



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

Northwest Regional Office

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Inspection Date August 8, 2014	Permit Number NA	County King	Receiving Waters Marine Waters	Ecology Inspector Amy Jankowiak
Entry Time 9:10 am	Photos Taken <input 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
Exit Time 11:48 am				

Name and Location of Site Inspected: RHAPSODY OF THE SEAS, Royal Caribbean Cruise Line Pier 91 Seattle, Washington	Additional Participants/Inspectors: Lazaro Eleuterio, Ecology
On-Site Representative(s): <i>Name/Title/Phone/e-mail</i> Lizel De Bruin, Environmental Officer RH EnvironmentalOfficer@rccl.com James Nazar, Staff Captain	
Responsible Official(s): <i>Name/Title/Address/Phone/e-mail</i> Rich Pruitt, Director Environmental Programs Royal Caribbean International 1080 Caribbean Way, Miami, FL 33132 Office: 305-982-2179; Cell: 305-495-2845; RPruitt@rccl.com	Other Facility Data: Notification made to Rich Pruitt on August 4, 2014

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 checked="" type="checkbox"/> Other

Section B: For Vessels Discharging ≥ 1nm from Berth and ≥ 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	
Turbidity or Equivalent: 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	
Disinfection Effectiveness Monitoring:	
<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	
Disinfection System:	

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	
Turbidity or Equivalent:		
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	
Disinfection Effectiveness Monitoring:		
<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	
Disinfection System:		

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	

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 appear to be in the OCNMS, MOU waters or Washington state waters (MOU related waters)
<input checked="" type="checkbox"/>	Wastewater Discharges protocol per MOU and managed properly	The discharge protocols appear to be consistent with MOU requirements to not occur in MOU related waters.
<input checked="" type="checkbox"/>	Residual Solids Managed Properly/Disposal Protocol per MOU	Residual solids appear to be handled per MOU requirements.
<input checked="" type="checkbox"/>	Hazardous Waste Managed Properly	Hazardous waste appears to be handled per MOU requirements.
<input checked="" type="checkbox"/>	WA Hazardous Waste Guidelines Followed (Appendix vii)	Hazardous waste guidelines appear to be handled per the MOU and guidelines.

<input checked="" type="checkbox"/>	Solid Waste Managed Properly (zero garbage discharge)	Solid waste appears to be managed per MOU requirements.
<input checked="" type="checkbox"/>	Photo/X-Ray Waste Managed Properly (fluids, cartridges,...) and landed ashore	Photo and x-ray waste appears to be handled per MOU requirements.
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	Unused/Outdated Pharmaceuticals Managed Properly (safely disposed of)	Unused or outdated pharmaceuticals appear to be managed per MOU requirements. See details below on narcotics to black water.
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	Waste Reduction/Reuse/Recycling Opportunities Maximized (glass, cardboard, aluminum & steel cans)	Waste reduction/reuse/recycling opportunities appear to be maximized per MOU requirements.
<input checked="" type="checkbox"/>	Batteries Managed Properly (recycled, reclaimed, disposed of properly)	Batteries appear to be managed per MOU requirements.
<input checked="" type="checkbox"/>	Incinerator Ash Managed Properly and minimized volume (haz waste segregation and annual testing)	Incinerator ash appears to be managed per MOU requirements.
<input checked="" type="checkbox"/>	Oily Bilge Water Managed Properly (<15 ppm, no visible sheen and underway)	Oily bilge water appears to be managed per MOU requirements.
<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 water exchanges are reported to not occur on this route.
<input checked="" type="checkbox"/>	OCNMS rules and regs followed	The discharge protocol appears to be consistent with MOU requirements to not occur in the OCNMS.

Additional General Questions

<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	How is maintenance performed on the outside of the vessel (paint chipping, painting, etc)	Outside vessel maintenance appears to be handled per MOU requirements.
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	How are food waste discharges handled (prevention of erroneous materials)?	Food waste appears to be handled per MOU requirements.
<input checked="" type="checkbox"/>	Medical sinks/floor drains, chem. stor areas wastes go where (plugged, blackwater, bilge)?	Medical sinks/floor drains appear to be handled per MOU requirements.
<input checked="" type="checkbox"/>	Where is pool and spa water discharged? Dechlorinated/debrominated and underway?	Pool and spa water appears to be handled per MOU requirements.
<input checked="" type="checkbox"/>	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)	NOT APPLICABLE
Total Suspended Solids (TSS)	
Fecal Coliform	
Residual Chlorine	
pH	
Ammonia, Nitrogen	

Section G: Summary of Findings/Comments

Introduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program (NWRO-WQ), along with Lazaro Eleuterio conducted the inspection of the Royal Caribbean Cruise Line (RCCL) RHAPSODY OF THE SEAS on August 8, 2014. The main contact on board the RHAPSODY OF THE SEAS was Lizel De Bruin, Environmental Officer for the RHAPSODY OF THE SEAS. Prior notification of the visit was given on August 4, 2014 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 RHAPSODY OF THE SEAS is not approved to discharge wastewater in MOU waters.

The RHAPSODY OF THE SEAS' maiden voyage was in 1997, and is 915 feet long with a width of 105.6 feet. The passenger and crew capacity is about 3200.

The RHAPSODY OF THE SEAS is scheduled for 15 port calls in Seattle and conducts one week cruises to Alaska turning around on Fridays between May 23, 2014 and August 29, 2014.

Inspection

We arrived and boarded the ship at about 9:10 am and first met with James Nazar, Staff Captain on the bridge and then began with introductions and a plan for the day with Lizel De Bruin, the Environmental Officer. We discussed various waste streams and discharge protocols in the Engine Control Room (ECR). We reviewed the various discharge and environmental records. We then toured the fuel bunkering (photo #01), photo lab, laundry, the Naval's advanced wastewater treatment system (AWTS) and the oily water separator. We then viewed the garbage and recycling areas, food compost area, anti-fouling, grease trap and the medical center. The inspection was then finalized with a debriefing and we disembarked the vessel at about 11:48 am.

Discharge Types and Protocols:

All discharges occur outside of 13 nautical miles (they add a one mile buffer beyond their normal policy). A pre-season plan (photo #03) is put into place and if a discharge is to occur, staff on the Bridge communicate with the ECR staff to verify that they are in an area where discharges are allowed. Both electronic and paper charts are used for navigation. Discharge locations are recorded in the ECR and electronically (photo #02). The discharge ports have padlocks on them and the keys are kept in the control room under the Watchkeeper's eye, a spare with the Chief Engineer. The ports are also tagged when in restricted areas. 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. The vessel has about 80 hours of holding capacity for black and gray water. 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).

The coarse screenings are collected and incinerated and the bioresidue collected is sent first through the Solids Reduction System of the NAVALIS system and it is then sent to the traditional marine sanitation device (Hamaan) for further treatment before discharge or drumming and sending ashore. Any solids discharged are done outside of MOU related waters.

Oily bilge water is treated with a Marin Flocculant oily water separator (photo #10) with a company standard of less than 5 ppm oil content. The white box (photo #09) is used to only allow discharges at less than 5 ppm maximum. The White Box is calibrated once per year. The Chief Engineer is the only one with the keys to the white box. Discharges (photo #11) of treated oily bilge take place outside of MOU related waters.

Pools use salt water and both pool and spa water is discharged as far out as possible and is dechlorinated prior to discharge. Emergency draining of spas could occur closer if necessary.

Food waste is collected in various locations, is sorted and then sent through a pulper and then to a tank for further dewatering. Pulped food waste and galley water is discharged outside of MOU related waters. Food waste such as pineapple heads, banana, orange and cantaloupe peels, pulper residue and butcher and fish waste are composted (photos #37 and #38) and sent ashore in Victoria. Records reviewed were consistent with food waste discharge protocol. Galleys use Ecolab phosphate free and non-toxic detergents and degreasers. Used cooking oil (photo #36) is recycled in Seattle. Grease is collected in a grease trap (photo #42) and combined with the used cooking oil for recycling.

Decks are kept clean and are swept regularly. Decks drain to the scuppers and most go directly overboard. Some scuppers drain to the graywater tanks. Paint chipping and painting is done in port occasionally. If painting and chipping occurs, weather conditions are first checked and a drop cloth is used on the pier and a drop cloth is hand held. A double bucket is used for paint with the cherry picker lined. The Staff Captain or First Officer oversee any painting and chipping.

Hull cleaning is done when checked and cleared with the harbormaster. Outside vessel washing occurs with freshwater or with phosphate free/non toxic cleaners when allowed by the port.

Laundry water is sent to the graywater tanks. Laundry uses Ecolab phosphate free, non-toxic cleaning products (photo #05). Any illness contaminated laundry is separated and sent to a dedicated washing machine. Dry cleaning uses a hydrocarbon system (Exxon Mobil, non PERC) (photo #06). The liquid residual goes to the oily water separator system and the dry materials are drummed and offloaded about twice per year.

Chemicals are stored (photo #12) in various locations and separated by types to prevent reactions.

X-rays are done digitally and therefore do not have a waste product. Photo waste goes through a silver recovery system, and is treated to less than 6 ppm and is then drummed (photo #04) and offloaded. Fluorescent bulbs go to a bulb crusher with a mercury vapor removal system. The filters are offloaded as hazardous waste and bulbs are offloaded. Hazardous waste materials include items such as used cartridges and filters, paints, thinners, chemicals, some batteries, sludge oil, aerosols (punctured), incinerator ash, pyrotechnics, photo waste and sharps. Hazardous waste is offloaded in Victoria. Hazardous waste logs were reviewed and appear to be consistent with MOU requirements.

Unused or outdated pharmaceuticals are either incinerated or off-loaded back to the vendor when feasible. Narcotics are sent to the blackwater/AWTS due to a DEA agreement with RCCL and a medical license. Drains in the medical facility go to the blackwater tanks. Biohazardous waste is collected (photo #43) in the medical center and is incinerated or offloaded as required. Gas cylinders are stored in a secure locker and levels/leaks monitored in the ECR (photo #44).

Solid waste (garbage, recyclables, etc) is collected and sorted (photo #29) and either reused, recycled, incinerated or offloaded to shore as appropriate. Some dry waste is offloaded in Seattle along with the used cooking oil. The garbage record book was reviewed and showed consistency with requirements. Glass (separated by color) (photo #31), compacted aluminum (photos #34 and #35), tin, scrap metal, china/ceramics, wood pallets, some plastics, some paper and cardboard (photo #33), some electronics, batteries (photo #32) and used cooking oil, cork and other items are recycled in Victoria. Reduction, reuse and recycling progress is tracked and minimization improvements are constant.

Oily rags, some food contaminated materials, medical waste is incinerated outside of 13 miles. The incinerated materials are loaded at the top level in the garbage/recycling area (photo #30) and moves to the bottom level where burning occurs and the ash is collected (photo #28). Incinerator ash is offloaded to Burlington Environmental and tested every six months to ensure non-metals status. Recent results have passed for non-metals.

An average of less than 1% sulfur content fuel is used throughout the route with typically <0.0006% alongside. Oil sludge is sent ashore in Victoria. The vessel is not equipped for shore power.

Freshwater is bunkered and produced via evaporator condensation.

Air conditioning condensate is re-used as technical water. The last ballast water exchange occurred prior to the Seattle/Alaska season deep off the coast. Antifouling is done via a Cathelco biofouling system for the Sea-chest (photos #39 and #41).

Black water and Gray water System:

A Navalys Poseidon AWTS is used to treat combined graywater and blackwater and is run continuously. There is only one train, so if maintenance or inspection is conducted, the older traditional Type II marine sanitation device (Hamaan) can be used. Blackwater, which includes toilet waste and infirmary drains and graywater which includes sink and shower water, laundry water and spa water is sent to various collection tanks (photos #07 and #08). The system was previously set up to treat blackwater and graywater separately, and some of the labeling on equipment specifies "GW" or "BW", when the equipment actually takes the combined blackwater and graywater streams. The combined black water and graywater is pumped to a shaker screen to screen out solids (photos #14 and #16). Screened solids are sent to the Sludge Reduction Tank (SRT) (photo #15) in the old Hamaan traditional marine sanitation device for further treatment. Screened wastewater is sent to the Aerated Equalization Tank (AET) (photo #17) for biological treatment. The AET is equipped with blowers (photo #13). Defoamer is also used at the AET (photo #26). Bioresidue from the AET is also sent to the SRT. From there, flocculant (photos #19 and #24) is added to the liquid for hydraulic separation and then to ultrafiltration with tubular ceramic membranes (photo #22). Filtered wastewater then goes to the Membrane Feed Tank and onto the membrane filters. The filters are backwashed (photo #21) automatically, daily, and are chemically cleaned periodically. Chlorinated and non-chlorinated backwash wastes are stored and then recycled to the AET system. The membranes' effluent (photo #20) goes to a finish tank and onto holding or ultraviolet (UV) light disinfection (photo #23) unit prior to discharge (photo #27). The membranes' effluent used to go to an ozone system which is no longer needed or used.

The system is challenging to operate, however produces great effluent. The staff have to monitor and assure that chemicals or grease does not interfere with the system, and may have to re-direct the flows to the old Hamaan unit if the influent might harm the AWTS. The membranes get clogged easily and may need replacement soon.

Solids from the SRT are sent through the Hamaan unit which consists of aeration, baffles, and chlorination. Solids are then discharged outside of MOU related waters.

Effluent is continuously monitored for turbidity and pH. An electronic system, AMOS, is used to plan and track maintenance for the system. During the inspection, the turbidity was 8 NTU at the effluent prior to going to the holding tank. There is also a dissolved oxygen sample point at the AET (photo #25). Sampling is done on the vessel for process control with an on-board sampling laboratory which analyzes TSS, COD, BOD, pH, total chlorine, and total coliform. The AWTS can be monitored (photo #18) from the ECR or from various parts of the system.

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:
Rich Pruitt, RCCL
Lizel De Bruin, Environmental Officer, RCCL
Mark Toy, Health
Greg Wirtz, NWCCA
Stephanie Jones Stebbins, Port of Seattle
Kevin Fitzpatrick, Ecology
Mark Henley, Ecology
Amy Jankowiak, Ecology
Central Files: Royal Caribbean Cruise Line – RHAPSODY OF THE SEAS; WQ 6.1

<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> 8/21/14
<u>Name and Signature of Reviewer:</u> Mark Henley 	<u>Agency/Office/Telephone:</u> Department of Ecology Northwest Regional Office Municipal Unit Supervisor 425-649-7103	<u>Date:</u> 8/21/14

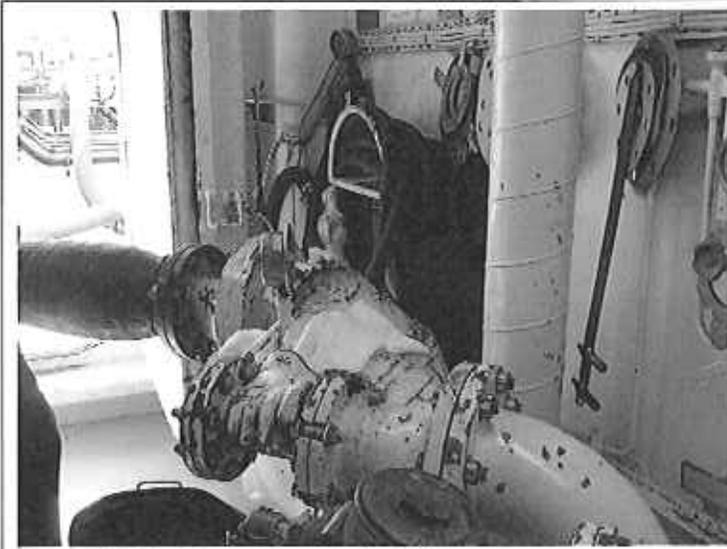


PHOTO #:01 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090122
DESCRIPTION: FUEL BUNKERING



PHOTO #:02 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090124
DESCRIPTION: ENGINE CONTROL ROOM WITH PORT KEY BOX

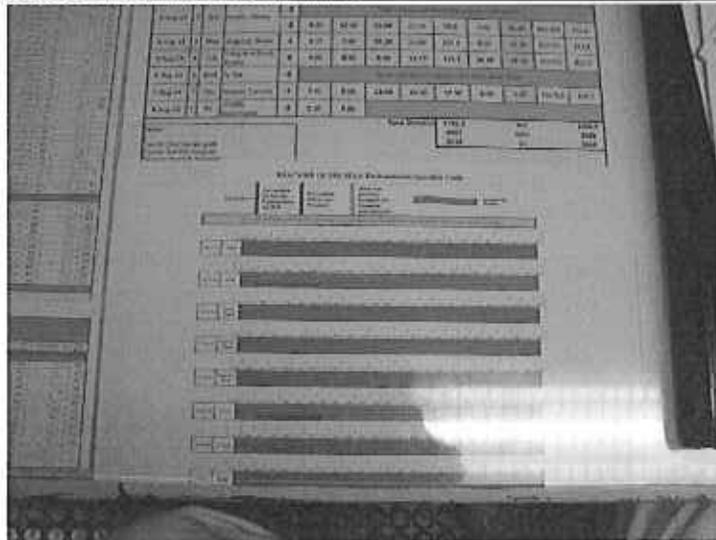


PHOTO #:03 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090126
DESCRIPTION: DISCHARGE PLAN (ECR)



PHOTO #:04 AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090129
DESCRIPTION: PHOTO WASTE CHEMICALS IN PHOTO LAB



PHOTO #:05 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090131
DESCRIPTION: LAUNDRY CLEANING DETERGENTS



PHOTO #:06 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090133
DESCRIPTION: DRY CLEANING SYSTEM/CHEMICALS

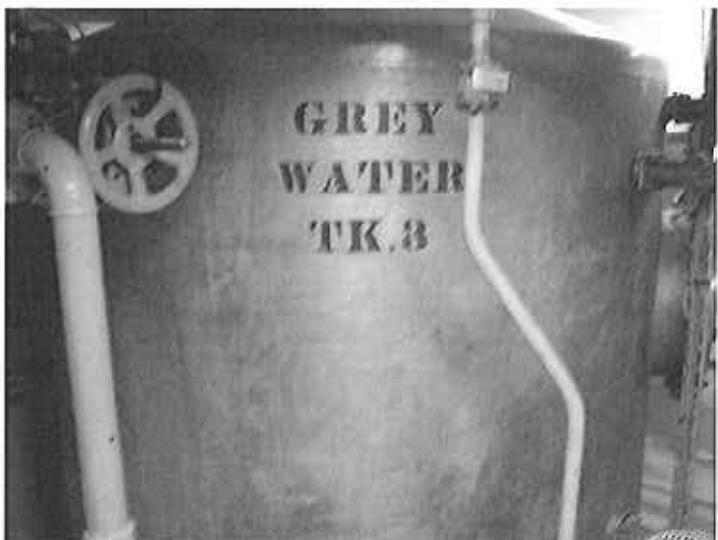


PHOTO #:07 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090135
DESCRIPTION: GREY WATER COLLECTION TANK

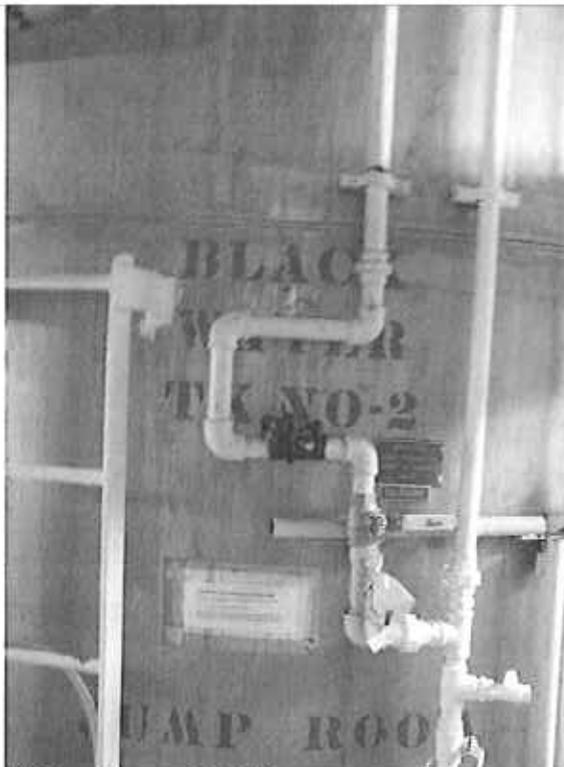


PHOTO #:08 AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090137
DESCRIPTION: BLACK WATER COLLECTION TANK

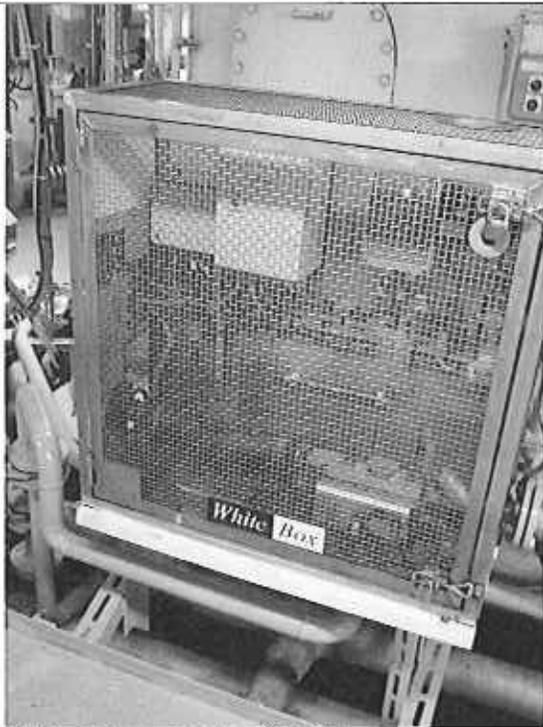


PHOTO #:09 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090140
DESCRIPTION: BILGE OILY WATER SEPARATOR (OWS) WHITE BOX



PHOTO #:10 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090142
DESCRIPTION: BILGE OWS

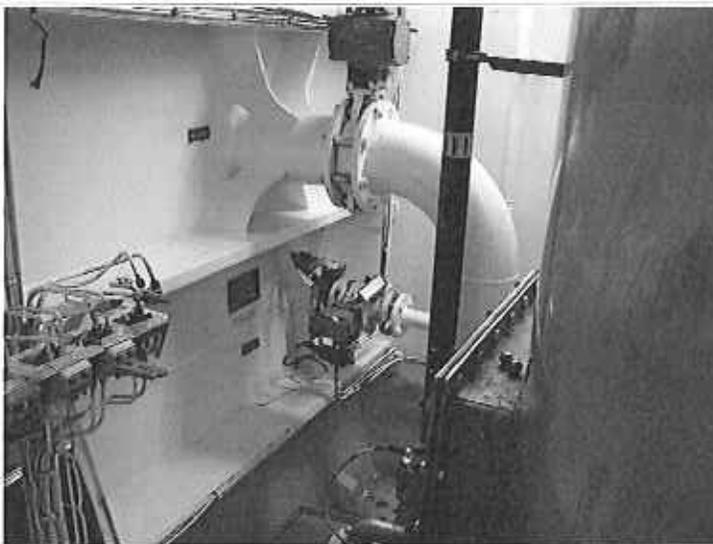


PHOTO #:11 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090148
DESCRIPTION: OWS OVERBOARD DISCHARGE PORT



PHOTO #:12 AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090143
DESCRIPTION: CHEMICAL STORAGE LOCKER

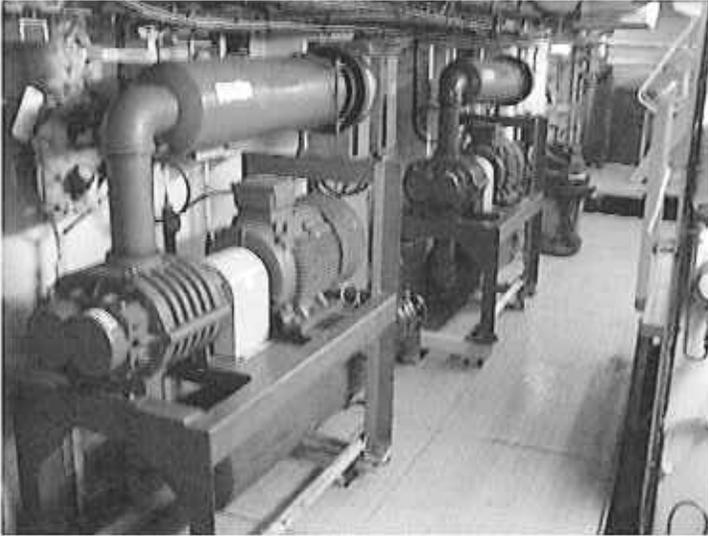


PHOTO #:13 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090141
DESCRIPTION: AERATED EQUALIZATION TANK (AET) BLOWERS

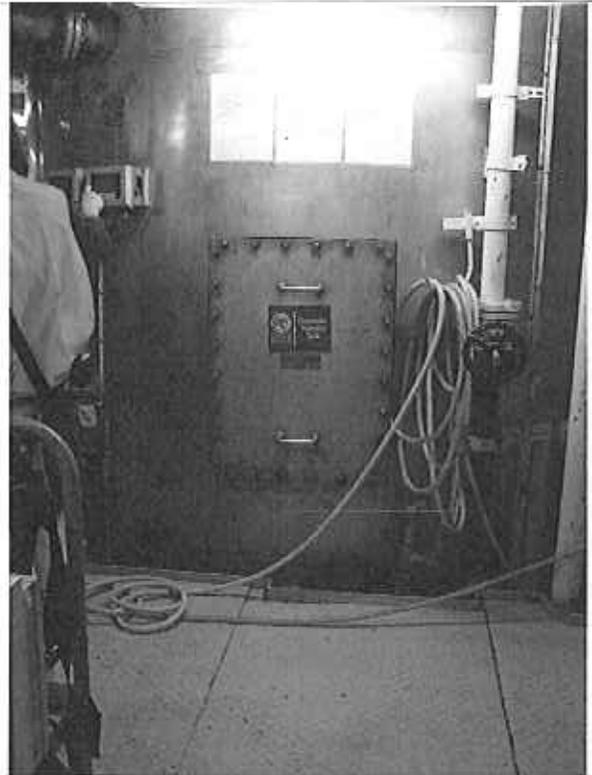


PHOTO #:14 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090145
DESCRIPTION: SHAKER SCREEN TANK



PHOTO #:15 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090149
DESCRIPTION: SLUDGE REDUCTION TANK (SRT)



PHOTO #:16 AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090150
DESCRIPTION: SHAKER SCREEN PLASTICS TANK

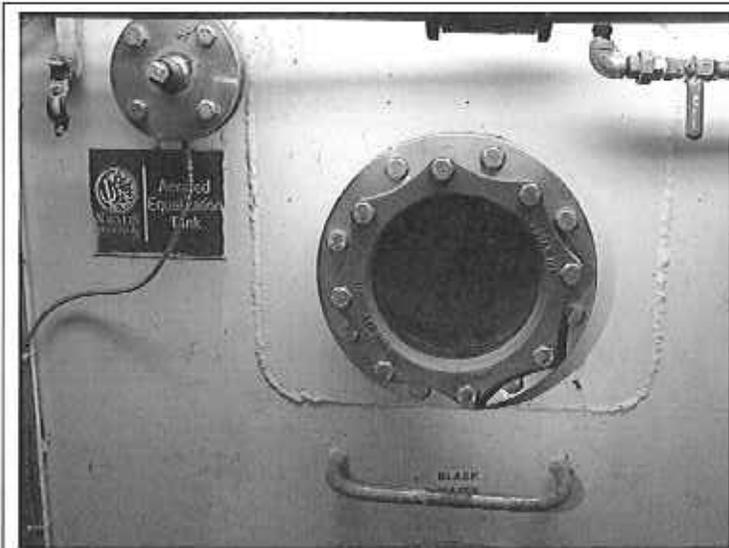


PHOTO #:17 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090151
DESCRIPTION: AET

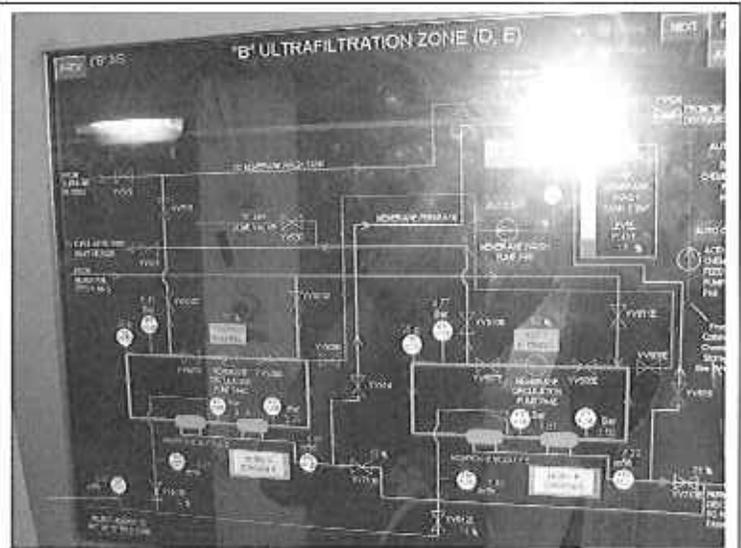


PHOTO #:18 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090153
DESCRIPTION: CONTROL SCREEN NEAR ADVANCED WASTE
WATER TREATMENT SYSTEM (AWTS)



PHOTO #:19 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090154
DESCRIPTION: FLOC FEEDING SYSTEM (MC130) FOR AWTS

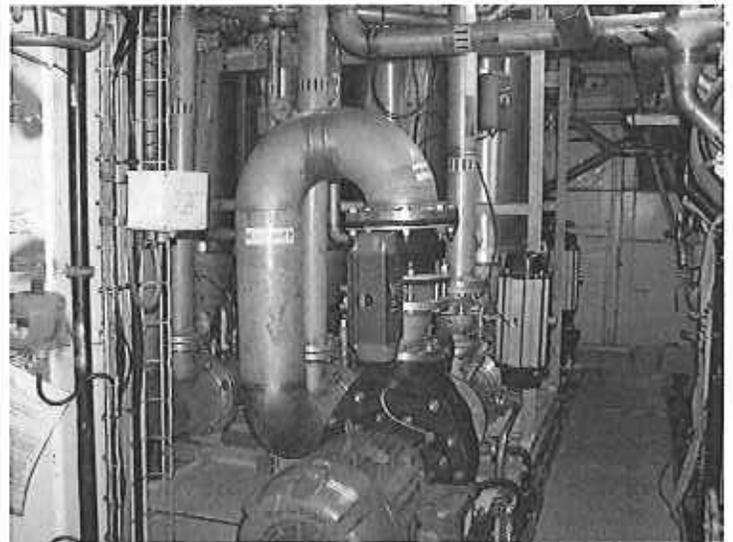


PHOTO #:20 AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090156
DESCRIPTION: AWTS MEMBRANES

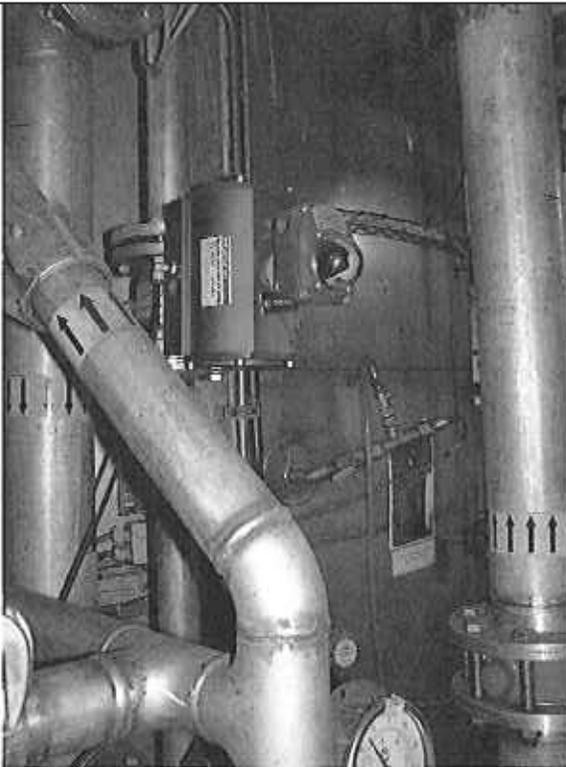


PHOTO #:21 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090158
DESCRIPTION: BACKWASH TANK FOR AWTS MEMBRANES



PHOTO #:22 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090161
DESCRIPTION: TUBULAR FILTERS FOR AWTS



PHOTO #:23 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090163
DESCRIPTION: ULTRAVIOLET LIGHT (UV) DISINFECTION SYSTEM
(CONTROL PANEL)



PHOTO #:24 AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090165
DESCRIPTION: 2ND FLOC METERING SYSTEM (DREWFLOC 2468)

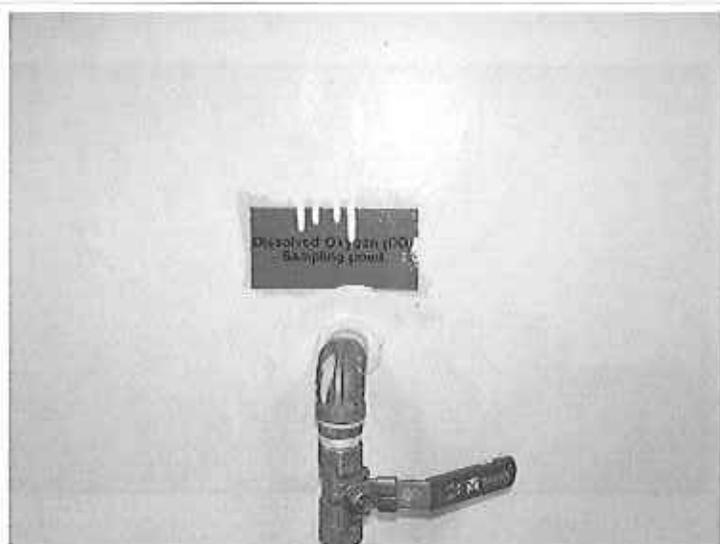


PHOTO #:25 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090166
DESCRIPTION: DISSOLVED OXYGEN SAMPLE POINT FOR AET

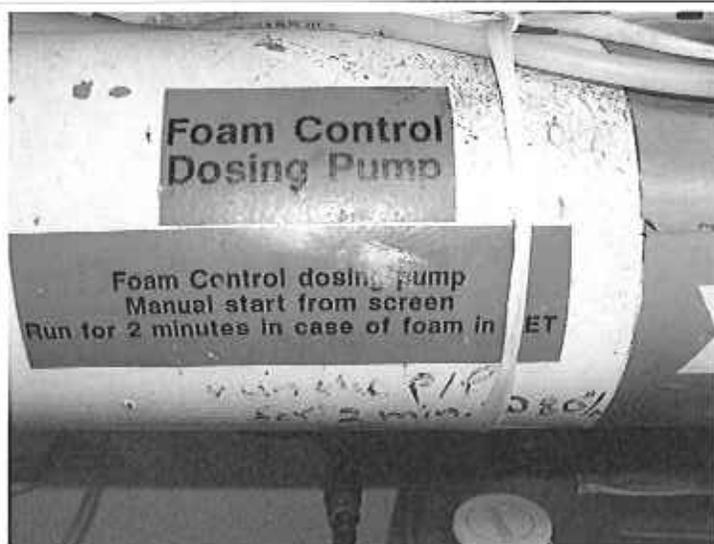


PHOTO #:26 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090168
DESCRIPTION: AET DEFOAMER

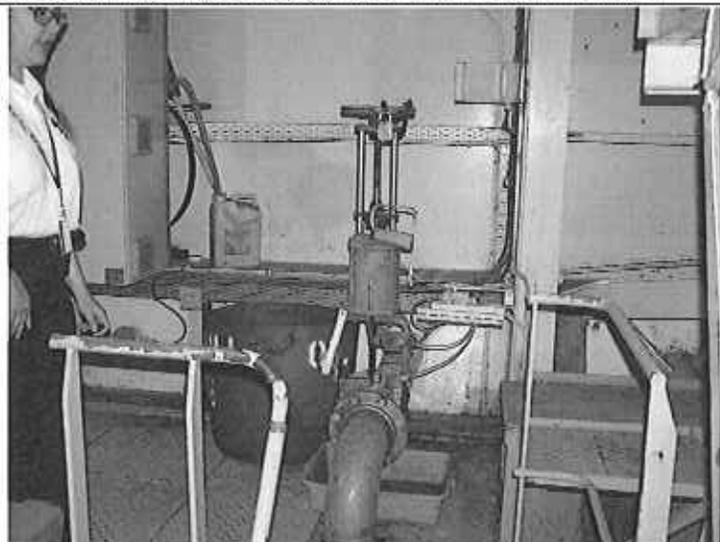


PHOTO #:27 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090171
DESCRIPTION: AWTS OVERBOARD DISCHARGE PORT

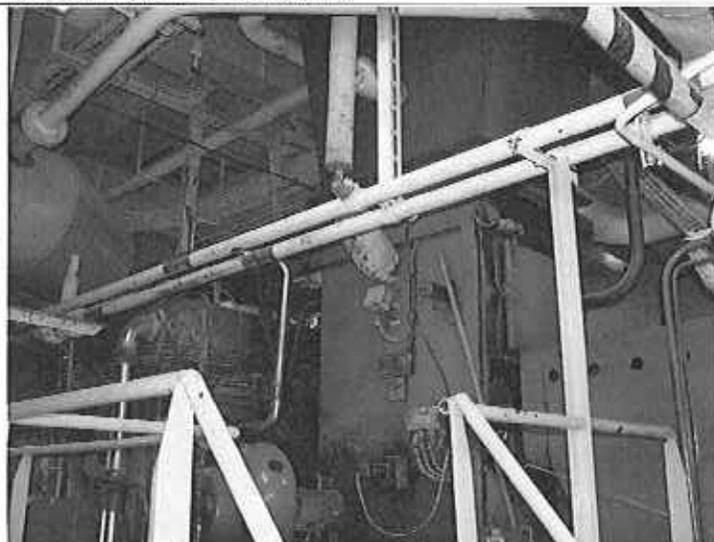


PHOTO #:28 AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090170
DESCRIPTION: INCINERATOR (LOWEST LEVEL) - BURNER



PHOTO #:29 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090176
DESCRIPTION: GARBAGE/RECYCLING AREA SORTING



PHOTO #:30 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090177
DESCRIPTION: INCINERATOR LOADING



PHOTO #:31 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090179
DESCRIPTION: GARBAGE/RECYCLING AREA CRUSHERS



PHOTO #:32 AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090182
DESCRIPTION: USED BATTERY SORTING



PHOTO #33 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090183
DESCRIPTION: CARDBOARD COMPACTED FOR RECYCLING



PHOTO #34 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090184
DESCRIPTION: ALUMINUM COMPACTOR



PHOTO #35 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090185
DESCRIPTION: COMPACTED ALUMINUM



PHOTO #36 AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090186
DESCRIPTION: USED COOKING OIL AND GREASE



PHOTO #:37 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090187
DESCRIPTION: COMPOST BINS

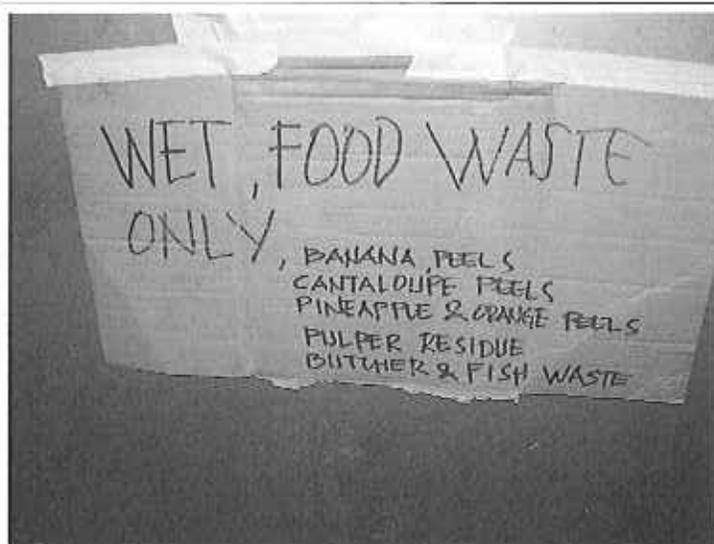


PHOTO #:38 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090188
DESCRIPTION: COMPOST AREA SIGNAGE

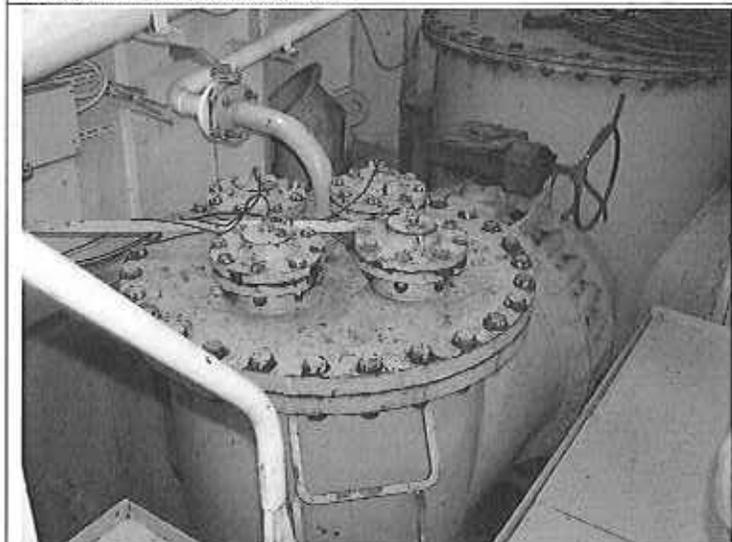


PHOTO #:39 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090189
DESCRIPTION: ANTIFOULING SEACHEST

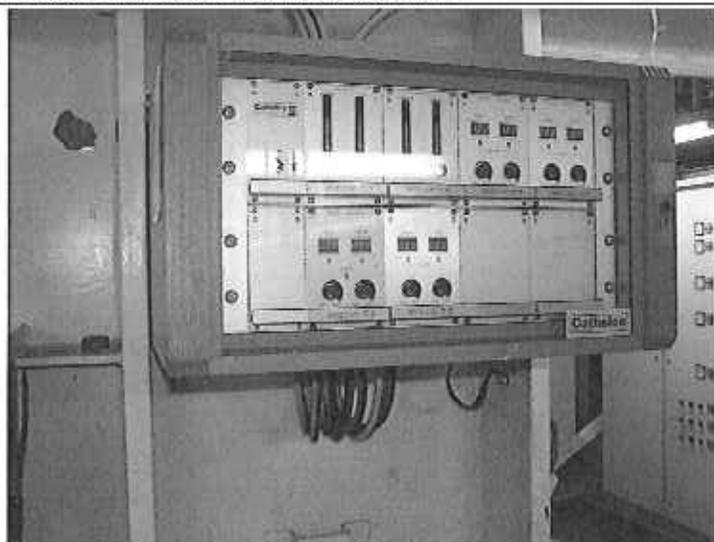


PHOTO #:40 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090192
DESCRIPTION: CATHELCO BIOFOULING CONTROLS



PHOTO #:41 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090193
DESCRIPTION: GREASE TRAP (BOX SHAPED CONTAINER BELOW LIGHT)



PHOTO #:42 DATE: AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090196
DESCRIPTION: MEDICAL CENTER BIOHAZARD STORAGE



PHOTO #:43 AUGUST 8, 2014
TAKEN BY: LAZARO ELEUTERIO FILE No.: P7090197
DESCRIPTION: GAS CYLINDER STORAGE

