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 7, 2018
Ocean Ranger starting report:	jonathan.driggers
Ship Name:	Norwegian Pearl
Ship Code:	NPE
Is this a revision of a previous report (Y/N)?	No

1: SOx Emissions Controls

1.1 Describe the SECA compliance plan.	Vessel currently using Scrubber System, while using HFO, in closed loop configuration with bleeder valve open while underway and in port in AK waters. Boilers and Incinerator using MGO. Vessel starts FO changeover from HFO to MGO 3 hours before arriving in Special Area (GB) to ensure vessel is completely on MGO before arrival. Should there be an issue where the Scrubber System is not/cannot operate within AK regulations, vessel will operate on MGO.
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.	Vessel currently using Scrubber System, while using HFO, in closed loop configuration with bleeder valve open while underway and in port in AK waters. Boilers and Incinerator using MGO. Vessel starts FO changeover from HFO to MGO 3 hours before arriving in Special Area (GB). Log is kept of FO changeovers, from HFO to MGO, and from MGO to HFO. Should there be an instance where Scrubber System cannot operate per requirements, vessel will use only MGO.
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?	Scrubber System onboard coupled to all 5 of vessel's Man B&W DGs; Scrubber System can only be ran with maximum of 3 DGs online when ran in closed loop configuration with bleeder valve open, due to cooling water configuration. When more than 3 DGs are required, vessel changes over to MGO.

	Vessel currently operating Scrubber System in closed loop configuration with bleeder valve open while underway and in port in AK waters. Prior to arrival in Special Areas (GB), vessel does fuel changeover from HFO to MGO.
1.4 Completed by:	Jonathan Driggers (jonathan.driggers)
1.5 EGCS units make, number, model, locations, fuel limitations (sulfur %).	EGCS onboard is Yara Marine Technologies GTM-R. Five units coupled to vessel's five DGs. System and its various components located on Decks 1,2,3, and 4, Compartments 14 and 15, Port side. Stack Scrubber Tower Units located on Decks 9,10,11, and 12. Maximum sulfur content of FO is 3.5%.
1.5 Completed by:	Jonathan Driggers (jonathan.driggers)
1.6 Scrubber type (closed, reagent cycle, combination or hybrid open-loop effluent to seawater)?	EGCS onboard is hybrid type, able to be operated either open loop (Sea to Sea) or closed loop. Currently, vessel is operating system in closed loop configuration with bleeder valve open while underway and in port in AK waters, except for Special Areas (GB).
1.6 Completed by:	Jonathan Driggers (jonathan.driggers)
1.7 System status (operational, commissioning, under construction)?	Operational, currently being operated in closed loop configuration with bleeder valve open while underway and in ports in AK waters, except in Special Areas (GB).
1.7 Completed by:	

1.8 Provide a process description and waste flow/chemicals used (Gaseous emissions, waste effluent, ash, spent reagents, etc.)

The GTM Scrubber is of the wet scrubber type, where dirty exhaust gas stream is brought into contact with the scrubbing liquid by spraying it with washwater (seawater, which may contain additives). The scrubber is designed to collect particulates and gaseous pollutants in the scrubbing washwater. Droplets that are in the flue gas can then be separated from the clean exhaust system by means of another device referred to as Demister, leaving only clean outflow gas in the exhaust. The resultant scrubbing washwater may be treated prior to any ultimate discharge or recycled in the process. The configuration of Scrubber and Scrubber System are designed to provide good contact between the washwater and the exhaust gas stream. If washwater is taken from vessel's Sea Chest, pumped through Scrubber, and then drained overboard (after neutralizing SOx levels), this is known as Open Loop Configuration.
If the washwater is taken from ship's process wash water tank, pumped through a scrubber, and (after treatment such as filtering), circulated without any discharge overboard, except for small bleeder valve partially opened,
this is called a Closed Loop Configuration. Vessel is currently operating Scrubber System in closed loop configuration with bleeder valve open while underway and in port in AK waters. Magnesium Oxide is introduced into the Scrubber System as an alkali, and is recovered and reclaimed as EGCS filter washwater sludge, which the vessel currently generates less than one fifty five gallon drum per day. This is treated as non hazardous waste, and is offloaded outside AK waters.

1.8 Completed by:	Jonathan Driggers (jonathan.driggers)
1.9 What scrubber process parameters are monitored (flow capacities, pH, other)?	pH, turbidity, and PAH.
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.	The large intake pipes are on Deck 1, Compartment 15, Port side; Large pipes for effluent discharge when in Open Loop Configuration are also on Deck 1, Compartment 15, Port side; Bleeder Valve overboard for use in Closed Loop Configuration (how vessel is currently operating Scrubber System) is on Deck 2, Compartment 14, Port side.
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 only change to Ballast Water Tanks would be the following two tanks that are no longer part of the vessel's Ballast Water System: BW 14P DB: 68m3, now part of Scrubber System, used as Process Tank; BW 14S DB: 64m3, now part of Scrubber System, used as Buffer Tank; All Ballast Water Tanks listed in previous Additional Observations Report are still part of Ballast Water System, and are being used either for Ballast Water, or for storage of WW. *NOTE*- Vessel is in process of amending 2018 VSSP to reflect what tanks are currently being used for the storage of WW in the 2018 AK season.
2.1 Completed by:	Jonathan Driggers (jonathan.driggers)
2.2 Are ballast water tanks used for wastewater storage?	Yes; Vessel currently using the following Ballast Water Tanks for WW Storage: 4P DB: TSG 4S DB: TSG 18P Inner: TSG 18S Inner: TSG 18P: TSG 18S: TSG 8P DB: GW 8S DB: GW 9P DB: GW 9S DB: GW *NOTE*- Vessel currently in process of amending 2018 VSSP to reflect current tanks status/usage.
2.2 Completed by:	Jonathan Driggers (jonathan.driggers)
2.3 Ballast Water system: brief description of the combined piping system if tanks used for both.	Vessel has common line to Ballast Water Tanks and Tanks holding TSG (mix of treated BW and GW). Fill/Suction line branches off common line into each tank. Tanks holding untreated WW has separate line from Ballast Water Tanks and Tanks holding TSG.
2.3 Completed by:	Jonathan Driggers (jonathan.driggers)
2.4 Ballast Water treatment installation? If yes, describe operation/system specifics.	Yes; Alfa Laval Trumba AB PureBallast 3.1 Flow 250 Ballast Water Treatment System Installed and operational 10/28/17; USCG Approval #162.060/2/0; Uses Ultraviolet Radiation and Filtration in treatment of Ballast Water during Ballasting/Deballasting Operations; TRC (Net Flow) Capacity: 30m3/hr-250m3/hr; Location of System onboard: Lower Engine Room/Compartment #9/Frame 185-205;
2.4 Completed by:	Jonathan Driggers (jonathan.driggers)
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.	Vessel has no plans to do any Ballast Ops inside AK waters. Last Ballast Ops done 5/7/18, deballasting Tank 16C, from 62m3 to 9m3. Start time was 0610 hours, 49* 43.7 N, 127* 49.2 W; Stop time 0642 hours, 49* 51.8 N, 128* 01.7 W.
2.5 Completed by:	Jonathan Driggers (jonathan.driggers)

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
3.1 Completed by:	James Ham (james.ham)
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
3.2 Completed by:	James Ham (james.ham)
3.3 Are there any changes from the previous Additional Observation projects (section 3) on the incinerators make, model, fuel used, capacity?	No changes
3.3 Completed by:	James Ham (james.ham)
3.4 Average Hotel power (kW) in port and underway?	For in port and underway is 8.8 MW / hr
3.4 Completed by:	James Ham (james.ham)
3.5 Average fuel consumption in port and underway?	In port 2 MT / hour underway 8.4 MT / hour
3.5 Completed by:	James Ham (james.ham)

4: Food Waste Garbage Handling

4.1 How is food waste handled and disposed of?	First step in handling food waste begins in the restaurants where plates are emptied by the wait staff into plastic containers on carts. The staff can begin to separate out plastic and debris here. The carts when full are sent to the galleys and further separation takes place when food waste is loaded into garbage pails. The pails are emptied onto stainless steel work tables and are pulped hear and drawn by vacuum into the food waste storage tank. There are a total of 21 pulpers onboard the ship. The food waste storage tank holds 6 m3. The food waste is then shredded through one or two macerators . It then is sent to the de-watering tank and a screw type press will squeeze out excess water which will be discharge to GW Tank 15 port. The macerated food is then discharged to a collection tank which has two overboard pumps available for discharge when permitted. The advantage of two discharge pumps is the ability to move large volumes of food waste in a short amount of time.
4.1 Completed by:	James Ham (james.ham)
4.2 Average food waste production per day (kgs/day)?	Calculation made by the Environmental Officer determined that 1,280 gallons of food waste are produced per day.
4.2 Completed by:	James Ham (james.ham)
4.3 Is the food waste de-watered? If yes, provide dewatering volumes and handling information.	The liquids are sent to gray water tank 15 port which is a designated GW/Galley water tank. These liquids are discharge when the ship is greater than 12 nm from shore. Environmental Officer estimate de-watering volume to be 200 hundred gallons per day.
4.3 Completed by:	James Ham (james.ham)
4.4 How are glass bottles, broken crockery, and ceramics handled?	Glass bottles are not segregated . Glass bottles are stored in red trash cans in garbage room and then is manually dump into Scanship glass crusher . It is then offloaded in Victoria as domestic waste. Broken crockery and ceramics are hot water

	washed and then is stored in white ash bags and then is crushed and is offloaded as dry waste in Victoria.
4.4 Completed by:	James Ham (james.ham)
4.5 How is food waste monitored and/or recorded?	Entries made in NAPA electronic log under deck and in Garbage Record Book for food waste discharged overboard. Including position and start time at beginning of operation. Qualities of overboard discharge , position, and stop time after operation is completed.
4.5 Completed by:	James Ham (james.ham)

5: Sea Water Intakes

5.1 List all of the seawater intakes (chests); include the locations, frame, side (PS/SB) or compartment.	(Frame 92-95) { 2 Filters PS Comp. 15 FWD. (Valve number: 701A1005 & 701A1006 { 2 Filters STB Comp. 15 FWD. (Valve number: 701A1024 &701A1006 (Frame 165-168) { 2 Filters PS Comp. 10 AFT. (Valve number: 701A1037 & 701A1038 (Frame 155-158) { 2 Filters PS Comp. 9 AFT. (Valve number: 701A1050 & 701A1049 { 2 Filters STB Comp. 9 AFT. (Valve number: 701A1067 & 701A1070
5.1 Completed by:	James Ham (james.ham)
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?	1 . First Engineer to inform ECR before start of work. 2. ECR to close Hydraulic operated suction valve before opening. 3. Turn local switch to zero position. 4 Close manual Valve after filter. 5. Close sea water filter vent valve. 6. Open drain valve under filter and vent cock on vent pipe. 7. Open filter cover. 8 After completion of cleaning is secured: * Open manual valve slowly when venting filter thru the vent cock. * Close vent cock and open vent valve. * First Engineer to inform ECR to open Hydraulic suction valve . * Check for leakage. Cleaning is done every 3 months or when is in alarm.
5.2 Completed by:	James Ham (james.ham)
5.3 How is debris and mud from filtration/strainers handled?	Debris is manually removed and is treated as garbage and is incinerated. Mud is flushed with water while in strainers to break it down .
5.3 Completed by:	James Ham (james.ham)
5.4 Marine Growth Protection Systems in the sea intakes. Description of the control systems and information on checmicals if used.	The Anfomatic System is automatic, requires minimal maintenance and is environmentally

	friendly. Mussels and similar marine life which are the primary cause of blockage in marine sea water cooling system are not killed by the Cupric ions given off by the Anfomatic anodes .The Environment created is hostile without being fatal and prevents the microscopic embryos from attaching to pipeline walls, settling or developing . A further benefit of the Anfomatic system is that potable water distillation plants can be operated without interruption. No chemicals are being used.
5.4 Completed by:	James Ham (james.ham)
5.5 Hull cleaning in place in Alaska 2018?	No schedule is in place.
5.5 Completed by:	James Ham (james.ham)

6: General

6.1 Is vessel crew cooperative on this project?	Yes. Environmental Officer had given me permission to speak department head crew members
6.1 Completed by:	James Ham (james.ham)
6.2 Do you feel the vessel has a clear understanding of compliance requirements?	Yes.
6.2 Completed by:	James Ham (james.ham)

Z: Signature & Submit

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