



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 09/3/2011	Permit Number NA	County King	Receiving Waters Marine Waters	Ecology Inspector Amy Jankowiak
Entry Time 8:46 am Exit Time 10:32 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: NORWEGIAN STAR, Norwegian Cruise Line Pier 66 Seattle, Washington				Additional Participants/Inspectors:
On-Site Representative(s): <i>Name/Title/Phone/e-mail</i> Freddy Petterson, Environmental Health Officer env13@ncl.com				
Responsible Official(s): <i>Name/Title/Address/Phone/e-mail</i> Randall R. Fiebrandt, Director, Environmental Operations Norwegian Cruise Line 7665 Corporate Center Drive, Miami, FL 33126 rfiebrandt@ncl.com 305-436-4956				Other Facility Data: Notification made to Randy Fiebrandt on August 29, 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 ≥ 1 nm from Berth and ≥ 6 Knots Only [2.1.3(A)]

<input checked="" type="checkbox"/> Schematics Match Black/Gray Wastewater System	Schematics appeared to be consistent with the system on board.
<input checked="" type="checkbox"/> Operations as Described in Submitted Documentation	Operations were as described.
<input checked="" type="checkbox"/> Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	Has continuous TSS monitoring.
<input checked="" type="checkbox"/> Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	Appears to be functioning properly.
<input checked="" type="checkbox"/> Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	A value of 30 mg/l or greater triggers automatic shut down of that MBR.
<u>Turbidity or Equivalent:</u> Last Calibration: Done approximately weekly. Trigger Level for Early Alarm: 25 mg/l Trigger Level for Shutdown: 30 mg/l Recorded Turbidity/Equivalent Levels Above Triggers: No triggers this season	
<input checked="" type="checkbox"/> Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	Has disinfection effectiveness monitoring.
<input checked="" type="checkbox"/> Disinfection Effectiveness Monitoring Equipment Functioning Properly	Appears to be functioning properly.
<u>Disinfection Effectiveness Monitoring:</u> UV intensity is monitored for disinfection effectiveness as well as bulb failure.	
<input checked="" type="checkbox"/> Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	Low intensity will shut down the effluent.
<input checked="" type="checkbox"/> Disinfection System Operated and Maintained Properly	The UV system appeared to be operational and maintained well.
<u>Disinfection System:</u> The UV system consists of 3 separate UV units with 14 bulbs each. An automatic cleaner is used.	

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	
	<p>Turbidity or Equivalent:</p> <p>Last Calibration:</p> <p>Trigger Level for Early Alarm:</p> <p>Trigger Level for Shutdown:</p> <p>Recorded Turbidity/Equivalent Levels Above Triggers:</p>	
<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:	

Section D: General (Approved to Discharge)

<input checked="" type="checkbox"/>	No Discharges Within ½ Miles From Shellfish Beds/ Protocol (President's Point, Apple Tree Cove, Tyece Shoal, Middle Point (near Pt Townsend))	There is a clear protocol in place to stop discharges at certain times/locations while in the shellfish bed areas. During that time, the effluent is sent to holding tanks and recirculated through the system. This protocol keeps discharges completely out of the area of ½ mile from shellfish beds.
<input checked="" type="checkbox"/>	Discharges Immediately Stopped When High Turbidity Occurs	They do have their systems set up to automatically shut down the discharge if high TSS (equivalent to turbidity) occurs.
<input checked="" type="checkbox"/>	Discharges Immediately Stopped When Disinfection System Upset Occurs	They do have their systems set up to shut down the discharge if the UV intensity is low (recirculates).
<input checked="" type="checkbox"/>	Immediate Notifications Made to WA Department of Health for Disinfection System Upset	Notifications are made to the cruise line main office and then they would notify Ecology.
<input checked="" type="checkbox"/>	Sampling Conducted 2/month, 1/month in Seattle (BOD, TSS, Fecal Coliform, pH, Chlorine Residual)	Sampling is being conducted as required, as of the date of the inspection.
<input checked="" type="checkbox"/>	Whole Effluent Toxicity Testing 1 per 2 Years (homeported) or 1/40 Calls for Continuous	Wet testing is not required.

Section E: General

<input checked="" type="checkbox"/>	Wastewater Discharge Records Review	Discharge records were reviewed (blackwater/graywater/residual solids) and are maintained properly. Discharges appear to be in the areas approved for discharge (>1nm and ½ mile outside of shellfish areas). A closer look at the records will be done after the end of the cruise season.
<input checked="" type="checkbox"/>	Wastewater Discharges protocol per MOU and managed properly	The discharge protocol for blackwater and graywater includes a plan for the week by the Environmental Officer and then a request is made to the bridge where locations are verified and the EO approves the discharge. The EO has the port keys and the discharges are logged on paper and electronically. When coming into Seattle, discharges are stopped prior to the OCNMS, then opened once past, closed near shellfish beds, and closed well before 1 mile from Port. Blackwater

	and graywater is treated with a Scanship advanced wastewater treatment system.
<input checked="" type="checkbox"/> Residual Solids Managed Properly/Disposal Protocol per MOU	Screenings and grit from drum screen as well as biomass (sewage sludge) from the Scanship system is held and then discharged outside of MOU waters, >12 nautical miles from shore, and outside of the Olympic Coast National Marine Sanctuary.
<input checked="" type="checkbox"/> Hazardous Waste Managed Properly	All hazardous waste that is collected is being sent off-shore in Prince Rupert, Canada. Some logs were reviewed and showed consistency.
<input checked="" type="checkbox"/> WA Hazardous Waste Guidelines Followed (Appendix vii)	All hazardous waste that is collected is being sent off-shore in Prince Rupert, Canada. Some logs were reviewed and showed consistency.
<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. Glass is recycled and not discharged.
<input checked="" type="checkbox"/> Photo/X-Ray Waste Managed Properly (fluids, cartridges,...) and landed ashore	Waste from the photo processing and x-ray goes through a silver recovery system prior to offload with hazardous waste materials.
<input checked="" type="checkbox"/> Dry-Cleaning Wastes and Byproducts (fluids, sludge, filter materials...) Managed Properly (PERC – haz waste – landed ashore)	Dry cleaning uses PERC which is off-loaded with hazardous waste. However, the system will be changed out shortly for a non-PERC system. Laundry water is collected and sent through the Scanship system.
<input checked="" type="checkbox"/> Unused/Outdated Pharmaceuticals Managed Properly (safely disposed of)	Expired and unused medications are either offloaded back to the vendor or offloaded for disposal. Narcotics are incinerated with witness.
<input checked="" type="checkbox"/> Fluorescent and Mercury Vapor Lamp Bulbs Managed Properly (prevent release of mercury)	Fluorescent lamps go through a bulb crusher and offloaded. Mercury filters are offloaded as hazardous waste. Other types of bulbs are offloaded as hazardous waste.
<input checked="" type="checkbox"/> Waste Reduction/Reuse/Recycling Opportunities Maximized (glass, cardboard, aluminum & steel cans)	Glass, aluminum, tin, scrap metal, plastics, some paper and cardboard, and other materials are recycled. Reduction and reuse opportunities are broadly used to prevent the amount of waste. Recycling is offloaded in Seattle.
<input checked="" type="checkbox"/> Batteries Managed Properly (recycled, reclaimed, disposed of properly)	Batteries are collected, sorted and binned to be offloaded in Prince Rupert 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 and tested annually. Results have passed. Incinerators are not to be used in MOU waters, >12nm, per protocol. Records showed consistency.
<input checked="" type="checkbox"/> Oily Bilge Water Managed Properly (<15 ppm, no visible sheen and underway)	Oily bilge is treated and with a Marin Floc oily water separator system. Discharges occur at less than 15 ppm and outside of MOU waters. A white box is used to prevent discharges of more than 15 ppm. Oily sludge is drummed and offloaded for proper disposal.
<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)	Full ballast exchanges only occur at sea when transiting between the East Coast and the Alaskan route.
<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 fresh water. Deck runoff goes to the scuppers. Training is conducted with staff on managing materials on the deck and when sweeping, preventing materials from going overboard.
<input checked="" type="checkbox"/> How is maintenance performed on the outside of the vessel (paint chipping, painting, etc)	Paint chipping and painting is done per written protocol using appropriate BMPs such as tarping with magnets and containment and without higher winds. Approval from the Port is gained before conducting work. Activities are supervised by the Chief Officer and the EO.
<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. Grease traps are used and the grease goes to the 15P solids tank.
<input checked="" type="checkbox"/> How are food waste discharges handled (prevention of erroneous materials)?	Food waste is sorted prior to going into the pulpers. Solid food waste is discharged outside of MOU waters after pulping. Some materials are incinerated. Galley water and pulper water goes to the Scanship

	system. Used cooking oil goes to the sludge tank.
<input checked="" type="checkbox"/> Medical sinks/floor drains, chem. stor areas wastes go where (plugged, blackwater, bilge)?	Medical floor drains go to the blackwater tanks and then to the Scanship system. Biohazardous wastes are collected and incinerated. Sharps are off-loaded with hazardous waste.
<input checked="" type="checkbox"/> Where is pool and spa water discharged? Dechlorinated/debrominated and underway?	Pool water is discharged out at sea. Jacuzzi water is discharged daily usually at night time. Both pool and spa water is dechlorinated with sodium thiosulfate prior to discharge.
<input checked="" type="checkbox"/> What type of fuel is used and percent sulfur content?	MGO of approximately 0.00085% is used while in the Port of Seattle (incentive) and <2% is used otherwise.

Other:

Section F: Sampling Results

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

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 Norwegian Cruise Line (NCL) NORWEGIAN STAR on September 3, 2011. The main contact on board the NORWEGIAN STAR was Freddy Pettersen, Environmental and Sanitation Officer for the NORWEGIAN STAR. Prior notification of the visit was given on August 29, 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 NORWEGIAN STAR is approved to discharge at least one nautical mile away from port and traveling at a speed of at least six knots in MOU waters.

The NORWEGIAN STAR was built in 2001, is 965 feet long with 15 decks and about a 28-foot draft. The passenger capacity is about 2348 and the crew capacity is about 1100.

The NORWEGIAN STAR is scheduled for 18 port calls in Seattle and conducts one week cruises to Alaska turning around on Saturdays between May 21, 2011 and September 17, 2011.

Inspection

I arrived and boarded the ship (photos #01 and #02) at about 8:46 am and began with introductions and a plan for the day with Freddy Pettersen, Environmental and Sanitation Officer. We discussed various waste streams and discharge protocols. We then reviewed the various discharge and environmental records. We then toured the Scanship blackwater and graywater Advanced Wastewater Treatment System (AWTS) and the oily bilge treatment system. We then toured one of the galleys and food waste system. The inspection was then finalized with a debriefing and we disembarked the vessel at about 10:32 am.

Discharge Types and Protocols:

The discharge protocol for wastewater includes a plan for the week by the Environmental Officer (EO) and then a request is made to the bridge where locations are verified and the EO approves the discharge. The EO has the port keys and the discharges are logged on paper and electronically. When coming into Seattle, discharges are stopped prior to the OCNMS, then opened once past, closed near shellfish beds, and closed well before one nautical mile from Port. Blackwater and graywater is treated with a Scanship advanced wastewater treatment system.

Blackwater, which includes toilet water and infirmary drains and graywater which includes sink and shower and laundry water is treated with a Scanship AWTS and is discharged at greater than one nautical mile away from port and traveling at a speed of at least six knots in MOU waters and at least ½ mile from designated shellfish areas. There is a clear protocol in place to not discharge near shellfish areas. Navigation on the bridge has the shellfish areas marked. No discharges occur in the Olympic Coast National Marine Sanctuary (OCNMS). There is also a protocol in place if there is a disinfection system upset or high turbidity which includes automatic shut-down of the discharge, identifying and fixing the cause of the problem and contacting the NCL office (which in turn contacts Ecology if required).

Discharge records were reviewed (blackwater, graywater and residual solids) and are maintained properly. Discharges appear to be in the areas approved for discharge (>1nm and ½ mile outside of shellfish areas) and outside of the OCNMS. A closer look at the records will be done after the end of the cruise season.

Screenings and grit from drum screen as well as biomass (sewage sludge) from the Scanship system is held and then discharged outside of MOU waters, >12 nautical miles from shore, and outside of the Olympic Coast National Marine Sanctuary.

Medical floor drains go to the blackwater tanks and then to the Scanship system. Biohazardous wastes are collected and incinerated. Sharps are off-loaded with hazardous waste.

All hazardous waste that is collected is being sent off-shore in Prince Rupert, Canada. Some logs were reviewed and showed consistency. Hazardous waste materials include aerosols, paints, thinners, sharps, lithium batteries, photo waste, oil filters, bulbs and other materials.

Waste from the photo processing and x-ray goes through a silver recovery system prior to offload with hazardous waste materials.

Dry cleaning uses PERC which is off-loaded with hazardous waste. However, the system will be changed out shortly for a non-PERC system. Laundry water is collected and sent through the Scanship system.

Expired and unused medications are either offloaded back to the vendor or offloaded for disposal. Narcotics are incinerated with witness.

Fluorescent lamps go through a bulb crusher and offloaded. Mercury filters are offloaded as hazardous waste. Other types of bulbs are offloaded as hazardous waste.

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. Glass is recycled and not discharged.

Glass, aluminum, tin, scrap metal, plastics, some paper and cardboard, and other materials are recycled. Reduction and reuse opportunities are broadly used to prevent the amount of waste. Recycling is sometimes offloaded in Seattle.

Batteries are collected, sorted and binned to be offloaded in Prince Rupert for recycling or disposal as appropriate.

Incinerator ash is offloaded and tested annually. Results have passed. Incinerators are not to be used in MOU waters, >12nm, per protocol. The incinerators are not turned on until about 11pm on this route, when out of MOU waters. Records showed consistency.

Oily bilge is treated and with a Marin Floc oily water separator system (photos #18 and #19). Discharges (photo #21) occur at less than 15 ppm and outside of MOU waters. A white box (photo #20) is used to prevent discharges of more than 15 ppm. Oily sludge is drummed and offloaded for proper disposal. Oily rags are incinerated.

Full ballast exchanges only occur at sea when transiting between the East Coast and the Alaskan route.

Food waste is sorted (photos #22 and #23) prior to going into the pulpers (photo #25). Solid food waste is discharged outside of MOU waters after pulping (photo #24). Some materials are incinerated. Galley water and pulper water goes to the Scanship system. Used cooking oil goes to the sludge tank.

Phosphate free, non-toxic cleaners are used in the galleys. Grease traps are used and the grease goes to the 15P solids tank.

Hull cleaning is done with fresh water. Deck runoff goes to the scuppers. Training is conducted with staff on managing materials on the deck and when sweeping, preventing materials from going overboard.

Paint chipping and painting is done per written protocol using appropriate BMPs such as tarping with magnets and containment and without higher winds. Approval from the Port is gained before conducting work. Activities are supervised by the Chief Officer and the EO.

Pool water is discharged out at sea. Jacuzzi water is discharged daily usually at night time. Both pool and spa water is dechlorinated with sodium thiosulfate prior to discharge.

MGO of approximately 0.00085% is used while in the Port of Seattle (incentive) and <2% is used otherwise.

Scanship System:

Blackwater, which includes toilet waste and infirmiry drains goes to one of 4 collection tanks (photo #12) and graywater which includes sink and shower and laundry water, combines in tanks before combining and entering the drum screens. There are two drum screens (photos #03 and #04) which provide pre-screening. The drum screens are cleaned weekly with water (photo #05). Solids from the drum screens go to the sludge tank. Liquid flow from the drum screens then enters the biostep tanks (photos #06 and #-7) for biological treatment (biofilm on rotating plastic pieces – 2 tanks in series, air added). After biostep, flocculants and polymers (photos #09 and #11) are added. Clarification then occurs via flotation tanks. The flotation tanks (photo #08) are cleaned by manual spray about once a week. Solids from the flotation tanks (photo #10) are sent to the sludge tank along with the screenings to be held for later discharge. Liquid flow then moves to the polishing filters (photo #13) for ultrafiltration (2 rotating mesh drums), and then to ultraviolet disinfection. Flow then moves to ultraviolet light (UV) disinfection (photos #14 and #15). There are three UV units, of which two are typically used with 14 bulbs each. The bulbs are alarmed for bulb failure and intensity at 10 watts. The UV sleeves are cleaned by dosing Metal Bright cleaner automatically. Flow from the UV units is either discharged directly overboard via the discharge port (photo #16) or is held for discharge later outside of MOU waters.

The cruise line uses a system called AMOS for work orders and maintenance. Manufacturer recommendations for maintenance of each piece of equipment is included in 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. Total suspended solids (TSS) (equivalent to turbidity) (photo #17) is monitored continuously at UV disinfection. If TSS exceed 25 mg/l, the system alarms and staff responds to investigate. At 30 mg/l, the system alarms and switches automatically to hold that discharge. PH is also monitored for adjustments.

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:

- Freddy Pettersen, Environmental and Sanitation Officer, NORWEGIAN STAR
- Randy Fiebrandt, NCL
- Mark Toy, Department of Health
- Greg Wirtz, NWCCA
- Mark Henley, Ecology
- Kevin Fitzpatrick, Ecology
- Amy Jankowiak, Ecology

Central Files: Norwegian Cruise Line - NORWEGIAN STAR; WQ 6.1

Section H: Signatures

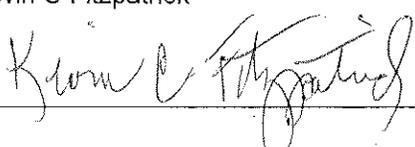
Name and Signature of Inspector:	Agency/Office/Telephone:	Date
Amy Jankowiak 	Department of Ecology Northwest Regional Office Municipal Compliance Specialist 425-649-7195	10/24/11
Kevin C Fitzpatrick 	Department of Ecology Northwest Regional Office Water Quality Section Manager 425-649-7033	10/25/11



PHOTO #:01 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030014
DESCRIPTION: NORWEGIAN STAR VESSEL

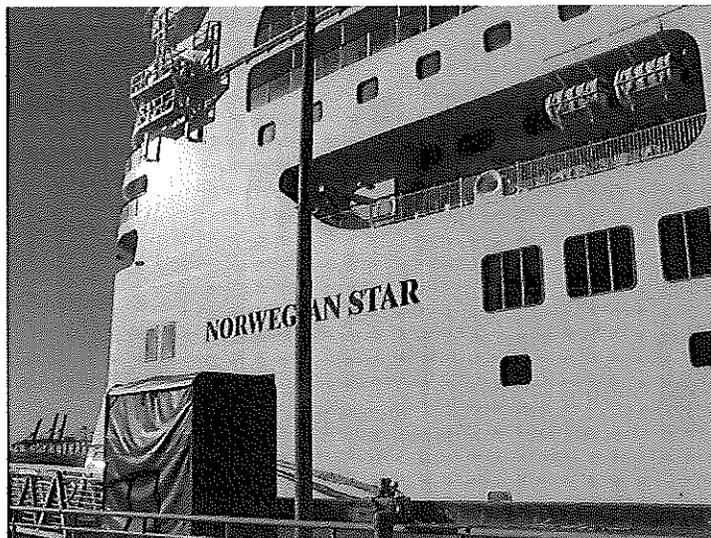


PHOTO #:02 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030015
DESCRIPTION: NORWEGIAN STAR VESSEL

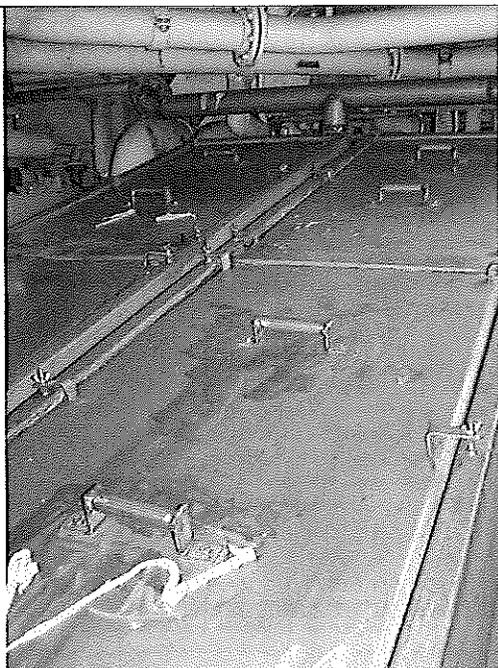


PHOTO #:03 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030017
DESCRIPTION: SCANSHIP DRUM SCREENS

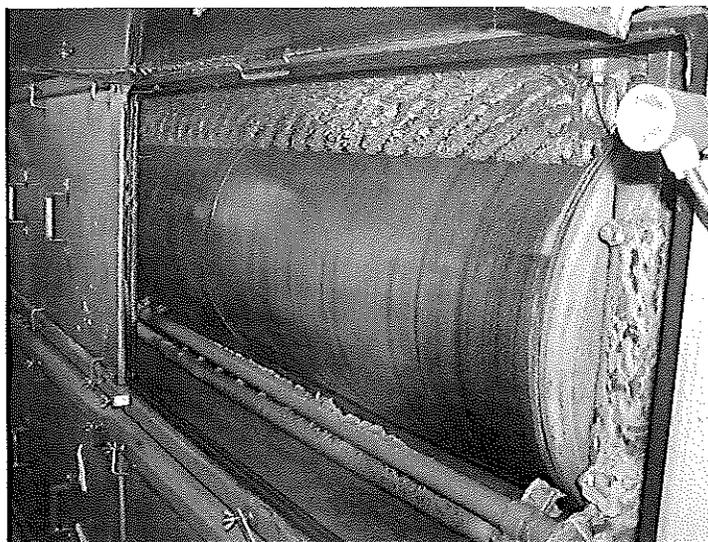


PHOTO #:04 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030018
DESCRIPTION: INSIDE OF SCANSHIP DRUM SCREEN

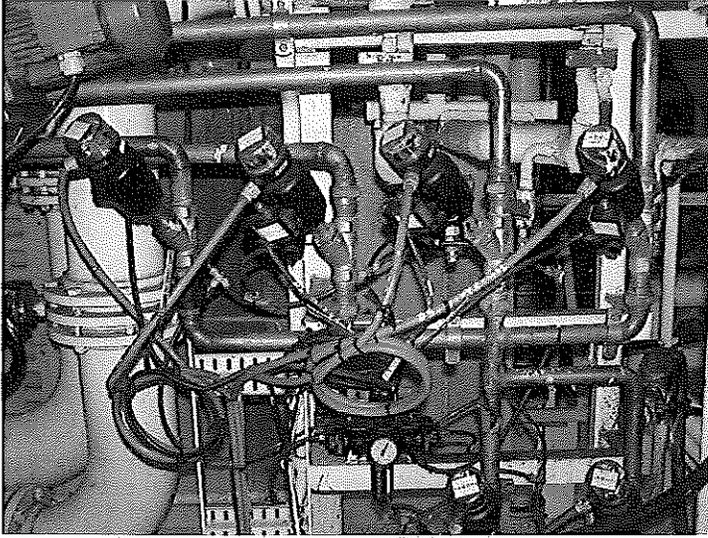


PHOTO #05 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030020
DESCRIPTION: SCANSHIP DRUM SCREEN WASHING SYSTEM

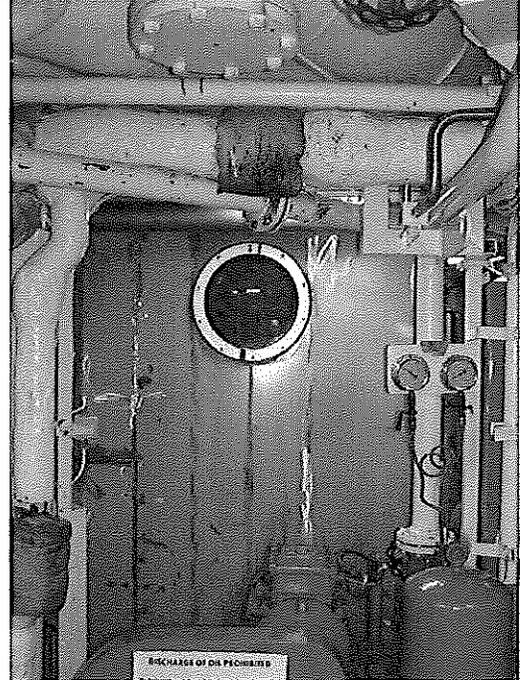


PHOTO #06 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030021
DESCRIPTION: SCANSHIP BIOSTEP (1 OF 2)

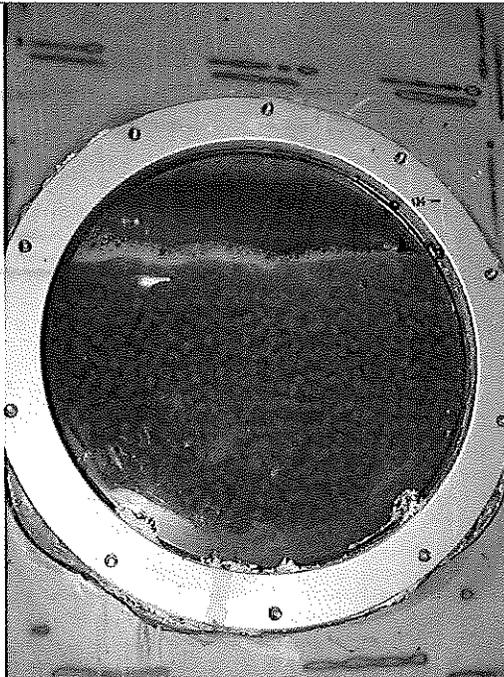


PHOTO #07 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030022
DESCRIPTION: SCANSHIP BIOSTEP (2 OF 2)

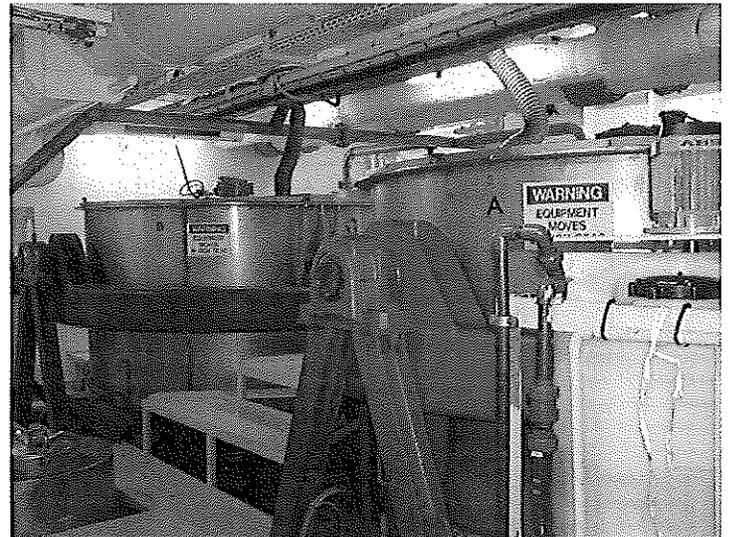


PHOTO #08 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030023
DESCRIPTION: SCANSHIP FLOTATION TANKS

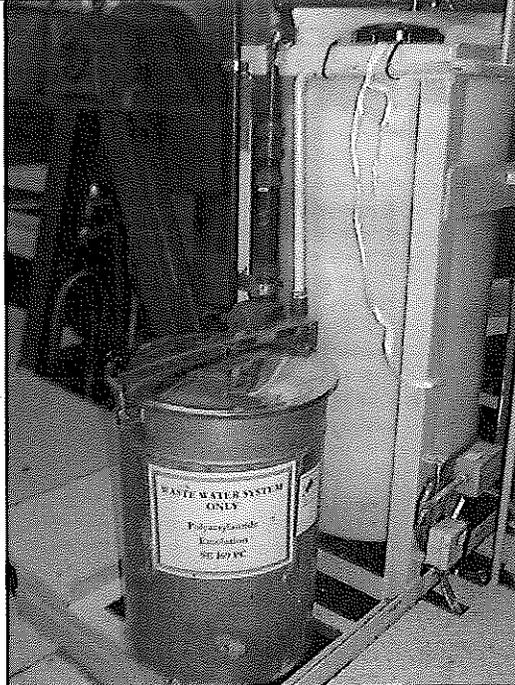


PHOTO #:09 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030024
DESCRIPTION: SCANSHIP POLYMER ADDITION SYSTEM

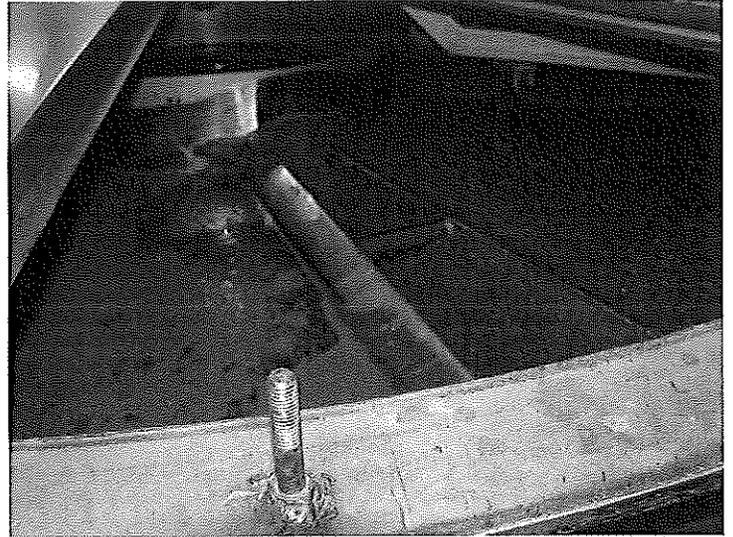


PHOTO #:10 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030025
DESCRIPTION: INSIDE OF SCANSHIP FLOTATION TANK

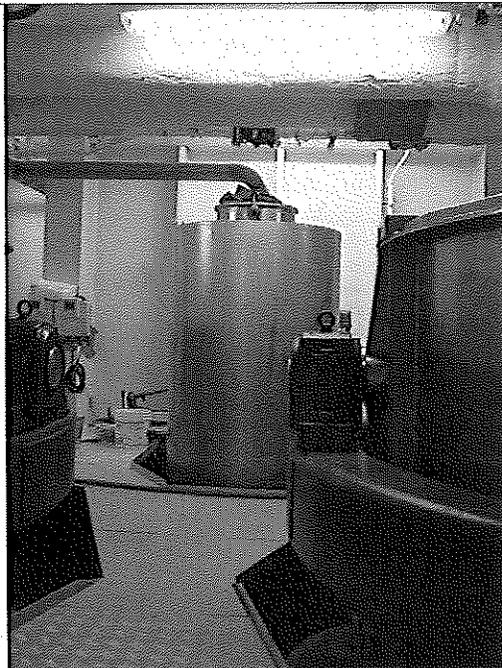


PHOTO #:11 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030027
DESCRIPTION: SCANSHIP FLOCCULATION ADDITION SYSTEM

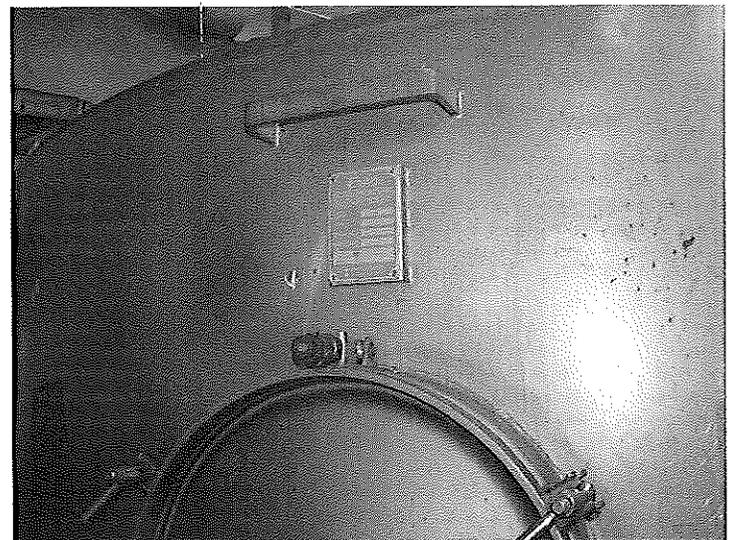


PHOTO #:12 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030028
DESCRIPTION: BLACKWATER VACUUM COLLECTION TANK

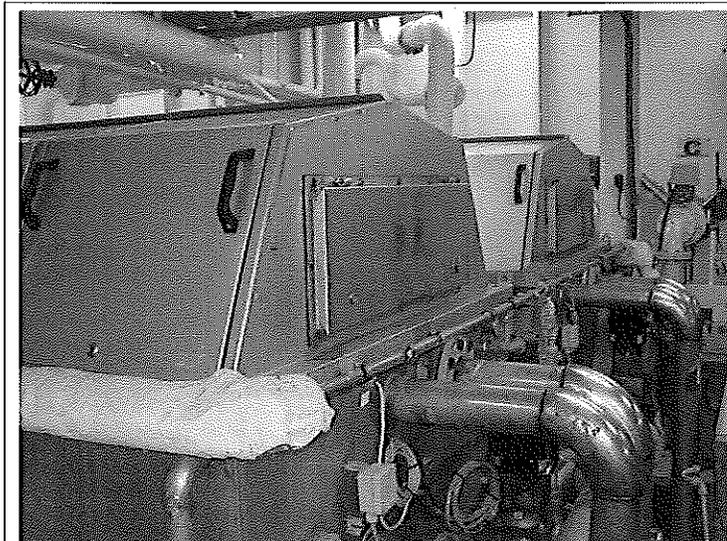


PHOTO #:13 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030029
DESCRIPTION: SCANSHIP POLISHING FILTER

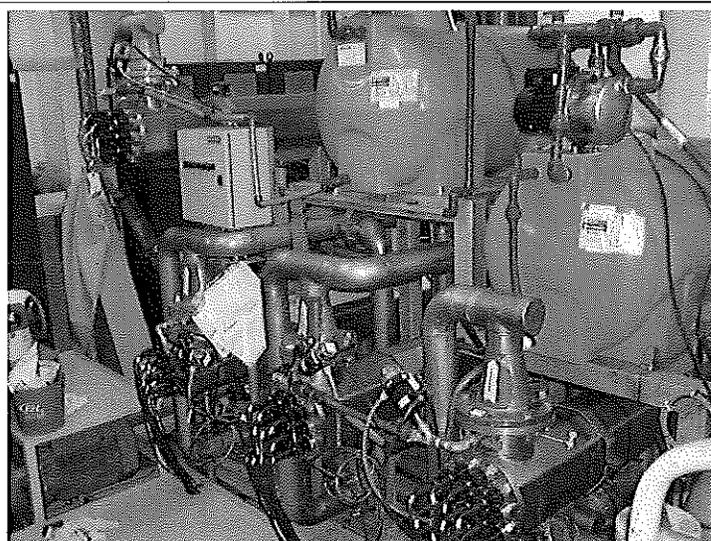


PHOTO #:14 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030030
DESCRIPTION: SCANSHIP ULTRAVIOLET LIGHT DISINFECTION SYSTEM (3 UNITS)

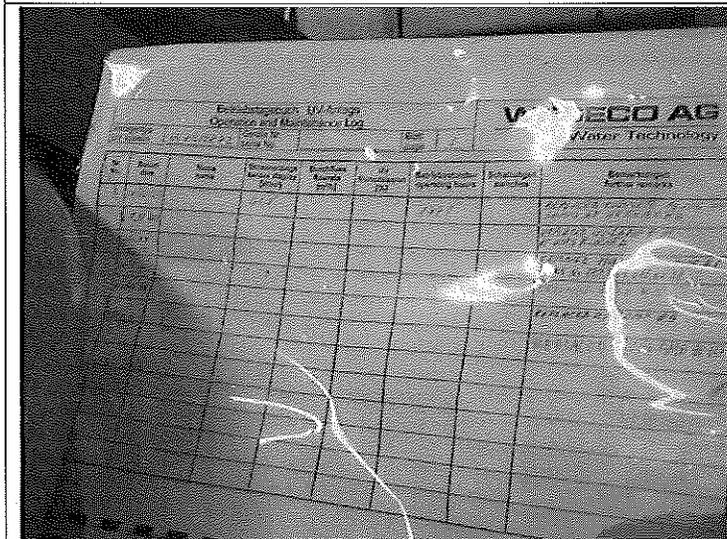


PHOTO #:15 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030031
DESCRIPTION: SCANSHIP UV LIGHT MAINTENANCE LOG

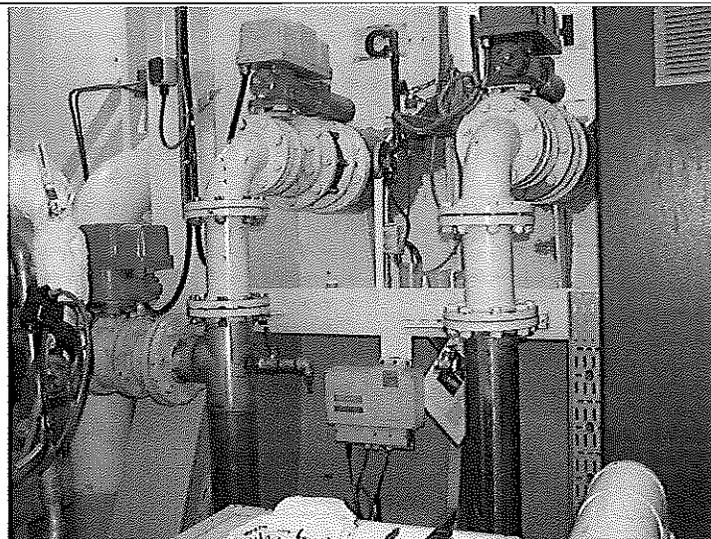


PHOTO #:16 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030032
DESCRIPTION: SCANSHIP EFFLUENT SAMPLING POINT AND DISCHARGE PORT

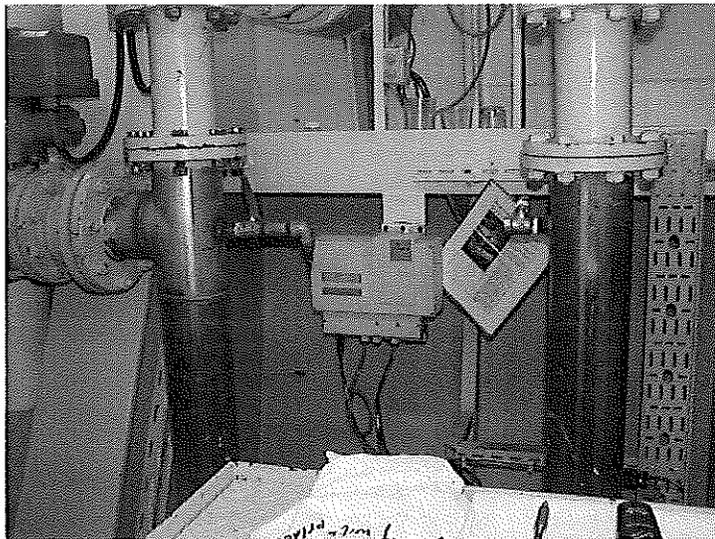


PHOTO #:17 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030033
DESCRIPTION: SCANSHIP TSS METER

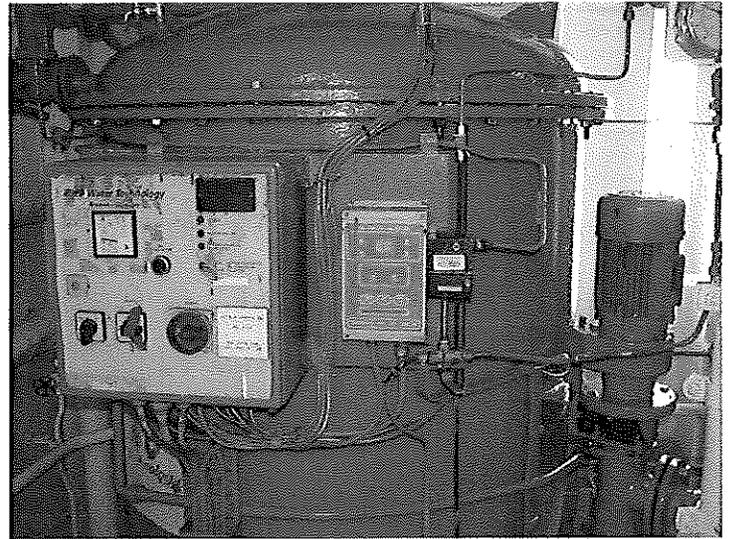


PHOTO #:18 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030034
DESCRIPTION: MARIN FLOC OILY BILGE OILY WATER SEPARATOR

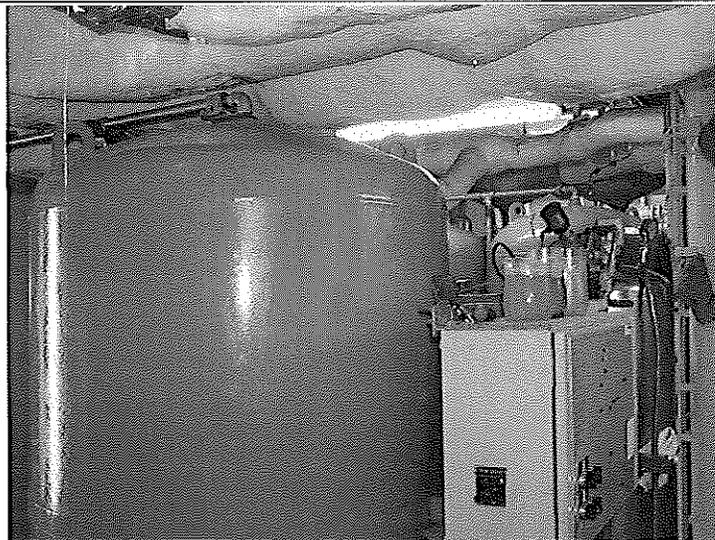


PHOTO #:19 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030035
DESCRIPTION: MARIN FLOC OILY BILGE OILY WATER SEPARATOR

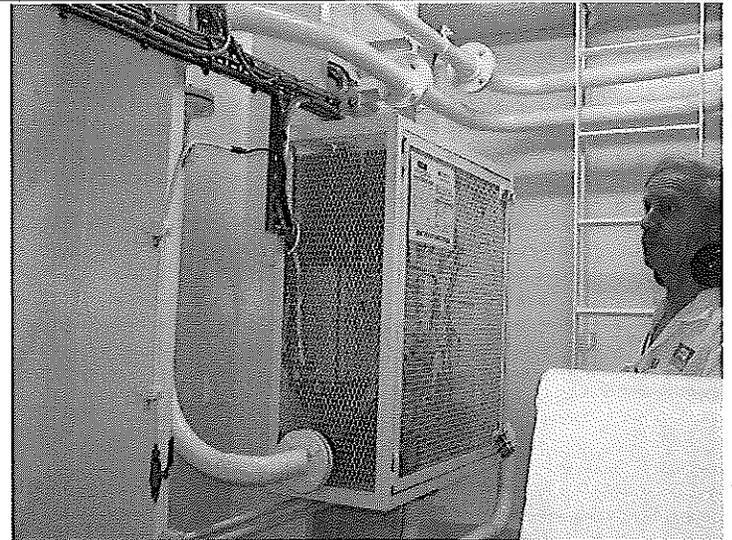


PHOTO #:20 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030036
DESCRIPTION: OILY BILGE WHITE BOX

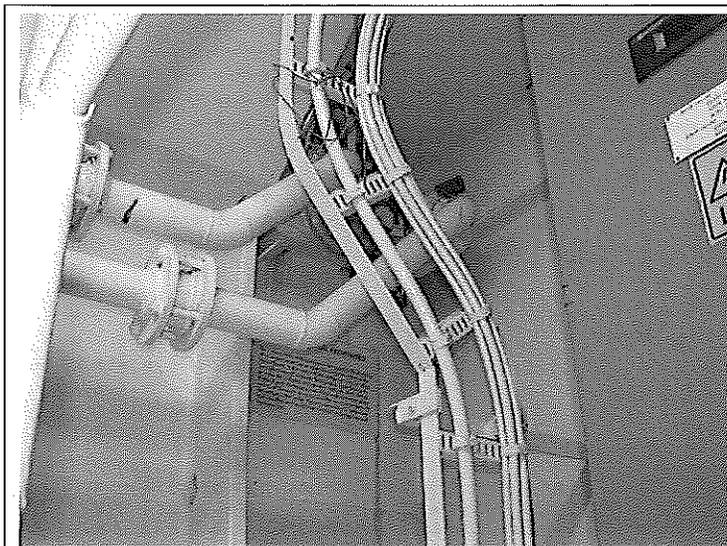


PHOTO #:21 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030037
DESCRIPTION: OILY BILGE DISCHARGE PORT

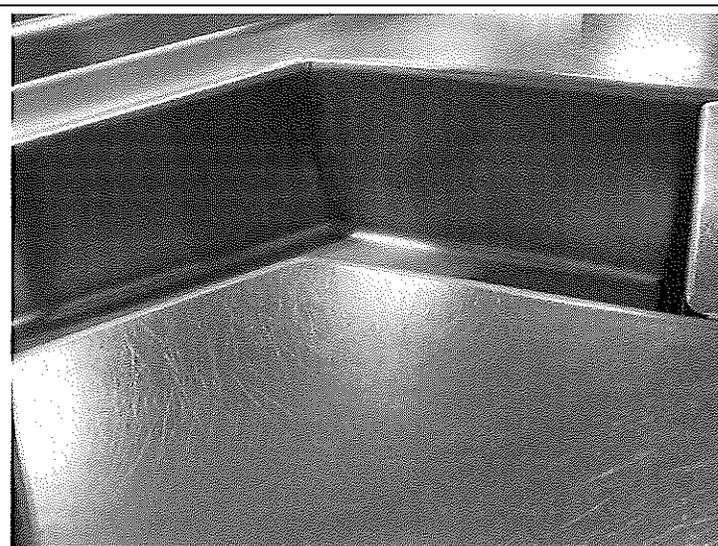


PHOTO #:22 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030038
DESCRIPTION: GALLEY FOOD TO PULPER

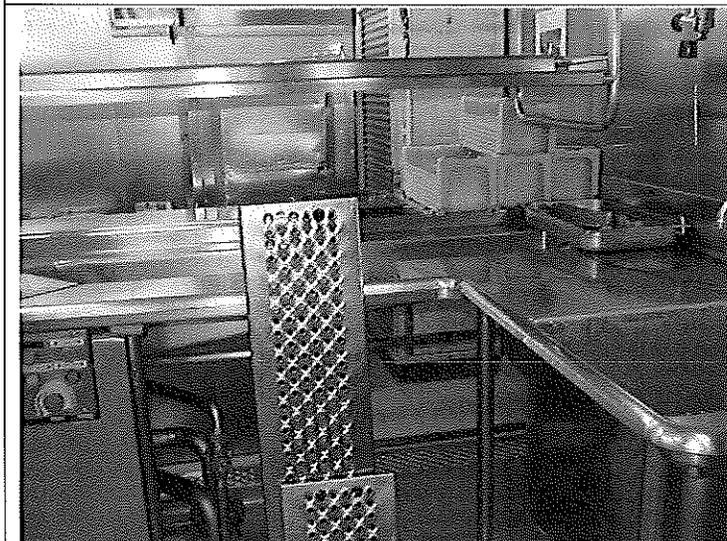


PHOTO #:23 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030039
DESCRIPTION: GALLEY FOOD TO PULPER

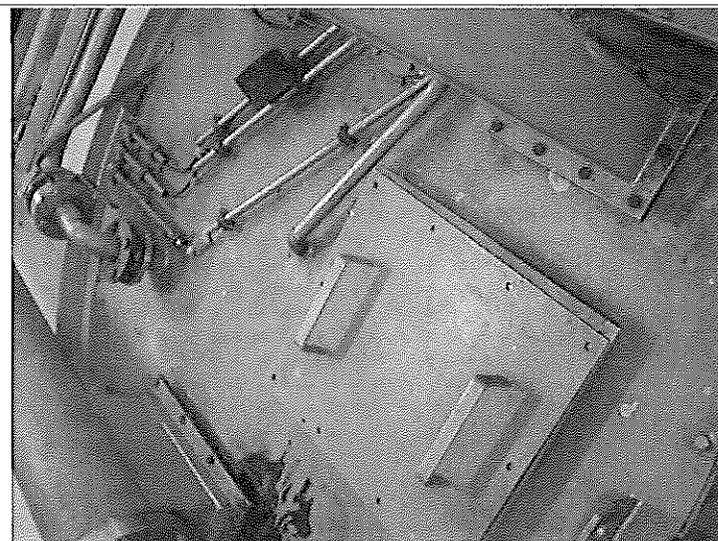


PHOTO #:24 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE No.:P9030040
DESCRIPTION: FOOD WASTE TANK (1 OF 2)



PHOTO #:25 DATE: SEPTEMBER 3, 2011
TAKEN BY: AMY JANKOWIAK FILE NO.:P9030041
DESCRIPTION: FOOD WASTE PULPER

