



State of Washington Department of Ecology  
**Cruise Ship Memorandum of Understanding, Cruise Operations in Washington State Inspection Report**

Northwest Regional Office  
 3190 160<sup>th</sup> Ave SE  
 Bellevue, WA 98008  
 Phone: (425) 649-7000  
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Inspection Date 07/30/2011	Permit Number NA	County King	Receiving Waters Marine Waters	Ecology Inspector Amy Jankowiak
Entry Time 9:17 am Exit Time 11:45 am	Photos Taken <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Samples Taken <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Inspection Announced <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Discharges to: <input checked="" type="checkbox"/> Surface Water <input type="checkbox"/> Ground Water <input type="checkbox"/> Dewater <input type="checkbox"/> POTW
Name and Location of Site Inspected: GOLDEN PRINCESS, Princess Cruises Pier 91 Seattle, Washington				Additional Participants/Inspectors:
On-Site Representative(s): <i>Name/Title/Phone/e-mail</i> Dario Oseo, Safety Environmental Health Officer NPDOSEO1@princesscruises.com				
Responsible Official(s): <i>Name/Title/Address/Phone/e-mail</i> Andrew Lorenzana, Environmental Operations Manager Princess Cruises 24200 Magic Mountain Parkway, Santa Clarita, CA 91355-1283 661-753-2755; alorenzana@princesscruises.com				Other Facility Data: Notification made to Andrew Lorenzana on July 25, 2011

**Section A: Areas Evaluated**

<input checked="" type="checkbox"/> Black/Gray Wastewater System	<input checked="" type="checkbox"/> Residual Solids	<input checked="" type="checkbox"/> Records/Reports	<input checked="" type="checkbox"/> Hazardous Waste/Solid Waste	<input checked="" type="checkbox"/> Sampling/Monitoring
<input checked="" type="checkbox"/> Discharge Locations	<input checked="" type="checkbox"/> Operation & Maintenance	<input checked="" type="checkbox"/> Sludge Handling/Disposal	<input checked="" type="checkbox"/> Oily Bilge Water	<input type="checkbox"/> Other

**Section B: For Vessels Discharging  $\geq 1$ nm from Berth and  $\geq 6$  Knots Only [2.1.3(A)]**

<input type="checkbox"/> Schematics Match Black/Gray Wastewater System	
<input type="checkbox"/> Operations as Described in Submitted Documentation	
<input type="checkbox"/> Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
<input type="checkbox"/> Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
<input type="checkbox"/> Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	
<u>Turbidity or Equivalent:</u> Last Calibration: Trigger Level for Early Alarm: Trigger Level for Shutdown: Recorded Turbidity/Equivalent Levels Above Triggers:	
<input type="checkbox"/> Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
<input type="checkbox"/> Disinfection Effectiveness Monitoring Equipment Functioning Properly	
<u>Disinfection Effectiveness Monitoring:</u>	
<input type="checkbox"/> Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
<input type="checkbox"/> Disinfection System Operated and Maintained Properly	
<u>Disinfection System:</u>	

NOT APPLICABLE

**Section C: For Vessels Discharging Continuously [2.1.3(B)]**

<input type="checkbox"/>	Schematics Match Black/Gray Wastewater System	
<input type="checkbox"/>	Operations as Described in Submitted Documentation	
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
<input type="checkbox"/>	Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	
	<u>Turbidity or Equivalent:</u> Last Calibration: Trigger Level for Early Alarm: Trigger Level for Shutdown: Recorded Turbidity/Equivalent Levels Above Triggers:	
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
<input type="checkbox"/>	Disinfection Effectiveness Monitoring Equipment Functioning Properly	
	<u>Disinfection Effectiveness Monitoring:</u>	
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
<input type="checkbox"/>	Disinfection System Operated and Maintained Properly	
	<u>Disinfection System:</u>	

**NOT APPLICABLE**

**Section D: General (Approved to Discharge)**

<input type="checkbox"/>	No Discharges Within 1/2 Miles From Shellfish Beds/ Protocol (President's Point, Apple Tree Cove, Tye Shoal, Middle Point (near Pt Townsend))	
<input type="checkbox"/>	Discharges Immediately Stopped When High Turbidity Occurs	
<input type="checkbox"/>	Discharges Immediately Stopped When Disinfection System Upset Occurs	
<input type="checkbox"/>	Immediate Notifications Made to WA Department of Health for Disinfection System Upset	
<input type="checkbox"/>	Sampling Conducted 2/month, 1/month in Seattle (BOD, TSS, Fecal Coliform, pH, Chlorine Residual)	
<input type="checkbox"/>	Whole Effluent Toxicity Testing 1 per 2 Years (homeported) or 1/40 Calls for Continuous	

**NOT APPLICABLE**

**Section E: General**

<input checked="" type="checkbox"/>	Wastewater Discharge Records Review	Discharge records were reviewed (blackwater/graywater/residual solids) and are maintained properly. No discharges in MOU waters were present from the beginning of the 2011 cruise season to present.
<input checked="" type="checkbox"/>	Wastewater Discharges protocol per MOU and managed properly	The discharge protocol for wastewater is to not discharge in MOU waters, consistent with MOU requirements. Protocols for discharge include clear communications with the bridge on locations.
<input checked="" type="checkbox"/>	Residual Solids Managed Properly/Disposal Protocol per MOU	AWTS screenings from screen press are incinerated. Sewage sludge/biomass from the AWTS is discharged outside of MOU waters, outside the OCNMS and >12 nm from shore.
<input checked="" type="checkbox"/>	Hazardous Waste Managed Properly	All hazardous waste that is collected is being sent off-shore in Victoria, Canada.
<input checked="" type="checkbox"/>	WA Hazardous Waste Guidelines Followed (Appendix vii)	All hazardous waste that is collected is being sent off-shore in Victoria, Canada.
<input checked="" type="checkbox"/>	Solid Waste Managed Properly (zero garbage discharge)	Solid waste is managed properly. The various solid waste streams are collected, sorted, stored, and sent ashore or incinerated as appropriate. The garbage record book was reviewed and showed

	consistency with requirements.
<input checked="" type="checkbox"/> Photo/X-Ray Waste Managed Properly (fluids, cartridges,...) and landed ashore	Waste from the photo processing goes through a silver recovery system prior to offload with hazardous waste materials. X-rays are done digitally.
<input checked="" type="checkbox"/> Dry-Cleaning Wastes and Byproducts (fluids, sludge, filter materials...) Managed Properly (PERC – haz waste – landed ashore)	No dry cleaning occurs on the vessel. Laundry water is held and then discharged outside of MOU waters.
<input checked="" type="checkbox"/> Unused/Outdated Pharmaceuticals Managed Properly (safely disposed of)	Expired and unused medications are either incinerated or off-loaded as appropriate. Narcotics are incinerated with witness.
<input checked="" type="checkbox"/> Fluorescent and Mercury Vapor Lamp Bulbs Managed Properly (prevent release of mercury)	Lamps are sorted, boxed and offloaded. Bulbs are not crushed on board.
<input checked="" type="checkbox"/> Waste Reduction/Reuse/Recycling Opportunities Maximized (glass, cardboard, aluminum & steel cans)	Glass, aluminum, tin, scrap metal, some plastics, some paper and cardboard and used cooking oil are recycled. Reduction and reuse opportunities are broadly used to prevent the amount of waste.
<input checked="" type="checkbox"/> Batteries Managed Properly (recycled, reclaimed, disposed of properly)	Batteries are collected, sorted and binned to be offloaded in Victoria for recycling or disposal as appropriate.
<input checked="" type="checkbox"/> Incinerator Ash Managed Properly and minimized volume (haz waste segregation and annual testing)	Incinerator ash is offloaded in Victoria and tested annually. Results have passed. Incinerations occurs outside MOU waters on the way out and is turned off in the early morning prior to arriving in Seattle.
<input checked="" type="checkbox"/> Oily Bilge Water Managed Properly (<15 ppm, no visible sheen and underway)	Oily bilge is treated and discharged at less than 15 ppm and outside of MOU waters. A white box is used to prevent discharges of more than 15 ppm.
<input checked="" type="checkbox"/> Ballast Water Managed Properly (per Wash regs – reporting, treated or if open sea exchange >200 nm from outside EEZ, 50nm if not EEZ)	Ballast exchanges occur outside 200nm. Records were reviewed and show consistency with requirements.
<input checked="" type="checkbox"/> OCNMS rules and regs followed	No discharges occur in OCNMS waters per protocol and records review showed consistency.

#### Additional General Questions

<input checked="" type="checkbox"/> How is deck runoff and hull cleaning handled (scuppers...) (non-toxic/phosphate free cleaners, biodegradable)	Hull cleaning is done with phosphate free cleaners (EnviroClean) and fresh water. Deck runoff goes to the scuppers and then out.
<input checked="" type="checkbox"/> How is maintenance performed on the outside of the vessel (paint chipping, painting, etc)	Paint chipping and painting is done approximately once/cruise and BMPs using tarps are used.
<input checked="" type="checkbox"/> Sculleries and Galleys – type of detergents and degreasers used (phosphate free and non-toxic)?	Phosphate free, non-toxic cleaners are used in the galleys.
<input checked="" type="checkbox"/> How are food waste discharges handled (prevention of erroneous materials)?	Food waste is sorted prior to going into the pulpers. The filters are checked routinely. Solid food waste is discharged outside of MOU waters after pulping. Galley water is held and then discharged outside of MOU waters.
<input checked="" type="checkbox"/> Medical sinks/floor drains, chem. stor areas wastes go where (plugged, blackwater, bilge)?	Medical floor drains are plugged.
<input checked="" type="checkbox"/> Where is pool and spa water discharged? Dechlorinated/debrominated and underway?	Pool and spa water is sent to the graywater system and is then discharged outside of MOU waters.
<input checked="" type="checkbox"/> What type of fuel is used and percent sulfur content?	Shore power is used while in Port. MGO of 0.0008% or Intermediate of 1.82% is used.

Other:

#### Section E: Sampling Results

Parameter	Results
Biochemical Oxygen Demand 5-Day (BOD <sub>5</sub> )	NA
Total Suspended Solids (TSS)	NA
Fecal Coliform	NA
Residual Chlorine	NA
pH	NA
Ammonia, Nitrogen	NA

NOT APPLICABLE

Introduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program (NWRO-WQ) conducted the inspection of the Princess Cruises GOLDEN PRINCESS on July 30, 2011. The main contact on board the GOLDEN PRINCESS was Dario Oseo, Environmental Officer for the GOLDEN PRINCESS. Prior notification of the visit was given on July 25, 2011 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 GOLDEN PRINCESS is not approved to discharge in MOU waters. The vessel has not been discharging and is holding effluent until outside MOU waters.

The GOLDEN PRINCESS was placed into service in 2001 and is 951 feet long with a width of 118 feet. The vessel has a approximately 2978 passengers and 1000 crew.

The GOLDEN PRINCESS is scheduled for 19 port calls in Seattle and conducts one week cruises to Alaska turning around on Saturdays between May 21, 2011 and September 24, 2011.

Inspection

I arrived and boarded the ship at about 9:17 am and began with introductions and a plan for the day with Dario Oseo, the Environmental Officer. We discussed various waste streams and discharge protocols. We then reviewed the various discharge and environmental records. We then toured the garbage and recycling area and the hazardous waste storage. Next, we viewed the Hamworthy advanced wastewater treatment system (AWTS) and the oily water separator system and white box. We then viewed the discharge valving and discharge ports. The inspection was then finalized with a debriefing and we disembarked the vessel at about 11:45 am.

Discharge Types and Protocols:

If the vessel is in an area where a discharge is allowed, the Bridge and the staff in the Engine Control Room (ECR) (photo #09) communicate by phone and with written verification by e-mail prior to any discharges. The captain gives the discharge port keys to the Environmental Officer when a discharge is authorized. There are hydraulic and solenoid valves. For blackwater and graywater, the latitude and longitude coordinates are recorded in the *Sewage and Graywater Discharge Record Book* and in the deck log. The date, time and location of both the start and the stop of the discharges are recorded, along with port location, effluent type, and volumes. All wastewater discharge records that were reviewed appeared to be in compliance with the MOU and also did not occur in MOU waters. The AWTS includes three separate MBR systems. Two treat for graywater and one treats for blackwater. The permeate from each is then combined into one discharge. Laundry and galley water do not go through the AWTS and are held separately and then discharged outside of MOU waters. No discharges occur in the Olympic Coast National Marine Sanctuary. Medical floor drains are plugged.

Screenings and grit from the Hamworthy system are collected and incinerated. The solids separated out by the bioreactors is discharged outside of MOU waters, >12 nautical miles from shore, and outside of the Olympic Coast National Marine Sanctuary.

Oily bilge water is treated with an oily water separator (photo #18) and discharged at less than 15 ppm after first going through a white box (photo #19) for monitoring prior to discharge (photo #20) outside of MOU waters.

Ballast water exchanges occur outside of MOU waters and outside of 200 nautical miles. Records were reviewed and showed consistency with requirements.

Pool and spa water is sent to the graywater system and is then discharged outside of 12 nautical miles.

Food waste is collected in various locations, is sorted and then sent through a pulper. The filters are checked regularly. The water is recirculated and eventually discharged outside of MOU waters. The solid food material from the pulpers is discharged outside of 12 nautical miles and outside MOU waters. Records reviewed were consistent with this protocol. Galleys use phosphate free and non-toxic cleaners.

Hull cleaning is done with phosphate free cleaners (EnviroClean) and fresh water. Deck runoff goes to the scuppers. Paint chipping and painting is done approximately once per cruise and best management practices with tarps are used.

The vessel does not offer dry cleaning services. Silver is captured from the photo waste, and is treated to less than 5 ppm and is then incinerated. X-rays are done digitally. Hazardous waste materials (photo #04) include oily rags, used

cartridges and filters, paints, batteries (some are reused or recycled), sludge oil, aerosols (punctured), and sharps. Depending on where materials are offloaded, some materials are considered universal waste. All hazardous waste is offloaded in Victoria. Fluorescent lamps are sorted, boxed and offloaded. Bulbs are not crushed on board.

Unused or outdated pharmaceuticals are either incinerated or off-loaded back to the manufacturer when feasible. Narcotics are incinerated with witness.

Solid waste (garbage, recyclables, etc) is collected sorted (photo #01) and either reused, recycled, donated, incinerated or offloaded to shore as appropriate. The garbage record book was reviewed and showed consistency with requirements.

Glass (photo #03), aluminum, tin, scrap metal, some plastics, some paper and cardboard (photo #02) and used cooking oil are recycled. Reduction and reuse opportunities are broadly used to prevent the amount of waste.

Incinerator ash is offloaded in Victoria and tested annually. Recent results have passed. The protocol for using incinerations is for Incinerators to be used outside of MOU waters on the way out and are turned off in the early morning prior to arriving in Seattle.

Shore power is used while in Seattle and MGO of approximately 0.0008% sulfur is used or 1.82% intermediate is used.

#### Black water and Gray water System:

Blackwater, which includes toilet waste and graywater which includes sink and shower water is treated with a Hamworthy advanced wastewater treatment system and is currently discharged outside of MOU waters. The Hamworthy system, which was just installed in the spring of 2010, consists of three separate membrane bioreactors (MBRs). Two of the MBRs treat graywater and one MBR treats blackwater. This is a change from previous practice where all MBRs treated combined black and gray water. This change has helped the performance of the MBRs.

Black water is collected (photos #05 and #6) by vacuum collection tanks and is then sent to one of the MBRs. Gray water which includes sink and shower water is piped to one of the gray water collection tanks prior to going to MBRs. Black or gray water flow moves to the screen press (photo #07). The solids are screened into bags (photo #08) and are then sent to the incinerator. The liquid moves to the 1<sup>st</sup> stage (photo #11) of the membrane bioreactor where aeration occurs. From the 1<sup>st</sup> stage, flow moves to the Inter-stage Russel filters (photo #12). The inter-stage filtered solids are returned back to the screen press. The liquid moves onto the 2<sup>nd</sup> stage of the MBR for further aeration. From the 2<sup>nd</sup> stage MBR, flow is sent to the membrane modules (photo #10) for ultrafiltration. Effluent from the membrane modules are sent to a permeate tank (photo #09) where turbidity is monitored (photo #13). Flow then combines with the other two MBR's for ultraviolet (UV) disinfection (photos #14 and #15). Disinfected effluent either goes directly overboard (photos #16 and #17) or to a holding tank if not in an approved area for discharge. The held effluent will eventually go back through the UV system before discharge. Currently, effluent is held and discharged outside of MOU waters. There is a sample port for treated effluent after UV disinfection.

Turbidity is measured continuously on each of the MBR permeate tanks. The UV system consists of 6 bulbs which are alarmed. The maintenance system provides details of when all maintenance is needed.

#### Conclusions and Recommendations

It is recommended that staff continue to work towards high functioning wastewater treatment systems. The staff on board the vessel were very knowledgeable of the systems and protocols.

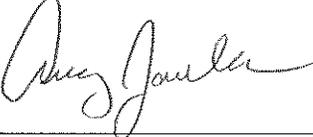
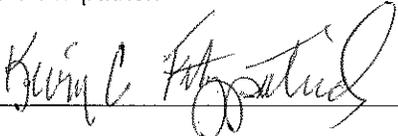
#### Attachments:

Photographs

#### Copies to:

Andrew Lorenzana, Princess Cruises  
Dario Oseo, Safety Environmental Health Officer  
Mark Toy, Health  
Greg Wirtz, NWCCA  
Stephanie Jones Stebbins, Port of Seattle  
Kevin Fitzpatrick, Ecology  
Mark Henley, Ecology  
Amy Jankowiak, Ecology  
Central Files: Princess Cruises – GOLDEN PRINCESS; 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> 9/22/11
<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> 9/22/11

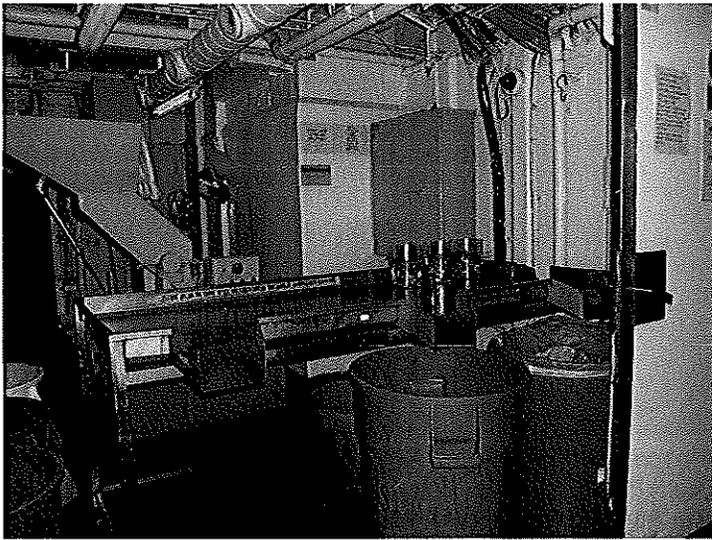


PHOTO #:01 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000017  
DESCRIPTION: GARBAGE/RECYCLING SORTING AREA

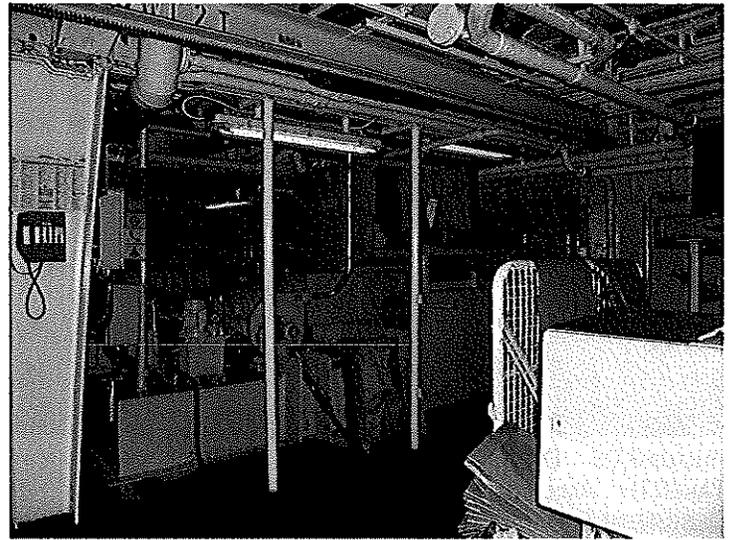


PHOTO #:02 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000018  
DESCRIPTION: GARBAGE/RECYCLING - COMPACTORS



PHOTO #:03 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000020  
DESCRIPTION: GLASS CRUSHER (LEFT) COMPACTOR WITH  
CONTAINMENT TO GRAY WATER TANKS (RIGHT)



PHOTO #:04 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000021  
DESCRIPTION: HAZARDOUS WASTE STORAGE LOCKER

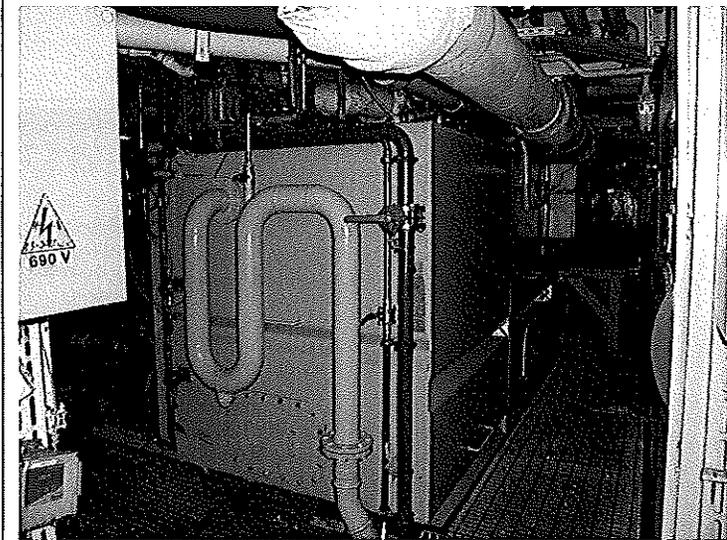


PHOTO #:05 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000022  
DESCRIPTION: HAMWORTHY SYSTEM BUFFER TANK (1 OF 3)

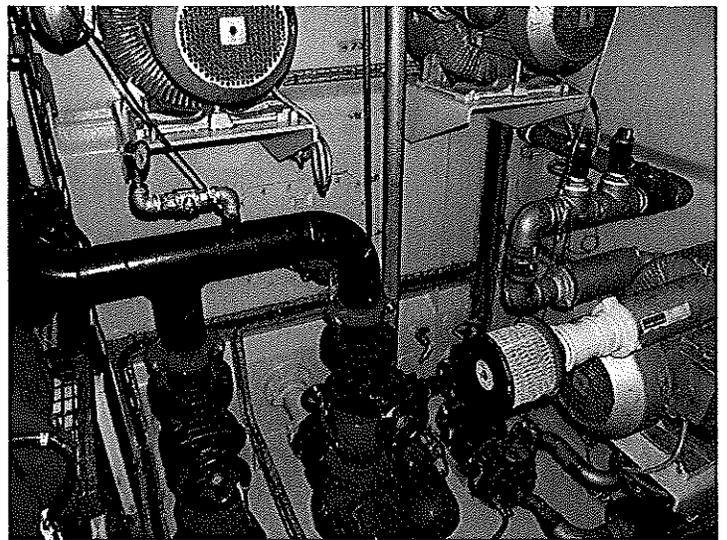


PHOTO #:06 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000023  
DESCRIPTION: HAMWORTHY BUFFER TANK PUMPS

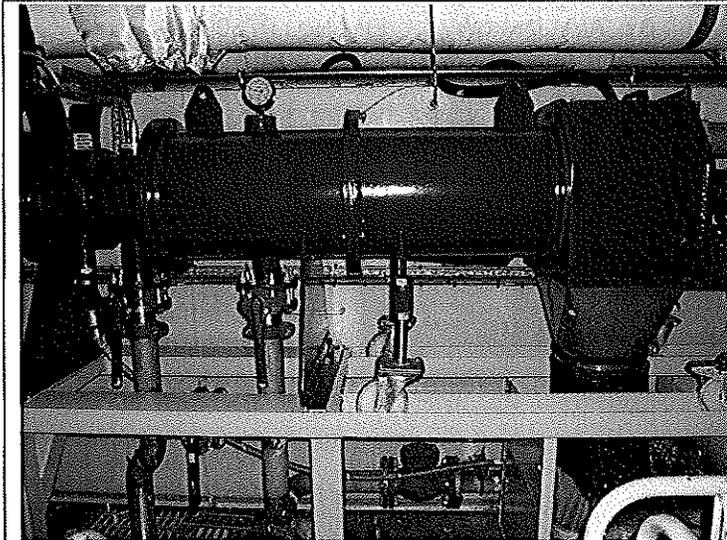


PHOTO #:07 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000024  
DESCRIPTION: HAMWORTHY SCREEN PRESS (1 OF 3)



PHOTO #:08 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000025  
DESCRIPTION: HAMWORTHY SCREEN PRESS SCREENINGS (TO INCINERATOR)

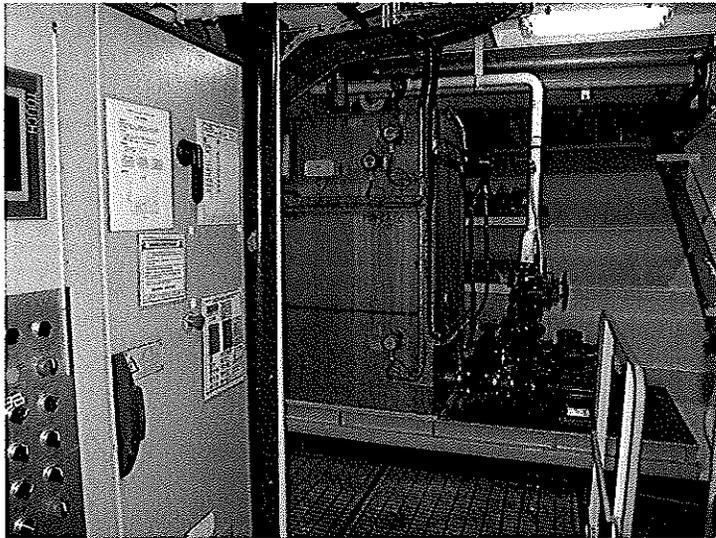


PHOTO #:09 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000026  
DESCRIPTION: HAMWORTHY PERMEATE TANK (1 OF 3)

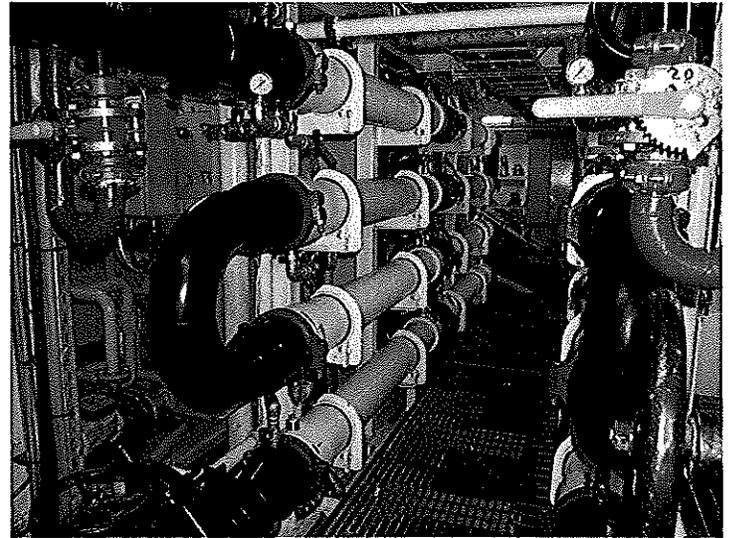


PHOTO #:10 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000027  
DESCRIPTION: HAMWORTHY MEMBRANE FILTERS (1 OF 3)

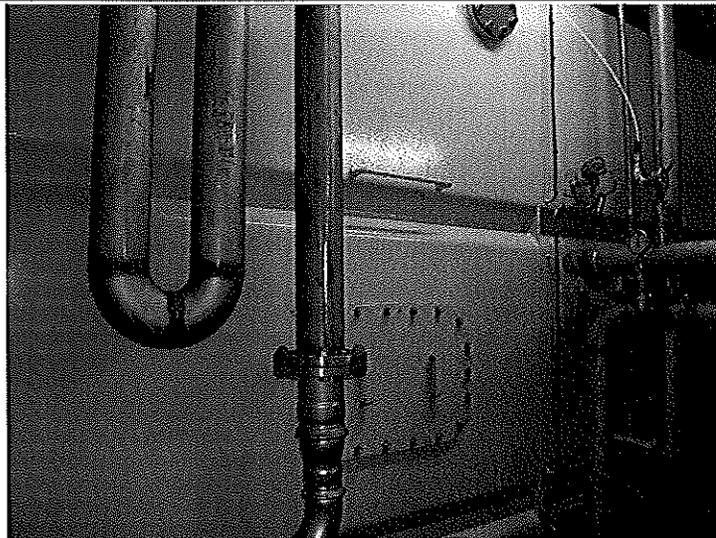


PHOTO #:11 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000028  
DESCRIPTION: HAMWORTHY STAGE 1 AND STAGE 2 MBR TANKS  
(1 OF 3)

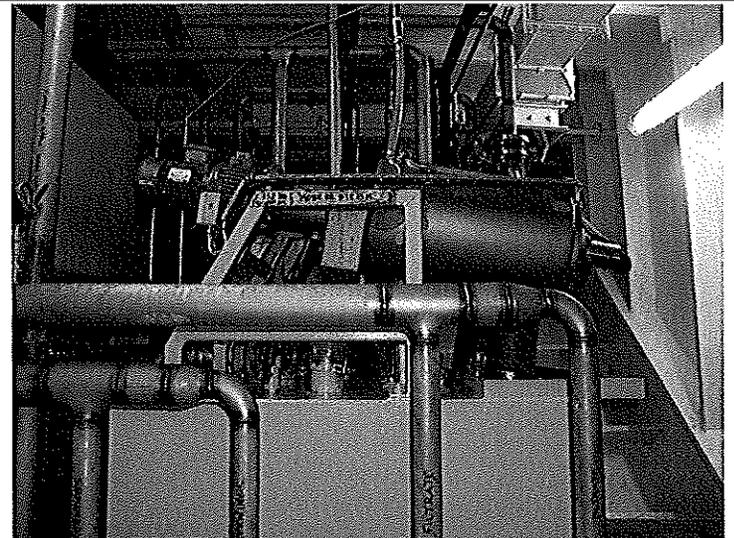


PHOTO #:12 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000029  
DESCRIPTION: HAMWORTHY INTERSTAGE RUSSEL FILTERS (1 OF 3)

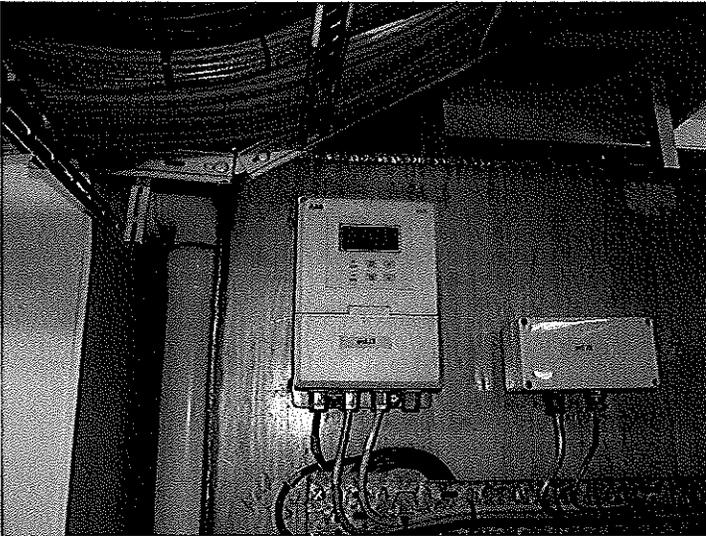


PHOTO #:13 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.:P73000030  
DESCRIPTION: HAMWORTHY TURBIDITY METER (1 OF 3)

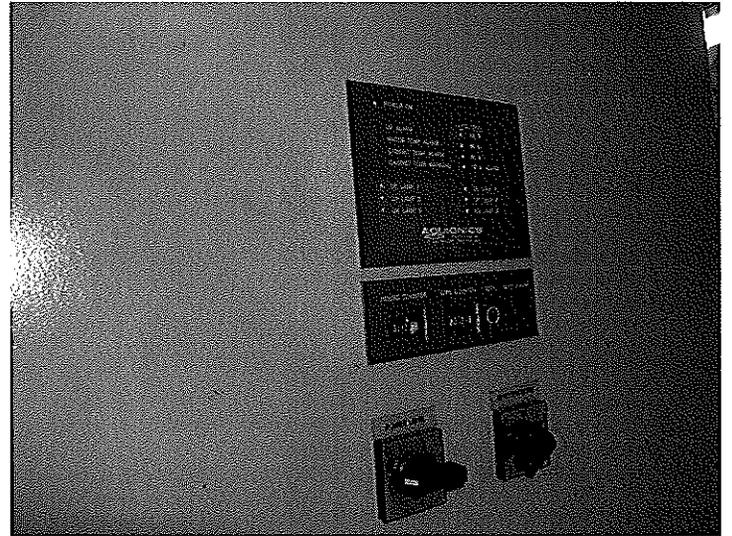


PHOTO #:14 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000031  
DESCRIPTION: HAMWORTHY ULTRAVIOLET DISINFECTION  
SYSTEM

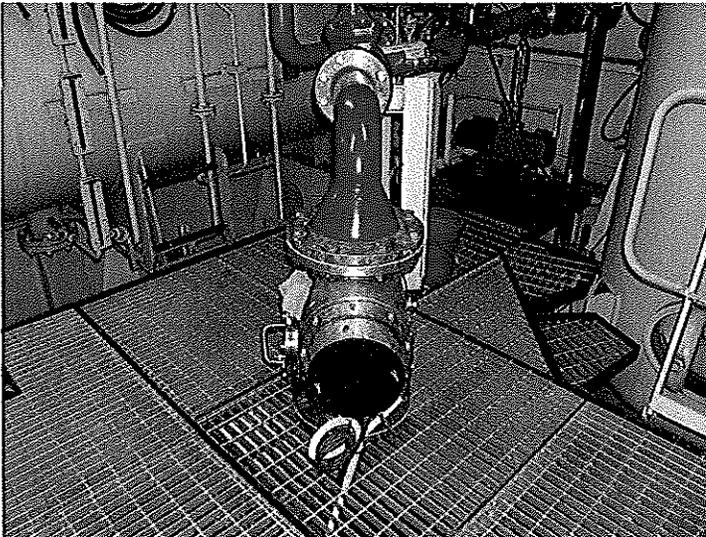


PHOTO #:15 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000032  
DESCRIPTION: HAMWORTHY ULTRAVIOLET DISINFECTION  
SYSTEM

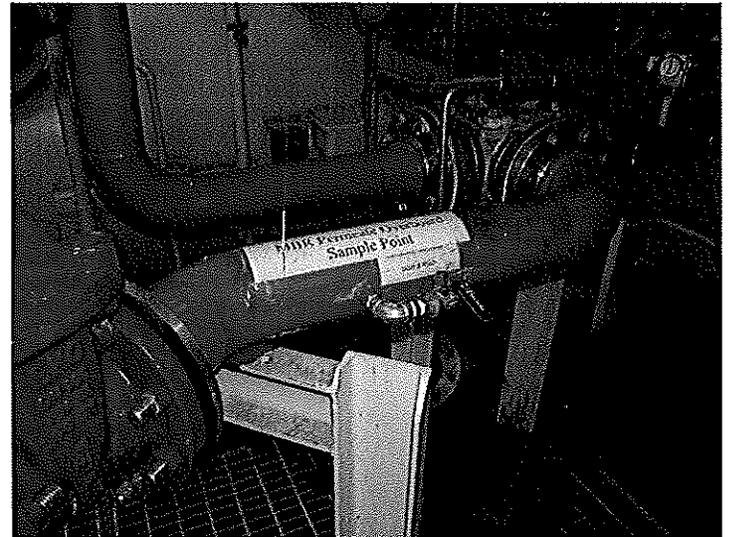


PHOTO #:16 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000033  
DESCRIPTION: HAMWORTHY MBR PERMEATE OVERBOARD  
SAMPLE POINT

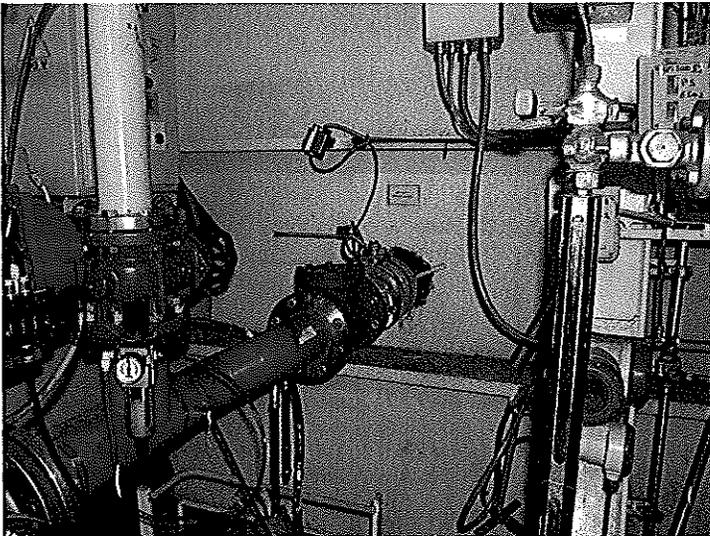


PHOTO #:17 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.:P73000034  
DESCRIPTION: HAMWORTHY MBR OVERBOARD PORT

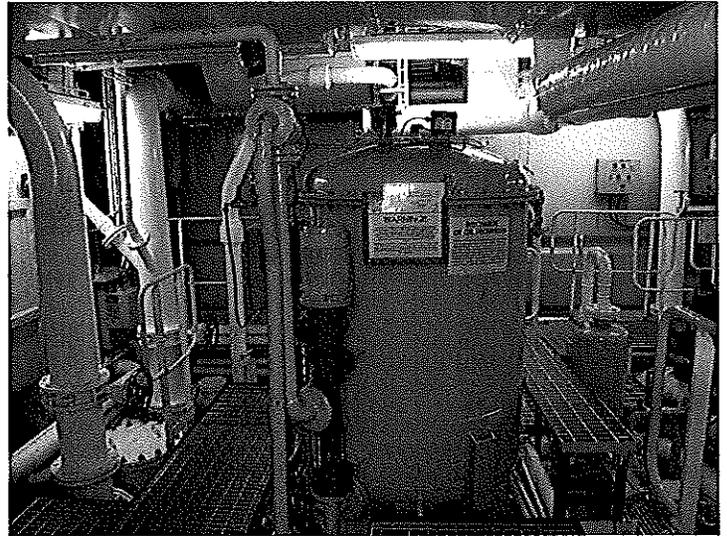


PHOTO #:18 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000035  
DESCRIPTION: OILY WATER SEPARATOR (OWS) SYSTEM



PHOTO #:19 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000036  
DESCRIPTION: OWS WHITE BOX

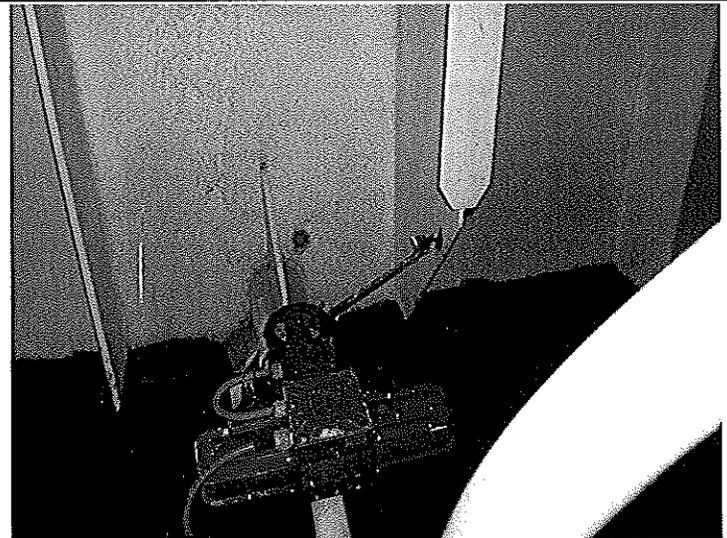


PHOTO #:20 DATE: JULY 30, 2011  
TAKEN BY: AMY JANKOWIAK FILE No.: P73000037  
DESCRIPTION: OWS OVERBOARD PORT

