CROWLEY
People Who Know

Consolidated Additional Observations

This questionnaire combines all standard Additional Observation Questions in one condensed questionnaire.
1. SOx Emissions Controls
2. Ballast Water Project
3. Combustion Source Project
4. Food Waste Project
5. Sea Intake Project

Findings can be reported in the spaces provided for each item; feel free to use additional space for notes and information. Sketches, diagrams, photos of handwritten notes, or copies of schematics are welcome.

Several questions are checks on previous Additional Observations, check these against the previous observations. If a ship is required to have an additional observation project on a section below, skip the section below. For example if a combustion source project is required leave the section in this project blank.

A: General Information

Report Start Date:	May 18, 2018
Ocean Ranger starting report:	philip.parent
Ship Name:	Princess Island
Ship Code:	PIS
Is this a revision of a previous report (Y/N)?	Yes

1: SOx Emissions Controls

1.1 Describe the SECA compliance plan.	The complies with SECA by burning low sulfur (less than 1%) MGO, while inside the SECA 24 mile boundary.
1.1 Completed by:	Philip Parent (philip.parent)
1.2 How does the vessel control SOX emissions in the ECA? Provide description. If the vessel used low sulfur fuels in AK describe the fuel switches and which combustion sources are operated on low fuel sulfur, and when.	While sailing in ECA waters the ship complies by burning low sulfur (less than 1%) MGO or running the EGCS on DGs burning low sulfur HFO (less than 2%).
1.2 Completed by:	Philip Parent (philip.parent)
1.3 Is the vessel operating or installing an exhaust gas scrubber system in the 2018 Alaska Cruise Season? If yes, complete section 1A. Otherwise skip to section 2.	Yes

1.a: SOx Emissions Controls

1.4 Which combustion sources are coupled with the EGCS system?	Ship has three Wartsila DGs (DG's 1 & 2 - 16V46C and DG 3 - 12V12V46F) that are coupled with their own EGCS systems.
1.4 Completed by:	Philip Parent (philip.parent)
1.5 EGCS units make, number, model, locations, fuel limitations (sulfur %).	All three EGCS units were manufactured by: Ecospray Technologies S.r.l., Alzano Scrivia EGC Tower Model for all three DGs: ECO-DeSOX ECG Tower number: DG#1: 17-100-MAR-SC16-0100 DG#2: 17-100-MAR-SC16-0100 DG#3: 15-001APCW-0100-DG3 (the Standby DG for Port use) Locations: DG#1 & #2: Incinerator spaces on Decks , 1,2,3,4 Frames 34-68 DG#3: Evaporator space on Deck 4 Frames 34-64 DeSox Tower located in stack fidley between Decks 11-14

	Fuel Limitations (Sulfur %): All 3 DGs: 3.5% Max Sulfur Content
1.5 Completed by:	Philip Parent (philip.parent)
1.6 Scrubber type (closed, reagent cycle, combination or hybrid open-loop effluent to seawater)?	Wet, Open Loop Scrubber type
1.6 Completed by:	Philip Parent (philip.parent)
1.7 System status (operational, commissioning, under construction)?	Operational
1.7 Completed by:	Philip Parent (philip.parent)
1.8 Provide a process description and waste flow/chemicals used (Gaseous emissions, waste effluent, ash, spent reagents, etc.).	Sea water is pumped by the SW Pump through the SW strainers to the Scrubber system. After the SW is filtered, it goes to the Scrubber DeSOx Tower where nozzles spray sea water on the exhaust gases in a direct contact process creating neutral carbonated salts. This liquid stream drains to the bottom of the scrubber to the static mixing chamber where the Scrubber effluent is diluted by means of additional sea water supplied by the Dilution Pump. The Scrubber effluent is monitored and is discharged overboard by wash water pumps in permitted Alaska waters. On Port Standby DG3 Scrubber, which has the sea chest's basket filter and Filtrex Duplex Filters the inlet side and both Filtrex Duplex and Dry Bag Filters on the discharge side (this setup only on DG3), the remaining wash water ash debris that has accumulated in the consumable Dry Filter bags is offloaded in Vancouver by Tymac. No chemicals are used in the wet open loop system.
1.8 Completed by:	Philip Parent (philip.parent)
1.9 What scrubber process parameters are monitored (flow capacities, pH, other)?	pH, Turbidity, PAH
1.9 Completed by:	Philip Parent (philip.parent)
1.10 For seawater intake/effluent, please provide port locations (PS/STB Frame number, etc.). Additional notes can include distance below waterline and angles.	Scrubbers Seawater Intake Locations: DG#1 and DG #2 - Fr 61-64 Stbd DG#3 - Fr 35 Midship
1.10 Completed by:	Philip Parent (philip.parent)

2: Ballast Water

2.1 Check the previous Additional Observation Reports (section 1.1) list of tanks used for Ballast Water storage. Including volumes and locations. List any changes.	Fore Peak C 6010 - 476.5m3 Deep Tank 1S 6131 - 432.1m3 Deep Tank 1P 6231 - 435.1m3 DB 2C 6012 - 139.7m3 DB 3S 6113 - 38.9m3 DB 3P 6213 - 38.9m3 DB 4S 6123 - 64.7m3 DB 4P 6223 - 64.7m3 DB 5S 6133 - 83.9m3 DB 5P 6233 - 83.9m3 DB 6S 6134 - 76.5m3 DB 6P 6234 - 76.5m3 DB 7S 6144 - 137.6m3 DB 7P 6244 - 154.6m3 DB 8S 6164 - 143.2m3 DB 8P 6264 - 154.6m3 DB 9C 6065 - 103.7m3 Skeg C 6016 - 222.6m3 Total - 2926.7m3 Per Captain - DB 8 P&S are voids with no ballast carried
2.1 Completed by:	Philip Parent (philip.parent)

2.2 Are ballast water tanks used for wastewater storage?	Yes. Only Deep Tanks 1P & 1S are used for GW storage in Alaska waters. After the Alaska cruising season, the tanks are flushed offshore 3 times.
2.2 Completed by:	Philip Parent (philip.parent)
2.3 Ballast Water system: brief description of the combined piping system if tanks used for both.	The ballast water system is self contained and only ballast water goes through the ballast water piping. Two tanks, Deep Tank 1P (6231) & 1S (6131), are used for are used for GW holding during the Alaska season.
2.3 Completed by:	Philip Parent (philip.parent)
2.4 Ballast Water treatment installation? If yes, describe operation/system specifics.	Yes, the Hyde-Guardian Ballast Water Treatment System is installed. The seawater is pumped through the 6 cleanable filter units, then passes through a powerful UV Reactor to destroy any biological growth. As the water is discharged, it passes through the U/V reactor once again. All ballast operations are done greater than 12nm offshore.
2.4 Completed by:	Philip Parent (philip.parent)
2.5 Ballast Water operations in AK waters (overboard intake/discharge, etc.)? Include the last date of ballast water discharges. Typically in the ballast water logs.	Ballast water operations are not done in Alaska waters. Intake and discharge of ballast water is done offshore, greater than 12nm. Last logged ballast water operations was 10 MT to the Forepeak Tank, 10 May 2018. Start: 52*47.7' N 130*19.1'W, Stop: 52*50.7'N 130*21.8'W Start: 1524 Stop: 1535
2.5 Completed by:	Philip Parent (philip.parent)

3: Combustion Sources

3.1 Are there any changes from the previous Additional Observation projects (Section 2.1) on the propulsion system question on brief description of propulsion and power systems used on board (Diesel direct/reduction gears/PTO's DE, FP, CPP Azipod, etc.)?	There are no changes or additions from the 2017 report.
3.1 Completed by:	Ronald Ladd (ronald.ladd)
3.2 Are there any changes from the previous Additional Observation projects (Section 1.1) on the list of the combustion equipment used for Power/Propulsion (make/model/output)?	There are no changes or additions from the 2017 report.
3.2 Completed by:	Ronald Ladd (ronald.ladd)
3.3 Are there any changes from the previous Additional Observation projects (section 3) on the incinerators make, model, fuel used, capacity?	There are no additions from the 2017 report and the only change has been the removal of one incinerator for the purpose of accommodating equipment and components associated with the EGC systems for DG2 and DG3.
3.3 Completed by:	Ronald Ladd (ronald.ladd)
3.4 Average Hotel power (kW) in port and underway?	The average "Hotel" power consumption in port and also U/W remains consistent which is 7.5 MW. The average power consumption while the vessel is U/W (if this is being asked here) is not a good question to answer as the U/W load varies greatly with the ship's speed, sea and weather conditions. The hotel and propulsion load while underway can be anywhere between 14 to 30 Mega Watts.
3.4 Completed by:	Ronald Ladd (ronald.ladd)

3.5 Average fuel consumption in port and underway?	The average fuel consumption in port would be, as best can be figured, 1.6 MT per hour and while the ship is underway it can be between 2.9 and 5.8 MT per hour.
3.5 Completed by:	Ronald Ladd (ronald.ladd)

4: Food Waste Garbage Handling

4.1 How is food waste handled and disposed of?	Food waste is comminuted in the pulpers and discharged outside of 3 nm. Non-comminuted food waste is discharged through the food chute outside of 12 nm and some is retained in totes, kept refrigerated, and landed ashore in VAN.
4.1 Completed by:	Ronald Ladd (ronald.ladd)
4.2 Average food waste production per day (kgs/day)?	This is estimated to be 6m3 per day.
4.2 Completed by:	Ronald Ladd (ronald.ladd)
4.3 Is the food waste de-watered? If yes, provide dewatering volumes and handling information.	Yes, food waste is dewatered. Pulper waste is filtered/strained with the removed liquid being used for recirculating and eventually this recirculated water will need additional potable water added to it. 20m3 of Pulper water/liquid will go to the GW Pulper Tank which in turn will go to a D/B tank and be discharged outside of 12nm.
4.3 Completed by:	Ronald Ladd (ronald.ladd)
4.4 How are glass bottles, broken crockery, and ceramics handled?	Glass beverage bottles (clear and colored - no separation) are crushed and landed ashore in FICB bags in VAN as "crushed glass". Crockery and ceramics is landed ashore as dry waste and if food contaminated, it goes ashore as contaminated food waste and in VAN as well.
4.4 Completed by:	Ronald Ladd (ronald.ladd)
4.5 How is food waste monitored and/or recorded?	This is monitored by the Garbage Room Manager and the EO who makes the food waste entries in the NAPA based Garbage Log.
4.5 Completed by:	Ronald Ladd (ronald.ladd)

5: Sea Water Intakes

5.1 List all of the seawater intakes (chests); include the locations, frame, side (PS/SB) or compartment.	Main Fire Pump #1 Port & Stbd at Fr 216 (Fwd Aux Rm) Fwd Sea Chests Port & Stbd at Fr 105 (A/C Compressor Rm) Aft Sea Chest Port: Fr 70 (Evaporator Rm 2) Stbd: Fr 70 (Incinerator Rm) G/T & EGCS for DG3 Port & Stbd, Fr 38 (G/T Aux Rm) EGCS for DG1 & DG2 Stbd Fr 68. (Incinerator Rm)

5.1 Completed by:	Ronald Ladd (ronald.ladd)
5.2 List filtration systems for each intake. Describe how filter systems are maintained. What is the frequency of cleaning? Is this performed in Alaska?	Each sea chest has a removable, metal, sea strainer installed. The frequency of cleaning is totally dependent on the conditions of the water in which the vessel travels and the amount of time the sea chest has seen taking through water. As an example, the Fire Main intake sees far less than the other salt water service intakes. The monitoring of the differential pressure (pressure drop) between the inlet and the outlet side of the sea chest strainer is what prompts the Engineers to shift service, isolate the sea strainer, extract the basket and perform a cleaning operation. Sea chest strainer cleaning is performed when the ship is in AK waters, and primarily in port.
5.2 Completed by:	Ronald Ladd (ronald.ladd)
5.3 How is debris and mud from filtration/strainers handled?	The entire contents of the sea strainer basket, primarily marine growth, is collected in drums and landed ashore in VAN.
5.3 Completed by:	Ronald Ladd (ronald.ladd)
5.4 Marine Growth Protection Systems in the sea intakes. Description of the control systems and information on checmicals if used.	There are no chemicals induced or introduced into the sea water intake distribution systems on the PIS ... or at least in Alaska which are my words saying this last comment. All the sea chest and sea water distribution systems listed above are dual protected which is to say that they all have an ultra sonic MGPS installed and also an Electrolytic MGPS system which was original to the ship. The Electrolytic MGPS system is installed in the sea chest themselves and the ultra sonic transducers from the Ultra Sonic system are placed in varying locations in the sea water distribution piping or circuit. The electrolytic system consists of pairs of anodes and on the PIS they are copper and aluminum are mounted in the sea chest And can only be replaced in the ship yard and by then they are fairly well eroded as is the nature of the arrangement. DC current is passed through the copper anodes, which produce ions that are carried with the seawater in the whole piping network. These copper ions in the seawater prevent marine organisms from settling down and multiplying on the surface of the pipes. The electrolytic system is being re-activated or re-instituted, on the PIS, as after 5 years they are not happy with the performance, or shall I say, the lack of good performance by newer Ultra Sonic system that has been the sole and only MGP system online for these past five year’s. Regarding the Ulta Sonic type MGP systems, high frequency waves are used as a method to prevent marine growth in the sea chest, strainer or along the piping systems.

Ultrasonic system is supposed to be known as one of the most highly effective methods to prevent biofouling but you could not prove that here with the Engineer's on this ship. They said all it does is probably scare the whales.

The Ultra Sonic type systems are supposed to have two types of effects on anti-fouling. A disturbance action because of the high frequency waves which renders the habitat unacceptable and a mechanical action on the organisms which are trying to deposit adhesive. It not only helps in preventing it from solidifying but also acts on 4-5mm organisms which are already anchored. The main advantage of this system is that it is non-invasive and the transducers are not making contact with the sea water. No toxic substances are produced, which is great but only if it actually does work in your application.

The manufacture of the Ultra Sonic MGP systems found onboard is "M.E.S. R.E.L." and the electrolytic systems are made by three manufactures. The newer units are made by Cathelco Limited, and also two small units by Marelco (which are installed in the EGCS sea chest systems) with the older units being made by Joten.

DC current is passed through the copper and aluminum anodes, in this mini sea chest and produces ions that are fed into the primary sea chest and then carried with the seawater to the entire sea water piping network. These copper ions in the seawater prevent marine organisms from settling down and multiplying on the surface of the pipes.

The cooper and aluminum anodes are pointed out and when these sacrifice away, can be replaced on board, unlike the main copper and aluminum anodes in a sea chest with this type system which needs a ship yard to renew the anodes. This is a brilliant dosing idea. The ultra sonic MGPS is not doing such a good job here on the PIS and this is an attempt to help the anti-fouling system as an addition to aide the ultra sonic system which is the original installed system for this seas chest.

View the VO photo's associated with the below report write ups from June 9, 2018

June 9, 2018 - PIS in SKG - Incinerator Room, mid level, @ 1032 hrs.

Shown here is a Marcelo manufactured Marine Growth Prevention System that the pump shown is photo 3 is related too. The pump feeds sea water to the "mini sea chest" shown here which in turn is fed back into the DG1 and DG 2's sea chest. This small "vessel" has a copper anode and a aluminum anode (just as in a large sea chest with larger anodes) which is known as an "electrolytic system" consisting of a pair of anodes, mostly copper and aluminum and

this mini sea chest "doses" the main sea chest with copper.

June 9, 2018 - PIS in SKG - Incinerator Room, mid level, @ 1036 hrs.

The ETO opens up this small MGPS controller that is responsible for controlling the electrical feed to the anodes shown above in the "dosing" arrangement that feeds cooper ions back to the main sea chest to distribute thought the sea water distribution system it is associated with.

This type of small "electrolytic dosing system" is also found on the #3 DG EGCS/fire pump sea chest found in the G/T Auxiliary Room.

5.4 Completed by:	Ronald Ladd (ronald.ladd)
5.5 Hull cleaning in place in Alaska 2018?	No hull cleaning will be done in Alaska. They were in the yard a just few months ago anyway.
5.5 Completed by:	Ronald Ladd (ronald.ladd)

6: General

6.1 Is vessel crew cooperative on this project?	Yes, they were but this is not an easy way to obtain this "static information" that could be requested or pre-obtained through the corporate office or so I should think. The Officers onboard have full days and to burden them down with information gathering in a very limited time frame is painful to do. It doesn't help with our working relationships we work so hard to establish. This, and who knows what I missed seeing or observing dealing with information gathering and sequestered away typing when I believe my value to Alaska should be in having "boots on the ground" watching what's going or not going on.
6.1 Completed by:	Ronald Ladd (ronald.ladd)
6.2 Do you feel the vessel has a clear understanding of compliance requirements?	Probably so.
6.2 Completed by:	Ronald Ladd (ronald.ladd)
6.3 Are there other remarks/ comments the OR wants to share?	I said them in 6.1
6.2 Completed by:	ronald.ladd

Z: Signature & Submit

Ocean Rangers contributing to this report:	Ronald Ladd (ronald.ladd) Richard Ekstrom (richard.ekstrom) Mark Farley (mark.farley)
Ocean Ranger Signature: