

2007 Assessment of Cruise Ship Environmental Effects in Washington



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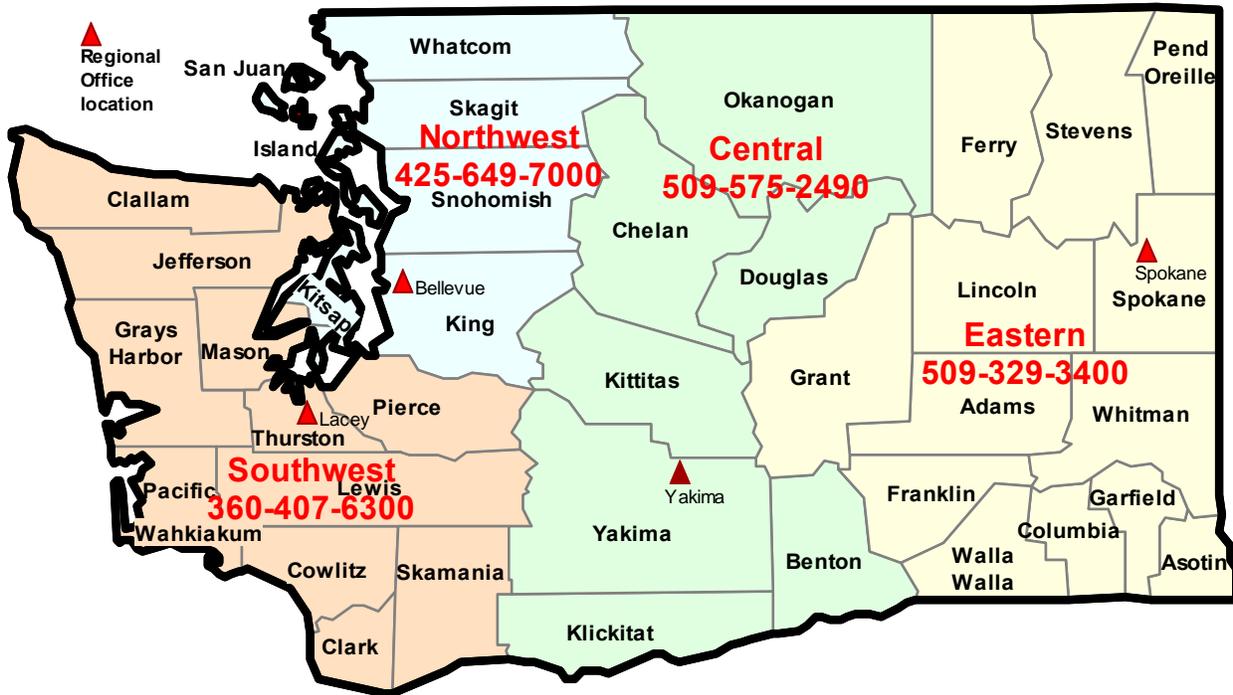
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EXECUTIVE SUMMARY

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.

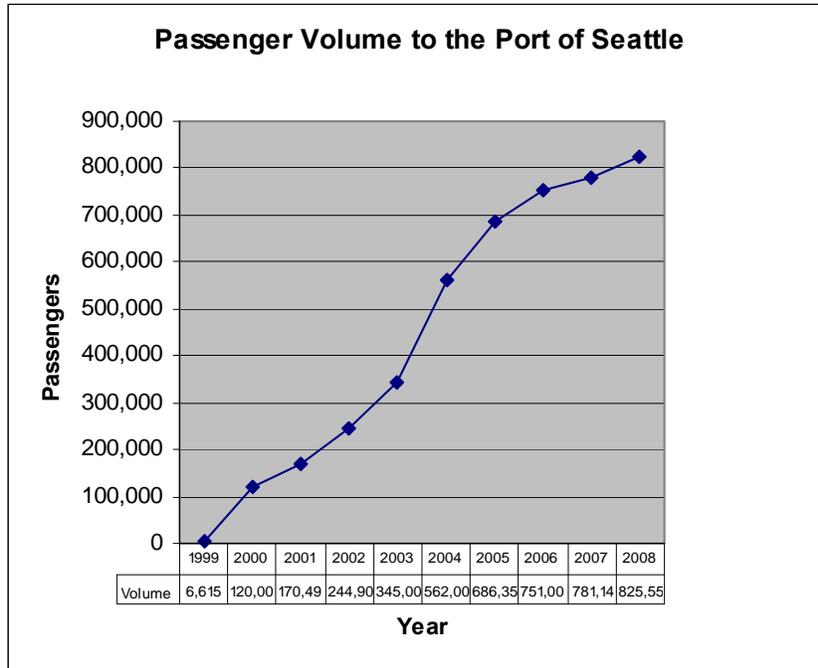
1.2 Cruise industry operations in Washington State

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 to 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.

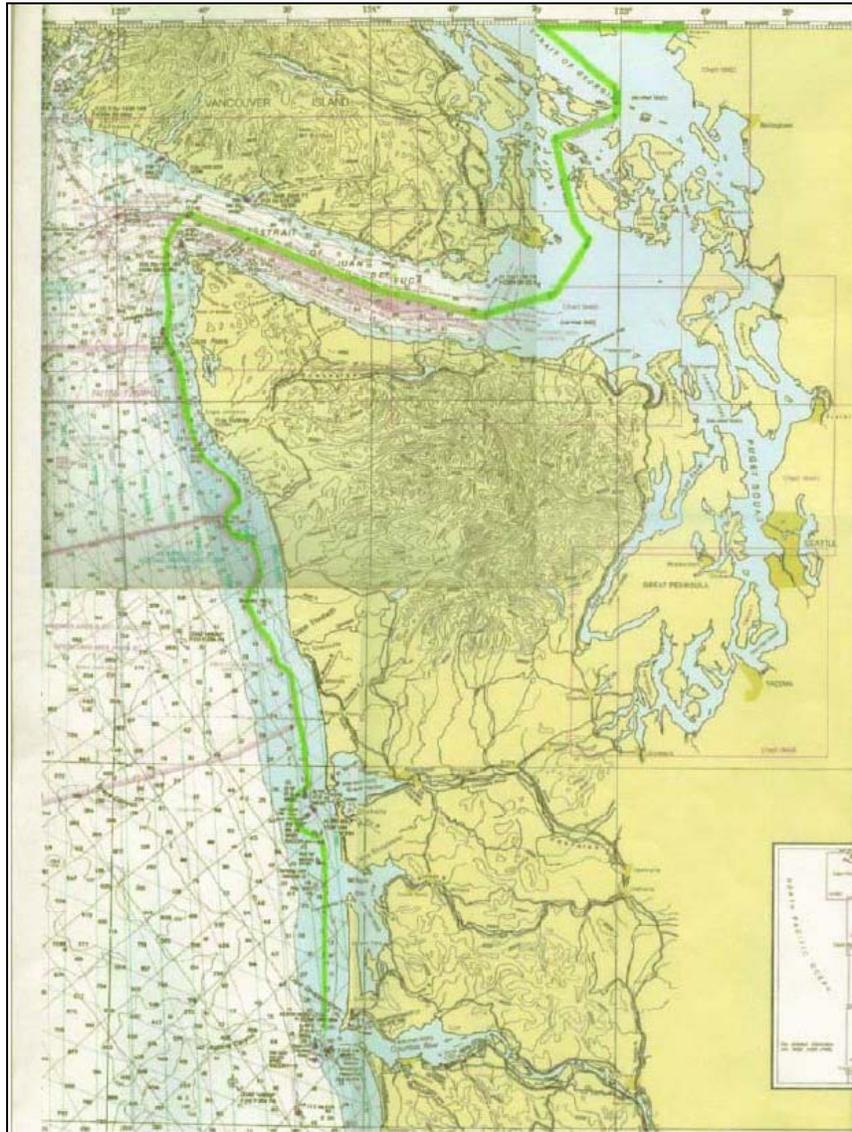


Figure 2: Map of “Waters subject to this MOU”

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 | 30/45 | | 30/45 | | 10 ug/l | | 20 / 40 | | |
| | | WA State Water Quality Standards ² | NA | | 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 | 30/45 | | 30/45 | | 10 ug/l | | 20 / 40 | | |
| | | WA State Water Quality Standards ² | NA | | 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.



Amendment No. 3 of the

Memorandum of Understanding

Cruise Operations in

Washington State

Originally signed April 20, 2004

Washington State Department of Ecology

Northwest Cruise Ship Association

Port of Seattle

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding, originally signed on April 20, 2004 is amended by and between the State of Washington, the Port of Seattle, and the Northwest Cruise Ship Association, hereinafter referred to as NWCA, representing the international cruise lines identified in *Appendix i*.

Whereas the State of Washington is charged with the responsibility of protecting and conserving Washington's environmental resources in relation to the Cruise Industry's environmental practices in Washington; and

Whereas the United States Coast Guard, herein referred to as USCG, has Federal jurisdiction over environmental matters in navigable waters in the United States; and

Whereas the Port of Seattle is charged with providing the services and facilities to accommodate the transportation of passengers, including cruise ship passengers, while protecting and enhancing the environment of the Port of Seattle; and

Whereas, the NWCA is a non-profit entity organized for the purpose of representing member cruise lines which operate in and about waters subject to this Memorandum of Understanding (MOU), whose current membership is identified in *Appendix i*; and

Whereas, the NWCA has adopted the "**Cruise Industry Waste Management Practices and Procedures**" as promulgated by the Cruise Industry's trade association, the Cruise Lines International Association, herein referred to as CLIA, which practices and procedures are attached hereto as *Appendix ii*; and

Whereas, NWCA cruise vessels operate in international waters and move passengers to destinations worldwide and, consequently, those cruise vessel waste management practices must take into account environmental laws and regulations in many jurisdictions and international treaties and conventions; and

Whereas, the NWCA, the State of Washington as represented by the Washington Department of Ecology (Ecology), the USCG and the Port of Seattle have met to develop waste management practices that preserve a clean and healthy environment and demonstrate the Cruise Industry's commitment to be a steward of the environment; and

Whereas, research is ongoing to establish the impact of ships' wastewater discharges on the ocean environment, and the results of this research will be taken into account in periodic review of the wastewater discharge practices described in this Agreement; and

Whereas, the cruise industry recognizes Washington's fragile marine environment and is committed to help protect this environment;

Now therefore, based upon mutual understanding, the parties enter into this Memorandum of Understanding to implement the following environmental goals, policies and practices:

Definition of terms for the purpose of this agreement:

“blackwater” means waste from toilets, urinals, medical sinks and other similar facilities;

"cruise ship" means any vessel that is owned or operated by a member of the NWCA;

“graywater” includes drainage from dishwasher, shower, laundry, bath, galley drains and washbasin drains;

“oily bilge water” includes bilge water that contains used lubrication oils, oil sludge and slops, fuel and oil sludge, used oil, used fuel and fuel filters, and oily waste.

“residual solids” includes grit or screenings, ash generated during the incineration of sewage sludge and sewage sludge, which is solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge.

“solid waste” means all putrescible and nonputrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes and recyclable materials [RCW 70.95.030 (22), Solid Waste Management: Reduction and Recycling];

“waters subject to this Memorandum of Understanding (MOU)” include the Puget Sound and the Strait of Juan de Fuca south of the international boundary with Canada; and for off the west coast, the belt of the seas measured from the line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters, and extending seaward a distance of three miles as illustrated in *Appendix iii*.

1. Applicability

1.1 The State of Washington agrees that the performance required by the NWCA under the terms of this Memorandum of Understanding shall be directed only to its member cruise lines. The NWCA acknowledges that its members operate cruise vessels engaged in cruise itineraries greater than one day duration; and further that its members do not operate one-day attraction ships or casino gambling ships. This agreement only applies to voyages during which the commercial passenger vessel actually calls at a port in the State of Washington.

1.2 The State of Washington and Port of Seattle accepts the CLIA Industry Standard E-01 – 01, titled *Cruise Industry Waste Management Practices and Procedures (Appendix ii)* as CLIA member policy in the management of solid waste, hazardous wastes and wastewaters in waters subject to this MOU. In addition to the CLIA Practices, the member vessels of NWCA operating in Washington agree to allow Ecology to conduct a minimum of one vessel inspection per season to verify compliance with the MOU and agree to comply with the following unique practices while operating in waters subject to this MOU:

2.1 Wastewater Management

In recognition of the sensitive nature of Washington's marine environment, the NWCA agrees to the following:

- 2.1.1 to prohibit the discharge of untreated blackwater, untreated graywater, and solid waste within waters subject to this MOU (*Appendix iii*); and to prohibit the discharge of oily bilge water if not in compliance with applicable federal and state laws within waters subject to this MOU.
- 2.1.2 other than as set forth in section 2.1.3 below, to prohibit the discharge of treated blackwater and treated graywater in waters subject to this MOU.
- 2.1.3 the discharge of treated blackwater and treated graywater from ships equipped with advanced wastewater treatment systems (AWTS) which meet the higher standards and the testing regime set out in federal law, Title XIV, Certain Alaska Cruise Ship Operations, Section 1404 (c) (*Appendix vi*) is allowed under the following conditions:
 - The ship is at least one nautical mile away from its berth at a port in Washington and is traveling at a speed of at least 6 knots.
 - No later than 60 days prior to the date the cruise ship wishes to commence discharge of AWTS-treated effluent, the cruise line shall submit the following vessel specific information to Ecology
 - Documentation on the type of treatment system in use on the ship including schematic diagrams of the system.
 - Documentation that the system is certified by the United States Coast Guard for continuous discharge in Alaska. If the certification has not yet been provided by the Coast Guard at the time the other documentation is submitted to Ecology, it may be submitted less than 60 days prior to commencement of discharge but in no event less than 30 days prior to the commencement of discharge.

No later than 60 days prior to the date a cruise ship wishes to commence discharge of AWTS-treated effluent at or within one nautical mile of its berth, the cruise line shall submit the following vessel specific information to Ecology:

- Documentation on the type of treatment system in use on the ship including schematic diagrams of the system.
- Documentation that the system is certified by the United States Coast Guard for continuous discharge in Alaska. If the certification has not yet been provided by the Coast Guard at the time the other documentation is submitted to Ecology, it may be submitted less than 60 days prior to commencement of discharge but in no event less than 30 days prior to commencement of discharge.
- Provision for daily twenty-four hour continuous turbidity or equivalent monitoring of the quality of the effluent generated by the AWTS.
- Documentation of system design that demonstrates the AWTS can be automatically shut down if monitoring of treated effluent indicates a system upset;

or documentation that demonstrates that operational controls exist to insure system shut down if monitoring of treated effluent indicates a system upset. An example of an acceptable operational control is a system that has the continuous monitoring device alarmed as to immediately alert engineering staff on watch to shut down overboard discharges from the system in the event of high turbidity levels in the treated effluent.

- Documentation that all treated effluent will receive final polishing with ultraviolet (UV) light immediately prior to discharge.
- Copies of water quality tests results taken from the AWTS effluent during the preceding six months.
- A vessel specific plan that: identifies how effluent will be stored until the AWTS is repaired and which indicates the storage capacity of holding tanks; and includes a notification protocol for notifying Ecology of system shut down which occurs while within waters subject to this MOU.

If Ecology determines that the documentation provided is insufficient, it shall so notify the cruise line. The cruise line shall provide supplemental documentation as requested by Ecology. If Ecology and the cruise line are unable to agree on the supplemental documentation and cruise line elects to discharge from the AWTS, cruise line understands that any such discharge will not have been approved by Ecology and further that Ecology may take appropriate action, including, but not limited to, publicizing, such fact.

Any cruise ship approved for discharge from an AWTS in waters subject to this MOU agrees to:

- a. sample the quality of the treated effluent using a Washington state-certified laboratory at least one time per month while at port in Washington during each cruise season using the sampling requirements established per the United States Coast Guard, Captain of the Port, Southeast Alaska Policy for conventional pollutants continued compliance monitoring regime and as referenced in *Appendix vi*. Parameters sampled include pH, Biochemical Oxygen Demand (BOD), Fecal Coliform, Total Suspended Solids (TSS), and Residual Chlorine (RC).
- b. Meet the limitations on discharge as set in Alaska regulations (*Appendix vi*) for BOD, TSS, pH, Fecal Coliform and Residual Chlorine.¹
- c. split samples with Ecology upon Ecology's request when sampling is conducted in Washington waters.
- d. Conduct Whole Effluent Toxicity (WET) Testing once every two years for vessels homeported² in Washington and once every 40 port calls or turnarounds to a port in Washington for all other vessels.
- e. provide Ecology with duplicates of test results obtained for and provided to the State of Alaska to enable Ecology to monitor the quality of the effluent from such systems.
- f. notify Ecology at least a week in advance of sampling and to allow Ecology staff access to the ship in order to observe sampling events.
- g. notify Ecology if any material changes are made to the system.

Note 1: There is a presumption that meeting Alaska's standards means that Washington's Water Quality Standards are likely being met and that if Alaska's standards are not being met, Washington's Water Quality Standards are not being met.

Note 2: A "homeported" vessel is a vessel that makes a call or does a turnaround at a port in Washington at least 20 times per year.

2.1.4 The discharge of residual solids (or “biosolids”) from either a type 2 marine sanitation device or an advanced waste water treatment system is prohibited in waters subject to this MOU, within 12 nautical miles from shore, and within the entire boundaries of the Olympic Coast Marine Sanctuary. All parties acknowledge that most of the Olympic Coast Marine Sanctuary lies beyond 3 miles of shore and therefore is outside the jurisdiction of the State of Washington.

2.2 Hazardous Waste Management

2.2.1 The CLIA in consultation with NWCA has developed, in conjunction with the Environmental Protection Agency (EPA), a national practice for the assigning of an EPA Identification Number to each cruise ship as the “generator” of hazardous wastes, which recognizes the multi-jurisdictional itineraries of a cruise vessel. EPA also proposes that the state where company offices are located may issue the national identification numbers provided the criteria and information submitted required for obtaining the number is standard for the United States. The State of Washington and NWCA agree to a uniform application procedure for the EPA national identification number in accordance with the Resource Conservation Recovery Act (RCRA) (*Appendix v*). The State of Washington shall have the right to inspect all such records upon written request to the cruise vessel operator. The State of Washington recognizes that in some cases EPA Identification Numbers may not be required under federal law for conditionally exempt small quantity generators.

2.2.2 *Appendix ii* includes the uniform procedure adopted by the NWCA for the application of RCRA to cruise vessels disposing of hazardous wastes in the State of Washington. The State of Washington accepts this procedure as the appropriate process for vendor selection and management of hazardous wastes in Washington. NWCA member lines agree to provide an annual report regarding the total hazardous waste offloaded in Washington by each cruise vessel.

2.2.3 The NWCA acknowledges that the state of Washington regulates some hazardous wastes differently than EPA and agrees, within the waters subject to this MOU, to comply with the guidelines for specific waste streams found in *Appendix vii*.

2.2.4 The State of Washington and NWCA agree that all hazardous waste disposal records required by RCRA for cruise vessels entering a Washington port shall be available to the State of Washington upon written request to the cruise vessel operator.

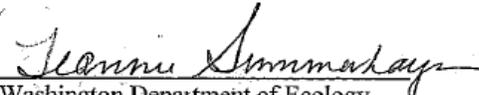
3. The State of Washington and the NWCA understand that the U.S. Coast Guard (USCG) has Federal jurisdiction over environmental matters in navigable waterways in the United States and conducts passenger ship examinations that include review of environmental systems, Safety Management System (SMS) documentation and such MARPOL-mandated documents as the Oil Record Book and the Garbage Record Book. Additionally, NWCA member cruise vessels will integrate such industry standards into SMS documentation that ensure compliance through statutorily required internal and third party audits.

4. The USCG has developed guidelines relating to the inspection of waste management practices and procedures, which have been adopted by the cruise industry. The State of Washington accepts the USCG Navigation and Vessel Inspection Circular and Environmental Systems Checklist (*Appendix iv*), which will be incorporated into USCG 840 Guidebook as the procedure to conduct waste management inspections on board cruise vessels. To reduce administrative burden on the cruise ship industry, the State of Washington agrees to first request from the USCG any records for cruise vessels entering waters subject to this MOU to the extent that those records are covered by the Memorandum of Agreement, dated May 25th, 2001, between the State of Washington Department of Ecology and the USCG. Other USCG records will be provided to the State directly by the NWCA member lines upon request.
5. The State of Washington recognizes that waste management practices are undergoing constant assessment and evaluation by cruise industry members. It is understood by the State of Washington and the NWCA that the management of waste streams will be an on-going process, which has as its stated objectives both waste minimization and pollution prevention. Consequently, all parties agree to continue to work with each other in good faith to achieve the stated objectives. This may require additional meetings with the parties to this Agreement to discuss specific issues applicable to the cruise industry in the U.S.
6. The NWCA acknowledges that its operating practices are required to comply with the applicable provisions of the Marine Mammal Protection Act, the Invasive Species Act and the State of Washington Ballast Water Management law, RCW Ch. 77.120. The NWCA agrees to acknowledge and comply with appropriate rules and regulations related to the Olympic Coast National Marine Sanctuary, including but not limited to the regulations for implementing the National Marine Sanctuary Program (subparts A through E and subpart O of Title 15, Chapter IX, Part 922 of the Code of Federal Regulations) and the International Maritime Organization (IMO) "Area To Be Avoided" off the Washington Coast.
7. This agreement does not prohibit discharges made for the purpose of securing the vessel or saving life at sea, provided that all reasonable precautions have been taken for the purpose of preventing or minimizing the discharge.
8. All parties acknowledge that ongoing discussions of environmental goals are recognized as a necessary component to the successful implementation of management practices for waste minimization and reduction.
9. Compliance, Modification and Review of MOU: NWCA members agree to immediately self-report non-compliance with any provision of this MOU to the Department of Ecology at the following 24-hour number: 425-649-7000. By December 1st of each year, a report shall be submitted to the Department of Ecology detailing the compliance with this MOU for each vessel within the NWCA that calls to a port in Washington for the previous cruise season. The reports should follow the format included in *Appendix viii*. All parties acknowledge that this MOU is not inclusive of all issues, rules or programs that may arise in the future. The State of Washington reserves the right to enter into additional MOUs to address or refine such issues, to take enforcement action in response

to violations of state law, or to pursue appropriate legislation. All parties agree to at least one annual meeting to review the effectiveness of the MOU, such meeting to be scheduled, if feasible, during October of each year. The State of Washington and NWCA reserve the right to cancel this MOU upon 90 days written notice.

10. The Port of Seattle and Ecology entered into an interagency agreement for the purpose of providing funding for Ecology personnel to further the intent of the MOU. The Port of Seattle is acting solely as a pass-through contracting entity to facilitate the collection of funds from the individual NWCA members and to provide payment to Ecology on behalf of the NWCA members. The interagency agreement as included in *Appendix ix* may be amended or renewed separately from this MOU at any time by the parties of the agreement without amending this MOU.

IN RECOGNITION OF THE MUTUAL UNDERSTANDINGS DISCUSSED HEREIN THE PARTIES HERETO AFFIX THEIR SIGNATURES. THIS AMENDMENT SHALL BE EFFECTIVE UPON THE DATE AND SIGNATURE OF THE FINAL SIGNING PARTY, THE DEPARTMENT OF ECOLOGY.


Washington Department of Ecology

5/25/07
Date


Port of Seattle


Northwest Cruise Ship Association

APPENDICES
MEMORANDUM OF UNDERSTANDING

| | |
|----------------------|---|
| Appendix i | List of NWCA Member Lines |
| Appendix ii | CLIA Standards |
| Appendix iii | Navigational Chart of the waters subject to this MOU |
| Appendix iv | USCG Navigation & Vessel Inspection Circular and Environmental Systems Checklist |
| Appendix v | Uniform application procedure for EPA National ID Number as per Resource Conservation Recovery Act. |
| Appendix vi | Alaska Regulations |
| Appendix vii | Washington Hazardous Waste Management Best Management Practices |
| Appendix viii | Boilerplate Compliance Letter |
| Appendix ix | Interagency Agreement (cost-recovery) |

Appendix i

List of NWCA Member Lines

Carnival Cruise Lines
Celebrity Cruises
Crystal Cruises
Holland America Line
Norwegian Cruise Lines
Princess Cruises
Regent Seven Seas
Royal Caribbean Cruises

Appendix ii

CLIA INDUSTRY STANDARD

CRUISE INDUSTRY WASTE MANAGEMENT PRACTICES AND PROCEDURES

The members of the Cruise Lines International Association (CLIA) are dedicated to preserving the marine environment and in particular the pristine condition of the oceans and other waters upon which our vessels sail. The environmental standards that apply to our industry are stringent and comprehensive. Through the International Maritime Organization, the United States and flag and port states, CLIA has developed consistent and uniform international standards that apply to all vessels engaged in international commerce. These standards are set forth in the International Convention for the Prevention of Pollution from Ships (MARPOL). The international standards of MARPOL have in turn been adopted by the United States and augmented by additional national legislation and regulation. The U.S. has jurisdiction over both foreign and domestic vessels that operate in U.S. waters where U.S. laws, such as the Federal Water Pollution Control Act, the Act to Prevent Pollution from Ships, the Ports and Waterways Safety Act, and the Resource Conservation and Recovery Act - which applies to hazardous waste as it is landed ashore for disposal, apply. The U.S. Coast Guard enforces both international conventions and domestic laws.

The cruise industry commitment to protecting the environment is demonstrated by the comprehensive spectrum of waste management technologies and procedures employed on its vessels.

CLIA members are committed to:

- a. Designing, constructing and operating vessels, so as to minimize their impact on the environment;
- b. Developing improved technologies to exceed current requirements for protection of the environment;
- c. Implementing a policy goal of zero discharge of MARPOL, Annex V solid waste products (garbage) and equivalent US laws and regulations by use of more comprehensive waste minimization procedures to significantly reduce shipboard generated waste;
- d. Expanding waste reduction strategies to include reuse and recycling to the maximum extent possible so as to land ashore even smaller quantities of waste products;
- e. Improving processes and procedures for collection and transfer of hazardous waste; and
- f. Strengthening comprehensive programs for monitoring and auditing of onboard environmental practices and procedures in accordance with the International Safety

Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code).

INDUSTRY WASTE MANAGEMENT STANDARDS: CLIA member cruise vessel operators have agreed to incorporate the following standards for waste stream management into their respective Safety Management Systems.

1. **Photo Processing, Including X-Ray Development Fluid Waste:** *Member lines have agreed to minimize the discharge of silver into the marine environment through the use of best available technology that will reduce the silver content of the waste stream below levels specified by prevailing regulations.*
2. **Dry-cleaning waste fluids and contaminated materials:** *Member lines have agreed to prevent the discharge of chlorinated dry-cleaning fluids, sludge, contaminated filter materials and other dry-cleaning waste byproducts into the environment*
3. **Print Shop Waste Fluids:** *Member lines have agreed to prevent the discharge of hazardous wastes from printing materials (inks) and cleaning chemicals into the environment.*
4. **Photo Copying and Laser Printer Cartridges:** *Member lines have agreed to initiate procedures so as to maximize the return of photo copying and laser printer cartridges for recycling. In any event, these cartridges will be landed ashore.*
5. **Unused And Outdated Pharmaceuticals:** *Member lines have agreed to ensure that unused and/or outdated pharmaceuticals are effectively and safely disposed of in accordance with legal and environmental requirements.*
6. **Fluorescent And Mercury Vapor Lamp Bulbs:** *Member lines have agreed to prevent the release of mercury into the environment from spent fluorescent and mercury vapor lamps by assuring proper recycling or by using other acceptable means of disposal.*
7. **Batteries:** *Member lines have agreed to prevent the discharge of spent batteries into the marine environment.*
8. **Bilge and Oily Water Residues:** *Member lines have agreed to meet or exceed the international requirements for removing oil from bilge and wastewater prior to discharge.*
9. **Glass, Cardboard, Aluminum and Steel Cans:** *Member lines have agreed to eliminate, to the maximum extent possible, the disposal of MARPOL Annex V wastes into the marine environment. This will be achieved through improved reuse and recycling opportunities. They have further agreed that no waste will be discharged into the marine environment unless it has been properly processed and can be discharged in accordance with MARPOL and other prevailing requirements.*
10. **Incinerator Ash:** *Member lines have agreed to reduce the production of incinerator ash by minimizing the generation of waste and maximizing recycling opportunities.*
11. **Graywater:** *[For ships traveling regularly on itineraries beyond the territorial waters of coastal states], member lines have agreed that graywater will be discharged only while the*

ship is underway and proceeding at a speed of not less than 6 knots¹; that graywater will not be discharged in port and will not be discharged within 4 nautical miles from shore or such other distance as agreed to with authorities having jurisdiction or provided for by local law except in an emergency, or where geographically limited. Member lines have further agreed that the discharge of graywater will comply with all applicable laws and regulations. For vessels whose itineraries are fully within US territorial waters, discharge shall comply fully with U.S. and individual state legislation and regulations.

12. **Blackwater:** *CLIA members have agreed that all blackwater will be processed through a Marine Sanitation Device (MSD), certified in accordance with U.S. or international regulations, prior to discharge. For ships traveling regularly on itineraries beyond territorial coastal waters, discharge will take place only when the ship is more than 4 miles from shore and when the ship is traveling at a speed of not less than 6 knots.¹ For vessels whose itineraries are fully within US territorial waters, discharge shall comply fully with U.S. and individual state legislation and regulations.*

Some member cruise lines are field-testing wastewater treatment systems that utilize advanced technologies. These onboard wastewater treatment systems, which are currently being referred to as advanced wastewater purification (AWP) systems, are designed to result in effluent discharges that are of a high quality and purity; for example, meeting or surpassing secondary and tertiary effluents and reclaimed water. Effluents meeting these high standards would not be subjected to the strict discharge limitations previously discussed.

Each CLIA cruise vessel operator has agreed to utilize one or more of the practices and procedures contained in the attached “*Cruise Industry Waste Management Practices and Procedures*” in the management of their shipboard waste streams. Recognizing that technology is progressing at a rapid rate, any new equipment or management practices that are equivalent to or better than those described, and which are shown to meet or exceed international and federal environmental standards, will also be acceptable. Member lines have agreed to communicate to CLIA the use of equivalent or other acceptable practices and procedures. As appropriate, such practices and procedures shall be included as a revision to the attached document. As an example, when improved systems for treating blackwater and graywater are perfected and shown to meet the requirements for MSDs and accepted by appropriate authorities, the new systems and associated technology will be included in the attachment as a revision.

CLIA and its Environmental Committee will continue to work with the U.S. Coast Guard, the U.S. Environmental Protection Agency and other appropriate agencies to further implement the above commitments.

¹ For vessels operating under sail, or a combination of sail and motor propulsion, the speed shall not be less than 4 knots.

ATTACHMENT: *CRUISE INDUSTRY WASTE MANAGEMENT PRACTICES AND PROCEDURES*

Revised: November 12, 2006

Effective for non-prior ICCL members: July 1, 2007

Appendix ii (cont.)

Attachment to CLIA Standard

CRUISE INDUSTRY WASTE MANAGEMENT PRACTICES AND PROCEDURES

REVISED: (November 27, 2006)

The cruise industry is dedicated to preserving the marine environment and oceans upon which our ships sail. As a stated industry standard, CLIA members have adopted aggressive programs of waste minimization, waste reuse and recycling, and waste stream management set forth in the following. In addition, CLIA members are working in a number of areas to identify and implement new technologies in order to improve the environmental performance of their ships. CLIA member lines currently have agreed to utilize waste management practices and procedures, which meet or exceed the stringent standards as set forth in international treaties and applicable U.S. laws.

Introduction

The cruise industry is inextricably linked to the environment. Our business is to bring people to interesting places in the world, over the water. Recognizing the future of the industry depends on a clean and healthy environment; cruise industry senior management is committed to stewardship of the environment and establishing industry practices that will make CLIA member cruise ship operators leaders in environmental performance.

This document outlining member line practices has been developed under the auspice of the industry's professional organizations, the Cruise Lines International Association (CLIA), the Florida Caribbean Cruise Association (FCCA), and the Northwest Cruise Ship Association (NWCA). The purpose of this document is to set forth cruise industry waste management practices and procedures that CLIA member cruise vessel operators have agreed to incorporate into their respective Safety Management Systems.

In the development of industry practices and procedures for waste management, the members of the Cruise Lines International Association have endorsed policies and practices based upon the following fundamental principles:

- Full compliance with applicable laws and regulations;
- Maintaining cooperative relationships with the regulatory community;
- Designing, constructing and operating vessels, so as to minimize their impact on the environment;
- Embracing new technology;
- Conserving resources through purchasing strategies and product management;
- Minimizing waste generated and maximize reuse and recycling;
- Optimizing energy efficiency through conservation and management;
- Managing water discharges; and
- Educating staff, guests and the community.

Discussion

Just as on shore, ship operations and passengers generate waste as part of many daily activities. On ships, waste is generated while underway and in port. Because ships move, the management of these wastes becomes more complicated than for land-based activities, as the facilities and laws change with the location of the ship. Facilities on the ships as well as management practices must be designed to take into account environmental laws and regulations around the world and the various local and state laws and regulations. Moreover, because waste management ultimately becomes a local activity, the local port infrastructure, service providers, and local waste disposal vendors are factors in the decision-making processes.

On an international level, environmental processes are an important part of the International Maritime Organization's (IMO's) policies and procedures for the maritime industry. CLIA member lines have agreed to incorporate environmental performance into Safety Management Systems (SMS) and MARPOL mandated Waste Management Manuals. Under agreements and laws specific to many nations, these programs are routinely reviewed by Port States to ensure compliance. For example, in the United States, the US Coast Guard has jurisdiction over environmental matters in ports and waterways and conducts passenger ship examinations that include review of environmental systems, SMS documentation and such MARPOL-mandated documents as the Oil Record Book and the Garbage Record Book. Within the United States, environmental laws and regulations apply include the Clean Water Act, the Refuse Disposal Act, the Resource Conservation and Recovery Act, The Clean Air Act, the Oil Pollution Act of 1990, and the Pollution Prevention Act, to name a few, which apply to all ships within U.S. waters.

The industry effort to develop waste management practices and procedures has focused on the traditional high volume wastes (garbage, graywater, blackwater, oily residues (sludge oil) and bilge water), pollution prevention, and the small quantities of hazardous waste produced onboard. In the process, CLIA members have shared waste management strategies and technologies, while focusing on a common goal of waste reduction.

The process of waste reduction includes waste prevention, the purchasing of products that have recycled content or produce less waste (e.g. source reduction), incineration, and recycling or reuse of wastes that are generated. The ultimate goal is to have the waste management culture absorbed into every facet of cruise vessel operation. A fully integrated system beginning with the design of the vessel should address environmental issues at every step.

Management practices for waste reduction should start before a product is selected. Eco-purchasing and packaging are vital to the success of any environmental program, as are strategies to change packaging, processes and management to optimize the resources used.

The commitment of the industry to this cooperative effort has been quite successful, as companies have shared information and strategies.

Industry Standard Waste Handling Procedures

CLIA member lines have agreed that hazardous wastes and waste streams onboard cruise vessels will be identified and segregated for individual handling and management in accordance with appropriate laws and regulations. They have further agreed, hazardous wastes will not be discharged overboard, nor be commingled or mixed with other waste streams.

- A. **Hazardous Waste Collection and Storage onboard Ship:** *CLIA member lines have agreed that specific procedures for hazardous waste collection, storage and crew training will be addressed in each ship's SMS or equivalent onboard instruction in the Case of US registry vessels.*
- B. **Photo Processing, Including X-Ray Development Fluid Waste:** *CLIA member lines have agreed to eliminate the discharge of silver from these sources into the marine environment through the use of best available technology that will reduce the silver content of the waste stream below levels specified by prevailing regulations or by treating all photo processing and x-ray development fluid waste (treated or untreated) as a hazardous waste and landing ashore in accordance with RCRA requirements.*

There are several waste streams associated with photo processing operations that have the potential to be regulated under the Resource Conservation and Recovery Act (RCRA). These waste streams include spent fixer, spent cartridges, expired film and silver flake.

Photographic fixer removes the unexposed silver compounds from the film during the developing process. The spent fixer can have as much as 2000-3000 parts per million (ppm) of silver. Silver bearing waste is regulated by RCRA as a hazardous waste if the level of silver exceeds 5 ppm as determined by the Toxicity Characteristic Leaching Procedure (TCLP) test.

Silver recovery units may be used to reclaim the silver from the used fixer waste stream. There are two types of recovery units. These are active (with electricity) and passive (without electricity) units. The active unit uses electricity to plate silver onto an electrode. The passive unit uses a chemical reaction between steel wool and silver to remove most of the silver from solution. Utilizing the best available technology, the equipment currently onboard CLIA member cruise ships is conservatively estimated to reduce the silver content of this effluent below 4 mg/l (milligrams/l or ppm)

Handling Method 1 Employed by Member Lines:

Treat used photographic and x-ray development fluids to remove silver for recycling.

Verify that the effluent from the recovery unit is less than 5 parts per million (ppm) silver, as measured by EPA-approved methodology.

After treatment, the residual waste stream fluid is non-hazardous and landed ashore as industrial waste.

Handling Method 2 Employed by Member Lines:

Used photographic and x-ray development fluids, either treated or untreated, may be assumed to be a hazardous waste. In this event, they are landed ashore in accordance with the requirements of the Resource Conservation and Recovery Act (RCRA).

- C. **Dry-cleaning waste fluids and contaminated materials:** *CLIA member lines have agreed to prevent the discharge of chlorinated dry-cleaning fluids, sludge, contaminated filter materials and other dry-cleaning waste byproducts into the environment.*

Shipboard dry cleaning facilities use a chlorinated solvent called perchlorethylene (also known as PERC or tetrachloroethylene) as a dry cleaning fluid. This is the approved dry cleaning solvent for these units. Operators must receive specific required training for the correct use of this chemical and its associated precautions. This solvent should be used in accordance with all safety procedures including appropriate personal protective equipment (PPE).

The dry cleaning units produce a small volume waste from condensate, the bottoms of the internal recovery stills, waste products from button and lint traps, spent perchloroethylene and filter media. This waste is comprised of dirt, oils, filters material, and spent solvent. Each ship utilizing these dry-cleaning units produces approximately two pounds of waste material weekly. However, the amounts may vary greatly by season and passenger load. This material is classified as hazardous waste under RCRA and must be disposed of accordingly.

Handling Method 1 Employed by Member Lines:

Perchloroethylene (PERC) and other chlorinated dry-cleaning fluids, contaminated sludge and filter materials are hazardous waste and landed ashore in accordance with the requirements of RCRA.

- C. **Print Shop Waste Fluids:** *CLIA member lines have agreed to prevent the discharge of hazardous wastes from printing materials (inks) and cleaning chemicals into the environment.*

Print shop waste may contain hazardous waste. Printing solvents, inks and cleaners all may contain hydrocarbons, chlorinated hydrocarbons, and heavy metals that can be harmful to human and aquatic species. Recent advances in printing technology and substitution of chemicals that are less hazardous reduces the volume of print shop waste generated and reduces the impact of these waste products.

CLIA member lines have agreed to utilize, whenever possible, printing methods and printing process chemicals that produce both less volume of waste and less hazardous waste products, that shipboard printers will be trained in ways to minimize printing waste generated, and that alternative printing inks such as soy based, non-chlorinated hydrocarbon based ink products will be used whenever possible. The member lines have further agreed that all print shop waste including waste solvents, cleaners, and cleaning cloths will be treated as hazardous waste, if such waste contains chemical components that may be considered as hazardous by regulatory definitions, and that all other waste may be treated as non-hazardous.

Handling Method 1 Employed by Member Lines:

When using traditional or non-soy based inks and chlorinated solvents, all print shop waste is treated as hazardous, and discharged ashore in accordance with RCRA.

Handling Method 2 Employed by Member Lines:

Shipboard printing processes use non-toxic based printing ink such as soy based, non-chlorinated solvents, and other non-hazardous products to eliminate hazardous waste products.

- D. Photo Copying and Laser Printer Cartridges:** *CLIA member lines have agreed to initiate procedures so as to maximize the return of photocopying and laser printer cartridges for recycling, and in any event, have agreed that these cartridges will be landed ashore.*

Increased use of laser and photo copying equipment on shore as well as onboard ship results in the generation of increased volumes of waste cartridges, inks, and toner materials. CLIA member lines have agreed to use only such inks, toners and printing/copying cartridges that contain non-hazardous chemical components, and that none of these cartridges or their components should be disposed of by discharge into the marine environment. In recognition of the member lines' goal of waste minimization, they have further agreed these cartridges should, whenever possible, be returned to the manufacturer for credit, recycling, or for refilling.

Handling Method Employed by Member Lines:

CLIA member lines have agreed that wherever possible, photo copying and laser printer cartridges will be collected, packaged and returned for recycling and when this is not possible, that these materials will not be discharged into the sea or other bodies of water but will be handled as other shipboard waste that is landed ashore for further disposal.

- F. Unused And Outdated Pharmaceuticals:** *CLIA member lines have agreed to ensure that unused and/or outdated pharmaceuticals are effectively and safely disposed in accordance with legal and environmental requirements.*

In general ships carry varying amounts of pharmaceuticals. The pharmaceuticals carried range from over-the-counter products such as anti-fungal creams to prescription drugs such as epinephrine. Each ship stocks an inventory based on its itinerary and the demographics of its passenger base. CLIA member lines have agreed that all pharmaceuticals will be managed to ensure that their efficacy is optimized and that disposal is done in an environmentally responsible manner.

CLIA member lines have further agreed that when disposing of pharmaceuticals, the method used will be consistent with established procedures, and that pharmaceuticals and medications which are off specification or which have exceeded their shelf-life, and stocks that are unused and out of date, cannot be used for patients and therefore will be removed from the ship. Further, each regulatory jurisdiction has a posting of listed pharmaceuticals that must be considered hazardous waste once the date has expired or the item is no longer considered good for patient use.

Through onboard management of the medical facility, CLIA member lines have agreed that stocks of such listed pharmaceuticals are returned to the vendor prior to date of expiration. Pharmaceuticals that are being returned and which have not reached their expiration date are shipped using ordinary practices for new products.

Safety and Health

CLIA member lines have agreed that all expired listed pharmaceuticals will be handled in accordance with established procedures and all personnel handling this waste will receive

appropriate training in the handling of hazardous materials. As guidance, the US Environmental Protection Agency (EPA) has issued a report that clarifies the fact that residuals, such as epinephrine, found in syringes after injections are not considered an acutely hazardous waste by definition and may be disposed of appropriately in sharps containers. Member lines have agreed that all Universal Precautions will be adhered to when handling sharps.

Handling Method 1 Employed by Member Lines:

Establish a reverse distribution system for returning unexpired, unopened non-narcotic pharmaceuticals to the original vendor.

Handling Method 2 Employed by Member Lines:

Appropriately destroy narcotic pharmaceuticals onboard ship in a manner that is witnessed and recorded.

Handling Method 3 Employed by Member Lines:

Land listed pharmaceuticals in accordance with local regulations. Listed pharmaceuticals are a hazardous waste having chemical compositions which prevent them from being incinerated or disposed of through the ship's sewer system. Listing of such pharmaceuticals may vary from state to state.

Handling Method 4 Employed by Member Lines:

Dispose of other non-narcotic and non-listed pharmaceuticals through onboard incineration or landing ashore.

- G. Fluorescent and Mercury Vapor Lamp Bulbs:** *CLIA member lines have agreed to prevent the release of mercury into the environment from spent fluorescent and mercury vapor lamps by assuring proper recycling or by using other acceptable disposal methods.*

Fluorescent and Mercury Vapor lamps contain small amounts of mercury that could potentially be harmful to human health and the environment. To prevent human exposure and contamination of the environment, CLIA member lines have agreed that these lamps will be handled in an environmentally safe manner. Recycling of mercury from lamps and other mercury containing devices is the preferred handling method and is encouraged by various states. The recycling of fluorescent lamps and high intensity discharge (HID) lamps keeps potentially hazardous materials out of landfills, saves landfill space and reduces raw materials production needs.

The recycling of fluorescent and HID lamps is a proven technology capable of reliably recovering greater than 99 percent of the mercury in the spent lights. At the recycling facility, this is done by using a crush-and-sieve method. In this process, the spent tubes are first crushed and then sieved to separate the large particles from the mercury containing phosphor powder. The phosphor powder is collected and processed under intense heat and negative pressure, a process called retorting. The mercury is volatilized and then recovered by condensation. The glass particles are segregated and recycled into other products such as fiberglass. Aluminum components are also recycled separately.

Storage and handling of used lamp bulbs pose no compatibility problems. Disposal of the glass tubes can be accomplished by (1) processing with shipboard lamp crusher units that filter and adsorb the mercury vapor through H.E.P.A. and activated carbon or (2) by keeping the glass tubes intact for recycling ashore. The intact lamps or crushed bulbs are classified as "Universal Waste" when they are shipped to a properly permitted recycling facility; as such, testing is not required. The filters are disposed of as a hazardous waste in accordance with applicable US EPA or other prevailing laws and regulations.

Handling Method Employed by Member Lines:

- (1) Fluorescent and mercury vapor lamps are collected and processed aboard by lamp crusher units and disposed of as stated above; or
- (2) Fluorescent and mercury vapor lamps are collected intact and landed for recycling or disposal in accordance with prevailing laws and regulations.

H. Other Mercury Containing Products: *CLIA Member lines have agreed to prevent the discharge of mercury containing products into the sea.*

Reduction in use: Where feasible, CLIA members will reduce the use of mercury containing products.

Disposal: Once mercury-containing products are no longer able to be used, or require disposal, these products shall be landed ashore as universal or hazardous waste as appropriate.

I. Batteries: *CLIA member lines have agreed to prevent the discharge of spent batteries into the marine environment.*

If not properly disposed of, spent batteries may constitute a hazardous waste stream. Most of the large batteries are on tenders and standby generators. Small batteries used in flashlights and other equipment and by passengers, account for the rest. There are four basic types of batteries used.

Lead-acid batteries – These are used in tenders and standby generators. They are wet, rechargeable, and usually six-celled. They contain a sponge lead anode, lead dioxide cathode, and sulfuric acid electrolyte. The electrolyte is corrosive. These batteries require disposal as a hazardous waste, unless recycled or reclaimed.

Lead-acid batteries use sulfuric acid as an electrolyte. Battery acid is extremely corrosive, reactive and dangerous. Damaged batteries will be drained into an acid-proof container. A damaged and leaking battery is then placed in another acid-proof container, and both the electrolyte and the damaged battery placed in secure storage for proper disposal as a hazardous waste.

Nickel-cadmium (NiCad) batteries – These are usually rechargeable, and contain wet or dry potassium hydroxide as electrolyte. The potassium hydroxide is corrosive and the cadmium is a characteristic hazardous waste. Therefore, NiCad batteries will be disposed of as hazardous waste, unless recycled or reclaimed.

Lithium batteries – These are used as a power source for flashlights and portable electronic equipment. All lithium batteries will be disposed of as hazardous waste, or sent out for reclamation.

Alkaline batteries – These are common flashlight batteries and are also used in many camera flash attachments, cassette recorders, etc. They should be recycled, properly disposed or reclaimed.

Handling Method Employed by Member Lines:

Spent batteries are collected and returned for recycling and/or disposal in accordance with prevailing regulations. Discarded batteries are isolated from the refuse waste stream to prevent potentially toxic materials from inappropriate disposal. The wet-cell battery-recycling program is kept separate from the dry battery collection process. Intact wet-cell batteries are sent back to the supplier. Dry-cell batteries are manifested to a licensed firm for recycling.

- J. Bilge and Oily Water Residues:** *CLIA member lines have agreed to meet or exceed the international requirements for removing oil from bilge and wastewater prior to discharge.*

The area of the ship at the very bottom of the hull is known as the bilge. The bilge is the area where water collects from various operational sources such as water lubricated shaft seals, propulsion system cooling, evaporators, and other machinery. All engine and machinery spaces also collect oil that leaks from machinery fittings and engine maintenance activities. In order to maintain ship stability and eliminate potential hazardous conditions from oil vapors in engine and machinery spaces, the bilge spaces should be periodically pumped dry. In discharging bilge and oily water residues, both international regulations (MARPOL) and United States regulations require that the oil content of the discharged effluent be less than 15 parts per million and that it not leave a visible sheen on the surface of the water.

All ships are required to have equipment installed onboard that limits the discharge of oil into the oceans to 15 parts per million when a ship is en route and provided the ship is not in a special area where all discharge of oil is prohibited. Regulations also require that all oil or oil residues, which cannot be discharged in compliance with these regulations, be retained onboard or discharged to a reception facility. The equipment and processes implemented onboard cruise ships to comply with these requirements are complex and sophisticated.

The term “*en route*” as utilized in MARPOL (73/78) Regulation 9(b) is taken to mean while the vessel is underway. The U.S. Coast Guard has informed CLIA that it agrees with this meaning of “*en route*.”

In accordance with MARPOL (73/78) Regulation 20 and as appropriate, US regulations (33CFR151.25), CLIA member lines have agreed that every cruise ship of 400 gross tons and above shall be provided with an oil record book which shall be completed on each occasion whenever any of numerous specified operations take place in the ship and that operations include:

- a. Ballasting or cleaning of fuel oil tanks,
- b. Discharge of dirty ballast or cleaning water from the fuel oil tanks above,
- c. Disposal of oily residues,
- d. And discharge of bilge water that accumulated in machinery spaces.

Requirements regarding the keeping of an Oil Record Book as well as the form of the Oil Record Book are also found in MARPOL and in U.S. Coast Guard regulations (33CFR151).

Handling Method Employed by Member Lines:

Bilge and oily water residue are processed prior to discharge to remove oil residues, such that oil content of the effluent is less than 15 ppm as specified by MARPOL Annex 1.

- K. Glass, Cardboard, Aluminum and Steel Cans:** *CLIA member lines have agreed to eliminate, to the maximum extent possible, the disposal of MARPOL Annex V wastes into the marine environment. This will be accomplished through improved reuse and recycling opportunities. They have further agreed that no waste will be discharged into the marine environment unless it has been properly processed and can be discharged in accordance with MARPOL and other prevailing requirements.*

Management of shipboard generated waste is a challenging issue for all ships at sea. This is true for cruise vessels, other commercial vessels, military ships, fishing vessels and recreational boats. Waste products in the past were made from natural materials and were mostly biodegradable. Today's packaging of food and other products present new challenges for waste management. A large cruise ship today can carry over three thousand passengers and crew. Each day, an average cruise passenger will generate two pounds of dry trash and dispose of two bottles and two cans.

A strategy of source reduction, waste minimization and recycling has allowed the cruise industry to significantly reduce shipboard generated waste. To attain this, CLIA member lines have agreed to adopt a multifaceted strategy that begins with waste minimization to decrease waste from provisions brought onboard. This means purchasing in bulk, encouraging suppliers to utilize more efficient packaging, reusable packaging, and packaging materials that are more environmentally friendly—those that can be more easily disposed of or recycled. In fact, through this comprehensive strategy of source reduction, total waste on passenger vessels has been reduced by nearly half over the past ten years.

Another important component of the industry's waste reduction strategy is product or packaging recycling. Glass, aluminum, other metals, paper, wood and cardboard are, in most cases, recycled. Wood and cardboard may be incinerated when appropriate.

Handling Method Employed by Member Lines:

MARPOL Annex V ship waste is minimized through purchasing practices, reuse and recycling programs, landing ashore and onboard incineration in approved shipboard incinerators. Any Annex V waste that is discharged at sea will be done in strict accordance with MARPOL and any other prevailing requirements.

- L. Incinerator Ash:** *CLIA member lines have agreed to reduce the production of incinerator ash by minimizing the generation of waste and maximizing recycling opportunities, and that the discharge of incinerator ash containing hazardous components will be prevented through a program of waste segregation and periodic ash testing.*

Incinerator ash is not normally a hazardous waste. Through relatively straightforward waste management strategies, items that would cause the ash to be hazardous are separated from the waste stream and handled according to accepted hazardous waste protocols. In general, source segregation for waste streams is foundational for onboard waste management and is incorporated into the waste management manual required by MARPOL. Waste management for onboard waste streams include the following: source reduction, minimization, recycling, collection, processing and discharge ashore. This allows the incinerator to be used primarily for food waste, contaminated cardboard, some plastics, trash and wood.

Member lines have agreed that incinerator ash will be tested at least once quarterly for the first year of operation to establish a baseline and that testing may then be conducted once a year. The member lines have further agreed that a recognized test procedure will be used to demonstrate that ash is not a hazardous waste. A recognized test procedure includes the following metals as indicators for toxicity - arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Special attention is placed on the removal of batteries from the incinerator waste stream. The use of incinerators saves landfill space and prevents the build up of material onboard that could become the breeding ground for insects, rodents and other vermin.

Handling Method Employed by Member Lines:

Proper hazardous waste management procedures are to be instituted onboard each ship to assure that waste products, which will result in a hazardous ash, are not introduced into the incinerator. Non-hazardous incinerator ash may be disposed of at sea in accordance with MARPOL Annex V. Ash identified as being hazardous is disposed of ashore in accordance with RCRA.

M. Wastewater reclamation

Because of the amounts of fresh water involved, and its restricted availability onboard ship (all fresh water must be either purchased or generated onboard), fresh water is a valuable commodity. Therefore, water management is extremely important and takes the form of both minimizing water usage and the potential reclamation and reuse of water for non-potable purposes. Many CLIA companies are researching new technology and piloting graywater treatment systems onboard their vessels. CLIA member operators also take numerous steps in onboard water management. Water management techniques include:

- a. Use of technical water (for example: air conditioning condensate) where possible.
- b. Use of water recovery systems (for example: filtering and reuse of laundry water – last rinse use for first wash).
- c. Reclamation and reuse as technical water (flushing toilets, laundry, open deck washing) of properly treated and filtered wastewaters.
- d. Active water conservation (for example: use of reduced flow showerheads, vacuum systems for toilets, vacuum food waste transportation and laundry equipment that utilizes less water).

N. Graywater: *For ships traveling regularly on itineraries beyond the territorial waters of coastal states, CLIA member lines have agreed to discharge graywater only while the ship is underway and proceeding at a speed of not less than 6 knots¹; that graywater will not be discharged in port and will not be discharged within 4 nautical miles from shore or such other distance as agreed to with authorities having jurisdiction or provided for by local law except in an emergency, or where geographically limited. The member lines*

have further agreed that the discharge of graywater will comply with all applicable laws and regulations. For vessels whose itineraries are fully within US territorial waters, discharge shall comply fully with U.S. and individual state legislation and regulations.

The term graywater is used on ships to refer to wastewater that is generally incidental to the operation of the ship. The International Maritime Organization (IMO) defines graywater as including drainage from dishwasher, shower, laundry, bath and washbasin drains. The US Clean Water Act (formally know as the Federal Water Pollution Control Act) includes galley, bath and shower water in its definition of graywater. The US regulations implementing this act do not include a further definition of gray water. However, the regulations do include a provision that exempts all of the wastewater included in the IMO definition and other discharges incidental to the operation of a ship from the Clean Water Act's permitting program (formally known as the National Pollution Discharge Elimination System (NPDES) program). Finally, the US Coast Guard regulations include provisions that essentially combine the two definitions from the IMO and the Clean Water Act. None of the definitions of graywater include blackwater (discussed below) or bilgewater from the machinery spaces. Recent U.S. Legislation places limits on the discharge of graywater in the Alaska Alexander Archipelago.

Handling Method Employed by Member Lines:

Graywater is discharged only while ships are underway and proceeding at a speed of not less than 6 knots, in recognition that dispersal of these discharges is desirable and that mixing of these waters, which are discharged approximately 10-14 feet below the surface, by the action of the propellers and the movement of the ship, provides the best dispersal available.

- O. Blackwater:** *Waste from toilets, urinals, medical sinks and other similar facilities is called "blackwater." CLLA members have agreed that all blackwater will be processed through a Marine Sanitation Device (MSD), certified in accordance with U.S. or international regulations, prior to discharge. For ships traveling regularly on itineraries beyond the territorial water of coastal states, discharge will take place only when the ship is more than 4 miles from shore and when the ship is traveling at a speed of not less than 6 knots.¹*

For vessels whose itineraries are fully within US territorial waters, discharge shall comply fully with U.S. and individual state legislation and regulations.

P. Advanced Wastewater Purification Systems:

To improve environmental performance, cruise lines are testing and installing wastewater purification systems that utilize advanced technologies. These onboard wastewater treatment systems are designed to result in effluent discharges that are of a high quality and purity; for example, meeting or surpassing standards for secondary and tertiary effluents and reclaimed water. Effluents meeting these high standards would not be subjected to the strict discharge limitations previously discussed.

¹ For vessels operating under sail, or a combination of sail and motor propulsion, the speed shall not be less than 4 knots.

Q. Training and Educational Materials

Training is an important and ongoing part of every position and tasking onboard cruise ships. Not only is training necessary for the safe and economical operation of a ship, it is required by numerous international conventions and flag state regulations. The International Convention on Standards of Training Certification and Watchkeeping (STCW) for example, sets forth requirements for knowledge, experience and demonstrated competency for licensed officers of the deck and engineering departments and for ratings forming part of the navigation or engineering watch. Equivalent national standards apply to ships in United States registry. These detailed requirements address not only the navigation of the ship but also the proper operation of the shipboard machinery and knowledge of and ability to assure compliance with the environmental protection requirements of MARPOL and the safety regulations of The International Convention on Safety of Life at Sea (SOLAS). SOLAS also requires that the ship's training manual (which contents are prescribed by regulation) be placed in the crew messes and recreation rooms or in individual crew cabins.

CLIA member lines have developed programs that raise the level of environmental awareness on the part of both the passengers and the crew. Each ship's crew receives training regarding shipboard safety and environmental procedures. Advanced training in shipboard safety and environmental management procedures is provided for those directly involved in these areas. Those directly responsible for processing wastes are given specific instruction in their duties and responsibilities and in the operation of the various equipment and waste management systems. Specific actions that our member lines have taken to train employees and increase passenger awareness include:

- a. Announcements over the public address system and notices in ship newsletters that caution against throwing any trash overboard,
- b. Signage and colorful posters placed in crew and passenger areas encouraging environmental awareness and protection,
- c. Safety and environmental information booklets in crew cabins and crew lounges,
- d. Regular meetings of ship safety and environmental committees consisting of officers and crew from all departments to review methods of improving performance, including better and more effective environmental practices.

For ships on an international voyage, STCW, SOLAS, the International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code), require that training be fully documented. Individual training is documented in each crewmember's file. Ship training exercises, such as fire drills and emergency response exercises, are documented in the appropriate ship's logs. All of these training documents are required to be available for oversight examination by both the ship's flag state inspectors and by port state authorities such as the United States Coast Guard.

Placards warning of the prohibition of the discharge of oil are posted on all ships operating in the navigable waters of the United States as required by U.S. Coast Guard regulations (33CFR155.450). Additionally, as part of required shipboard waste management plans, both Coast Guard regulations (33CFR151.59) and MARPOL (Annex V Regulation 9) require the posting of placards that notify the passengers and the crew of the disposal requirements for garbage. These placards are to be written in the official language of the State whose flag the ship is entitled to fly and also in English or French if neither of these is the official

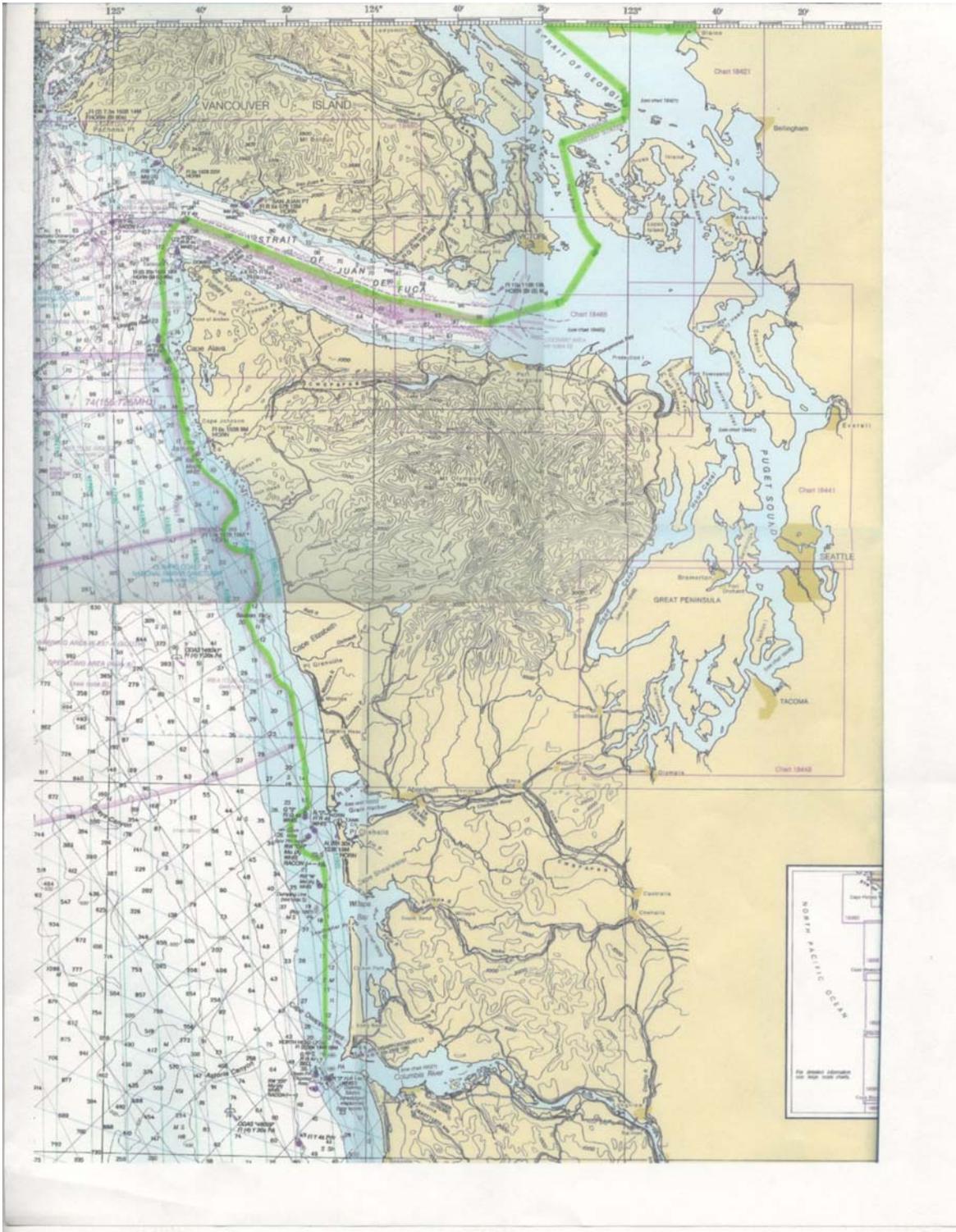
language. Once again, oversight of compliance with these requirements is conducted by ISM audits and frequent inspections by flag states and the United States Coast Guard.

For those ships on an international voyage, the Safety of Life at Sea Convention mandates compliance with the ISM Code. This comprehensive Code requires that each vessel operating company and each vessel participate in a very strictly defined management program, under both internal and external audit and regulatory oversight that sets forth detailed procedures for assuring compliance with safety, environmental protection, emergency response and training mandates.

Equivalent equipment, practices and procedures

CLIA member lines have agreed that the use of equivalent or other acceptable practices and procedures shall be communicated to CLIA. As appropriate, such practices and procedures shall be included as a revision to this document. As an example, when improved systems for treating blackwater and graywater are perfected, shown to meet the requirements for MSDs and accepted by appropriate authorities for the treatment of graywater, the new systems and associated technology will be included together with their impact on the current standard of discharging graywater only while underway.

Appendix iii: Navigational Chart of Waters Subject to this MOU



Appendix iv



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COMDTPUB P16700.4
NVIC 04-04

13 FEBRUARY 2004

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 04-04

Subj: ENVIRONMENTAL INSPECTION CHECKLIST; ADDENDUM TO FOREIGN PASSENGER VESSEL EXAMINATION BOOK, CG-840

- Ref:
- (a) General Accounting Office (GAO) Report of February 2000 on "MARINE POLLUTION - Progress Made to Reduce Marine Pollution by Cruise Ships, but Important Issues Remain."
 - (b) Title XIV "Certain Alaskan Cruise Ship Operations" contained in Section 1(a)(4) of Public Law 106-554 enacted on December 21, 2000
 - (c) 33 CFR 159, Subpart E - Discharge of Effluents in certain Alaskan Waters by Cruise Vessel Operations
 - (d) Memorandum of Understanding (MOU) dated March 14, 2000 entered between Florida Department of Environmental Protection (FDEP) and the Florida-Caribbean Cruise Association (FCCA), a representative of the cruise industry in Florida
 - (e) International Council of Cruise Lines (ICCL) Industry Standard E-01-01, "Waste Management Practices and Procedures"

1. PURPOSE. As the result of a GAO report and Bluewater Network petition, the FCCA, FDEP, and the Coast Guard began discussing the means to improve and ensure the compliance of large passenger vessels with existing Federal and state environmental standards. These discussions have resulted in the checklist contained in Enclosure 1. This checklist is an extensive list of possible inspection items related to pollution prevention equipment, operation, plans and records. It is intended as a job aid to be used by Coast Guard personnel during certificate of compliance examinations onboard foreign-flagged passenger vessels. Additionally, this document does not change or establish new Coast Guard authorities, but is intended to provide

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NON-STANDARD DISTRIBUTION: B:a G-MOC, G-MO-1, G-MSE (1)

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a framework and focus on responsibilities currently possessed. This checklist will be incorporated into a future revision of the existing Foreign Passenger Vessel Examination Book, CG-840.

2. ACTION. Officers in Charge Marine Inspections (OCMIs) and their designated marine inspectors should:
 - a. Bring this circular to the attention of appropriate individuals in the marine industry within their zones, especially those in the industry who are not members of ICCL. This circular is available on the world-wide web at: <http://www.uscg.mil/hq/g-m/nvic/index.htm>. Internet release authorized.
 - b. Follow the guidance in this circular while conducting Certificate of Compliance examinations on foreign-flag passenger vessels, choosing one of the five waste streams to inspect.
 - c. If any non-conformities are noted between the procedures listed in the vessel's Safety Management System (SMS) documentation and the actual procedures being followed on the ship, notify the Company immediately and follow the guidance contained in NVIC 4-98. If major non-conformities are identified, an OCMI should use risk-based decision-making and exercise discretion with regard to the level of control action utilized on the vessel.
 - d. If deficiencies or discrepancies are noted in the execution of the hazardous waste management program, notify the applicable Environmental Protection Agency (EPA) office or the State Resource Conservation and Recovery Act (RCRA) program office immediately.
3. DIRECTIVES AFFECTED. The existing Foreign Passenger Vessel Examination Books CG-840, CV1, CV2 and CV3 will be revised to include the checklist contained in Enclosure (1), as soon as practicable.
4. BACKGROUND.
 - a. From 1993 to 1998, nearly 2400 documented cases of pollution by foreign-flagged vessels were investigated, of which nearly four percent involved passenger vessels. As a result, Congress requested the GAO to examine the nature and extent of cruise ship involvement in these incidents; current and planned federal agency enforcement efforts; and cruise company actions to prevent future recurrences of pollution incidents. On February 1, 2000, the GAO completed a report to Congress, reference (a), recommending that the Coast Guard initiate discussions with the cruise ship industry, other federal and state agencies, and environmental groups as appropriate, on the need for improved water quality standards for gray water and black water discharged from cruise ships and other vessels. In addition, the report recommended an assessment of the need to periodically monitor the water quality of these discharges. This GAO report is available on the world-wide web for review at <http://frwebgate.access.gpo.gov/cgi-bin/useftp.cgi?IPaddress=162.140.64.21 &filename=rc00048.pdf&directory=/diskb/wais/data/gao>.

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- b. At the time reference (a) became public, federal responsibilities were in place for various vessel waste stream control systems including effluent from the oily water separators, effluent from the sewage treatment plants, hazardous waste, and garbage. Subsequently, legislation was passed and regulations were promulgated (see references (b) and (c)) that expanded federal responsibilities to include requirements for gray water discharge and for monitoring and sampling of black water and gray water waste streams on cruise ships in Alaska¹.
 - c. On March 14, 2000, the Florida Caribbean Cruise Association (FCCA) signed a MOU with the Florida Department of Environmental Protection (FDEP), reference (d), that is available for review on the world-wide web at http://www.iccl.org/resources/fdep_mou.htm. Under this MOU, the FDEP recognized ICCL's Industry Standard E-01-01, "Waste Management Practices and Procedures," reference (e), as meeting or exceeding the standards set forth in Florida laws and applicable regulations. Though not a party to the MOU, the Coast Guard participated in discussions that resulted in the MOU. In the MOU, the FDEP recognized the Coast Guard as the primary federal agency with responsibility for examining passenger vessel waste streams. As a result, the Coast Guard worked in conjunction with FDEP and ICCL to develop a checklist related to monitoring of hazardous waste and disposal.
5. DISCUSSION. The enclosed checklist reflects the collective work of the USCG, FCCA and FDEP and has been tested for use by several Coast Guard Marine Safety Offices. The checklist is not a listing of all items to be inspected; rather the marine inspector should use it as a reminder of the various items that may be examined during a certificate of compliance examination of a foreign passenger vessel. As always, the marine inspector's experience, knowledge, and judgment will determine the depth and scope of each examination. However, each marine inspector should select at least one waste stream for a thorough and detailed inspection during every annual or periodic foreign passenger vessel examination. The stream selection will be based on the marine inspector's discretion, taking into account the inspector's impression about the condition of the various waste stream systems on board the vessel. The selection will also be based on the need to inspect all systems over a reasonable period of time, whether a particular waste stream is applicable for examination (e.g. there may be no requirement applicable to gray water at the port of examination or the vessel does not discharge/offload hazardous waste), and maintaining randomness so that the operator has no advance knowledge of the waste stream that may be selected. During the examination, the operator should be able to present to the marine inspector a clear description of the practices and procedures for handling each waste stream and also to produce such records, as the inspector might need to verify compliance with these guidelines. In performing pollution prevention examinations, inspectors should be especially familiar with the contents of the Marine Safety Manual (MSM), Volume II, Material Inspection, Section B, Chapter 6, "Pollution Prevention," and Section C, Chapter 2, Paragraph K, "Marine Sanitation Devices" and this NVIC. Marine inspectors should also be familiar with ICCL's Industry Standard E-01-01 "Waste Management Practices and Procedures", reference (e), and the vessel's Safety Management System (SMS) documentation, which should address all the elements discussed in

¹ Presently, there are no other federal requirements applicable to the control or filtering of gray water discharge from foreign-flagged passenger ships.

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this standard. Note reference (e) is available at the ICCL website at [http://www.iccl.org/resources/exhibit a.pdf](http://www.iccl.org/resources/exhibit_a.pdf). If any elements are not addressed there should be a rationale for its omission. The different waste streams may be categorized as follows:

- a. Oil pollution prevention systems: include the oily water separator, the fuel/lubricating oil transfer, and sludge containment system. The marine inspector should verify that the oily water separator is operating within the desired range; that the alarms are working; that crew is knowledgeable and operating instructions are posted; and that maintenance is carried out at regular intervals. Actual piping may be verified against the approved piping diagram if the marine inspector notices modifications made to the system.
- b. Black water system: includes marine sanitation devices (MSDs) and other systems to treat, store, and discharge sewage. The checklist is designed to guide the marine inspector through some basic questions to ascertain whether the system is working as designed and that the crew is properly trained in its operation. For example, does the MSD appear to be properly installed? Is the MSD approved for use on this particular vessel (USCG Approved, IMO or Administration Approved to MARPOL Annex IV)? Is there adequate capacity or throughput for the number of persons on board? Are maintenance procedures being followed, including procedures outlined in the vessel's SMS? Are there records of expendables being ordered: filters, chemicals, et cetera? Are the units operating within the manufacturer's design specifications? Are there clear and simple operating instructions? Is the crew knowledgeable in the use of the equipment/system?
- c. Hazardous waste: includes dry cleaning (containing Perchloroethylene, or commonly-called "PERC") waste, used paints and thinners that contain hazardous substances, silver-bearing photo-processing waste, cleaning solutions and other items that contain hazardous substances. Each vessel may vary in both the type and volumes of hazardous waste generated depending on the technology and processes used aboard. This checklist is designed to evaluate onboard management of hazardous waste streams, to ensure that hazardous constituents are not released into the environment, and that accountability is demonstrated via adequate waste disposal records.
- d. Non-hazardous waste: includes shipboard garbage including plastics and synthetic material, medical waste, food wastes and recyclables such as glass, cardboard, aluminum and metal cans. Items to be checked should include: disposal and incineration records; waste sorted to prevent hazardous waste from entering the non-hazardous waste stream; no plastics or synthetics discharge overboard; separate and proper disposal of hazardous and non-hazardous incinerator ash; and proper disposal of cooking grease from grease traps.
- e. Gray water system: includes discharges from galley, sinks, washbasin drains, showers, and baths, excluding drains and sinks from medical spaces. These may be held in large tanks before being pumped overboard. The handling and discharge of gray water will *vary* from ship to ship and the inspector should ensure the procedures followed by the ship correspond to those described in its SMS documentation. If gray water is directed to MSD systems, the marine inspector shall ensure that combined gray water/black water throughput does not exceed the throughput of the MSD systems. Other waste streams such as hazardous waste

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 04-04

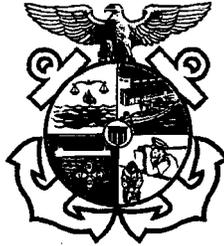
or medical waste must also not be mixed with gray water. Drains from hospitals, photo labs (if hazardous substances are used and stored therein), and slops, must be separate from the gray water system.



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Encl: (1) Foreign Passenger Vessel Pollution Survey Exam Book (CG-840 PSEB)

United States Coast Guard



**FOREIGN PASSENGER VESSEL
POLLUTION SURVEY EXAM BOOK**
(FOR ALL PASSENGER VESSELS)

| | |
|---|---|
| Name of Vessel | Flag <input type="checkbox"/> No Change |
| IMO Number | Case Number |
| Date Completed | |
| Location | |
| Senior Marine Inspectors / Port State Control Officers | |
| 1. | 5. |
| 2. | 6. |
| 3. | 7. |
| 4. | 8. |
| | |

Use of Foreign Passenger Vessel Pollution Survey Exam Book

This Checklist is an extensive list of possible examination items related to pollution prevention equipment, operation, plans and records. It is intended as a job aid to be used by Coast Guard senior marine inspectors during boardings of foreign-flagged passenger vessels. It is not the Coast Guard's intention to inspect all the items listed in the checklist at every exam; rather the inspector should use it as a reminder of the various items that may be examined during a foreign passenger vessel certificate of compliance examination. As always, the inspector's experience, knowledge, and judgment will determine the depth and scope of each examination; however, the inspector should select at least one waste stream for a thorough and detailed inspection. The stream selection will be based on the marine inspector's discretion, taking into account the inspectors impression about the condition of the various waste stream systems on board the vessel, weighing the need to inspect all systems over a reasonable period of time, and maintaining randomness so that the operator has no advance knowledge of the waste stream that may be selected.

It is incumbent on the vessel operator to be familiar with this checklist. The individuals responsible for different segments of the various waste streams should be able to present to the inspector a clear description of the practices and procedures for handling each waste stream and also to produce such records, as the marine inspector might need, to verify compliance with these guidelines. Inspectors should obtain a clear picture about the selected waste stream(s) and associated environmental processes by observing onboard practices and through questioning of the individuals that perform these practices. Inspectors should avoid circumstances in which a shore-side representative is the sole company liaison during the environmental inspection.

As a port state responsibility, marine inspectors and port state control officers must verify that the vessels and their crews are in substantial compliance with international conventions and applicable U.S. laws. The marine inspectors and port state control officers, based on their observations, must determine the depth and scope of the examination.

This document does not establish or change Federal laws or regulations. References given are only general guides. Refer to IMO publications, United States Code, Code of Federal Regulations, the Port State Control Job Aid, NVIC's, and any locally produced guidance for specific regulatory references. Marine inspectors should be especially familiar with all equipment standards and the contents of the Marine Safety Manual (MSM), Volume II, Material Inspection, Section B, Chapter 6, "Pollution Prevention," Section C, Chapter 2, Paragraph K, "Marine Sanitation Devices," and Volume IV, Technical, Chapter 3, Section K, "Special Engineering Applications for Pollution Prevention".

NOTE: Guidance on how to examine foreign passenger vessels for compliance with pollution prevention equipment standards, can be found in NVIC_-04.

Conducting the exam

- Complete Certificates/Equipment Data/Records information (Section A).
- Review SMS Environmental Procedures (Section B).
- Examine MSD, OWS, Garbage logs, Oil Record Book as per CG-840 Exam books.
- Determine if gray water requirements apply in the vessel's AOR and in inspection zone (If not, do not select C2)
- Make waste stream selection for a detailed exam (Section C)

Section

- C1 Oil Pollution Handling Waste Stream (Bilge, Sludge, Fuel, Lube Oil etc)
- C2 Gray Water Waste Stream
- C3 Black Water/Sewage Waste Stream
- C4 Hazardous Waste Stream
- C5 Non-hazardous Waste Stream

NOTE: Many items listed are not mandatory requirements, but fall under the umbrella of "Management Policy". Marine inspectors should be familiar with ICCL's Industry Standard E-01-01 "Waste Management Practices and Procedures," and SMS documentation on all cruise ships should address all the elements discussed in this standard. If any elements are not addressed there should be a rationale for its omission. If the areas listed are corporate policy as set out in the company's SMS documentation, then the vessel should be held accountable for the actions as required in 33 CFR 96 and SOLAS Chapter IX. If state or local laws exist that are more stringent than U.S. or international law, then the local or state laws must be followed. These vessels are not exempt simply because they are a foreign-flagged vessel.

Pre-inspection Items

- Review MISLE records
- Deficiency History
- Critical Profile
- Review Court-ordered requirements and environmental audit reports, if applicable
- CG Activity History
- Print Center for Disease Control Green Sheet
- <http://www2.cdc.gov/nceh/vsp/vspmain.asp>

Post-inspection Items

- Issue letters/certificates to vessel
- Issue Port State Control Report of Inspection-Form A
- Issue Port State Control Report of Inspection-Form B (if needed)
- Complete COC endorsement (include "Waste Stream" area inspected)
- MISLE activity case

Certificates / Reports (complete at annual exam or to update MISLE Certificate data)

| Name of Certificate | Issuing Agency | ID # | Port Issued | Issued Date | Expiration Date | No Change | Endorsement Date |
|---|----------------|------|-------------|-------------|-----------------|-----------|------------------|
| International Oil Pollution Prevention (leave blank if completed in the CVE 840 book) | | | | | | | |
| International Sewage Pollution Prevention Certificate (if issued) | | | | | | | |
| International Anti-Fouling System Certificate (if issued) | | | | | | | |
| State Certificates of Emission (only if applicable) | | | | | | | |
| State Certificates of Ballast Water (only if applicable) | | | | | | | |

Equipment Data

| Equipment Name | Capacity | US or MEPC Approval Nr | Authority/Agency | No Change | Date of approval/acceptance |
|---|------------|------------------------|------------------|-----------|-----------------------------|
| Oil Water Separator | Throughput | | | | |
| Oil Water Separator | Throughput | | | | |
| Oil Water Separator | Throughput | | | | |
| Waste Oil Holding Tank(s) Capacity(ies) | | | | | |
| Marine Sanitation Device Certificate of Type Test | Volume/day | | | | |
| Marine Sanitation Device Certificate of Type Test | Volume/day | | | | |
| Marine Sanitation Device Certificate of Type Test | Volume/day | | | | |
| Black Water Tank Capacity | | | | | |
| Grey Water Tank Capacity | | | | | |

Pollution Records

| | Date | Location | Amount |
|---|------|----------|--------|
| Last time bunkers were taken on | | | |
| Next time bunkers will be taken on | | | |
| Last time sludge/oily bilge water pumped ashore | | | |
| Last operation of OWS or overboard discharge | | | |
| Garbage incinerated | | | |
| Garbage discharged overboard at sea | | | |
| Garbage discharged ashore | | | |
| Required U.S. Ballast Water Report | | | |

SECTION A
Certificates/Equipment Data/Records
Information

Environmental Procedures can be found in the ship's Safety Management System (SMS) documentation or in company policies and maintenance manuals, inspection logs, oil record books, etc. Marine inspectors should question the ship staff on procedures and normal operations, and compare the answer to what is written in procedures and manuals. For each waste stream, persons with specific responsibilities should be questioned at each step in the waste handling process. Inspectors should require being shown specific process step by the person responsible for that step. Inspectors should ask extensive questions regarding availability of documents and supporting material relevant to the individual performing the specific activity in the waste handling process. Other questions should focus upon training provided and reporting procedures when problems with waste management processes are identified.

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| | | 33 CFR 155.700 |
| <input type="checkbox"/> Current pollution prevention records | <ul style="list-style-type: none"> • Person-in-charge designated and qualified (certificated/licensed) • Transfer equipment tests and inspections • Declaration of Inspection (available and retained for at least one month) • Ship to provide PMS logs and required PMS activities for the selected waste stream for verification. • Verify SMS incorporates PMS activities and logs for all Waste Streams. • Court required logs to track oil usage in systems having oil to sea interfaces (if applicable) • Recent environmental audit reports when available | 33 CFR 156.150 33 CFR 156.170 ISM Code/SMS 33 CFR 96 |
| <input type="checkbox"/> Oil Record book (Part 1) (spot-check) | <ul style="list-style-type: none"> • Each operation signed by person-in-charge • Each complete page signed by master • Book maintained for 3 years • Use of proper codes and version for vessel • Transfer receipts/manifest match oil record book entries • OWS rates not exceeding design criteria • Incinerator rates not exceeding design criteria • Consistent bilge water management patterns • Comparison of oil record book entries to vessel's daily tank sounding book | MARPOL Annex. 1/20 33 CFR 151.25 |
| <input type="checkbox"/> Shipboard Oil Pollution Emergency Plan | <ul style="list-style-type: none"> • Approved by Administration (class society) • Updated and current • In English and working language of crew • Correct contact numbers for National and Local Authorities (Port Authorities for ports visited not every COTP) • Immediate Actions List • Non Mandatory Provisions (if listed in SOPEP). Spill kits located and inspected | MARPOL Annex. 1/26.1 33 CFR 151.26 |
| <input type="checkbox"/> MARPOL Annex V | <ul style="list-style-type: none"> • Placard posted • Record book • Garbage management plan | MARPOL Annex V/9 |
| <input type="checkbox"/> Non-Hazardous Waste Disposal Documentation (if applicable) | <ul style="list-style-type: none"> • EPA Generator ID# _____ (if applicable) • Records • Non-Hazardous Waste Manifests | U.S. Local Regulations as applicable |
| <input type="checkbox"/> Recycling policy being followed (requires a detailed assessment) | | |
| <input type="checkbox"/> Hazardous Waste Disposal Documentation (if applicable) | <ul style="list-style-type: none"> • EPA Generator ID# _____ (if applicable) • Records • Uniform Hazardous Waste Manifests • Land Disposal Restriction Notification Certification Forms (LDR) • Shipping Document for Regulated Medical Waste • Interview Person(s) responsible for landing of wastes • Specialized training for Responsible person(s) and related documentation • Evidence of disposal in other countries to bona fide receivers documented | Shipboard policy SMS 40 CFR 262 Shipboard policy SMS |

Oil pollution prevention systems include, but are not limited to, the oily water separator, other filtering or flocculation devices, bilge water management, fuel/lubricating/waste oil transfer, purifier and lantern space sludge collection, transfer and containment systems. Marine inspectors should verify that the oily water separator is operating within the required range; that the alarms are working and sound at appropriate levels; that crew is knowledgeable and operating instructions are posted; that maintenance is carried out at regular intervals and repairs are documented; and that system operation and maintenance are in accordance with the vessel's SMS. Marine inspectors should verify the actual pollution prevention system piping against vessel's approved piping diagrams, if modifications such as blanked off tees, connections points, hoses, or temporary piping segments associated with these systems are observed.

- Oily Water Separator (OWS)**
 - Verify bilge piping, no modifications & matches approved diagram (direct to OWS, to holding tank, etc.)
 - No blanked flanges, pipe caps, or dead-ended valves, or tees on inlet or outlet piping
 - Evidence of bolting/unbolting of associated piping segments
 - Recent paint on pipe segments
 - Observe general housekeeping and cleanliness
 - Witness operational test of OWS, evaluate operator competency. System operating in published ranges
 - Verify unit is processing contaminated source. Operate system for sufficient time (15 minute minimum) to identify reduction in contaminated source
 - Test 15 ppm Oil Content Meter and alarm
 - On units with multiple Oil Content Meters, compare readings
 - Ensure sample analyzed by Meter is OWS output (Trace sample line for presence of unacceptable clean water connection)
 - Verify no electrical bypasses, jumpers, extra switches on or within unit or Meter control panel
 - Verify system automatically re-circulates (3-way valve) or shuts down when >15ppm. Verify proper operation of valve
 - Verify proper operation of system backflush or oil purge cycle
 - Visually sample processed water for gross contamination (sheen or visible oil)
 - Compare ship's operational maintenance routine with actual Preventative Maintenance conducted. Request proof/documentation of maintenance completed (used consumables from OWS, receipts of service, technician reports, contractor disposal records)
 - Review meter calibration records
 - Review strip charts if fitted
 - Examine other machinery space overboard piping for unusual connections
 - Review records pertaining to system repairs

- Oil Pollution placard posted 33 CFR 155.450
- Oil Transfer Procedures 33 CFR 154.340
 - Posted / available in crew's language 33 CFR 155.720
 - Person in Charge (PIC) fluent in English or language mutually agreed upon w/ shoreside PIC 33 CFR 155.750
 - Format in CFR order or cross reference index page 33 CFR 154.310
 - List/description of products carried by vessel
 - Description of transfer system including a line diagram of piping system (pumps, vents, valves, alarms, shutoffs, etc.)
 - Number of persons required on duty
 - Duties by title of each person
 - Means of communication (two-way voice)
 - Procedures to top off tanks and disconnect
 - Procedures to report oil discharges
 - Emergency response procedures (fire, spill, human exposure)

- Standard discharge connection MARPOL Annex 1/19
- Fuel/lube/sludge oil fill, vent & overflow discharge containment 33 CFR 155.430
 - Size (<1600GT/2 bbl, >1600GT 1 bbl) 33 CFR 155.320
 - Fixed (Built after 30Jun74) or Portable (before 30Jun74)
 - Drains
 - Scupper closures

- Prohibited oil spaces (no oil/hazardous substances carried fwd of collision bulkhead) 33 CFR 155.470

- Lighting at each Transfer Operations Work Area 33 CFR 155.790
 - Adequate
 - Located/Shielded to not interfere with navigation
- Oil transfer hose (if vessel uses to transfer in U.S. waters) including Lifeboat/Tender Hoses 33 CFR 155.800/805
 - Condition 33 CFR 154.500
 - Markings (MAWP, Mfg. Date, Test date) - 33 CFR 156.170
 - Hose assembly requirements (blanked off if not new, gas free or in use)
 - Tests and inspections
- Bilge Water Management MARPOL Annex I
 - Examine machinery space bilges (stem to stem)
 - Contamination / oily residues in bilges on bulkheads, piping, structures, within roseboxes
 - Leakage from systems and engines into machinery spaces (may not be seen during port ops)
 - Engine oil usage, quantities, where lost, consumed or in bilges
 - Evidence of recent cleaning of systems, equipment and components
 - Status of oily bilge water tanks, last cleaned, at capacity
 - Adequate capacity all tanks
 - Levels of tanks during inspection — high or low?
 - If tanks near full — what are the vessel's processing plans?
 - Evidence of detergent usage (Note- emulsions cannot separate in gravity separator and are likely to result in discharges over 15 PPM)
 - Other methods to discharge bilge water
 - Evidence of excess water ingress, pump glands, seals, valve glands
 - Portable (diaphragm /other) pumps present
 - Hoses, fittings, and connections in areas — usage unknown
 - Unlocked overboard valves on bilge, bilge & ballast, salt water service
 - Seal management program-used
 - Designated clean or exempted areas — oil free status
 - Lifeboat / Security / Tender vessel engineering systems leak free
 - Lifeboat / Security / Tender vessel bilges clean
 - Lifeboat / Security / Tender vessel- oily bilge handling when leakages present (when in use off vessel or once reloaded)
- Waste/Sludge oil incineration
 - Tests and inspections
 - Record keeping
 - Incinerator operates with sludge / waste oils
 - Clean / dirty furnace, evidence of use
 - Operators capable & prove operation
 - Purifier sludge tanks full / empty
 - Connections to bilge main or other areas
 - Transfer pump operable
 - Transfer pump to sludge system, ashore, incinerator settler only
 - Estimated quantities of sludge produced — normal or excessive (fuel sludge production can exceed 2% of total fuel used)
- Systems with Oil to Sea Interfaces
 - Oil lubricated stern tubes, bow and stern thruster seals, fin stabilizer seals, etc.
 - Exterior examination in way of systems for evidence of leaking seals
 - Presence of barrels, drums, hoses, pumps, and other equipment/supplies/arrangements necessary to refill systems at equipment.
 - Check consumption records if SMS or environmental compliance programs require such records.

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| <u>Section C2</u> <u>Gray Water Waste Stream</u> |
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Gray water system includes discharges from galley, sinks, washbasin drains, showers, and baths. These may be held in large tanks before being pumped overboard. The handling and discharge of gray water will vary from ship to ship and the marine inspector should ensure the procedures followed by the ship correspond to those described in its SMS documentation. If gray water is pumped through a/the Marine Sanitation Device(s) (MSD), ensure that the total volume does not exceed the MSD's capacity. Other waste streams such as hazardous waste or medical waste (RCRA biomedical wastes) must not be mixed with gray water. Drains from hospitals (U.S. restriction), photo labs (if commingled with hazardous wastes), slops, must be separate from the gray water system.

Sources

- Galley (ex. Dishwashers, floor drains, sinks)
- Showers/Baths & washbasin drains
- Laundry
- Deck drains throughout vessel

(Clean Water Act)
 33 USC 1251 et seq.
 33 CFR 159.300
 Subpart E for (D17)
 Local Regulations
 ISM Code
 33 CFR 96

- Prohibited Sources (hazardous materials, bilges, photo shop & print shop if hazardous wastes are commingled, hospital spaces (U.S. only), etc.)
- Evidence of other drained fluids into scuppers or other entry points (photo lab, hospital, specialty spaces)
- Drains from spaces containing machinery (fan rooms, hotel equipment, etc.) oil free or segregated
- Connections to the Black Water System (if permitted in MSD Operation Manual, if so, is MSD capacity sufficient?)
- Connections to Ballast Water System
- Number of tanks
- Total tank capacity _____ m3
- Volume Produced _____ (m3 per day)
- Maximum number of days in port without discharging.
- Current capacity sufficient for persons on board and time in port?
- Review vessel's gray water handling procedures (SMS).
- Ensure that Quality Assurance / Quality Control Plan is vessel specific.
- Is Gray water processed and discharged?
- What are Gray water disposal procedures: Shore and at Sea. (company policy)
- Does vessel have sampling procedures? (if so, review)
- Types of tests performed, equipment and useable testing supplies readily available?
- Sampling equipment/supplies useable and available?
- How often do they take samples? Review samples record book.
- What are the state, federal and local regulations for gray water discharge?
- Responsible crew interviewed
- Disposal and Records
 - Shore (receipts available)
 - At sea (logs maintained)
 - Sampling/Testing (logs maintained)
 - Note some gray water treatment employs advanced ultra-filtration systems, these systems claim to reduce gray water waste by 85% - 90%, or more.
 - Alaska - Effective July 2001, Operators of cruise vessels carrying 500 or more passengers & transiting applicable waters of Alaska are restricted in where they may discharge effluents & will be required to perform testing of sewage & gray water discharges. The Coast Guard will inspect, monitor, & oversee this process to ensure compliance with applicable water quality laws & regulations. (33 CFR 159)

Black water system includes MSDs and other systems to collect, treat, store, and discharge sewage. This checklist is designed to guide the marine inspector through some basic questions to ascertain whether the system is working as designed and that the crew is properly trained in its operation. For example, does the MSD appear to be properly installed? Is there adequate capacity for the number of persons on board? Are maintenance procedures, including SMS procedures, being followed? Are there records of expendables being ordered: filters, chemicals, et cetera? Are the units operating within the manufacturer's design specifications? Are there clear and simple operating instructions? Is the crew knowledgeable in the use of the equipment/system?

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| <ul style="list-style-type: none"> ❑ Sources <ul style="list-style-type: none"> • Toilets, Urinals, scuppers • All Drainage from Medical Premises (U.S. restriction) • System installed, maintained and operated in accordance with approved plans and manufacturers specifications. • Tank Capacity and Volume Produced • Current volume in tanks • Modifications documented ❑ Operations and Treatment (new section) <ul style="list-style-type: none"> • Chemical/Biological treatment & protective equipment • Chemical Treatment Level • Sufficient chemicals, additives, approved cleaning materials onboard. (enzymes, "Gamazyme", chlorine) • Compressors operating, inlet filters maintained • Vacuum system operable, if applicable • Flow indicators clear — indicating flow • Last system cleaning • Macerator operating maintenance • Methods to dilute discharge? • Operating instructions/SMS procedures ❑ U.S. Marine Sanitation Device Requirements <ul style="list-style-type: none"> • Type (II, III) • Nameplate (Should be designed to resist efforts of removal or efforts to alter the information) • Placard • Proper operation (macerators, treatment chemicals) and structural integrity, no leaks • Certificate of Type Test. <u>For Foreign Flag Vessels in U. S. Waters</u> A foreign flag vessel that has a "Certificate of Type Test" under MARPOL Annex IV indicating that its sewage treatment plant meets the test requirements of Resolution MEPC.2 (VI) of the International Maritime Organization (IMO) will be accepted by the Coast Guard as being in compliance with 33 CFR 159.7(b) or (c). The Certificate of Type Test must be issued by or on behalf of a government that is a party to the MARPOL convention. Such a plant will be considered as fully equivalent to a Coast Guard certified Type II MSD as long as the unit is in operable condition. However, the unit may not be labeled as USCG certified. U.S. registered vessels will continue to be required to have Coast Guard certified MSDs per 33 CFR 159. ❑ Standard Discharge Connection (NLT 27 Sep 03) <ul style="list-style-type: none"> • New ships 200 gross tons and above • New ships less than 200 gross tons and carry more than 10 persons. • Existing ships 200 gross tons and above and exiting ship less than 200 gross tons and carry more than 10 persons after 27 Sep 13 (10 years after the date entry into force of Annex IV) ❑ Disposal <ul style="list-style-type: none"> • Shore (last done, reasons?) • Overboard valves secured • MSD bypass piping noted? (Condition of valves, pipe tees and caps, evidence of frequent usage) • At sea (provide proof of discharge location) • Logged position, speed (if required by management) MARPOL Annex IV* <ul style="list-style-type: none"> • When comminuted and disinfected greater than 3 miles. 33 CFR 159 • Company policy followed? • When not comminuted or disinfected greater than 12 miles. • Both to be discharged while ship is underway at greater than 4 knots. Locations of discharges compared to deck logs. • Not in EPA "No Discharge Zones" • Connections to the gray water system (effluent routed to gray water system to dilute effluent?) | <p>MARPOL Annex IV* 40 CFR 140.3 & .4 33 CFR 159.57 33 CFR 159.7 33 CFR 159.55 33 CFR 159.59 MARPOL Annex IV/9* 40 CFR 140.3 MARPOL Annex IV/11 * Resolution MEPC.2(VI) 33 CFR 159.65 NVIC 9-82 ISM Code 33 CFR 96</p> <p>33 CFR 159</p> <p>MARPOL Annex IV/2* MARPOL Annex IV/10*</p> <p>MARPOL Annex IV* 33 CFR 159.7 40 CFR 140.4 40 CFR 136</p> |
|---|---|

- Alaskan Waters:
Effective July 2001, Operators of cruise vessels carrying 500 or more passengers and transiting applicable waters of Alaska are restricted in where they may discharge effluents and will be required to perform testing of sewage and gray water discharges. The Coast Guard will inspect, monitor, and oversee this process to ensure compliance with applicable water quality laws and regulations. (33 CFR 159).

Sampling/Testing

- Lab analysis of fecal coliform/total suspended solids in effluent (recorded on ISPP if issued)
- Results of residual chlorine content in effluent testing
- Calibration records for dosing pump/proportioner

* Although the United States is not signatory to MARPOL Annex IV, the requirements of Annex IV may be enforced for those vessels that have committed to comply with Annex IV requirements in addition to 33 CFR Part 159 requirements as part of the vessels' SMS. This commitment is typical for ICCL Member vessels and many other cruise ships.

Hazardous waste must be handled in accordance with the ship's SMS. If such waste is disposed of in U. S. waters, the SMS hazardous waste handling procedures must meet or exceed 40 CFR Part 262 requirements. Hazardous waste includes dry cleaning (PERC) waste, used paints and thinners that contain hazardous substances, silver-bearing photo-processing waste, cleaning solutions and other similar items. Each vessel may vary in both the type and volumes of hazardous waste generated depending on the technology and processes aboard ship. This checklist is designed to evaluate on-board management of hazardous waste streams and to ensure that hazardous constituents are not released into the environment, disposed of properly and that accountability is demonstrated via adequate waste disposal records.

Hazardous Waste

40 CFR 262
49 CFR 173
RCRA
SARA Title III
42 USC 11002(a)(3) 40
CFR 355 App A / B ISM
Code
33 CFR 96

- Has the company conducted a waste determination? Through Process Knowledge or Waste Analysis (circle one)? If not, hazardous waste may not be landed.
- Have responsible personnel received initial and refresher training? Has the training been documented?
- Is there any evidence that hazardous wastes are being incinerated, diluted, neutralized, or evaporated as a means of disposal.
- Is there any evidence (e.g. lack of disposal records) of hazardous material being discharged overboard?
- Are hazardous wastes being properly stored, maintained, labeled, and placarded? Note any observations made of deficiencies, dates and nature of repairs.
- Are proper storage devices available?
- Waste not commingled
- Quantities on board consistent with receipt/disposal documentation?
- Does the crew have ready access to spill control and decontamination equipment?
- Are records maintained and manifests completed for potential hazardous waste streams, for example:
 - Silver Bearing Photo Processing Waste (developers, wash water, Silver Recovery Units)
 - X-Ray equipment
 - Print Shop Waste (inks, dyes, cleaning solvents)
 - Used Solvents, Paints & Thinners
 - Fluorescent/Mercury Vapor Bulbs
 - Batteries (universal wastes): Nickel Cadmium (Nicad); Lead Acid; Lithium; Alkaline
 - Certain Pharmaceuticals/Narcotics
 - Dry Cleaning Waste (PERC, lint, sludge, filters, condensate water)
 - Aerosol Cans
 - Cleaning Solutions (de-scalers, acids, bases, other corrosives)
 - Expired pyrotechnics (from safety equipment and entertainment use)
 - Rags contaminated with hazardous wastes (also - in approved storage containers?)
 - Incinerator ash if contaminated with toxic/hazardous substances (plastics containing heavy metals)
- Do records reflect reasonable accumulations of waste with respect to the capacity of the vessel, its age, technologies onboard, and amounts of repair/maintenance?
- Used lead acid batteries not mixed and kept dry?

- Records of hazardous consumables kept updated
Used and unused

Shipboard Records
ISM Code
33 CFR 96

The following excerpt from 40 CFR 262 regarding Resource Conservation and Recovery Act (RCRA) requirements is provided for background information only. The Federal or State RCRA program office must be consulted if any clarifications are needed for a particular situation.

HAZARDOUS WASTE HANDLING REQUIREMENTS

§ 262.11 Hazardous waste determination.

A person who generates a solid waste, as defined in 40 CFR 261.2, must determine if that waste is a hazardous waste using the following method: (a) Determine if the waste is listed as a hazardous waste in subpart D of 40 CFR part 261.

(c) Or if not listed in subpart D of 40 CFR part 261, generator must determine if the waste is identified in subpart C of 40 CFR part 261 by either:

(1) Testing the waste according to the methods set forth in subpart C of 40 CFR part 261

(2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.

262.12 EPA identification numbers.

(a) A generator must not treat, store, dispose of, transport, or offer for transportation, hazardous waste without having received an EPA identification number from the Administrator.

262.20 General requirements.

- (a) A generator who transports, or offers for transportation, hazardous waste for offsite treatment, storage, or disposal must prepare a Manifest OMB control number 2050-0039 on EPA form 8700-22, and, if necessary, EPA form 8700-22A, according to the appendix to part 262.
- (b) Generator must designate on manifest one facility that is permitted to handle the waste described on the manifest.

262.23 Use of the manifest.

- (a) The generator must:
- (1) Sign the manifest certification by hand; and
 - (2) Obtain the handwritten signature of the initial transporter and date of acceptance on the manifest; and
 - (3) Retain one copy, in accordance with § 262.40(a) and give the transporter the remaining copies of the manifest.

262.30, .31, .32 & .33 Packaging, Labeling, Marking and Placarding.

Before transporting hazardous waste or offering hazardous waste for transportation off-site, a generator must package, label, mark and placard the waste in accordance with the applicable Department of Transportation regulations on packaging under 49 CFR parts 172, 173, 178, and 179. Before transporting hazardous waste or offering hazardous waste for transportation off-site, a generator must mark each container of 110 gallons or less used in such transportation with the following words and information displayed in accordance with the requirements of 49 CFR 172.304: **HAZARDOUS WASTE Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency. Generator's Name and Address ----- . Manifest Document Number -----.**

262.34 Accumulation time.

A generator may accumulate hazardous waste on-site for 90 days or less for large quantity generator and 180 days or less for small quantity generator, without a permit or without having interim status.

The date upon which each period of accumulation begins must be clearly marked and visible for inspection on each container and while being accumulated on-site, each container and tank is labeled or marked clearly with the words, "Hazardous Waste."

§ 262.40 Recordkeeping.

- (a) A generator must keep a copy of each manifest signed in accordance with § 262.23(a) for three years or until he receives a signed copy from the designated facility which received the waste. This signed copy must be retained as a record for at least three years from the date the waste was accepted by the initial transporter.
- (b) A generator must keep a copy of each Biennial Report and Exception Report for a period of at least three years from the date of the report.
- (c) A generator must keep records of any test results, waste analyses, or other determinations made in accordance with § 262.11 for at least three years from the date that the waste was last sent to on-site or off-site treatment, storage, or disposal.

AGENT

Vessel representative hired by the ship's owners. Ship's agent may be tasked with various jobs such as: ensuring proper vessel documentation and compliance.

AUTOMATIC STOPPING DEVICE

Is a control mechanism that ensures discharge of an oily water separator is stopped when the oil content of the effluent exceeds 15 parts per million (PPM). The automatic stopping device may be initiated by the operation of the oil content meter.

BALLAST

Used to improve the stability and control the draft of a ship. (In Ballast - having only ballast for a load)

BLACK OIL

A viscous and black or very dark brown colored oil. Depending on the quantity spilled, oil tends to quickly spread out over the water surface to a thickness of about one-millimeter.

BLACK WATER (sewage)

Examples - possible sources toilets, urinals and drainage from medical facilities (U.S. restriction).

COC

Certificate of Compliance, CG Form 3585.

COTP

Captain of the Port.

CWA

Clean Water Act.

CVE

Control Verification Examination is the examination of vessel for compliance with SOLAS requirements and applicable U. S. regulations. More properly referred to as the Passenger Vessel Certificate of Compliance Examination.

DISPERSION

The breaking up of an oil slick into small droplets which are mixed into the water column as a result of breaking waves and other sea surface turbulence.

EFFLUENT

To flow out. (Waste material, refuse, and sewage)

EMULSIFICATION

The formation of a water - in - oil mixture. In the environment, the tendency for emulsification to occur varies with different oils and is much more likely to occur under high-energy conditions (wind and waves). Emulsions may also be formed by surfactants, including detergents, which cause the oil and water to mix, or by mechanical means such as pressure washing or pump action.

EPA

Environmental Protection Agency

EQUIPMENT HAVING AN OIL TO SEA INTERFACE

Equipment that uses a seal to prevent leakage of oil into the sea. Examples, oil-lubricated stern tube seals, hydraulically-driven stabilizer fin seals, bow and stern thruster seals. An indicator that system seals are leaking to the sea may be evidence of frequent filling of system reservoirs, presence of barrels, drums, hoses, pumps, and other equipment/supplies/arrangements necessary to refill systems. Some ships' SMS or environmental compliance programs may require that records of refilling such systems are kept. If so, these records should be checked.

15 PPM ALARM

An alarm that activates when the effluent passing through oil-filtering equipment exceeds 15 parts per million (ppm) of oil.

GRAY WATER

Includes discharges from galley, sinks, washbasins, drains, showers and baths. These may be held in large tanks prior to being discharged overboard (State, Fed, regulation permitting).

HSSC

International Convention to Harmonized System of Survey and Certification.

ICCL

International Council of Cruise Lines, a cruise ship industry association which participates in industry standards and policy development process to promote all measures that foster a safe, secure, healthy cruise ship environment.

ICLL

International Convention for Load Lines.

IMO

International Maritime Organization; a specialized agency of the United Nations concerned solely with maritime affairs. IMO is responsible for international treaties, conventions, resolutions and codes to improve maritime safety.

ISM Code

International Safety Management Code. (Chapter IX of SOLAS)

MARPOL

The International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978.

MSC

Maritime Safety Committee. One of five technical committees of the IMO which deals with issues such as aids to navigation, vessel equipment and construction, manning requirements, handling dangerous cargoes, hydrostatic and marine casualty information.

MSD

Marine Sanitation Device.

OIL CONTENT METER

An instrument used to measure continuously the oil content of the effluent in the OWS output line, in parts per million, to ensure that the operation does not contravene the convention.

OIL FILTERING EQUIPMENT

Equipment that uses any combination of a separator, filter or coalescer, and also a single unit designed to produce an effluent with oil content less than 15 parts per million (ppm). (MARPOL Annex I, Reg 16)

OILY WATER SEPARATOR (OWS)

The basic principle of oil / water separation is their difference in specific gravity. The specific gravity of most oils is less than water; therefore, it will naturally float to the top of an oil and water solution. Small droplets of oil float to the top much slower than large droplets. This is due to the large surface area to mass ratio. To speed up the process of separation, OWS units form larger oil droplets out of smaller ones, thus decreasing the surface area to mass ratio. The increased mass of the oil droplet increases its buoyancy, thus causing it to rise more quickly. Gravitational-based systems are not effective processors of oil-water emulsions formed by detergents or mixtures containing high specific gravity oils.

PASSENGER SHIP

A ship which carries more than 12 passengers.

PMS

Preventative Maintenance System

QUALIFIED INDIVIDUAL (QI)

The person authorized by the responsible party to act on their behalf, authorize expenditures and obligate organization's resources.

RCRA

Resource Conservation and Recovery Act (RCRA), was enacted by the U.S. in 1976 to address the issue of how to safely manage and dispose of the huge volumes of municipal and industrial hazardous waste generated nationwide.

RECOVERABLE OIL

Oil that is in a thick enough layer on the water to be recovered by conventional techniques and equipment. Only black or dark brown oil, mousse, and heavy sheens (dull brown) are generally considered thick enough to be effectively recovered by skimmers.

SEPARATION EQUIPMENT

A device designed to remove enough oil from an oil-water mixture to provide a resulting mixture with an oil content of less than 100ppm, or 15ppm, such as an Oily Water Separator (OWS).

SLICK

Oil spilled on the water, which absorbs energy and dampens out the surface waves making the oil appear smoother or slicker than the surrounding water.

SHEEN

A sheen is a very thin layer of oil (less than 0.0001 inches or 0.003mm) floating on the water surface and is the most common form of oil seen in the later stages of a spill. According to their thickness, sheens vary in color ranging from dull brown for the thicker layers to rainbows, grays silvers and almost transparent for the thinnest layers.

SLUDGE TANKS

Tanks used to contain sludge formed by fuel and lube oil purifiers and from other sources or cleaning activities. Sludge is not readily processed by many oily water separators and frequently requires treatment ashore or incineration. Every ship of 400 GT or more must be provided with a tank or tanks of adequate capacity, in regard to type of machinery and length of voyage, to receive the oil residues (sludge) that cannot be dealt with otherwise in accordance with MARPOL Annex I.

SMS

Safety Management System (sometimes referred to as an SQM). Required by the ISM Code and Chapter IX of SOLAS.

SOLAS

Safety of Life at Sea. The International Convention for the Safety of Life at Sea.

SOPEP

Shipboard Oil Pollution Emergency Plan. (MARPOL Annex I, Reg. 26)

STCW

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers.

TANKER

Is a self-propelled vessel constructed or adapted for the carriage of bulk liquid cargoes of oil or hazardous materials.

TRANSFER

Any movement of oil or hazardous material to, from or within a vessel by means of pumping, gravitation, or displacement.

Appendix v

MEMORANDUM SUBJECT: Cruise Ship Identification Numbers and State Required Annual Reporting Components

FROM: Elizabeth Cotsworth, Director Office of Solid Waste

TO: RCRA Senior Policy Managers

Regions 1-10

Over the last several months, the Environmental Protection Agency (EPA), Office of Solid Waste has been working with Region 4, Region 9, Region 10, and ten states having cruise ship traffic to facilitate national acceptance of one EPA hazardous waste identification (ID) number per individual cruise ship. This came about because the ships were receiving different numbers from each state in which hazardous waste was off-loaded. Having multiple identification numbers causes the ships to create and maintain duplicate copies of hazardous waste management records, leading to an increased paperwork burden.

Through meetings and conference calls, the participants on this project reached an agreement on the issue. Today, we are asking that individual cruise ships be assigned only one EPA hazardous waste identification number as a generator of hazardous waste for purposes of the Resource Conservation and Recovery Act. The following procedures would apply:

- a) A cruise ship would determine its American-based home port state (the state in which it has corporate offices or its main port of call).
- b) After determining the home port state, the cruise line will notify the selected state or corresponding EPA regional office of its hazardous waste activities.
- c) The cruise ship will identify its hazardous waste generator size in accordance with 40 CFR 261.5(c).
- d) The home port state or EPA regional office will issue an EPA hazardous waste identification number for each individual cruise ship using the current established procedure. The number will reflect the home port state initials and ten alphanumeric characters.

We are recommending that the state or region consider using a ship = s registry number, which is known as the International Maritime Organization (IMO) number, as part of the EPA hazardous waste identification number. The IMO number is generally a five to seven digit number; zeros can be added before or after the number to reach the ten characters required for the EPA hazardous waste identification number. Using the IMO number will allow for coordination with the Coast Guard, as this is the number they use most often.

After the identification number is assigned, it will remain with that ship and be used on all hazardous waste manifests regardless of where the waste is off-loaded in the U.S. The assignment of the EPA ID number will not impact the applicability of state-specific RCRA requirements. For example, when waste is off-loaded in a state, the cruise ship will comply with that particular state = s RCRA requirements whether or not that state assigned the ID number. The ship will be required to provide records to the individual state as required by state law.

Many of the states who will not be issuing the ID number expressed an interest in obtaining

information provided by the cruise ship in either an annual or biennial report to its home port state. This request for annual report information can be addressed through the existing Biennial Reporting System (BRS). The attachment to this memo provides more specific information on how the ID numbers and annual reports will be incorporated into the EPA = s BRS databases.

If you have any questions, please contact Teena Wooten at (703) 308-8751.

Attachment (1)

cc: Key RCRA Contacts, Regions 1 - 10

RCRA Enforcement Contacts, Regions 1 - 10

RCRA Data Management Contacts, Regions 1-10

Tom Kennedy, Association of State and Territorial Solid Waste
Management Officials (ASTSWMO)

Anne Dobbs, Texas Natural Resource Conservation Commission (TNRCC)

Dangerous Waste Site Identification Form

Site ID



Washington State Department of Ecology
Hazardous Waste Information
P.O. Box 47658
Olympia, WA 98504-7658
(800) 874-2022 (within state)
(360) 407-6170

Web site: www.ecy.wa.gov/programs/hwtr

| For Ecology Use Only | | Date Received: | |
|----------------------|----------|----------------|----------|
| Form | Reviewed | Entered | Verified |
| Site ID | | | |
| GM | | | |
| WR | | | |
| OI | | | |

1. Reason for Submittal

- To provide **New** Notification of Regulated Waste Activity (complete entire form)
- To provide **Revised** Site Identification information (complete entire form)
- To **Withdraw** Site Identification Number (skip sections 10 and 11)
- To **Reactivate** Site Identification Number (complete entire form) Effective Date: _____ (mm/dd/yyyy)
- A component of the **Dangerous Waste Annual Report** (skip section 11) Reporting Year: _____ (yyyy)

2. RCRA Site ID Number:

3. Site Location Information

Company Name: _____

Site Address: _____

City/State/Zip: _____

County: _____

Tax Registration Number: _____

NAICS Code: _____

Type of Business: _____

4. Company Mailing Address

Name: _____

Mail Address: _____

City/State/Zip: _____

Country: _____

5. Legal Owner

Name: _____

Mail Address: _____

City/State/Zip: _____

Phone Number (Ext): (____) _____

Owner Since: _____ (mm/dd/yyyy)

Owner Type: Federal State County Municipal
 District Private Tribal Other

6. Land Owner

Name: _____

Mail Address: _____

City/State/Zip: _____

Phone Number (Ext): (____) _____

Owner Type: Federal State County Municipal
 District Private Tribal Land
 Puyallup Trust Other

Dangerous Waste Site Identification Form (continued)

Site ID

RCRA Site ID Number:

7. Site Operator

Name: _____

Mail Address: _____

City/State/Zip: _____

Phone Number (Ext): (____) _____

Operator Since: _____ (mm/dd/yyyy)

Operator Type: Federal State County Municipal
 District Private Tribal Other

8. Site Contact

Name: _____

Mail Address: _____

City/State/Zip: _____

Phone Number (Ext): (____) _____

Email Address: _____

9. Form Contact

Name: _____

Mail Address: _____

City/State/Zip: _____

Phone Number (Ext): (____) _____

Email Address: _____

10. Type of Regulated Waste Activity (Mark the appropriate boxes for activities that apply to your site)

A. Hazardous Waste Activities

1. Generator of Hazardous Waste

(Choose only one of the following four categories)

a. LQG: Large Quantity Generator (Greater than 2,200 lbs/mo)

b. MQG: Medium Quantity Generator (Between 220 – 2,200 lbs/mo)

c. SQG: Small Quantity Generator (Less than 220 lbs/mo)

d. XQG: No Regulated Waste Generated

2. Frequency of Generation

(Choose only one of the following three types)

a. Monthly

b. Batch

c. One-time only

3. Transporter of Hazardous Waste

a. Transport own waste

b. Transport for commercial purposes

4. Recycler of On-Site Waste

(i.e., on-site use, reuse or reclamation of a waste after it has been generated)

5. Transfer Facility of Hazardous Waste

6. Permit-by-Rule (PBR)

7. Treatment-by-Generator (TBG)

8. Generator of Mixed Radioactive Waste

9. Importer of Hazardous Waste

10. Treatment, Storage, Disposal or Recycling (TSDR) Facility

(Note: A RCRA Permit is required for this activity)

11. 24-Hour Recycler of Off-Site Waste

(i.e., Immediate Recycler)

12. Dangerous Waste Fuel Activity

a. Generator of dangerous waste fuel

b. Generator marketing to burner

c. Other marketers (i.e., blender, distributor, etc.)

d. Burner (indicate type of combustion unit)

1. Utility boiler

2. Industrial boiler

3. Industrial furnace

e. Deferrals/Exemptions (in federal registry only)

1. Smelter deferral

2. Small quantity exemption

3. Other (specify):

Dangerous Waste Site Identification Form (continued)

Site ID

RCRA Site ID Number:

B. Universal Waste Activities

1. Large Quantity Handler of Universal Waste
(Mark all boxes that apply)

| | <u>Generate</u> | <u>Accumulate</u> |
|-----------------------------------|--------------------------|--------------------------|
| a. Batteries | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Mercury containing thermostats | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Lamps | <input type="checkbox"/> | <input type="checkbox"/> |

2. Destination Facility for Universal Waste
(Note: A RCRA Permit is required for this activity)

C. Used Oil Activities

1. Off-specification used oil burner Indicate type(s) of combustion devices

- 1. Utility boiler
- 2. Industrial boiler
- 3. Industrial furnace

2. Used oil transporter Indicate type(s) of activity(s)

- a. Transporter
- b. Transfer facility

3. Used oil processor/re-refiner Indicate type(s) of activity(s)

- a. Process
- b. Re-refine

4. Used Oil Fuel Marketer

- a. Directs shipment of used oil to used oil burner
- b. First claims the used oil meets the specifications

11. Description of Hazardous Wastes

A. Waste Codes for Federally Regulated Hazardous Wastes: Identify those codes that best describe your waste. (e.g., D001 – Ignitable, D002 – Corrosive, D003 – Reactive, etc.)

| | | | | | | | |
|--|--|--|--|--|--|--|--|
| | | | | | | | |
| | | | | | | | |

B. Waste Codes for State Regulated (i.e., non-Federal) Hazardous Wastes: Identify those codes that best describe your waste. (e.g., WT02 – Toxic, WP02 – Persistent, WL02 – Labpack, WSC2 – Solid Corrosive, etc.)

| | | | | | | | |
|--|--|--|--|--|--|--|--|
| | | | | | | | |
| | | | | | | | |

12. Comments

| |
|--|
| |
| |
| |
| |

Additional sheets may be attached for comments if needed.

13. Certification

This form cannot be processed without a signature

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

Signature

Date

Name (print or type)

Title

If you have special accommodation needs or require this document in an alternative format, please contact the Hazardous Waste and Toxics Reduction Program at 1-800-833-6388 (TTY) or quick dial 711-833-6388 (TTY).

14. Electronic Submittals

I am interested in the electronic filing of my Dangerous Waste Annual Reporting and Site Identification information to Ecology over the Internet. Ecology will issue a PIN number, along with electronic filing instructions, in a letter addressed to the Form Contact in Section 9 on this form.

Appendix vi

Alaska Regulations

Title XIV – Certain Alaskan Cruise Ship Operations

SEC. 1404. LIMITATIONS ON DISCHARGE OF TREATED SEWAGE OR GRAYWATER.

.....

(c) Until such time as the Administrator promulgates regulations under paragraph (b) of this section, treated sewage and graywater may be discharged from vessels subject to this Title in circumstances otherwise prohibited under paragraphs (a)(1) and (a)(2) of this section, provided that—

- (1) the discharge satisfies the minimum level of effluent quality specified in 40 CFR 133.102, as in effect on the date of enactment of this Section;
- (2) the geometric mean of the samples from the discharge during any 30-day period does not exceed 20 fecal coliform/100 ml and not more than 10% of the samples exceed 40 fecal coliform/100 ml;
- (3) concentrations of total residual chlorine may not exceed 10.0 µg/l; and,
- (4) prior to any such discharge occurring, the owner, operator or master, or other person in charge of a cruise vessel, can demonstrate test results from at least five samples representative of the effluent to be discharged, taken from the vessel on different days over a 30-day period, conducted in accordance with the guidelines promulgated by the Administrator in 40 CFR Part 136, which confirm that the water quality of the effluents proposed for discharge is in compliance with paragraphs (1), (2) and (3) of this subsection. To the extent not otherwise being done by the owner, operator, master or other person in charge of a cruise vessel pursuant to section 1406, the owner, operator, master or other person in charge of a cruise vessel shall demonstrate continued compliance through periodic sampling. Such sampling and test results shall be considered environmental compliance records that must be made available for inspection pursuant to section 1406 (d) of this Title.

Title 40 CFR 133.102 Secondary treatment.

The following paragraphs describe the minimum level of effluent quality attainable by secondary treatment in terms of the parameters—BOD₅, SS and pH. All requirements for each parameter shall be achieved except as provided for in §§ 133.103 and 133.105.

(a) *BOD₅*.

- (1) The 30-day average shall not exceed 30 mg/l.
- (2) The 7-day average shall not exceed 45 mg/l.
- (3) The 30-day average percent removal shall not be less than 85 percent.

(4) At the option of the NPDES permitting authority, in lieu of the parameter BOD5 and the levels of the effluent quality specified in paragraphs (a)(1), (a)(2) and (a)(3), the parameter CBOD5 may be substituted with the following levels of the CBOD5 effluent quality provided:

- (i) The 30-day average shall not exceed 25 mg/l.
- (ii) The 7-day average shall not exceed 40 mg/l.
- (iii) The 30-day average percent removal shall not be less than 85 percent.

(b) *SS*.

- (1) The 30-day average shall not exceed 30 mg/l.
- (2) The 7-day average shall not exceed 45 mg/l.
- (3) The 30-day average percent removal shall not be less than 85 percent.

(c) *pH*. The effluent values for pH shall be maintained within the limits of 6.0 to 9.0 unless the publicly owned treatment works demonstrates that: (1) Inorganic chemicals are not added to the waste stream as part of the treatment process; and (2) contributions from industrial sources do not cause the pH of the effluent to be less than 6.0 or greater than 9.0.

Appendix vii

Hazardous Waste Management

This Appendix is to be used as guidance for hazardous waste discharged in Washington State waters or landed ashore in Washington. The following is a list of Resource Conservation Recovery Act (RCRA) and Washington State Criteria hazardous waste that may be found on cruise ships, and appropriate guidance for its discharge or offloading from the ship.

Terms

Hazardous Waste – Includes all hazardous waste as defined by RCRA and Chapter 173-303 of the Washington Administrative Code (WAC), where Washington State Criteria hazardous waste is defined.

Publicly Owned Treatment Works (POTW) - Ecology's Hazardous Waste Toxics Reduction (HWTR) Program will acknowledge Advanced Wastewater Treatment Systems (AWTS) as a substitute for a POTW. Type 2 Marine Sanitation Devices (MSDs) are not considered a POTW for purposes of this MOU.

WASTE STREAMS

Antifreeze- Excluded as a hazardous waste if recycled. (WAC 173-303-522)

Aqueous Degreasing - If the resulting waste is hazardous it can be treated to remove the hazard and the resulting effluent can be sent to the AWTS or Oily Water Separator. If no treatment is performed it can be landed ashore for proper disposal.

Batteries & Mercury Containing Thermostats - These are universal waste if sent for recycling. (Ecology Publication Number 98-407, Universal Waste Rule for Batteries and Mercury Containing Thermostats)

Spent Lead Acid Batteries - Spent lead-acid batteries are conditionally excluded if recycled. (WAC 173-303-520)

Cathode Ray Tubes (CRTs) - Excluded if recycled, otherwise are to be managed as a hazardous waste. (Ecology Publication Number 02-04-017, Interim Enforcement Policy Conditional Exclusion for Cathode Ray Tubes* and Related Electronic Wastes)

Dry Cleaner – Perchloroethylene (PERC) and other chlorinated dry cleaning fluids, contaminated sludge and filter materials are hazardous waste and must be landed ashore in accordance with RCRA requirements.

Florescent Tubes - Handling procedures for fluorescent tubes do not allow for crushing of the bulbs. (WAC 173-303-573 and Ecology Focus Sheet, Publication # 00-04-020, Universal Waste Rule for Dangerous Waste Lamps)

HVAC - CFC's or HCFC's are excluded as a hazardous waste if recycled. (WAC 173-303-506)

Filters from HVAC units that use Halogenated Organic Compounds (HOC's) as fire retardants would be a State Criteria hazardous waste and must be managed as such.

Mercury Switches - Are a hazardous waste and must be managed as such.

Painting - Discarded Paints & Cleanup Solvents. All spent paints and solvents must be properly designated and if hazardous waste, managed as such.

PCB's - Regulated as a state hazardous waste if they come from transformers, capacitors and bushings if PCB's are from 2ppm to 50ppm. If PCB's are above 50 ppm they must be managed as a TSCA waste. (WAC 173-303-9940)

Pharmaceuticals - Drugs that designate as RCRA waste, but that are not controlled substances must be sent ashore as hazardous waste. If the drug is a RCRA waste and a controlled substance, contact the US Drug Enforcement Agency (DEA) about suitable destruction methods and then manage the residue from destruction as a hazardous waste (disposal to water, regular garbage or incineration would be illegal). If the drug is not a RCRA waste, regardless whether it is a controlled substance or not, it can be incinerated on board or sent ashore for incineration at a facility permitted to incinerate municipal solid waste. (WAC 173-303-071(n))

Photo Waste - Silver can be removed from fixer and the resulting effluent would be allowed to go to an advanced wastewater treatment system (AWTS), but not to graywater or to a Type 2 MSD. If the fluids can not go to the AWTS, they must be landed ashore in accordance with RCRA requirements. (Ecology Publication 94-138R, A Guide For Photo Processors)

Printer Wastes - Inks, solvents and rags, used for cleaning, will need to be properly designated, and if hazardous waste, managed as such.

Spray Cans – Cans that are not empty must be properly designated, and if hazardous waste, managed as such.

Solvent Degreasing - Solvents, when used, must be properly designated, and if hazardous waste, managed as such.

Appendix viii

Regional Director
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Dear Director:

Re: Washington Cruise MOU Compliance Report: XXXX (enter year) Cruise Season

Section 9 of the Memorandum of Understanding for Cruise Operations in Washington State (signed XXX (enter signature date)), requires an annual submittal detailing the compliance with the MOU for the each vessel within the NWCA that calls to a port in Washington for the previous cruise season. Please accept this letter on behalf of XXX (name your cruise line) for the XXXX (enter year) cruise season.

The following ships operated Washington waters during XXXX (enter year):

- Name the ship or ships; list the port of call and the dates.

XXX's operations in Washington State addressed the following key provisions of the MOU as follows:

Section 2.1 Wastewater Management. XXX managed its wastewater in compliance with this section as follows:

[Choose one or more options as appropriate]

- In compliance with Section 2.1.1 and 2.1.2, XXX held all treated and untreated gray and black water while in Washington waters and did not discharge solid waste or oily bilge water if not in compliance with applicable federal and state laws while in Washington waters. List the ships that held their effluent and describe the type of treatment system each ship in this category has. Based on a thorough review of ships' logs and records we certify that our ship(s) complied with these provisions of the MOU. XXX will make these records available to Ecology upon request.
- In compliance with Section 2.1.3, XXX submitted the information required to allow discharge of treated wastewater one mile from berth to Ecology on XX date for the following ship(s): ----- . Describe the type of treatment system each ship in this category has. Approval of the information was received from Ecology on XX date.
- In compliance with Section 2.1.3, XXX submitted information supporting its request to discharge treated wastewater while at berth to Ecology on XX date for the following ship(s) -

----. Describe the type of treatment system each ship in this category has. Approval to discharge while at berth was received from Ecology on XX date.

Section 2.1.4 Discharge of Residual Solids. Based on a review of XXX ships' logs and records, XXX certifies that we complied with the prohibition on discharging residual solids coming from any type of treatment system within 12 nautical miles from shore and while within the Olympic Coast National Marine Sanctuary. XXX will make these records available to Ecology upon request.

Section 2.2.1 through 2.2.4 Hazardous Waste Management. Based on a review of XXX ship's logs and records, XXX certifies that Hazardous Wastes were managed in accordance with these sections of the MOU. XXX will make these records available to Ecology upon request. Add a description of how hazardous waste is managed while in Washington.

Section 6. Marine Mammal Protection Act, Invasive Species Act, and the Washington Ballast Water Management Act. Based on a review of XXX ship's logs and records, XXX certifies that the provisions of the above laws were implemented as required by these laws. XXX will make these records available to Ecology upon request. Add a description of how compliance with these laws was achieved.

Section 9. Immediate self-reporting to Ecology of any incidences of non-compliance with any provisions of the MOU. Describe any incidences of non-compliance and when they were reported to Ecology and any corrective actions taken.

I hereby certify that the above information is true and can be verified through documentation. If you have any questions or concerns, please call me at XXX-XXX-XXXX.

Sincerely,

Name
Position/Title
Company

Appendix ix

2007 Agreement

INTERAGENCY AGREEMENT NO. C007032

BETWEEN

THE STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

AND

PORT OF SEATTLE

THIS AGREEMENT is made and entered into by and between the DEPARTMENT OF ECOLOGY, hereinafter referred to as "Ecology", and the Port of Seattle, hereinafter referred to as the PORT.

IT IS THE PURPOSE OF THIS AGREEMENT to provide the funding for Ecology personnel to further the intent of the *Memorandum of Understanding, Cruise Operations in Washington State* (the "Cruise MOU") which was entered into between the Department of Ecology, the Port of Seattle, and the Northwest Cruiseship Association ("NWCA"). The Port and Ecology acknowledge their intent to amend the Cruise MOU in the near future to specifically authorize these activities. The parties further acknowledge that the Port is acting solely as a pass-through contracting entity to facilitate the collection of funds from the individual NWCA members and to provide payment to Ecology on behalf of the NWCA members.

THEREFORE, IT IS MUTUALLY AGREED THAT:

STATEMENT OF WORK

Ecology shall furnish the necessary personnel, equipment, material and/or service(s) and otherwise do all things necessary for or incidental to the performance of the work set forth in Attachment "A" attached hereto and incorporated herein.

PERIOD OF PERFORMANCE

Subject to its other provisions, the period of performance of this Agreement shall commence on January 1, 2007, and be completed on December 31, 2007, unless terminated sooner as provided herein.

PAYMENT

The parties have determined that the cost of accomplishing the work herein will not exceed \$75,000.00. Payment for satisfactory performance of the work shall not exceed this amount unless the parties mutually agree to a higher amount. Compensation for service(s) shall be based on the following rates or in accordance with the following terms, or as set forth in accordance with the budget in Attachment "B" which is attached hereto and incorporated herein.

Notwithstanding anything to the contrary in this Agreement, the Port's obligation to pay for the work set forth on Attachments A and B is expressly contingent on payment to the Port by NWCA and/or its members for such work.

BILLING PROCEDURE

Ecology shall submit an invoice to the Port for work accomplished during the year by March 1, 2008. Payment to Ecology for approved and completed work will be made by warrant or account transfer by the

Port within 60 days of receipt of the invoice. Upon expiration of the Agreement, any claim for payment not already made shall be submitted within 60 days after the expiration date or the end of the fiscal year, whichever is earlier.

Payment will be mailed to Ecology at the following address:

Dept. of Ecology
Cashiering Section
PO Box 5128
Lacey, WA 98509-5128

360-407-7096 Telephone
360-649-7193
dine461@ecy.wa.gov

RECORDS MAINTENANCE

The parties to this Agreement shall each maintain books, records, documents and other evidence which sufficiently and properly reflect all direct and indirect costs expended by either party in the performance of the service(s) described herein. These records shall be subject to inspection, review or audit by personnel of both parties, other personnel duly authorized by either party, the Office of the State Auditor, and federal officials so authorized by law. All books, records, documents, and other material relevant to this Agreement will be retained for six years after expiration and the Office of the State Auditor, federal auditors, and any persons duly authorized by the parties shall have full access and the right to examine any of these materials during this period.

Records and other documents, in any medium, furnished by one party to this agreement to the other party, will remain the property of the furnishing party, unless otherwise agreed. The receiving party may be required to disclose records and documents, but will not disclose or make available this material to any third parties without first giving notice to the furnishing party and giving it a reasonable opportunity to respond. Each party will utilize reasonable security procedures and protections to assure that records and documents provided by the other party are not erroneously disclosed to third parties.

RIGHTS IN DATA

Unless otherwise provided, data which originates from this Agreement shall be "works for hire" as defined by the U.S. Copyright Act of 1976 and shall be owned by Ecology. Data shall include, but not be limited to, reports, documents, pamphlets, advertisements, books, magazines, surveys, studies, computer programs, films, tapes, and/or sound reproductions. Ownership includes the right to copyright, patent, register, and the ability to transfer these rights.

INDEPENDENT CAPACITY

The employees or agents of each party who are engaged in the performance of this Agreement shall continue to be employees or agents of that party and shall not be considered for any purpose to be employees or agents of the other party.

AGREEMENT ALTERATIONS AND AMENDMENTS

This Agreement may be amended by mutual agreement of the parties. Such amendments shall not be binding unless they are in writing and signed by personnel authorized to bind each of the parties.

TERMINATION

Either party may terminate this Agreement upon 30 days' prior written notification to the other party. If this Agreement is so terminated, the parties shall be liable only for performance rendered or costs incurred in accordance with the terms of this Agreement prior to the effective date of termination.

TERMINATION FOR CAUSE

If for any cause, either party does not fulfill in a timely and proper manner its obligations under this Agreement, or if either party violates any of these terms and conditions, the aggrieved party will give the other party written notice of such failure or violation. The responsible party will be given the opportunity to correct the violation or failure within 15 working days. If failure or violation is not corrected, this Agreement may be terminated immediately by written notice of the aggrieved party to the other.

DISPUTES

In the event that a dispute arises under this Agreement, it shall be determined by a Dispute Board in the following manner: Each party to this Agreement shall appoint one member to the Dispute Board. The members so appointed shall jointly appoint an additional member to the Dispute Board. The Dispute Board shall review the facts, agreement terms and applicable statutes and rules and make a determination of the dispute. The determination of the Dispute Board shall be final and binding on the parties hereto. As an alternative to this process, either of the parties may request intervention by the Governor, as provided by RCW 43.17.330, in which event the Governor's process will control.

GOVERNANCE

This Agreement is entered into pursuant to and under the authority granted by the laws of the state of Washington and any applicable federal laws. The provisions of this Agreement shall be construed to conform to those laws.

In the event of an inconsistency in the terms of this Agreement, or between its terms and any applicable statute or rule, the inconsistency shall be resolved by giving precedence in the following order:

- a. Applicable state and federal statutes and rules;
- b. Statement of work; and
- c. Any other provisions of the agreement, including materials incorporated by reference.

ASSIGNMENT

The work to be provided under this Agreement, and any claim arising thereunder, is not assignable or delegable by either party in whole or in part, without the express prior written consent of the other party, which consent shall not be unreasonably withheld.

WAIVER

A failure by either party to exercise its rights under this Agreement shall not preclude that party from subsequent exercise of such rights and shall not constitute a waiver of any other rights under this Agreement unless stated to be such in a writing signed by an authorized representative of the party and attached to the original Agreement.

SEVERABILITY

If any provision of this Agreement or any provision of any document incorporated by reference shall be held invalid, such invalidity shall not affect the other provisions of this Agreement which can be given effect without the invalid provision, if such remainder conforms to the requirements of applicable law and the fundamental purpose of this agreement, and to this end the provisions of this Agreement are declared to be severable.

ALL WRITINGS CONTAINED HEREIN

This Agreement contains all the terms and conditions agreed upon by the parties. No other understandings, oral or otherwise, regarding the subject matter of this Agreement shall be deemed to exist or to bind any of the parties hereto.

COUNTERPARTS

This Agreement may be executed in counterparts, each of which may have the signature of only one Party, but each of which shall be deemed to be an original, and all of which, when taken together, shall be deemed to be a single Agreement.

CONTRACT MANAGEMENT

The program manager for each of the parties shall be responsible for and shall be the contact person for all communications and billings regarding the performance of this Agreement.

The Contract/Program Manager for Ecology is:

Kevin Fitzpatrick
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452
(425) 649-7033
E-mail: kfit461@ecy.wa.gov

The Contract/Program Manager for Port of Seattle is:

Michael McLaughlin
General Manager, Cruise and Dock Services
Port of Seattle
P.O. Box 1209
Seattle, WA U.S.A. 98111
Phone:(206)728-3453
E-mail: mclaughlin.m@portseattle.org

IN WITNESS WHEREOF, the parties have executed this Agreement.

State of Washington
Department of Ecology



David C. Peeler, Manager Date 10/2/07
Water Quality Program

Port of Seattle

Smith Strout 9/24/07
Date
for Tay Yoshitani,
Chief Executive Officer

APPROVED AS TO FORM:

ATTORNEY GENERAL'S OFFICE

Susan Ridgley, Senior Port Counsel

Susan Ridgley

2007 Agreement

ATTACHMENT A

Department of Ecology/Port of Seattle

Cruise Ship Memorandum of Understanding Scope of Work

The Department of Ecology (Ecology), the Port of Seattle, and the NorthWest CruiseShip Association (NWCA) are signatory to the *Memorandum of Understanding, Cruise Operations in Washington State* (MOU). Originally the MOU was signed April 20, 2004 and thereafter annually amended. The member cruise lines of the NWCA agree to comply with practices, while operating in waters subject to the MOU, pertaining to the management of solid and hazardous wastes and wastewaters. Ecology is charged with protecting and conserving Washington's environmental resources in relation to the cruise industry's environmental practices in Washington. The NWCA has agreed to fund Ecology's costs to implement the MOU and to accomplish the tasks listed herein.

Task 01

Compliance Work:

Work with stakeholders on drafting necessary amendments to cruise MOU. Provide technical assistance for cruise lines and vessel staff. Field questions from the public, press, environmental groups, and cruise lines. Monitor compliance with the MOU. Work with other programs within Ecology on hazardous waste, biosolids, solid waste, spill prevention, and other MOU elements. Work with Ecology policy and fiscal staff on cruise related issues. Research issues related to vessel discharges. Evaluate, draft and update guidance on Whole Effluent Toxicity (WET) testing for cruise ships and evaluate WET testing results. Work with Department of Health Shellfish program on shellfish and virus related studies and issues. Manage and update Ecology's cruise ship website.

Task 02

Inspections:

Conduct annual inspections of cruise vessels to verify the operation of the treatment systems and to evaluate compliance with the MOU. Write up inspection reports and provide recommendations for improvement. Take samples from vessels and evaluate results.

Task 03

Wastewater Discharge Approvals:

Verify documentation submitted for approval of discharges. Evaluate documentation and treatment systems for requirements of MOU to discharge and based on the information submitted and an engineering review, provide approval for discharges as appropriate.

Task 04

Annual Reports:

Draft annual assessment of cruise ship environmental effects report. Evaluate monthly sampling data results and summarize annually.

Task 05

Project Management:

Oversee the cruise ship MOU program and assist as needed. Provides Administrative oversight for compliance with the MOU, represents senior program management in duties related to protection of water quality from cruise ship discharges including negotiations.

Task 06

Additional tasks may become part of this agreement by mutual concurrence of Ecology and the Port of Seattle, or upon extension of the agreement.

**Appendix B
Summary of Sampling Data Received for the 2007 cruise season.**

Note: Only the data for the ships that received approval for discharge are required to submit data per the MOU; and some of the data below is data gathered prior to approval for continuous discharge in Alaska.

highlighted blue = outside of Washington/Alaska voyage waters or discharge approval period

| SHIP: NORWEGIAN PEARL | | | | | | | |
|---|------------------|-------|---------|-------------------|----------------|----------|---|
| | pH | BOD | TSS | Chlorine Residual | Fecal Coliform | Comments | |
| | | | | | | | St. Units |
| 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 | | | | | | |
| 3/2/07 | Unknown/SGS | 7.31 | ND< 2.0 | ND< 6.0 | ND< 0.05 | ND< 2 | MIXED BLACK AND GRAY OVERBOARD |
| 3/11/07 | Unknown/SGS | 7.51 | 3.7 | 5.4 | ND< 0.05 | ND< 1 | MIXED BLACK AND GRAY OVERBOARD |
| 3/16/07 | Unknown/SGS | 6.15 | 7.6 | 17 | ND< 0.05 | ND< 2 | MIXED BLACK AND GRAY OVERBOARD |
| 3/20/07 | Unknown/SGS | 6.2 | 10 | ND< 2.0 | 0.10 | ND< 50 | MIXED BLACK AND GRAY OVERBOARD |
| 3/25/07 | Unknown/SGS | 6.43 | 3.3 | 4.4 | ND< 0.05 | ND< 1 | MIXED BLACK AND GRAY OVERBOARD |
| 4/13/07 | Unknown/SGS | 6.26 | ND< 2.0 | 6.1 | ND< 0.05 | ND< 2.0 | MIXED BLACK AND GRAY OVERBOARD |
| 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 |
| ND = Non Detect; * Detection limit of 50 used. Non detect result. | | | | | | | |
| Unannounced sampling includes other parameters not listed above. | | | | | | | |
| | MINIMUM | 6.15 | ND | ND | ND | ND | met Seattle sampling requirement |
| | AVERAGE | | 8.89 | 10.41 | 0.09 | | |
| | MAXIMUM | 8.00 | 19.40 | 44.00 | 0.10 | * 50 | |
| | GEOMETRIC MEAN | | | | | 2 | |

| SHIP: NORWEGIAN STAR | | | | | | | |
|---|------------------|-------|---------|-------------------|----------------|----------|---|
| | pH | BOD | TSS | Chlorine Residual | Fecal Coliform | Comments | |
| | | | | | | | St. Units |
| 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 | | | | | | |
| 1/9/07 | Unknown/SGS | 6.87 | 8.8 | ND< 10 | 0.15 | ND< 2 | MIXED BLACK AND GRAY OVERBOARD |
| 1/25/07 | Unknown/SGS | 6.58 | ND< 5.0 | ND< 10 | 0.06 | ND< 2 | MIXED BLACK AND GRAY OVERBOARD |
| 2/2/07 | Unknown/SGS | 6.71 | ND< 5.0 | ND< 10 | 0.03 | ND< 2 | MIXED BLACK AND GRAY OVERBOARD |
| 2/18/07 | Unknown/SGS | 6.62 | ND< 5.0 | ND< 10 | 0.05 | ND< 2 | MIXED BLACK AND GRAY OVERBOARD |
| 3/14/07 | Unknown/SGS | 7.00 | 8.7 | ND< 10 | 0.13 | ND< 2 | MIXED BLACK AND GRAY OVERBOARD |
| 3/22/07 | Unknown/SGS | 7.09 | 22.0 | 23 | ** 0.48 | 8 | MIXED BLACK AND GRAY OVERBOARD |
| 4/15/07 | Unknown/SGS | 6.39 | ND< 5.0 | ND< 10 | ND< 0.02 | ND< 20 | MIXED BLACK AND GRAY OVERBOARD |
| 4/23/07 | Unknown/SGS | 6.51 | ND< 5.0 | ND< 10 | ND< 0.02 | 8 | MIXED BLACK AND GRAY OVERBOARD |
| 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 |
| ND = Non Detect; *Detection limit of 20 used. Result is non-detect. ** field result | | | | | | | |
| U = analyte not detected, to the limit of detection | | | | | | | |
| Unannounced sampling includes other parameters not listed above. | | | | | | | |
| | MINIMUM | 6.39 | ND | ND | ND | ND | met Seattle sampling requirement |
| | AVERAGE | | 8.63 | 7.67 | 0.11 | | |
| | MAXIMUM | 7.34 | 22.00 | 23.00 | 0.48 | * 20 | |
| | GEOMETRIC MEAN | | | | | 3 | |

| SHIP: NORWEGIAN SUN | | | | | | | |
|--|------------------|-----------|---------|-------------------|----------------|----------|--|
| | 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 | | | | | | |
| 4/13/07 | Unknown/SGS | 6.64 | 10.0 | 1 | 0.10 | ND< 2 | MIXED BLACK AND GRAY OVERBOARD |
| 4/17/07 | Unknown/SGS | 6.53 | ND< 2.0 | 1 | 0.10 | ND< 2 | MIXED BLACK AND GRAY OVERBOARD |
| 8/8/07 | Juneau/Analytica | 7.13 | 11.3 | < 4 | ND< 0.10 | < 2 | MIXED BLACK AND GRAY OVERBOARD |
| 8/15/07 | Juneau/Analytica | 7.52 | 7.28 | < 4 | ND< 0.10 | < 2 | MIXED BLACK AND GRAY OVERBOARD |
| 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 |
| ND = Non Detect | | | | | | | |
| Unannounced sampling includes other parameters not listed above. | | | | | | | |
| | MINIMUM | 6.53 | ND | ND | ND | ND | Seattle testing compliance (did not call in Seattle) |
| | AVERAGE | | 6.92 | 3 | 0.10 | | |
| | MAXIMUM | 7.52 | 11.30 | 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 | | | | | | |
| 4/22/07 | San Francisco/CERCO | 6.9 | 7 | ND< 2 | ND< 0.10 | < 2 | MIXED BLACK AND GRAY OVERBOARD |
| 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 |
| ND = Non Detect | | | | | | | |
| U = analyte not detected, to the limit of detection | | | | | | | |
| Unannounced sampling includes other parameters not listed above. | | | | | | | |
| | MINIMUM | 6.25 | ND | ND | ND | ND | met Seattle sampling requirement |
| | AVERAGE | | 11.93 | 4.86 | 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 | | | | | | |
| 4/19/07 | Port Everglades/Kappa | 7.18 | 1.3 | ND< 3 | ND< 0.10 | ND< 2 | MIXED BLACK AND GRAY OVERBOARD |
| 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 |
| ND = Non Detect; * a detection limit of 60 mg/l was used as a result of dilutions used during the test. | | | | | | | |
| U = analyte not detected, to the limit of detection | | | | | | | |
| Unannounced sampling includes other parameters not listed above. | | | | | | | |
| | MINIMUM | 7.18 | ND | ND | ND | ND | met Seattle sampling requirement |
| | AVERAGE | | 16.24 | 4.9 | 0.10 | | |
| | MAXIMUM | 8.00 | 110.00 | 24.0 | 0.12 | 80 | |
| | GEOMETRIC MEAN | | | | | 3 | |

| 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 | | | | | | |
| 7/8/07 | Seattle/Laucks | 7.4 | 16 | ND< 2 | ND< 0.10 | 2.0 | MIXED BLACK AND GRAY OVERBOARD |
| 7/18/07 | Juneau/Analytica | 7.68 | ND< 2 | ND< 4 | ND< 0.10 | < 2 | MIXED BLACK AND GRAY OVERBOARD |
| 8/5/07 | Seattle/Laucks | 7.1 | 23 | ND< 2 | ND< 0.10 | < 2 | MIXED BLACK AND GRAY OVERBOARD |
| 8/8/07 | Juneau/Analytica | 7.74 | 2.21 | 2 | ND< 0.10 | ND< 2 | MIXED BLACK AND GRAY unannounced sampling |
| 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 |
| ND = Non Detect | | | | | | | |
| U = analyte not detected, to the limit of detection | | | | | | | |
| Unannounced sampling includes other parameters not listed above. | | | | | | | |
| | MINIMUM | 6.80 | ND | ND | ND | ND | met Seattle sampling requirement |
| | AVERAGE | | 16.30 | 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

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

¹ MOU/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

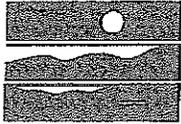
Fecal Coliform: geometric mean of any 30-day period shall not exceed 20 fecal coliform/100 ml and not more than 10% of the samples exceed 40 fecal coliform/100 ml

² Washington 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)



State of Washington Department of Ecology
**Verification of Operating Conditions
 of Advanced Wastewater Treatment
 Systems for Cruise Ship Discharges**

Northwest Regional Office
 3190 160th Ave SE
 Bellevue, WA 98008
 Phone: (425) 649-7000 Fax: (425) 649-7098

Section A: General Information

| | | | |
|----------------------|--|-----------------------------|----------------------------------|
| Vessel Name: | GOLDEN PRINCESS | Date: | July 14, 2007 |
| Vessel Operator: | Princess Cruises | Entry Time: | 9:01 AM |
| IMO Number: | 9192351 | Exit Time: | 11:24 AM |
| Vessel Type: | Passenger Ship | Notification (name & date): | Dwight Hutchinson; July 10, 2007 |
| Location: | Pier 30, Seattle | | |
| On-board contact(s): | Yulian Varbanov, Environmental Officer | | |
| Inspector(s): | Amy Jankowiak, Department of Ecology | | |
| # passengers/crew: | ~3000/~1060 capacity | Amount of Wastewater: | ~320 tons/day |

Description of advanced wastewater treatment system (name, type, major components, etc.):
 Hamworthy is a biological reactor and ultrafiltration system. The system includes screening via a screen press, biological treatment via bio-reactors with inter-stage fillers and a membrane system, and ultraviolet light disinfection. Approval for continuous discharge from Ecology was granted on May 3, 2007, although the vessel chooses not to discharge at <4nm in Washington waters at this time.

Section B: Areas Evaluated

| | | | | | | | |
|-------------------------------------|------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|--------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | Black/Gray wastewater system | <input checked="" type="checkbox"/> | Operations Center/Computer system | <input checked="" type="checkbox"/> | Records/Reports | <input checked="" type="checkbox"/> | Sampling/Monitoring |
| <input checked="" type="checkbox"/> | Discharge locations | <input checked="" type="checkbox"/> | Operations & Maintenance | <input checked="" type="checkbox"/> | Sludge Handling/Disposal | <input checked="" type="checkbox"/> | Other |

Section C: For vessels discharging ≥ 1nm from berth and ≥ 6 knots only

| | | |
|--------------------------|---|----------------|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | Not Applicable |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | Not Applicable |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance) in place | Not Applicable |

Section D: For vessels discharging continuously (at berth or within 1 nm of berth)

| | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | Schematics match black/gray wastewater system | System appears to be as depicted in schematics |
| <input checked="" type="checkbox"/> | Sludge disposal protocol per MOU | All screen press material is incinerated and all other sludge from the Hamworthy system are discharged at >12nm. |
| <input checked="" type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance and for system shut down) in place | Notification procedures include notifying the office, who in turn notifies Ecology and also reporting it to the captain, who also notifies local authorities. The environmental officer was unable to locate a copy of the MOU on the vessel. Ecology provided the environmental officer with an electronic copy. |
| <input checked="" type="checkbox"/> | Operations as described in submitted documentation | Operations appeared to be as described in submitted documentation |
| <input checked="" type="checkbox"/> | Daily 24-hour continuous turbidity or equivalent monitoring | Continuous turbidity monitoring. There are turbidity meters on each of the three MBR permeate tanks. A value of 25 NTU or greater triggers shut down (also alarmed at 20 NTU). |
| <input checked="" type="checkbox"/> | Turbidimeter or equivalent monitoring equipment functioning properly | Appears to be functioning properly |
| | <u>Turbidity or equivalent</u> : Yes Last calibration: Not discussed Frequency of readings: continuous Trigger level for alarm: 20 NTU Trigger level for shutdown: 25 NTU Recorded turbidity/equivalent levels above triggers: None, typical results are 4 NTU or less | |
| <input checked="" type="checkbox"/> | Auto shut down or operational controls to insure system shut down if a system upset occurs | Yes. There are turbidity meters on each of the three MBR permeate tanks. A value of 25 NTU or greater triggers shut down (also alarmed at 20 NTU). |

| | | |
|-------------------------------------|--|--|
| <input checked="" type="checkbox"/> | Ultraviolet (UV) light disinfection immediately prior to discharge | Yes |
| <input checked="" type="checkbox"/> | UV replacement bulbs available | Yes. |
| <input checked="" type="checkbox"/> | UV/bulbs cleaned regularly | Staff was unsure of any needs for hand wipe cleaning |

Section E: General

| | | |
|--|--|--|
| <input checked="" type="checkbox"/> | Sampling conducted 2/month, 1/month in Seattle (BOD, TSS, fecal coliform, pH, chlorine residual) | As of the date of the inspections, sampling has been conducted as required |
| <input checked="" type="checkbox"/> | Whole Effluent Toxicity Testing 1 per 2 years | Not required yet, in first season of approval |
| <input checked="" type="checkbox"/> | Training up to date for system operators | Not discussed in detail |
| <input checked="" type="checkbox"/> | Discharge records maintained | Maintained properly |
| <input checked="" type="checkbox"/> | Alarms functioning properly | Alarms appear to be functioning properly. |
| Alarms Shutdowns: Yes High turbidity/TSS warnings: Yes High wastewater levels: Yes UV disinfection (intensity, bulbs, bank out, power failure): Yes | | |

Section F: Sample Results

| Parameter | Effluent Result |
|---------------------------------------|---------------------|
| Biochemical Oxygen Demand 5-Day (BOD) | 6.60 mg/l |
| Total Suspended Solids (TSS) | 13 mg/l |
| Fecal Coliform, MF | 1140 CFU/100 ml |
| Residual Chlorine | <0.1 mg/l |
| Ammonia, Nitrogen | 21 mg/l |
| pH | 6.61 standard units |

Section G: Summary of Findings/Comments

Introduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program (NWRO-WQ), conducted the inspection of the GOLDEN PRINCESS (photos #01 and #02) on July 14, 2007. The main contacts on board the GOLDEN PRINCESS included Yulian Varbanov, Environmental Officer, and the engineers for the MBR system. Prior notification of the visit was given on July 10, 2007 for security protocol. The purpose of the inspection was to evaluate compliance with the *Memorandum of Understanding Cruise Operations in Washington State*, as amended. The GOLDEN PRINCESS received approval to discharge continuously on May 3, 2007.

The GOLDEN PRINCESS's current advanced wastewater treatment system (AWTS), Hamworthy Membrane Bioreactor system (MBR), was installed on the vessel in 2007 and began operation in March/April 2007. The GOLDEN PRINCESS has been in operation for six years, with 2007 being the first season to call to port in Seattle. There are typically about 3000 passengers and about 1060 crew.

Inspection

I arrived boarded the ship at 9:01 am and began with introductions and a plan for the day. I met with Mr Yulian Varbanov, the Environmental Officer, and discussed some general information about the vessel, as well as some particulars about various waste streams. Mr Varbanov has been on the GOLDEN PRINCESS for about one month, and has been with Princess Cruises for about one year. The Environmental Officers receive both the Environmental Awareness training and the Advanced Environmental Awareness Training, as well as Tier I, II, and III training. The engineers that work with specific equipment receive training on that equipment, and watch engineers are trained on all equipment. The Hamworthy system is operated by one engineer, a chief plumber and one or two other plumbers. All crew on board the vessel receive the Environmental Awareness Training which among other things, addresses keeping chemicals like bleach out of the toilets, and the proper disposal of medications. Mr. Varbanov was unable to locate a copy of the MOU on board the vessel at the time of the inspection. Ecology provided the environmental officer with an electronic copy. Notification procedures include notifying the office, who in turn notifies Ecology and also reporting it to the Captain, who also notifies local authorities.

Food waste from the vessel is collected in the galley, and goes through a pulper. The water extracted from the pulper is recycled through the pulper. The food material then goes to the food press and then into a holding tank. The food waste is then discharged at greater than 12 nautical miles from shore per discharge protocol. The protocol includes a notification from the bridge to the engine control room. An e-mail warning is first sent that an area of approved discharge is

approaching. A second e-mail is sent prior to exiting the approved discharge area. Wastewater from the Hamworthy MBR system is discharged per protocol at greater than four nautical miles, even though the vessel is approved for continuous discharge. Pool water is collected along with graywater (except for accommodation graywater which is combined with blackwater and treated with the Hamworthy MBR system), and discharged at greater than 12 nautical miles from shore. Drinking water is either brought onto the vessel during bunkering as potable water, or water is generated by an evaporator (desalinization) system taking salt water, and desalinating. The water is then filtered, chlorinated, adjusted for pH, and mineralized. The filtered residuals are sent to the bilge tank. Bilge water is discharged post oily water separator at less than 15 ppm. Laundry water does not go through the MBR system, and is discharged as graywater at greater than 12 nautical miles from shore. Sludge from the MBR system is collected and discharged at greater than 12 nautical miles from shore, and outside of the Olympic Coast National Marine Sanctuary. Screenings from the MBR screen press are collected and incinerated.

We then headed to the control room to discuss the operation of the Hamworthy system and to review records. Discharge records were reviewed and are well kept. The records include dates, times, discharge locations, port locations, effluent type, volumes, speed, signatures and remarks. Since the vessel began discharging in May of 2007, there have been only a few occasions of discharge in Washington waters. The locations of the discharges from the MBR system appear to be at greater than four nautical miles from shore while coming into Seattle and also while leaving Seattle. The vessel is approved to discharge continuously, however, the line chooses to discharge only at greater than four nautical miles. All discharges of sludge or graywater appeared to be outside of the MOU waters. The e-mail notifications to the engine control room were also reviewed for a couple of the MOU water discharges.

We then headed down for a tour of the Hamworthy system. The Hamworthy system consists of three separate MBR's which combine at the UV Permeate tank prior to disinfection and discharge. Two MBR's would be sufficient for the quantity of wastewater entering the system; however, the vessel operates all three unless conducting maintenance. Blackwater and accommodation graywater is collected by an Air-Vac System (vacuum) and sent to the blackwater collection tank (photo #03). From there, the wastewater is mixed and piped (photo #04) to the screen press (photo #05). The solids are screened into bags (photo #06). The screened solids are then sent to the incinerator (photo #17). The liquid moves to the 1st stage (photo #07) of the membrane bioreactor where aeration occurs. From the 1st stage, flow moves to the inter-stage filters (photo #08). The inter-stage filters are about 2 microns and the filtered solids are returned back to the 1st stage. The liquid moves onto the 2nd stage (photo #09) of the MBR for further aeration. From the 2nd stage MBR, flow is sent to the membrane modules (photos #10 and #11) for ultrafiltration. Solids from the filters are sent back to the 2nd stage MBR. Effluent from the membrane modules are sent to a permeate tank (photo #12) where turbidity is monitored. Flow then combines with the other two MBR's at the UV Permeate tank (photo #15). From the UV Permeate tank, effluent moves through the ultraviolet disinfection system (photo #14). Disinfected effluent either goes directly overboard or to a holding tank if not in an approved area for discharge. The MBR discharge port is padlocked unless approved to discharge and discharging.

Turbidity is measured continuously on each of the MBR permeate tanks. Staff has not seen readings of greater than 4 NTU since the system began operation. The meters are alarmed at 20 NTU with shut down at a 25 NTU maximum. The membranes are cleaned by backwashing about once a week and is triggered by the pressure values. Cleaning and maintenance of the new MBR system has been challenging and time consuming. Staff has been working with the vendors on any needed replacement parts and challenges. Staff was unsure of the cleaning requirements for the UV disinfection system. It is recommended that staff review the manufacturer recommendation on cleaning the UV system, as most systems require periodic hand wiping of the bulbs to prevent scaling and maintaining clarity of the bulbs.

The staff has been trained by Admiralty Environmental, LLC on process control and compliance sampling. The staff have a small laboratory on board where they sample for such parameters as coliform, pH, COD, and other tests (photo #15). The on-board sampling allows for immediate results and a chance for immediate corrections to the system.

Next we looked at some of the areas of potential waste streams including food waste and photo waste. Food waste from the vessel is collected in the galley, and goes through a pulper. The water extracted from the pulper is recycled back through the pulper. The food material then goes to the food press (photo #16) and then into a holding tank. The food waste is then discharged at greater than 12 nautical miles from shore per discharge protocol. Photo waste is collected in 2 separate pails, one of which has the silver waste. Both pails are sent to the waste disposal area and both pails are tested for silver. The waste material is incinerated at <5 ppm. A log is kept at both the photo room and the waste disposal area.

Samples were taken for Biochemical Oxygen Demand (BOD 5-Day), Total Suspended Solids (TSS), pH, chlorine residual, fecal coliform and ammonia from the effluent of the UV disinfection prior to going to the holding tank. The sample port (photo #18) was cleaned prior to pulling samples. The samples were put on ice immediately and were transported to AmTest laboratory in Redmond, Washington that morning. Chain of Custody and sampling procedures were followed. All results are in Section F. The results are typical of the results submitted to Ecology thus far for 2007 with the exception of fecal coliform. The highest fecal coliform reported for 2007 has been 200 cts/100ml, and all other results were 6 or less. There could be a number of reasons for the occasional higher fecal coliform levels including, but not limited to, ultraviolet light disinfection.

system bulb failures, scaling on the UV lights, membrane filter problems, or sample contamination.

Conclusions and Recommendations

The laboratory testing on-board is an excellent way to monitor and make needed adjustments to the system. Having a laboratory on-board for the testing is ideal

Mr. Varbanov and the staff operating and maintaining the Hamworthy system were very knowledgeable of the system as well as the other environmental impacts of the vessel

It is requested that staff look into possible reasons for the occasional higher fecal coliform counts and report to Ecology the findings. It is also requested that staff report to Ecology the on-board coliform results for samples taken between July 11 – July 18 and the turbidity results for each of the MBR's during the same time period. Please submit the above information by August 24, 2007.

It is recommended that the manufacturer recommendations for cleaning the UV disinfection system be reviewed and any needed changes be implemented.

Attachments:

- Photographs
- Sampling Results Report

Copies to:

- Andrew Lorenzana, Princess Cruises
- Yulian Varbanov, Environmental Officer
- Amy Jankowiak, Ecology
- Kevin Fitzpatrick, Ecology
- Central Files: Princess Cruises; GOLDEN PRINCESS; WQ 6 1

Section H: Signatures

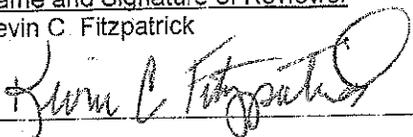
| <u>Name and Signature of Inspector</u> | <u>Agency/Office/Telephone</u> | <u>Date</u> |
|---|---|-------------|
| Amy Jankowiak  | Department of Ecology/Northwest Regional Office/Water Quality Program/Municipal Compliance Specialist/(425) 649-7195 | 8/7/07 |
| <u>Name and Signature of Reviewer</u> | <u>Agency/Office/Telephone</u> | <u>Date</u> |
| Kevin C. Fitzpatrick  | Department of Ecology/Northwest Regional Office/Water Quality Section Manager/(425) 649-7033 | 8/7/07 |



PHOTO #01 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No :P7140003
DESCRIPTION: GOLDEN PRINCESS VESSEL



PHOTO #02 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No :P7140002
DESCRIPTION: GOLDEN PRINCESS VESSEL

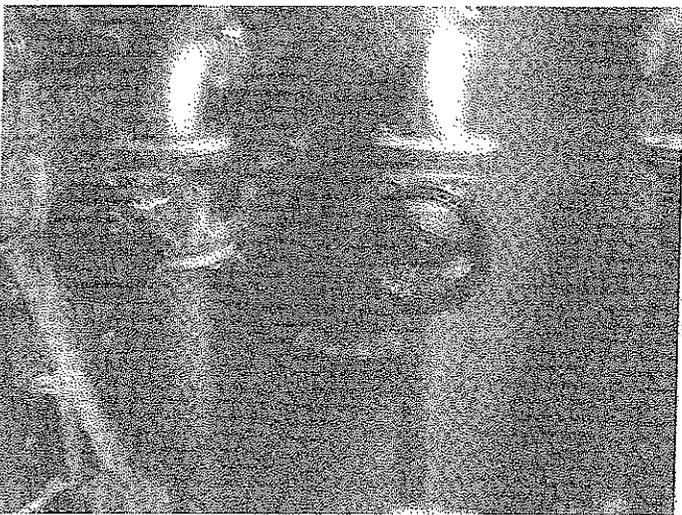


PHOTO #03 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No :P7140005
DESCRIPTION: BLACK WATER COLLECTION TANK



PHOTO #04 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No :P7140004
DESCRIPTION: PIPING FROM BLACK WATER COLLECTION TANK
TO SCREEN PRESS

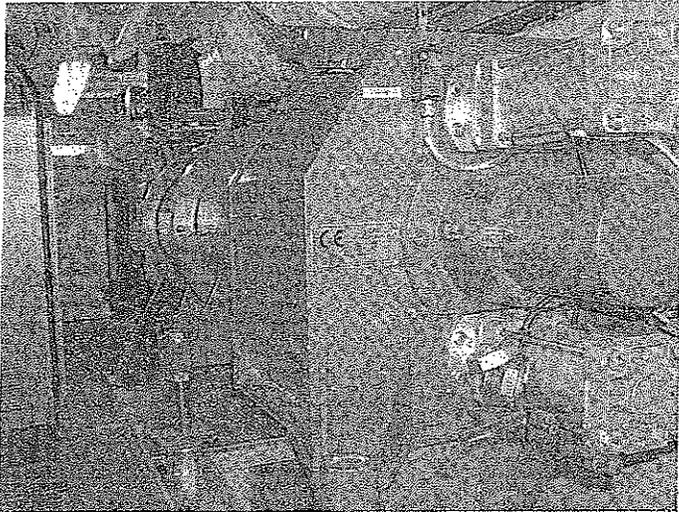


PHOTO #05 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140008
DESCRIPTION: SCREEN PRESS

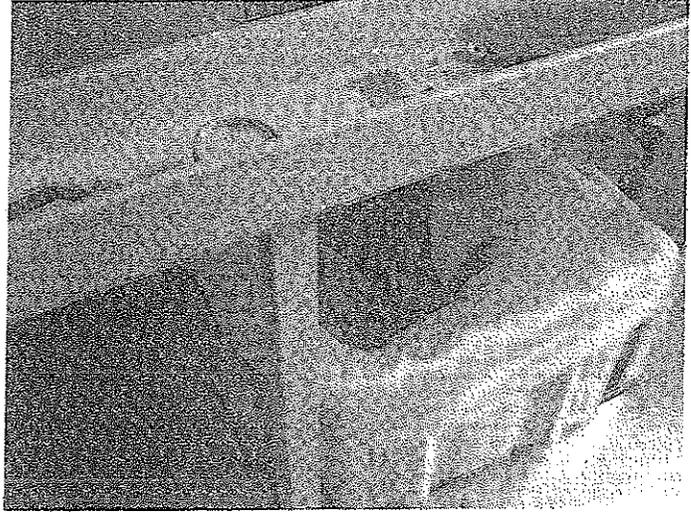


PHOTO #06 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140006
DESCRIPTION: SCREEN PRESS SOLIDS COLLECTION

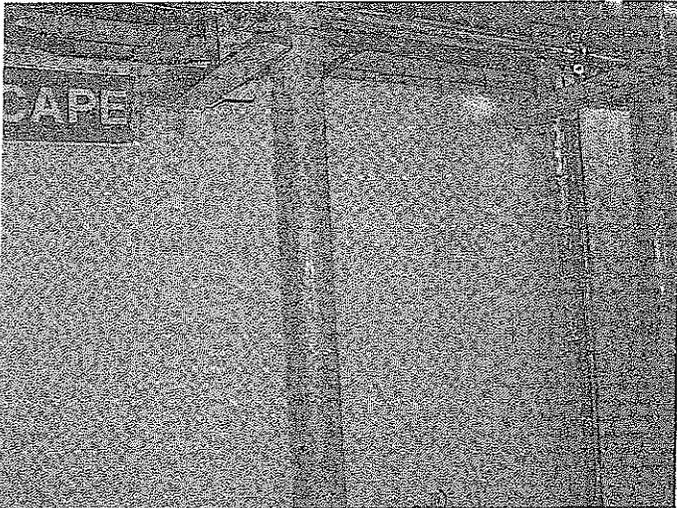


PHOTO #07 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140009
DESCRIPTION: 1ST STAGE TANK

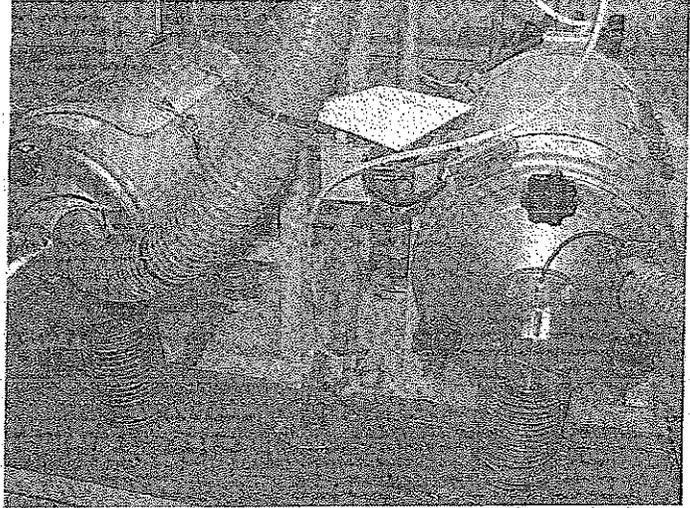


PHOTO #08 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140010
DESCRIPTION: INTERSTAGE FILTERS

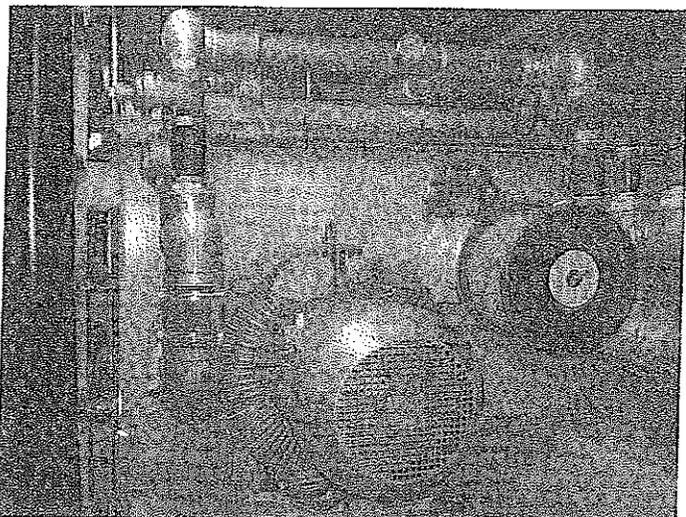


PHOTO #:09 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140011
DESCRIPTION: 2ND STAGE TANK



PHOTO #:10 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140012
DESCRIPTION: MEMBRANE FILTERS (TUBES), PRINCESS CRUISES
STAFF (ENVIRONMENTAL OFFICER, AND MBR ENGINEER)

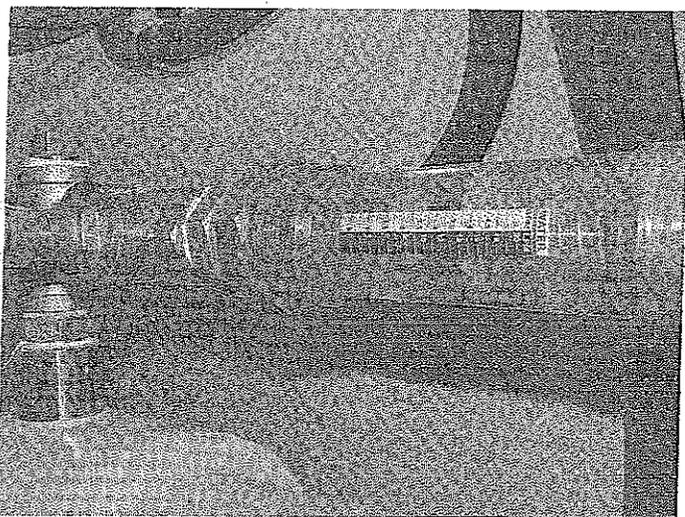


PHOTO #:11 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140013
DESCRIPTION: MEMBRANE FILTER VIEWER (1 ON EACH FILTER)

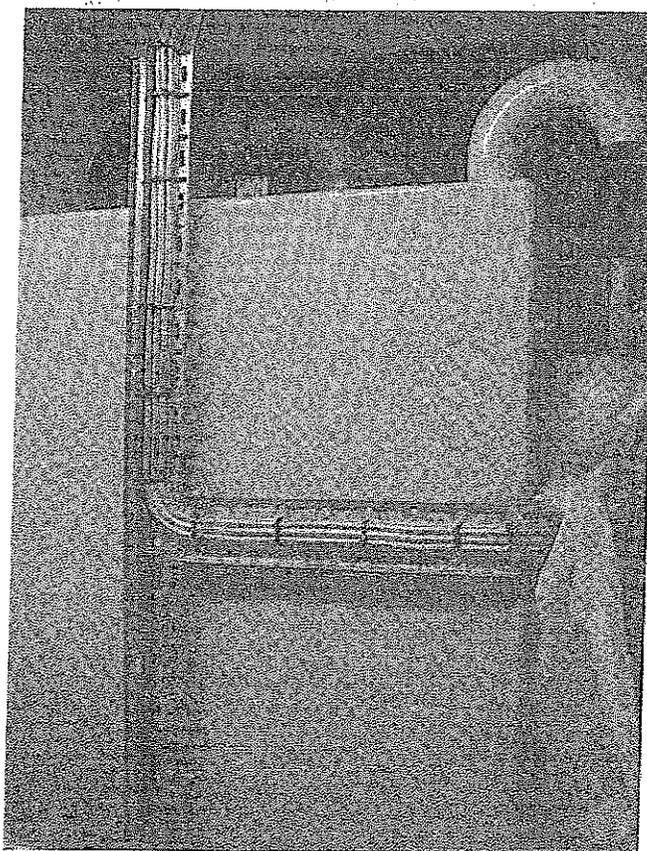


PHOTO #:12 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140014
DESCRIPTION: PERMEATE TANK



PHOTO #:13 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140015
DESCRIPTION: UV PERMEATE TANK

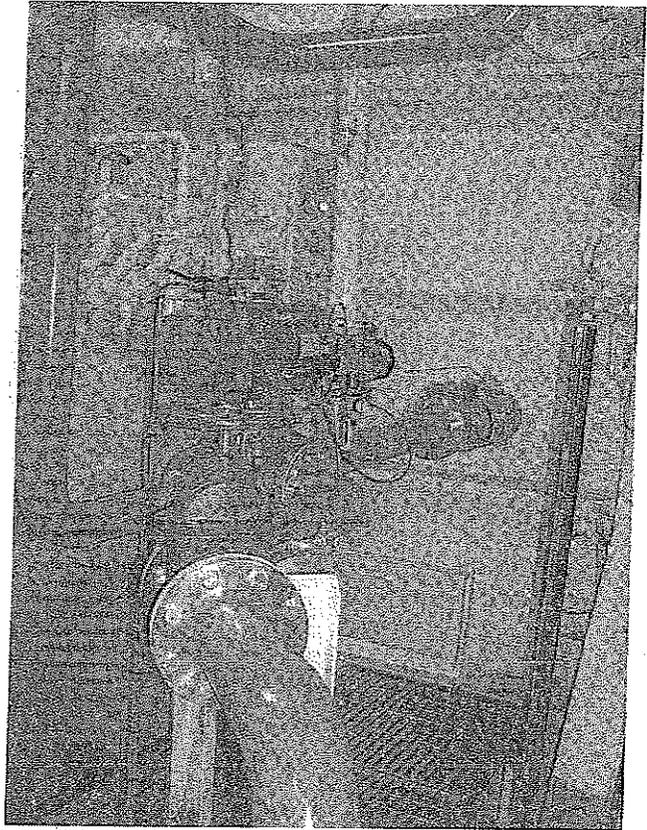


PHOTO #:14 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140016
DESCRIPTION: ULTRAVIOLET (UV) DISINFECTION SYSTEM

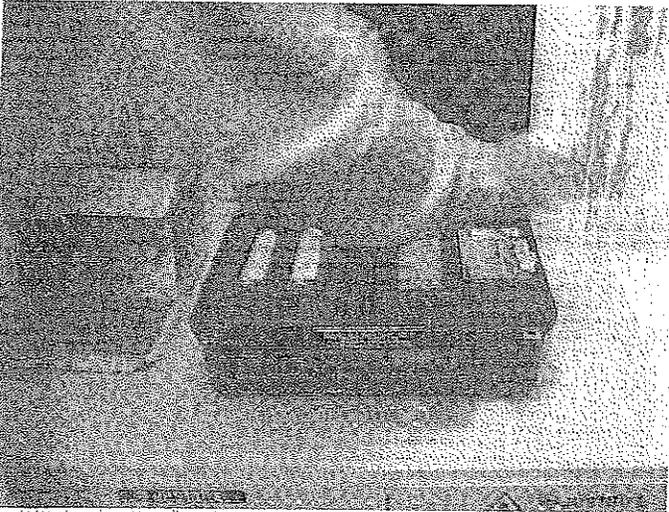


PHOTO #:15 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140017
DESCRIPTION: ON-BOARD LABORATORY TEST KIT

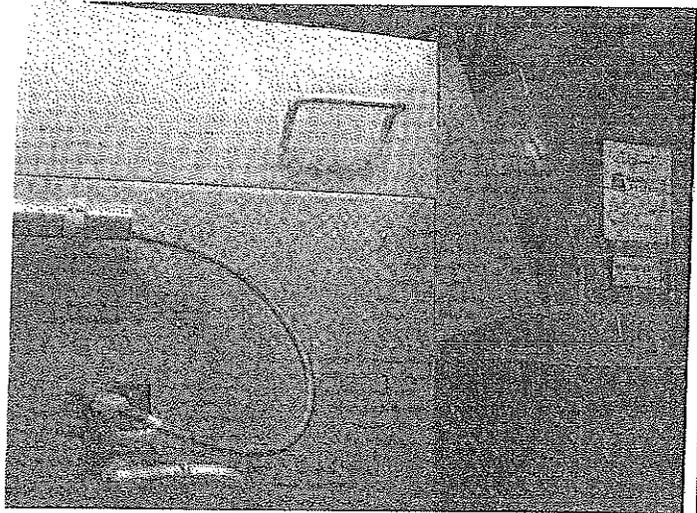


PHOTO #:16 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P7140018
DESCRIPTION: FOOD WASTE PRESS



PHOTO #:17 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No :P7140019
DESCRIPTION: INCINERATOR

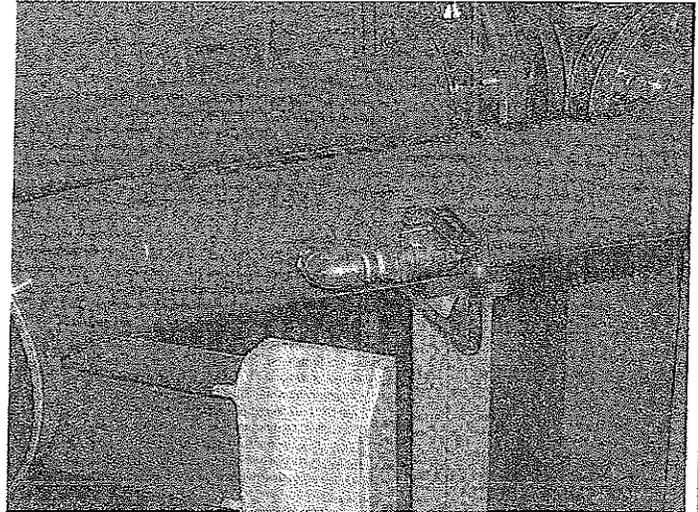


PHOTO #:18 DATE: 07/14/07 TAKEN BY: AMY JANKOWIAK
FILE No :P7140021
DESCRIPTION: FINAL EFFLUENT SAMPLING POINT (AT UV
DISINFECTION

[Faint, illegible text, possibly bleed-through from the reverse side of the page]



Am Test Inc.
14603 N E. 87th St.
Redmond, WA 98052
(425) 885-1664

Professional
Analytical
Services

RECEIVED

JUL 25 2007

DEPT OF ECOLOGY

Jul 23 2007
Department of Ecology
3190 160th Ave SE
Bellevue, WA 98008
Attention: Amy Jonkawiak

Dear Amy Jonkawiak:

Enclosed please find the analytical data for your Golden Princess project.

The following is a cross correlation of client and laboratory identifications for your convenience.

| CLIENT ID | MATRIX | AMTEST ID | TEST |
|------------|--------|------------|-----------------------|
| Golden Eff | Water | 07-A009018 | Micro, CONV, DEM, NUT |

Your sample was received on Monday, July 16, 2007. At the time of receipt, the sample was logged in and properly maintained prior to the subsequent analysis

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,

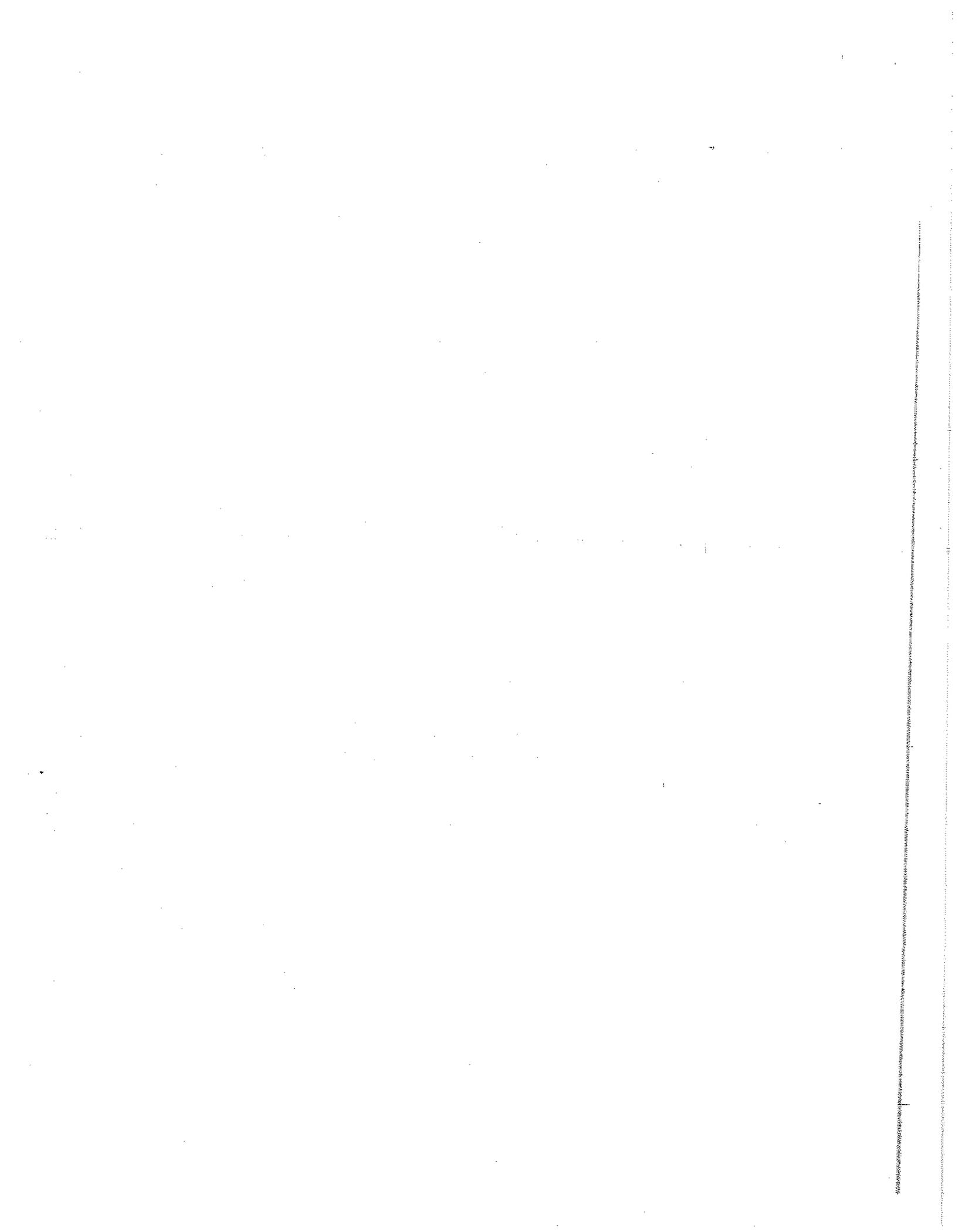
Kathy Fugiel
President

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals



Am Test Inc.
 14603 N E. 87th St.
 Redmond, WA 98052
 (425) 885-1664
 www.amtestlab.com



Professional
 Analytical
 Services

ANALYSIS REPORT

Department of Ecology
 3190 160th Ave SE
 Bellevue, WA 98008
 Attention: Amy Jankowiak
 Project Name: Golden Princess

Date Received: 07/14/07
 Date Reported: 7/24/07

AMTEST Identification Number 07-A009018
 Client Identification Golden Eff
 Sampling Date 07/14/07, 11:15
 All results reported on an as received basis.

Microbiological

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|-----------------|--------|------------|---|------|----------|---------|----------------|
| Fecal Coliforms | 1140 | CFU/100 ml | | 1. | SM 9222D | KF | 07/14/07 12:30 |

Conventionals

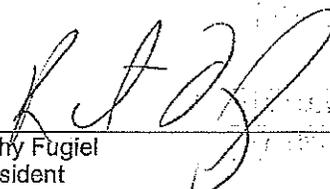
| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|------------------------|--------|-------|---|------|-----------|-----------|----------|
| pH | 6.61 | unit | | | EPA 150.1 | L:KF Rspc | 07/14/07 |
| Chlorine Residual | < 0.1 | mg/l | | 0.10 | EPA 330.5 | KF | 07/14/07 |
| Total Suspended Solids | 13. | mg/l | | 10 | EPA 160.2 | JR | 07/17/07 |

Demand

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|-----------|--------|-------|---|------|---------|---------|----------|
| BOD-low | 6.60 | mg/l | | 2.00 | SM 5210 | MRW | 07/14/07 |

Nutrients

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|------------------|--------|-------|---|-------|-----------|---------|----------|
| Ammonia Nitrogen | 21. | mg/l | | 0.005 | EPA 350.1 | TS | 07/18/07 |


 Kathy Fugiel
 President

AMTEST

L A B O R A T O R I E S

QC Summary for sample number: 07-A009018

DUPLICATES

| SAMPLE # | ANALYTE | UNITS | SAMPLE VALUE | DUPLICATE VALUE | RPD |
|------------|------------------------|-------|--------------|-----------------|-----|
| 07-A009018 | Chlorine Residual | mg/l | < 0.1 | < 0.1 | |
| 07-A008801 | Ammonia Nitrogen | mg/l | < 0.005 | < 0.005 | |
| 07-A008821 | Ammonia Nitrogen | mg/l | 0.020 | 0.023 | 14. |
| 07-A008919 | Ammonia Nitrogen | mg/l | 0.009 | < 0.005 | |
| 07-A008737 | Total Suspended Solids | mg/l | 45 | 44. | 2.2 |
| 07-A008875 | Total Suspended Solids | mg/l | 12 | 8.0 | 40. |

MATRIX SPIKES

| SAMPLE # | ANALYTE | UNITS | SAMPLE VALUE | SMPL+ SPK | SPK AMT | RECOVERY |
|------------|------------------|-------|--------------|-----------|---------|----------|
| 07-A008819 | Ammonia Nitrogen | mg/l | 0.040 | 0.26 | 0.25 | 88.00 % |
| 07-A008917 | Ammonia Nitrogen | mg/l | 0.12 | 0.38 | 0.25 | 104.00 % |

STANDARD REFERENCE MATERIALS

| ANALYTE | UNITS | TRUE VALUE | MEASURED VALUE | RECOVERY |
|------------------------|-------|------------|----------------|----------|
| pH | unit | 7.40 | 7.50 | 101. % |
| BOD | mg/l | 200 | 180 | 90.0 % |
| Chlorine Residual | mg/l | 0.25 | 0.28 | 112. % |
| Ammonia Nitrogen | mg/l | 0.89 | 0.88 | 98.9 % |
| Ammonia Nitrogen | mg/l | 4.0 | 4.1 | 102. % |
| Total Suspended Solids | mg/l | 100 | 83. | 83.0 % |
| Total Suspended Solids | mg/l | 100 | 93. | 93.0 % |

BLANKS

| ANALYTE | UNITS | RESULT |
|------------------------|-------|---------|
| BOD | mg/l | < 10 |
| Chlorine Residual | mg/l | < 0.1 |
| Ammonia Nitrogen | mg/l | < 0.005 |
| Ammonia Nitrogen | mg/l | < 0.005 |
| Total Suspended Solids | mg/l | < 1 |
| Total Suspended Solids | mg/l | 1.0 |

www.ck12.com

AmTest Chain of Custody Record

14603 NE 87th St. Redmond, WA 98052
Ph (425) 885-1664 Fx (425) 883-3495
www.amtestlab.com

Chain of Custody No. **1417**

| | |
|--|--|
| Client Name & Address: Department of Ecology 3190 North Ave SE Bellevue WA 98008 | Invoice To: Amy Jankowat Department of Ecology 3190 North Ave SE Bellevue WA 98008 |
| Contact Person: <u>Amy Jankowat</u> | Invoice Contact: <u>Amy Jankowat</u> |
| Phone No: <u>425-649-7195</u> | PO Number: |
| Fax No: <u>425-649-7098</u> | Invoice Ph/Fax: <u>425-649-7195</u> |
| E-mail: <u>ajankowat@ecy.wa.gov</u> | Invoice E-mail: <u>ajankowat@ecy.wa.gov</u> |
| Report Delivery: (Choose all that apply) <input checked="" type="checkbox"/> Mail / <input type="checkbox"/> Fax / <input checked="" type="checkbox"/> Email / <input type="checkbox"/> Posted Online | Data posted to online account: YES / NO |
| | Web Login ID: |

Special Instructions:

Requested TAT: (Rush must be pre-approved by lab)
 Standard RUSH (5 Day / 3 Day / 48 HR / 24 HR)

RUSH Request Approved By:

| Project Name: <u>GOLDEN PRINCESS</u> | | Date Sampled | Time Sampled | Matrix | No. of containers | Analysis Requested | | | | | | | | |
|---|-------------|----------------|--------------|--------|-------------------|----------------------------------|------------|----------|----------------|----------|-------------------|---------|--|--|
| Project Number: | AmTest ID | | | | | Client ID (35 characters max) | BOD(5-Day) | TSS | fecal coliform | pH | Residual Chlorine | Ammonia | | |
| | <u>9016</u> | <u>7/14/07</u> | <u>15</u> | | <u>3</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | <u>1</u> | | | | |
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| | | | | | |
|---|------------------------|----------------------|------------------------------------|------------------------|----------------------|
| Collected/Relinquished By: <u>Amy Jankowat</u> | Date <u>7/14/07</u> | Time <u>12:18</u> | Received By: <u>[Signature]</u> | Date <u>7/14/07</u> | Time <u>12:18</u> |
| Relinquished By: | Date | Time | Received By: | Date | Time |
| Relinquished By: | Date | Time | Received By: <u>[Signature]</u> | Date <u>7/14/07</u> | Time <u>12:18</u> |

COMMENTS:

10

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State of Washington Department of Ecology
**Verification of Operating Conditions
 of Advanced Wastewater Treatment
 Systems for Cruise Ship Discharges**

Northwest Regional Office
 3190 160th Ave SE
 Bellevue, WA 98008
 Phone: (425) 649-7000 Fax: (425) 649-7098

Section A: General Information

| | | | |
|--|--|-----------------------------|--------------------------------|
| Vessel Name: | NORWEGIAN STAR | Date: | August 4, 2007 |
| Vessel Operator: | NCL (Bahamas) Ltd. | Entry Time: | 9:02 AM |
| IMO Number: | 9195157 | Exit Time: | 10:48 AM |
| Vessel Type: | Passenger Ship | Notification (name & date): | Randy Fiebrandt, July 31, 2007 |
| Location: | Pier 66, Seattle | | |
| On-board contact(s): | Matilda Ivanova, Environmental Officer; Macario Ihalad, Environmental Engineer | | |
| Inspector(s): | Amy Jankowiak, Ecology Northwest Regional Office, Water Quality Program | | |
| # passengers/crew: | Actual: ~2600/~1100 | Amount of Wastewater: | 40-50 m ³ /hr |
| Description of advanced wastewater treatment system (name, type, major components, etc): Scanship is a biological reactor and ultrafiltration system. The system includes prefiltration, biological treatment via a biofilm process, chemical precipitation, clarification through flotation tanks, polishing filtration and UV disinfection. Approval for continuous discharge from Ecology was granted in 2004, 2005, 2006 and May 3, 2007. | | | |

Section B: Areas Evaluated

| | | | | | | | |
|-------------------------------------|------------------------------|-------------------------------------|------------------------------------|-------------------------------------|--------------------------|-------------------------------------|---|
| <input checked="" type="checkbox"/> | Black/Gray wastewater system | <input checked="" type="checkbox"/> | Operations Center/ Computer system | <input checked="" type="checkbox"/> | Records/Reports | <input checked="" type="checkbox"/> | Sampling/Monitoring |
| <input checked="" type="checkbox"/> | Discharge locations | <input checked="" type="checkbox"/> | Operations & Maintenance | <input checked="" type="checkbox"/> | Sludge Handling/Disposal | <input checked="" type="checkbox"/> | Other (oil spill notification drill, debunking) |

Section C: For vessels discharging ≥ 1nm from berth and ≥ 6 knots only

| | | |
|--------------------------|---|----|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | NA |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | NA |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance) in place | NA |

Section D: For vessels discharging continuously (at berth or within 1 nm of berth)

| | | |
|-------------------------------------|--|---|
| <input checked="" type="checkbox"/> | Schematics match black/gray wastewater system | System is as depicted in schematics. |
| <input checked="" type="checkbox"/> | Sludge disposal protocol per MOU | Discharges 12 nm out and outside of the Olympic Coast National Marine Sanctuary Area to Be Avoided per stated protocol. |
| <input checked="" type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance and for system shut down) in place | Notification is done per NTVCR plan which includes Ecology's phone number posted on the bridge and control room |
| <input checked="" type="checkbox"/> | Operations as described in submitted documentation | Operations were as described |
| <input checked="" type="checkbox"/> | Daily 24-hour continuous turbidity or equivalent monitoring | Has continuous TSS monitoring |
| <input checked="" type="checkbox"/> | Turbidimeter or equivalent monitoring equipment functioning properly | Appears to be functioning properly. Details in narrative. |
| | <u>Turbidity or equivalent</u> Last calibration: not sure, not required per AMOS work order/maintenance program Frequency of readings: continuous Trigger level for alarm: 20 mg/l, then 28 mg/l to stop for 1 minute, then trigger level for shutdown: 30 mg/l, then reopen at 25 mg/l Recorded turbidity/equivalent levels above triggers: | |
| <input checked="" type="checkbox"/> | Auto shut down or operational | Automatic shutdown appears to be operating properly. |

| | | |
|-------------------------------------|--|--|
| | controls to insure system shut down if a system upset occurs | |
| <input checked="" type="checkbox"/> | Ultraviolet (UV) light disinfection immediately prior to discharge | 3 UV banks run in series for effluent with 14 bulbs each |
| <input checked="" type="checkbox"/> | UV replacement bulbs available | There are two unit's worth of spares available. |
| <input checked="" type="checkbox"/> | UV/bulbs cleaned regularly | Yes, the units are cleaned by dosing Metal Bright automatically about every 3 5 days Hand wiping of the bulbs is not done, nor required by AMOS. |

| Section E: General | | |
|-------------------------------------|--|---|
| <input checked="" type="checkbox"/> | Sampling conducted 2/month, 1/month in Seattle (BOD, TSS, fecal coliform, pH, chlorine residual) | As of the date of the inspection, sampling has been conducted as required. |
| <input checked="" type="checkbox"/> | Whole Effluent Toxicity Testing 1 per 2 years | Acute WET testing was conducted in 2005 and Chronic WET testing in 2006 |
| <input checked="" type="checkbox"/> | Training up to date for system operators | Scanship conducts training on the ship during start-up of the system and handover training occurs including notes and verbal for about 2 weeks. |
| <input checked="" type="checkbox"/> | Discharge records maintained | Maintained properly. |
| <input checked="" type="checkbox"/> | Alarms functioning properly | Alarms appear to be functioning properly. |
| | Alarms Shutdowns: Yes High turbidity/TSS warnings: Yes High wastewater levels: Yes UV disinfection (intensity, bulbs, bank out, power failure): Yes | |

| Section F: Sample Results | | |
|---------------------------|---------------------------------------|----------------------------------|
| | Parameter | Effluent Result |
| | Biochemical Oxygen Demand (BOD 5-Day) | 18 mg/l |
| | Total Suspended Solids (TSS) | 7 mg/l |
| | Fecal Coliform (MF) | 6 CFU/100ml |
| | Residual Chlorine | 0.10 mg/l (0.10=detection limit) |
| | Ammonia, Nitrogen | 49 mg/l |
| | pH | 7.32 standard unit |

| Section G: Summary of Findings/Comments |
|---|
| <p>Introduction Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program, Municipal Compliance Specialist conducted the inspection of the NORWEGIAN STAR (photo #01) on August 4, 2007. The main contacts on board the NORWEGIAN STAR included Matilda Ivanova, Environmental Officer and Macario Ihaled, Environmental Engineer. Mr. Ihaled is filling in as operator of the Scanship system, while Mr. Delfin Josen is on vacation. Prior notification of the visit was given on July 31, 2007 for security protocol. The purpose of the inspection was to evaluate compliance with the <i>Memorandum of Understanding Cruise Operations in Washington State (MOU)</i>, as amended including the operating conditions of Advanced Wastewater Treatment System (AWTS). The NORWEGIAN STAR received approval to discharge continuously per the MOU in 2004, 2005, 2006 and on May 3, 2007.</p> <p>The NORWEGIAN STAR was built in 2001, is 965 feet long with 15 guest decks, with about a 28-foot draft. Passenger capacity is 4080 total passenger berths. There are typically about 2600 passengers and 1100 crew. It is my understanding that the ship's wastewater system, Scanship, was installed in 2004.</p> <p>Inspection We arrived boarded the ship at 9:02 am and began with introductions and a plan for the day. We then discussed the operation of the Scanship system and reviewed discharge records. We discussed some of the areas of potential waste streams. We then headed down for a tour of the Scanship system and bilge system. Samples were pulled from the AWTS prior to finalizing the inspection and disembarking the vessel at about 10:48 am.</p> <p>Discharge Types and Protocols:</p> <p>The latitude and longitudes are recorded in the <i>Sewage and Graywater Discharge Record Book</i> along with all other discharge records. Discharge records were well kept and include dates, times, discharge locations, port locations, effluent type, volumes, speed, signatures and remarks. Discharge protocols include a pre-schedule include detailed estimated times</p> |

for the various types of discharges. Also, prior to any discharge, a notification from the bridge is made, as well as a notification prior to closing discharge ports. The Environmental Officer has the key for discharges and is in charge of all discharges. The Captain and the Chief Engineer also have spare keys.

Treated effluent from the AWTS is discharged continuously. Laundry water is sent to the Scanship system for treatment. Food waste pulper water is discharged at greater than 12 nautical miles. Food waste is discharged at greater than 4 nautical miles and outside of Washington waters and the Olympic Coast National Marine Sanctuary (OCNMS). Pulper water used to go through the AWTS, however, this caused pH problems, and now the waste water is discharged directly (at greater than 4 nautical miles and outside of Washington waters and the OCNMS). Sludge from the AWTS is collected and is discharged at greater than 12 nm and outside the OCNMS. Some of the sludge material can be dried and incinerated. The Scanship dryer has not been functioning properly and has only been used about once this year.

Oily bilge water is sent to a dirty bilge tank (photo #14) and then onto the Marinfloc for separating oil. Waste from the Marinfloc is off-loaded and liquid flow goes to the Clean bilge tank and onto the oily water separator. From the oily water separator, the oil content is again measured in the locked "white box" (photo #16). If the parts per million exceed 15, the discharge valve (photo #15) closes and sends the waste either to the clean bilge tank where it then again goes through the oily water separator or it can be sent all the way back to the dirty bilge tank.

Ballast water is exchanged outside of Washington waters, greater than 50 nautical miles out at sea. X-ray/photo waste is separated, collected, labeled and offloaded to shore as hazardous waste in Canada. Air Conditioning Condensate is sent to the laundry tank to be used for washing clothes.

Water (production and bunkering): Potable water that is bunkered is sampled prior to bringing on board and then again after chlorination (pH, chlorine, coliform...). After chlorination, water is sent to a potable only tank separated of void space and is chlorinated again before using. All bunkered potable water is used within 48 hours. Water is also produced by desalination using a reverse osmosis system. Three evaporators are used that are run by engine heat. Some of the produced water is non-chlorinated and used as technical water (boilers, engine coolants...). The reverse osmosis water for general use is chlorinated at least 2 ppm and is sent to a tank designated for consumption. At the farthest point, the chlorine residual is to be between 0.2 ppm and 5 ppm. The salt that is collected through the production process is sent back to the salt water.

Scanship Advanced Wastewater Treatment System:

Graywater and blackwater from the ship are collected in a tank - mixed. The wastewater is pumped to two drum screens for pre-screening (photo #02), followed by biological treatment (biofilm on rotating plastic pieces - 2 tanks in series) (photos #03 and #04), chemical precipitation (flocculants, polymer) (photos #05, #06, #07 and #08), clarification via flotation tanks (2 tanks) (photos #05 and #08), ultrafiltration via polishing filters (2 rotating mesh drums) (photo #10), and disinfection via ultraviolet light (UV) (photo #11).

The cruise line uses a system called AMOS for work orders and maintenance. Manufacturer recommendations for maintenance for each piece of equipment is included into the AMOS system which triggers staff when maintenance is required. Scanship also monitors maintenance on the system. Any needed calibrations, cleaning, and other needed maintenance would be included in AMOS. The last calibration of the TSS meter (photo #13) is not known, and is not required by AMOS. The trigger level for an alarm of the TSS meter is set at 20 mg/l, then 28 mg/l to stop for 1 minute, and the trigger level for shutdown is 30 mg/l. The discharge port can then reopen at 25 mg/l. There are three UV banks that run in series for effluent with 14 bulbs each. There are two unit's worth of spares available. The units are cleaned by dosing Metal Bright at automatically about every 3-5 days. Hand wiping of the bulbs is not done, nor required by AMOS.

Samples were taken for Biochemical Oxygen Demand (BOD 5-Day), Total Suspended Solids (TSS), pH, chlorine residual, fecal coliform and ammonia from the effluent of the UV disinfection at the discharge port (photos #12 and #13). The samples were put on ice immediately and were transported to AmTest laboratory in Redmond, Washington that morning. Chain of Custody and sampling procedures were followed. All results are in Section F.

Conclusions and Recommendations

The Scanship system appears to be functioning well. The staff was knowledgeable of the system.

Procedures for discharge appear to be thorough and inclusive of verification.

Attachments:

Photographs
Sampling Results Report

Copies to:

Randy Fiebrandt, NCL
Matilda Ivanova, STAR
Amy Jankowiak, Ecology
Kevin Fitzpatrick, Ecology
✓ Central Files: Norwegian Cruise Lines - NORWEGIAN STAR; WQ 6 1

Section H: Signatures

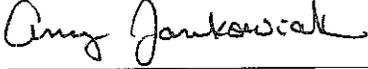
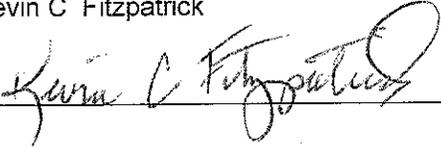
| <u>Name and Signature of Inspector</u> | <u>Agency/Office/Telephone</u> | <u>Date</u> |
|---|--|-------------|
| Amy Jankowiak  | Department of Ecology/Northwest Regional Office/Water Quality Program/Compliance Specialist/(425) 649-7195 | 9/25/07 |
| Kevin C Fitzpatrick  | Department of Ecology/Northwest Regional Office/Water Quality Section Manager/ (425) 649-7033 | 9/25/07 |



PHOTO #:01 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040037
DESCRIPTION: NORWEGIAN STAR VESSEL

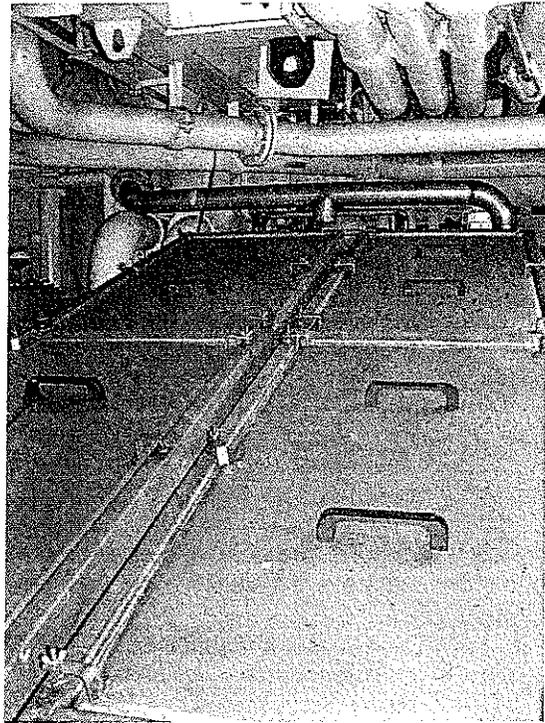


PHOTO #:02 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040020
DESCRIPTION: AWTS DRUM SCREENS

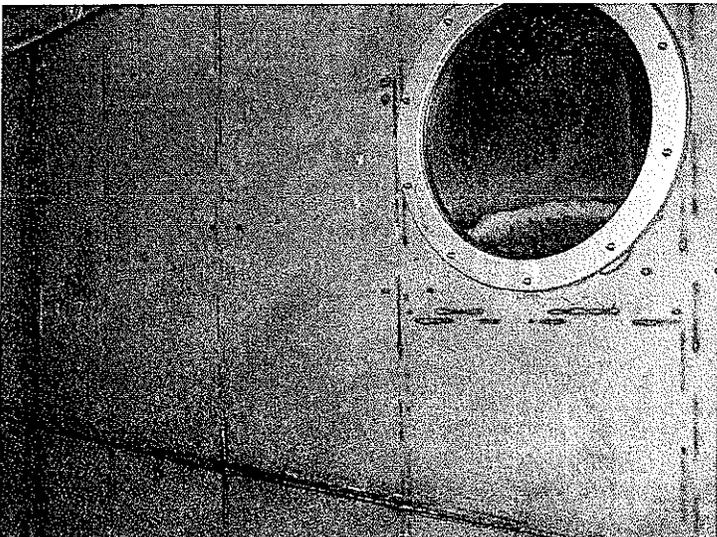


PHOTO #:03 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040021
DESCRIPTION: AWTS 1ST BIOFILM TANK

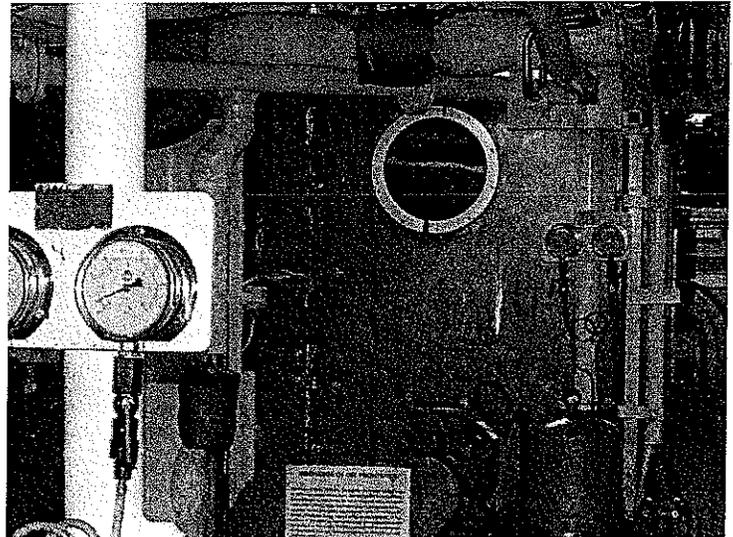


PHOTO #:04 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040022
DESCRIPTION: AWTS 2ND BIOFILM TANK

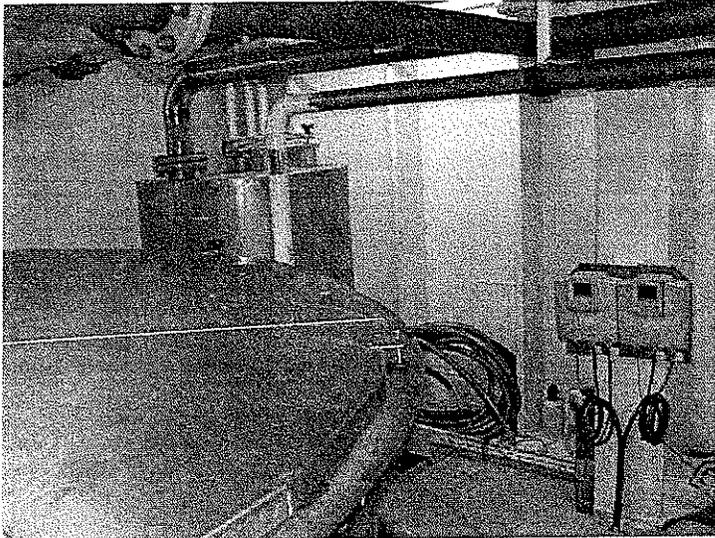


PHOTO #:05 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040023
DESCRIPTION: AWTS FLOC TANK A (BACK LEFT), FLOTATION
TANK A (FRONT), PH METERS (RIGHT)

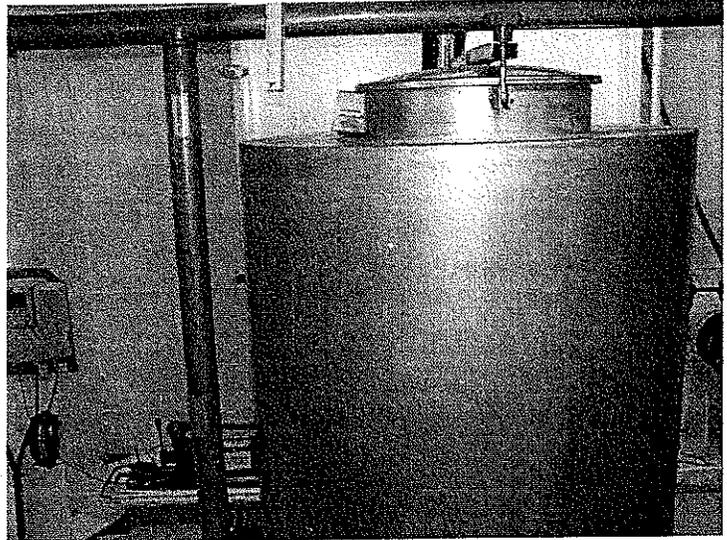


PHOTO #:06 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040024
DESCRIPTION: AWTS FLOC TANK B



PHOTO #:07 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040025
DESCRIPTION: AWTS FLOC TANK PH METERS (7 24 AND 6.94)

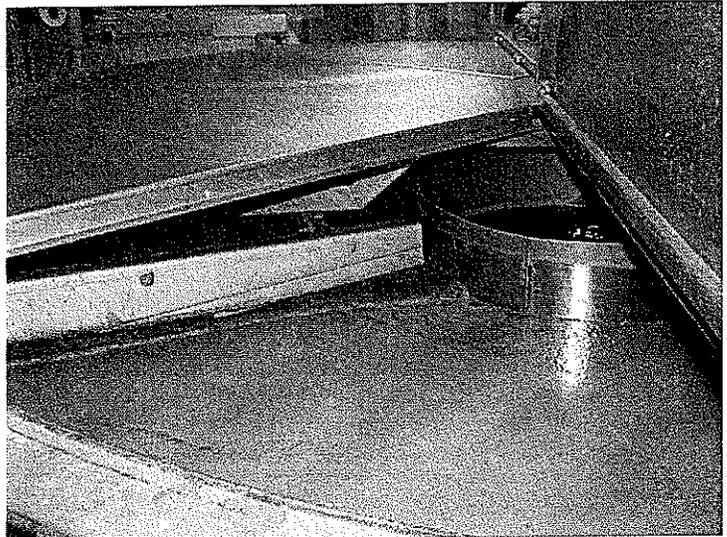


PHOTO #:08 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040027
DESCRIPTION: AWTS FLOTATION TANK B (VIEW OF INSIDE WITH
SKIMMER)

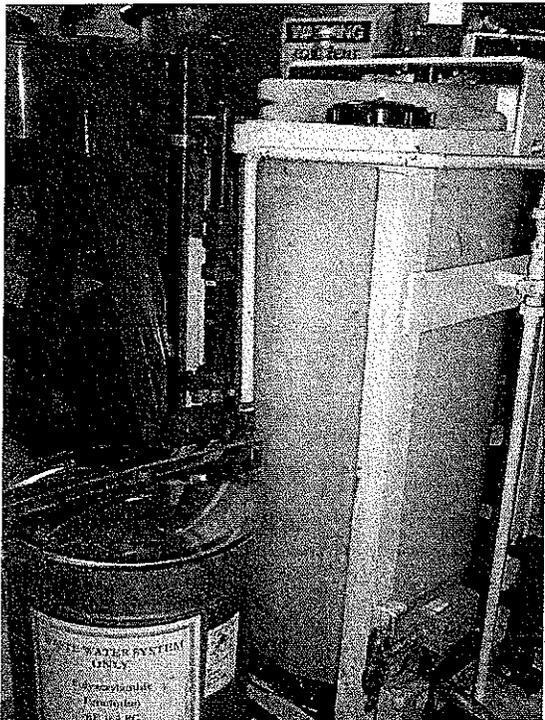


PHOTO #:09 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040029
DESCRIPTION: AWTS POLYMER (POLYACRYLAMIDE EMULSION)
AND POLYMER MIXING TANK

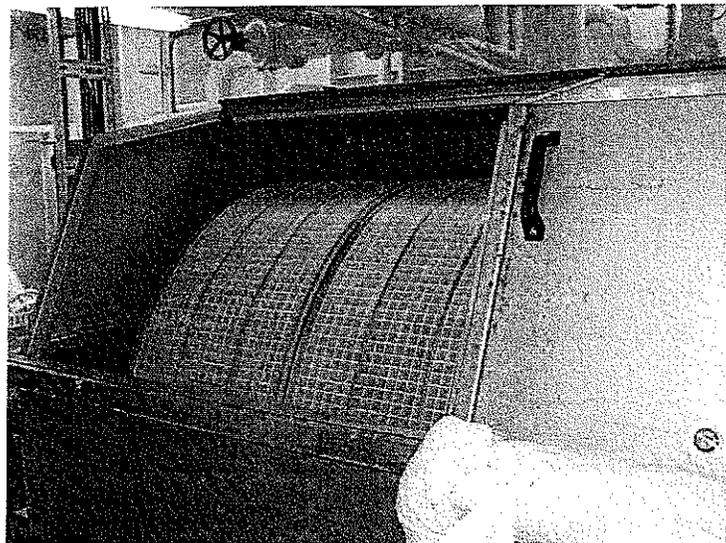


PHOTO #:10 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040030
DESCRIPTION: AWTS ULTRAFILTRATION UNIT (1 OF 2)

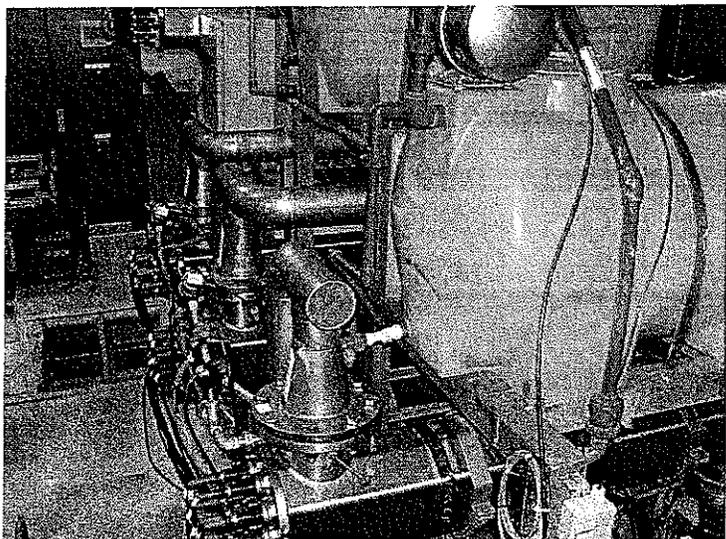


PHOTO #:11 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040031
DESCRIPTION: AWTS ULTRAVIOLET DISINFECTION SYSTEM (3
UNITS WITH BLUE METAL BRITE CLEANERS)

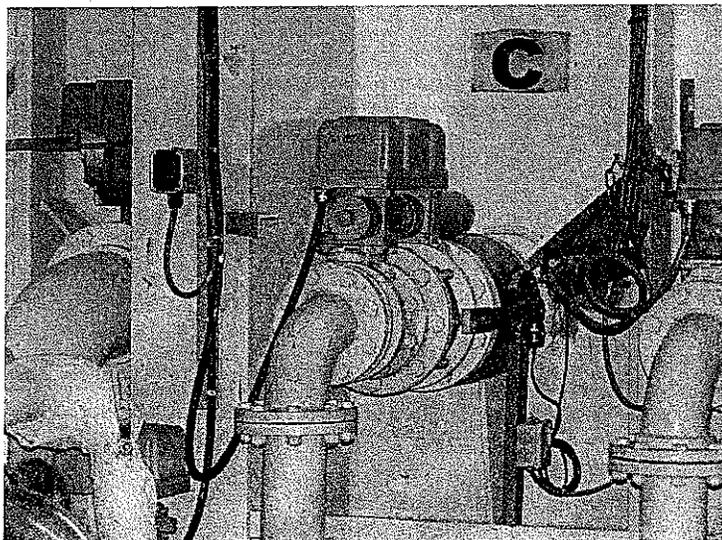


PHOTO #:12 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040032
DESCRIPTION: AWTS DISCHARGE PORT (C)

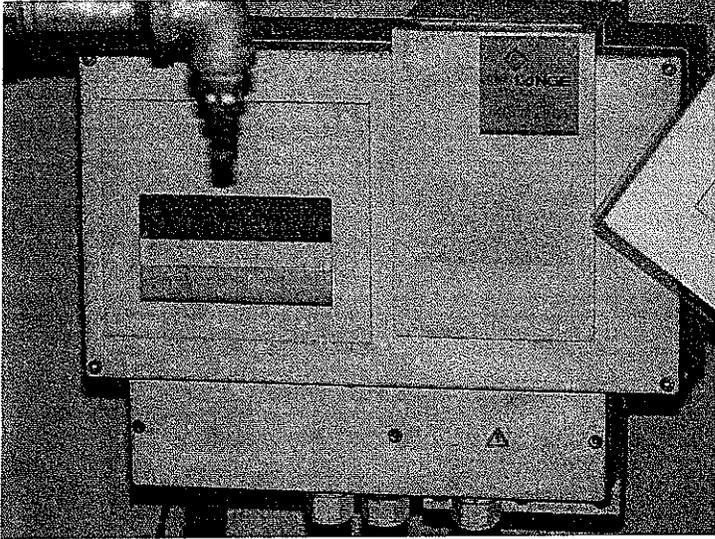


PHOTO #:13 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040033
DESCRIPTION: AWTS CONTINUOUS TSS MONITOR (2 MG/L) AND
SAMPLE PORT

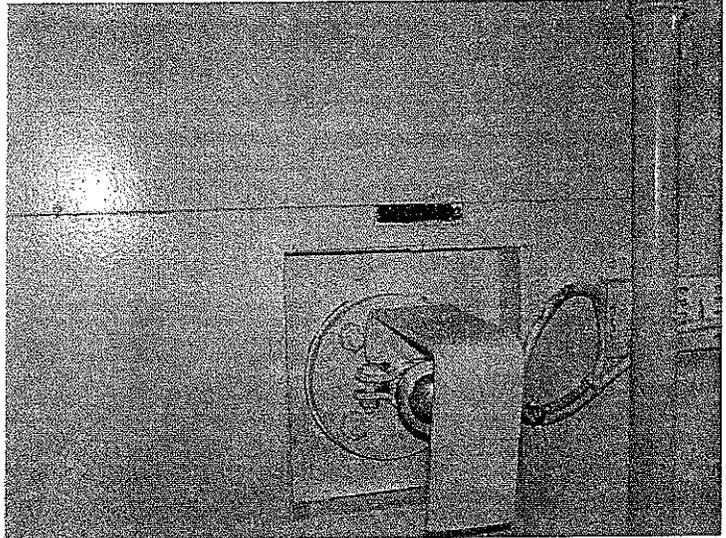


PHOTO #:14 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040034
DESCRIPTION: DIRTY BILGE TANK

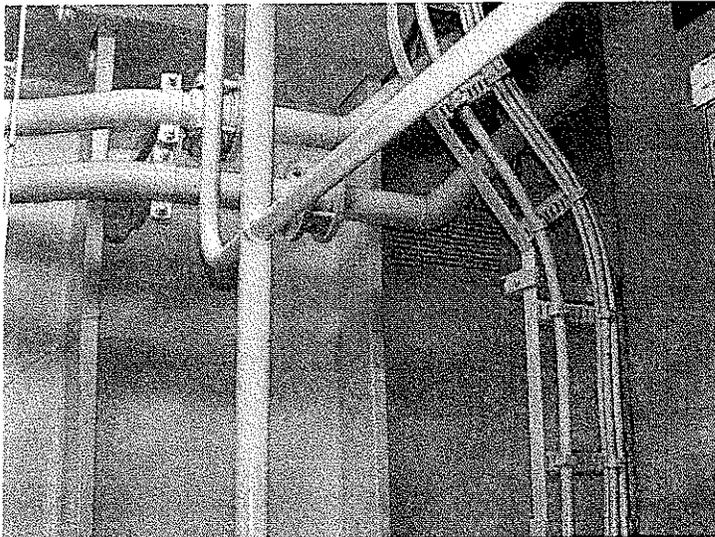


PHOTO #:15 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040035
DESCRIPTION: BILGE DISCHARGE PORT

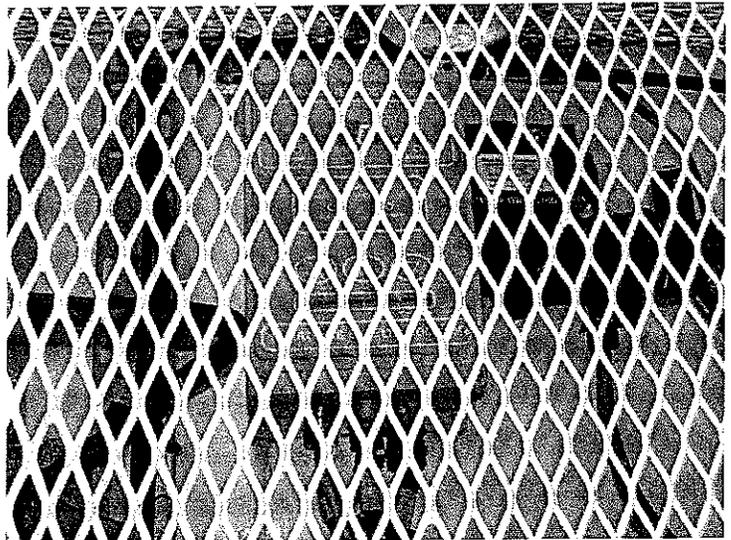


PHOTO #:16 DATE: 08/4/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8040036
DESCRIPTION: BILGE WHITE BOX

AMTEST

LABORATORIES

Am Test Inc.
14603 N.E. 87th St.
Redmond, WA 98052
(425) 885-1664

Professional
Analytical
Services

Aug 21 2007
Department of Ecology
3190 160th Ave SE
Bellevue, WA 98008
Attention: Amy Jankowiak

Dear Amy Jankowiak:

Enclosed please find the analytical data for your Norwegian Star project.

The following is a cross correlation of client and laboratory identifications for your convenience.

| CLIENT ID | MATRIX | AMTEST ID | TEST |
|-----------|--------|------------|-----------------------|
| STAR-EFF | Water | 07-A009961 | Micro, CONV, DEM, NUT |

Your sample was received on Saturday, August 4, 2007. At the time of receipt, the sample was logged in and properly maintained prior to the subsequent analysis.

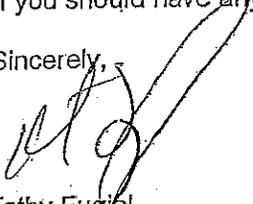
The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to contact me:

Sincerely,



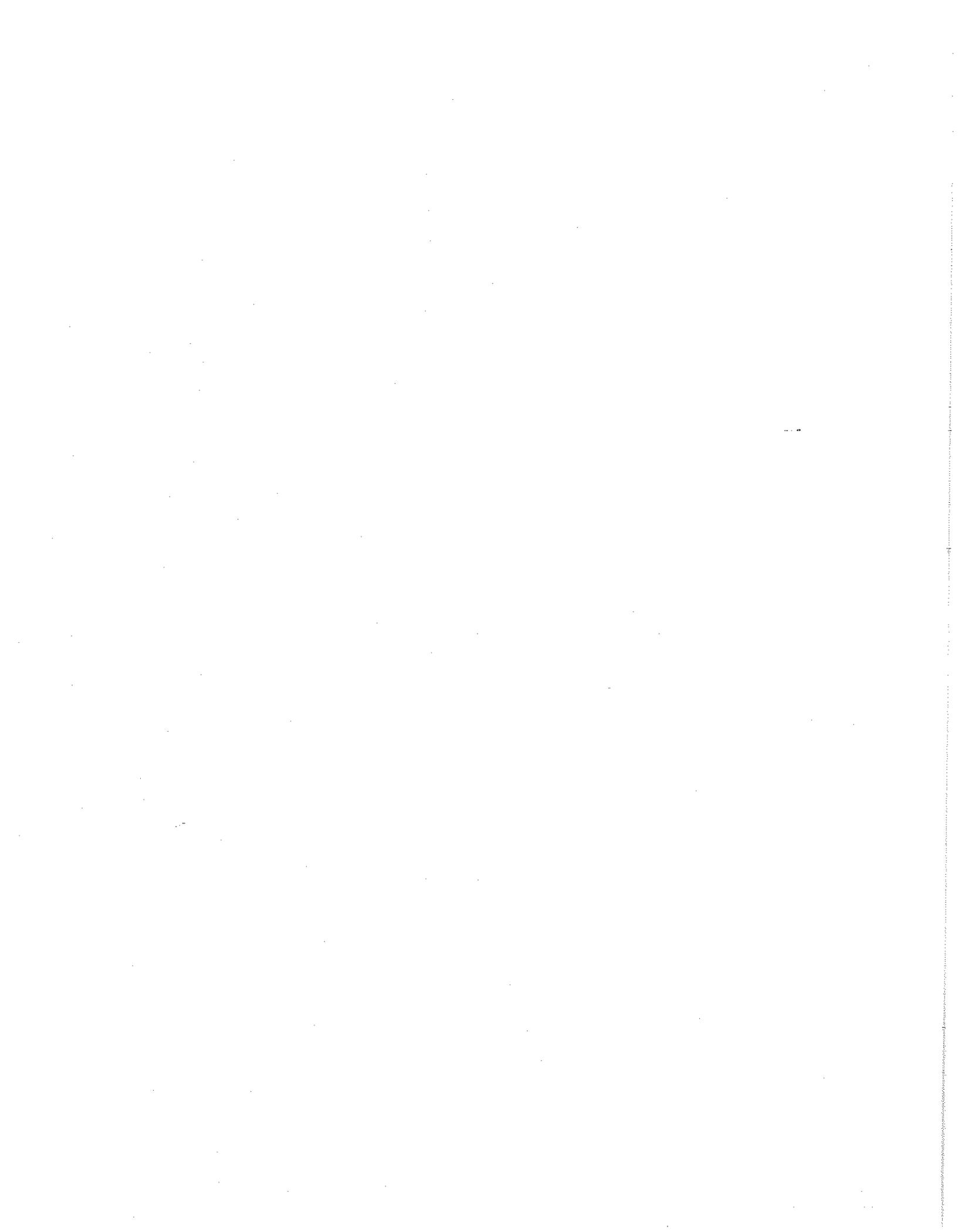
Kathy Fugiel
President

BACT = Bacteriological
CONV = Conventional

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals



Am Test Inc.
 14603 N.E. 87th St.
 Redmond, WA 98052
 (425) 885-1664
 www.amtestlab.com



Professional
 Analytical
 Services

ANALYSIS REPORT

Department of Ecology
 3190 160th Ave SE
 Bellevue, WA 98008
 Attention: Amy Jankowiak
 Project Name: Norwegian Star
 All results reported on an as received basis.

Date Received: 08/04/07
 Date Reported: 8/21/07

AMTEST Identification Number 07-A009961
 Client Identification STAR-EFF
 Sampling Date 07/04/07, 10:28

Microbiological

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|-----------------|--------|------------|---|------|----------|---------|----------|
| Fecal Coliforms | 6. | CFU/100 ml | | 1. | SM 9222D | KF | 08/04/07 |

Conventionals

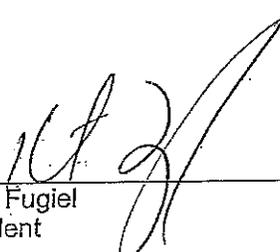
| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|------------------------|--------|-------|---|------|-----------|---------|----------|
| pH | 7.32 | unit | | | EPA 150.1 | KF | 08/04/07 |
| Chlorine Residual | 0.10 | mg/l | | 0.10 | EPA 330.5 | KF | 08/04/07 |
| Total Suspended Solids | 7.0 | mg/l | | 1.0 | EPA 160.2 | JR | 08/14/07 |

Demand

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|-----------|--------|-------|---|------|---------|---------|----------|
| BOD-low | 18.0 | mg/l | | 2.00 | SM 5210 | MRW | 08/04/07 |

Nutrients

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|------------------|--------|-------|---|-------|-----------|---------|----------|
| Ammonia Nitrogen | 49. | mg/l | | 0.005 | EPA 350.1 | AY | 08/13/07 |


 Kathy Fugiel
 President

AMTEST

LABORATORIES

QC Summary for sample number: 07-A009961

DUPLICATES

| SAMPLE # | ANALYTE | UNITS | SAMPLE VALUE | DUPLICATE VALUE | RPD |
|------------|------------------------|-------|--------------|-----------------|-----|
| 07-A009856 | Ammonia Nitrogen | mg/l | 0.047 | 0.050 | 6.2 |
| 07-A010125 | Ammonia Nitrogen | mg/l | < 0.005 | 0.030 | |
| 07-A010145 | Ammonia Nitrogen | mg/l | 0.008 | 0.010 | 22. |
| 07-A010228 | Ammonia Nitrogen | mg/l | 0.024 | 0.026 | 8.0 |
| 07-A009961 | Total Suspended Solids | mg/l | 7.0 | 8.0 | 13. |
| 07-A010033 | Total Suspended Solids | mg/l | 4.0 | 5.0 | 22. |
| 07-A010234 | Total Suspended Solids | mg/l | 4.0 | 3.0 | 29. |

MATRIX SPIKES

| SAMPLE # | ANALYTE | UNITS | SAMPLE VALUE | SMPL+ SPK | SPK AMT | RECOVERY |
|------------|------------------|-------|--------------|-----------|---------|----------|
| 07-A010057 | Ammonia Nitrogen | mg/l | 0.013 | 0.29 | 0.25 | 110.80 % |
| 07-A010143 | Ammonia Nitrogen | mg/l | 0.78 | 1.1 | 0.25 | 128.00 % |
| 07-A010206 | Ammonia Nitrogen | mg/l | 0.052 | 0.33 | 0.25 | 111.20 % |
| 07-A010245 | Ammonia Nitrogen | mg/l | 0.029 | 0.26 | 0.25 | 92.40 % |

STANDARD REFERENCE MATERIALS

| ANALYTE | UNITS | TRUE VALUE | MEASURED VALUE | RECOVERY |
|------------------------|-------|------------|----------------|----------|
| BOD-low | mg/l | 200. | 215. | 108. % |
| Chlorine Residual | mg/l | 2.50 | 2.30 | 92.0 % |
| Ammonia Nitrogen | mg/l | 4.0 | 4.2 | 105. % |
| Ammonia Nitrogen | mg/l | 8.9 | 8.7 | 97.8 % |
| Ammonia Nitrogen | mg/l | 4.0 | 4.2 | 105. % |
| Total Suspended Solids | mg/l | 100 | 100 | 100. % |
| Total Suspended Solids | mg/l | 100 | 100 | 100. % |

BLANKS

| ANALYTE | UNITS | RESULT |
|------------------------|-------|---------|
| BOD-low | mg/l | < 2 |
| Chlorine Residual | mg/l | < 0.1 |
| Ammonia Nitrogen | mg/l | < 0.005 |
| Ammonia Nitrogen | mg/l | < 0.005 |
| Ammonia Nitrogen | mg/l | < 0.005 |
| Total Suspended Solids | mg/l | < 1 |
| Total Suspended Solids | mg/l | < 1 |

| | |
|---|---|
| Client Name & Address: Department of Ecology 3190 160th Ave SE Bellevue, WA 98008 | Invoice To: Amy Jankowiak Department of Ecology 3190 160th Ave SE Bellevue, WA 98008 |
| Contact Person: Amy Jankowiak | Invoice Contact: Amy Jankowiak |
| Phone No: 425-649-7195 | PO Number: |
| Fax No: 425-649-7098 | Invoice Ph/Fax: 425-649-7195 / 425-649-7098 |
| E-mail: aijan461@ecy.wa.gov | Invoice E-mail: aijan461@ecy.wa.gov |
| Report Delivery: (Choose all that apply) <input checked="" type="checkbox"/> Mail / <input type="checkbox"/> Fax / <input checked="" type="checkbox"/> Email / <input type="checkbox"/> Posted Online | Data posted to online account: YES / NO |
| Special Instructions: | |

Requested TAT: (Rush must be pre-approved by lab)
 Standard RUSH (5 Day / 3 Day / 48 HR / 24 HR)

RUSH Request Approved By: _____

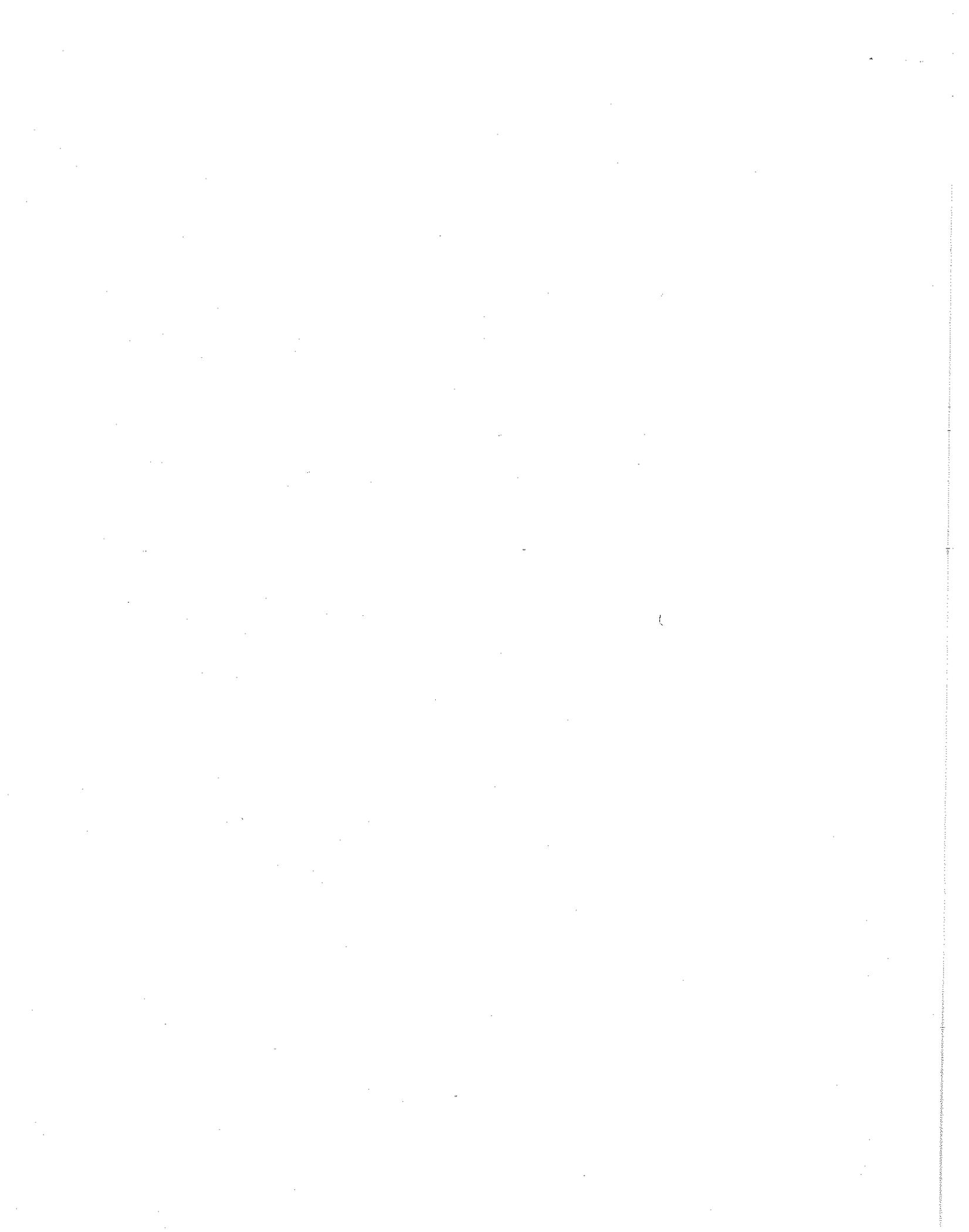
| Project Name: | Project Number: | Date Sampled | Time Sampled | Matrix | No. of containers | Analysis Requested | | | | | | | | |
|----------------|-----------------|--------------|--------------|--------|-------------------|--------------------|-----|----------------|---------|-------------------|-------|-------|-------|--|
| | | | | | | BOD (5-Day) | TSS | Fecal coliform | Ammonia | Residual chlorine | Other | Other | Other | |
| NORWEGIAN STAR | | 8/4/07 | 10:28 | | 2 | | | | | | | | | |
| | | 8/4/07 | 10:30 | | 2 | | | | | | | | | |
| | | 9960-65 | | | | | | | | | | | | |

| | | | | | |
|----------------------------|--------|-------|-----------------|--------|------|
| Collected/Relinquished By: | Date | Time | Received By: | Date | Time |
| <i>Amy Jankowiak</i> | 8/4/07 | 11:30 | | | |
| Relinquished By: | Date | Time | Received By: | Date | Time |
| | | | | | |
| Relinquished By: | Date | Time | Received By: | Date | Time |
| | | | <i>Kurt Zyl</i> | 8/4/07 | |

COMMENTS:

shelf 65

PH = 7.32





State of Washington Department of Ecology
**Verification of Operating Conditions
of Advanced Wastewater Treatment
Systems for Cruise Ship Discharges**

Northwest Regional Office
3190 160th Ave SE
Bellevue, WA 98008
Phone: (425) 649-7000 Fax: (425) 649-7098

Section A: General Information

| | | | |
|----------------------|--|-----------------------------|----------------------|
| Vessel Name: | AMSTERDAM | Date: | August 17, 2007 |
| Vessel Operator: | Holland America Line | Entry Time: | 9:55 AM |
| IMO Number: | 9188037 | Exit Time: | 11:55 AM |
| Vessel Type: | Passenger Ship | Notification (name & date): | Tina Stoltz, 8/14/07 |
| Location: | Pier 30, Seattle | | |
| On-board contact(s): | Kieron Connelly, On-coming Environmental Officer, Ted Arnold, Out-going Environmental Officer, Robert Diaz, HAL Office – Deputy Director, Environmental Compliance, William “Bill” Morani Jr., HAL Office – VP, Environmental Compliance | | |
| Inspector(s): | Amy Jankowiak, Department of Ecology – Northwest Regional Office, Water Quality Program | | |
| # passengers/crew: | ~ 1400 / ~ 650 | Amount of Wastewater: | ---- |

Description of wastewater treatment system (name, type, major components, etc.):
Blackwater is treated with a marine sanitation device (not an Advanced Wastewater Treatment system) including filtration, aeration, and chlorination. Graywater is collected, strained, and held prior to discharge. All wastewater discharges occur at greater than 12 nautical miles and outside of MOU waters

Section B: Areas Evaluated

| | | | | | | | |
|-------------------------------------|------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|--------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | Black/Gray wastewater system | <input type="checkbox"/> | Operations Center/Computer system | <input checked="" type="checkbox"/> | Records/Reports | <input type="checkbox"/> | Sampling/Monitoring |
| <input checked="" type="checkbox"/> | Discharge locations | <input checked="" type="checkbox"/> | Operations & Maintenance | <input checked="" type="checkbox"/> | Sludge Handling/Disposal | <input checked="" type="checkbox"/> | Other |

Section C: For vessels discharging ≥ 1nm from berth and ≥ 6 knots only

| | | |
|--------------------------|---|----------------|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | Not Applicable |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | Not Applicable |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance) in place | Not Applicable |

Section D: For vessels discharging continuously (at berth or within 1 nm of berth)

| | | |
|--------------------------|--|----------------|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | Not Applicable |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | Not Applicable |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance and for system shut down) in place | Not Applicable |
| <input type="checkbox"/> | Operations as described in submitted documentation | Not Applicable |
| <input type="checkbox"/> | Daily 24-hour continuous turbidity or equivalent monitoring | Not Applicable |
| <input type="checkbox"/> | Turbidimeter or equivalent monitoring equipment functioning properly | Not Applicable |
| | Turbidity or equivalent : Not applicable Last calibration Frequency of readings: Trigger level for alarm: Trigger level for shutdown: Recorded turbidity/equivalent levels above triggers: | |
| <input type="checkbox"/> | Auto shut down or operational controls to insure system shut down if a system upset occurs | Not Applicable |
| <input type="checkbox"/> | Ultraviolet (UV) light disinfection immediately prior to discharge | Not Applicable |
| <input type="checkbox"/> | UV replacement bulbs available | Not Applicable |
| <input type="checkbox"/> | UV/bulbs cleaned regularly | Not Applicable |

Section E: General

| | | |
|-------------------------------------|---|----------------|
| <input checked="" type="checkbox"/> | Sampling conducted 2/month, 1/month in Seattle (BOD, TSS, fecal coliform, pH, chlorine residual) | Not Applicable |
| <input checked="" type="checkbox"/> | Whole Effluent Toxicity Testing 1 per 2 years | Not Applicable |
| <input checked="" type="checkbox"/> | Training up to date for system operators | Not Applicable |
| <input checked="" type="checkbox"/> | Discharge records maintained | Not Applicable |
| <input checked="" type="checkbox"/> | Alarms functioning properly | Not Applicable |
| | Alarms Shutdowns: not applicable High turbidity/TSS warnings: High wastewater levels: UV disinfection (intensity, bulbs, bank out, power failure): | |

Section F: Sample Results

| Parameter | Effluent Result |
|---------------------------------------|-----------------|
| Biochemical Oxygen Demand 5-Day (BOD) | Not Applicable |
| Total Suspended Solids (TSS) | Not Applicable |
| Fecal Coliform, MF | Not Applicable |
| Residual Chlorine) | Not Applicable |
| Ammonia, Nitrogen | Not Applicable |
| pH | Not Applicable |

Section G: Summary of Findings/Comments

Introduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program, conducted the inspection of the Holland America Line AMSTERDAM (photo #01) on August 17, 2007. The main contacts on board the AMSTERDAM included Kieron Connelly, the on-coming Environmental Officer, Ted Arnold, the out-going Environmental Officer, William Morani Jr, Vice President, Environmental Compliance HAL, and Robert Diaz, Deputy Director, Environmental Compliance HAL. Prior notification of the visit was given on August 14, 2007 for security protocol. The purpose of the inspection was to evaluate compliance with the *Memorandum of Understanding Cruise Operations in Washington State* (MOU), as amended. The AMSTERDAM does not have an advanced wastewater treatment system on board, and therefore, does not discharge any black or graywater into MOU waters

The AMSTERDAM was delivered in 2000, is 780 feet long, with about a 26-foot draft. Passenger capacity is about 1400 with about 650 crew.

Inspection

I arrived and boarded the ship at 9:55 am and began with introductions and a plan for the day. We then discussed discharge protocols for various waste streams, non-compliance notification procedures, and the operation of food waste, oily bilge water, water bunkering and production, and ballast water management. Discharge records were reviewed for blackwater and graywater discharges, ballast water and oil. We then discussed the blackwater and graywater treatment and then viewed the systems themselves. The inspection was then finalized and I disembarked the vessel at about 10:55 am.

Non-compliance notification: The USCG and Ecology are notified appropriately for any non-compliance issues. Staff mentioned that the numbers are posted and available to staff.

Discharge Types and Protocols:

All discharges to water occur at greater than 12 nautical miles and outside of MOU waters with the possible exception of spa water. Spa water may be discharged close to the Strait of Juan de Fuca. Staff will check on the locations of these discharges. Bromine is not specifically listed as a toxic substance in the Washington Water Quality Standards, so the general rule applies: **“WAC 173-201A-240 Toxic substances.** (1) Toxic substances shall not be introduced above natural background levels in waters of the state which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic toxicity to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the department.” It is unlikely that the bromine discharged from the vessel would violate the standards as long as the vessel is moving while discharging at the concentrations typical for the vessel (2-5ppm).

Only upon verification of location between the Bridge and the Engine Control Room (ECR), will a discharge occur at greater than 12 nautical miles and outside of MOU waters. The Bridge authorizes the discharge. The latitude and longitude coordinates are recorded in the *Sewage and Graywater Discharge Record Book* and in the deck log. There is an overboard valve monitoring system on the bridge and the ECR has lights monitoring discharges. The date, time and location of both the start and the stop of the discharges are recorded, along with port location, effluent type, volumes, and speed. Discharges are tentatively scheduled ahead of time by matrix, but are locations are always verified prior to discharges. All discharge records that were reviewed appeared to be in compliance with the MOU.

The discharge ports have either locks, green tags (photo #08), seals (photo #10), or a combination there of. The seals automatically record when the valve is open or closed. It is recorded when a tag or lock is broken or opened.

Blackwater treated by the marine sanitation device (photo #03), and graywater is always discharged at greater than 12 nautical miles and outside of MOU waters. Blackwater is collected by vacuum to a tank (photos #04 and #05), then goes through prefiltration. Liquid moves to the next tank for aeration, while the solids collected by prefiltration are collected and off-loaded in Victoria. The aerated liquid is fine-filtered. The solids are sent back for aeration and breakdown. The filtered effluent is then chlorinated and held until discharge (photos #9 and #10). There are four of the blackwater treatment systems (photo #02) on board the vessel. Graywater is collected and strained. The strained material is also collected and off-loaded in Victoria. The graywater does not receive any further treatment and is held until discharge.

Oily bilge water is treated with a Cascade System (photo #07). Oily bilge water is sent to the 50 ppm oily water separator, then to the intermediate tank and then to the 15 ppm oily water separator. If the effluent does not meet 15ppm, it is automatically sent back to the intermediate tank for more treatment. The effluent that meets 15 ppm (typically <9 ppm) is either discharged at greater than 12 nautical miles and outside of MOU waters or is sent to a clean tank and later discharged (photo #11). All effluent first goes through the white box for monitoring prior to discharge.

Food waste goes from the galley to the Somat Press. The hydro extractor water is sent through spiral pumps and is sent back to the Somat Press. The food waste from the press/extractor is discharged (typically Saturday night, Tuesday night and Thursday morning) at greater than 12 nautical miles and outside of MOU waters. Food waste that does not go through the press (bones, etc.) is collected and off-loaded on-shore in Victoria. The liquid from the press/extractor is changed out occasionally and discharged over the side at greater than 12 nautical miles and outside of MOU waters. Plastics and garbage are separated at the source, overseen by staff.

Ballast water discharges occur outside of MOU waters prior to coming into the Strait of Juan de Fuca.

X-ray's in the medical area are performed digitally. Silver is captured from the photo waste, collected and off-loaded as hazardous waste in Victoria. All wastes to shore are off-loaded in Victoria.

Potable water is bunkered typically in Seattle, Juneau, and Ketchikan. Chlorine is added prior to distribution. Water is also produced by desalination. Three evaporators (photo #06) are used that are run by engine heat (<100°C). The seawater is boiled off in vacuum. The water is then chlorinated and sent to a tank for a short time prior to distribution. Salt collected from the evaporators is sent back to the sea. Residual chlorine is monitored at the furthest point for a minimum of 0.2 ppm.

Conclusions and Recommendations

The protocols and procedures for discharge are clear and inclusive of verification. The discharge records showed no discharges of blackwater or graywater in MOU waters for the period looked at of 2005 through the date of the inspection.

The staff was very knowledgeable of the systems and procedures related to compliance with the MOU.

Attachments:
Photographs

Copies to:
William Morani, Jr., HAL
Robert Diaz, HAL
Kieron Connelly, HAL
Ted Arnold, HAL
John Turvey, HAL
Tina Stoltz, HAL
Amy Jankowiak, Ecology

Kevin Fitzpatrick, Ecology
Mark Toy, Dept. of Health
✓ Central Files: Holland America Line - AMSTERDAM; WQ 6.1

Section H: Signatures

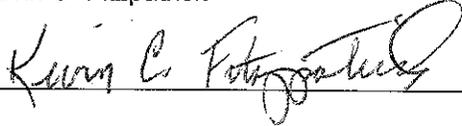
| <u>Name and Signature of Inspector</u> | <u>Agency/Office/Telephone</u> | <u>Date</u> |
|--|---|-------------|
| Amy Jankowiak  | Department of Ecology/Northwest Regional Office/Water Quality Program/Compliance Specialist/(425) 649-7195 | 9/25/07 |
| Kevin C. Fitzpatrick  | Department of Ecology/Northwest Regional Office/Water Quality Section Manager/(425) 649-7033 | 9/25/07 |



PHOTO #:01 DATE: 08/17/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8170038
DESCRIPTION: HOLLAND AMERICA LINE AMSTERDAM VESSEL

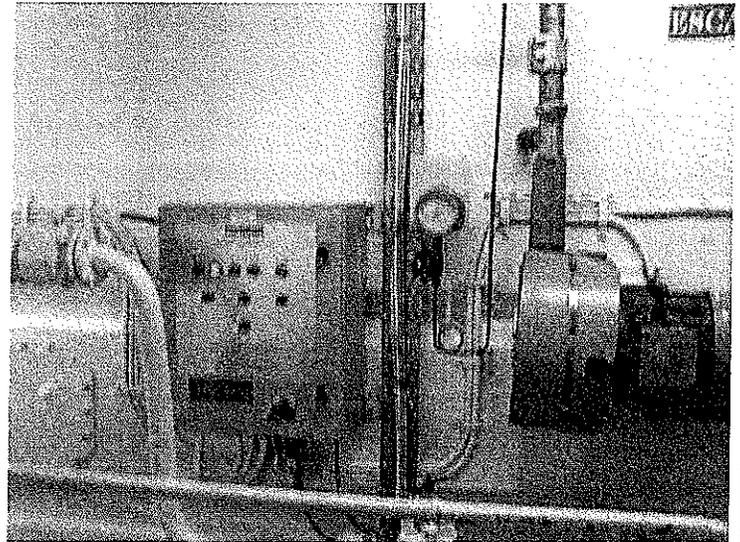


PHOTO #:02 DATE: 08/17/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8170039
DESCRIPTION: BLACKWATER TREATMENT SYSTEM

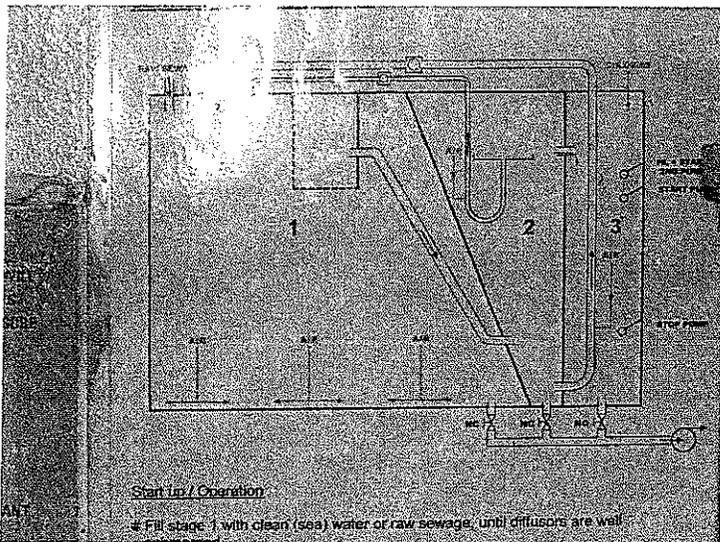


PHOTO #:03 DATE: 08/17/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8170040
DESCRIPTION: BLACKWATER TREATMENT SYSTEM SCHEMATIC

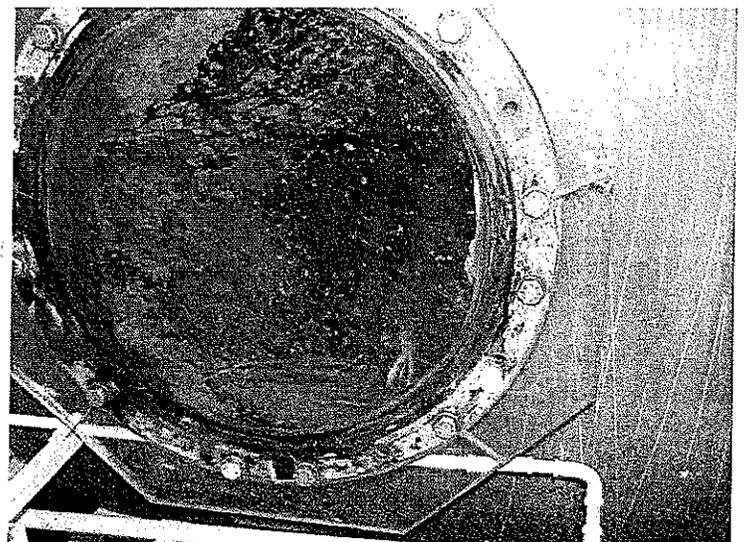


PHOTO #:04 DATE: 08174/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8170042
DESCRIPTION: BLACKWATER VACUUM TANK



PHOTO #:05 DATE: 08/17/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8170043
DESCRIPTION: BLACKWATER VACUUM TANK

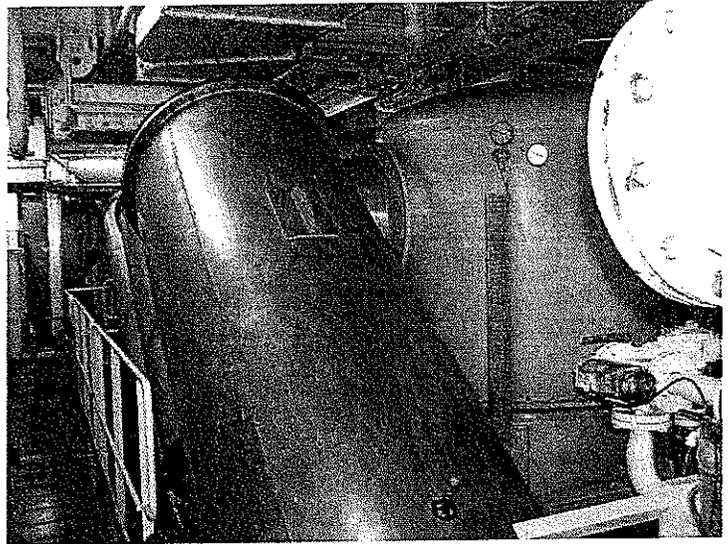


PHOTO #:06 DATE: 08/17/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8170044
DESCRIPTION: EVAPORATORS (3) FOR WATER PRODUCTION

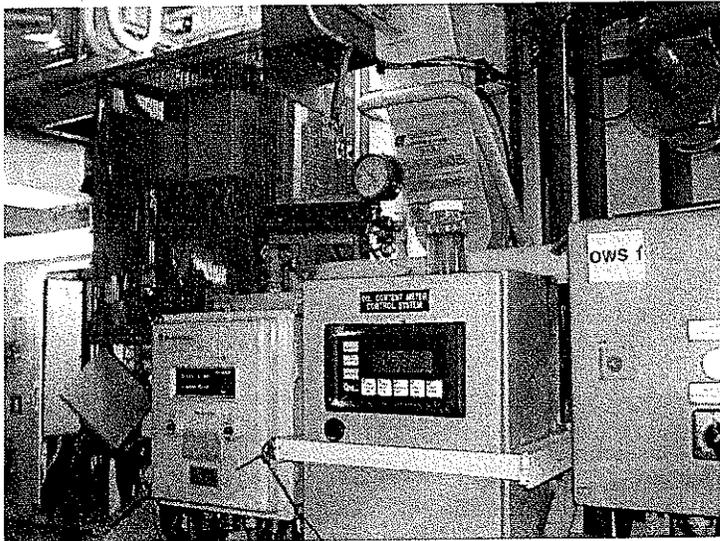


PHOTO #:07 DATE: 08/17/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8170045
DESCRIPTION: BILGE WATER SYSTEM (WHITE BOX UPPER LEFT)

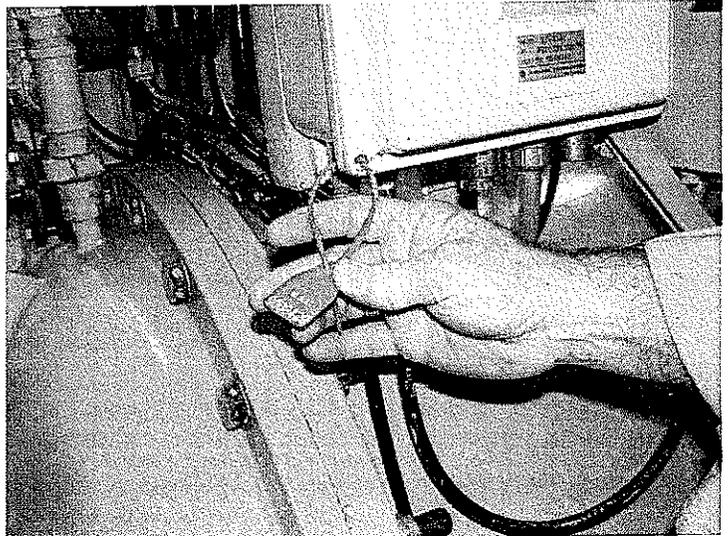


PHOTO #:08 DATE: 08/17/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8170047
DESCRIPTION: GREEN TAG USED FOR LOCKOUTS

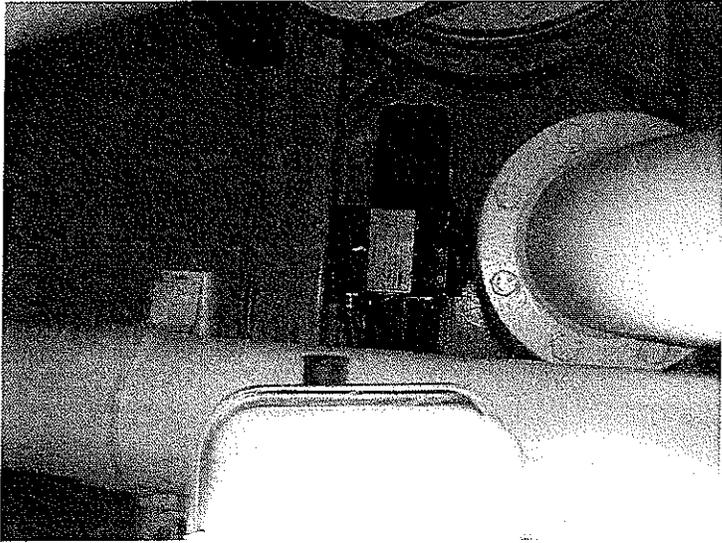


PHOTO #:09 DATE: 08/17/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8170048
DESCRIPTION: BLACKWATER AND GRAYWATER DISCHARGE
PORT

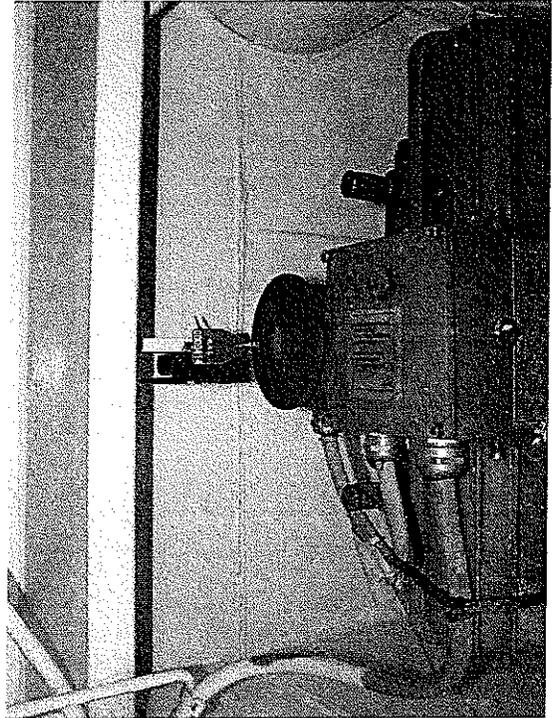


PHOTO #:10 DATE: 08/17/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8170049
DESCRIPTION: BLACKWATER AND GRAYWATER DISCHARGE
PORT (GREEN LOCKOUT TAG AND SEAL)

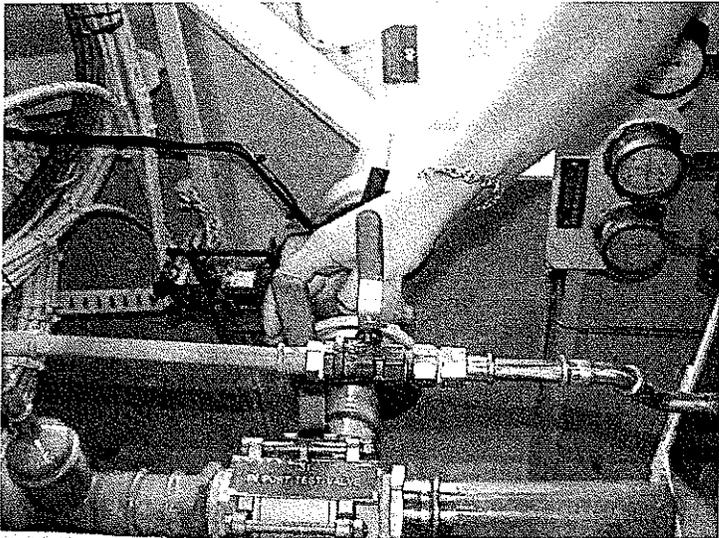


PHOTO #:11 DATE: 08/17/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8170050
DESCRIPTION: BILGE WATER DISCHARGE PORT (AND SAMPLE
PORT)

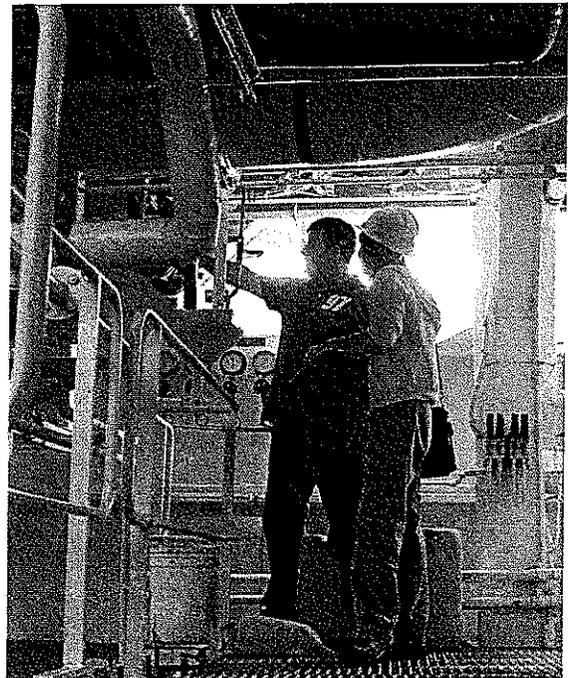


PHOTO #:12 DATE: 08/17/07 TAKEN BY: WILLIAM MORANI
FILE No.:8
DESCRIPTION: KIERON CONNELLY, HAL EO AND AMY
JANKOWIAK, DOE DURING INSPECTION





State of Washington Department of Ecology
**Verification of Operating Conditions
of Advanced Wastewater Treatment
Systems for Cruise Ship Discharges**

Northwest Regional Office
3190 160th Ave SE
Bellevue, WA 98008
Phone: (425) 649-7000 Fax: (425) 649-7098

Section A: General Information

| | | | |
|----------------------|---|-----------------------------|---|
| Vessel Name: | OOSTERDAM | Date: | August 25, 2007 |
| Vessel Operator: | Holland America Line | Entry Time: | 9:40 AM |
| IMO Number: | 9221281 | Exit Time: | 11:50 AM |
| Vessel Type: | Passenger Ship | Notification (name & date): | Tina Stoltz; August 21, 2007 |
| Location: | Pier 30, Seattle | | |
| On-board contact(s): | Cornelis Kant, Environmental Officer, Marc Laughlan, AWWPS, Robert Diaz, HAL Office – Deputy Director, Environmental Compliance | | |
| Inspector(s): | Amy Jankowiak, Department of Ecology; Michael Cahill, Department of Ecology | | |
| # passengers/crew: | Actual ~1800/~650 | Amount of Wastewater: | GW ~ 34m ³ /hr BW ~14m ³ /hr (2006 numbers) |

Description of advanced wastewater treatment system (name, type, major components, etc.):
Rochem Advanced Waste Water Purification System. The Rochem graywater system includes prefiltration, reverse osmosis and UV disinfection. The Rochem blackwater system includes prefiltration, biological treatment via bioreactors, ultrafiltration, and UV disinfection. Approval for discharge at greater than one nautical mile away from port and at greater than six knots from Ecology was granted in July 2004, June 2005 and June, 2006. Discharge approval has not been requested as of yet for the 2007 season. Discharges are being held until outside MOU waters.

Section B: Areas Evaluated

| | | | | | | | |
|-------------------------------------|------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|--------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | Black/Gray wastewater system | <input checked="" type="checkbox"/> | Operations Center/Computer system | <input checked="" type="checkbox"/> | Records/Reports | <input type="checkbox"/> | Sampling/Monitoring |
| <input checked="" type="checkbox"/> | Discharge locations | <input checked="" type="checkbox"/> | Operations & Maintenance | <input checked="" type="checkbox"/> | Sludge Handling/Disposal | <input checked="" type="checkbox"/> | Other |

Section C: For vessels discharging ≥ 1nm from berth and ≥ 6 knots only

| | | |
|--------------------------|---|----------------|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | Not Applicable |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | Not Applicable |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance) in place | Not Applicable |

Section D: For vessels discharging continuously (at berth or within 1 nm of berth)

| | | |
|--------------------------|---|----------------|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | Not Applicable |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | Not Applicable |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance and for system shut down) in place | Not Applicable |
| <input type="checkbox"/> | Operations as described in submitted documentation | Not Applicable |
| <input type="checkbox"/> | Daily 24-hour continuous turbidity or equivalent monitoring | Not Applicable |
| <input type="checkbox"/> | Turbidimeter or equivalent monitoring equipment functioning properly | Not Applicable |
| | <u>Turbidity or equivalent</u> : Not applicable Last calibration Frequency of readings: Trigger level for alarm: Trigger level for shutdown: Recorded turbidity/equivalent levels above triggers: | |
| <input type="checkbox"/> | Auto shut down or operational controls to insure system shut down if a system upset occurs | Not Applicable |
| <input type="checkbox"/> | Ultraviolet (UV) light disinfection immediately prior to discharge | Not Applicable |
| <input type="checkbox"/> | UV replacement bulbs available | Not Applicable |
| <input type="checkbox"/> | UV/bulbs cleaned regularly | Not Applicable |

Section E: General

| | | |
|---|--|---|
| <input checked="" type="checkbox"/> | Sampling conducted 2/month, 1/month in Seattle (BOD, TSS, fecal coliform, pH, chlorine residual) | Sampling being conducted, but not approved for or discharging |
| <input checked="" type="checkbox"/> | Whole Effluent Toxicity Testing 1 per 2 years | WET testing was conducted in 2005 and 2006. |
| <input checked="" type="checkbox"/> | Training up to date for system operators | Trainings conducted by handovers and/or manufacturer specific training. |
| <input checked="" type="checkbox"/> | Discharge records maintained | Records maintained properly No discharges in MOU waters present for 2007 to date. |
| <input checked="" type="checkbox"/> | Alarms functioning properly | Alarms appear to be functioning properly. |
| <u>Alarms</u> Shutdowns: not applicable High turbidity/TSS warnings: High wastewater levels: UV disinfection (intensity, bulbs, bank out, power failure): | | |

Section F: Sample Results

| Parameter | Effluent Result |
|---------------------------------------|-----------------|
| Biochemical Oxygen Demand 5-Day (BOD) | Not Applicable |
| Total Suspended Solids (TSS) | Not Applicable |
| Fecal Coliform, MF | Not Applicable |
| Residual Chlorine) | Not Applicable |
| Ammonia, Nitrogen | Not Applicable |
| pH | Not Applicable |

Section G: Summary of Findings/Comments

Introduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program, and Michael Cahill, Ecology Northwest Regional Office, Spill Prevention Unit, conducted the inspection of the Holland America Line OOSTERDAM on August 25, 2007. The main contacts on board the OOSTERDAM included Cornelis Kant, Environmental Officer, Marc Laughlan, AWWPS, and Robert Diaz, Deputy Director, Environmental Compliance HAL. Prior notification of the visit was given on August 21, 2007 for security protocol. The purpose of the inspection was to evaluate compliance with the *Memorandum of Understanding Cruise Operations in Washington State (MOU)*, as amended. The OOSTERDAM is currently not approved for and is not discharging black or graywater into MOU waters. The vessel has requested and received approval for discharge at greater than one nautical mile from shore and at greater than six knots in 2004, 2005, and 2006. Discharge approval has not been requested as of yet for the 2007 season. Discharges are being held until outside MOU waters.

The HOLLAND OOSTERDAM was built in 2002, and is 936 feet long with a width of 106 feet and a maximum draft of 26 feet. There are typically about 1800 passengers and about 650 crew. The ship's wastewater systems', Rochem, were installed in 2002. The vessel is powered with on-shore power during port calls in Seattle

Inspection

We arrived and boarded the ship at about 9:40 am and began with introductions and a plan for the day. We then discussed various waste streams, and the operation of food waste, air conditioning condensate, pool/spa water, water bunkering and production, photo waste, laundry water, and medical wastes. We discussed protocols for discharges. Discharge records were reviewed for blackwater and graywater discharges, and oily water discharges. We then headed to the bridge to review discharge procedures and to verify locations of certain discharges. We then viewed and discussed the black and graywater treatment systems, as well as the oily bilge system. The inspection was then finalized and I disembarked the vessel at about 11:50 am. Mr. Cahill stayed on board to finalize a fuel bunkering inspection.

Discharge Types and Protocols:

All discharges to water occur at greater than 12 nautical miles and outside of MOU waters. No discharges occur in the Olympic Coast National Marine Sanctuary.

Food waste is collected from the galley and is sent to the press. The solid food waste is heated (by steam engine), dried and incinerated. The liquid food waste is sent to the graywater system for treatment. Grease is collected separately and off-loaded to shore, often in Seattle for biodiesel use

Plastics and garbage are separated from the food waste at the source/galley and is overseen by various staff several times a day. Cardboard is incinerated along with the food waste. Holland America Line is looking into using plastic foldable boxes for products to cut down on the amount of cardboard incinerated. There is not enough room on the vessel to store the cardboard for recycling.

Air conditioning condensate is collected and discharged while underway at greater than 12 nautical miles. Pool and spa water is always discharged at greater than 12 nautical miles.

Potable water is bunkered now and then, while the rest is produced by desalination. Steam from the boilers heat up the sea water with low pressure evaporation. The condensate is then chlorinated and adjusted for pH prior to distribution. Salt collected from the evaporators is sent back to the sea. Scaling is treated with acid and is then neutralized prior to discharge at sea. Residual chlorine is monitored at the furthest point for a minimum of 0.2 ppm.

Silver is captured from the photo waste, collected and off-loaded as hazardous waste in Victoria. All hazardous wastes to shore are off-loaded in Victoria.

Laundry water is sent to the graywater system for treatment. Eco-Lab products are used for the laundry and cleaning.

Medical waste is collected and sent to shore with hazardous waste, including sharps. Medicines that are not used or expired are sent back to the manufacturer.

Oily bilge water is sent to the 50 ppm oily water separator, then to the intermediate tank and then to the 15 ppm oily water separator (photos #10 and #11). If the effluent does not meet 15ppm, it is automatically sent back for further treatment. The effluent that meets 15 ppm is either discharged at greater than 12 nautical miles and outside of MOU waters or is sent to a clean tank and later discharged. All effluent first goes through the white box (photo #12) for monitoring prior to discharge.

Discharge Protocol:

Only upon verification of location between the Bridge and the Engine Control Room (ECR), will a discharge occur at greater than 12 nautical miles and outside of MOU waters. The maps on the bridge clearly showed that no discharges are to occur in the Olympic Coast National Marine Sanctuary. The Bridge also has discharge protocols displayed showing that approval must be granted first by Ecology for black and graywater discharges. The Bridge authorizes any discharge. The latitude and longitude coordinates are recorded in the *Sewage and Graywater Discharge Record Book* and in the deck log. There is an overboard valve monitoring system (photo #01) on the bridge. The system has four lights:

- >12 nm
- > 4, <12 nm
- <4 nm
- Special Areas

The "special areas light" means no discharges (lit during inspection). The computer system "Overboard Valve Monitoring" system details where certain discharges can and cannot take place and includes alarms (including a greater than 6 knots alarm). When any overboard valve is open, the location (lat and long) is automatically recorded (open and close). The date, time and location of both the start and the stop of the discharges are recorded, along with port location, effluent type, volumes, and speed. Discharges are tentatively scheduled ahead of time by matrix, but locations are always verified prior to discharges. All discharge records that were reviewed appeared to be in compliance with the MOU. Two locations were plotted at the Bridge for verification of location (graywater discharges). The discharges occurred in Canadian waters.

The discharge ports have either locks, green tags (photo #08), seals (photo #10), or a combination there of. The seals automatically record when the valve is open or closed. It is recorded when a tag or lock is broken or opened.

Graywater System:

Laundry water and passenger shower/sink wastewater goes into the graywater holding tank and is sent to the low pressure reverse osmosis (LP-RO) treatment system. The flow enters the prefiltration SWECO system (photo #13) and then goes to the LP-RO units (photo #14). Screenings from the prefiltration are collected and sent to incineration. The LP-RO system consists of four different units. The number of units used can be changed depending on need. Effluent from the LP-RO system goes to a permeate tank and then onto ultraviolet (UV) disinfection. PH is adjusted with sodium acid and caustic soda. From the UV, the flow can either go straight overboard (photo #17) after being combined with the blackwater system effluent, or can go to storage tanks. The graywater system is not currently operating due to operational problems and no discharges are occurring in MOU waters (can hold for about 2.5 days). The final effluent had been showing high BOD from the graywater system and some higher fecal coliform results. The graywater system has also been having problems with condensate in some of the valves. The refrigerated dryer has not been working properly to dry the valves. Staff has been sending sampling results to Rochem. It is recommended that staff work closely with Rochem to resolve the operational problems.

Blackwater System:

Toilet waste, Galley waste, infirmary drains and crew waste goes to a collection tank (photo #07) and then to a buffer tank (photo #03) and then onto the blackwater treatment system (Rochem UF; ultrafiltration) From the buffer tank, flow goes to prefiltration through the SWECO system (photo #04). Solids are vibrated out and sent to incineration. PH is adjusted after prefiltration. Liquid from the prefiltration filtrate tank (photo #05) goes to the bioreactors (photo #06). From the bioreactors, flow goes through the membranes for ultrafiltration (UF). Effluent from the membranes is disinfected via a separate UV system (photo #08) where turbidity (photo #09) is monitored as well. From the UV, the flow can either go straight overboard after being combined with the graywater system effluent (photo #02), or can go to storage tanks. The blackwater system is currently not discharging in MOU waters.

Samples was not conducted per HAL request. Sampling is not required per the MOU when not approved and not discharging.

Conclusions and Recommendations

Staff seemed very knowledgeable of the protocols and systems.

It is recommended that staff work closely with Rochem to resolve the operational problems of the graywater system.

Attachments:

Photographs

Copies to:

William Morani, Jr., HAL

Bob Diaz, HAL

John Turvey, HAL

Tina Stoltz, HAL

Cornelis Kant, Environmental Officer

Amy Jankowiak, Ecology

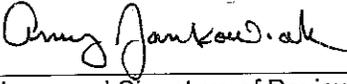
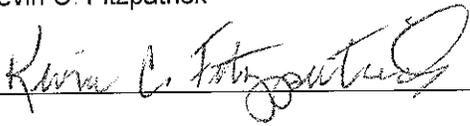
Mark Toy, Health

Michael Cahill, Ecology

Kevin Fitzpatrick, Ecology

Central Files: Holland America Line – HOLLAND OOSTERDAM; WQ 6 1

Section H: Signatures

| <u>Name and Signature of Inspector</u> | <u>Agency/Office/Telephone</u> | <u>Date</u> |
|--|---|-------------|
| Amy Jankowiak  | Department of Ecology/Northwest Regional Office/Water Quality Program/Compliance Specialist/(425) 649-7195 | 9/25/07 |
| <u>Name and Signature of Reviewer</u> | <u>Agency/Office/Telephone</u> | <u>Date</u> |
| Kevin C. Fitzpatrick  | Department of Ecology/Northwest Regional Office/Water Quality Section Manager/(425) 649-7033 | 9/25/07 |

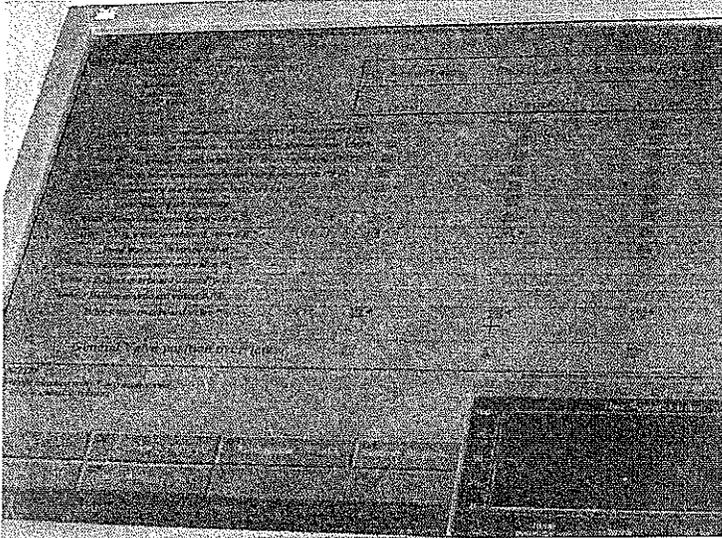


PHOTO #:01 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No :P8250020
DESCRIPTION: OVERBOARD VALVE MONITORING SYSTEM

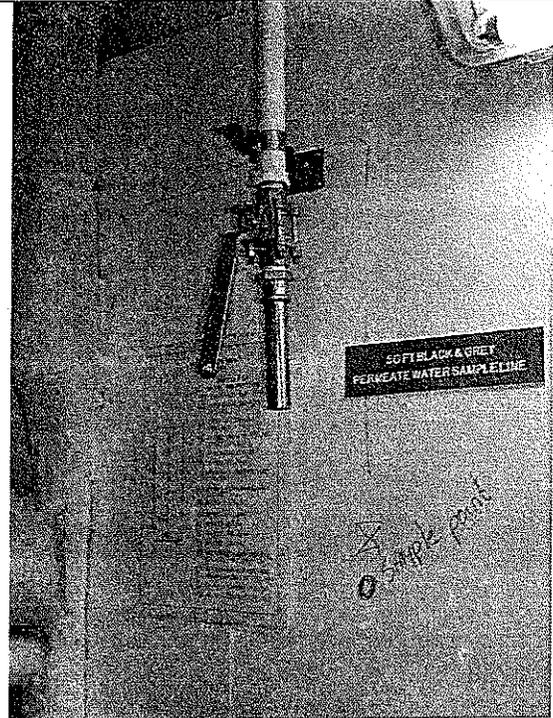


PHOTO #:02 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8250022
DESCRIPTION: AWTS EFFLUENT SAMPLE PORT

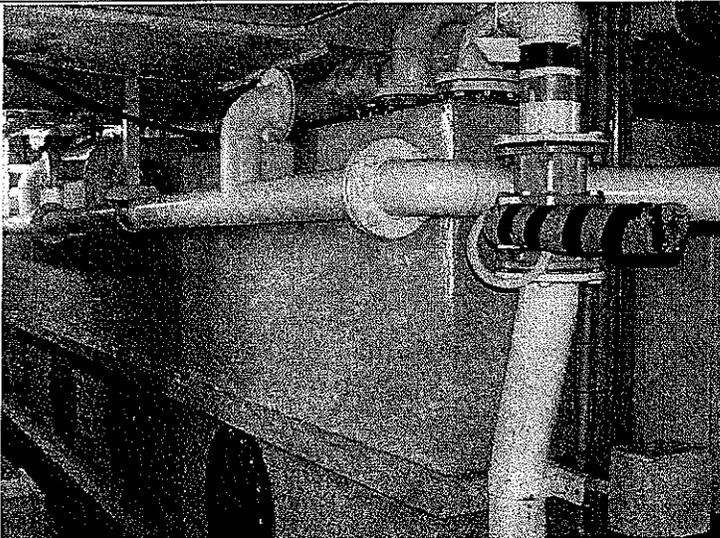


PHOTO #:03 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8250023
DESCRIPTION: AWTS - BLACKWATER BUFFER TANK

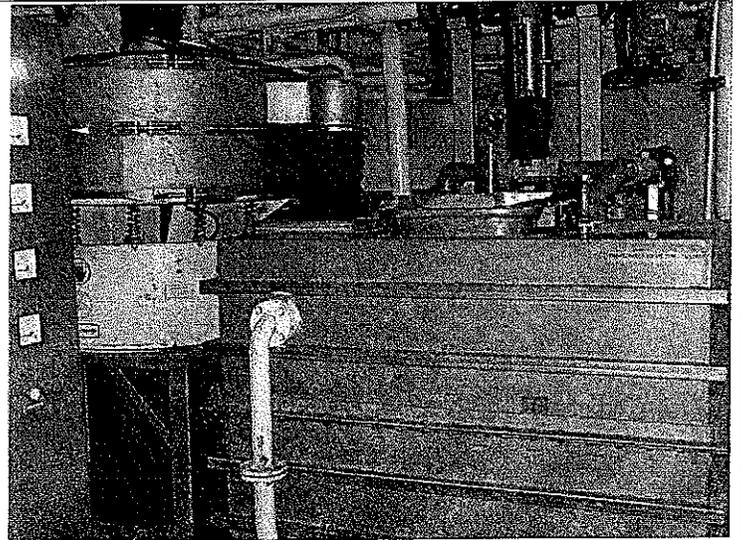


PHOTO #:04 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8250025
DESCRIPTION: AWTS - BLACKWATER PREFILTRATION SYSTEM (SWECO FILTER), SOLIDS SEPARATION

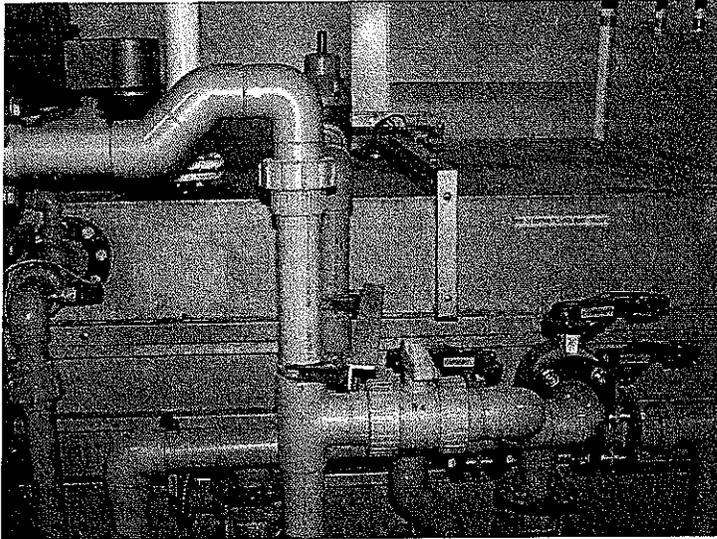


PHOTO #:05 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8250026
DESCRIPTION: AWTS – BLACKWATER PREFILTRATION SYSTEM,
FILTRATE SEPARATION

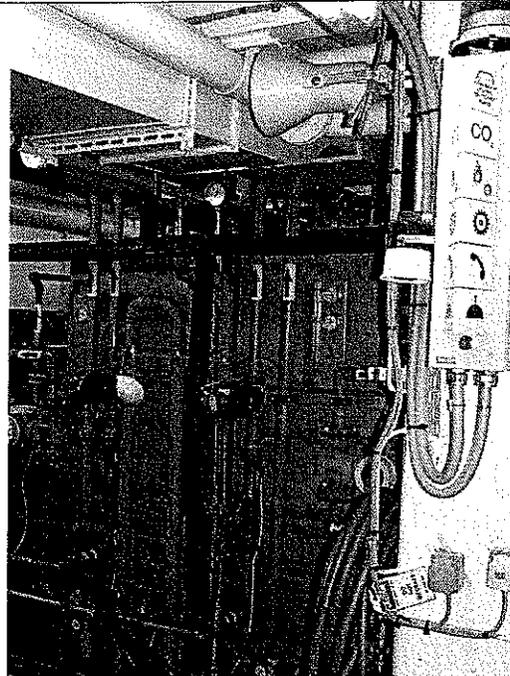


PHOTO #:06 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8250027
DESCRIPTION: AWTS – BLACKWATER SYSTEM
BIOREACTORS/ULTRAFILTRATION

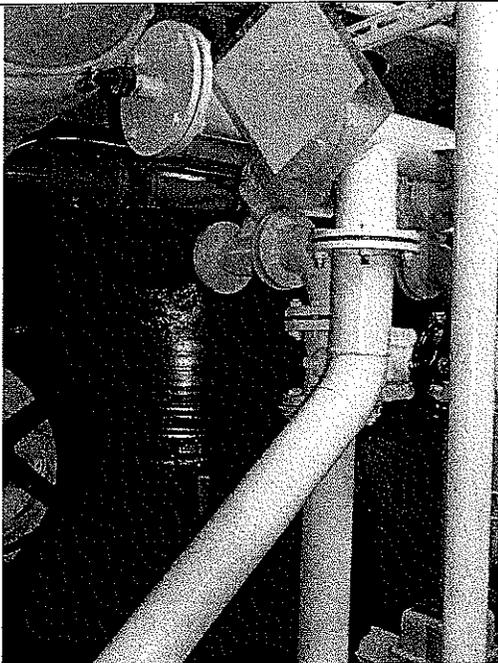


PHOTO #:07 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8250028
DESCRIPTION: BLACKWATER COLLECTION TANK

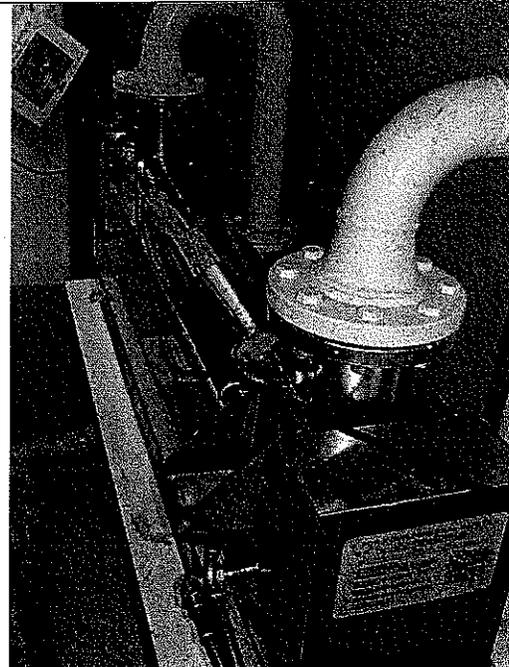


PHOTO #:08 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8250029
DESCRIPTION: AWTS – ULTRAVIOLET DISINFECTION SYSTEM

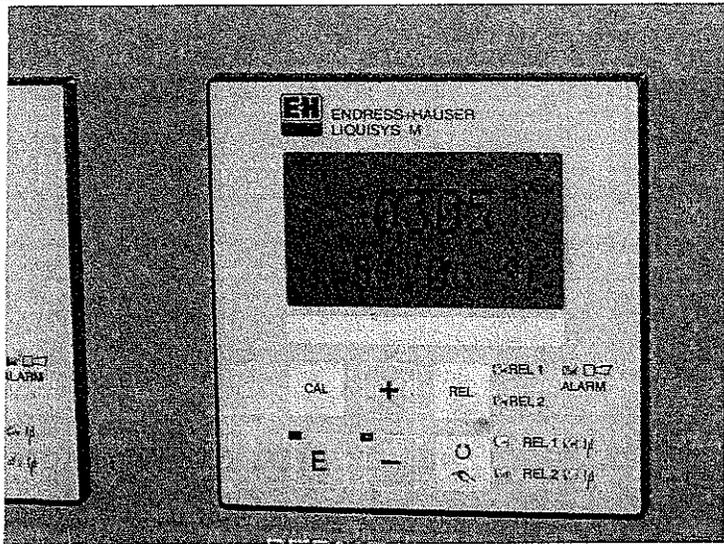


PHOTO #:09 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8250030
DESCRIPTION: AWTS - BLACKWATER SYSTEM TURBIDITY
METER

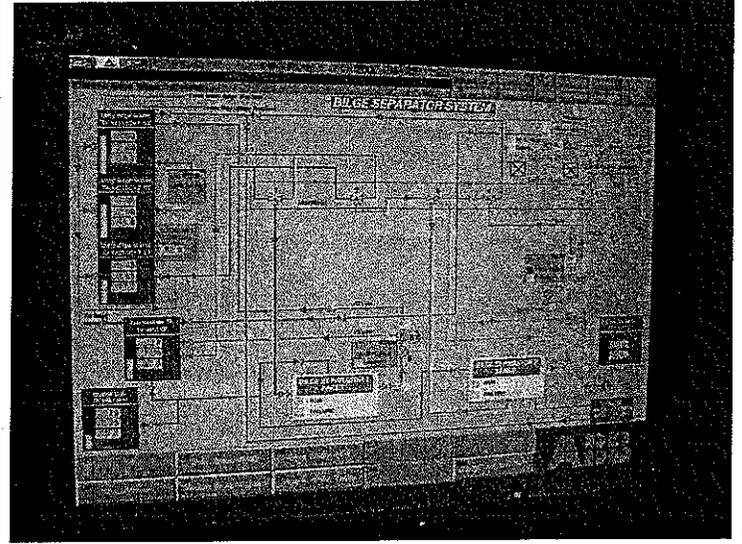


PHOTO #:10 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8250035
DESCRIPTION: OILY BILGE SYSTEM

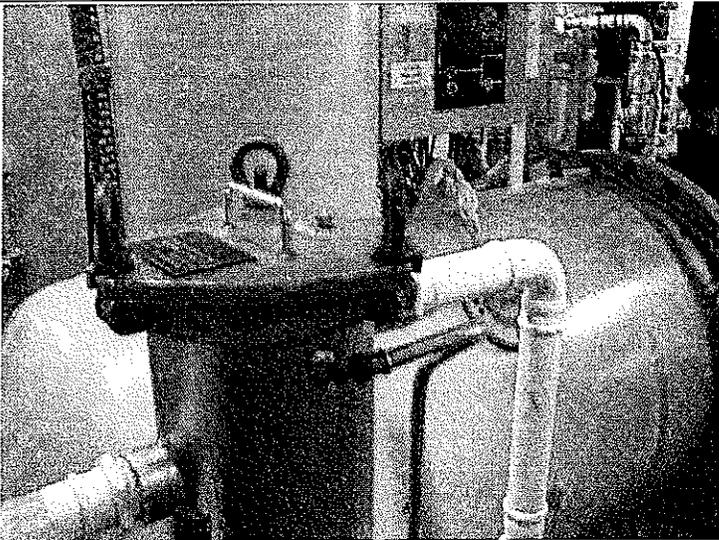


PHOTO #:11 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8250036
DESCRIPTION: OILY WATER SEPARATOR (1 OF 2)

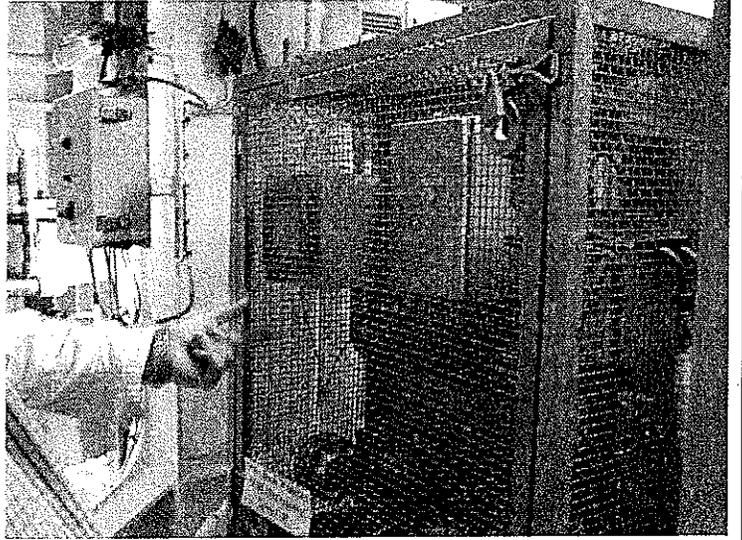


PHOTO #:12 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P8250038
DESCRIPTION: OILY BILGE SYSTEM WHITE BOX

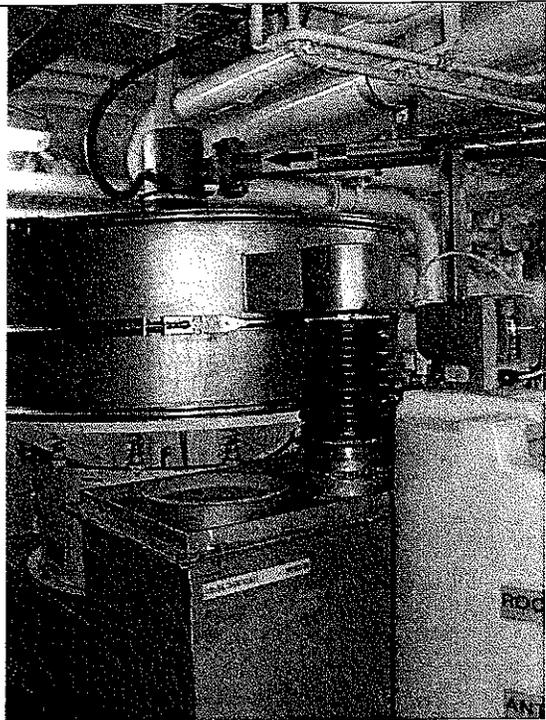


PHOTO #:13 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE NO :P8250039
DESCRIPTION: AWTS – GRAYWATER SYSTEM PRE-FILTRATION
SYSTEM

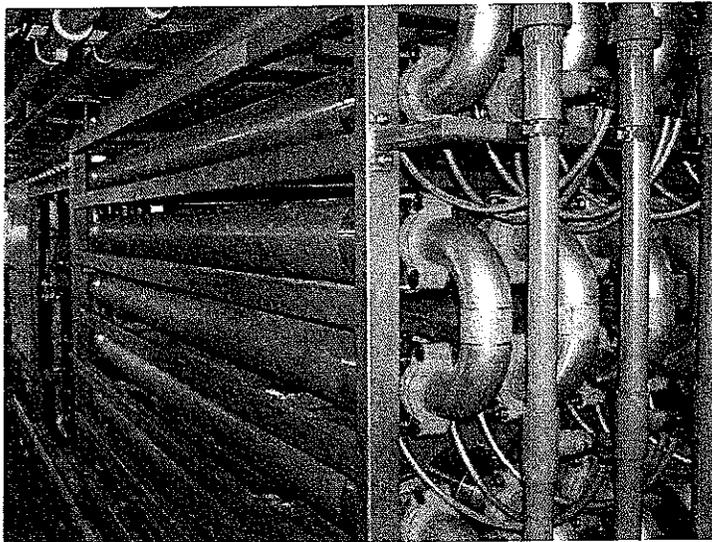


PHOTO #:14 DATE: 08/25/07 TAKEN BY: AMY JANKOWIAK
FILE No :P8250040
DESCRIPTION: AWTS – GRAYWATER SYSTEM – REVERSE
OSMOSIS



State of Washington Department of Ecology
**Verification of Operating Conditions
of Advanced Wastewater Treatment
Systems for Cruise Ship Discharges**

Northwest Regional Office
3190 160th Ave SE
Bellevue, WA 98008
Phone: (425) 649-7000 Fax: (425) 649-7098

Section A: General Information

| | | | |
|--|---|-----------------------------------|---|
| Vessel Name: | NORWEGIAN PEARL | Date: | September 2, 2007 |
| Vessel Operator: | NCL (Bahamas) Ltd | Entry Time: | 9:30 AM |
| IMO Number: | 9195157 | Exit Time: | 11:45 AM |
| Vessel Type: | Passenger Ship | Notification (name & date): | Randy Fiebrandt, August 27, 2007 |
| Location: | Pier 66, Seattle | | |
| On-board contact(s): | Ernst Bugge, Environmental Officer; Daniel Gaza, Environmental Engineer | | |
| Inspector(s): | Amy Jankowiak, Ecology Northwest Regional Office, Water Quality Program; Mark Toy, Department of Health | | |
| # passengers/crew: | ~4000 total | Amount of Wastewater: Per VSSP | Design: 1780 m ³ /day blackwater; 1200 m ³ /day graywater through Scanship Generation: 100 m ³ /day blackwater; 1000 m ³ /day graywater |
| Description of advanced wastewater treatment system (name, type, major components, etc.): Scanship is a biological reactor and ultrafiltration system. The system includes prefiltration, biological treatment via a biofilm process, chemical precipitation, clarification through flotation tanks, polishing filtration and UV disinfection. Approval for continuous discharge from Ecology was granted on May 3, 2007. | | | |

Section B: Areas Evaluated

| | | | | | | | |
|-------------------------------------|------------------------------|-------------------------------------|------------------------------------|-------------------------------------|--------------------------|-------------------------------------|---|
| <input checked="" type="checkbox"/> | Black/Gray wastewater system | <input checked="" type="checkbox"/> | Operations Center/ Computer system | <input checked="" type="checkbox"/> | Records/Reports | <input checked="" type="checkbox"/> | Sampling/Monitoring |
| <input checked="" type="checkbox"/> | Discharge locations | <input checked="" type="checkbox"/> | Operations & Maintenance | <input checked="" type="checkbox"/> | Sludge Handling/Disposal | <input checked="" type="checkbox"/> | Other (oil spill notification drill, debunking) |

Section C: For vessels discharging ≥ 1nm from berth and ≥ 6 knots only

| | | |
|--------------------------|---|----|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | NA |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | NA |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance) in place | NA |

Section D: For vessels discharging continuously (at berth or within 1 nm of berth)

| | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | Schematics match black/gray wastewater system | System is as depicted in schematics. |
| <input checked="" type="checkbox"/> | Sludge disposal protocol per MOU | Discharges 12 nm out and outside of the Olympic Coast National Marine Sanctuary Area to Be Avoided per stated protocol. |
| <input checked="" type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance and for system shut down) in place | NCL Headquarters in Miami is notified and local authorities are also contacted. A notification sheet with Ecology's phone numbers were available and viewable on the vessel. A copy of the MOU was on the SEMS system, but it was an old amendment version (No. 1) The current version of the MOU is Amendment No. 3. |
| <input checked="" type="checkbox"/> | Operations as described in submitted documentation | Operations were as described. |
| <input checked="" type="checkbox"/> | Daily 24-hour continuous turbidity or equivalent monitoring | Has continuous TSS monitoring. |
| <input checked="" type="checkbox"/> | Turbidimeter or equivalent monitoring equipment functioning properly | Appears to be functioning properly. Details in narrative. |
| | <u>Turbidity or equivalent</u> Last calibration: Daily Frequency of readings: continuous Trigger level for alarm: 20 mg/l, calls environmental engineer 30 mg/l switches automatically to hold and does not allow discharge until the problem is fixed and the TSS levels are normal. Recorded turbidity/equivalent levels above triggers: Yes. Automatic shut down is working. | |

| | | |
|-------------------------------------|--|---|
| <input checked="" type="checkbox"/> | Auto shut down or operational controls to insure system shut down if a system upset occurs | Automatic shutdown appears to be operating properly |
| <input checked="" type="checkbox"/> | Ultraviolet (UV) light disinfection immediately prior to discharge | 3 UV banks available to run in series for effluent. Using 2 of the 3 typically (readings at time of inspection – 60 w/m ² and 78 w/m ²) |
| <input checked="" type="checkbox"/> | UV replacement bulbs available | There is at least one unit's worth of spares available. |
| <input checked="" type="checkbox"/> | UV/bulbs cleaned regularly | Yes, the units are cleaned by dosing Metal Bright automatically about every 110 hours. Hand wiping of the bulbs is done about once monthly and is checked weekly. |

Section E: General

| | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | Sampling conducted 2/month, 1/month in Seattle (BOD, TSS, fecal coliform, pH, chlorine residual) | As of the date of the inspection, sampling has been conducted as required. |
| <input checked="" type="checkbox"/> | Whole Effluent Toxicity Testing 1 per 2 years | WET testing not yet required for vessel – in first season of operation. |
| <input checked="" type="checkbox"/> | Training up to date for system operators | Scanship conducts training on the ship during start-up of the system and handover training occurs. The Chief Engineer, Environmental Officer and Environmental Engineer are all trained by Scanship at a minimum. |
| <input checked="" type="checkbox"/> | Discharge records maintained | Maintained properly |
| <input checked="" type="checkbox"/> | Alarms functioning properly | Alarms appear to be functioning properly |
| | Alarms Shutdowns: Yes High turbidity/TSS warnings: Yes High wastewater levels: Yes UV disinfection (intensity, bulbs, bank out, power failure): Yes | |

Section F: Sample Results

| Parameter | Effluent Result |
|---------------------------------------|---------------------|
| Biochemical Oxygen Demand (BOD 5-Day) | <10 mg/l |
| Total Suspended Solids (TSS) | 67 mg/l |
| Fecal Coliform (MF) | <1 CFU/100 ml |
| Residual Chlorine | <0.1 mg/l |
| Ammonia, Nitrogen | 0.088 mg/l |
| pH | 7.20 standard units |

Section G: Summary of Findings/Comments

Introduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program, Municipal Compliance Specialist conducted the inspection of the NORWEGIAN PEARL on September 2, 2007 along with Mark Toy, Washington State Department of Health, Office of Shellfish and Water Protection. The main contacts on board the NORWEGIAN PEARL included Ernst Bugge, Environmental Officer and Daniel Gaza, Environmental Engineer. Mr. Gaza operates the Scanship system. Prior notification of the visit was given on August 27, 2007 for security protocol. The purpose of the inspection was to evaluate compliance with the *Memorandum of Understanding Cruise Operations in Washington State* (MOU), as amended including the operating conditions of Advanced Wastewater Treatment System (AWTS). The NORWEGIAN PEARL received approval to discharge continuously per the MOU on May 3, 2007.

The NORWEGIAN STAR was built in 2005 and started service in November of 2006. It is 965 feet long with 15 guest decks, with about a 27-foot draft. Passenger capacity is 4080 total passenger berths. There are typically about 4000 people in total on board including passengers and crew.

Inspection

We arrived boarded the ship at 9:30 am and began with introductions and a plan for the day. We then discussed discharge protocols, non-compliance notifications, and training. We also discussed the process and protocols of various waste streams. We then reviewed the gray and blackwater discharge books and discussed the operation of the Scanship system. We then toured the sludge dryers, garbage and recycling area, food waste, incinerators, ballast and bilge. We then toured the Scanship system. Samples were pulled from the AWTS prior to finalizing the inspection and disembarking the vessel at about 11:45 am.

Non-compliance Notification with the MOU: Notification procedures were known and readily available for non-compliance with the MOU. NCL Headquarters in Miami is notified and local authorities are also contacted. A notification sheet with Ecology's phone numbers were available and viewable on the vessel.

Copy of the MOU: A copy of the MOU was on the SEMS system, but it was an old amendment version (No. 1). The current version of the MOU is Amendment No. 3. The copy of the MOU from Ecology's website was shown to Mr. Bugge. The SEMS system should be updated to include the most recent version of the MOU.

Discharge Types and Protocols:

The latitude and longitudes are recorded in the *Sewage and Graywater Discharge Record Book* along with all other discharge records. Discharge records were well kept and include dates, times, discharge locations, port locations, effluent type, volumes, speed, signatures and remarks. Discharge protocols include a pre-schedule include detailed estimated times for the various types of discharges. Also, prior to any discharge, a notification from the bridge is made, as well as a notification prior to closing discharge ports.

Food waste sent from the galley by chutes to two pulpers (grinders) (photos #04 and #07) and then to a tank (photo #08). The waste is then screened and the liquid is sent to the Scanship system for treatment. The solids screened out are sent to the sewage sludge tank where they are either dried (photos #01 and #03) and incinerated (photos #09 and #10) along with the sludge or held until discharge outside of MOU/Olympic Coast National Marine Sanctuary (OCNMS) waters. Grease is collected separately by filter and sent to the sewage sludge tank as well.

Oily bilge water is treated via two Marinfloc systems (photo #12) to <5 ppm. White boxes (photo #13) are used to assure oil content by monitoring the oil content, and storing the start/stop discharge time, volume, and ship position.

All solid wastes and recyclable materials (except for aluminum) are landed ashore in Victoria including cardboard, medical sharps, hazardous waste (photo #05), and x-ray and photo waste at < 5ppm. Medical waste is incinerated along with food-contaminated cardboard and sludge. Expired medications are collected with hazardous waste. Fluorescent light bulbs are crushed with a mercury removal system (photo #06). Paper is shredded (photo #02) and compacted. Aerosol is removed (photo #05) prior to landing ashore.

Treated effluent from the AWTs is discharged continuously. Laundry water is sent to the Scanship system for treatment. Ballast water is exchanged outside of Washington waters and has ultraviolet (UV) disinfection (photo #11).

The Environmental Officer (EO) has the key for the oily water white boxes and all overboard valves (the Captain and Chief Engineer also have keys, but all discharges go through the EO). The bridge contacts the control room, and the EO opens the locks for discharges.

Scanship Advanced Wastewater Treatment System:

Graywater and blackwater from the ship are collected in a tank - mixed. The wastewater is pumped to two drum screens for pre-screening, followed by biological treatment (biofilm on rotating plastic pieces - 2 tanks in series) (photo #15), chemical precipitation (flocculants, polymer) (photo #14), clarification via flotation tanks (2 tanks) (photo #17), ultrafiltration via polishing filters (2 rotating mesh drums) (photos #18 and #19), and disinfection via ultraviolet light (UV) (photo #20). Solids from the screen press and flotation tanks goes to the sludge tank. Material from the sludge tank is either dried and incinerated, or held until outside MOU/OCNMS waters. A defoamer (photo #16) is added to the bioreactor as needed.

Total Suspended Solids (TSS) is monitored continuously at UV disinfection. If the TSS exceeds 20 mg/l, the system alarms and calls the Environmental Engineer for response. At 30 mg/l, the discharge automatically shuts down and sends the effluent to holding tanks. A discharge is held until the problem is fixed and the TSS levels are normal. During the inspection, TSS trends were looked at. TSS levels have been high, and the automatic shut down has occurred. Often the pressure changes from changing valves is enough to trigger a higher TSS level.

There are three UV banks that are able to run in series for effluent with 14 bulbs each. Only two of the three are needed and typically used at any one time, allowing for cleaning and maintenance. There is one unit's worth of spare bulbs available. The units are cleaned by dosing Metal Bright at automatically about every 110 hours. Hand wiping of the bulbs is done about once a month with checks done weekly.

Sampling:

Samples were taken for Biochemical Oxygen Demand (BOD 5-Day), Total Suspended Solids (TSS), pH, chlorine residual, fecal coliform and ammonia from the effluent of the UV disinfection at the discharge port (photo #21). The samples were put

on ice immediately and were transported to AmTest laboratory in Redmond, Washington that day. Chain of Custody and sampling procedures were followed. All results are in Section F. The result for TSS was 67 mg/l. This result is higher than the results submitted to Ecology for the 2007 season thus far – average results have been about 12 mg/l, with a high of 44 mg/l. Limits for TSS as specified in the MOU are 30 mg/l for a 30-day average, and 45 mg/l for a 7-day average. It is recommended that operations staff look into the possible reasons for the occasional higher TSS results.

Conclusions and Recommendations

The Scanship system appears to be functioning well with the exception of the occasional higher TSS values. It is recommended that operations staff look into the possible reasons for the occasional higher TSS results.

The staff was knowledgeable of the system.

Procedures for discharge appear to be thorough and inclusive of verification.

It is recommended that the SEMS system be updated to include the most recent version of the MOU.

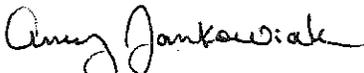
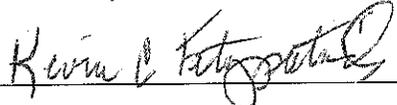
Attachments:

- Photographs
- Sampling Results Report

Copies to:

- Randy Fiebrandt, NCL
- Ernst Bugge, PEARL
- Amy Jankowiak, Ecology
- Kevin Fitzpatrick, Ecology
- Mark Toy, Dept. of Health
- ✓ Central Files: Norwegian Cruise Lines - NORWEGIAN PEARL; WQ 6.1

Section H: Signatures

| <u>Name and Signature of Inspector</u> | <u>Agency/Office/Telephone</u> | <u>Date</u> |
|--|--|-------------|
| Amy Jankowiak  | Department of Ecology/Northwest Regional Office/Water Quality Program/Compliance Specialist/(425) 649-7195 | 9/25/07 |
| Kevin C. Fitzpatrick  | Department of Ecology/Northwest Regional Office/Water Quality Section Manager/(425) 649-7033 | 9/25/07 |

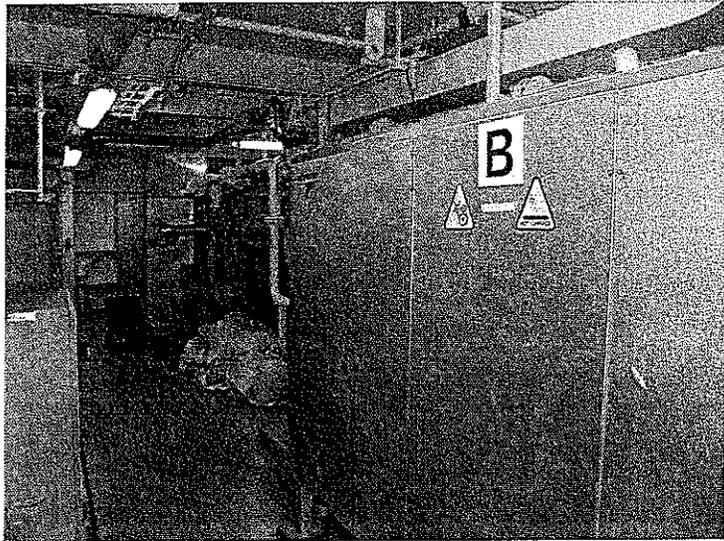


PHOTO #:01 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020014
DESCRIPTION: SLUDGE DRYERS (B – FRONT, A – BACK OF PHOTO)

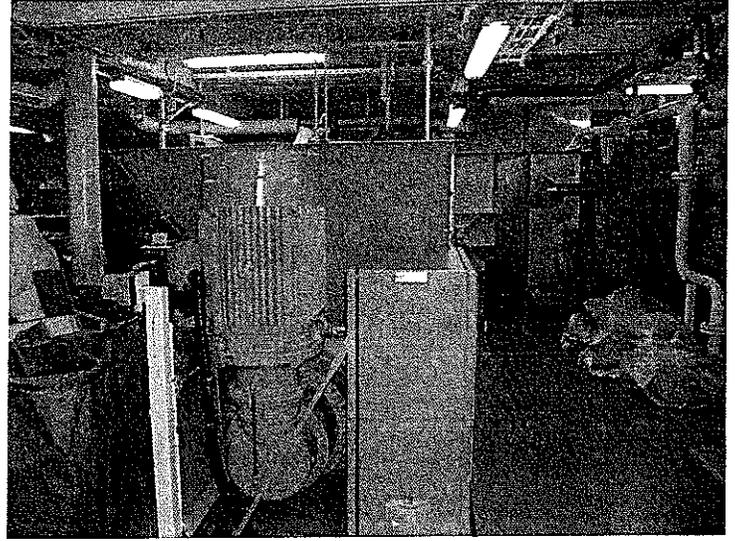


PHOTO #:02 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020015
DESCRIPTION: PAPER SHREDDER

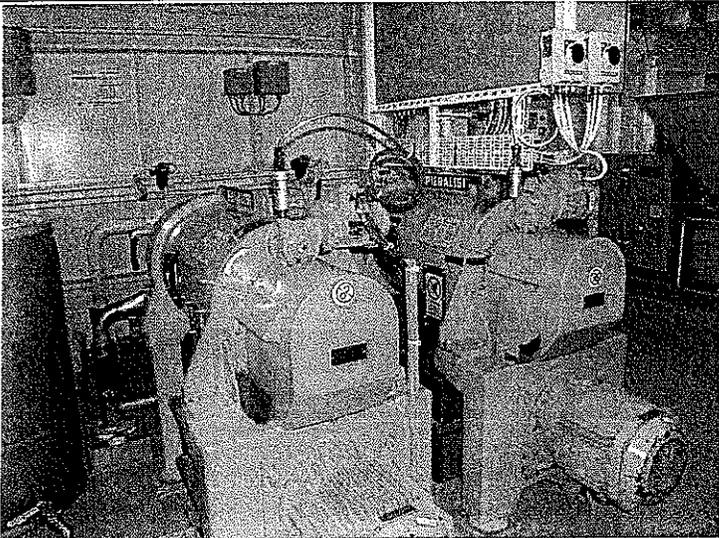


PHOTO #:03 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020018
DESCRIPTION: BIO SLUDGE DECANTERS (CENTRIFUGES)

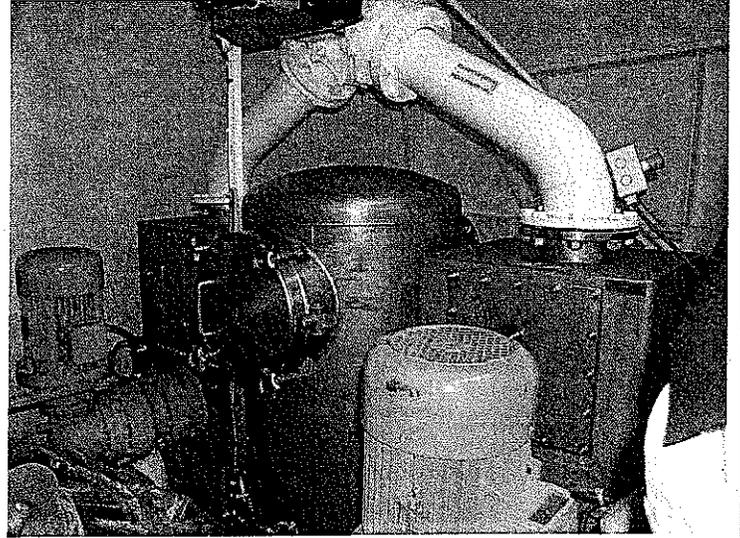


PHOTO #:04 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020019
DESCRIPTION: FOOD WASTE PULPERS

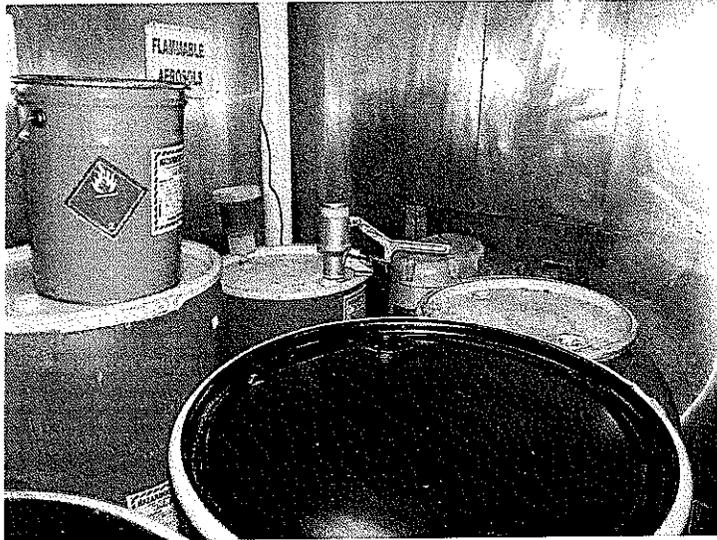


PHOTO #:05 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No : P9020022
DESCRIPTION: HAZARDOUS WASTE STORAGE – AEROSOL
DISPOSAL (BACK OF PHOTO)



PHOTO #:06 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020023
DESCRIPTION: FLUORESCENT BULB CRUSHER – MERCURY
REMOVAL SYSTEM

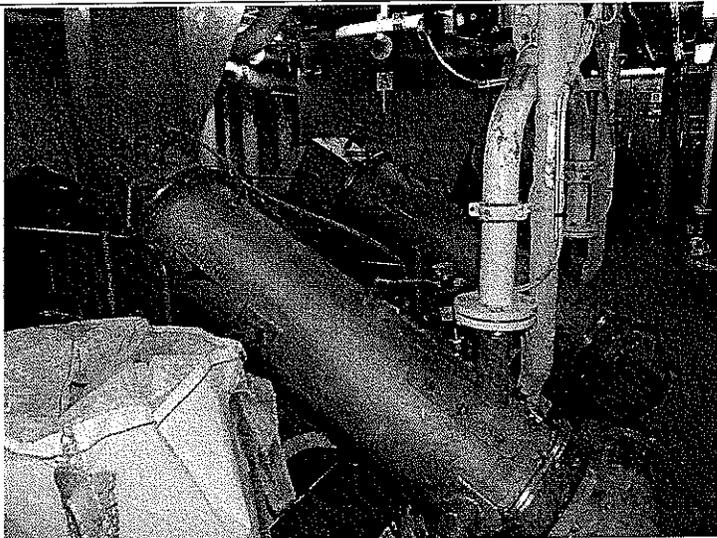


PHOTO #:07 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020024
DESCRIPTION: FOOD WASTE - DEWATERING

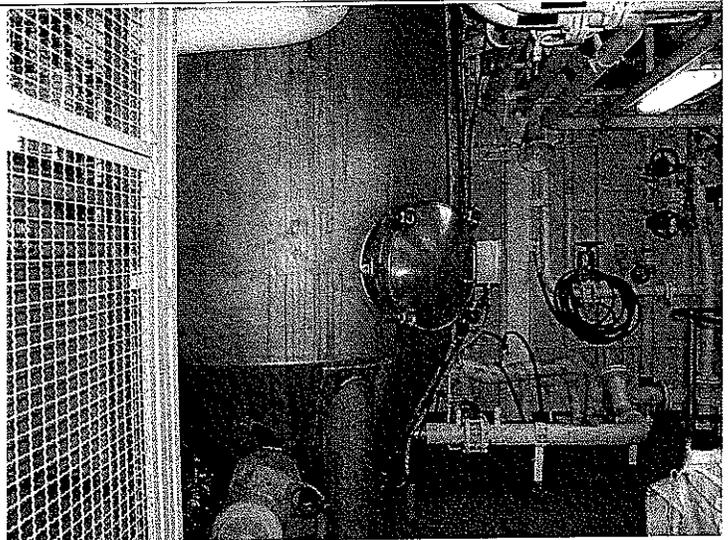


PHOTO #:08 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020025
DESCRIPTION: FOOD WASTE DEWATERING TANK

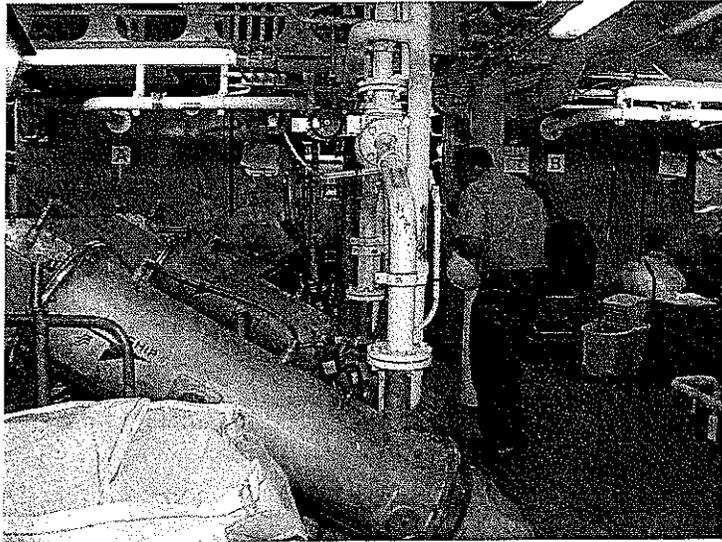


PHOTO #:09 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020027
DESCRIPTION: INCINERATOR SIOLOS

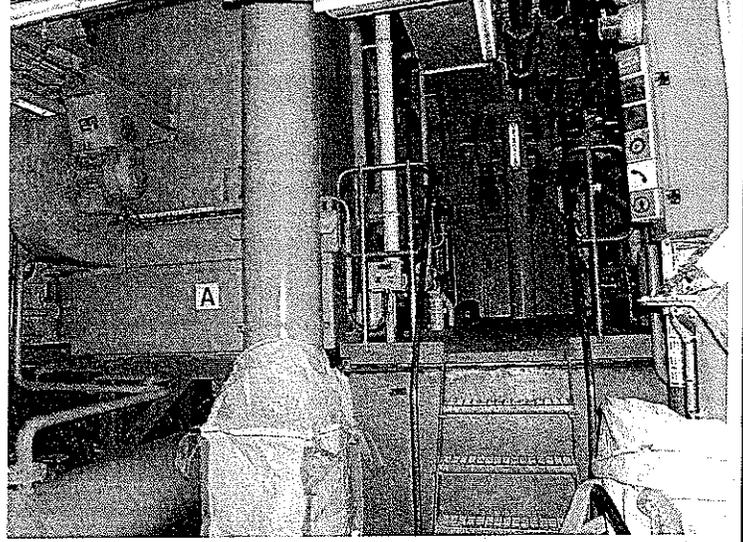


PHOTO #:10 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020030
DESCRIPTION: INCINERATORS

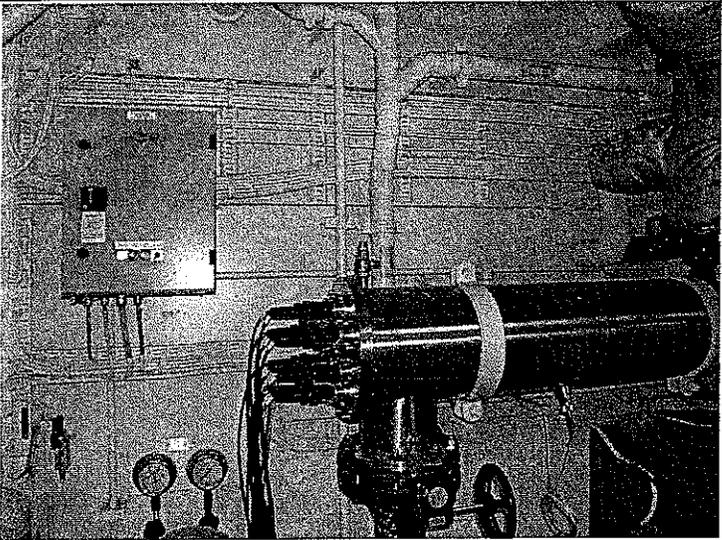


PHOTO #:11 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020031
DESCRIPTION: BALLAST UV DISINFECTION

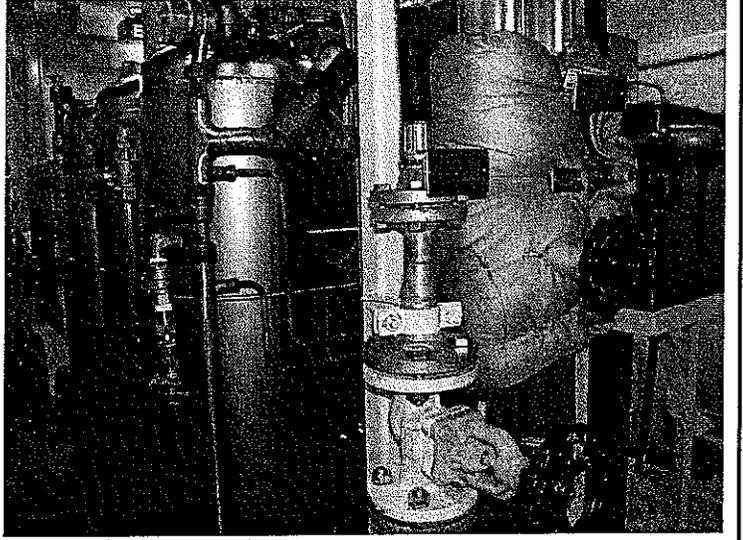


PHOTO #:12 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020032
DESCRIPTION: MARINFLOC OILY BILGE WATER SYSTEM

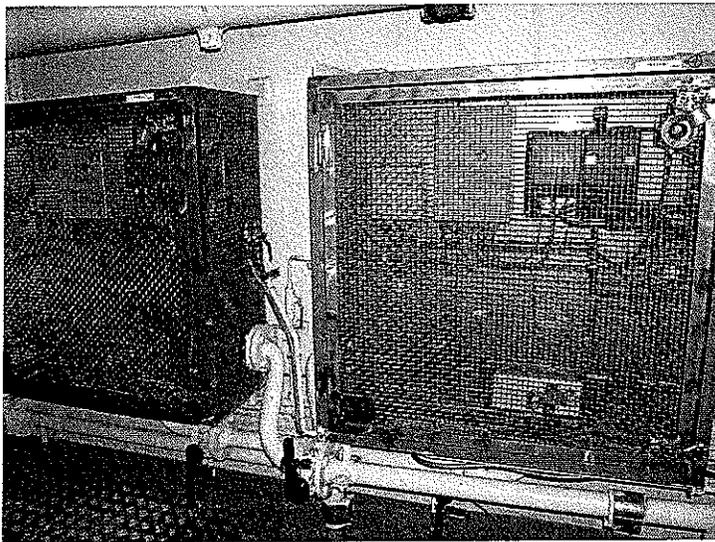


PHOTO #:13 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020033
DESCRIPTION: OILY BILGE WATER SYSTEM WHITE BOXES

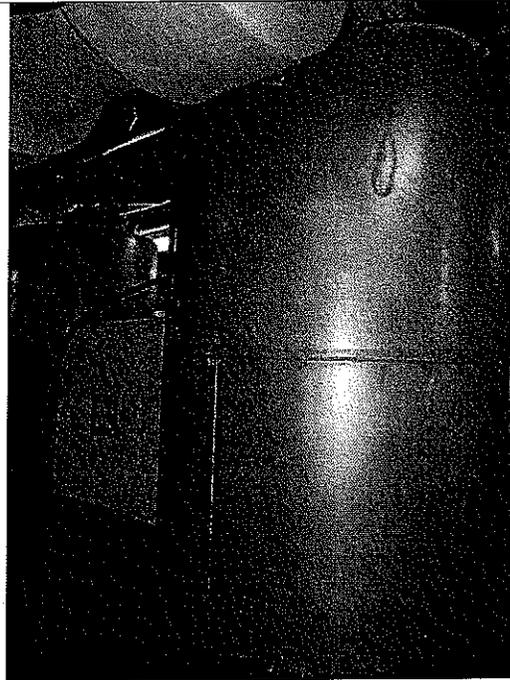


PHOTO #:14 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020034
DESCRIPTION: AWTS: FLOC TANK



PHOTO #:15 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020035
DESCRIPTION: AWTS: BIOREACTOR

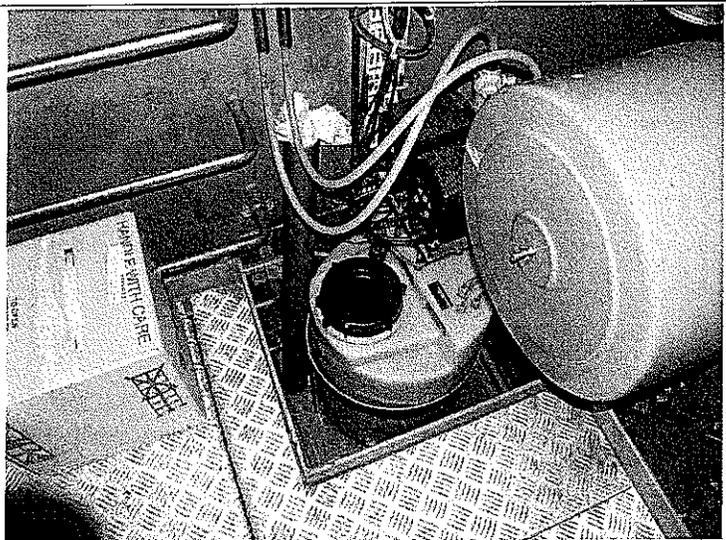


PHOTO #:16 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020037
DESCRIPTION: AWTS: BIOREACTOR DEFOAMER

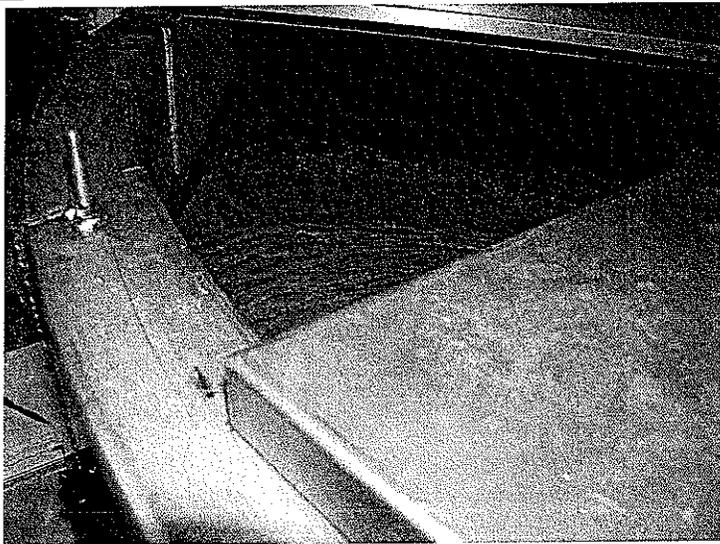


PHOTO #:17 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020038
DESCRIPTION: AWTS: FLOTATION TANK (1 OF 2)

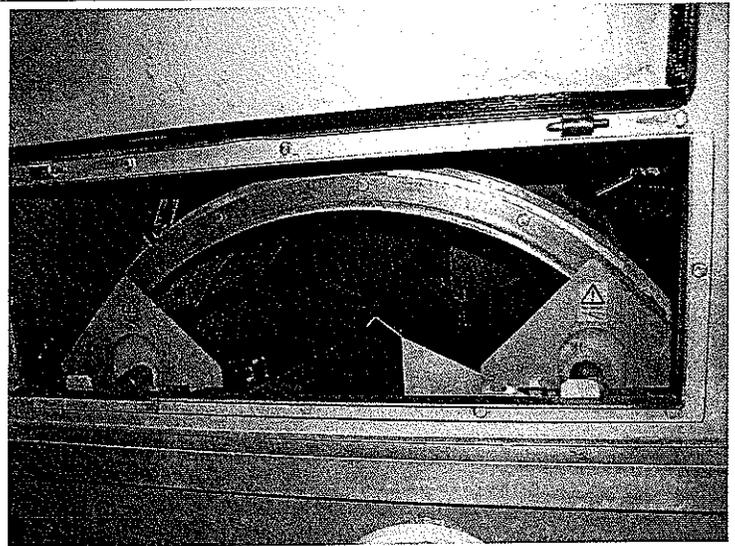


PHOTO #:18 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020040
DESCRIPTION: AWTS: POLISHING FILTER

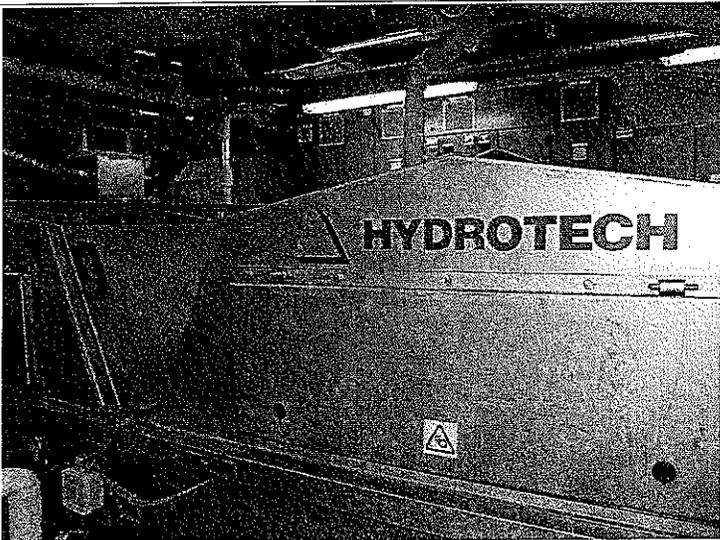


PHOTO #:19 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020041
DESCRIPTION: AWTS: POLISHING FILTER

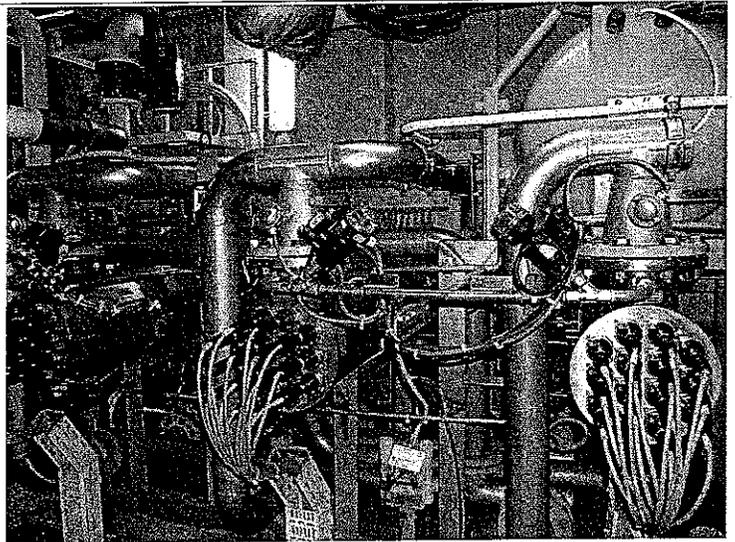


PHOTO #:20 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020042
DESCRIPTION: AWTS: UV DISINFECTION SYSTEM

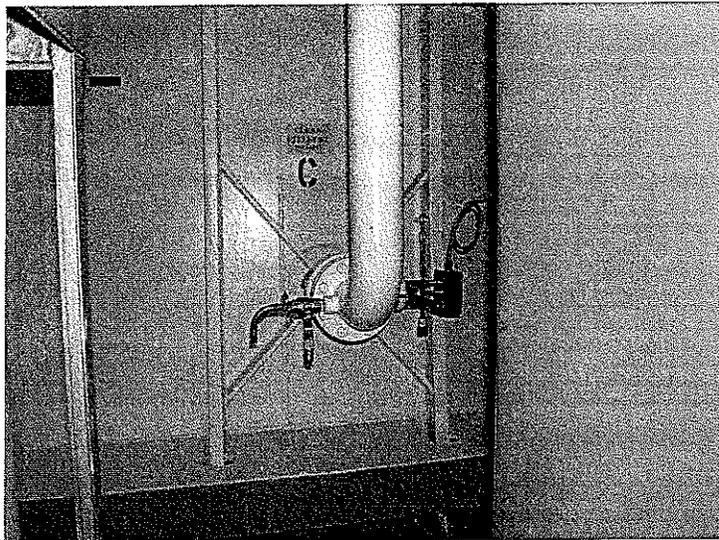


PHOTO #:21 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020046
DESCRIPTION: AWTS: DISCHARGE PORT AND SAMPLING
LOCATION

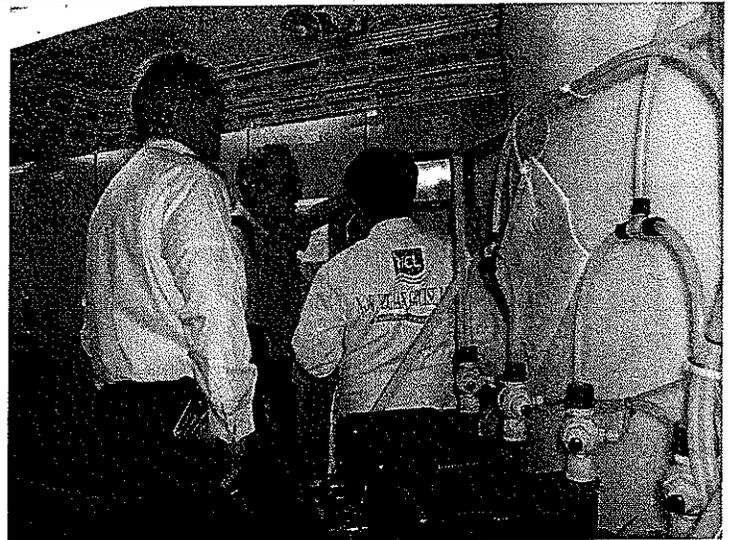


PHOTO #:22 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020047
DESCRIPTION: ERNST BUGGE, DANIEL GAZA, AND MARK TOY
REVIEWING UV ALARMS

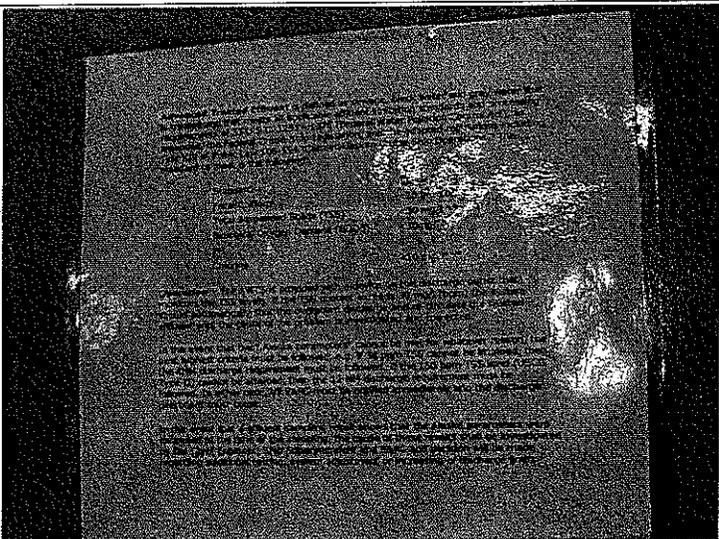


PHOTO #:23 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020048
DESCRIPTION: TSS DISCHARGE PLACARD



PHOTO #:24 DATE: 09/2/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9020049
DESCRIPTION: UV ALARMS PAGE



Am Test Inc.
14603 N E. 87th St.
Redmond, WA 98052
(425) 885-1664

Professional
Analytical
Services

RECEIVED

SEP 18 2007

DEPT OF ECOLOGY

Sep 13 2007
Department of Ecology
3190 160th Ave SE
Bellevue, WA 98008
Attention: Amy Jankowsak

Dear Amy Jankowsak:

Enclosed please find the analytical data for your Norwegian Pearl project.

The following is a cross correlation of client and laboratory identifications for your convenience.

| CLIENT ID | MATRIX | AMTEST ID | TEST |
|-----------|--------|------------|-----------------------|
| Pearl-Eff | Water | 07-A011175 | Micro, CONV, DEM, NUT |

Your sample was received on Sunday, September 2, 2007. At the time of receipt, the sample was logged in and properly maintained prior to the subsequent analysis.

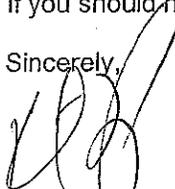
The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Kathy Fugiel
President

BACT = Bacteriological
CONV = Conventionals
TC=Total Coliforms

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals
APC=Aerobic Plate Count

Am Test Inc.
14603 N E. 87th St.
Redmond, WA 98052
(425) 885-1664
www.amtestlab.com



Professional
Analytical
Services

ANALYSIS REPORT

Department of Ecology
3190 160th Ave SE
Bellevue, WA 98008
Attention: Amy Jankowsak
Project Name: Norwegian Pearl

Date Received: 09/02/07
Date Reported: 9/13/07

AMTEST Identification Number 07-A011175
Client Identification Pearl-Eff
Sampling Date 09/02/07, 11:22
All results reported on an as received basis.

Microbiological

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|-----------------|--------|------------|---|------|----------|---------|----------------|
| Fecal Coliforms | < 1 | CFU/100 ml | | 1. | SM 9222D | KF | 09/02/07 12:00 |

Conventionals

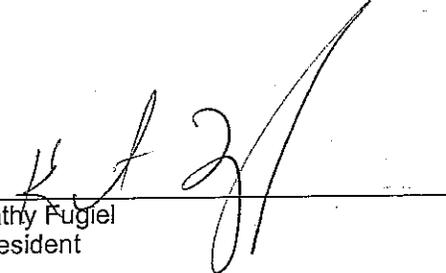
| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|------------------------|--------|-------|---|------|-----------|---------|----------|
| pH | 7.20 | unit | | | EPA 150.1 | KF | 09/02/07 |
| Chlorine Residual | < 0.1 | mg/l | | 0.10 | EPA 330.5 | KF | 09/02/07 |
| Total Suspended Solids | 67. | mg/l | | 1.0 | EPA 160.2 | JR | 09/11/07 |

Demand

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|-----------|--------|-------|---|------|---------|---------|----------|
| BOD | < 10 | mg/l | | 10. | SM 5210 | MRW | 09/02/07 |

Nutrients

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|------------------|--------|-------|---|-------|-----------|---------|----------|
| Ammonia Nitrogen | 0.088 | mg/l | | 0.005 | EPA 350.1 | TS | 09/07/07 |


Kathy Fugiel
President

AMTEST

LABORATORIES

QC Summary for sample number: 07-A011175

DUPLICATES

| SAMPLE # | ANALYTE | UNITS | SAMPLE VALUE | DUPLICATE VALUE | RPD |
|------------|------------------------|-------|--------------|-----------------|------|
| 07-A011175 | Chlorine Residual | mg/l | < 0.1 | < 0.1 | |
| 07-A010975 | Ammonia Nitrogen | mg/l | 6.6 | 7.6 | 14. |
| 07-A011077 | Ammonia Nitrogen | mg/l | 0.052 | 0.053 | 1.9 |
| 07-A011241 | Ammonia Nitrogen | mg/l | 0.047 | 0.046 | 2.2 |
| 07-A011344 | Ammonia Nitrogen | mg/l | 0.066 | 0.076 | 14. |
| 07-A011268 | Total Suspended Solids | mg/l | 530 | 530 | 0.00 |
| 07-A011415 | Total Suspended Solids | mg/l | < 1 | < 1 | |
| 07-A011415 | Total Suspended Solids | mg/l | < 1 | < 1 | |
| 07-A011416 | Total Suspended Solids | mg/l | 3.0 | 3.0 | 0.00 |

MATRIX SPIKES

| SAMPLE # | ANALYTE | UNITS | SAMPLE VALUE | SMPL+ SPK | SPK AMT | RECOVERY |
|------------|------------------|-------|--------------|-----------|---------|----------|
| 07-A011076 | Ammonia Nitrogen | mg/l | 40. | 52. | 12. | 100.00 % |
| 07-A011189 | Ammonia Nitrogen | mg/l | 0.096 | 0.32 | 0.25 | 89.60 % |
| 07-A011343 | Ammonia Nitrogen | mg/l | 35. | 41. | 5.0 | 120.00 % |
| 07-A011401 | Ammonia Nitrogen | mg/l | 0.14 | 0.34 | 0.25 | 80.00 % |

STANDARD REFERENCE MATERIALS

| ANALYTE | UNITS | TRUE VALUE | MEASURED VALUE | RECOVERY |
|------------------------|-------|------------|----------------|----------|
| pH | unit | 7.40 | 7.42 | 100. % |
| BOD | mg/l | 200 | 230 | 115. % |
| Chlorine Residual | mg/l | 0.50 | 0.49 | 98.0 % |
| Ammonia Nitrogen | mg/l | 13 | 11. | 84.6 % |
| Ammonia Nitrogen | mg/l | 18 | 17. | 94.4 % |
| Ammonia Nitrogen | mg/l | 14. | 15. | 107. % |
| Total Suspended Solids | mg/l | 100 | 93. | 93.0 % |
| Total Suspended Solids | mg/l | 100 | 90. | 90.0 % |
| Total Suspended Solids | mg/l | 100 | 90. | 90.0 % |

BLANKS

| ANALYTE | UNITS | RESULT |
|------------------------|-------|---------|
| BOD | mg/l | < 10 |
| Chlorine Residual | mg/l | < 0.1 |
| Ammonia Nitrogen | mg/l | < 0.005 |
| Ammonia Nitrogen | mg/l | < 0.005 |
| Ammonia Nitrogen | mg/l | < 0.005 |
| Total Suspended Solids | mg/l | < 1 |
| Total Suspended Solids | mg/l | < 1 |
| Total Suspended Solids | mg/l | < 1 |



QC Summary for sample numbers: 07-A011204 to 07-A011209

DUPLICATES

| SAMPLE # | ANALYTE | UNITS | SAMPLE VALUE | DUPLICATE VALUE | RPD |
|------------|----------|-------|--------------|-----------------|-----|
| 07-A011204 | Chloride | ug/g | 120 | 91. | 27. |
| 07-A011260 | Chloride | ug/g | < 10 | < 10 | |
| 07-A011447 | Chloride | ug/g | 57. | 47. | 19. |
| 07-A011204 | Fluoride | ug/g | 1400 | 1500 | 6.9 |
| 07-A011259 | Sulfur | ug/g | 25.2 | 27.9 | 10. |

MATRIX SPIKES

| SAMPLE # | ANALYTE | UNITS | SAMPLE VALUE | SMPL+ SPK | SPK AMT | RECOVERY |
|------------|----------|-------|--------------|-----------|---------|----------|
| 07-A011259 | Chloride | ug/g | < 10 | 110 | 120 | 91.67 % |
| 07-A011209 | Fluoride | ug/g | 180 | 1200 | 1000 | 102.00 % |

STANDARD REFERENCE MATERIALS

| ANALYTE | UNITS | TRUE VALUE | MEASURED VALUE | RECOVERY |
|----------|-------|------------|----------------|----------|
| Chloride | ug/g | 43. | 39. | 90.7 % |
| Chloride | ug/g | 130 | 130 | 100. % |
| Chloride | ug/g | 43. | 40. | 93.0 % |
| Fluoride | ug/g | 100 | 89. | 89.0 % |
| Sulfur | ug/g | 1500 | 1270 | 84.7 % |
| Sulfur | ug/g | 1500 | 1380 | 92.0 % |

BLANKS

| ANALYTE | UNITS | RESULT |
|----------|-------|--------|
| Chloride | ug/g | < 10 |
| Chloride | ug/g | < 10 |
| Chloride | ug/g | < 10 |
| Fluoride | ug/g | < 25 |
| Sulfur | ug/g | 4.00 |

| | |
|--|---|
| Client Name & Address: Department of Ecology 3190 160th Ave SE Bellevue, WA 98008 | Invoice To: Amy Jankowiak Department of Ecology 3190 160th Ave SE Bellevue WA 98008 |
| Contact Person: Amy Jankowiak | Invoice Contact: Amy Jankowiak |
| Phone No: 425-649-7195 | PO Number: |
| Fax No: 425-649-7098 | Invoice Ph/Fax: 425-649-7195 / 7098 |
| E-mail: ajan461@ecy.wa.gov | Invoice E-mail: ajan461@ecy.wa.gov |
| Report Delivery: (Choose all that apply) <input checked="" type="checkbox"/> Mail / <input type="checkbox"/> Fax / <input checked="" type="checkbox"/> Email / <input type="checkbox"/> Posted Online | Data posted to online account: YES / NO |
| Special Instructions: | Web Login ID: |

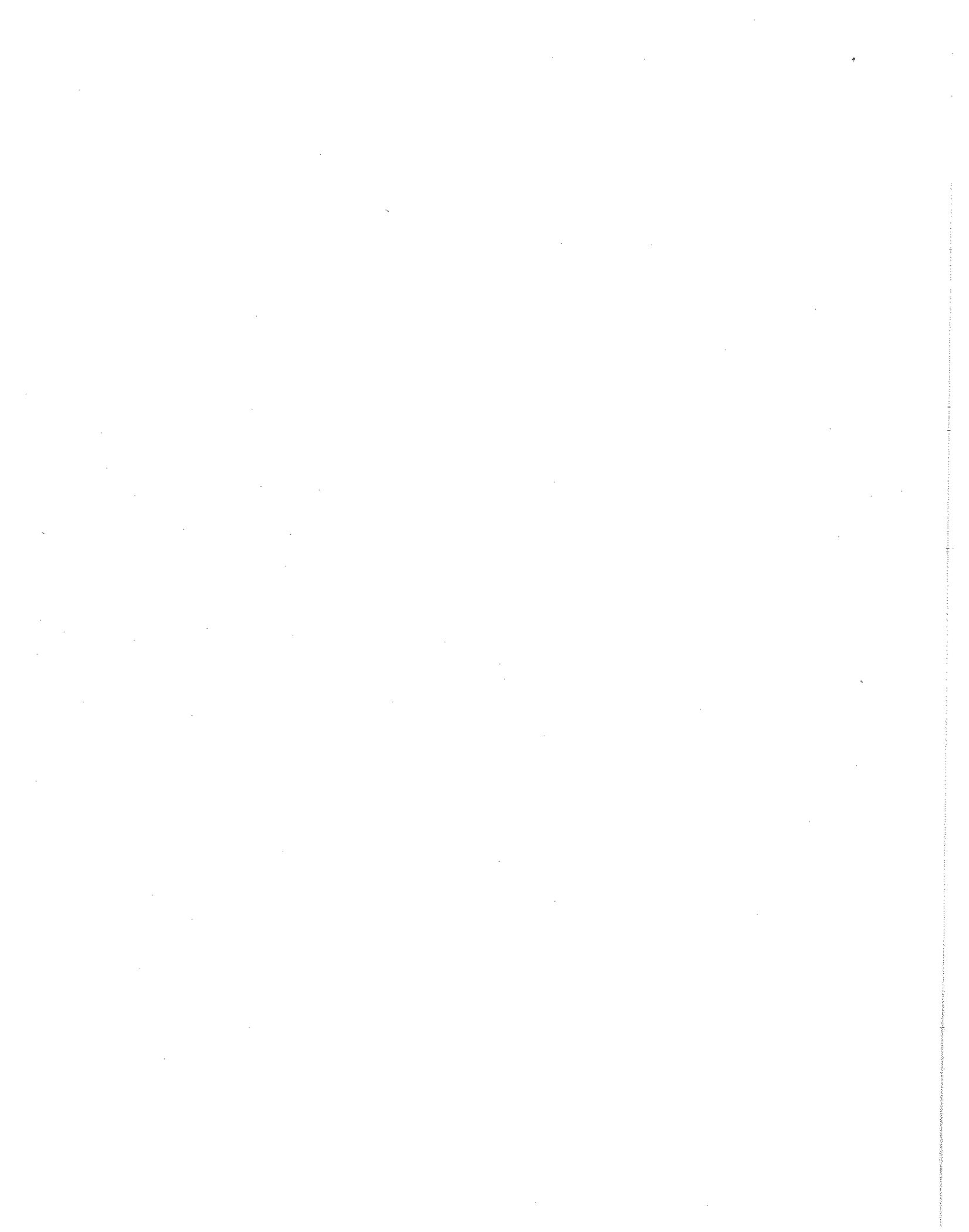
Requested TAT: (Rush must be pre-approved by lab)
 Standard RUSH (5 Day / 3 Day / 48 HR / 24 HR)

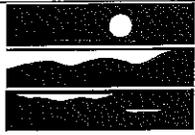
RUSH Request Approved By: _____

| Project Name: NORWEGIAN PEARL | | Date Sampled | Time Sampled | Matrix | No. of containers | Analysis Requested | | | | | | | | |
|----------------------------------|----------------------------------|--------------|--------------|--------|-------------------|--------------------|-----|----------------|----|-------------------|---------|--|--|--|
| AmTest ID | Client ID (35 characters max) | | | | | BOD (5-Day) | TSS | fecal coliform | pH | residual chlorine | ammonia | | | |
| 11125 | PEARL-EFF | 9-2-07 | 11:22 W | | 4 | 1 | 1 | 1 | 1 | 1 | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
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| | | | | | |
|--|----------------|-----------------|--------------------------------|----------------|---------------|
| Collected/Relinquished By: <i>Amy Jankowiak</i> | Date 9-2-07 | Time 12:34pm | Received By: | Date | Time |
| Relinquished By: | Date | Time | Received By: | Date | Time |
| Relinquished By: | Date | Time | Received By: <i>Kat Jyl</i> | Date 9/2/07 | Time 12:30 |

COMMENTS:





State of Washington Department of Ecology
**Verification of Operating Conditions
of Advanced Wastewater Treatment
Systems for Cruise Ship Discharges**

Northwest Regional Office
3190 160th Ave SE
Bellevue, WA 98008
Phone: (425) 649-7000 Fax: (425) 649-7098

Section A: General Information

| | | | |
|----------------------|---|-----------------------------|---------------------|
| Vessel Name: | VISION OF THE SEAS | Date: | September 7, 2007 |
| Vessel Operator: | Royal Caribbean Cruises Ltd. | Entry Time: | 9:05 AM |
| IMO Number: | 9116876 | Exit Time: | 11:00 AM |
| Vessel Type: | Passenger Ship | Notification (name & date): | Rich Pruitt; 9/4/07 |
| Location: | Terminal 66, Seattle | | |
| On-board contact(s): | James Calhoun, Environmental Officer; Zeljko Radovic, Second Engineer | | |
| Inspector(s): | Amy Jankowiak, Department of Ecology – Northwest Regional Office, Water Quality Program; Mike Dawda, Department of Ecology – Northwest Regional Office, Water Quality Program | | |
| # passengers/crew: | ~2500/~760 | Amount of Wastewater: | --- |

Description of wastewater treatment system (name, type, major components, etc.):
Hydroxyl blackwater treatment system. The hydroxyl system is a bioreactor systems with pre-screening, positive flotation, oxidation, ozone, and UV disinfection. Untreated graywater and treated blackwater is held and discharged at greater than 12 nm and outside MOU waters. The vessel is not approved for discharge in Washington MOU waters.

Section B: Areas Evaluated

| | | | | | | | |
|-------------------------------------|------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|--------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | Black/Gray wastewater system | <input type="checkbox"/> | Operations Center/Computer system | <input checked="" type="checkbox"/> | Records/Reports | <input type="checkbox"/> | Sampling/Monitoring |
| <input checked="" type="checkbox"/> | Discharge locations | <input checked="" type="checkbox"/> | Operations & Maintenance | <input checked="" type="checkbox"/> | Sludge Handling/Disposal | <input checked="" type="checkbox"/> | Other |

Section C: For vessels discharging ≥ 1nm from berth and ≥ 6 knots only

| | | |
|--------------------------|---|----------------|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | Not Applicable |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | Not Applicable |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance) in place | Not Applicable |

Section D: For vessels discharging continuously (at berth or within 1 nm of berth)

| | | |
|--------------------------|---|----------------|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | Not Applicable |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | Not Applicable |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance and for system shut down) in place | Not Applicable |
| <input type="checkbox"/> | Operations as described in submitted documentation | Not Applicable |
| <input type="checkbox"/> | Daily 24-hour continuous turbidity or equivalent monitoring | Not Applicable |
| <input type="checkbox"/> | Turbidimeter or equivalent monitoring equipment functioning properly | Not Applicable |
| | <u>Turbidity or equivalent</u> : Not applicable Last calibration Frequency of readings: Trigger level for alarm: Trigger level for shutdown: Recorded turbidity/equivalent levels above triggers: | |
| <input type="checkbox"/> | Auto shut down or operational controls to insure system shut down if a system upset occurs | Not Applicable |
| <input type="checkbox"/> | Ultraviolet (UV) light disinfection immediately prior to discharge | Not Applicable |
| <input type="checkbox"/> | UV replacement bulbs available | Not Applicable |
| <input type="checkbox"/> | UV/bulbs cleaned regularly | Not Applicable |

Section E: General

| | | |
|-------------------------------------|---|----------------|
| <input checked="" type="checkbox"/> | Sampling conducted 2/month, 1/month in Seattle (BOD, TSS, fecal coliform, pH, chlorine residual) | Not Applicable |
| <input checked="" type="checkbox"/> | Whole Effluent Toxicity Testing 1 per 2 years | Not Applicable |
| <input checked="" type="checkbox"/> | Training up to date for system operators | Not Applicable |
| <input checked="" type="checkbox"/> | Discharge records maintained | Not Applicable |
| <input checked="" type="checkbox"/> | Alarms functioning properly | Not Applicable |
| | <u>Alarms</u> Shutdowns: not applicable High turbidity/TSS warnings: High wastewater levels: UV disinfection (intensity, bulbs, bank out, power failure): | |

Section F: Sample Results

| Parameter | Effluent Result |
|---------------------------------------|-----------------|
| Biochemical Oxygen Demand 5-Day (BOD) | Not Applicable |
| Total Suspended Solids (TSS) | Not Applicable |
| Fecal Coliform, MF | Not Applicable |
| Residual Chlorine) | Not Applicable |
| Ammonia, Nitrogen | Not Applicable |
| pH | Not Applicable |

Section G: Summary of Findings/CommentsIntroduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program, and Mike Dawda, Ecology Northwest Regional Office, Water Quality Program, conducted the inspection of the Royal Caribbean Cruise Line, VISION OF THE SEAS on September 7, 2007. The main contacts on board the VISION OF THE SEAS included James Calhoun, Environmental Officer, and Zeljko Radovic, Second Engineer. Prior notification of the visit was given on September 4, 2007 for security protocol. The purpose of the inspection was to evaluate compliance with the *Memorandum of Understanding Cruise Operations in Washington State* (MOU), as amended. The VISION OF THE SEAS has not requested and is not approved for discharge in Washington State. The vessel is not planned to return to the Seattle-Alaska route next season.

Inspection

We arrived and boarded the ship at 9:05 am and began with introductions and a plan for the day. We then discussed discharge protocols for various waste streams, the water bunkering and production process, garbage and recycling, and the black water Hydroxyl system. Discharge records were reviewed for black water and gray water discharges and showed no discharges in Washington waters for the period reviewed from September 1, 2006 (date of last inspection) to present. We then headed down to the Hydroxyl system to tour the system. Next, we took a look at the water production system, and then the garbage/recycling areas. We concluded the visit and disembarked the vessel at about 11:00 am.

Discharge Protocols:

The VISION OF THE SEAS has not requested, and is not approved to discharge in waters subject to the MOU. The vessel collects and holds all graywater, then discharges at greater than 12 nautical miles and outside of the waters subject to the MOU (including staying outside of the Olympic Coast National Marine Sanctuary). Blackwater is collected and treated through the Hydroxyl system prior to going to holding tanks and then discharges at greater than 12 nautical miles and outside of the waters subject to the MOU. Oily bilge water is treated (oil water separators) and is disinfected with UV prior to being discharged at less than fifteen parts per million. Sludge from the blackwater system is either incinerated or landed ashore for treatment and land application (trucked by Emerald Services to King County Metro system). Air conditioning condensate is collected and sent for use in the laundry. Laundry wastewater is sent to the graywater holding tank. Salt and descaling (Ameroyal – potassium hydroxide (photo #12), is added to prevent scaling on the evaporators (photo #11) at a rate of about 38 meters/1,567 cubic meters) from the water production process is discharged overboard. Pool (salt water) and Jacuzzi (bromine) water is discharged overboard outside of MOU waters. X-ray and photo waste is sent through a silver recovery unit, then collected and landed ashore at <5ppm. Medical waste is collected in its own tank and then sent with the galley wastewater to the graywater tank. Medical sharps are collected and landed ashore along with all other hazardous waste. Medical staff and cleaning staff are trained on proper disposal requirements. Expired medications are logged and incinerated at > 12 nautical miles. Dry garbage and food-contaminated cardboard are incinerated. Plastics, aluminum, tin (photo #13), steel, copper, brass, wood, and office paper are all recycled. Plastic drums are cleaned, de-labeled, and

recycled (photo #14). Fluorescent bulbs are collected and crushed in a mercury removal system (photo #15) and sent ashore. Grease is collected and sent ashore (photo #16). Some cooking oil is recycled ashore. For all discharges, the bridge notifies the control room when coming to an area where discharge is approved and when nearing an area where discharge is not approved. The bridge enters the time, location, and speed of discharges. All overboard ports are padlocked or sealed. The locks and seals are checked once a week and randomly. The keys to the padlock are kept in the control room under the direction of the engineer on duty.

Blackwater System:

Toilet discharges are sent by vacuum system to the collection tank (photo #02). From the tank, the flow is strained by suction through a ¼ inch screen (photo #01). Solids screened out are collected and sent to the incinerator or to the sludge tank (photo #07). Liquid flow is sent to PFM Tank #1 (photo #03), a positive flotation mechanism. Flocculant/polymer is added (photo #05) at this stage to help bring the solids up. Sludge from the BFM is sent to the sludge tank for landing ashore. Liquid flow from PFM Tank #1 moves to the 1st Bioreactor (photo #06) for biological treatment, from there it goes to the 2nd Bioreactor for further treatment. Flow then moves to PFM Tank #2 (photo #04) where more polymer is added. Liquid flow then goes to the oxidation tank (photo #09) for ozone treatment. Effluent from the oxidation tank is disinfected with an ultraviolet disinfection (photo #10) unit and then sent to storage tanks. If the ballast tanks are used for wastewater storage, they are flushed three times before they are considered ballast tanks again. The tanks can hold wastewater for at least two days.

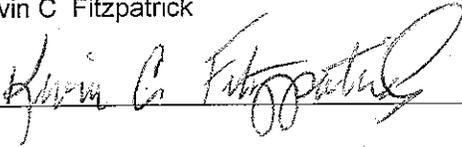
Samples were not taken, as the vessel does not discharge in MOU waters. Discharge records were reviewed and of the dates looked at (September 1, 2006 to present), no discharges occurred on the dates the vessel was in Washington waters.

Conclusions and Recommendations

Mr. Calhoun, Environmental Officer, and Mr. Radovic, Second Engineer (wastewater system operator) were all very knowledgeable of the wastewater system and other environmental systems and protocols.

Attachments:
Photographs

Copies to:
Rich Pruitt, RCCL
James Chapman, EO
Amy Jankowiak, Ecology
Kevin Fitzpatrick, Ecology
Mark Toy, Dept. of Health
Central Files: Royal Caribbean Cruise Line – VISION OF THE SEAS; WQ 6.1

| Section H: Signatures | | |
|---|---|-------------------------|
| <u>Name and Signature of Inspector</u> Amy Jankowiak  | <u>Agency/Office/Telephone</u> Department of Ecology/Northwest Regional Office/Water Quality Program/Municipal Compliance Specialist/(425) 649-7195 | <u>Date</u> 10/23/07 |
| <u>Name and Signature of Reviewer</u> Kevin C Fitzpatrick  | <u>Agency/Office/Telephone</u> Department of Ecology/Northwest Regional Office/Water Quality Section Manager/(425) 649-7033 | <u>Date</u> 10/23/07 |



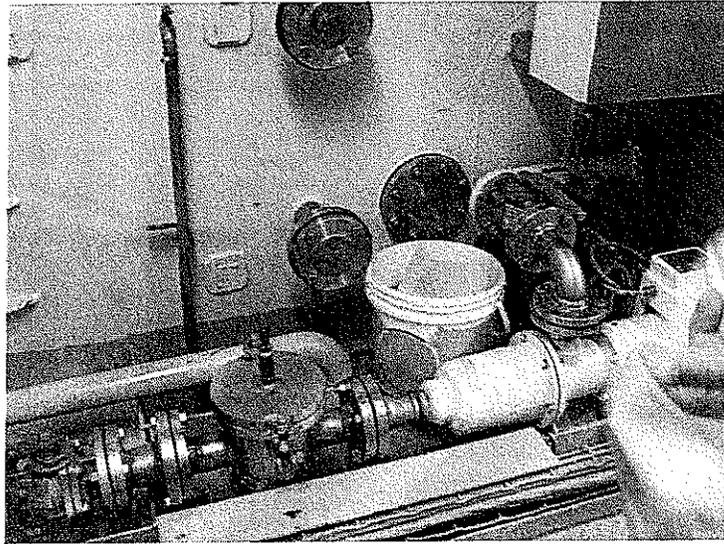


PHOTO #:01 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070021
DESCRIPTION: AWTS: SCREEN (BLACKWATER COLLECTION
TANK IN BACKGROUND)



PHOTO #:02 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070023
DESCRIPTION: AWTS: BLACKWATER COLLECTION TANK
VIEWPOINT

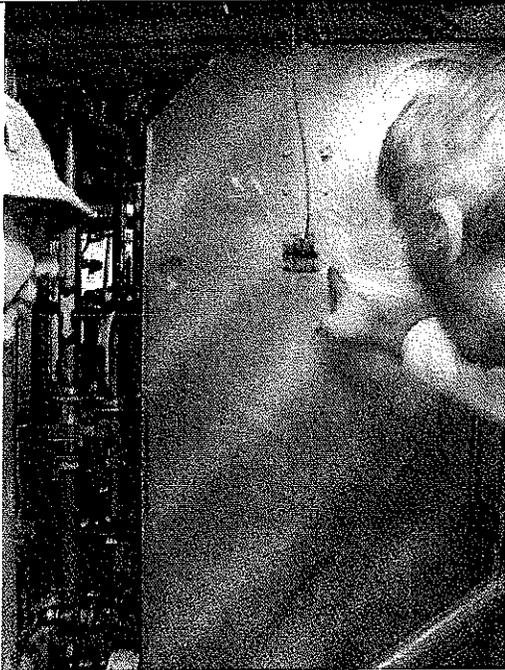


PHOTO #:03 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070022
DESCRIPTION: AWTS: PFM TANK 1(FIRST IN SERIES)

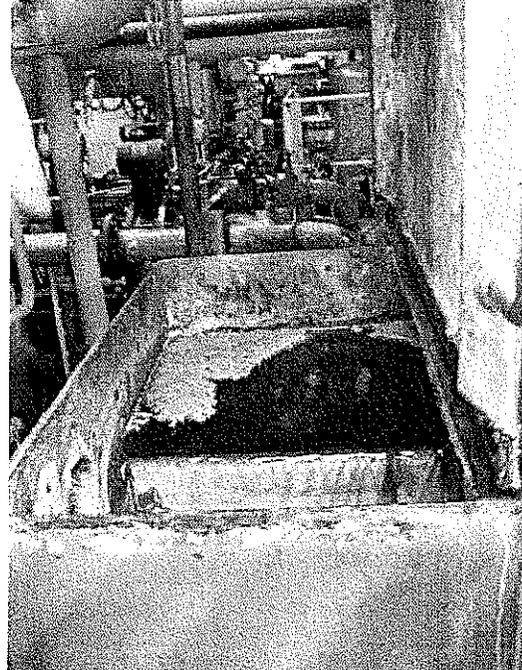


PHOTO #:04 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070024
DESCRIPTION: AWTS: INSIDE OF PFM TANK 2 (EFFLUENT)

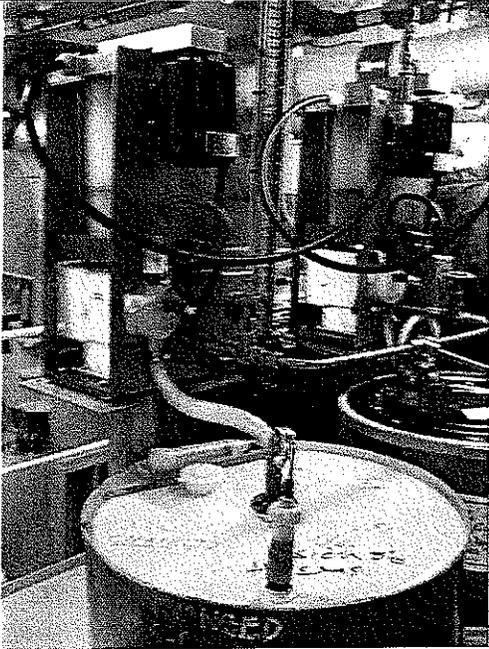


PHOTO #:05 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070025
DESCRIPTION: AWTS: POLYMER SYSTEM FOR PFM TANKS



PHOTO #:06 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070026
DESCRIPTION: AWTS: BIOREACTOR TANK (1 OF 2)

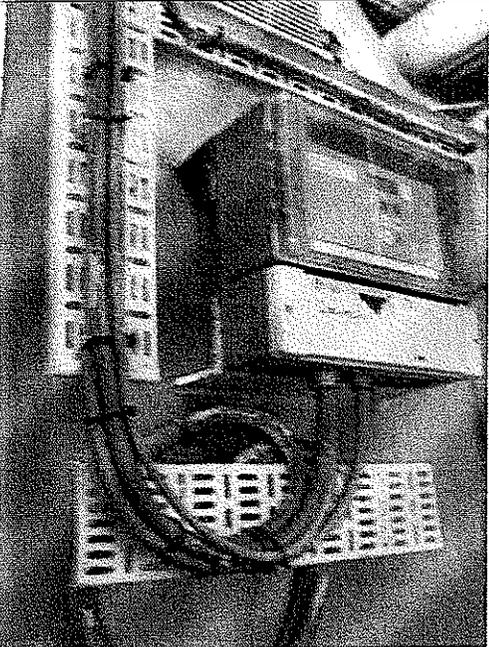


PHOTO #:07 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070027
DESCRIPTION: AWTS: BLACKWATER SLUDGE TANK

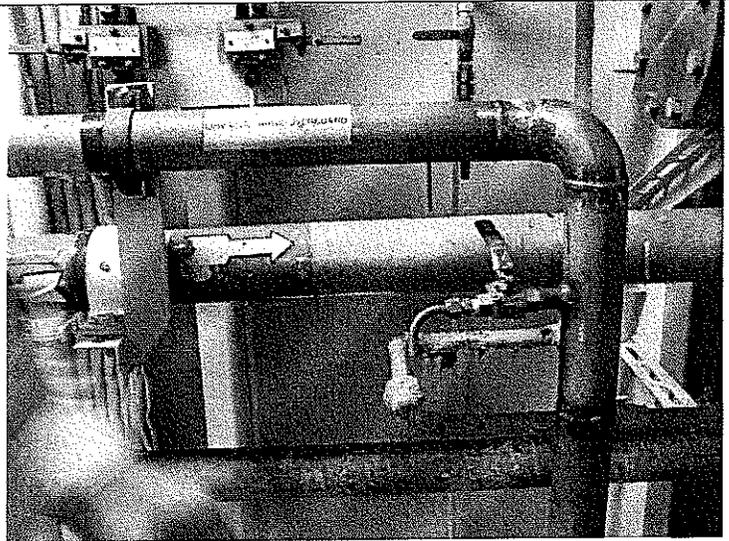


PHOTO #:08 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070028
DESCRIPTION: AWTS: OVERBOARD DISCHARGE SAMPLE PORT

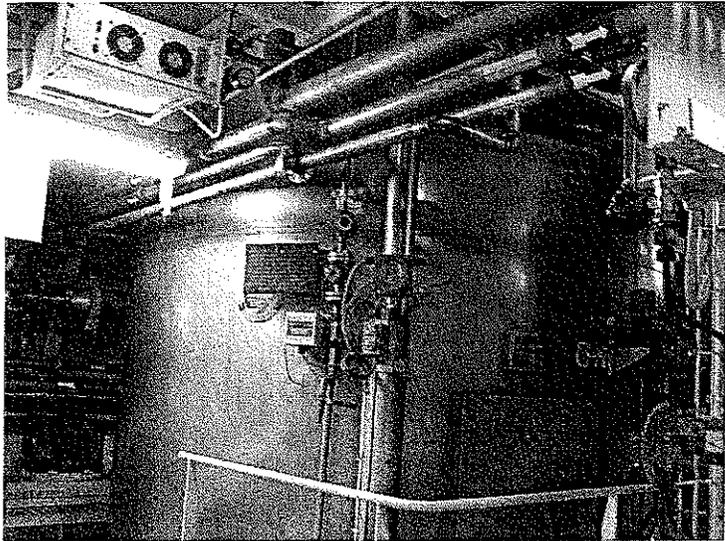


PHOTO #:09 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No :P9070029
DESCRIPTION: AWTS: OXIDATION TANK

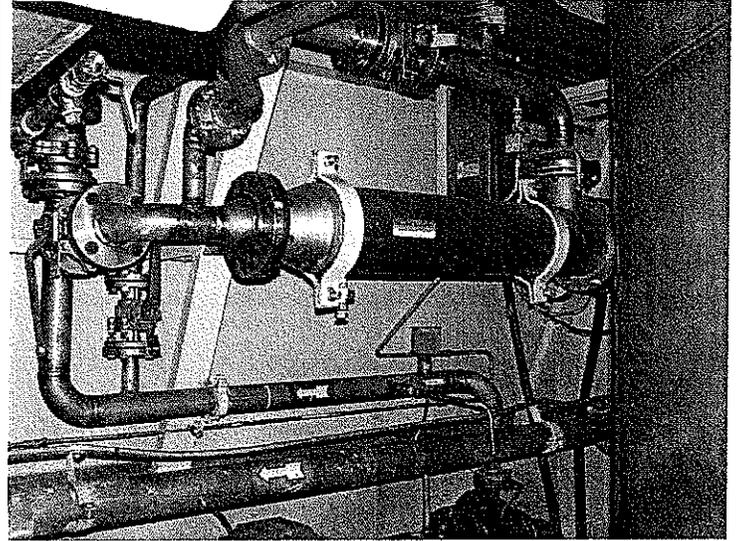


PHOTO #:10 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No :P9070031
DESCRIPTION: AWTS: ULTRAVIOLET DISINFECTION SYSTEM



PHOTO #:11 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No :P9070033
DESCRIPTION: WATER PRODUCTION EVAPORATOR (1 OF 2)

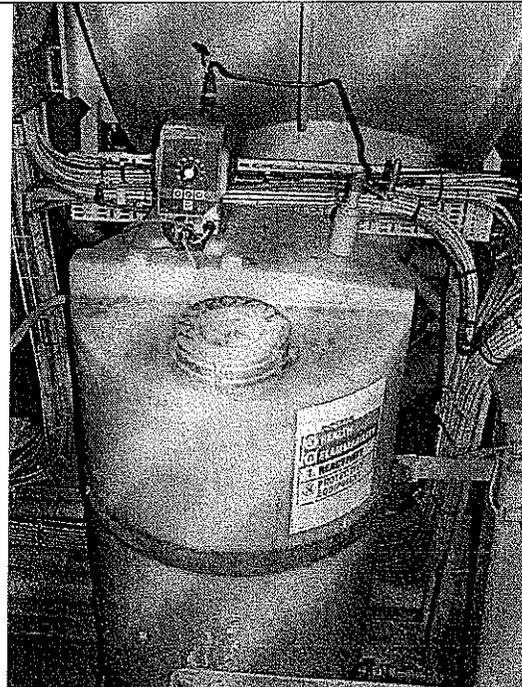


PHOTO #:12 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No :P9070034
DESCRIPTION: WATER PRODUCTION DESCALING CHEMICAL
ADDITION POINT



PHOTO #:13 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070036
DESCRIPTION: GARBAGE ROOM – TIN AND ALUMINUM
RECYCLING



PHOTO #:14 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070041
DESCRIPTION: PLASTIC DRUM RECYCLING



PHOTO #:15 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070042
DESCRIPTION: FLUORESCENT BULB CRUSHING AND MERCURY
REMOVAL SYSTEM

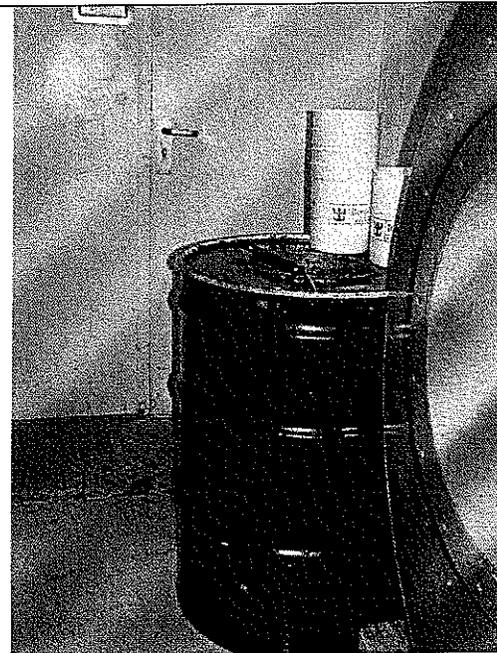


PHOTO #:16 DATE: 09/7/07 TAKEN BY: AMY JANKOWIAK
FILE No.:P9070043
DESCRIPTION: GREASE COLLECTION DRUM



State of Washington Department of Ecology
**Verification of Operating Conditions
 of Advanced Wastewater Treatment
 Systems for Cruise Ship Discharges**

Northwest Regional Office
 3190 160th Ave SE
 Bellevue, WA 98008
 Phone: (425) 649-7000 Fax: (425) 649-7098

Section A: General Information

| | | | |
|----------------------|--|-----------------------------|---------------------------------|
| Vessel Name: | NOORDAM | Date: | September 23, 2007 |
| Vessel Operator: | Holland America Line | Entry Time: | 9:15 AM |
| IMO Number: | 9230115 | Exit Time: | 11:50 AM |
| Vessel Type: | Passenger Ship | Notification (name & date): | Tina Stoltz; September 17, 2007 |
| Location: | Terminal 30, Seattle | | |
| On-board contact(s): | Tim Capel; Environmental Officer, Verhulst Dirk Johannes, Advanced Wastewater Treatment System Operator/4 th Engineer, and John Turvey, Holland America Line (HAL) | | |
| Inspector(s): | Amy Jankowiak, Department of Ecology – Northwest Regional Office, Water Quality Program, Karen Burgess, Department of Ecology – Northwest Regional Office, Water Quality Program | | |
| # passengers/crew: | ~1900/~800 | Amount of Wastewater: | --- |

Description of advanced wastewater treatment system (name, type, major components, etc.):
 Rochem Advanced Waste Water Purification System The Rochem graywater system includes prefiltration, reverse osmosis and UV disinfection. The Rochem blackwater system includes prefiltration, biological treatment via bioreactors, ultrafiltration, and UV disinfection. Approval for discharge at greater than one nautical mile away from port and at greater than six knots from Ecology was granted on August 13, 2007.

Section B: Areas Evaluated

| | | | | | | | |
|-------------------------------------|------------------------------|-------------------------------------|------------------------------------|-------------------------------------|--------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | Black/Gray wastewater system | <input checked="" type="checkbox"/> | Operations Center/ Computer system | <input checked="" type="checkbox"/> | Records/Reports | <input checked="" type="checkbox"/> | Sampling/Monitoring |
| <input checked="" type="checkbox"/> | Discharge locations | <input checked="" type="checkbox"/> | Operations & Maintenance | <input checked="" type="checkbox"/> | Sludge Handling/Disposal | <input checked="" type="checkbox"/> | Other |

Section C: For vessels discharging ≥ 1nm from berth and ≥ 6 knots only

| | | |
|-------------------------------------|---|--|
| <input checked="" type="checkbox"/> | Schematics match black/gray wastewater system | Systems appear to match schematics. |
| <input checked="" type="checkbox"/> | Sludge disposal protocol per MOU | Discharges protocols per MOU |
| <input checked="" type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance) in place | A copy of the current MOU (Amendment No 3) was available from the Environmental Officer, as well as being on the bridge. |

Section D: For vessels discharging continuously (at berth or within 1 nm of berth)

| | | |
|--------------------------|---|----------------|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | Not Applicable |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | Not Applicable |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance and for system shut down) in place | Not Applicable |
| <input type="checkbox"/> | Operations as described in submitted documentation | Not Applicable |
| <input type="checkbox"/> | Daily 24-hour continuous turbidity or equivalent monitoring | Not Applicable |
| <input type="checkbox"/> | Turbidimeter or equivalent monitoring equipment functioning properly | Not Applicable |
| | <u>Turbidity or equivalent</u> : Not applicable Last calibration Frequency of readings: Trigger level for alarm: Trigger level for shutdown: Recorded turbidity/equivalent levels above triggers: | |
| <input type="checkbox"/> | Auto shut down or operational controls to insure system shut down if a system upset occurs | Not Applicable |
| <input type="checkbox"/> | Ultraviolet (UV) light disinfection immediately prior to discharge | Not Applicable |
| <input type="checkbox"/> | UV replacement bulbs available | Not Applicable |
| <input type="checkbox"/> | UV/bulbs cleaned regularly | Not Applicable |

Section E: General

| | | |
|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> | Sampling conducted 2/month, 1/month in Seattle (BOD, TSS, fecal coliform, pH, chlorine residual) | Sampling to date conducted as required |
| <input checked="" type="checkbox"/> | Whole Effluent Toxicity Testing 1 per 2 years | Not yet required In first season of approval |
| <input checked="" type="checkbox"/> | Training up to date for system operators | Not discussed |
| <input checked="" type="checkbox"/> | Discharge records maintained | Records maintained properly All discharges in 2007 to date in line with MOU requirements. |
| <input checked="" type="checkbox"/> | Alarms functioning properly | Alarms appear to be functioning properly. |
| | <u>Alarms</u> Shutdowns: not applicable High turbidity/TSS warnings: High wastewater levels: UV disinfection (intensity, bulbs, bank out, power failure): | |

Section F: Sample Results

| Parameter | Effluent Result |
|---------------------------------------|--|
| Biochemical Oxygen Demand 5-Day (BOD) | 10 mg/l |
| Total Suspended Solids (TSS) | 7.0 mg/l |
| Fecal Coliform, MF | <1 CFU/100 ml |
| Residual Chlorine | 0.11 mg/l |
| Ammonia, Nitrogen | 38 mg/l |
| pH | 7.70 standard units (Field result = 7.2 standard units) |

Section G: Summary of Findings/Comments

Introduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program, and Karen Burgess, Ecology Northwest Regional Office, Water Quality Program, conducted the inspection of the Holland America Line NOORDAM (photo #01) on September 23, 2007. The main contacts on board the NOORDAM included Tim Capel, Environmental Officer, Verhulst Dirk Johannes, Advanced Wastewater Treatment System Operator/4th Engineer, and John Turvey, Holland America Line (HAL). Prior notification of the visit was given on September 17, 2007 for security protocol. The purpose of the inspection was to evaluate compliance with the *Memorandum of Understanding Cruise Operations in Washington State* (MOU), as amended. The NOORDAM was approved for discharge of treated black and gray water at greater than one nautical mile from shore and at greater than six knots into MOU waters on August 13, 2007.

The HOLLAND NOORDAM was built about 18 months ago, and is 935 feet long. There are typically about 1900 passengers and about 800 crew. The vessel is powered with on-shore power during port calls in Seattle.

Inspection

We arrived and boarded the ship at about 9:15 am and began with introductions and a plan for the day. We then discussed various waste streams, and the operation of food waste, pool/spa water, water bunkering and production, photo waste, garbage and recycling, oily bilge water and medical wastes. We discussed protocols for discharges. Discharge records were reviewed for black water and gray water discharges, ballast, and oily water discharges. We then headed to the bridge to review discharge procedures and to verify locations of certain discharges (all in Canadian waters). We then looked at the garbage/recycling area (photo #02). We discussed and viewed the black and gray water treatment systems. Samples were taken of the combined black and gray water effluent prior to disembarking vessel at about 11:50 am.

Discharge Types and Protocols:

All discharges to water, with the exception of treated gray and black water and pool/spa water, occur at greater than 12 nautical miles and outside of MOU waters. Black water and Gray water treated by the vessel's advanced wastewater treatment systems (AWTS) can be discharged at greater than one nautical mile from shore and at greater than six knots. No discharges occur in the Olympic Coast National Marine Sanctuary. Pool and spa water uses bromine and is discharged outside of port, while underway.

Food waste is collected from the galley and is sent to a Scanship system for drying (photo #03) and is then incinerated. Grease is collected separately and is incinerated. Used cooking oil is collected and off-loaded in Seattle for recycling about once every five weeks for biodiesel use. Cardboard is collected and off-loaded for recycling/credit. Aerosol cans are de-

pressurized (photo #04) and sent on-shore. Fluorescent light bulbs are crushed on-board with a mercury vapor removal system (photo #06). All materials separated and collected for recycling and the solid waste is off-loaded on-shore. There has been a huge effort to minimize the garbage and hazardous waste materials to be off-loaded. Volumes have gone down since last year. Silver is captured from the photo waste, collected and off-loaded in Victoria. Hazardous waste (photo #07) and medical sharps are off-loaded in Victoria, Canada only. Paper, grease, and some of the solids from the blackwater and graywater treatment systems are incinerated. Expired medications are collected and sent back to the company. The sinks from the medical facility drain to the blackwater system. Laundry water is sent to a holding tank and then discharged outside of MOU waters. The laundry is not sent to the AWTS as the detergents can cause problems for the filters. The biomass from the blackwater system is collected and discharged at greater than 12 nautical miles and outside of MOU waters and the Olympic Coast National Marine Sanctuary.

Potable water is currently bunkered periodically in Juneau and Ketchikan, while the rest is produced by desalination. Steam from the boilers heat up the sea water with low pressure evaporation. The condensate is then chlorinated and adjusted for pH prior to distribution. Salt from the evaporators is sent back to the sea. Scaling is treated with acid and is then neutralized prior to discharge at sea.

Oily bilge water is sent to the 50 ppm oily water separator, then to the intermediate tank and then to the 15 ppm oily water separator. If the effluent does not meet 15ppm, it is automatically sent back for further treatment. The effluent that meets 15 ppm is either discharged at greater than 12 nautical miles and outside of MOU waters or is sent to a clean tank and later discharged. All effluent first goes through the white box (photo #23) for monitoring prior to discharge.

Only upon verification of location between the Bridge and the Engine Control Room (ECR), will a discharge occur at greater than 12 nautical miles and outside of MOU waters. Discharges are tentatively scheduled ahead of time by matrix, but locations are always verified prior to discharges. The ECR requests location verification from the bridge prior to a discharge. The bridge has clear information on where discharges are and are not allowed. The latitude and longitude coordinates are recorded in the *Sewage and Graywater Discharge Record Book* and in the deck log. There is an overboard valve monitoring system on the bridge. The system has four lights:

- >12 nm
- > 4, <12 nm
- <4 nm
- Special Areas

The "special areas light" means no discharge. The computer system "Overboard Valve Monitoring" system details where certain discharges can and cannot take place and includes alarms (including a greater than 6 knots alarm). When any overboard valve is open, the location (lat and long) is automatically recorded (open and close). The date, time and location of both the start and the stop of the discharges are recorded, along with port location, effluent type, volumes, and speed. All discharge records that were reviewed appeared to be in compliance with the MOU. A few locations were plotted at the Bridge for verification of location and were shown to be in Canadian waters prior to Washington approval.

The discharge ports have locks. The Chief Engineer and Environmental Officer are in charge of the keys located in the Engine Control Room. There is a 3 watch system (2nd Engineer, 3rd Engineer and an assistant). The engineers are trained in standard and advanced as well as general wastewater. Verhulst Dirk Johannes, 4th Engineer, has been operating the blackwater and graywater advanced wastewater treatment systems for the past two and a half months.

Blackwater System (Rochem UF; ultrafiltration):

Toilet waste, Galley waste, and infirmary drains are sent to the blackwater vacuum collecting units (5 tanks) (photo #14) and then goes to a buffer tank (photo #15) where graywater retentate mixes along with air. A basket filter collects some solids debris from the waste going into the buffer tank which are collected and incinerated. The waste then goes to the SWECO pre-filtration system (photo #16). Solids (photo #17) are vibrated out and sent to the 5S tank for holding and discharge. Liquid from the prefiltration filtrate tank goes to the bioreactors (photo #18). A defoamer is used when cleaning chemicals affect the system. From the bioreactors, flow goes through the membranes for ultrafiltration (UF) (photo #19). Effluent from the membranes is disinfected via an ultraviolet (UV) disinfection system (photos #20 and #21) where turbidity (TSS) is monitored. PH and conductivity are also monitored on the system. From the UV, the flow can either go straight overboard after being combined with the graywater system effluent, or can go to storage tanks.

Graywater System (low pressure reverse osmosis (LP-RO) treatment system):

Shower/sink wastewater goes into the graywater holding tank (18P) and is sent to prefiltration. The SWECO pre-filtration system (photo #07) vibrated out the solids. Flow then goes through the bag filters (photo #08). Solids from the SWECO and the bag filters are collected and incinerated. The flow then goes to the LP-RO units (photos #09 and #10). Any material that does not pass through the RO units goes to the blackwater buffer tank for further treatment. Effluent from the LP-RO system goes to permeate tanks (photo #11) and then onto UV disinfection (separate from the blackwater UV system) (photos #12 and #13). From the UV, the flow can either go straight overboard after being combined with the blackwater system effluent,

or can go to storage tanks. The system is monitored for pH and conductivity, as well as chlorine residual. Chlorine residual comes from the potable water system and is adjusted coming into the graywater system.

Each of the UV systems has eight bulbs. There are about 20 spare bulbs on board. All of the bulbs are also changed out annually (May of 2007). The system has indicator lights showing the operation of each bulb. The UV systems are cleaned about once a month with an alkaline cleaner. There are alarms on the main components of the treatment systems.

Samples were taken for Biochemical Oxygen Demand (BOD 5-Day), Total Suspended Solids (TSS), pH, chlorine residual, fecal coliform and ammonia from the combined effluent (photo #22) after UV disinfection prior to going to the holding tank. The samples were put on ice immediately and were transported to AmTest laboratory in Redmond, Washington that morning. Chain of Custody and sampling procedures were followed. All results are in Section F.

Conclusions and Recommendations

Staff seemed very knowledgeable of the protocols and systems.

Procedures for discharge appear to be thorough and inclusive of verification.

Attachments:

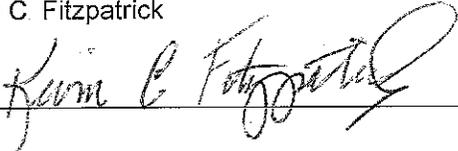
Photographs
Laboratory Reports

Copies to:

William Morani, Jr, HAL
Bob Diaz, HAL
John Turvey, HAL
Tina Stoltz, HAL
Tim Capel, Environmental Officer
Amy Jankowiak, Ecology
Mark Toy, Health
Kevin Fitzpatrick, Ecology
Karen Burgess, Ecology

Central Files: Holland America Line – HOLLAND NOORDAM; WQ 6 1

Section H: Signatures

| <u>Name and Signature of Inspector</u> | <u>Agency/Office/Telephone</u> | <u>Date</u> |
|---|---|-------------|
| Amy Jankowiak  | Department of Ecology/Northwest Regional Office/Water Quality Program/Municipal Compliance Specialist/(425) 649-7195 | 10/23/07 |
| <u>Name and Signature of Reviewer</u> | <u>Agency/Office/Telephone</u> | <u>Date</u> |
| Kevin C. Fitzpatrick  | Department of Ecology/Northwest Regional Office/Water Quality Section Manager/(425) 649-7033 | 10/23/07 |

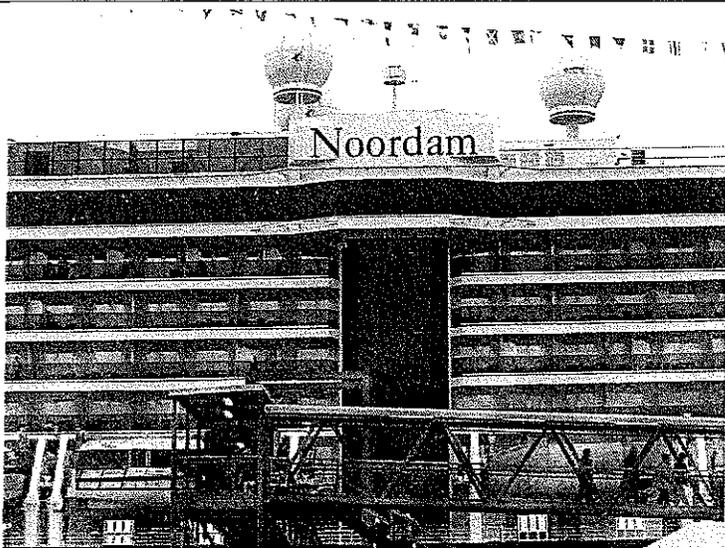


PHOTO #:01 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No : P9230001
DESCRIPTION: NOORDAM VESSEL

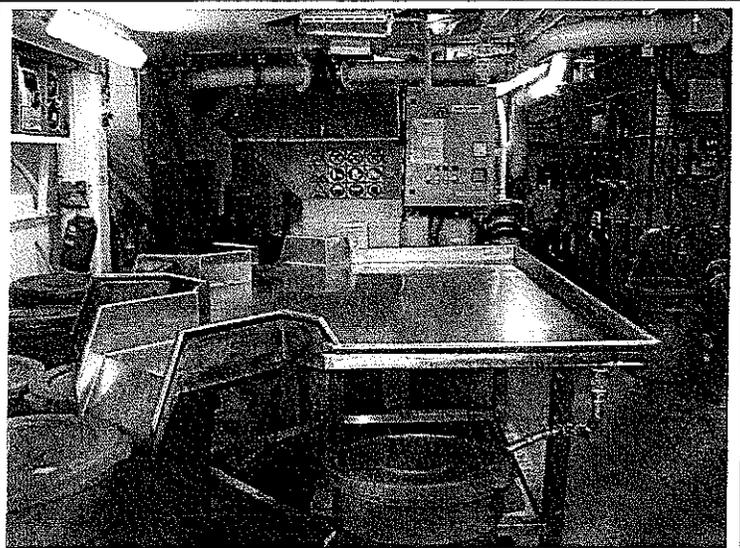


PHOTO #:02 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No : P9230002
DESCRIPTION: GARBAGE/RECYCLING SORTING AREA

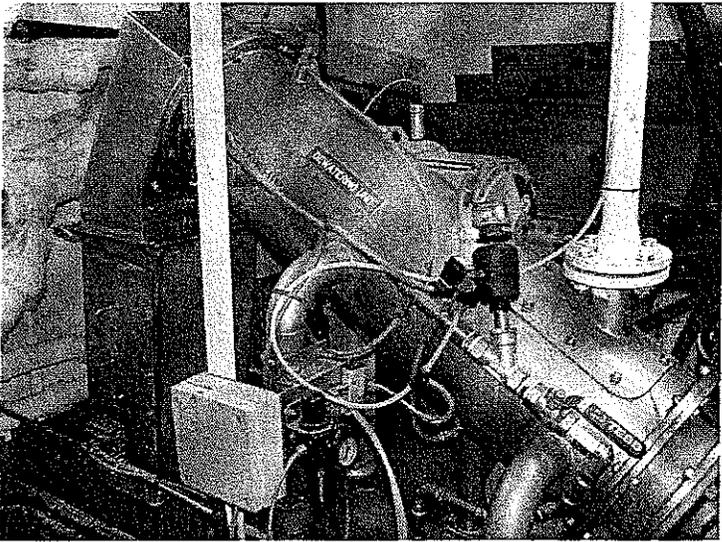


PHOTO #:03 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No : P9230003
DESCRIPTION: FOOD WASTE DEWATERING UNIT

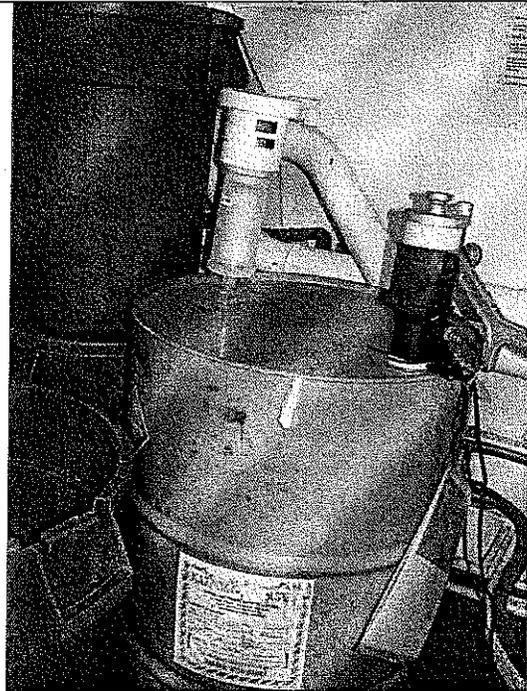


PHOTO #:04 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230004
DESCRIPTION: AEROSOL DISPOSAL SYSTEM



PHOTO #:05 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230005
DESCRIPTION: HAZARDOUS WASTE STORAGE AREA



PHOTO #:06 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230006
DESCRIPTION: FLUORESCENT LIGHT CRUSHING/MERCURY
REMOVAL SYSTEM

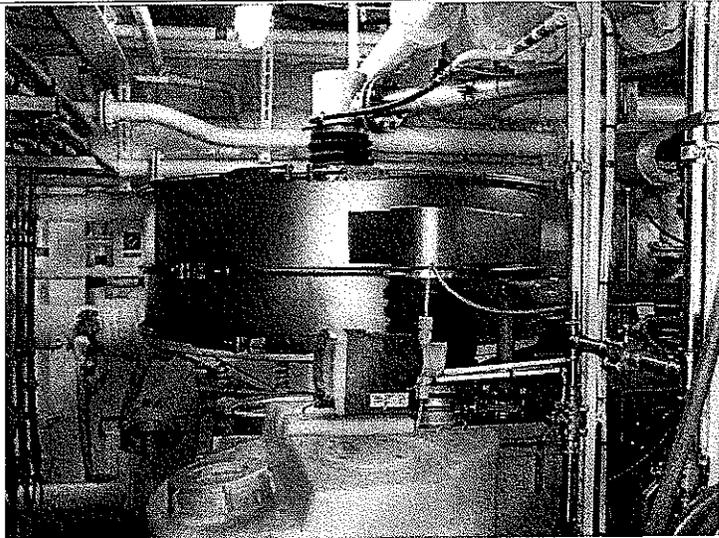


PHOTO #:07 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230008
DESCRIPTION: GRAYWATER SYSTEM (GW) SWECO PRE-
FILTRATION SYSTEM

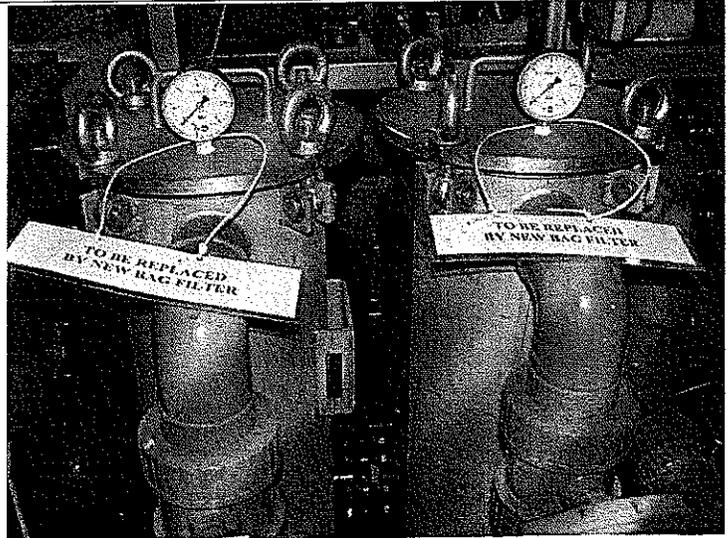


PHOTO #:08 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230009
DESCRIPTION: GW BAG FILTERS

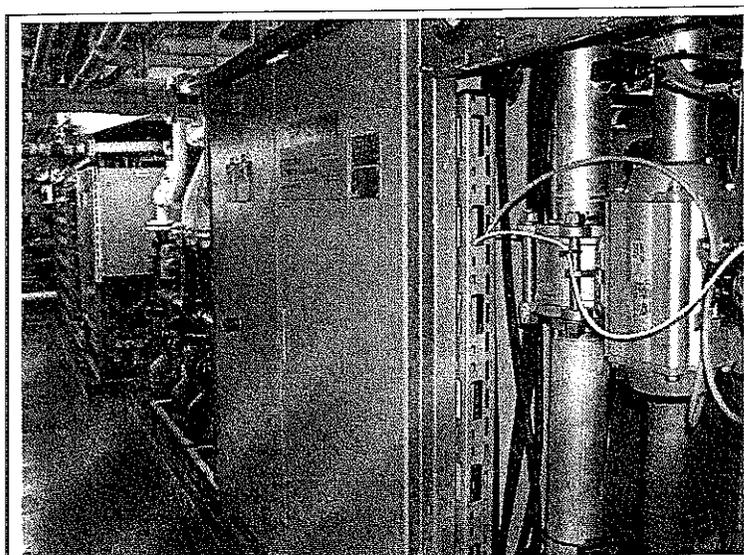


PHOTO #:09 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No : P9230010
DESCRIPTION: GW REVERSE OSMOSIS SYSTEM

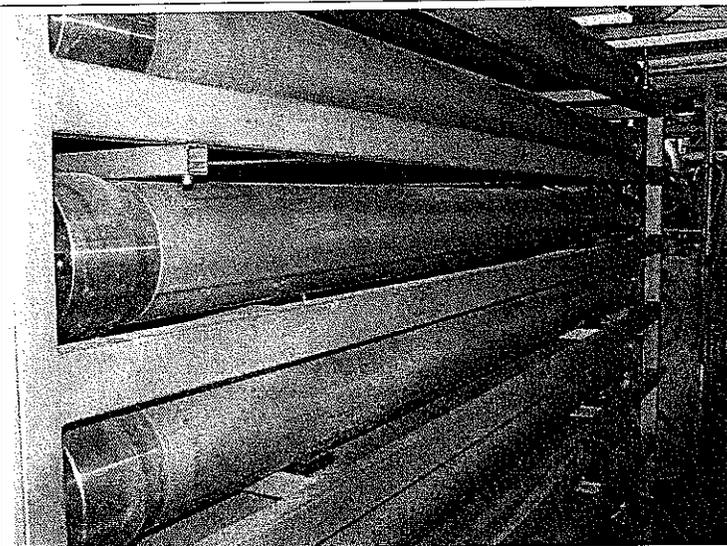


PHOTO #:10 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230011
DESCRIPTION: GW REVERSE OSMOSIS SYSTEM

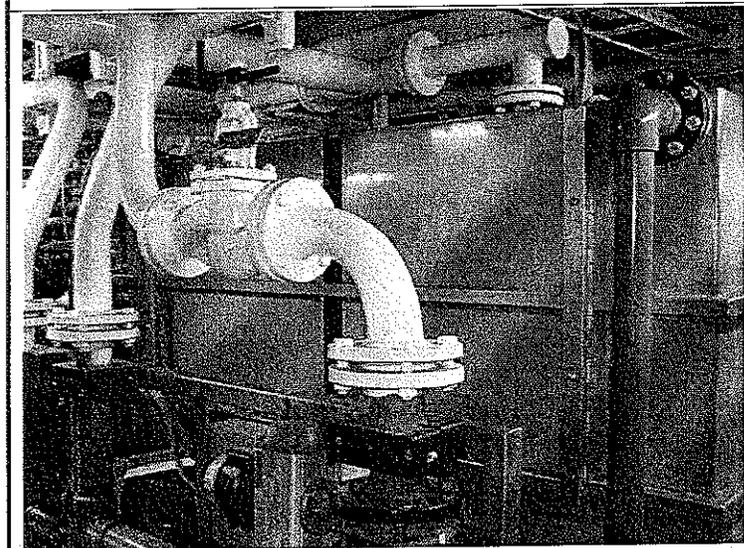


PHOTO #:11 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230012
DESCRIPTION: GW RO PERMEATE TANKS



PHOTO #:12 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230013
DESCRIPTION: GW ULTRAVIOLET LIGHT DISINFECTION SYSTEM

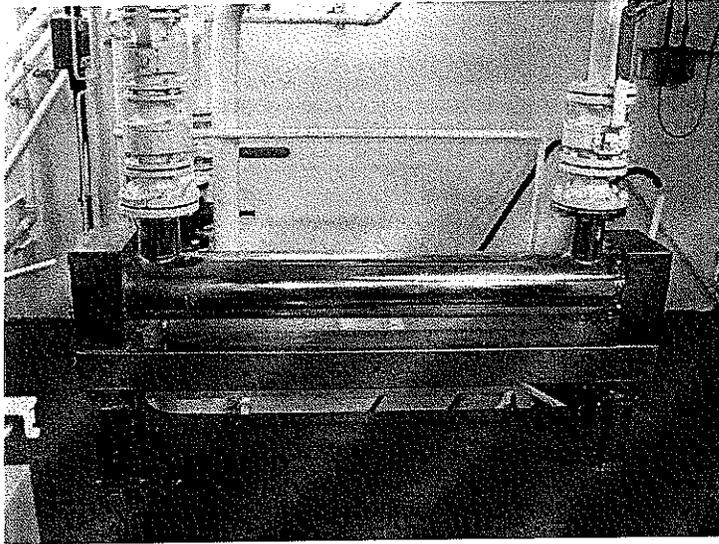


PHOTO #:13 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230014
DESCRIPTION: GW ULTRAVIOLET LIGHT DISINFECTION SYSTEM

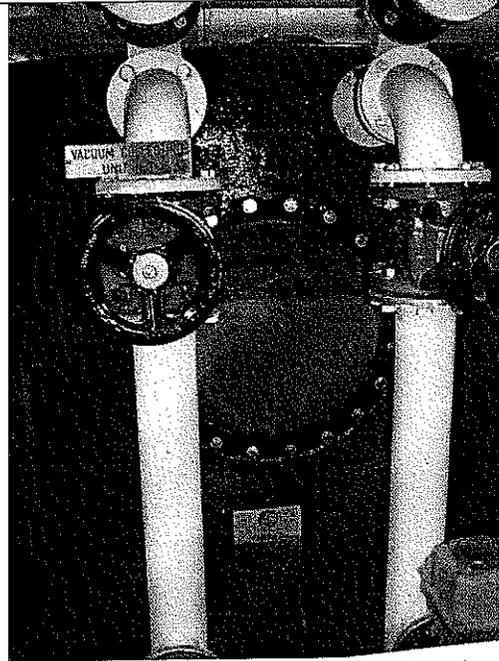


PHOTO #:14 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230018
DESCRIPTION: BLACKWATER SYSTEM (BW) VACUUM
COLLECTING UNIT

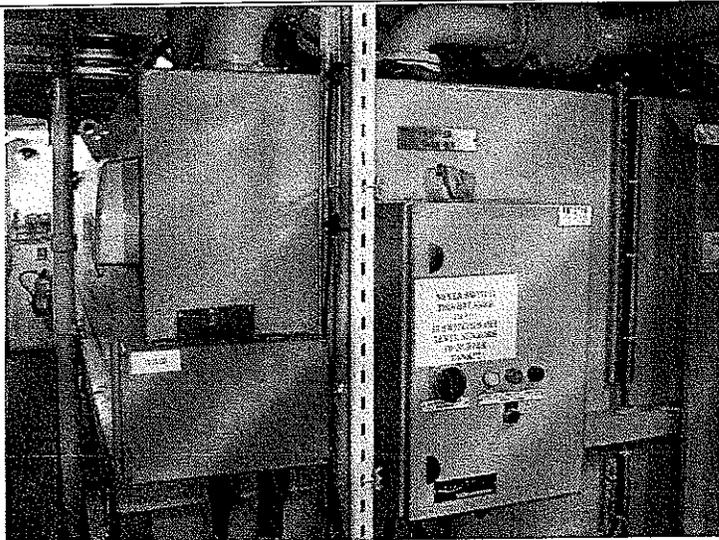


PHOTO #:15 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230019
DESCRIPTION: BW BUFFER TANK

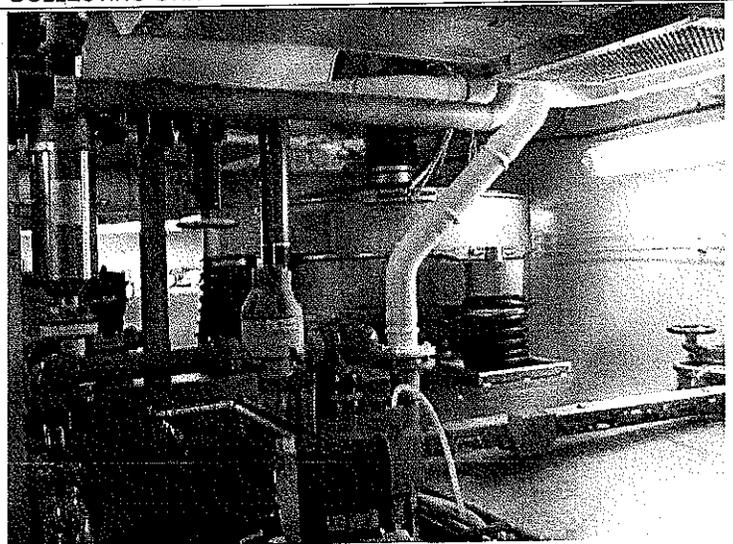


PHOTO #:16 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230020
DESCRIPTION: BW SWECO PRE-FILTRATION SYSTEM



PHOTO #:17 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230021
DESCRIPTION: BW SWECO SOLIDS

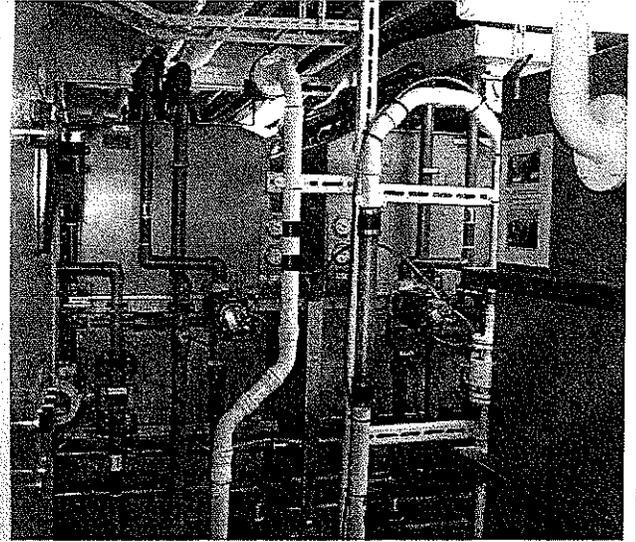


PHOTO #:18 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230022
DESCRIPTION: BW BIOREACTORS (2 OF 3)

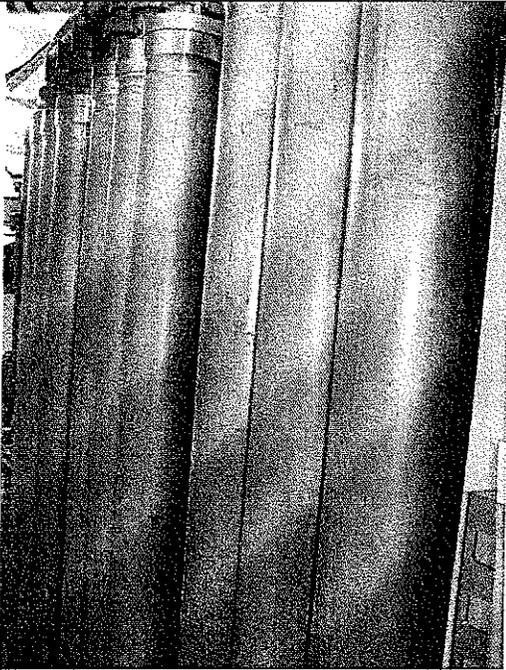


PHOTO #:19 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230023
DESCRIPTION: BW ULTRAFILTERS

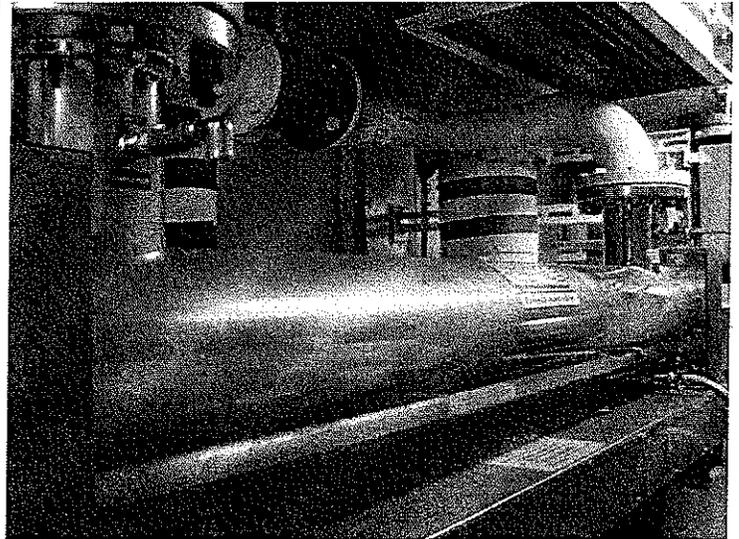


PHOTO #:20 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230025
DESCRIPTION: BW ULTRAVIOLET LIGHT DISINFECTION SYSTEM

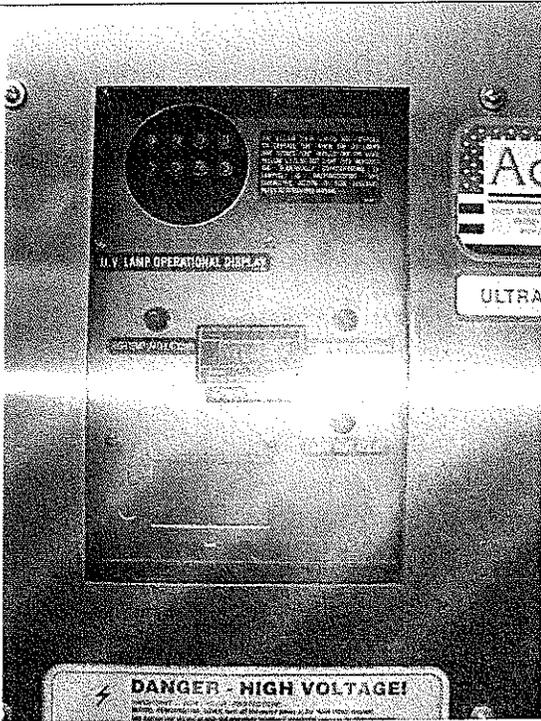


PHOTO #:21 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230026
DESCRIPTION: BW ULTRAVIOLET LIGHT DISINFECTION SYSTEM

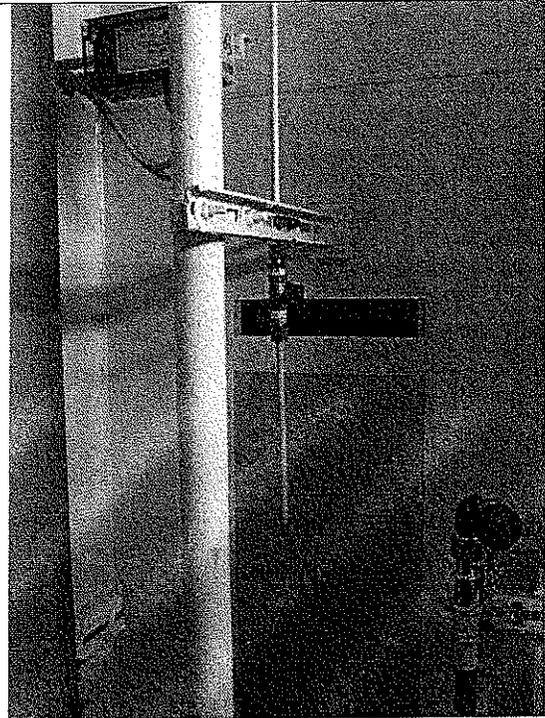


PHOTO #:22 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230027
DESCRIPTION: COMBINED EFFLUENT SAMPLE PORT

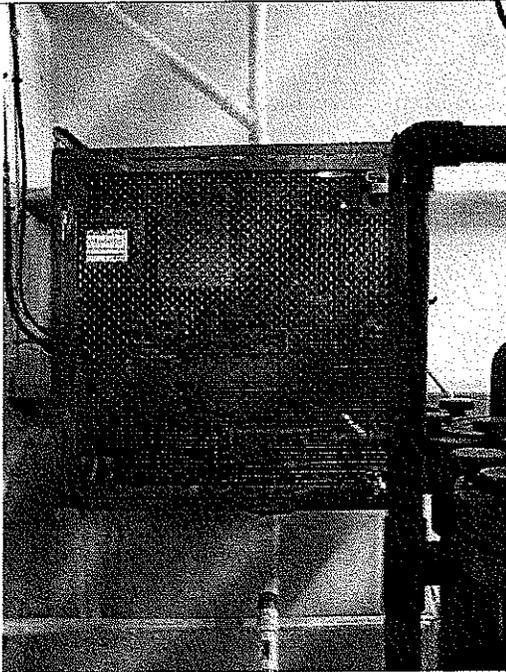


PHOTO #:23 DATE: 09/23/07 TAKEN BY: AMY JANKOWIAK
FILE No.: P9230028
DESCRIPTION: OILY BILGE WATER SYSTEM WHITE BOX



QC Summary for sample number: 07-A012077

DUPLICATES

| SAMPLE # | ANALYTE | UNITS | SAMPLE VALUE | DUPLICATE VALUE | RPD |
|------------|------------------------|-------|--------------|-----------------|------|
| 07-A011752 | Ammonia Nitrogen | mg/l | 77 | 78 | 1.3 |
| 07-A011806 | Ammonia Nitrogen | mg/l | < 0.005 | < 0.005 | |
| 07-A011875 | Ammonia Nitrogen | mg/l | < 0.005 | < 0.005 | |
| 07-A011868 | Total Suspended Solids | mg/l | < 1 | < 1 | |
| 07-A011790 | Total Suspended Solids | mg/l | 240 | 240 | 0.00 |

MATRIX SPIKES

| SAMPLE # | ANALYTE | UNITS | SAMPLE VALUE | SMPL+ SPK | SPK AMT | RECOVERY |
|------------|-------------------|-------|--------------|-----------|---------|----------|
| 07-A012077 | Chlorine Residual | mg/l | 0.11 | 0.63 | 0.50 | 104.00 % |
| 07-A011804 | Ammonia Nitrogen | mg/l | < 0.005 | 0.24 | 0.25 | 96.00 % |
| 07-A011874 | Ammonia Nitrogen | mg/l | < 0.005 | 0.27 | 0.25 | 108.00 % |
| 07-A011888 | Ammonia Nitrogen | mg/l | 0.069 | 0.31 | 0.25 | 96.40 % |

STANDARD REFERENCE MATERIALS

| ANALYTE | UNITS | TRUE VALUE | MEASURED VALUE | RECOVERY |
|------------------------|-------|------------|----------------|----------|
| Chlorine Residual | mg/l | 0.25 | 0.23 | 92.0 % |
| Ammonia Nitrogen | mg/l | 8.9 | 8.8 | 98.9 % |
| Ammonia Nitrogen | mg/l | 4.0 | 3.8 | 95.0 % |
| Ammonia Nitrogen | mg/l | 8.9 | 9.0 | 101. % |
| Total Suspended Solids | mg/l | 100 | 100 | 100. % |
| Total Suspended Solids | mg/l | 100 | 98. | 98.0 % |

BLANKS

| ANALYTE | UNITS | RESULT |
|------------------------|-------|---------|
| Chlorine Residual | mg/l | < 0.1 |
| Ammonia Nitrogen | mg/l | < 0.005 |
| Ammonia Nitrogen | mg/l | < 0.005 |
| Ammonia Nitrogen | mg/l | < 0.005 |
| Total Suspended Solids | mg/l | < 1 |
| Total Suspended Solids | mg/l | < 1 |

Am Test Inc.
14603 N.E. 87th St.
Redmond, WA 98052
(425) 885-1664
www.amtestlab.com



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Services

ANALYSIS REPORT

Department of Ecology
3190 160th Ave SE
Bellevue, WA 98008
Attention: Amy Jankowiak
Project Name: Holland Noordam
All results reported on an as received basis.

Date Received: 09/23/07
Date Reported: 10/ 8/07

AMTEST Identification Number 07-A012077
Client Identification Nor-Eff
Sampling Date 09/23/07

Microbiological

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|-----------------|--------|------------|---|------|----------|---------|----------|
| Fecal Coliforms | < 1 | CFU/100 ml | | 1. | SM 9222D | KF | 09/23/07 |

Conventionals

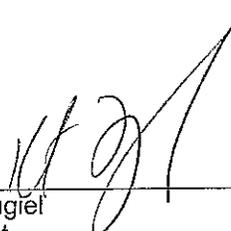
| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|------------------------|--------|-------|---|------|-----------|---------|----------|
| pH | 7.70 | unit | | | EPA 150.1 | KF | 09/23/07 |
| Chlorine Residual | 0.11 | mg/l | | 0.10 | EPA 330.5 | KF | 09/23/07 |
| Total Suspended Solids | 7.0 | mg/l | | 1.0 | EPA 160.2 | JR | 09/25/07 |

Demand

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|-----------|--------|-------|---|------|---------|---------|----------|
| BOD | 10. | mg/l | | 10. | SM 5210 | MRW | 09/23/07 |

Nutrients

| PARAMETER | RESULT | UNITS | Q | D.L. | METHOD | ANALYST | DATE |
|------------------|--------|-------|---|-------|-----------|---------|----------|
| Ammonia Nitrogen | 38. | mg/l | | 0.005 | EPA 350.1 | TS | 09/24/07 |


Kathy Fugiel
President



Am Test Inc.
14603 N.E. 87th St.
Redmond, WA 98052
(425) 885-1664

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Analytical
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RECEIVED

OCT 15 2007

DEPT OF ECOLOGY

Oct 8 2007
Department of Ecology
3190 160th Ave SE
Bellevue, WA 98008
Attention: Amy Jankowiak

Dear Amy Jankowiak:

Enclosed please find the analytical data for your Holland Noordam project.

The following is a cross correlation of client and laboratory identifications for your convenience.

| CLIENT ID | MATRIX | AMTEST ID | TEST |
|-----------|--------|------------|-----------------------|
| Nor-Eff | Water | 07-A012077 | Micro, CONV, DEM, NUT |

Your sample was received on Sunday, September 23, 2007. At the time of receipt, the sample was logged in and properly maintained prior to the subsequent analysis

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,

Kathy Fugiel
President

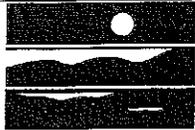
BACT = Bacteriological
CONV = Conventionals
TC=Total Coliforms

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals
APC=Aerobic Plate Count

Faint mirrored text at the bottom of the page, likely bleed-through from the reverse side.



State of Washington Department of Ecology
**Verification of Operating Conditions
of Advanced Wastewater Treatment
Systems for Cruise Ship Discharges**

Northwest Regional Office
3190 160th Ave SE
Bellevue, WA 98008
Phone: (425) 649-7000 Fax: (425) 649-7098

Section A: General Information

| | | | |
|----------------------|--|-----------------------------|-----------------------|
| Vessel Name: | MERCURY | Date: | October 8, 2007 |
| Vessel Operator: | Celebrity Cruises | Entry Time: | 9:06 AM |
| IMO Number: | 91006302 | Exit Time: | 11:45 AM |
| Vessel Type: | Passenger Ship | Notification (name & date): | Rich Pruitt, 10/04/07 |
| Location: | Pier 66, Seattle | | |
| On-board contact(s): | Andrew Mott, Sanitation Engineer; Noriel Abenir, Sanitation Engineer | | |
| Inspector(s): | Amy Jankowiak, Department of Ecology, Raman Iyer, Department of Ecology, and Mike Dawda, Department of Ecology | | |
| # passengers/crew: | ~2000/~850 | | |

Description of advanced wastewater treatment system (name, type, major components, etc):

Biopure is a marine sanitation device including aeration, settling, and chlorination for blackwater only. This system is run at all times.

Rochem Advanced Waste Water Purification System: The Rochem combines blackwater from the Biopure system and graywater and includes prefiltration, reverse osmosis in two stages with aeration and UV disinfection. The Rochem system is only run for about 2 hours for sampling purposes. There is not enough capacity in the AWTS to treat all of the wastewater, therefore it is only used for sampling purposes to retain certification in case there is a need to use the system in special areas.

The vessel has never requested approval for discharge and is not approved for discharge in Washington/MOU waters.

Section B: Areas Evaluated

| | | | | | | | |
|-------------------------------------|------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|--------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | Black/Gray wastewater system | <input type="checkbox"/> | Operations Center/Computer system | <input checked="" type="checkbox"/> | Records/Reports | <input checked="" type="checkbox"/> | Sampling/Monitoring |
| <input checked="" type="checkbox"/> | Discharge locations | <input checked="" type="checkbox"/> | Operations & Maintenance | <input checked="" type="checkbox"/> | Sludge Handling/Disposal | <input checked="" type="checkbox"/> | Other |

Section C: For vessels discharging ≥ 1 nm from berth and ≥ 6 knots only

| | | |
|--------------------------|---|----------------|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | Not Applicable |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | Not Applicable |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance) in place | Not Applicable |

Section D: For vessels discharging continuously (at berth or within 1 nm of berth)

| | | |
|--------------------------|---|----------------|
| <input type="checkbox"/> | Schematics match black/gray wastewater system | Not Applicable |
| <input type="checkbox"/> | Sludge disposal protocol per MOU | Not Applicable |
| <input type="checkbox"/> | Notification procedures (for contacting Ecology of non-compliance and for system shut down) in place | Not Applicable |
| <input type="checkbox"/> | Operations as described in submitted documentation | Not Applicable |
| <input type="checkbox"/> | Daily 24-hour continuous turbidity or equivalent monitoring | Not Applicable |
| <input type="checkbox"/> | Turbidimeter or equivalent monitoring equipment functioning properly | Not Applicable |
| | <u>Turbidity or equivalent</u> : Not applicable Last calibration Frequency of readings: Trigger level for alarm: Trigger level for shutdown: Recorded turbidity/equivalent levels above triggers: | |
| <input type="checkbox"/> | Auto shut down or operational controls to insure system shut down if a system upset occurs | Not Applicable |

| | | |
|--------------------------|--|----------------|
| <input type="checkbox"/> | Ultraviolet (UV) light disinfection immediately prior to discharge | Not Applicable |
| <input type="checkbox"/> | UV replacement bulbs available | Not Applicable |
| <input type="checkbox"/> | UV/bulbs cleaned regularly | Not Applicable |

| Section E: General | | |
|--------------------------|---|----------------|
| <input type="checkbox"/> | Sampling conducted 2/month, 1/month in Seattle (BOD, TSS, fecal coliform, pH, chlorine residual) | Not Applicable |
| <input type="checkbox"/> | Whole Effluent Toxicity Testing 1 per 2 years | Not Applicable |
| <input type="checkbox"/> | Training up to date for system operators | Not Applicable |
| <input type="checkbox"/> | Discharge records maintained | Not Applicable |
| <input type="checkbox"/> | Alarms functioning properly | Not Applicable |
| | <u>Alarms</u> Shutdowns: not applicable High turbidity/TSS warnings: High wastewater levels: UV disinfection (intensity, bulbs, bank out, power failure): | |

| Section F: Sample Results | | |
|---------------------------|---------------------------------------|----------------|
| | Parameter | Results |
| | Biochemical Oxygen Demand 5-Day (BOD) | Not Applicable |
| | Total Suspended Solids (TSS) | Not Applicable |
| | Fecal Coliform | Not Applicable |
| | Residual Chlorine | Not Applicable |
| | Ammonia, Nitrogen | Not Applicable |
| | pH | Not Applicable |

| Section G: Summary of Findings/Comments |
|---|
| <p><u>Introduction</u> Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program, Mike Dawda, Ecology Northwest Regional Office, Water Quality Program, and Raman Iyer, Ecology Northwest Regional Office, Water Quality Program, conducted the inspection of the Celebrity Cruises MERCURY on October 8, 2007. The main contacts on board the MERCURY included Andrew Mott, Environmental Officer, and Noriel Abenir, Sanitation Engineer. Prior notification of the visit was given on October 4, 2007 for security protocol. The purpose of the inspection was to evaluate compliance with the <i>Memorandum of Understanding Cruise Operations in Washington State</i> (MOU), as amended. The MERCURY has not requested and is not approved for discharge in Washington State.</p> <p><u>Inspection</u> We arrived and boarded the ship at 9:06 am and began with introductions and a plan for the day. We then discussed discharge protocols for various waste streams (blackwater, graywater, biomass-sewage residuals, food waste, oily bilge water, ballast water, pool/spa water, and expired medications) the water bunkering and production process, garbage and recycling, and notification procedures. Discharge records were reviewed for black water and gray water discharges and showed no discharges in Washington waters for the period reviewed from September 21, 2007 (date of first visit of the season in MOU waters) to present. We then headed down to the Biopure and Rochem systems to view the components. Next, we took a look at the oily bilge system and the garbage and recycling areas. We then reviewed oily bilge records (no oily bilge discharges in Washington waters from September 21, 2007 to present date, discussed environmental training and concluded with a de-briefing and disembarked the vessel at about 11:45 am.</p> <p><u>Discharge Protocols:</u> The MERCURY has not requested, and is not approved to discharge in waters subject to the MOU. All blackwater is treated with a marine sanitation device, Biopure, and is discharged outside of MOU waters. Currently, untreated graywater is sent to a holding tank and discharged outside of MOU waters along with the MSD treated blackwater. This season, the vessel is running three or four day cruises between Seattle and Canada, and is discharging all blackwater and graywater in a pre-designated area (box shaped near: 48°17,1N and 123°23,2W) in Canadian waters greater than four nautical miles from shore. The Environmental Officer and vessel staff conducted extensive pre-planning accounting for the vessels itinerary, route, and holding tank capacity in order to assure that all discharges would take place in accordance to regulations and the MOU. Sewage residuals (sludge) is strained and incinerated. Food waste is discharged at greater than 12 nautical miles from shore, as is pool water and bilge water. Spa/Jacuzzi water is discharged outside of MOU waters and at greater than four nautical miles. Expired medications and narcotics are collected and documented by the medical staff and discharged at</p> |

greater than 12 nautical miles with witnesses. The vessel does go out to sea briefly during these routes enabling the discharges needed at greater than 12 nautical miles. Ballast water is retained on board and exchanged at greater than 50 nautical miles as needed. The marine sanitation device (MSD), Biopure, is currently the only wastewater system being while the vessel is in MOU waters. The advanced wastewater treatment system (AWTS) Rochem system is not used due to its limited capacity (vessel produces about 800m³/day and the AWTS capacity is about 270m³/day). The vessel has holding capacity of about 1700 m³ which allows for about 48 hours. When a discharge is to occur from the MSD, the engine control room confirms the location (within the box) with the bridge navigation staff. All discharges are logged in the *Sewage and Graywater Discharge Record Book* based on the coordinates from the bridge. Some of the recent discharge records were not readily available in the control room log, and had to be obtained from the Environmental Officer. All overboard ports are locked. The officer on-duty has the keys.

Notifications numbers were posted on the vessel for various environmental emergencies. A posting of Ecology's Northwest Regional Office's phone number for non-compliance of the MOU has been given to staff to also be posted for the vessel's convenience. The environmental officer was aware of the fact that the most current version of the MOU is located on Ecology's website.

Food waste is collected from the galley and is sent through a Somat pulper (photo #16) and discharged outside of 12 nautical miles (outside MOU waters). The liquid from the pulper is recycled back through the pulper. Occasionally the liquid is changed out and sent to the graywater tank. Food waste such as bones is incinerated. Grease is collected and reused in the heavy fuel tanks.

Oily bilge water is treated with the Turbulo and Marinfloc systems (oily water separators) (photo #13). The Turbulo system typically treats to less than 5 ppm, and the Marinfloc then treats to almost zero ppm.

Garbage, recycling, (photo #14) and hazardous waste is collected and sent ashore typically in Victoria or Vancouver, B.C. None of these materials are sent ashore in Seattle. Cardboard is recycled, as well as many other materials including aluminum, glass, and tin. Papers, plastics, food-contaminated cardboard, biohazardous materials, some food waste (bones), oily rags, and sewage residuals are incinerated. Medical sharps, PERC from dry-cleaning are included in hazardous waste off-loads. Photo waste is treated to less than 5 ppm through silver recovery. Fluorescent light bulbs are crushed with the bulb eater with mercury vapor removal (photo #15).

Air conditioning condensate is reused in the laundry. Laundry water is sent to the graywater tank. Potable water is bunkered often, and only a small amount is produced on board with evaporators.

Blackwater and Graywater Systems:

The marine sanitation device (MSD), Biopure (photos #01 #02, and #04), operates by first collecting blackwater into a storage collection tank (photo #03). The wastewater then flows into the Biopure system (four separate identical units) by suction. The system includes basic screening of plastics and larger objects, aeration, pH adjustment, some settling by addition of polymer, and chlorination for disinfection all in one tank partially divided. Solids cleaned out of the tank are strained and incinerated periodically. Effluent from the Biopure system is sent to a holding tank prior to discharge (or is sent to the AWTS if operating). Staff take on-board samples for COD, TSS and fecal coliforms about weekly for process control. Chlorine dosing levels are adjusted based on fecal coliform results. Sampling results from the MSD are only for blackwater. The untreated graywater is either combined with the treated blackwater and sent to a holding tank for discharge, or is sent to the AWTS.

The advanced wastewater treatment system (AWTS) Rochem (photos #07 and #08), is currently only turned on for about two hours prior to sampling to retain certification. The system operates by first taking waste from the holding tanks and sending it to the SWECO screen (photo #10). Solids are vibrated and collected. The solids that are removed are strained and incinerated. The liquid flows to another tank prior to going to the reverse osmosis (RO) membranes (photos #05, #06, and #09). The liquid goes through the 1st stage of the membranes, then onto the aeration tank and then to the 2nd stage of the RO membranes. There are two separate RO units. The membranes are cleaned for about four hours every month with an acid cleanser. Flow is then sent to the permeate tanks and pH is adjusted. From there, the liquid moves to ultraviolet (UV) disinfection (photo #11). Turbidity or TSS is monitored with alarms for shut down. The UV has intensity alarms. The effluent from the UV goes through carbon filtration (photo #12) prior to discharge or recirculation.

Samples were not taken, as the vessel does not discharge in MOU waters. Discharge records were reviewed and of the dates looked at (September 21, 2007 to present), no discharges occurred on the dates the vessel was in Washington waters.

Conclusions and Recommendations

Mr. Mott, the Environmental Officer, was very knowledgeable of the wastewater system and other environmental systems and protocols.

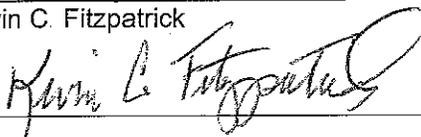
The inspections that occurred in 2006 of the MERCURY vessel yielded the discovery of unauthorized discharges and a fine for the company. The inspection on October 8, 2007 showed a great deal of improvement with understanding the locations of waters of the state, waters of the MOU, and discharge protocols. The Environmental Officer and vessel staff conducted extensive pre-planning accounting for the vessels itinerary, route, and holding tank capacity in order to assure that all discharges would take place in accordance to regulations and the MOU.

At the end of the 2006 season, Celebrity Cruises stated that they would likely install a Hamworthy Membrane Bioreactor advanced wastewater treatment system on board the MERCURY that would have the capacity to treat all of the wastewater produced. A test installation was done on another Celebrity Cruises vessel, but due to technical problems, the Line is reevaluating the technology and configuration. The Line is still committed to installing a new system by the end of 2009.

Attachments:
Photographs

Copies to:
Rich Pruitt, RCCL
Andrew Mott, MERCURY EO
Amy Jankowiak, Ecology
Kevin Fitzpatrick, Ecology
Raman Iyer, Ecology
Mike Dawda, Ecology
Mark Toy, Dept. of Health
Central Files: Celebrity Cruises – MERCURY; WQ 6.1

Section H: Signatures

| Name and Signature of Inspector | Agency/Office/Telephone | Date |
|--|---|-----------------|
| Amy Jankowiak | Department of Ecology/Northwest Regional Office/Water Quality Program/Municipal Compliance Specialist/(425) 649-7195 | |
| Name and Signature of Reviewer Kevin C. Fitzpatrick  | Agency/Office/Telephone Department of Ecology/Northwest Regional Office/Water Quality Section Manager/(425) 649-7033 | Date 11/5/07 |

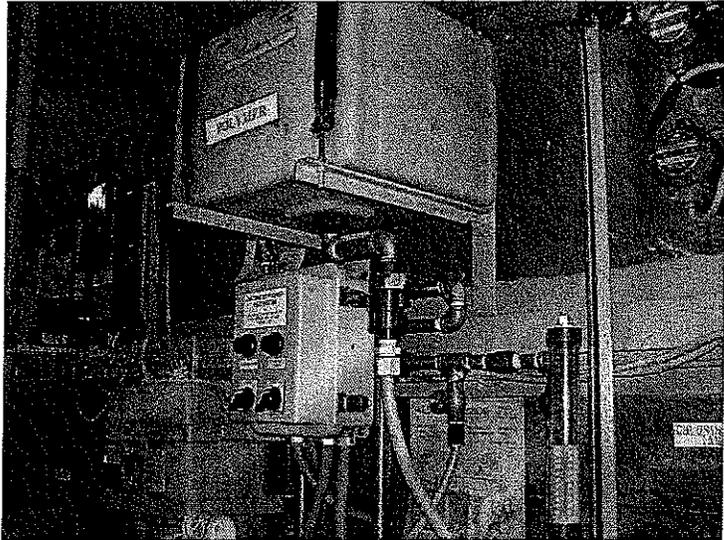


PHOTO #:01 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No :PA080002
DESCRIPTION: MSD – BIOPURE TANK WITH POLYMER AND
CHLORINE IN FORGROUND



PHOTO #:02 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No :PA080003
DESCRIPTION: MSD – PH CONTROL, BLOWER CONTROL,
CHLORINE DOSING IN FORGROUND

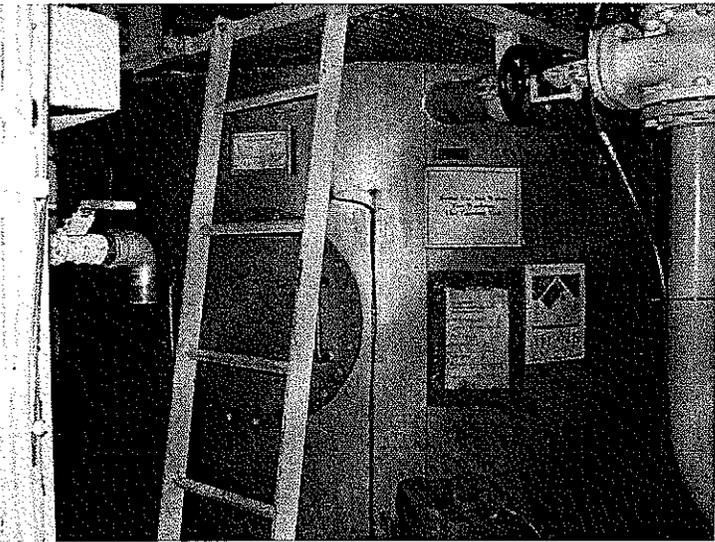


PHOTO #:03 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No :PA080004
DESCRIPTION: COLLECTION TANK (PRIOR TO MSD)

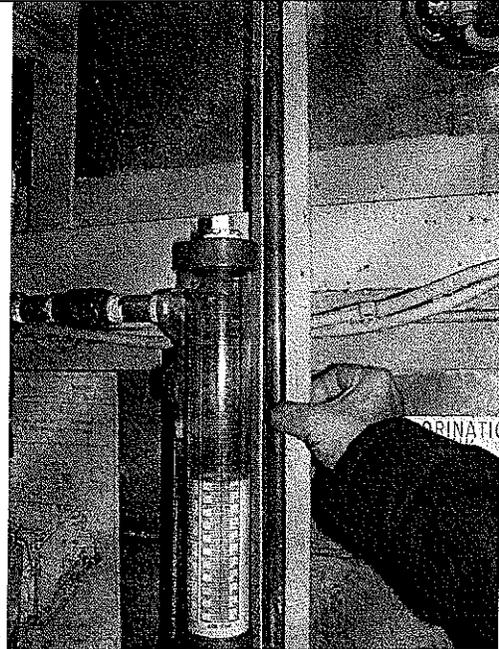


PHOTO #:04 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No :PA080005
DESCRIPTION: MSD – EFFLUENT TUBE

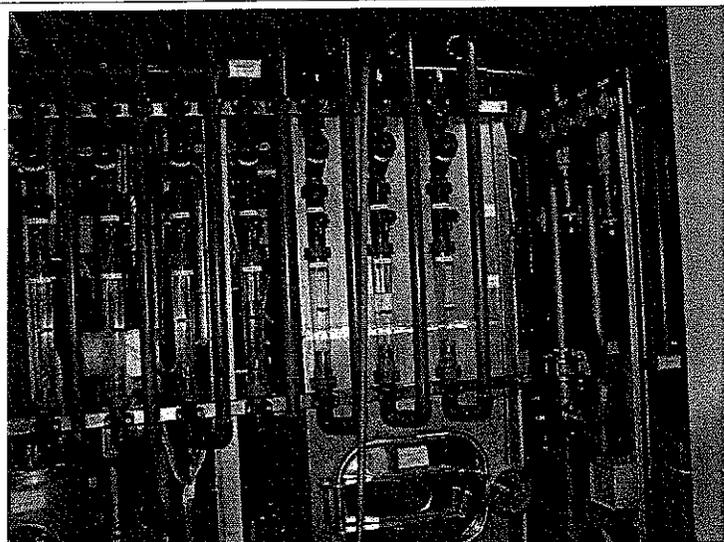


PHOTO #:05 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No.:PA080006
DESCRIPTION: AWTS - REVERSE OSMOSIS UNIT 1

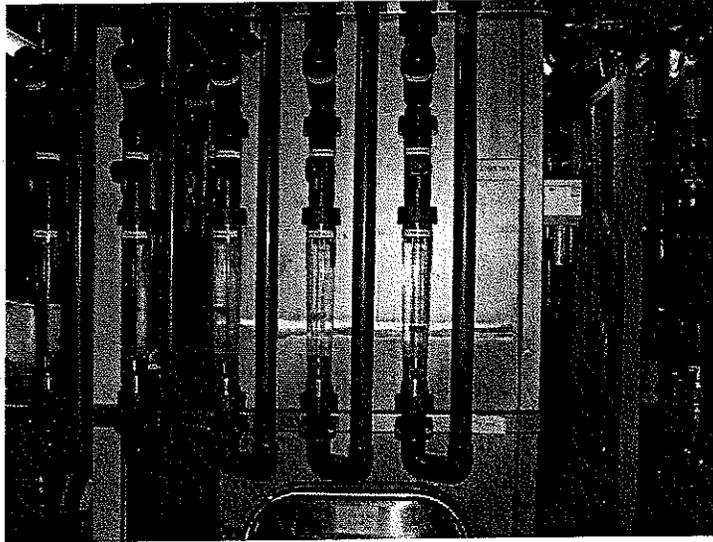


PHOTO #:06 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No.:PA080007
DESCRIPTION: AWTS - REVERSE OSMOSIS UNIT 2

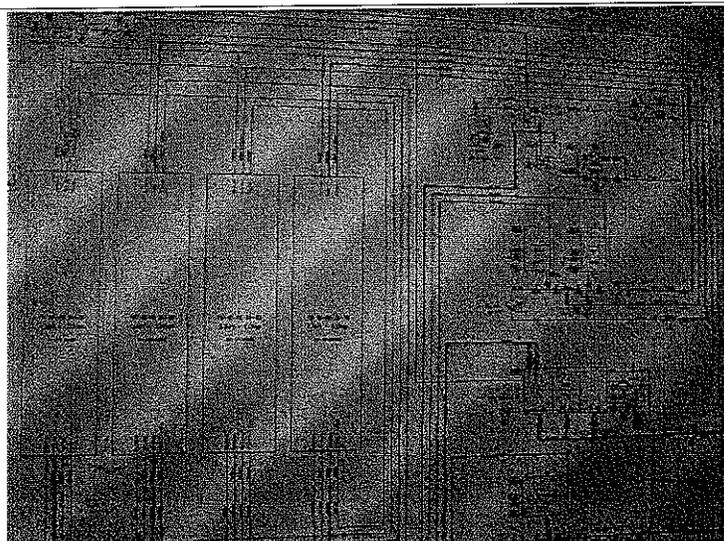


PHOTO #:07 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No.:PA080008
DESCRIPTION: AWTS - DRAWINGS

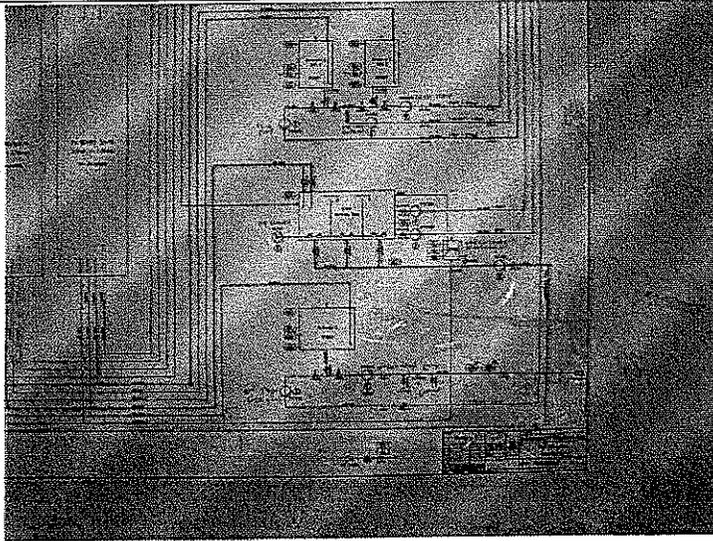


PHOTO #:08 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No.:PA080009
DESCRIPTION: AWTS - DRAWINGS

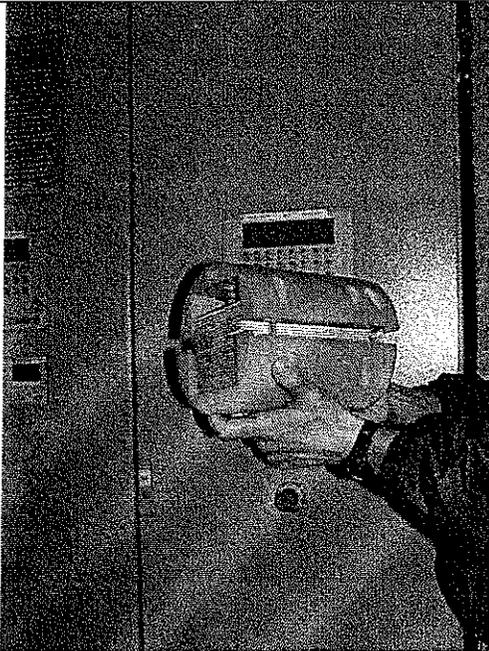


PHOTO #:09 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No.:PA080011
DESCRIPTION: AWTS – REVERSE OSMOSIS MEMBRANE

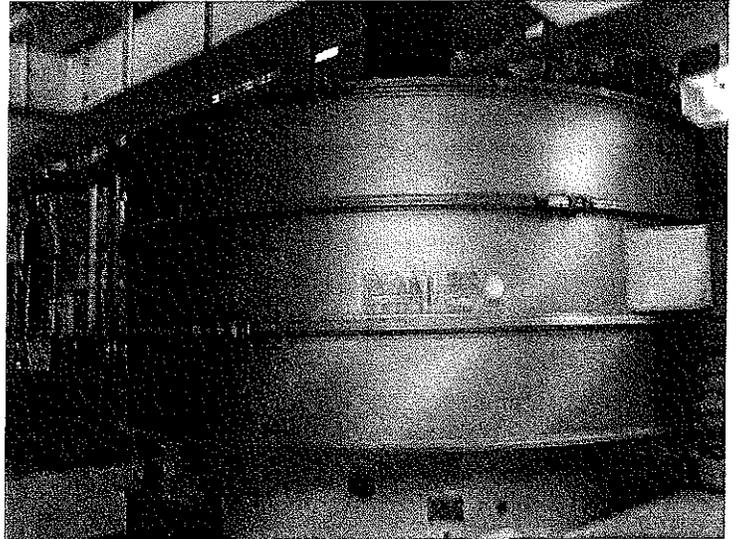


PHOTO #:10 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No.:PA080012
DESCRIPTION: AWTS – SWECO SCREEN

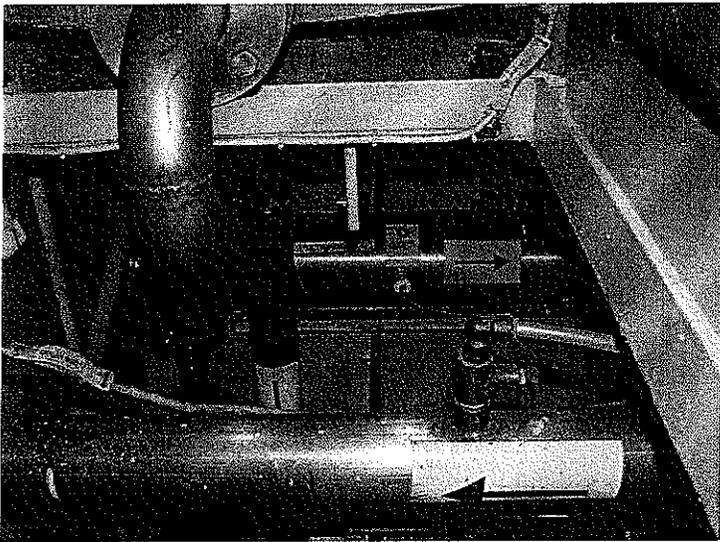


PHOTO #:11 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No.:PA080014
DESCRIPTION: AWTS – UV DISINFECTION

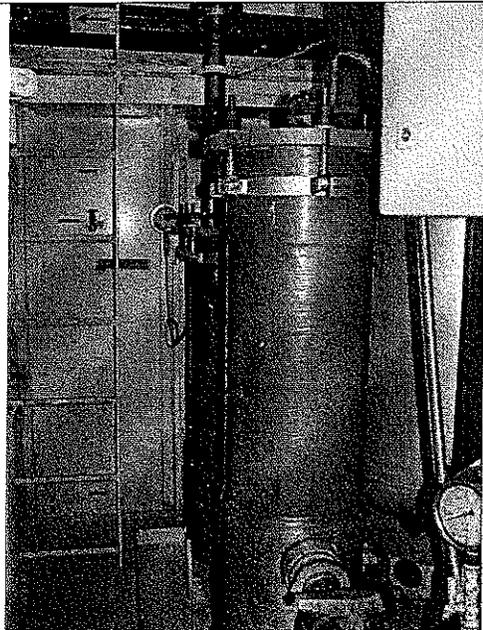


PHOTO #:12 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No.:PA080015
DESCRIPTION: AWTS CARBON FILTERS

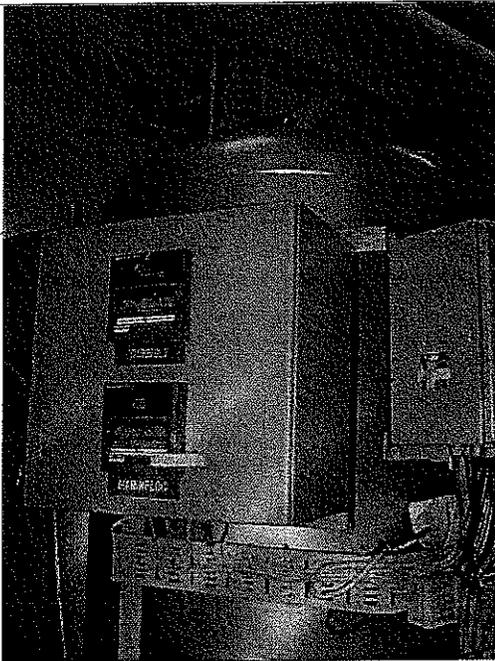


PHOTO #:13 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No :PA080016
DESCRIPTION: OILY BILGE TREATMENT SYSTEMS (TURBULO
AND MARINFLOC)



PHOTO #:14 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No :PA080018
DESCRIPTION: GARBAGE/RECYCLING AREA



PHOTO #:15 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No :PA080020
DESCRIPTION: FLUORESCENT BULB EATER (MERCURY VAPOR
REMOVAL SYSTEM)

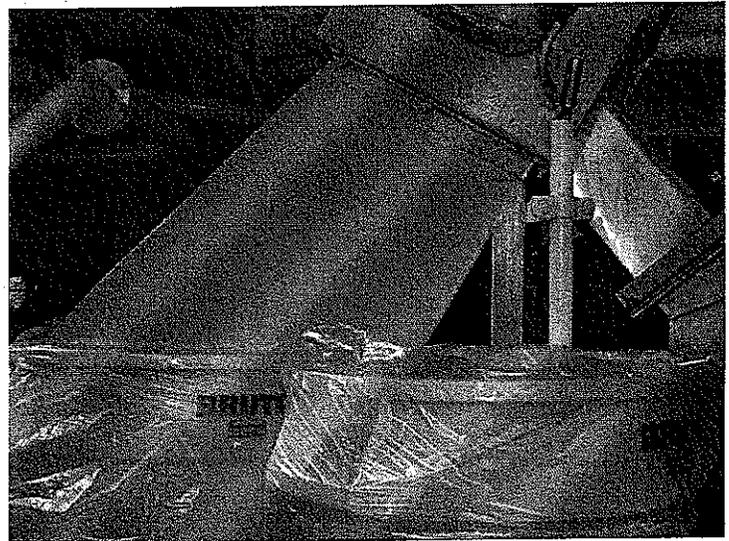


PHOTO #:16 DATE: 10/08/07 TAKEN BY: AMY JANKOWIAK
FILE No :PA080021
DESCRIPTION: FOOD WASTE SOMAT

November 29, 2007

Ray Hellwig, Regional Director
 Washington State Department of Ecology
 Northwest Regional Office
 3190 160th Avenue SE
 Bellevue, WA 98008-5452

Dear Mr. Hellwig:

Re: Washington Cruise MOU Compliance Report: 2007 Cruise Season

In accordance with the provisions of Memorandum of Understanding for Cruise Operations in Washington State (April 20, 2004 as amended May 2007), please accept this letter on behalf of Celebrity Cruises Inc. for the 2007 cruise season.

The following Celebrity Cruises Inc. ship(s) operated in Washington waters during 2007:

Celebrity Cruises Inc:

- *Mercury*; Seattle: May 2, September 21, 24, 28,
October 1, 5, 8, 12, 15, 19, 22, 26, 29, November 2
- *Summit*, Seattle: May 16.

Celebrity Cruises Inc.'s operations in Washington State addressed the following key provisions of the MOU as follows:

Section 1.1. Wastewater Management. Celebrity Cruises Inc. managed its wastewater in compliance with this section as follows:

In compliance with Section 1.1.1 and 1.1.2, the *Mercury* and *Summit*, held all gray and black water onboard until the ships were outside the waters included in this MOU. The *Mercury* has a Rochem Reverse Osmosis advanced wastewater purification system installed that can treat all black and a portion of the gray water and 4 type II Marine Sanitation Devices (Biopure - 4 plants on board) that treat all the black water according to International Maritime Organization and as for the Rochem system, Alaska legislation standards. The ship is currently certified by the US Coast Guard for continuous discharge in Alaska. The *Summit* has Hamann Marine Sanitation Devices and a Hydroxyl advanced wastewater purification system that is in the process of being commissioned. However, neither of these ship's systems are currently approved by the DOE for discharge in Washington. Based on a thorough review of ships' logs and records, we certify that our ships complied with these provisions of the MOU. Celebrity Cruises Inc. will make these records available to Ecology upon request.

Section 1.1.4 Discharge of Residual Solids. Based on a review of Celebrity Cruises Inc. ships' logs and records, Celebrity Cruises Inc. certifies that we complied with the prohibition on discharging residual solids coming from any type of treatment system within 12 nautical miles from shore, while within the IMO "Area to Be Avoided" and the Olympic Coast National Marine Sanctuary off the Washington Coast. Celebrity Cruises Inc. will make these records available to Ecology upon request.

Section 1.2. Solid Waste Management. Based on a review of Celebrity Cruises Inc. ships' logs and records, Celebrity Cruises Inc. certifies that no solid wastes were discharged into waters subject to the MOU. Celebrity Cruises Inc. will make these records available to Ecology upon request. All solid wastes were held onboard for landing to an approved facility or for onboard incineration. In some instances, food wastes were processed onboard and discharged while underway at more than 6 knots speed and while the ship is greater than 12 nautical miles from the nearest land and outside waters subject to this MOU, thus exceeding the International Maritime Organizations MARPOL Annex V requirements. While the *Mercury* was cruising in British Columbia on 3 and 4 day itineraries, and due to the fact that distances were less than 12 nm from the nearest land the vessel landed for disposal comminuted/pulped food waste (screened for plastics) in Victoria (Sept 22, 26, Oct 3, 6, 10, 17, 20, 24, 31) and Vancouver(29 Sept.). No comminuted food waste was discharged into Washington State Waters.

Section 1.3.1 through 1.3.4 Hazardous Waste Management. Based on a review of Celebrity Cruises Inc. ship's logs and records, Celebrity Cruises Inc. certifies that Hazardous Wastes were managed in accordance with these sections of the MOU.

Mercury & Summit: Landed all non-hazardous and hazardous waste in other locations outside of Washington. Celebrity Cruises Inc. will make these additional records available to Ecology upon written request.

Section 5. Marine Mammal Protection Act, Invasive Species Act, and the Washington Ballast Water Management Act. Based on a review of Celebrity Cruises Inc. ships' logs and records, Celebrity Cruises Inc. certifies that the provisions of the above laws were implemented as required by these laws. Celebrity Cruises Inc. will make these records available to Ecology upon request. All Celebrity Cruises Inc. ships fully comply with the appropriate sections of the Invasive Species Act by meeting and exceeding all international and U.S. Ballast Water Management and Reporting requirements found in Subpart D of 33 CFR part 151. Prior to each Alaska Cruising season, Celebrity Cruises Inc. prepares a binder for all ships deploying to the Pacific Northwest that includes all relevant environmental regulations for all west coast of North America and specifically the U.S. and Canada. In that binder we included the ballast water handling requirements for the state of Washington. The ship's specific management strategy was to eliminate the discharge of ballast. In this case, the ship managed to meet stability requirements with other onboard liquid weight. No actions were taken by the ship that would have harassed or hazarded any protected mammal species.

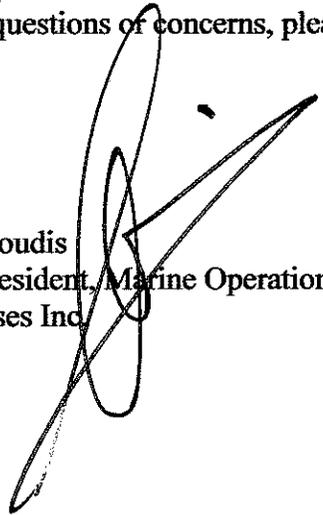
Section 10. Immediate self-reporting to Ecology of any incidences of non-compliance with any provisions of the MOU.

Celebrity Cruises Inc. Ships experienced no violations of the provisions of the MOU during the 2007 season.

I hereby certify that the above information is true and can be verified through documentation. If you have any questions of concerns, please call me at 305-982-2738.

Sincerely,

John Krousouloudis
Senior Vice President, Marine Operations
Celebrity Cruises Inc.

A handwritten signature in black ink, appearing to read 'John Krousouloudis', is written over the typed name and title. The signature is stylized with large loops and a long horizontal stroke extending to the right.

PHONE: 206 281 3535
FAX: 206 281 7110

300 Elliott Avenue West
Seattle Washington 98119

November 30, 2007

Jeannie Summerhays, Regional Director
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Dear Ms. Summerhays:

Re: Washington Cruise MOU Compliance Report: 2007 Cruise Season

Section 9 of the Memorandum of Understanding for Cruise Operations in Washington State (signed May 25, 2007), requires an annual submittal detailing the compliance with the MOU for the each vessel within the NWCA that calls to a port in Washington for the previous cruise season. Please accept this letter on behalf of Holland America Line (HAL) for the 2007 cruise season.

In calendar year 2007 the following HAL vessels operated in Washington State waters: Amsterdam, Noordam, Oosterdam, Zaandam, and Zuiderdam. Dates of the calls were as follows:

- Amsterdam: Seattle, May 18 to September 21, 2007, weekly calls
- Noordam: Seattle, May 13 to September 30, 2007, weekly calls
- Oosterdam: Seattle, May 5 to September 22, 2007, weekly calls
- Zaandam: Seattle, April 23, 2007, one call
- Zuiderdam: Seattle, September 30, 2007, one call

HAL's operations in Washington State addressed the following key provisions of the MOU as follows:

Section 2.1. Wastewater Management. HAL managed its wastewater in compliance with this section as follows:

- In compliance with Section 2.1.1 and 2.1.2, Amsterdam, Oosterdam, Zaandam and Zuiderdam held all treated and untreated gray and black water while in Washington waters and

did not discharge solid waste or oily bilge water if not in compliance with applicable federal and state laws while in Washington waters. Amsterdam has a Hamworthy Type II MSD; Oosterdam and Zuiderdam have Rochem Advanced Wastewater Purification Systems (AWWPS), and Zaandam has a Zenon AWWPS. Based on a review of ships' logs and records, we certify that these ships complied with these provisions of the MOU. HAL will make these records available to Ecology upon request.

- In compliance with Section 2.1.3, HAL submitted the information required to allow discharge of treated wastewater one mile from berth to Ecology via email on July 31, 2007 documenting the issuance of the U.S. Coast Guard "Continuous Discharge" letter for the Noordam. Approval of the information was received from Ecology on August 13, 2007. Noordam has a Rochem AWTs.
- In compliance with Section 2.1.3 ("a" through "g"), HAL complied with each of the requirements to discharge including sampling requirements, and meeting effluent limitations.

Section 2.1.4 Discharge of Residual Solids. Based on a review of HAL ships' logs and records, HAL certifies that we complied with the prohibition on discharging residual solids coming from any type of treatment system within 12 nautical miles from shore and while within the IMO "Area to Be Avoided" off the Washington Coast and within the entire boundaries of the Olympic Coast National Marine Sanctuary. HAL will make these records available to Ecology upon request.

Section 2.2.1 through 2.2.4 Hazardous Waste Management. Based on a review of HAL ship's logs and records, HAL certifies that Hazardous Wastes were managed in accordance with these sections of the MOU. HAL will make these records available to Ecology upon request. Hazardous waste was not offloaded from HAL vessels in Washington State in 2007.

Section 6. Marine Mammal Protection Act. Invasive Species Act and the Washington Ballast Water Management Act. Based on a review of HAL ship's logs and records, HAL certifies that the provisions of the above laws were implemented as required by these laws. HAL will make these records available to Ecology upon request.

Washington State Department of Ecology
November 30, 2007
Page Three

Section 9. Immediate self-reporting to Ecology of any incidences of non-compliance with any provisions of the MOU. HAL operations in Washington State resulted in no known incidences of non-compliance with the MOU.

I hereby certify that the above information is true and can be verified through documentation. If you have any questions or concerns, please call me at (206) 301-5343.

Sincerely,



William J. Morani, Jr.
Vice President
Environmental Management Systems

WJM/jg



NORWEGIAN CRUISE LINE
FREESTYLE CRUISING

November 28, 2007

Jeannie Summerhays, Regional Director
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Dear Director:

Re: Washington Cruise MOU Compliance Report: 2007 Cruise Season

Section 9 of the Memorandum of Understanding for Cruise Operations in Washington State (signed May 25, 2007), requires an annual submittal detailing the compliance with the MOU for the each vessel within the NWCA that calls to a port in Washington for the previous cruise season. Please accept this letter on behalf of NCL (Bahamas) Ltd for the 2007 cruise season.

The following ships operated Washington waters during 2007:

- NORWEGIAN STAR – Sailed from Seattle on 5/05, 5/12, 5/19, 5/26, 6/02, 6/09, 6/16, 6/23, 6/30, 7/07, 7/14, 7/21, 7/28, 8/04, 8/11, 8/18, 8/25, 9/01, 9/08, 9/15, and 9/22.
- NORWEGIAN PEARL – Sailed from Seattle on 5/13, 5/20, 5/27, 6/03, 6/10, 6/17, 6/24, 7/01, 7/08, 7/15, 7/22, 7/29, 8/05, 8/12, 8/19, 8/26, 9/02, 9/09, 9/16 and 9/23.

NCL's operations in Washington State addressed the following key provisions of the MOU as follows:

Section 2.1 Wastewater Management. NCL managed its wastewater in compliance with this section as follows:

- In compliance with Section 2.1.3, NCL submitted information supporting its request to discharge treated wastewater while at berth to Ecology on 05 April 2007 for the following ships - NORWEGIAN STAR and NORWEGIAN PEARL. Both of these ships are equipped with the Scanship Advanced Wastewater Treatment System (AWTS) and were sampled twice a month for the entire season. All sample results were submitted to Department of Ecology and were well within the standards detailed in the MOU. Approval to discharge while at berth was received from Ecology on 03 May 2007 for both ships.

- In compliance with Section 2.1.3 (“a” through “g”), NCL complied with each of the requirements to discharge including sampling requirements and meeting effluent limitations.

Section 2.1.4 Discharge of Residual Solids. Based on a review of NCL ships’ logs and records, NCL certifies that we complied with the prohibition on discharging residual solids coming from any type of treatment system within waters subject to this MOU, within 12 nautical miles from shore and within the entire boundaries of the Olympic Coast National Marine Sanctuary. NCL will make these records available to Ecology upon request.

Section 2.2.1 through 2.2.4 Hazardous Waste Management. Based on a review of NCL ship’s logs and records, NCL certifies that Hazardous Wastes were managed in accordance with these sections of the MOU. NCL will make these records available to Ecology upon request. All hazardous waste was collected and held aboard and discharged ashore in Canada (Victoria or Prince Rupert) in accordance with Canadian and Company policies.

Section 6. Marine Mammal Protection Act, Invasive Species Act, and the Washington Ballast Water Management Act. Based on a review of NCL ship’s logs and records, NCL certifies that the provisions of the above laws were implemented as required by these laws. NCL will make these records available to Ecology upon request. Prior to initial entry to Washington the NORWEGIAN STAR and NORWEGIAN PEARL each conducted an open ocean exchange of ballast and held all ballast water aboard during the season. Appropriate Ballast Water Reports were filed with U.S. Coast Guard and the Marine Exchange throughout the season.

Section 9. Immediate self-reporting to Ecology of any incidences of non-compliance with any provisions of the MOU. There were no incidents of non-compliance.

I hereby certify that the above information is true and can be verified through documentation. If you have any questions or concerns, please call me at 305-436-4956.

Sincerely,



Randall R. Fiebrandt, P.E.
Director, Environmental Systems
(T) 305-436-4956 (F) 305-436-4159



PRINCESS CRUISES
escape completely

RECEIVED
DEC 06 2007
DEPT OF ECOLOGY

November 30, 2007

Jeannie Summerhays, Regional Director
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Dear Regional Director:

Re: Washington Cruise Ship MOU Compliance Report: 2007 Cruise Season

Please accept this letter on behalf of Princess Cruises for the 2007 cruise season as our annual submittal detailing the compliance with the MOU.

The following ships operated Washington waters during 2007:

- Name of ships; listed port of call and dates.

Sun Princess – Seattle:

May 6,13,20,27
June 3,10,17,24
July 1,8,15,22,29
August 5,12,19,26
September 2,9,16,23

Golden Princess – Seattle:

May 5,12,19,26
June 2,9,16,23,30
July 7, 14,21,28
August 4,11,18,25
September 1,8,15,22

Princess Cruises operations in Washington State addressed the following key provisions of the MOU as follows:

Section 2.1 Wastewater Management. Princess Cruises managed its wastewater in compliance with this section as follows:

In compliance with Section 2.1.3, Princess Cruises submitted information supporting its request to discharge treated wastewater while at berth to Ecology on April 30, 2007 for the following ship(s) Golden Princess and Sun Princess. Approval to discharge while at berth was received from Ecology on May 3, 2007. The types of treatment systems for each ship in this category are Hamworthy's Membrane Bio-Reactors (MBR's).

- Description of MBR's

The Golden Princess treats all black water and accommodations gray water with MBR #1, MBR #2 and MBR #3. Black water is delivered directly from the collecting EVAC tanks to the MBR's. Gray water from accommodations is delivered from the dedicated gray water collection tanks and then to one of two MBR's buffer tanks. Gray water from the galleys and laundry are not treated by the MBR's and is held into double bottom tanks. The Hamworthy system has an MBR 1st Stage Screen Press Vexamas Hydro which filters paper and other solids called "screenings" out of the feed. The screenings are collected from the dry waste outlet and into a bagging unit. The bagging is manually removed periodically throughout the day and delivered to the incinerator for incineration while at sea. The feed then flows into the 1st Stage of the Bioreactor which operates as an aerobic biological treatment system. Incoming feed enters into a high strength biomass within which there is a diverse microbial ecology that breaks down and consumes the raw sewage and grey water mix. The by-products of consumption are water and carbon dioxide; the water passes through the membrane and is discharged, the carbon dioxide is vented to atmosphere (outside the Engine Room) along with the air that is used for the aeration of the biomass. This air supply to the biomass via fine-bubble diffusers also lowers the chemical oxygen demand (COD) of the waste. From the 1st Stage of the Bioreactor further filtering is completed in each of the two Russel Type Bag Filters. Any further solids are then redirected back to the Screen Press Vexamas Hydro and the remaining filtrate is pumped to the 2nd Stage of the Bioreactor where further aeration is completed. The 2nd Stage of the Bioreactor is then pumped down via cross-flow pumps which deliver feed to the membrane modules. The final effluent is then pumped from the membranes into a permeate tank where it is then circulated thru an Ultra Violet (UV- System) for further disinfection before it is finally pumped overboard.

The Sun Princess treats all black water and accommodations gray water with MBR #1, MBR #2 and MBR #3. Black water is delivered directly from the collecting EVAC tanks to the MBR's. Gray water from accommodations is delivered from the dedicated gray water collection tanks and then to one of two MBR's buffer tanks where the grey water is provided with some aerobic aeration through the usage of blowers. The gray water and black water are then mixed into a common line before entering the MBR's. Gray water from the galleys and laundry are not treated by the MBR's and is held into double bottom tanks. The Hamworthy system has an MBR 1st Stage Screen Press Waterlink which filters paper and other solids called "screenings" out of the feed. The screenings are collected from the dry waste outlet and into a bagging unit. The bagging is manually removed periodically throughout the day and delivered to the incinerator for incineration while at sea. The feed then flows into the 1st Stage of the Bioreactor which operates as an aerobic biological treatment system. Incoming feed enters into a high strength biomass within which there is a diverse microbial ecology that breaks down and consumes the raw sewage and grey water mix. The by-products of consumption are water and carbon dioxide; the water passes through the membrane and is discharged, the carbon dioxide is vented to atmosphere (outside the Engine Room) along with the air that is used for the aeration of the biomass. This air supply to the biomass via fine-bubble diffusers also lowers the chemical oxygen demand (COD) of the waste. From the 1st Stage of the Bioreactor further filtering is completed in each of the two Russel Type Bag Filters. Any further solids are then redirected back to the Screen Press Waterlink, and the remaining filtrate is pumped to the 2nd Stage of the Bioreactor where further aeration is completed. The 2nd Stage of the Bioreactor is then pumped down via cross-flow pumps which deliver feed to the membrane modules. The final effluent is then pumped from the

membranes into a permeate tank where it is then circulated thru an Ultra Violet (UV System) for further disinfection before it is finally pumped overboard.

Based on a thorough review of ships' logs and records we certify that our ship(s) complied with these provisions of the MOU. Princess Cruises will make these records available to Ecology upon request.

- In compliance with Section 2.1.3 ("a" through "g"), Princess Cruises complied with each of the requirements to discharge including sampling requirements, and meeting effluent limitations.

Section 2.1.4 Discharge of Residual Solids. Based on a review of Golden Princess and Sun Princess ships' logs and records, Princess Cruises certifies that we complied with the prohibition on discharging residual solids coming from any type of treatment system within waters subject to this MOU, within 12 nautical miles from shore and within the entire boundaries of the Olympic Coast National Marine Sanctuary. Princess Cruises will make these records available to Ecology upon request.

Section 2.2.1 through 2.2.4 Hazardous Waste Management. Based on a review of Golden Princess and Sun Princess ship's logs and records, Princess Cruises certifies that Hazardous Wastes were managed in accordance with these sections of the MOU. Princess Cruises will make these records available to Ecology upon request. All waste that was landed by Princess Cruises in Seattle was handled by Clean Harbors Environmental Services, Inc. According to this contractor Princess Cruises waste was handled in accordance to WAC 173-303-240, and appropriate DOT regulations.

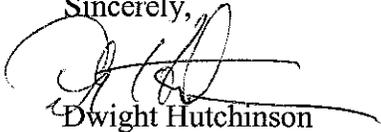
Section 6. Marine Mammal Protection Act, Invasive Species Act, and the Washington Ballast Water Management Act. Based on a review of Golden Princess and Sun Princess ship's logs and records, Princess Cruises certifies that the provisions of the above laws were implemented as required by these laws. Princess Cruises will make these records available to Ecology upon request. Princess Cruises has developed navigation procedures in order for marine mammal avoidance. At any time when large marine mammals are sighted in a quadrant which could lead to a close quarter situation with the ships track (passing closer than 100 yards), that speed is immediately reduced to 10 knots or below and, if necessary, course altered to open this approach distance. As always, first consideration must be the safety of the ship, so prior to making this adjustment in course and speed, the ships navigational situation must be considered.

It is Princess Cruises policy that each officer responsible with the operation of ballast water fully understands the practices prescribed in the ships Ballast Water Management Plan. This plan contains a detailed description of the ballast water management processes that the ship must use. Princess Cruises complies with the Washington State Ballast Water Program.

Section 9. Immediate self-reporting to Ecology of any incidences of non-compliance with any provisions of the MOU. There were no incidences of non-compliance to report to Ecology or any corrective actions required.

I hereby certify that the above information is true and can be verified through documentation.
If you have any questions or concerns, please call me at 661-753-1802.

Sincerely,

A handwritten signature in black ink, appearing to be 'D. Hutchinson', written over a horizontal line.

Dwight Hutchinson
Environmental Operations Director
Princess Cruises

Jankowiak, Amy (ECY)

From: alorenzana@princesscruises.com
Sent: Thursday, November 29, 2007 2:49 PM
To: Jankowiak, Amy (ECY)
Subject: Re: annual compliance reports due Dec 1st
Attachments: C.htm; 2007 Annual compliance letter boilerplate.doc

Hello Amy,

I am working at completing the annual compliance report for our Sun Princess and Golden Princess, but will please need a little more time to provide you all of the requested information. I will provide the report to you as soon as possible. Please excuse the delay, I am also traveling to your meeting on Tuesday.

Kindest Regards,

Andrew Lorenzana
Environmental Operations Manager, M.E.
Princess Cruises-Cunard Environmental Operations
24305 Town Center Drive
Santa Clarita, CA 91355-4999
Office: 661-753-2755

"Jankowiak, Amy (ECY)" <AJAN461@ecy.wa.gov>

ENV

11/26/2007 11:49 AM

<jhansen@nwcruiseship.com>, "Grabb, Daniel (HAL)"
<DGrabb@HollandAmerica.com>, "Turvey, Jonathan (HAL)"
To <JTurvey@HollandAmerica.com> "Fiebrandt Randy" <RFiebrandt@ncl.com>
<alorenzana@princesscruises.com>
"Fitzpatrick, Kevin (ECY)" <KFIT461@ecy.wa.gov>,
cc <dspalding@nwcruiseship.com> "Ressler Peter"
<Ressler P@portseattle.org>

Subject annual compliance reports due Dec 1st

12/3/2007



Royal Caribbean International
1050 Caribbean Way
Miami FL 33132

tel: 305 539 6000
www.royalcaribbean.com

November 29, 2007

Mr. Ray Hellwig
Regional Director
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Dear Mr. Hellwig:

Re: Washington Cruise MOU Compliance Report: 2007 Cruise Season

In accordance with the provisions of the Memorandum of Understanding for Cruise Operations in Washington State (April 20, 2004, amended May 2007), please accept this letter on behalf of Royal Caribbean International for the 2007 cruise season.

The following Royal Caribbean International ship operated in Washington waters during 2007:

Vision of the Seas; Seattle: May 11, 18, 25. June 1, 8, 15, 22, 29. July 6, 13, 20, 27. August 3, 10, 17, 24, 31, and September 7, 14.

Radiance of the Seas, Seattle: 23 September

Serenade of the Seas; Seattle: 9 May and 1 October

Royal Caribbean International's operations in Washington addressed the following key provisions of the MOU as follows:

Section 1.1. Wastewater Management. Royal Caribbean International managed its wastewater in compliance with this section as follows:

In compliance with Section 1.1.1 and 1.1.2, Royal Caribbean International's ships, the *Vision of the Seas* and *Radiance of the Seas* held all gray and black water onboard until the ship was outside the waters included in this MOU. The *Vision of the Seas* has a Hydroxyl Advanced Wastewater Purification treatment system installed that treats all black water in excess of international and US Federal standards. The *Radiance of the Seas* has an IMO type approved Hamann MSD installed. However, neither ship was approved for discharge in Washington State waters. Based on a thorough review of ships' logs and records, we certify that these two ships complied with these provisions of the MOU. The *Serenade of the Seas* did inadvertently discharge Advanced Wastewater Purification (AWP) treated gray and black water inside waters of the MOU in May 2007. This incident was self-reported to DOE and was followed by a detailed investigation of the incident. Royal Caribbean International has made these records available to Ecology upon request.

Section 1.1.4 Discharge of Residual Solids. Based on a review of ship's logs and records, Royal Caribbean International certifies that we complied with the prohibition on discharging residual solids coming from any type of treatment system within 12 nautical miles from shore and while within the IMO "Area to Be Avoided" and the Olympic Coast National Marine Sanctuary off the Washington Coast. Royal Caribbean International will make these records available to Ecology upon request.

Section 1.2. Solid Waste Management. Based on a review of ship's logs and records, Royal Caribbean International certifies that no solid wastes were discharged into waters subject to the MOU. Royal Caribbean International will make these records available to Ecology upon request. All solid wastes were held onboard for landing to an approved facility or for onboard incineration. In some instances, food wastes were processed onboard and discharged while underway at more than 6 knots speed and while the ship was greater than 12 nautical miles from the nearest land while the ships were outside the waters subject to this MOU, thus exceeding the International Maritime Organizations MARPOL Annex V requirements.

Section 1.3.1 through 1.3.4 Hazardous Waste Management. Based on a review of ship's logs and records, Royal Caribbean International certifies that no Hazardous Wastes were landed in Washington State and that they were managed in accordance with these sections of the MOU. Royal Caribbean International will make these records available to Ecology upon request.

Section 5. Marine Mammal Protection Act, Invasive Species Act, and the Washington Ballast Water Management Act. Based on a review of ship's logs and records, Royal Caribbean International certifies that the provisions of the above laws were implemented as required by these laws. Royal Caribbean International will make these records available to Ecology upon request. All Royal Caribbean International ships fully comply with the appropriate sections of the Invasive Species Act by meeting and exceeding all international and U.S. Ballast Water Management and Reporting requirements found in Subpart D of 33 CFR part 151. Prior to each Alaska Cruising season, Royal Caribbean International prepares an electronic web-based binder for all ships deploying to the Pacific Northwest that includes all relevant environmental regulations for all west coast U.S. states and Canada. In that binder, we included the ballast water handling requirements for the state of Washington. The ship's specific management strategy was to not discharge ballast. In this case, the ships managed to meet stability requirements with other onboard liquid weight. No actions were taken by the ships that would have harassed or hazarded any protected mammal species.

Section 10. Immediate self-reporting to Ecology of any incidences of non-compliance with any provisions of the MOU. The *Radiance of the Seas* and *Vision of the Seas* experienced no violations of the provisions of the MOU. We have fully reported the incident involving *Serenade of the Seas*' unauthorized discharge of Advanced Wastewater Purification treated gray and black water on 10 May 2007 to the department.

Mr. Ray Hellwig
November 29, 2007
Page 3

I hereby certify that the above information is true and can be verified through documentation. If you have any questions or concerns, you may contact me at telephone number 305-982-2469.

Sincerely,

A handwritten signature in black ink, appearing to read "W. S. Wright". The signature is fluid and cursive, with a large initial "W" and a distinct "S" and "Wright" following.

Captain William S. Wright
Senior Vice President, Marine Operations

WASHINGTON ANNUAL CRUISE MEMORANDUM OF UNDERSTANDING & CRUISE SHIP UPDATE MEETING

Date/Time: 12/4/2007, 1:00 pm to 4:30 pm

Groups: Port of Seattle, Department of Ecology, Cruise Line Representatives

Location: Port of Seattle Pier 69, Commission Chambers

Attendees:

David Wetzel, Admiralty Environmental
Amy Jankowiak, Department of Ecology
Kevin Fitzpatrick, Department of Ecology
Dave Peeler, Department of Ecology
Norm Davis, Department of Ecology
Peter Christiansen, Department of Ecology
Marietta Sharp, Department of Ecology
Mark Toy, Department of Health
Bob Woolrich, Department of Health
Blain Reeves, Department of Natural Resources
Fred Felleman, Friends of the Earth
David Bain, GRR Rescue
Lincoln Loehr, Heller, Ehrman LLP
Bill Morani, Holland America Line
Dan Grabb, Holland America Line
Jon Turvey, Holland America Line
Bob Diaz, Holland America Line
Representative Mary Lou Dickerson, House of Representatives
Mark Buscher, King County Wastewater Treatment Division
Andrew Dalton, Muckleshoot Fisheries Division
John Hansen, Northwest Cruiseship Association
David Fyfe, Northwest Indian Fisheries Commission
Jim Jessernig, Pacific Coast Shellfish
Peter Ressler, Port of Seattle
Eric Hanson, Port of Seattle???
Mike McLaughlin, Port of Seattle
Andrew Lorenza, Princess Cruises
Selena Haza, Quay Cruise Agencies, USA
Doug Coburn, Quay Cruise Agencies, USA
Rich Pruitt, Royal Caribbean Cruises
Debbie Kay, Suquamish Tribe Fisheries
Cathy Stanley, Tulalip Tribes Natural Resources
Scott Meschke, University of Washington
Michael Antee, USFDA
Representative Mary Lou Dickerson, Washington State

Agenda

| | | |
|--------------------------|---|---|
| 1:00 PM – 1:20 PM | Welcome, Introductions MOU introduction presentation | (Amy Jankowiak, Peter Ressler, All) |
| 1:20 PM – 1:35 PM | Compliance with the 2007 season Findings from 2007 season inspections | (Amy Jankowiak, cruise line reps) |
| 1:35 PM – 2:35 PM | Department of Health Report – virus/cruise ships <i>Assessment of Potential Health Impacts of Virus Discharge from Cruise Ships to Shellfish Growing Areas in Puget Sound</i> | (WA Department of Health, University of Washington) |
| 2:35 PM – 2:45 PM | Funding – for the MOU Where we are, how it works | (Ecology, Port of Seattle, Cruise line reps) |
| 2:45 PM – 3:00 PM | BREAK | |
| 3:00 PM – 3:15 PM | Biosolids Update | (Amy Jankowiak, parties to the MOU) |
| 3:15 PM – 3:30 PM | Whole Effluent Toxicity Update | (Amy Jankowiak, parties to the MOU) |
| 3:30 PM – 4:00 PM | MOU Amendments What changes are needed | (Parties to the MOU) |
| 4:00 PM – 4:25 PM | Comments/Discussion from cruise lines and interested parties | (All) |
| 4:25 PM – 4:30 PM | Looking Ahead What to expect for next season, legislative... | (All) |

Welcome, Introductions

Penny Mabie, EnviroIssues, introduced herself as the meeting facilitator and welcomed attendees to the annual Cruise Memorandum of Understanding (MOU) meeting. Meeting attendees and members of the public introduced themselves.

Amy Jankowiak, Department of Ecology, thanked meeting attendees for their participation in the annual MOU meeting. The purpose of the meeting was to provide a 2007 update on the MOU, invite suggestions for amendments, and to discuss any questions or issues of concern surrounding the MOU. Amy briefly noted Department of Ecology goals to prevent pollution, support sustainable communities & natural resources, and to clean up pollution in Puget Sound. She proceeded to show two PowerPoint presentations. The first provided an overview of MOU specifications and related issues, and the second reported on 2007 MOU compliance.

MOU Background and Specifications

Amy Jankowiak, Department of Ecology

Why Department of Ecology Focuses on Cruise Ships

- To protect State waters
- Cruise ships are similar to small cities
- Unique shape of state and marine waters
- Shellfish protection is a priority for public health
- Because of their mobility, cruise ships require specific regulation

Cruise ships in Washington Waters

- Cruise ships have docked in Seattle since 1999
- In early 2003, Ecology developed Best Management Practices (BMPs) for cruise ship maintenance while in Seattle
- In May 2003, sludge discharge from a vessel led to development of the MOU

Memorandum of Understanding (MOU) in Washington State

- Signed April 20, 2004
- Major components:
 - Defines “Waters subject to the MOU”
 - Prohibits untreated blackwater and untreated graywater discharges
 - No discharge in Washington waters without advanced wastewater treatment systems (AWTS)
 - Can discharge while > 1 mile from port, > 6 knots with AWTS
 - If certain conditions met, can continuously discharge even while at port.
- Ships covered by MOU:
 - NWCA member lines (over 250 people, at Port for more than 1 day)
 - 15 ships covered in 2007
- Ships not covered by MOU:
 - Non-NWCA cruise ships: 2 in 2007, 3 Port calls
 - Small cruise ships (less than 250 people)
 - Alaska Marine Highway System, Bellingham
 - Washington State Ferries
 - Other types of ships/boats

MOU Sampling Requirements

Ships approved for discharge agree to:

- Allow inspections a minimum of once per season, to verify compliance with MOU
- Submit Compliance/Non-Compliance Notifications
- Submit Annual Compliance Reports

MOU sampling procedures:

- Sample monthly in Seattle (BOD, TSS, fecal coliform, pH, residual chlorine)
- Meet limits (fecal GEM 20, BOD/TSS 30/45, pH 6-9, chlorine residual 10ug/l)
- Split samples with Ecology, upon request
- Whole Effluent Toxicity (WET) testing once every 2 years, or once every 40 calls

- Provide test results (Alaska and Seattle)
- Comply with vessel inspections by Ecology

MOU Residual Solids

- Residual Solids (biomass, sludge) discharges are prohibited in waters subject to the MOU, within 12 nautical miles from shore, and within the Olympic Coast National Marine Sanctuary.

Other MOU Specifications

- Solid waste discharge prohibited
- Hazardous waste management required
- Oily Bilge water
- United States Coast Guard (USCG) jurisdiction
- Annual meeting, Annual Report, Amendments, Funding

Benefits of Existing MOU

- MOU exists as an agreement to protect water quality
- Enforcement capabilities under Water Quality Standards and RCW 90.48.080
- Press coverage in cases of MOU violation
- Increases efforts for collection of sampling data
- Outlines procedure for notification of noncompliance
- Facilitates open communication with cruise lines and vessels
- Department of Ecology continues to learn more about vessels and equipment

Issues / Problems of Existing MOU

- Difficulty with enforcement of agreement
- No coverage for smaller passenger vessels or non NWCA vessels
- Air quality issues are not covered by the MOU

2007 Compliance

Amy Jankowiak, Department of Ecology

Discharge Approvals

If documentation is insufficient, cruise lines are notified as to which documentation is needed. In 2007, cruise ships Norwegian Pearl, Star, Sun, Golden Princess, and Sun Princess were approved for continuous discharge. Remaining vessels opted to hold discharges in 2007.

2007 Discharge Approvals

- 98% port calls from large cruise ships under the MOU, 6 vessels approved; 190 calls

Inspections

- Introductions/overview of plan for the day (prior notification given)
 - Approximately 2 hours in length
 - Similar to inspections for on-land plants

- Control room
 - Run-through of how system works
 - Variety of questions on staffing, training, protocols
 - Review of records
- Tour of treatment system(s)
- Observations of other waste streams on the ship
- Sampling

Inspections Conducted

- 8 inspections conducted as of December 2007 (all but one home-ported vessels).
- Inspection findings: evaluation is still in process, results thus far indicate compliance.
 - Operating well; more sampling on board for process control
 - Discharge protocols thorough with verification

2007 Sampling

- Sampling data still being received and evaluated. Summary of data and data will be included in the 2007 annual report
- WET testing
 - Required for vessels approved for discharge
 - Once every two years if home-ported (20 visits) or
 - Once every 40 port calls or turnarounds
 - All required WET testing submitted thus far (*Sun Princess* now at 2 years home-ported)

2007 Compliance Notifications

- One reported incident for 2007 season to date
- Compliance letters
 - All in except for one (extension requested)

Recommendations for MOU (from 2006 annual report)

- Ecology recommends MOU continue to be used as a complement to environmental regulations until regulations specific to cruise ship waste management in Washington are put in place
- Ecology continue to inspect ships that discharge, including closely looking at wastewater management and other waste streams
- Ecology and Health to work together to seek information on smaller passenger vessels
- Cruise lines to conduct a thorough review of records on an on-going basis and at end of season to evaluate compliance and inspection recommendations to be implemented

Questions / Comments about MOU Compliance

John Hansen, Northwest Cruiseship Association (NWCA), told the group he appreciates the work of the Department of Ecology, the Port of Seattle, and various partners in Canada and Alaska. The NWCA continues to learn more about the MOU and is pleased about clean reports that have followed each cruise season since the implementation of the MOU.

He noted the commercial success of operations, with 9 ships home-ported in Seattle and 17 in Vancouver. The association expects similar numbers in 2008. In addition to commercial success, the association measures success by environmental compliance. John pointed out the success of 2007, with no major issues surrounding environment, safety, or security. John explained that the objective of the cruise ship association is to do everything possible to maintain high environmental standards.

Amy Jankowiak, Department of Ecology, invited other cruise line members to offer information surrounding MOU compliance. No one responded and the meeting proceeded to the next agenda item.

Department of Health Report

Mark Toy, Department of Health

Since 1999, there has been a significant increase in the number of cruiseship calls to the Port of Seattle. The Department of Health (DOH) was tasked by the State legislature to study impacts of large cruise ship wastewater discharges on norovirus exposures to Puget Sound shellfish. DOH commissioned the University of Washington to conduct the study.

2005 Legislation

- Washington legislation sought to put MOU into law
- Questions about shellfish safety stopped passage of bill
- State legislature budgeted funds for virus study
- DOH commissioned the UW to conduct studies

Concern with Cruise Ship Wastewater Discharges

- CDC reported 18 norovirus outbreaks on cruise ships in the Northwest since 2000
- Cruise ships discharge to surface waters at shallow depths
- Cruise ships pass by approved WA commercial shellfish growing areas
- No empirical information on how well vessel treatment removed viruses

Advanced Wastewater Treatment Systems (AWTS)

- AWTS employ filters that effectively screen bacteria but only partially for viruses (disinfection at end of treatment inactivates viruses)
- Shellfish closure zone based on upset condition (loss of disinfection is most common wastewater plant problem)
- Existing pathogenic indicator standard of 14 Fecal Coliforms (FC)/100 ml no longer as reliable

University of Washington (UW) Major areas of study

- Estimation of virus discharge
- Dilution from ship to shoreline
- Uptake and retention of viral particles by shellfish
- Risk of disease

UW Study Findings Estimation of virus discharge

- Enormous variation in norovirus shedding between individuals

- One person with high shedding rates can discharge as much or more virus than 100 people shedding at average rates.
- This variation blurs total virus discharge in outbreak vs. non-outbreak conditions
- Disinfection is key in determining level of norovirus discharge
 - Disinfection: 4 log inactivation
 - All other treatment: 2.5 – 4 log inactivation

UW Study Findings Dilution from Ship to Shore

- Near field dilution factor (initial dilution with propellers when ship moving) ranges from 30,000 to 200,000:1
- Far field dilution factor (remaining dilution to shore) not as significant, ranging from 50 to 2000:1, depending on conditions
- Total dilution multiplicative – even in worse case $30,000 \times 50 = 1,500,000:1$ dilution

UW Study Findings Uptake and retention of viruses by shellfish

- Bioaccumulation factors for shellfish 3-1000x the viral concentration in the overlying water
- Depuration rates of viruses much slower than for fecal coliform bacteria
- Calculated ‘acceptable annual risk’ +/- 1 norovirus/10,000 liters in overlying water

UW Study Findings Risk of Disease

- For shellfish consumption rates, used Suquamish Tribe (high values)
- Estimated annual risk of disease based on oyster consumption only
- Used dilution rates and travel time to most sensitive locations (Point Jefferson)

UW Study Findings Conclusions

- When AWTs functioning well, virus discharges should not lead to norovirus accumulation in shellfish beds
- Loss of disinfection can lead to potentially unacceptable virus levels in water over shellfish beds
- No empirical measurements of norovirus levels in ambient waters or shellfish of Puget Sound are available to confirm or refute results in UW report
- Hard to translate transient conditions to annual risk
 - complexity of water circulation patterns make it hard to predict dilution during specific episodic discharges
 - Not enough data on harvesting patterns to reveal locally higher risks
 - Probability of upset event not factored in

Issues for DOH Office of Shellfish and Water Protection (OSWP)

- AWTs renders fecal coliforms an unreliable indicator for measuring risk of pathogenic organisms
- No reliable viral indicator standard is established to set sanitary line
- Model Ordinance provides little guidance on setting closure zones based on viral risk
- Regulatory authority of ship wastewater discharge lies with federal (Coast Guard), not State agencies at present time
- Lack of empirical data on which to base decisions

Report Recommendations

- Request cruise ships maintain minimum distance (0.5 miles) from known shellfish beds - two geoduck tracts within 0.5 mile of traffic lane in Kingston growing area
- No discharge when AWTS upset occurs
 - Automatic or immediate shutdown capacity for all ships discharging in Washington waters
- NWCA members notify DOH immediately when AWTS upset
 - Short discharge transit time (+/- 1 hour) to closest shellfish beds if upset condition
 - DOH must notify growers quickly to avoid recall and/or consumption of unsafe product
 - Weekdays: (360) 236-3330. After Hours: (360) 786-4183
- Improve/ensure reliability of AWTS on cruise ships
 - Expand ‘upset’ condition to include disinfection adequacy for viruses
 - Set alarms for UV dosage as well as intensity, depending on target pathogen (4 log inactivation):
 - 8.4 mJ/cm² for *E. coli* bacteria
 - 40 mJ/cm² for Norovirus
 - 60 mJ/cm² for Rotavirus and Hepatitis A Virus (HAV)
 - 186 mJ/cm² for Adenovirus (drinking water standard)
- Work with USCG and Ecology to improve knowledge of small passenger ship discharges
- Request Ecology ensure UV disinfection is adequate for viruses.

For More Information:

DOH Office of Shellfish and Water Protection <http://www.doh.wa.gov/ehp/sf/default.htm>

Puget Sound Marine Modeling Partnership <http://www.psmem.org/>

National Shellfish Sanitation Program <http://www.cfsan.fda.gov/~ear/nss2-toc.html>

Funding for the MOU

Amy Jankowiak, Department of Ecology

Funding agreements were put in place for 2006 and 2007. Funding agreements for 2008 are currently underway. Actual costs have been lower than original estimates. As the MOU specifies, invoicing will take place on March 1, 2008. The port has 60 days to make payment.

Biosolids Update

Amy Jankowiak, Department of Ecology

King County recently released a 2007 wastewater report that investigated the need for infrastructure at Terminal 91 to manage cruise ship wastewater. The report discussed transport by pipe, among other methods. The Port of Seattle also held a meeting to discuss management of cruise ship wastewater and biomass (residual solids) from on-board treatment systems. MOU parties are discussing a variety of options for waste discharge, including, transport of biomass to land for treatment and ultimately beneficial use.

The Port of Seattle and Department of Ecology will hold a meeting in January 2008 to discuss next steps for biomass treatment. For the convenience of cruiseline representatives traveling from other regions, the meeting will take place in conjunction with discussion of other cruiseship topics. MOU parties are welcome, as well as anyone with a request to attend. Interested parties can contact Amy Jankowiak, 425-649-7195, or ajan461@ecy.wa.gov .

Whole Effluent Toxicity Update

Amy Jankowiak, Department of Ecology

Amy reported that a meeting with MOU parties was held earlier in the day to discuss Whole Effluent Toxicity (WET) testing. Ecology and the cruise lines believe that there are changes needed in the testing methodology. Next steps will be to evaluate various studies on mixing zones and effluent testing via a literature review. Based on this review, the WET testing guidelines will be reevaluated. Efforts will also be undertaken to help labs better understand cruise ship discharge testing so tests are run appropriately. Previous methodologies may not have been the most ideal for WET testing.

A follow-up meeting about this topic will be paired with the cruise ship biomass meeting in January 2008. MOU parties are welcome, as well as anyone with a request to attend. Interested parties can contact Amy Jankowiak, 425-649-7195, or ajan461@ecy.wa.gov .

MOU Amendments

Amy Jankowiak, Department of Ecology

The Department of Ecology has initially discussed the results of the DOH shell fish virus impacts study with the parties of the MOU. The intent is to incorporate these recommendations into the 2008 MOU, though Ecology recognizes there will be some technology development and/or acquisition needs on the part of the cruise lines.

Ecology proposes to allow cruise lines ample time to consider DOH recommendations and to examine new technologies. Ecology will work with DOH and the cruise lines on clarifying MOU language, by specifying notification procedures for upset conditions, defining upset conditions, expanding definitions to include ultra violet (UV) disinfection, and other points of clarification.

Questions / Comments about MOU Amendments

Amy Jankowiak, Department of Ecology, asked if anyone suggests other amendments to the MOU. She added that Ecology will work with the MOU parties to finalize MOU amendments prior to the start of cruise season.

John Hansen, Northwest Cruiseship Association, said the NWCA has no additional recommendations for additional amendments at this time. He assured NWCA participation in DOH studies and assistance in crafting language for the MOU.

Next Steps

At upcoming 2008 meetings, parties to the MOU will discuss implementation of effective WET testing and biomass treatment, among other issues. Interested parties will be kept abreast of legislation that emerges from the 2008 State Legislative session.

Questions / Comments

What experience has Royal Caribbean had in offloading solids and sending them to the King County Waste Treatment Plant?

Rich Pruitt, RCI/Celebrity Cruises, answered that Royal Caribbean has been offloading portions of sludge by truck to King County as part of maintenance activities. Because they were not offloading all the sludge on board, he did not feel their experience was directly useful to the issue of removing biomass from cruise ships via trucking.

For the King County study, did the West Point WET testing use zero dilution? Did the participants in the wet testing meeting this morning discuss Alaska's WET testing results, and has the Alaska study had been reviewed in consideration of dilution methods in the Northwest? It was suggested to increase the sample size of the testing by including data from other states, such as Alaska.

Amy Jankowiak responded that the specific results from King County were not on hand at the meeting, but that Ecology can obtain this information from King County. As for the Alaska study, the study from Dr. Kim has yet to be finalized and published.

Andrew Lorenzana, Princess Cruises, responded that the process of dilution needed to achieve appropriate standards occurs in matter of seconds, or less.

Would the cruise lines consider a no-discharge option for all of Puget Sound? The ICCL recommends no discharges in areas of decreased circulation. There are concerns about nitrification in the water as well as the presence of heavy metals and ammonia from discharges.

Jon Turvey, Holland America Line responded that discharge policies are evaluated based on scientific data, both in Puget Sound and Alaskan waters. Also, issues of discharge are not specific to cruise lines.

Why did the UW norovirus testing not include ambient water quality testing?

Response: The infrastructure is not in place to accommodate this kind of testing. Thousands of samples would be required.

Mark Toy, Department of Health, and Scott Meschke, University of Washington, explained that when advanced wastewater treatment functions properly, there should not be any significant impact on shellfish. When systems malfunction, shellfish beds may be closed up to 21 days. The Department of Health recommends improving the reliability of wastewater treatment systems.

Amy Jankowiak, Department of Ecology, asked cruise line representatives to discuss the ability to hold discharges until outside of Puget Sound and potential pros and cons associated with holding discharge.

Jon Turvey, Holland Armerica Line responded that the variability among ships makes it difficult to speak for all cruise lines. The cruise lines have invested heavily in making sure discharge is treated and safe. Jon added that according to a recent report from King County, the cruise lines' 2007 discharge record is cleaner than King County's record.

Wasn't it unfair to compare the cruise ship effluent to the West Point Treatment Plant's effluent? Shouldn't the County compare cruise ship effluent to Brightwater effluent quality, since it will be a modern treatment plant with the most up-to-date treatment systems?

Mark Busher, King County Wastewater Treatment Division clarified that the comparison between West Point treated effluent and that of cruise ships is very valid. He stated that both the West Point and the Renton treatment plants are modern treatment plants and meet and typically exceed all treatment standards.

A comment was made that the Cruise Lines want to be treated the same as all other treated wastewater discharges, that they should not be expected to meet more stringent standards. David Fife, Northwest Indian Fisheries Commission, suggested everyone should think carefully about that. Other dischargers have permanent shellfish closures enacted around their "outfalls". That could result in large shellfish area closures if it applied to cruise ship discharge.

How is the Department of Ecology monitoring the discharges and effects of nutrients on Puget Sound?

Kevin Fitzpatrick, Department of Ecology responded that Ecology has two big studies ongoing regarding nutrients in the water. The studies are currently focused in the South Sound area. There is still a lot of information to gather. Ecology is starting to look at whether nutrient removal at on-shore treatment plants makes sense in the future. However, implementation is years away. In addition to cost, several related issues need to be addressed before any standards changes are suggested.

State Representative Mary Lou Dickerson asked if Ecology or DOH will pursue agency legislation in 2008?

Amy Jankowiak, Department of Ecology, responded that she is unable to respond to that question at this time.

Can the MOU be amended to include recommendations for zero discharge in Puget Sound?

John Turvey, Holland America Line: This would not be appropriate for the cruiseship MOU, since discharge and water quality issues are not solely linked to cruise ship practices.

Will the public be involved in the WET testing discussions?

Amy Jankowiak, Department of Ecology, responded that anyone who is interested in attending the January meeting should let Amy know and she will send the information.

Do on-land treatment discharge systems record daily PH levels? Amy responded some do, some don't. It depends on the size of the facility. The smaller facilities typically do either monthly or weekly for certain parameters.

Comment: Additional measures should be taken to ensure discharge functionality and compliance on the part of cruise ships. The inspection frequency doesn't seem adequate. Since cruise ships are present at the Port for a shorter time, they should be tested at a higher frequency to meet the same standards as on-land treatment systems.

I understand that some cruise ships have electronic connections with their home ports and the treatment system manufacturers for ongoing monitoring. Could Ecology be included in that correspondence between ships and the home port so more monitoring data could be collected?

Ecology response – We try not to collect data just for data's sake. We only want to collect data that measures improvements to water quality. The data referred to is typically for process control, not effluent quality.

Comment: David Baine spoke about a study he is involved with looking at microbes in air affecting killer whales. One of the early findings from killer whale airways monitoring is the presence of antibiotic-resistant bacteria. These are due to human causes. One potential cause could be inadequately treated waste discharge.
