



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 September 9, 2021	Permit Number NA	County King	Receiving Waters Marine Waters	Ecology Inspector Evan Dobrowski & Amy Jankowiak
Entry Time: 09:15	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
Exit Time: 11:25				

Name and Location of Site Inspected: Silver Muse, SilverSea Cruises Pier 66 Seattle, Washington	Additional Participants/Inspectors: Igor Simovic, Staff Captain
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On-Site Representative(s): Name/Title/Phone/e-mail
 Anton Aneshtiev, Environmental Officer

Responsible Official(s): Name/Title/Address/Phone/e-mail Mark Conroy, Managing Director, The Americas Silversea Cruises Wells Fargo Center 333 SE 2 nd Avenue, Suite 2600 Miami, FL 33131 954-468-3036; mconroy@silversea.com	Other Facility Data: Notification made to Mark Conroy on August 30, 2021 Flag – Bahamas IMO #9784350
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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: NOT APPLICABLE Trigger Level for Early Alarm: NOT APPLICABLE Trigger Level for Shutdown: NOT APPLICABLE 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:		

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

<input checked="" type="checkbox"/> Dry-Cleaning Wastes and Byproducts (fluids, sludge, filter materials...) Managed Properly (PERC – haz waste – landed ashore)	Dry cleaning protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Unused/Outdated Pharmaceuticals Managed Properly (safely disposed of)	Unused or outdated pharmaceuticals management protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Fluorescent and Mercury Vapor Lamp Bulbs Managed Properly (prevent release of mercury)	Fluorescent and mercury vapor lamp bulbs protocols for management are consistent with 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 management protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Incinerator Ash Managed Properly and minimized volume (haz waste segregation and annual testing)	Incinerator ash management is consistent with MOU requirements.
<input checked="" type="checkbox"/> Oily Bilge Water Managed Properly (<15 ppm, no visible sheen and underway)	Oily bilge water protocols are consistent with 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)	The vessel employs ballast water exchange outside 200 nm and treatment.
<input checked="" type="checkbox"/> OCNMS rules and regs followed	The discharge protocols are consistent with MOU requirements and are not to occur in OCNMS waters.

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 protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> How is maintenance performed on the outside of the vessel (paint chipping, painting, etc)	Outside vessel maintenance protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Sculleries and Galleys – type of detergents and degreasers used (phosphate free and non-toxic)?	Restaurants and galleys use detergents and degreasers that are non-toxic and phosphate free.
<input checked="" type="checkbox"/> How are food waste discharges handled (prevention of erroneous materials)?	Food waste discharge protocols are consistent with MOU requirements and records reviewed show no discharges in MOU related waters.
<input checked="" type="checkbox"/> Medical sinks/floor drains, chem. stor areas wastes go where (plugged, blackwater, bilge)?	Medical sinks/floor drains are reported as connected to Blackwater.
<input checked="" type="checkbox"/> Where is pool and spa water discharged? Dechlorinated/debrominated and underway?	Pool and spa water protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> What type of fuel is used and percent sulfur content?	<0.1% sulfur fuel content used when in MOU waters or EGCS treated equivalent 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

Evan Dobrowski, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program (NWRO-WQ) conducted the inspection of the Silversea Cruise Line's SILVER MUSE on September 9, 2021. Amy Jankowiak, Ecology NWRO-WQ, assisted in conducting the inspection. The main contact on board the SILVER MUSE was Anton Aneshtiev, Environmental Officer (EO) for the vessel. Prior notification of the visit was given on August 30, 2021 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 SILVER MUSE is not approved to discharge wastewater in MOU waters.

The SILVER MUSE launched in 2017, and is 698 feet long with about a 21-foot draft. The passenger capacity is approximately 600 with a crew capacity of about 400. The vessel has four diesel engines for propulsion. The SILVER MUSE is scheduled for 6 port calls in Seattle for biweekly, 11 day cruises to Alaska between July 30, 2021 and September 19, 2021.

Inspection

We arrived at the cruise terminal at Pier 66 and began by following COVID protocols. After receiving instructions, we boarded the ship at 9:15 a.m. and began with introductions and a plan for the day with Anton Aneshtiev (Environmental Officer) and Igor Simovic (Staff Officer). We started our inspection by visiting the Engine Control Room (ECR) and discussed various waste streams and discharge protocols and locations of discharges with Anton Aneshtiev along with additional engineering staff. We viewed records and discussed systems and protocols. This vessel is not equipped with an Exhaust Gas Cleaning System (EGCS). Systems discussed included bilge treatment, and the Scanship advanced wastewater treatment system (AWTS) for blackwater and graywater treatment. We then toured the food waste, laundry, garbage room material sorting, and hazardous waste areas. The inspection was then finalized with a brief debriefing and we disembarked the vessel at 11:25 a.m.

Discharge Types and Protocols in MOU waters, Washington State waters or the Olympic Coast National Marine Sanctuary (OCNMS) (MOU related waters):

The discharge protocols are established at the start of the Seattle-Alaska season with voyage planning, meetings and trainings. A Discharge plan is created for each stretch of the **voyage (example: Ketchikan to Seattle August 26, 2021- August 28, 2021, as attached)** The pre-set discharge procedures are to not discharge in MOU related waters. In addition, there are regular departure meetings to go over the near-term plan, including Bridge staff and the EO. The vessel travels into and out of the Strait of Juan de Fuca to and from Alaska this season (photo #02), all discharge valves to water are shut off 12 miles outside the OCNMS. The vessel does not use the Canadian exemptions and holds all water discharges throughout the voyage into and out of Seattle to the sea. Discharges are allowed again after exiting the Strait and more than 12 miles out to sea.

When in an area of allowed discharge, the protocol starts with the Bridge staff notifying the ECR staff that they are in an area of allowed discharge. A 30 minute notice by email is provided to ECR staff when coming within 12 miles for discharges to stop. All discharges are recorded both on paper logbooks.

For black water and gray water, the latitude and longitude coordinates are recorded in the *Sewage and Graywater Discharge Record Book* (Sewage/Graywater Log), and was reviewed for recent discharges. The date, time and location of both the start and the stop of the discharges are recorded, along with the volume, discharge type, flow rate, and speed. The recent Sewage/Graywater Logs were reviewed and all discharges appeared to be outside of the MOU related waters.

Discharge Types

Blackwater and Graywater Scanship system (photo #04):

Black water moves by vacuum to the bio waste silo. From the silo, it goes to the drum screens which provide pre-screening. Blackwater liquid goes to the drum screens then enters the biosteps (bioreactor) (photo #14). Graywater is collected in mixing tanks and then mixes with blackwater at the biosteps. Solids from the pre-screen sent to the bioresidue tank. Gray water consists of sink, shower, galley water and laundry water. Anti-foamer is added to at the biological stage (photo #05). Biological treatment (biofilm on rotating plastic pieces with air added) occurs in the Biostep bioreactor.

After the biostep, polymers and coagulants are added. Liquid then moves to the Dissolved Air Flotation (DAF) tanks (photo #06) for clarification. An air and water mixture is added to the bottom of the flotation tanks to keep turbulence at the bottom and to allow the solids to rise to the top, along with the help of the chemical addition. Skimmers on the top skim the solids into a sludge pocket which is then pumped to the bioresidue tank which is discharged outside of MOU

related waters and more than 12 miles. Liquid flow then moves to the polishing filters (photos #15 and #16) for ultrafiltration.

Flow then moves to ultraviolet (UV) light disinfection (photo #11). There are two large UV units, which work in sequence. The UV system is alarmed for bulb failure and intensity. Flow from the UV units either is discharged directly overboard via the discharge port (if in an area of allowed discharge)(photo #09) or is re-circulated to the mixing tanks.

Total suspended solids (TSS) (equivalent to turbidity) is monitored continuously at UV disinfection (photo #08). At the time of the inspection, the TSS was 10.6 mg/l. If TSS exceeds 30 mg/l, the system automatically stops discharging and holds. PH is also monitored for adjustments. There are several monitors throughout the system that are used to access controls as well as in the ECR. The vessel conducts its own laboratory monitoring for process control, splits samples with a land-based lab for comparability. The vessel is approved to discharge continuously in Alaska, which has additional monitoring requirements.

Bilge:

Oily bilge water is collected to the dirty bilge-settling tank and is treated with an oily water separator system (OWS) (photo #07 and #17). The oily bilge is treated to less than 15 parts per million (ppm) oil content. Prior to discharge, the clean bilge is sent through "white box" (photo #10) which can't be bypassed and doesn't allow discharges of greater than 15 ppm. The treated oily bilge water is then discharged outside of MOU related waters at a maximum of 15 ppm, and outside of MOU related waters. The Chief Engineer has the one key to the white box, and discharges of clean bilge and offloads of oily sludge are recorded in the Oil record Book. No bypasses or re-routing around the OWS or white box has been known to occur. While in MOU waters Oily Bilge water is not treated and instead collected and hauled to shore collection via MarVac and Stericycle.

Ballast and Pools:

Ballast water is treated on board as necessary with a filter and UV treatment system with exchanges done at greater than 200 nautical miles.. There one main pool and 3 Jacuzzis. They are all fresh water and all discharges are done outside 12 miles after pH balancing (outside MOU related waters).

Food Waste:

Food waste is sorted at the source (photo #26) in galleys with a screen prior to the pulper (photo #25). Food is pulped to less than 25 nm and is sent vacuum (photo #23) to the food tank (photo #25) and discharged outside of MOU related waters. Galleys use Ecolab phosphate free and non-toxic detergents and degreasers. Food waste discharges are logged in the Garbage Record Book.

Outside Vessel:

Deck wash is done with NPDES VGP allowed materials (non-toxic, phosphate free, biodegradable cleaners) and processes and in international waters. Outside vessel maintenance such as paint chipping and painting would only be done at port with Port of Seattle permission following best management practices. Outside vessel maintenance has not been occurring at the Port of Seattle by this vessel this season.

Laundry:

Dry cleaning is not done on board. Laundry (photo #12 and #28) water is sent to the Scanship treatment system and discharged outside of MOU related waters.

Medication:

Unused or outdated medications are sent back to manufacturer/pharmacy or offloaded as medical waste. Red bag waste in the medical facility is incinerated or offloaded as hazardous waste. Sharps are sent to the hazardous waste locker for off-loading as bio-hazardous waste. Drains from the medical facility go to the blackwater tanks.

Solid and Hazardous Waste:

No photo waste is created onboard. X-rays are done digitally without any waste. Fluorescent bulbs are boxes and offloaded, not crushed on board. Hazardous waste materials are stored separately (photo #18) and offloaded. Solid waste (garbage, recyclables (photo #20), etc) is collected, sorted (photo #19), and either reused, recycled, incinerated (photo #22) or off-loaded to shore as appropriate. Waste minimization efforts are done by tracking, material usage

analysis, and minimizing materials such as single-use plastics. Solid and hazardous waste is offloaded in Seattle during this route this season using Stericycle and Waste Management. Hazardous waste offload records were reviewed. The incinerator is used primarily for cardboard that can't be recycled and some soft plastics. Incinerator ash (photo #27) is offloaded after testing as non-hazardous waste.

EGCS:

ECA fuel-sulfur compliance is achieved through the use of 0.1% sulfur content fuel (MGO) when in MOU waters, The SILVER MUSE does not have an Exhaust Gas Cleaning System. The vessel is also equipped for shore power, though shore power is not available at Pier 66 in Seattle. The vessel was bunkering fuel (photo #03) during the inspection.

Conclusions and Recommendations

The protocols for discharges are clear. Records were orderly and appeared consistent with the MOU. The treatment systems appear to be operating well.

Attachments:

- Photographs
- Passage Plan

Copies to:

- Anton Aneshtiev, EO, Silver Muse
- Mark Toy, Health
- Donna Spalding, CLIA-NWC
- Alex Adams, Port of Seattle
- Amy Jankowiak, Ecology
- Evan Dobrowski, Ecology
- Central Files: SilverSea Cruise Line – SILVER MUSE; WQ 6.1

Section H: Signatures

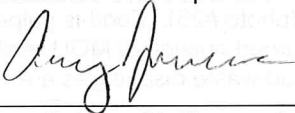

Name and Signature of Inspector:	Agency/Office/Telephone:	Date
Amy Jankowiak, Compliance & Technical Assistance Unit Supervisor 	Department of Ecology Northwest Regional Office Water Quality Program 206-594-0165	10/4/21
Evan Dobrowski, Stormwater & Maritime Compliance Specialist 	Department of Ecology Northwest Regional Office Water Quality Program 206-594-0175	10/4/21

PHOTO ADDENDUM – SILVER MUSE
SILVERSEA CRUISE LINE
SEPTEMBER, 9, 2021



Photo # 1 Image: IMG_0281
Date: 9/9/2021
Taken by: Evan Dobrowski
Description: Vessel SILVER MUSE (From South of Pier 66)



Photo # 2 Image: IMG_0099
Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Bridge – Navigation map



Photo # 3 Image: IMG_0100
Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Bridge – View of bunkering Fuel

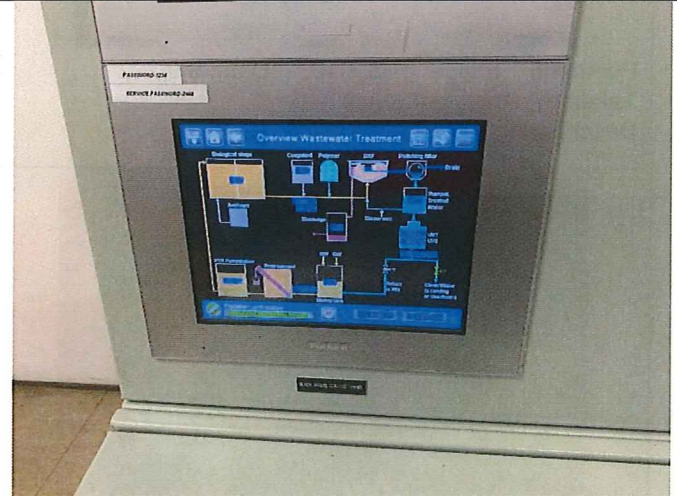


Photo # 4 Image: IMG_0102
Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Scanship Schematic

PHOTO ADDENDUM – SILVER MUSE
SILVERSEA CRUISE LINE
SEPTEMBER, 9, 2021



Photo # 5 Image: IMG_0107 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Scanship – Antifoam Dosing



Photo # 6 Image: IMG_0110 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Scanship – Dissolved Air Flotation (DAF)



Photo # 7 Image: IMG_0248 Date: 9/9/2021
Taken by: Evan Dobrowski
Description: Bilge – oily water separator (OWS)



Photo # 8 Image: IMG_0114 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Scanship – TSS reading

PHOTO ADDENDUM – SILVER MUSE
SILVERSEA CRUISE LINE
SEPTEMBER, 9, 2021



Photo # 9 Image: IMG_0241 Date: 9/9/2021
Taken by: Evan Dobrowski
Description: Scanship – Overboard Discharge Port (Padlocked)



Photo # 10 Image: IMG_0127 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Bilge – White Box

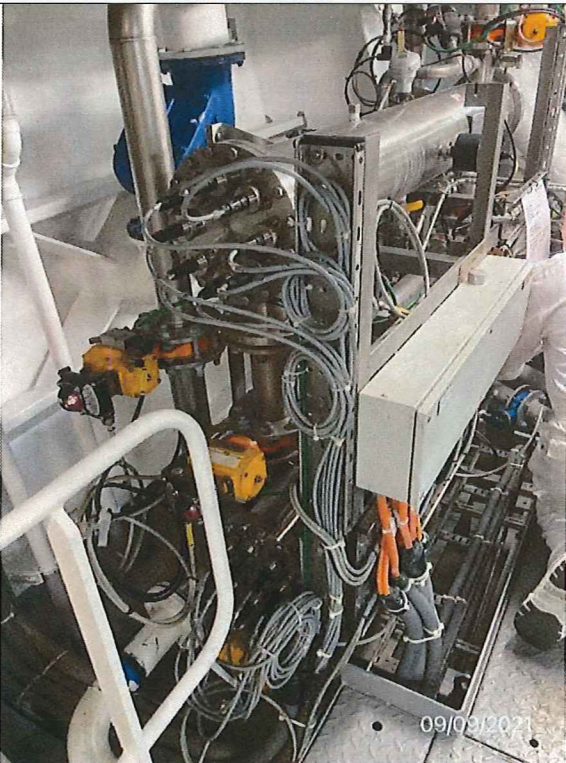


Photo # 11 Image: IMG_0240 Date: 9/9/2021
Taken by: Evan Dobrowski
Description: Scanship UV



Photo # 12 Image: IMG_0119 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Laundry Room

PHOTO ADDENDUM – SILVER MUSE
SILVERSEA CRUISE LINE
SEPTEMBER, 9, 2021



Photo # 13 Image: IMG_0131 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Garbage Room – Used Cooking Oil

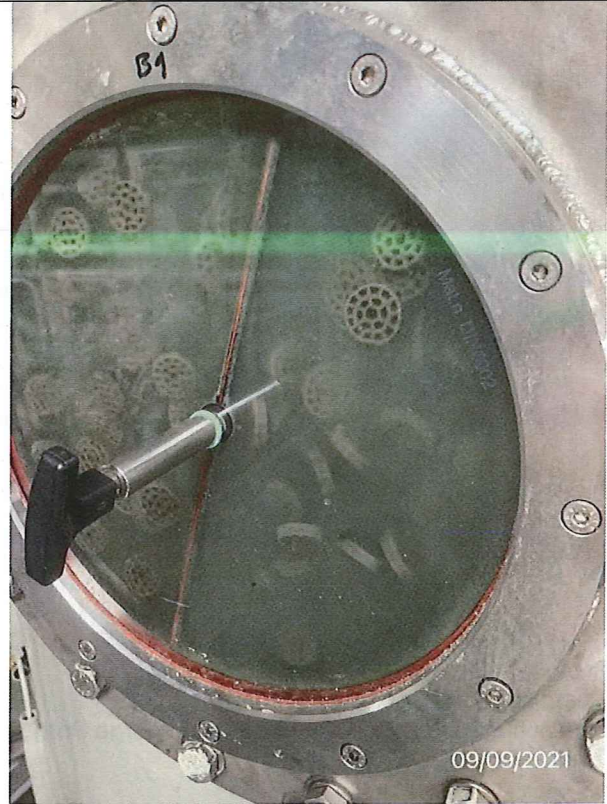


Photo # 14 Image: IMG_0223 Date: 9/9/2021
Taken by: Evan Dobrowski
Description: Scanship Biostep

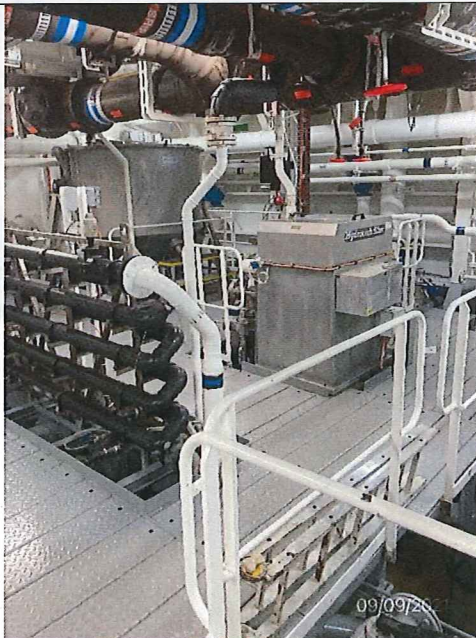


Photo # 15 Image: IMG_0071 Date: 9/9/2021
Taken by: Evan Dobrowski
Description: Scanship polishing filters



Photo # 16 Image: IMG_0233 Date: 9/9/2021
Taken by: Evan Dobrowski
Description: Scanship polishing filters - inside

PHOTO ADDENDUM – SILVER MUSE
SILVERSEA CRUISE LINE
SEPTEMBER, 9, 2021



Photo # 17 Image: IMG_0123 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Bilge – Oil Water Separator



Photo # 18 Image: IMG_0130 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Garbage Room – Sorted Hazardous Wastes



Photo # 19 Image: IMG_0256 Date: 9/9/2021
Taken by: Evan Dobrowski
Description: Garbage Room (GR)



Photo # 20 Image: IMG_0129 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: GR – Garbage/Recycling Sorted

PHOTO ADDENDUM – SILVER MUSE
 SILVERSEA CRUISE LINE
 SEPTEMBER, 9, 2021



Photo # 21 Image: IMG_0259 Date: 9/9/2021
 Taken by: Evan Dobrowski
 Description: GR – Glass Crusher

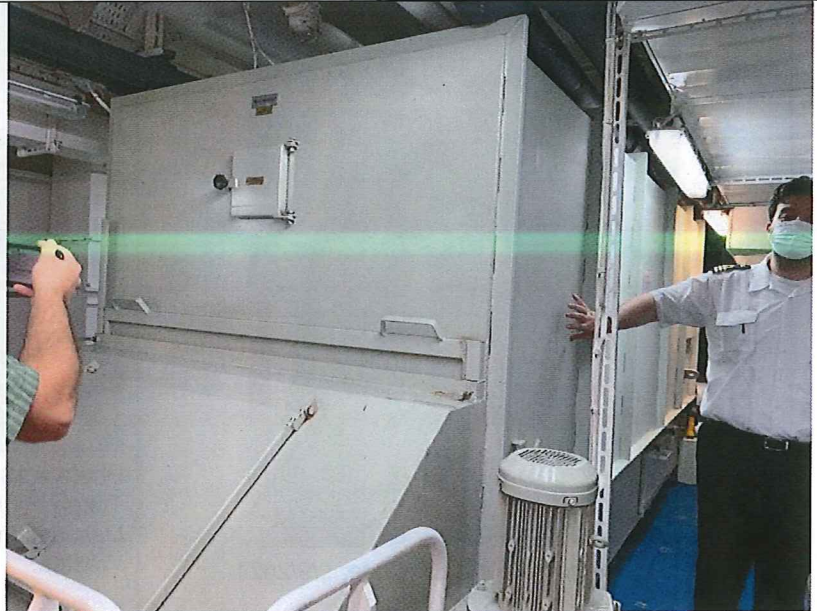


Photo # 22 Image: IMG_0135 Date: 9/9/2021
 Taken by: Amy Jankowiak
 Description: GR – Incinerator

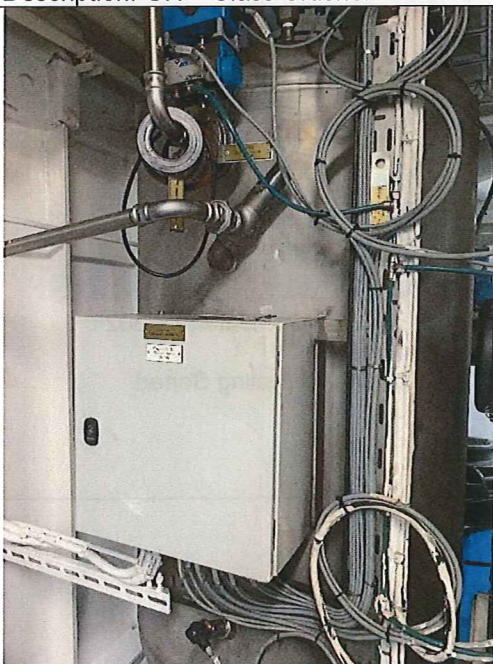


Photo # 23 Image: IMG_0132 Date: 9/9/2021
 Taken by: Amy Jankowiak
 Description: Food Waste Vacuum

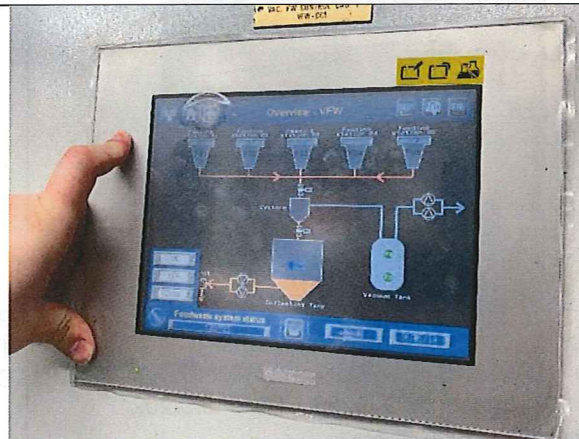


Photo # 24 Image: IMG_0134 Date: 9/9/2021
 Taken by: Amy Jankowiak
 Description: Food Waste Schematic

PHOTO ADDENDUM – SILVER MUSE
SILVERSEA CRUISE LINE
SEPTEMBER, 9, 2021



Photo # 25 Image: IMG_0133 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Food Waste Collection tank

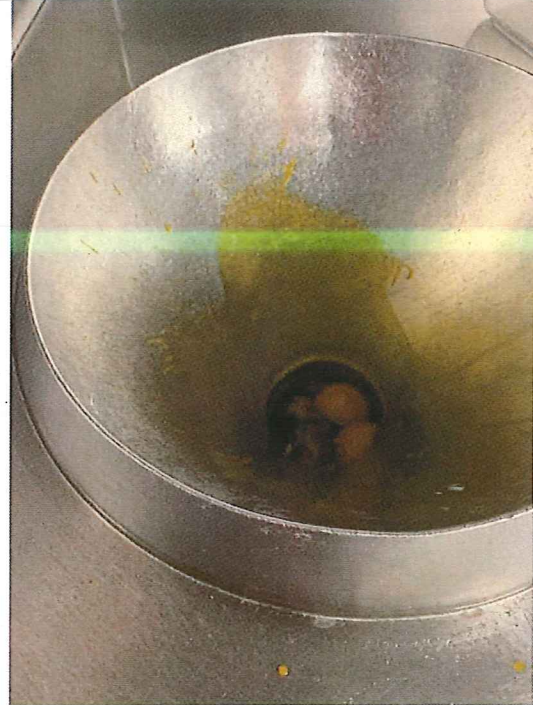


Photo # 26 Image: IMG_0137 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Galley – Pulper screen



Photo # 27 Image: IMG_0136 Date: 9/9/2021
Taken by: Amy Jankowiak
Description: Garbage Room – Incinerator Ash



Photo # 28 Image: IMG_0242 Date: 9/9/2021
Taken by: Evan Dobrowski
Description: Laundry – Chem storage

