007 season. Results previously submitted have shown toxicity most likely due to high ammonia and/or detergent and surfactant concentrations in the effluent samples. A group of stakeholders has been formed and has met once during 2007, once in January of 2008, and will meet again prior to the 2008 cruise season to evaluate and discuss the testing protocols, results, and testing guidelines.

4.2 Sampling data

Ecology received sampling results for the cruise ships that it approved for discharge in waters subject to the MOU:

- Norwegian Cruise Line's PEARL, STAR and SUN
- Princess Cruises GOLDEN PRINCESS and SUN PRINCESS
- Holland Line's NOORDAM

Sampling results were compared to the limits established by Alaska/the Washington Cruise MOU and are also compared to Washington's water quality standards. Sampling results are summarized for all data received in Appendix B.

Table 4 below shows the results for the cruise ships during the approval period and within Washington/Alaska voyages.

Table 4: Sample Results - Cruise Ships Approved for Discharge into Washington Waters

SHIP: NORWEGIAN PEARL											
		pH	BOD		TSS		Chlorine Residual		Fecal Coliform	Comments	
		St. Units	mg/l		mg/l		mg/l		#/100 ml		
MOU/Alaska Limits ¹		6-9	30/45		30/45		10 ug/l		20 / 40		
WA State Water Quality Standards ²		6.8-8.7	NA		NA		13 / 7.5 ug/l		14 / 43		
Sample Date	Location/ Lab										
5/13/07	Seattle/Laucks	6.3		12		7	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
5/29/07	Juneau/Analytica	6.56		16	<	4	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
6/3/07	Seattle/Laucks	8.0		7		44	ND<	0.10		7.0	MIXED BLACK AND GRAY OVERBOARD
6/5/07	Juneau/Analytica	6.98		14.0	ND<	4	ND<	0.10	ND<	2	MIXED BLACK AND GRAY OVERBOARD unannounced sampling
6/19/07	Juneau/Analytica	7.04		18.0		5.00	ND<	0.10	<	1	MIXED BLACK AND GRAY OVERBOARD
7/8/07	Seattle/Laucks	6.4		9		5	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
7/17/07	Juneau/Analytica	7.00		19.4		13	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD unannounced sampling
8/5/07	Seattle/Laucks	6.4		14		40	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
8/21/07	Juneau/Analytica	7.67		5.98		4.00	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
9/2/07	Seattle/Laucks	6.6		5	ND<	2	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
9/11/07	Juneau/Analytica	7.56		2.09		8.00	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
	MINIMUM	6.30		ND		ND		ND		ND	met Seattle sampling requirement
	AVERAGE			11.14		12.36		0.10			
	MAXIMUM	8.00		19.40		44.00		0.10	*	7	
	GEOMETRIC MEAN									2	

* Detection limit of 50 used. Non detect result.

SHIP: NORWEGIAN STAR											
		pH	BOD		TSS		Chlorine Residual		Fecal Coliform	Comments	
		St. Units	mg/l		mg/l		mg/l		#/100 ml		
		6-9	30/45		30/45		10 ug/l		20 / 40		
		MOU/Alaska Limits ¹									
		WA State Water Quality Standards ²	6.8-8.7		NA		13 / 7.5 ug/l		14 / 43		
Sample Date	Location/ Lab										
5/5/07	Seattle/Laucks	6.4		11		6	ND<	0.10		4.0	MIXED BLACK AND GRAY OVERBOARD
5/15/07	Juneau/Analytica	6.97		7.97	<	4	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
6/2/07	Seattle/Laucks	6.7		22		5	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
6/5/07	Juneau/Analytica	7.17		10.6		6.00	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD unannounced sampling
6/5/07	Juneau/Analytica	7.20		10.4		8.00	ND<	0.10		4	MIXED BLACK AND GRAY OVERBOARD unannounced sampling - duplicate
6/19/07	Juneau/Analytica	6.90		3.08	<	4.0	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
7/7/07	Seattle/Laucks	6.9		6		5	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
7/10/07	Juneau/Analytica	6.63		5.94		6.00	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
7/17/07	Juneau/Analytica	6.85		2.43	<	4.0	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD unannounced sampling
8/4/07	Seattle/Laucks	6.5		11		5	ND<	0.10	ND<	2	MIXED BLACK AND GRAY OVERBOARD
8/21/07	Juneau/Analytica	7.29		4.30	<	4.0	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
9/1/07	Seattle/Laucks	6.6	ND<	4	ND<	2	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
9/11/07	Juneau/Analytica	7.34		18.0		9.00	ND<	0.10	<	2	MIXED BLACK AND GRAY OVERBOARD
		MINIMUM		ND		ND		ND		ND	met Seattle sampling requirement
		AVERAGE		8.98		5.23		0.10			
		MAXIMUM		22.00		9.00		0.10	*	4	
		GEOMETRIC MEAN								2	

*Detection limit of 20 used. Result is non-detect. ** field result

SHIP: NORWEGIAN SUN											
		pH	BOD		TSS		Chlorine Residual		Fecal Coliform	Comments	
		St. Units	mg/l		mg/l		mg/l		#/100 ml		
		6-9	30/45		30/45		10 ug/l		20 / 40		
		MOU/Alaska Limits ¹									
		WA State Water Quality Standards ²	6.8-8.7		NA		13 / 7.5 ug/l		14 / 43		
Sample Date	Location/ Lab										
9/5/07	Juneau/Analytica	6.98		4.13	ND<	4	ND<	0.10	ND<	2	MIXED BLACK AND GRAY OVERBOARD
9/12/07	Juneau/Analytica	7.17		6.79	ND<	4	ND<	0.10	ND<	2	MIXED BLACK AND GRAY OVERBOARD
		MINIMUM		ND		ND		ND		ND	Seattle testing compliance (did not call in Seattle)
		AVERAGE		5.46		4		0.10			
		MAXIMUM		6.79		4		0.10		2	
		GEOMETRIC MEAN								2	

SHIP: GOLDEN PRINCESS							
		pH	BOD	TSS	Chlorine Residual	Fecal Coliform	Comments
		St. Units	mg/l	mg/l	mg/l	#/100 ml	
MOU/Alaska Limits ¹		6-9	30/45	30/45	10 ug/l	20 / 40	
WA State Water Quality Standards ²		6.8-8.7	NA	NA	13 / 7.5 ug/l	14 / 43	
Sample Date	Location/ Lab						
5/7/07	Juneau/Analytica	7.48	47.9	18.0	ND< 0.10	200	MIXED BLACK AND GRAY OVERBOARD
5/10/07	Ketchikan/R&M	7.03	2.48	3.00	ND< 0.10	6	MIXED BLACK AND GRAY OVERBOARD
5/12/07	Seattle/Laucks	7.4	4	5	ND< 0.10	4	MIXED BLACK AND GRAY OVERBOARD
6/2/07	Seattle/Laucks	7.4	10	ND< 2	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
6/4/07	Juneau/Analytica	6.99	8.31	6.00	ND< 0.10	< 1	MIXED BLACK AND GRAY OVERBOARD unannounced sampling
6/18/07	Juneau/Analytica	6.25	5.33	< 4	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
7/2/07	Juneau/Analytica	7.74	16.2	6.00	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
7/7/07	Seattle/Laucks	6.8	20	7	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
7/31/07	Skagway/Analytica	6.30	5.47	ND< 4	ND< 0.10	ND< 2	MIXED BLACK AND GRAY OVERBOARD unannounced sampling
8/4/07	Seattle/Laucks	6.9	11	ND< 2	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
8/6/07	Juneau/Analytica	7.59	9.39	< 4	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
9/1/07	Seattle/Laucks	7.3	18	5	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
9/3/07	Juneau/Analytica	7.73	ND< 2.0	3.00	ND< 0.10	ND< 2	MIXED BLACK AND GRAY OVERBOARD
MINIMUM		6.25	ND	ND	ND	ND	met Seattle sampling requirement
AVERAGE			12.31	5.08	0.09		
MAXIMUM		7.74	47.90	7.00	0.10	200	
GEOMETRIC MEAN						3	

SHIP: SUN PRINCESS							
		pH	BOD	TSS	Chlorine Residual	Fecal Coliform	Comments
		St. Units	mg/l	mg/l	mg/l	#/100 ml	
MOU/Alaska Limits ¹		6-9	30/45	30/45	10 ug/l	20 / 40	
WA State Water Quality Standards ²		6.8-8.7	NA	NA	13 / 7.5 ug/l	14 / 43	
Sample Date	Location/ Lab						
5/13/07	Seattle/Laucks	7.4	9	ND< 2	ND< 0.10	2	MIXED BLACK AND GRAY OVERBOARD
5/16/07	Juneau/Analytica	7.45	ND< 2.0	ND< 4	ND< 0.10	ND< 2	MIXED BLACK AND GRAY OVERBOARD
5/30/07	Juneau/Analytica	7.83	ND< 2.0	ND< 4	ND< 0.10	< 2	MIXED BLACK AND GRAY unannounced sampling
5/30/07	Juneau/Analytica	7.85	ND< 2.0	ND< 4	ND< 0.10	< 2	MIXED BLACK AND GRAY unannounced sampling (blind duplicate)
6/3/07	Seattle/Laucks	7.3	6	3	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
6/6/07	Juneau/Analytica	7.83	2.09	< 4.0	ND< 0.11	< 2	MIXED BLACK AND GRAY OVERBOARD
7/8/07	Seattle/Laucks	8.0	ND< 4	3	ND< 0.12	< 2	MIXED BLACK AND GRAY OVERBOARD
7/11/07	Juneau/Analytica	7.74	4.01	ND< 4	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
8/1/07	Juneau/Analytica	7.87	5.04	ND< 4	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
8/5/07	Seattle/Laucks	7.5	*ND< 60	3	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
8/22/07	Juneau/Analytica	7.97	17.9	24	ND< 0.10	< 2	MIXED BLACK AND GRAY unannounced sampling
9/2/07	Seattle/Laucks	7.6	* 110	ND< 2	ND< 0.10	80	MIXED BLACK AND GRAY OVERBOARD
9/5/07	Juneau/Analytica	7.81	ND< 2.0	ND< 4	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
MINIMUM		7.30	ND	ND	ND	ND	met Seattle sampling requirement
AVERAGE			17.39	5.0	0.09		
MAXIMUM		8.00	110.0	24.0	0.12	80	
GEOMETRIC MEAN						3	

* A detection limit of 60 mg/l was used as a result of dilutions used during the test.

SHIP: HOLLAND NOORDAM							
		pH	BOD	TSS	Chlorine Residual	Fecal Coliform	Comments
		St. Units	mg/l	mg/l	mg/l	#/100 ml	
MOU/Alaska Limits ¹		6-9	30/45	30/45	10 ug/l	20 / 40	
WA State Water Quality Standards ²		6.8-8.7	NA	NA	13 / 7.5 ug/l	14 / 43	
Sample Date	Location/ Lab						
8/15/07	Juneau/Analytica	7.88	18.3	ND< 4	ND< 0.10	< 2	MIXED BLACK AND GRAY OVERBOARD
8/17/07	Juneau/Analytica	7.81	28.0	ND< 1	ND< 0.10	ND< 2	MIXED BLACK AND GRAY unannounced sampling
9/2/07	Seattle/Laucks	6.8	38	ND< 2	ND< 0.10	ND< 2	MIXED BLACK AND GRAY OVERBOARD
9/19/07	Juneau/Analytica	7.40	2.87	ND< 4	ND< 0.10	ND< 2	MIXED BLACK AND GRAY OVERBOARD
	MINIMUM	6.80	ND	ND	ND	ND	met Seattle sampling requirement
	AVERAGE		21.79	3	0.10		
	MAXIMUM	7.88	38.00	4	0.10	2	
	GEOMETRIC MEAN					2	

ND = non detect, value in box is the detection level

Unannounced sampling includes other parameters not listed above

BOD = biochemical oxygen demand - or organics; TSS = total suspended solids

mg/l = milligrams per liter; ug/l = micrograms per liter; #/100 ml = coliforms per 100 milliliters

¹MOU/Alaska limits from Title XIV, Certain Alaska Cruise Ship Operations,

Section 1404(c) /40CFR 133.102

BOD and TSS: 30-day average shall not exceed 30 mg/l, 7-day average shall not exceed 45 mg/l

Fecal coliform: geometric mean of any 30-day period shall not exceed 20 fecal coliform/100 ml and not more than 10% of the samples exceed 40 fecal coliform/100 ml

²Washington State Water Quality Standards for Surface Waters of the State of

Washington Chapter 173-201A WAC

Fecal coliform: shall not exceed a geometric mean of 14 colonies/100 ml and not more than 10% of a samples shall exceed a geometric mean of 43 colonies/100 ml

pH: 7-8.5 with a human-caused variation within less than 0.2

chlorine: 13 ug/l is the acute limit (1-hour average); 7.5 ug/l is the chronic limit (4-day average)

For the ships that discharged from the AWTS, the results were in compliance with the Washington MOU and Alaska limits. However, when the samples were compared to Washington's water quality standards, pH and chlorine residual would have violated the standards at the point of discharge. The chlorine detection level used for most of the samples is higher than the water quality standard limit. The discharges from the cruise ships do not account for a mixing zone. On-land sewage treatment plants do have mixing zones. The results from the cruise ships for the parameters listed as above are generally as good as or better than most of the on-land plants.

Random unannounced samples were taken by the Alaska Department of Environmental Conservation in Alaska throughout the season. The samples taken included parameters other than the conventional pollutants detailed in Table 4. Copies of laboratory results received by Ecology can be obtained through Ecology's public disclosure office.

Table 5 below compares the various advanced wastewater treatment systems results as averaged. All result received are included in the averages.

Table 5: Comparison of Advanced Wastewater Treatment Systems and Result Averages

Total Number of Samples = 80	pH	BOD	TSS	Chlorine Residual	Fecal Coliform
Treatment System (number of samples)	Standard Units	mg/l	mg/l	mg/l	#/100 ml
	AVG	AVG	AVG	AVG	Geometric Mean
Scanship (44)	6.85	8.50	8	0.1	2.4
Rochem (8)	7.40	14.09	5.0	<0.1	2.8
Hamworthy (28)	7.48	16.30	3	<0.1	2.0

5. Inspections per the MOU

Eight different vessels were inspected by Ecology staff throughout the 2007 season. A list of vessels inspected is included in Table 6. The inspections were per the MOU and included a walkthrough of the wastewater systems, a review of discharge records, a review of notification procedures, gathering information on discharge procedures, monitoring, system shutdown during upset conditions, equipment maintenance, process control, and disinfection system maintenance and gathering other information, as applicable. The inspections typically also included sampling. Results are included in the inspection reports.

In general, the ship's wastewater systems were operating well and produced high quality effluent. There is more process control sampling being done on board the vessels. Discharge protocols are thorough and include verifications. The MERCURY vessel showed great improvement from last season in clearly planning discharge locations in accordance with the MOU.

One vessel did not have the most current version of the MOU readily available. One vessel has had some operational problems with their advanced wastewater treatment system and therefore held all discharges in MOU waters as they work to resolve the malfunctions. Two vessels showed higher tests results as conducted by Ecology, however, the results appear to be anomalies. As not all vessels could be inspected, copies of discharge documents were requested and received for review. Upon review, no violations of the MOU were discovered.

Copies of the inspection reports are included in Appendix C.

Table 6: 2006 Vessel Inspections

Vessels Inspected	Date Inspected
GOLDEN PRINCESS (Princess Cruises)	7/14/07
NORWEGIAN STAR (Norwegian Cruise Line)	8/4/07
AMSTERDAM (Holland America Line)	8/17/07
OOSTERDAM (Holland America Line)	8/25/07
NORWEGIAN PEARL (Norwegian Cruise Line)	9/2/07
VISION OF THE SEAS (Royal Caribbean)	9/7/07
NOORDAM (Holland America Line)	9/23/07
MERCURY (Celebrity Cruises)	10/8/07

6. Compliance with MOU requirements

Royal Caribbean International SERENADE OF THE SEAS:

On May 13, 2007, Royal Caribbean International contacted Ecology to report that on May 11, 2007, the SERENADE OF THE SEAS while in transit from Seattle to Nanaimo, B.C. mistakenly discharged approximately 97,500 gallons of treated wastewater from their Advanced Wastewater Purification system into Washington/MOU waters. The discharge occurred without prior request for approval from Ecology per the MOU.

Royal Caribbean International submitted a detailed follow-up report on the incident. The report details that on May 11, 2007 the vessel was maneuvering to enter the traffic separation lane at the southern end of the Strait of Georgia. The ship had been in Canadian waters for 51 minutes and had been back in U.S. waters for about 12 minutes, when, due to poor planning, the ship's officers failed to recognize that they could not discharge. Royal Caribbean conducted an onboard investigation of the incident to determine what happened, why, and to determine corrective actions. Senior staff provided training to prevent further incidents and a review of records. All other ships were compliant with the MOU. Navigation policies and procedures were noted to be reviewed and revised. A full disciplinary review was also sited.

There were no reported incidents of non-compliance in relation to solid waste management, hazardous waste management, or any other condition of the MOU not listed above.

Letters detailing compliance with the MOU from member lines are included in Appendix D.

7. Shellfish and viruses

The Washington State Department of Health has been working to examine the issues of cruise ship discharges and how that might impact shellfish. The state Legislature budgeted \$100,000 for a study on potential human health impacts from virus discharges from large passenger vessels. The Department of Health contracted with the University of Washington to undertake this study. The results indicate that, when AWTS are fully functional, viral discharges from large cruise ships should not cause illness through shellfish. However, if the treatment systems malfunction, virus discharges from cruise ships may reach some shellfish beds at levels that may lead to illness. The Department of Health report identifies recommendations to limit the risk of an unacceptable discharge. Recommendations include the following:

- No discharge should occur within 0.5 nautical miles of bivalve shellfish beds that are recreationally harvested or commercially approved to harvest.
- Cruise ships should withhold discharge when a system upset occurs.
- DOH should be notified immediately in the event of an AWTS upset.
- A small passenger ship study should be done to assess potential impacts of these vessels.
- The Department of Ecology should revise its "Criteria for Sewage Works Design" to address minimum UV dosage for virus inactivation.

The full report can be found at: <http://www.doh.wa.gov/ehp/sf/Pubs/cruise-ship-report.pdf>

The intent is to incorporate the recommendations listed above into the next amendment of the MOU for the 2008 cruise season. Ecology recognizes that there will be some technology development and/or acquisition needs on the part of the cruise lines. Ecology will work with the Department of Health and the cruise lines on clarifying MOU language by specifying notification procedures for upset conditions, defining upset conditions, expanding definitions to include ultraviolet disinfection, and making other points of clarification.

8. Conclusions

8.1 Overall

The Memorandum of Understanding continues to be a key tool in protecting water quality by having requirements in place to allow discharges only from advanced wastewater treatment systems, allowing for inspections to verify compliance, and building communication with the cruise lines and vessel staff on requirements of the MOU.

While we continue to learn more about the large passenger vessels, more information is needed in regard to the small ships—including which ships are operating in Washington waters, what type of treatment systems are on board, which ships are discharging and where, and the quality of the effluent being discharged.

The majority of the lines and vessels operating with the MOU had a successful season and were in compliance throughout. The sampling results for conventional pollutants continue to show excellent effluent quality. An evaluation of the results from the whole effluent toxicity testing has begun. A group of stakeholders has been formed and has met once during 2007, once in early 2008, and will meet again prior to the 2008 cruise season to evaluate and discuss the testing protocols, results, and testing guidelines.

The disposal of sewage sludge (biomass) from cruiseships, although outside of Washington's waters of the state, is of concern because sludge has the potential of being used in a more beneficial way. Most on-land treatment systems treat their sludge for usage to be applied on land for agronomic soil amendments, or it is turned into compost for widespread use. A group has been formed which includes Ecology biosolids experts, King County representatives, cruise line representatives, and the Port of Seattle to consider options for sewage sludge (biomass) handling.

The MOU specifies that all of the parties agree to at least one annual meeting to review the effectiveness of the MOU. The annual meeting was held on December 4, 2007. The Port of Seattle, the Department of Ecology, representatives from the NorthWest CruiseShip Association and some of its member lines (Princess Cruises, Holland America Line, and Royal Caribbean/Celebrity Cruises), the Department of Health, as well as other interested parties convened for the meeting. Agenda items included:

- Welcome and Introductions.
- Compliance with the 2007 season.
- Department of Health Report - viruses.
- Funding for the MOU.
- Biosolids and Whole Effluent Toxicity testing updates.
- MOU Amendments.
- Comments/Discussion from cruise lines and interested parties.
- Looking Ahead.

The meeting notes are included in Appendix E.

Advantages of the MOU include having something in place to protect water quality, building a partnership with the cruise industry and other key stakeholders, and being able to inspect and evaluate the quality of treatment from the ships that discharge. Limitations of the MOU include the inability to effectively enforce on what is essentially a voluntary agreement, the lack of coverage under the MOU for large passenger ships that are not members of the NorthWest CruiseShip Association, and air quality issues are not currently covered in the MOU.

8.2 Recommendations

1. The Department of Ecology recommends that the MOU continue to be used as a complement to environmental regulations until regulations specific to cruise ship waste management in Washington State are put in place.
2. Ecology recommends that Ecology continue to inspect ships that discharge in waters subject to the MOU, including closely looking at wastewater management and the management of other waste streams.
3. It is recommended that the parties of the MOU continue to work together on evaluating the testing protocols, results, and testing guidelines for whole effluent toxicity and make recommendation on how to proceed.
4. It is recommended that Ecology, King County representatives, cruise line representatives, and the Port of Seattle continue to work together in evaluating options for sewage sludge (biomass) handling.
5. It is recommended that Ecology, the cruise lines, and the Washington State Department of Health work together to amend the MOU incorporating the recommendations from the Department of Health report.
6. It is recommended that the cruise lines conduct a thorough review of records on an on-going basis throughout the season as well as at the end of the season to evaluate compliance and that all recommendations made in inspection reports be implemented.