State of Washington Department of Ecology

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

Northwest Regional Office
3190 160th Ave SE
Bellevue, WA 98008
Phone: (425) 649-7000
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Inspection Date	Permit Number	County	Receiving Waters	Ecology Inspector
September 2, 2012	NA	King	Marine Waters	Amy Jankowiak
Entry Time 8:58 am Exit Time 10:50 am	Photos Taken ☒ Yes ☐ No	Samples Taken ☐ Yes ☒ No	Inspection Announced ☒ Yes ☐ No	Discharges to: ☒ Surface Water ☐ Ground Water ☐ Dewater ☐ POTW

Name and Location of Site Inspected:
STAR PRINCESS, Princess Cruises
Pier 91
Seattle, Washington

Additional Participants/Inspectors:

On-Site Representative(s): ***Name/Title/Phone/e-mail***
Casey Zambor, Occupational Safety and Environmental Officer

Responsible Official(s): ***Name/Title/Address/Phone/e-mail***
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 August 28, 2012

Section A: Areas Evaluated

☒ Black/Gray Wastewater System	☒ Residual Solids	☒ Records/Reports	☒ Hazardous Waste/ Solid Waste	☒ Sampling/Monitoring
☒ Discharge Locations	☒ Operation & Maintenance	☒ Sludge Handling/ Disposal	☒ Oily Bilge Water	☒ Other

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

☐	Schematics Match Black/Gray Wastewater System	
☐	Operations as Described in Submitted Documentation	
☐	Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
☐	Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
☐	Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	

Turbidity or Equivalent:

Last Calibration:

Trigger Level for Early Alarm: Trigger Level for Shutdown:

Recorded Turbidity/Equivalent Levels Above Triggers:

NOT APPLICABLE

☐	Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
☐	Disinfection Effectiveness Monitoring Equipment Functioning Properly	

Disinfection Effectiveness Monitoring:

☐	Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
☐	Disinfection System Operated and Maintained Properly	

Disinfection System:

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

☐	Schematics Match Black/Gray Wastewater System	
☐	Operations as Described in Submitted Documentation	
☐	Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
☐	Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
☐	Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	
	Turbidity or Equivalent: Last Calibration: Trigger Level for Early Alarm: Trigger Level for Shutdown: Recorded Turbidity/Equivalent Levels Above Triggers:	
☐	Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
☐	Disinfection Effectiveness Monitoring Equipment Functioning Properly	
	Disinfection Effectiveness Monitoring:	
☐	Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
☐	Disinfection System Operated and Maintained Properly	
	Disinfection System:	
	Section D: General (Approved to Discharge)	
☐	No Discharges Within ½ Miles From Shellfish Beds/ Protocol (President's Point, Apple Tree Cove, Tyee Shoal, Middle Point (near Pt Townsend))	
☐	Discharges Immediately Stopped When High Turbidity Occurs	
☐	Discharges Immediately Stopped When Disinfection System Upset Occurs	
☐	Immediate Notifications Made to WA Department of Health for Disinfection System Upset	
☐	Sampling Conducted 2/month, 1/month in Seattle (BOD, TSS, Fecal Coliform, pH, Chlorine Residual)	
☐	Whole Effluent Toxicity Testing 1 per 2 Years (homeported) or 1/40 Calls for Continuous	
	Section E: General	
☒	Wastewater Discharge Records Review	Discharge records were reviewed (blackwater/graywater/residual solids) and are maintained properly. No discharges appear to be in the OCNMS, MOU waters or Washington state waters (MOU related waters)
☒	Wastewater Discharges protocol per MOU and managed properly	The discharge protocols appear to be consistent with MOU requirements to not occur in MOU waters or the OCNMS.
☒	Residual Solids Managed Properly/Disposal Protocol per MOU	Residual solids appear to be handled per MOU requirements.
☒	Hazardous Waste Managed Properly	Hazardous waste appears to be handled per MOU requirements.
☒	WA Hazardous Waste Guidelines Followed (Appendix vii)	Hazardous waste guidelines appear to be handled per the MOU and guidelines.
☒	Solid Waste Managed Properly (zero garbage discharge)	Solid waste appears to be managed per MOU requirements.
☒	Photo/X-Ray Waste Managed Properly (fluids, cartridges,...) and landed ashore	Photo and x-ray waste appears to be handled per MOU requirements.

NOT APPLICABLE

☒	Dry-Cleaning Wastes and Byproducts (fluids, sludge, filter materials...) Managed Properly (PERC – haz waste – landed ashore)	Dry cleaning waste products appear to be managed per MOU requirements.
☒	Unused/Outdated Pharmaceuticals Managed Properly (safely disposed of)	Unused or outdated pharmaceuticals appear to be managed per MOU requirements.
☒	Fluorescent and Mercury Vapor Lamp Bulbs Managed Properly (prevent release of mercury)	Fluorescent and mercury vapor lamp bulbs appear to be managed per MOU requirements.
☒	Waste Reduction/Reuse/Recycling Opportunities Maximized (glass, cardboard, aluminum & steel cans)	Waste reduction/reuse/recycling opportunities appear to be maximized per MOU requirements.
☒	Batteries Managed Properly (recycled, reclaimed, disposed of properly)	Batteries appear to be managed per MOU requirements.
☒	Incinerator Ash Managed Properly and minimized volume (haz waste segregation and annual testing)	Incinerator ash appears to be managed per MOU requirements.
☒	Oily Bilge Water Managed Properly (<15 ppm, no visible sheen and underway)	Oily bilge water appears to be managed per MOU requirements.
☒	Ballast Water Managed Properly (per Wash regs –reporting, treated or if open sea exchange >200 nm from outside EEZ, 50nm if not EEZ)	Ballast water exchanges are reported to not occur on this route.
☒	OCNMS rules and regs followed	The discharge protocol appears to be consistent with MOU requirements to not occur in the OCNMS.
	Additional General Questions	
☒	How is deck runoff and hull cleaning handled (scuppers...) (non-toxic/phosphate free cleaners, biodegradable)	Deck runoff and hull cleaning appears to be handled per MOU requirements.
☒	How is maintenance performed on the outside of the vessel (paint chipping, painting, etc)	See below.
☒	Sculleries and Galleys – type of detergents and degreasers used (phosphate free and non-toxic)?	Galleys appear to use phosphate free and non-toxic detergents and degreasers.
☒	How are food waste discharges handled (prevention of erroneous materials)?	Food waste appears to be handled per MOU requirements.
☒	Medical sinks/floor drains, chem. stor areas wastes go where (plugged, blackwater, bilge)?	Medical sinks/floor drains appear to be handled per MOU requirements.
☒	Where is pool and spa water discharged? Dechlorinated/debrominated and underway?	Pool and spa water appears to be handled per MOU requirements.
☒	What type of fuel is used and percent sulfur content?	<1% sulfur content is used throughout the route.

Other:

Section F: Sampling Results

Parameter	Results
Biochemical Oxygen Demand 5-Day (BOD_5)	
Total Suspended Solids (TSS)	
Fecal Coliform	
Residual Chlorine	
pH	
Ammonia, Nitrogen	

NOT APPLICABLE

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 Princess Cruises STAR PRINCESS on September 2, 2012. The main contact on board the STAR PRINCESS was Casey Zambor, Occupational Safety and Environmental Officer (EO) for the STAR PRINCESS. Prior notification of the visit was given on August 28, 2012 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 STAR PRINCESS is not approved to discharge wastewater in MOU waters.

The STAR PRINCESS' was built in 2002, and is 950.2 feet long with a width of 118 feet. The passenger capacity is 2598 with a crew capacity of about 1060.

The STAR PRINCESS is scheduled for 19 port calls in Seattle and conducts one week cruises to Alaska turning around on Sundays between May 20, 2012 and September 23, 2012.

Inspection

I arrived and boarded the ship (photo #01) at about 8:58 am and began with introductions and a plan for the day with Casey Zambor, EO. We discussed various waste streams and discharge protocols. We reviewed the various discharge and environmental records. We then toured the Hamworthy advanced wastewater treatment system (AWTS) and the oily bilge water separator. We then viewed the garbage and recycling areas, the food waste systems, hazardous waste storage and the Engine Control Room (ECR). The inspection was then finalized with a debriefing and I disembarked the vessel at about 10:50 am. I also observed painting of the outside of the vessel during departure.

Discharge Types and Protocols:

Discharges of wastewater, wastewater residual solids, oily bilge, and food waste occur outside of 12 nautical miles. The discharge protocol includes the Bridge staff notifying the ECR staff when they are ½ hour away from either entering into a discharge area or getting close to exiting an area for discharge. The locations are then confirmed at both the Bridge and the ECR prior to a discharge. Discharge locations are recorded in the Bridge log book, in the ECR log books. Treated wastewater discharges are also recorded electronically. The various logs are compared for consistency. The ECR monitoring systems include a screen showing which discharge ports are opened and closed. At the time of the inspection, the screen showed all discharge ports being closed (photo #30). For black water and gray water, the latitude and longitude coordinates are recorded in the *Sewage and Graywater Discharge Record Book.* 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 did not occur in MOU waters, Washington State waters or the Olympic Coast National Marine Sanctuary (OCNMS) (MOU related waters).

Residual solids from the AWTS are collected in a solids tank and then discharged outside of MOU related waters. Any solids discharged are done outside of MOU related waters.

Oily bilge water is treated with a Westfalia centrifuge oily water separator (photos #11 and #12) and a RWO oily water separator (photo #10). A white box (photo #15) is used to only allow discharges at less than 15 ppm oil content (photo #13) maximum. The discharge port (photo #14) is padlocked with the ECR watchkeeper being in charge of the keys. The discharge protocol is to discharge treated oily bilge outside of MOU related waters.

Ballast water exchanges do not occur on this route.

Pools use fresh water and pool water is discharged overboard outside of MOU related waters. Spa water is discharged overboard outside of MOU related waters every 72 hours. Water is dechlorinated prior to discharge.

Food waste is collected in various locations, is sorted and then sent through a pulper. Pulped food waste and galley water is discharged outside of MOU related waters. A food chute (photo #20) is used for food waste such as bones and pineapples which the pulpers can't take. Records reviewed were consistent with this protocol. Sorting is done both in the galley and at the pulper to prevent non food waste items from being discharged. Food waste such as pineapple heads, coffee, watermelon rinds and shrimp are either incinerated or composted (photo #25) in Victoria per a new program. Galleys use phosphate free and non-toxic detergents and degreasers. Used cooking oil (photo #29) is recycled.

Decks runoff goes to scuppers and then overboard. There is no chemical storage on the decks. NPDES permit requirements are followed for deck runoff. Under water hull cleaning was done in dry dock in November. Above water hull cleaning is done with fresh water only. Paint chipping and painting is done in port upon port approval. The protocol includes capturing all paint chips with containment. There is no written protocol. Upon disembarking the vessel, window painting was being conducted via a cherry picker (photos #30, #31 and #32). There was no containment in the cherry

picker. A written protocol for outside vessel maintenance such as painting should be put in place and followed. It is also recommended that the Port of Seattle best management practices (BMPs) for such work be reviewed and followed. It is a violation of state law (Chapter 90.48.080 Revised Code of Washington) to discharge paint or paint chips into the waters of the State. The Department of Ecology may take formal administrative enforcement if such violations occur.

Laundry water is discharged untreated outside of MOU related waters. Dry cleaning is only done by steaming without a dry cleaning system that would use chemicals such as PERC.

X-rays are done digitally and therefore do not have a waste product. Photo waste goes through a silver recovery system (photo #27), and is treated to less than 5 ppm and is then incinerated. Fluorescent bulbs offloaded as hazardous waste and not crushed on board. Hazardous waste materials (photo #26) include items such as oily rags, oily sludge, incinerator ash, some sewage sludge, aerosols (not punctured), sharps, used cartridges and filters, electronics and batteries. Hazardous waste is typically offloaded in Victoria. Hazardous waste logs were reviewed and appear to be consistent with MOU requirements.

Unused or outdated pharmaceuticals are incinerated. Narcotics are incinerated with witness. Drains in the medical facility go to the blackwater tanks. Sharps are off-loaded as bio-hazardous waste and red bagged medical waste is incinerated.

Solid waste (garbage, recyclables, etc) is collected sorted (photo #21) and either reused, recycled, incinerated or offloaded (photo #24) to shore as appropriate. The garbage record book was reviewed and showed consistency with requirements.

Glass (photo #22), broken china, some plastics, scrap metals (photo #28), aluminum (photo #23), some cardboard, wood pallets and paper and used cooking oil and other items are recycled. Reduction, reuse and recycling progress is tracked and minimization improvements are constant.

Incinerator ash is offloaded as hazardous waste and tested annually to ensure non-metals status. Recent results have passed for non-metals. Incinerators (photo #19) are used at greater than 1 nm from shore.

Less than 1% sulfur content fuel is used throughout the route.

Freshwater is bunkered in Skagway and Juneau and occasionally in Seattle. Air conditioning condensate is discharged overboard.

Black water and Gray water System:

The Hamworthy system consists of three separate membrane bioreactors (MBRs), with two in operation at one time, the third in rotation. Black water, which includes toilet waste and infirmary drains is collected by vacuum to collection tanks and then combines with gray water (photo #17) which includes sink and shower water and is piped to a buffer tank. From the buffer tank, flow moves to the screen press (photo #03). The solids are screened into bags (photo #04) and are then sent to the incinerator. The liquid moves to the 1st stage of the membrane bioreactor where aeration occurs. From the 1st stage, flow moves to the Russell Filters (inter-stage filters – photo #02). The inter-stage filtered solids are returned back to the screen press. The liquid moves onto the 2nd stage of the MBR for further aeration. A sample port at the effluent of the 2nd stage (photo #07) is used for process control sampling. From the 2nd stage MBR, flow is sent to the membrane modules (photos #05 and #06) for ultrafiltration. Solids from the filters are sent back to the bioreactor. Effluent from the membrane modules are sent to a permeate tank (photo #08) where turbidity (photo #09) is monitored. Flow then combines with the other two MBR's at the UV Permeate tank. From the UV Permeate tank, effluent moves through the ultraviolet (UV) disinfection system (photo #16). Disinfected effluent either goes directly overboard (photo #18) or to a holding tank if not in an approved area for discharge. Currently, effluent from the permeate tanks is held and discharged outside of MOU related waters.

Turbidity is measured continuously on each of the MBR permeate tanks. At the time of the inspection, MBR #1 was 1.7 and MBR #3 was 7.2. The meters are alarmed at 5.95 NTU with shut down at a 30 NTU maximum.

The staff has a small laboratory on board where they sample for process control.

<u>Conclusions and Recommendations</u>

It is recommended that staff continue to work towards high functioning wastewater treatment systems.

A written protocol for outside vessel maintenance such as painting should be put in place and followed. It is also

recommended that the Port of Seattle best management practices (BMPs) for such work be reviewed and followed.

Attachments:
Photographs

Copies to:
Andrew Lorenzana, Princess Cruises
Casey Zambor, Environmental 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 – STAR PRINCESS; 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	10/2/12
Name and Signature of Reviewer:	**Agency/Office/Telephone:**	**Date**
Mark Henley	Department of Ecology Northwest Regional Office Water Quality Section Manager 425-649-7103	10/2/12

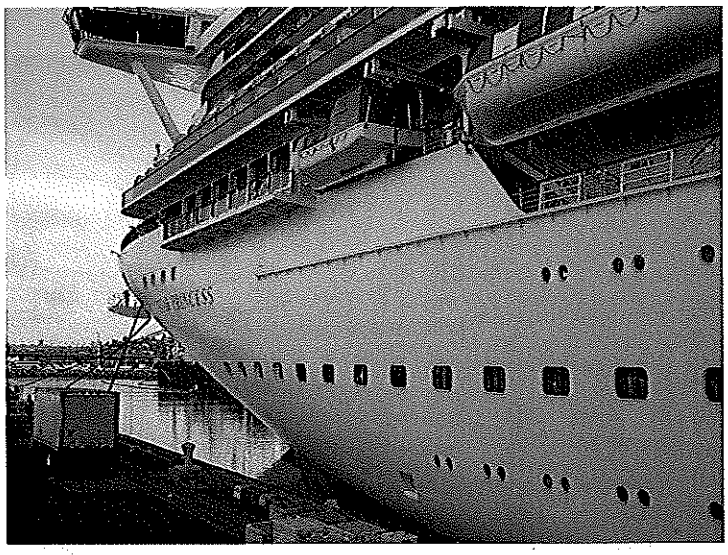

PHOTO #:01 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020001
DESCRIPTION: VESSEL

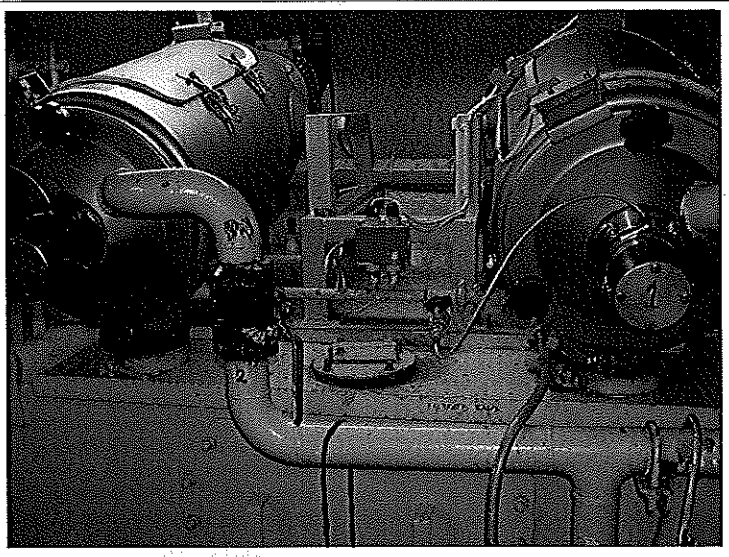

PHOTO #:02 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020003
DESCRIPTION: AWTS INTERSTAGE FILTERS

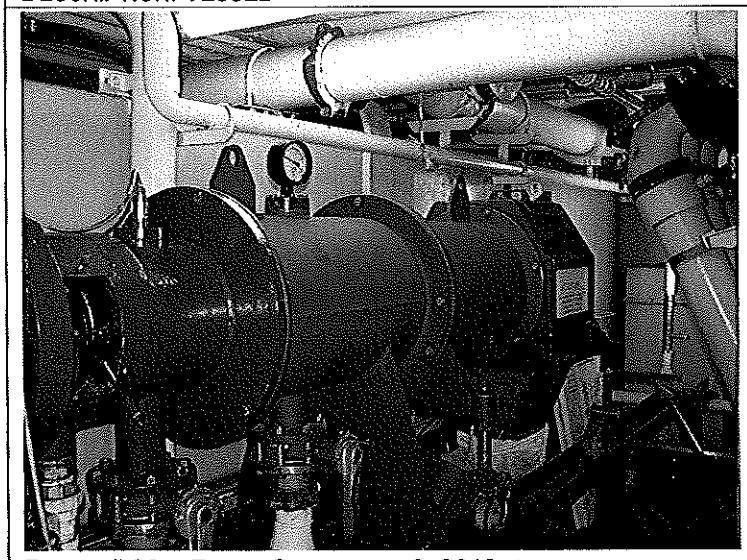

PHOTO #:03 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020004
DESCRIPTION: AWTS SCREEN PRESS (FRONT) AND BIOREACTOR TANK (GREEN TANK IN BACKGROUND)

PHOTO #:04 SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020005
DESCRIPTION: AWTS SCREENINGS FROM SCREEN PRESS

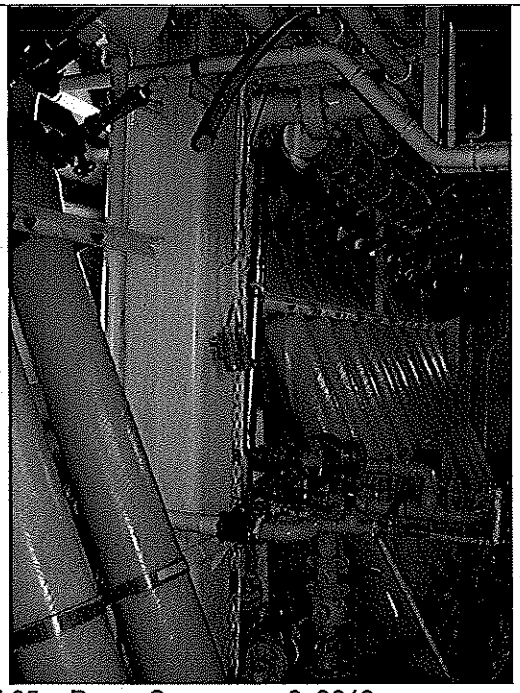

PHOTO #:05 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020006
DESCRIPTION: AWTS MEMBRANES

PHOTO #:06 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020007
DESCRIPTION: AWTS MEMBRANES

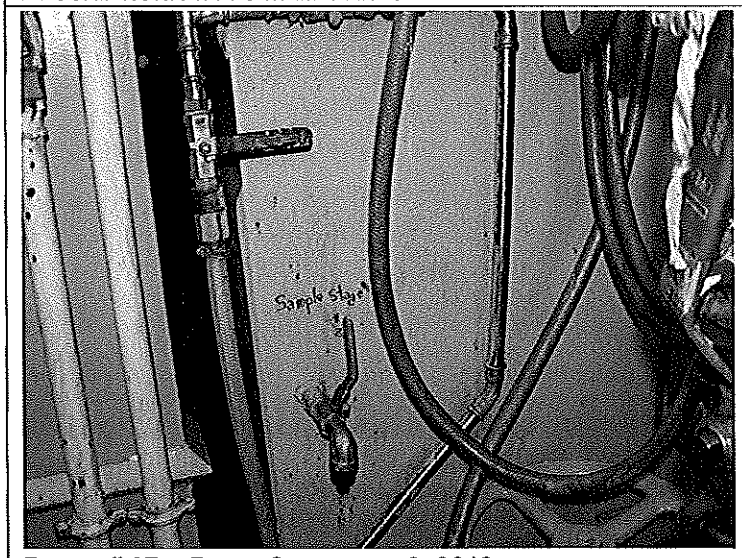

PHOTO #:07 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020008
DESCRIPTION: AWTS BIOREACTOR STAGE 2 SAMPLE POINT

PHOTO #:08 SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020009
DESCRIPTION: AWTS PERMEATE EFFLUENT

PHOTO #:09 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020010
DESCRIPTION: AWTS TURBIDIMETER

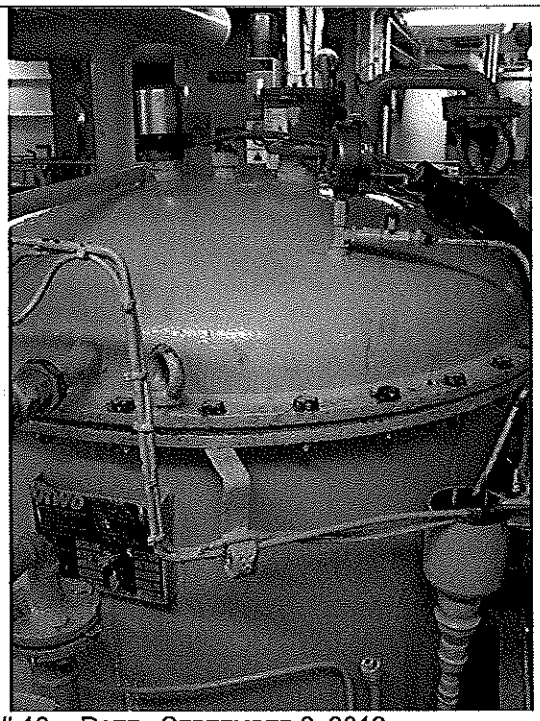

PHOTO #:10 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020011
DESCRIPTION: RWO OILY WATER SEPARATOR

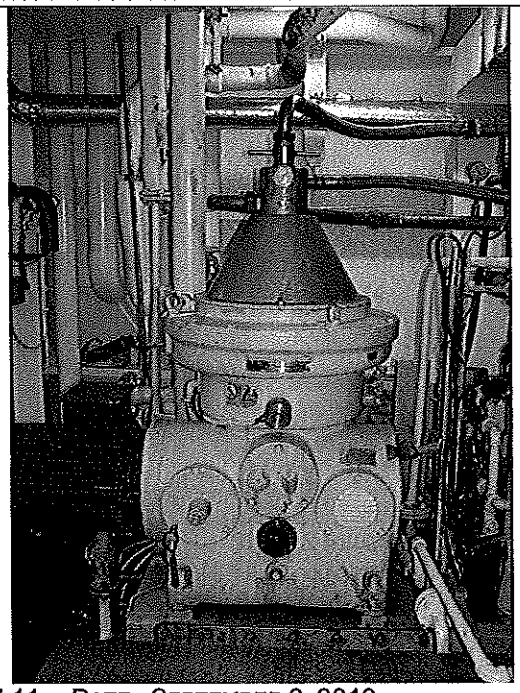

PHOTO #:11 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020012
DESCRIPTION: CENTRIFUGE FOR OILY WATER SEPARATOR

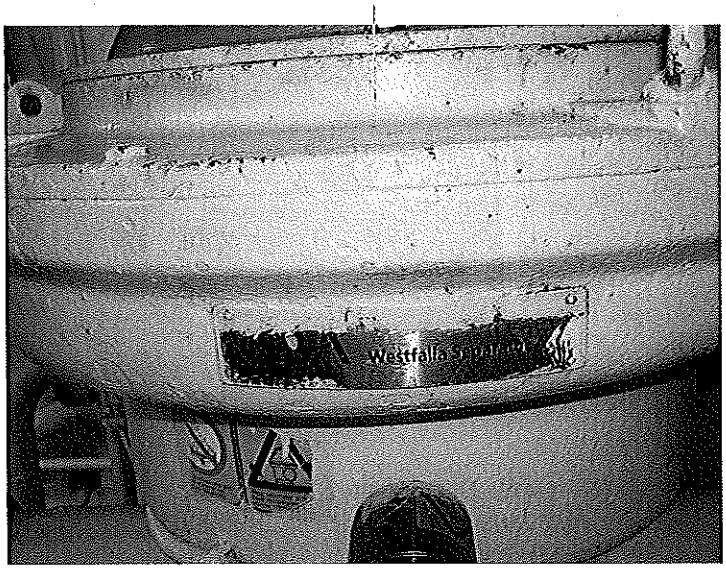

PHOTO #:12 SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020013
DESCRIPTION: WESTFALIA CENTRIFUGE OILY WATER SEPARATOR

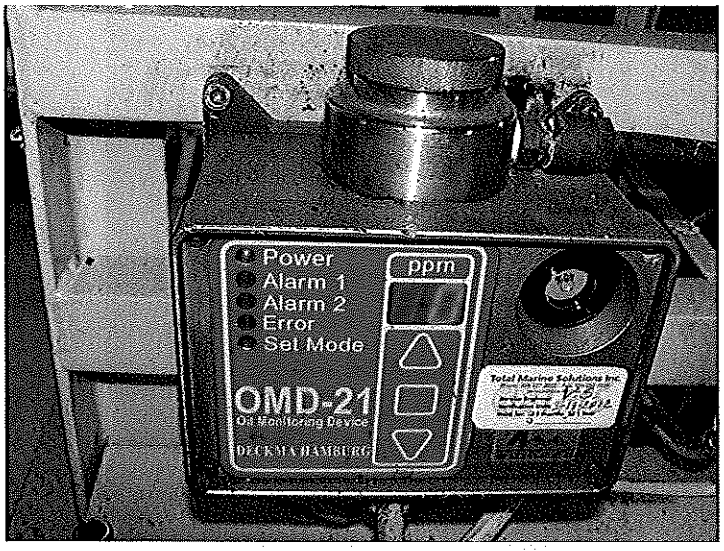

PHOTO #:13 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020014
DESCRIPTION: WESTFALIA OWS OIL CONTENT METER

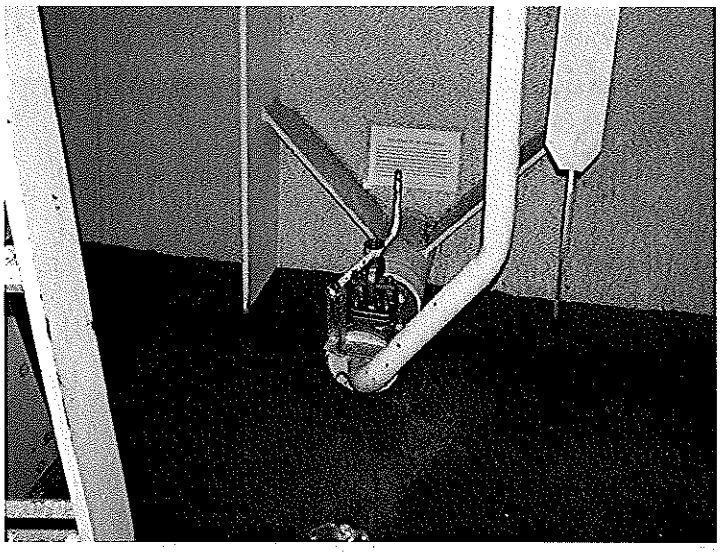

PHOTO #:14 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020015
DESCRIPTION: OILY BILGE DISCHARGE PORT

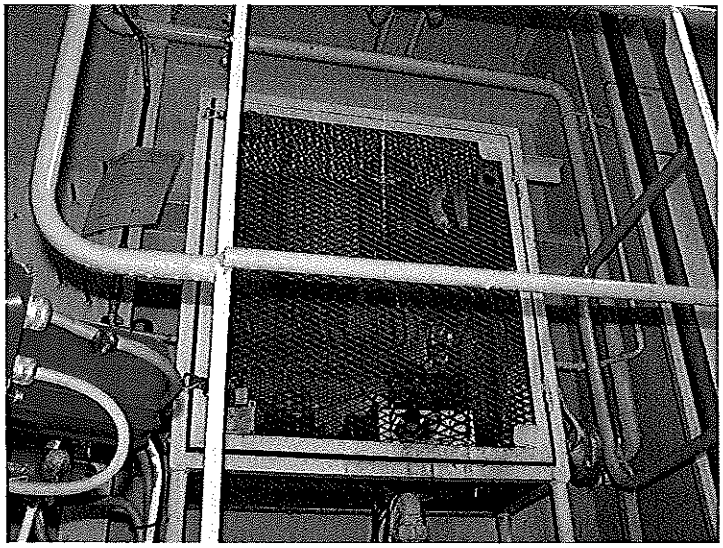

PHOTO #:15 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020016
DESCRIPTION: OWS WHITE BOX

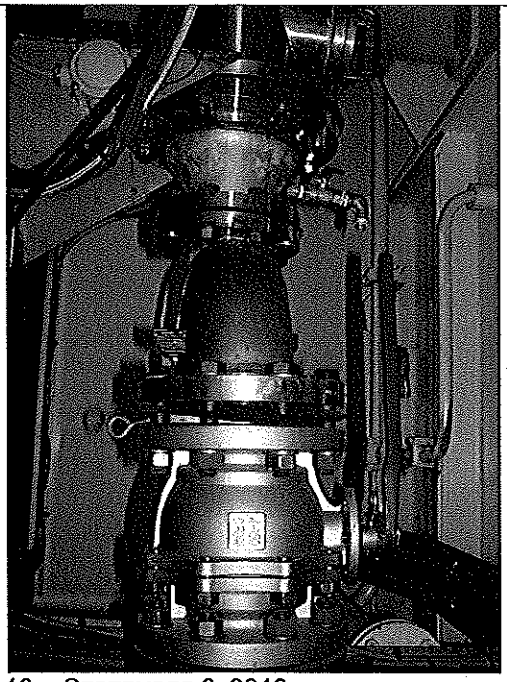

PHOTO #:16 SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020017
DESCRIPTION: AWTS ULTRAVIOLET DISINFECTION UNIT (UV)

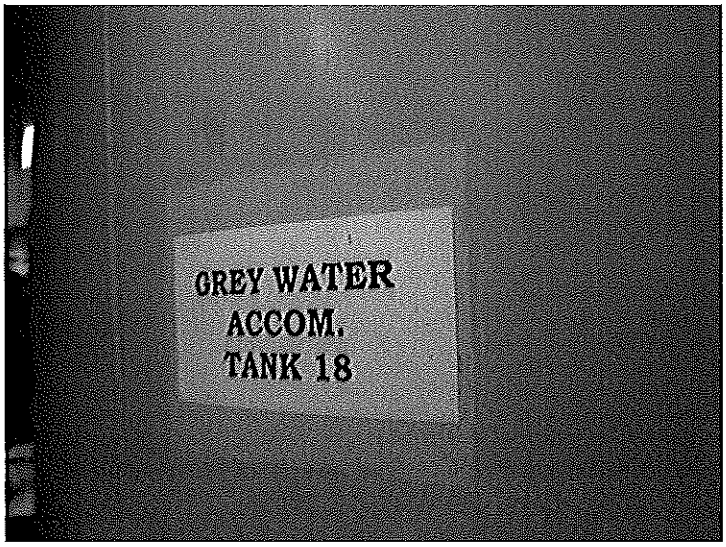

PHOTO #:17 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020019
DESCRIPTION: GRAYWATER ACCOMMODATION TANK

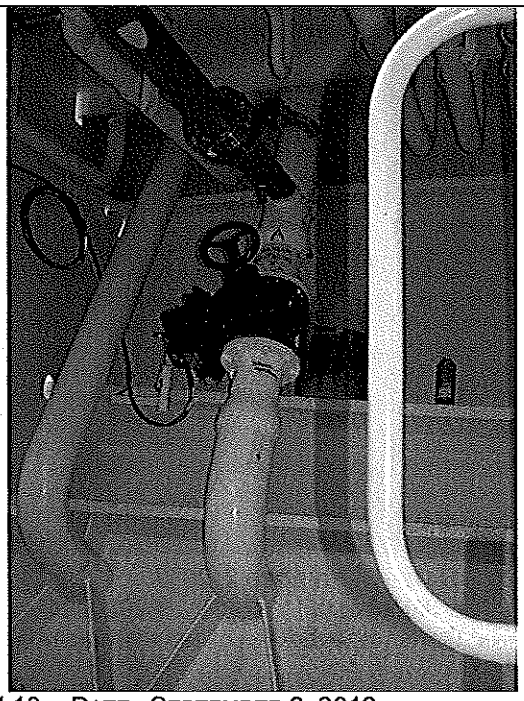

PHOTO #:18 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020020
DESCRIPTION: AWTS DISCHARGE PORT

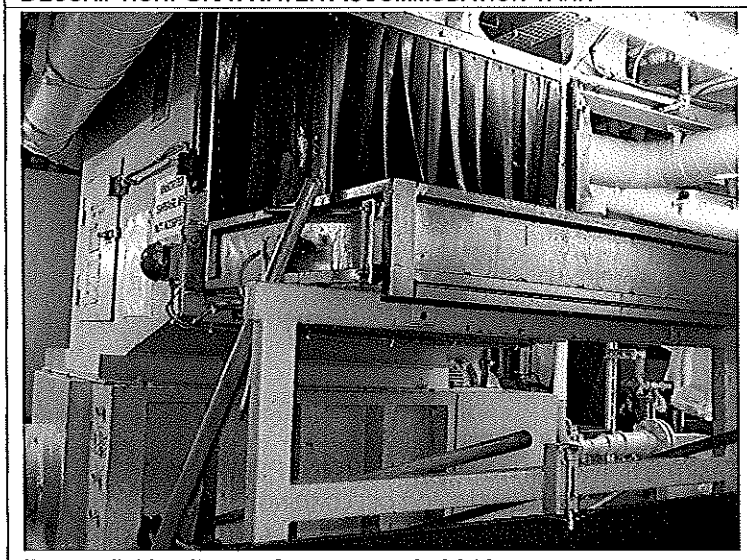

PHOTO #:19 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020021
DESCRIPTION: INCINERATOR

PHOTO #:20 SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020022
DESCRIPTION: FOOD WASTE CHUTE

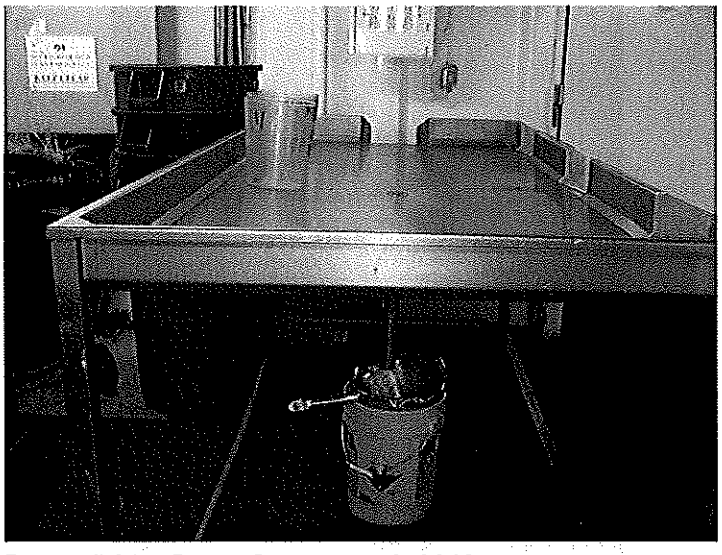

PHOTO #:21 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020024
DESCRIPTION: GARBAGE AND RECYCLING SORTING TABLE

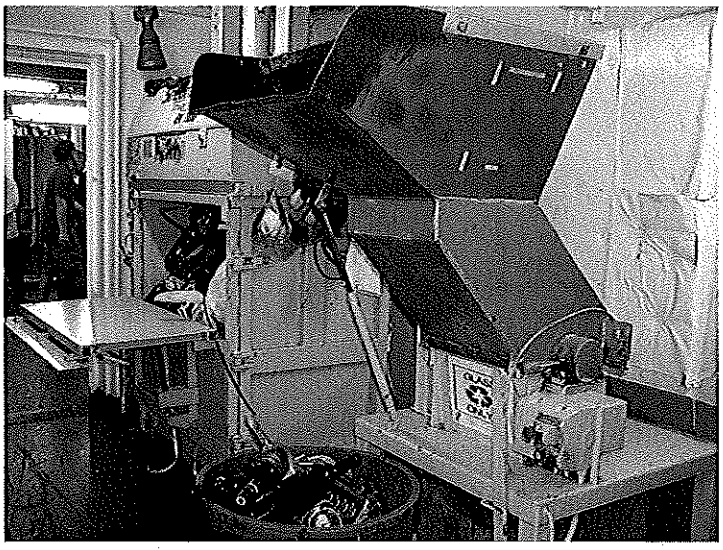

PHOTO #:22 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020026
DESCRIPTION: GLASS CRUSHER

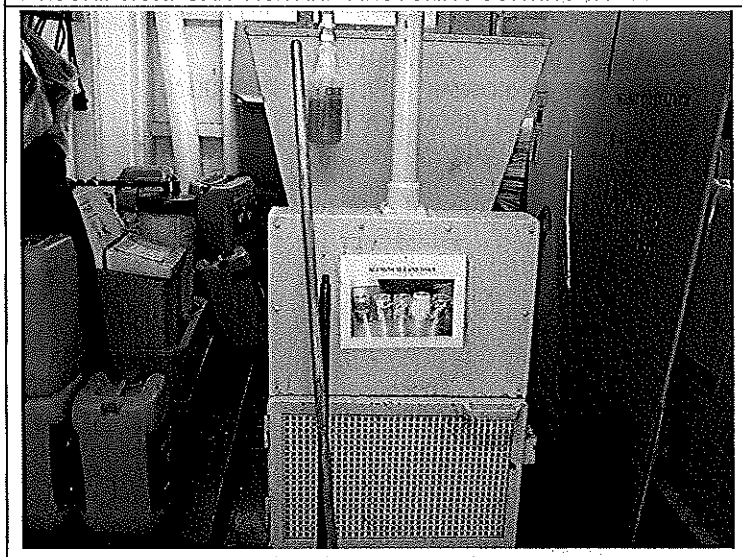

PHOTO #:23 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020027
DESCRIPTION: ALUMINUM CAN COMPACTOR

PHOTO #:24 SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020028
DESCRIPTION: DRY WASTE FOR OFFLOADING

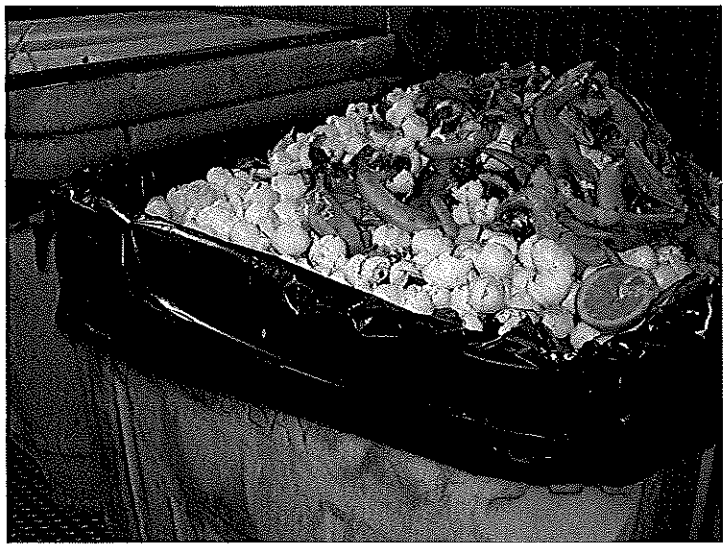

PHOTO #:25 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020029
DESCRIPTION: COMPOST FOR VICTORIA CAN OFFLOAD

PHOTO #:26 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020030
DESCRIPTION: HAZARDOUS WASTE STORAGE

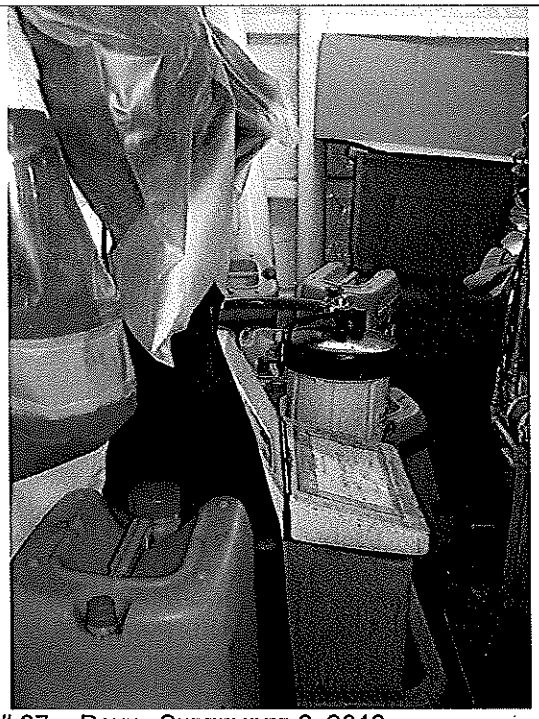

PHOTO #:27 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020031
DESCRIPTION: PHOTO SILVER RECOVERY UNIT

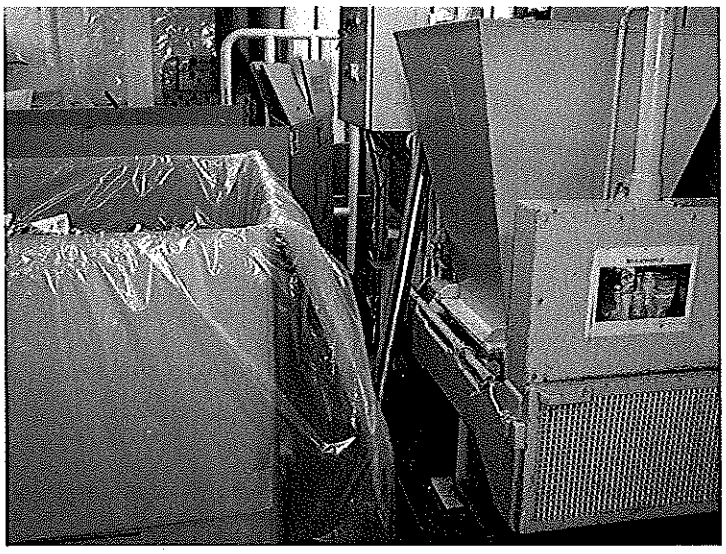

PHOTO #:28 SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020032
DESCRIPTION: TIN CAN COMPACTOR (RT) AND GLASS (LFT)

PHOTO #:29 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020033
DESCRIPTION: USED COOKING OIL TOTE (WHITE)

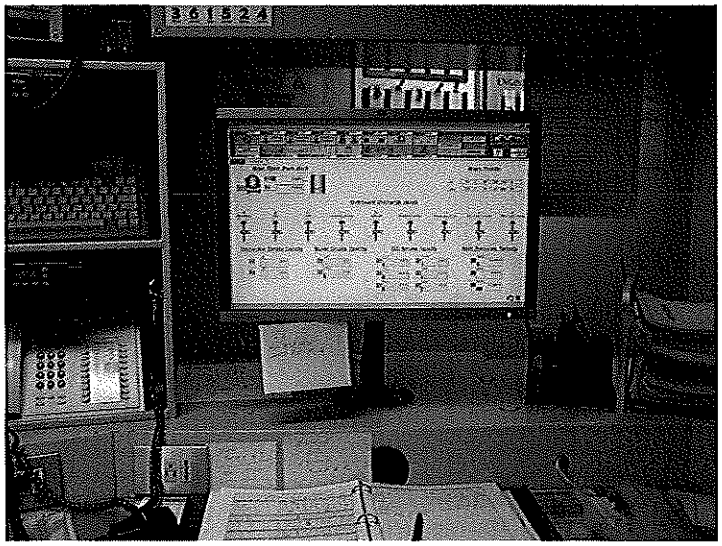

PHOTO #:30 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020034
DESCRIPTION: DISPLAY SHOWING ALL DISCHARGE PORTS CLOSED

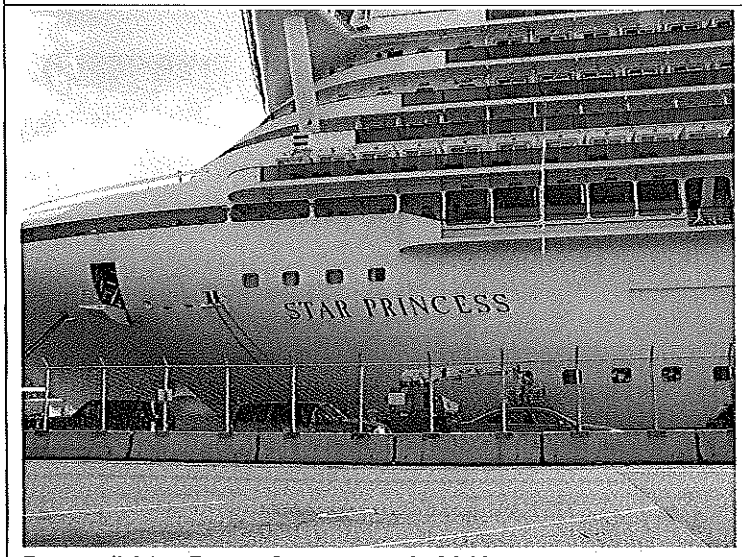

PHOTO #:31 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020035
DESCRIPTION: VESSEL BEGINNING PAINTING OF WINDOW AREA

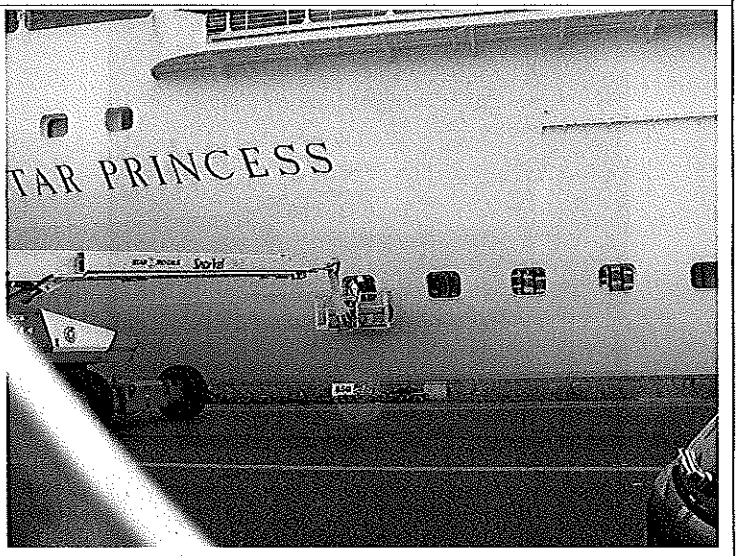

PHOTO #:32 SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020036
DESCRIPTION: PAINTING OF WINDOW AREA

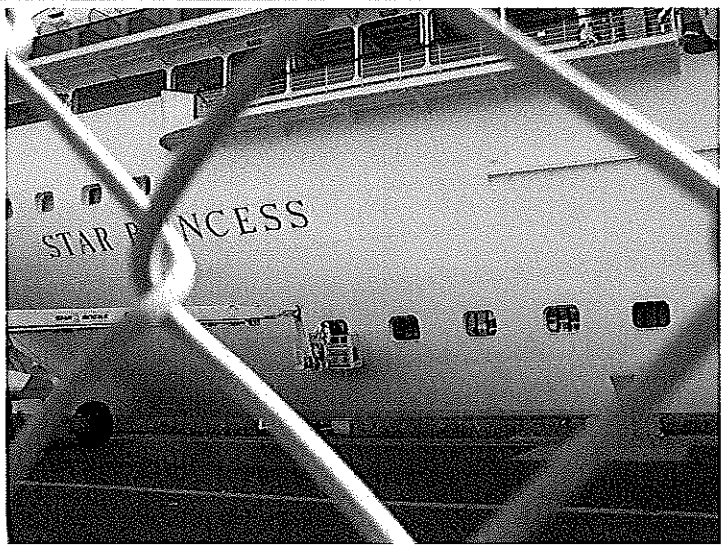

PHOTO #:33 DATE: SEPTEMBER 2, 2012
TAKEN BY: AMY JANKOWIAK FILE NO.: P9020037
DESCRIPTION: PAINTING OF WINDOW AREA