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:	jonathan.driggers
Ship Name:	Princess Coral
Ship Code:	PCR
Is this a revision of a previous report (Y/N)?	No

1: SOx Emissions Controls

1.1 Describe the SECA compliance plan.	Compliance will be achieved by a combination of the use of compliant fuels in DGs and oil fired equipment without an EGCS, and the operation of EGCS or use of compliant fuels on oil fired equipment with EGCS installed.
1.1 Completed by:	Jonathan Driggers (jonathan.driggers)
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 underway in AK waters, vessel using HFO with 1.8% sulphur content and EGCS for all three of its Wartsila DGs. Prior to arrival in port, vessel conducts FO changeover from HFO and EGCS to MGO with 0.0008% sulphur content. Vessel remains on MGO for entire time in port. After departing port, vessel conducts FO changeover from MGO to HFO and EGCS. Prior to entering Special Areas, vessel conducts FO changeover from HFO and EGCS to MGO, and remains on MGO for entire time inside, until after departing, when it does FO changeover back to HFO and EGCS. All FO changeovers logged in Fuel Changeover Record Book in ECR. Vessel also has Matrix it uses that shows when and where FO changeover is to be done during its voyage. Good communication between Bridge and ECR ensures timely FO changeover. The following sources use low sulphur fuel (MGO) in AK waters: DG1- just before arrival in port, while in port, short time after departure, and in Special Area; DG2- just before arrival in port, while in port, short time after departure, and in Special Area;

	DG3- just before arrival in port, while in port, short time after departure, and in Special Area; Gas Turbine- when in GB EDG1- when tested EDG2- when tested Incinerator- while underway Fwd. Boiler- while underway and in port Aft Boiler- while underway and in port All 3 DGs have EGCS installed, for the use of HFO, while vessel is underway in AK waters.
1.2 Completed by:	Jonathan Driggers (jonathan.driggers)
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?	DG1: Wartsila Model 16V46CR 16,800kW DG2: Wartsila Model 16V46CR 16,800kW DG3: Wartsila Model 12V46F 14,400kW
1.4 Completed by:	Jonathan Driggers (jonathan.driggers)
1.5 EGCS units make, number, model, locations, fuel limitations (sulfur %).	Ecospray Technologies Model ECO-DeSOx Total of three: *DG1-Aft Engine Room, Port EGC Tower #15-046-APC-SC-0050 *DG2-Aft Engine Room, Starboard EGC Tower #15-046-APC-SC-0200 *DG3-Forward Engine Room, Starboard EGC Tower #15-046-APC-PLC-100 EGCS designed to operate at any DG load up to 85% MCR, when using fuel with sulphur content of 3.5% or less.
1.5 Completed by:	Jonathan Driggers (jonathan.driggers)
1.6 Scrubber type (closed, reagent cycle, combination or hybrid open-loop effluent to seawater)?	Open Loop (Sea to Sea) System
1.6 Completed by:	Jonathan Driggers (jonathan.driggers)
1.7 System status (operational, commissioning, under construction)?	Operational, being used while underway in AK waters. EcoSpray Techs onboard working on software for Washwater Treatment System of DG3 EGCS, for possible operation of DG3 EGCS in port in AK waters in the future. Per Scrubber Engineer, System will be tested while underway, and could possibly be ran in AK ports for the 2018 season.
1.7 Completed by:	Jonathan Driggers (jonathan.driggers)
1.8 Provide a process description and waste flow/chemicals used (Gaseous emissions, waste effluent, ash, spent reagents, etc.).	Seawater is pumped into the EGCS, it is filtered and sent to the Scrubber Tower where nozzles spray seawater into the DGs exhaust gas stream in a direct contact process, trapping pollutants. The liquid stream (now basically weakened sulfuric acid) falls to the bottom of the Scrubber System and drains to the Mixing Chamber. In the Mixing Chamber, the effluent is diluted by additional seawater. Effluent is monitored, and if within acceptable limits, is discharged overboard. No chemicals used in System, and ash generation is very minimal.

1.8 Completed by:	Jonathan Driggers (jonathan.driggers)
1.9 What scrubber process parameters are monitored (flow capacities, pH, other)?	The following operating parameters are recorded continuously when EGCS is in operation: *Wash-water pressure at EGCS Inlet *Wash-water flow rate at EGCS Inlet *Exhaust gas pressure before the EGCS unit *Exhaust gas pressure drop across the EGCS unit *DG load *Exhaust gas temperature before the EGCS unit *Exhaust gas temperature after the EGCS unit *Temperature of intake and effluent *Flow rate of intake and effluent *pH of intake and effluent *PAH of intake and effluent *Turbidity of intake and effluent
1.9 Completed by:	Jonathan Driggers (jonathan.driggers)
1.10 For seawater intake/effluent, please provide port locations (PS/STB Frame number, etc.). Additional notes can include distance below waterline and angles.	Seawater intake located Deck 1 of Incinerator Room, about 6 meters below waterline. Effluent discharge located Deck 2 of Incinerator Room, about 2.5 meters below waterline.
1.10 Completed by:	Jonathan Driggers (jonathan.driggers)

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.	The ballast system on the Coral Princess comprises of 16 double bottom ballast tanks, a fore peak tank,an aft peak tank,and 2 pairs of heeling tanks. Tank#. Frame#. Volume (m3) 6016 WB Skeg C 2-39 222.1 6065 WB DB 9C 60-68 103.7 6264 WB DB 8P 89-105. 166.3 6144 WB DB 7S 105-120 137.6 6244 WB DB 7P 105-120 154.6 6134 WB DB 6S 120-133 76.5 6234 WB DB 6P 120-133 76.5 6133 WB DB 5S 133-146 83.9 6233 WB DB 5P 133-146 83.9 6123 WB DB 4S 146-159 64.8 6223 WB DB 4P 146- 159 64.8 6113 WB DB 3S 159-175 38.9 6213 WB DB 3P 159-175 38.9 6012 WB DB 2C 216-228 139.8 6131 WB Deep Tank 1S 257-273 431.1 6231 WB Deep Tank 1P 257-273 435.0 6010 WB Fore Peak C 288-312 476.7
2.1 Completed by:	Robert Layko (robert.layko)
2.2 Are ballast water tanks used for wastewater storage?	Yes some ballast tanks are being used to hold WW. Tank# Name 6231/ WB Deep Tank 1 P 6131/ WB Deep Tank 2 P 2211/ Double Bottom 1 P 2211/ Double Bottom 1 S 2243/ Double Bottom 2P 2043/ Double Bottom 2C 2143/ Double Bottom 2S 2235/ Double Bottom 3P 2135/ Double Bottom 3S 2035/ Double Bottom 3C 2256/ Grey Water 4P

	2156/ Grey Water 4S 2264/ Laundry Port 2064/ Laundry Center 2164/ DB Laundry Stbd 2175/ Food Waste Drain Tk
2.2 Completed by:	Robert Layko (robert.layko)
2.3 Ballast Water system: brief description of the combined piping system if tanks used for both.	The Ballast and Bilge systems are cross connected by 4 block valves, these bilge and ballast crossover valves are secured and locked out. Seals are also in place which are being checked by the Environmental Officer on his weekly seal rounds. The Vessels Ballast system main manifold is arranged for common suction and discharge. Operations line up depends on what needs to be done. Block valves are being used to isolate Bilge, GW, and Fire main systems.
2.3 Completed by:	Robert Layko (robert.layko)
2.4 Ballast Water treatment installation? If yes, describe operation/system specifics.	The ship is equipped with Hyde GUARDIAN Ballast Water Treatment System. It is integrated into the ships ballast system so that treatment occurs automatically. It features a two-stage process: an efficient depth filter to remove sediment and larger organisms, and a powerful Ultra Viloet disinfection unit to kill or inactivate smaller plankton, bacteria and other pathogens. During ballasting Water is processed through both the filter and U/V stages as it is pumped from the sea chest to the ballast tanks. All solids are discharged during back flushing to the location they entered. During de-ballasting, the filter is bypassed, and water flows only through U/V system before discharging.
2.4 Completed by:	Robert Layko (robert.layko)
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.	The last entry in the Ballast Water log was on 05/15/18 00:37 Start: 58*56.5N 140* 41.9W Start of operations internal content 280 m3 End of operations 180 m3 Pump used along with Ballast Water Treatment system used. Duration of operation was 36 min Estimated volume: 100 m3 Finish of operations: 59*0.7N 141*3.8W Observations: none Conducted by: Second Officer
2.5 Completed by:	Robert Layko (robert.layko)

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.)?	No changes to 2017 report
3.1 Completed by:	Wesley Whittier (wesley.whittier)
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)?	No changes to previous 2017 report
3.2 Completed by:	Wesley Whittier (wesley.whittier)
3.3 Are there any changes from the previous Additional Observation projects (section 3) on the incinerators make, model, fuel used, capacity?	No changes to previous 2017 report

3.3 Completed by:	Wesley Whittier (wesley.whittier)
3.4 Average Hotel power (kW) in port and underway?	33000kw in port; 35000kw underway
3.4 Completed by:	Wesley Whittier (wesley.whittier)
3.5 Average fuel consumption in port and underway?	15-18 cubic meters in port; 45 cubic meters at sea
3.5 Completed by:	Wesley Whittier (wesley.whittier)

4: Food Waste Garbage Handling

4.1 How is food waste handled and disposed of?	Food waste that is processed into a pulped dry/wet sludge matter is stored in the Food Waste Holding Tank and then is discharged overboard through the "A" overboard valve located in the machinery compartment Zone 5, port-side at frame 120. When discharging the processed food waste through the "A" (TSG) overboard discharge valve, the amount of flow-rate (L/min) and total amount (m3) is recorded in NAPA. This discharge is greater than 12NM; outside Alaska waters, in accordance with MARPOL
4.1 Completed by:	Wesley Whittier (wesley.whittier)
4.2 Average food waste production per day (kgs/day)?	Yes; approximately 0.65 cubic meters per day
4.2 Completed by:	Wesley Whittier (wesley.whittier)
4.3 Is the food waste de-watered? If yes, provide dewatering volumes and handling information.	Yes; approximately 0.25 cubic meters per day Portions of the liquid processing of the pulp is reclaimed and used for recirculation. No water residuals are treated in the AWTS, nor for other processing purposes. The water that is drained from the silos on deck 3, below the garbage handling compartment, is streamed into the reservoir tank in between the two silos. The recirculating pumps automatically start pumping down the reservoir tank at sensor level and discharge to the lower Aft Sewage Room's Pulper Water Storage Tank 2175. At greater than 12NM, the Pulper Water Storage Tank may be discharged through the "A" (TSG) overboard discharge port.
4.3 Completed by:	Wesley Whittier (wesley.whittier)
4.4 How are glass bottles, broken crockery, and ceramics handled?	Offloaded in Vancouver by Tymac
4.4 Completed by:	Wesley Whittier (wesley.whittier)
4.5 How is food waste monitored and/or recorded?	The record keeping of the food waste volumes is the responsibility of the Environmental Officer. Everything is recorded in NAPA, the vessel's electronic log. Receipts are recorded in the Waste Management System and hard copies are kept by the Staff Engineer. The Environmental Officer keeps track of all volumes in his electronic file, EPMD.
4.5 Completed by:	Wesley Whittier (wesley.whittier)

5: Sea Water Intakes

5.1 List all of the seawater intakes (chests); include the locations, frame, side (PS/SB) or compartment.	8 sea chests total (2) Forward Treatment Room port and starboard (2) A/C Room forward; port and starboard (2) Forward Aux Room; port and starboard

	(1) Evap Room; port (1) Incinerator Room; starboard
5.1 Completed by:	Wesley Whittier (wesley.whittier)
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?	Basket-type strainers scheduled for cleaning using AMOS every 3-months; also cleaned when needed based on pressure drop across strainer Yes, performed in Alaska
5.2 Completed by:	Wesley Whittier (wesley.whittier)
5.3 How is debris and mud from filtration/strainers handled?	Disposed as garbage
5.3 Completed by:	Wesley Whittier (wesley.whittier)
5.4 Marine Growth Protection Systems in the sea intakes. Description of the control systems and information on checmicals if used.	Ultrasonic protection; no chemicals
5.4 Completed by:	Wesley Whittier (wesley.whittier)
5.5 Hull cleaning in place in Alaska 2018?	No hull cleaning in Alaska during the 2018 season
5.5 Completed by:	Wesley Whittier (wesley.whittier)

6: General

6.1 Is vessel crew cooperative on this project?	Yes.
6.1 Completed by:	Wesley Whittier (wesley.whittier)
6.2 Do you feel the vessel has a clear understanding of compliance requirements?	Yes,
6.2 Completed by:	Robert Layko (robert.layko)
6.2 Completed by:	robert.layko wesley.whittier

Z: Signature & Submit

Ocean Rangers contributing to this report:	Robert Layko (robert.layko) Jonathan Driggers (jonathan.driggers)
Ocean Ranger Signature: