



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:	Jun 18, 2018
Ocean Ranger starting report:	richard.ekstrom
Ship Name:	Celebrity Infinity
Ship Code:	XIN
Is this a revision of a previous report (Y/N)?	No

1: SOx Emissions Controls

1.1 Describe the SECA compliance plan.

The Infinity has two gas turbines and one diesel generator for propulsion and hotel power. The gas turbines burn MGO exclusively which is compliant in all ECA zones. The diesel generator is equipped with an approved exhaust gas cleaning system which can be run in either an open or closed loop, once again making it compliant, providing the necessary parameters are met.
Richard Ekstrom (richard.ekstrom)

1.1 Completed by:

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.

The Infinity operates one diesel generator fitted with an approved EGCS. Company policy states that should the generator be out of compliance for 90 minutes then a fuel switch would take place from heavy fuel to MGO. The procedure follows:
1. Reduce DG load to 7 MW.
2. Shut off steam supply to booster module.
3. Shut off steam supply to tracing lines.
4. When fuel temperatures reach 85 degrees Celsius switch 3-way valve to MGO position.
5. When fuel temperatures reach 70 degrees celsius open MGO return line cooler.

1.2 Completed by:

Richard Ekstrom (richard.ekstrom)

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?

DG 1 is fitted with an exhaust gas cleaning system.

1.4 Completed by:

Richard Ekstrom (richard.ekstrom)

1.5 EGCS units make, number, model, locations, fuel limitations (sulfur %).

There is one exhaust gas cleaning system installed on DG 1. The name is: Wartsila

1.5 Completed by:

1.6 Scrubber type (closed, reagent cycle, combination or hybrid open-loop effluent to seawater)?

1.6 Completed by:

1.7 System status (operational, commissioning, under construction)?

1.7 Completed by:

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

1.8 Completed by:

1.9 What scrubber process parameters are monitored (flow capacities, pH, other)?

1.9 Completed by:

1.10 For seawater intake/effluent, please provide port locations (PS/STB Frame number, etc.). Additional notes can include distance below waterline and angles.

1.10 Completed by:

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.

2.1 Completed by:

Inline 2450. DW Hybrid SOX EGC. Unit SC 2000 . Serial #119. Lloyds approved on 10/27/16.

Richard Ekstrom (richard.ekstrom)

The exhaust gas cleaning system can be run in either an open or closed loop.

Richard Ekstrom (richard.ekstrom)

The EGCS has been approved and is up and running for the Alaska season.

Richard Ekstrom (richard.ekstrom)

The Infinity has one DG fitted with an EGCS. This system, in the closed loop, requires pH to be adjusted which is done with a liquid alkali (sodium hydroxide) injected with a dosing pump. The wash water from the scrubber is sent to the processing tank. On a set schedule 10% of the process water will be pumped to the BOTU (bleed off treatment unit). This cleaned water is sent to the effluent tank and discharged outside Alaskan waters. Sludge remaining in the tank is treated with a flocculant to aid in binding sludge together which is then pumped to barrels and offloaded in Vancouver. In the open loop the scrubber wash water is cleaned by a hydrocyclone unit and discharged overboard.

Richard Ekstrom (richard.ekstrom)

Parameters measured include: pH. PAH, turbidity/suspended particles, nitrates and SO2/CO2 ratio.

Richard Ekstrom (richard.ekstrom)

The sea chest is located forward port side at frames 86 and 89 for open loop operation.

Richard Ekstrom (richard.ekstrom)

The ballast water tanks remain the same and they are:

Fore peak: 710m3
Ballast: deep tank 2 425m3
3P: Ballast/GW 124m3
3S: Ballast /GW 124m3
4P Center: 462m3 ballast
4S Center: 462m3 ballast
4 P: 277m3 ballast/TWW
4 S: 277m3 ballast/TWW
5 P: 74m3 ballast/TWW
5 C: 260m3 ballast
5 S: 74m3 ballast/TWW
6 P: 160m3 ballast
6 S: 160m3 ballast
Tank 7: 298m3 ballast
Tank 8: 231m3 ballast

Richard Ekstrom (richard.ekstrom)

2.2 Are ballast water tanks used for wastewater storage?

Yes

2.2 Completed by:

Richard Ekstrom (richard.ekstrom)

2.3 Ballast Water system: brief description of the combined piping system if tanks used for both.

There is a common line for gray water and ballast. Each tank has a suction and fill valve. Since the Infinity has no plans to ballast water this season there is little chance of cross contamination between the ballast and gray water systems. Trim is accomplished by transferring gray water between tanks or by using the independent heeling tanks. Any contaminated tanks or piping can be flushed when the ship is outside of Alaskan waters.

2.3 Completed by:

Richard Ekstrom (richard.ekstrom)

2.4 Ballast Water treatment installation? If yes, describe operation/system specifics.

The ballast water treatment system is HydeGuardian Marine Model 250. Capacity is 250m3/hr. Installation was completed Nov. 2015 and is Lloyd's and USCG certified. As ballast water is loaded it is pumped through a set of filters which serve to remove sediment and larger organisms. From there the ballast water passes through a set of UV filters which operate to destroy or damage the DNA of remaining organisms. When discharging ballast water it passes through the UV filters once again.

2.4 Completed by:

Richard Ekstrom (richard.ekstrom)

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 Infinity does not intend to ballast water this season in Alaska. The last ballast water discharge was on 4/30/18 at start position: 011 28.4 N and 075 37.6 W. Stop position: 016 29.4N and 074 58.6W.

2.5 Completed by:

Richard Ekstrom (richard.ekstrom)

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.)?

The propulsion systems are the same. The Infinity has port and starboard azipods known as Ahlstrom DCF Mermaid. The azipods have a shaft horse power of 21,000 KW at 153 rpm.

3.1 Completed by:

Richard Ekstrom (richard.ekstrom)

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)?

The combustion systems remain the same and are:

Gas turbine #1: GE/LM 2500 PLUS
Year: 2001
Maximum Rating: 25,000 KW

Gas turbine #2: GE/LM 2500 PLUS
Year:2001
Maximum rating: 25,000 KW

Diesel generator #1
Wartsila
Installed: 2008
Serial No: PAA EO 54186
11,600 KW at 600 rpm

3.2 Completed by:

Richard Ekstrom (richard.ekstrom)

3.3 Are there any changes from the previous Additional Observation projects (section 3) on the incinerators make, model, fuel used, capacity?

The two incinerators remain the same:

Make: Norsk Inova NH 1200 SG-S
Year built: 1999 and 2007
Serial #: 0434 01 14078 and 0434/01 1408
Maximum rating: 1,400 KW

3.3 Completed by:

Richard Ekstrom (richard.ekstrom)

3.4 Average Hotel power (kW) in port and underway?

The average hotel power in port and underway is approximately 5.5 to 6.0 MW

3.4 Completed by:

Richard Ekstrom (richard.ekstrom)

3.5 Average fuel consumption in port and underway?

Average fuel consumption for a seven day cruise is 1,200 metric tons.

3.5 Completed by:

Richard Ekstrom (richard.ekstrom)

4: Food Waste Garbage Handling

4.1 How is food waste handled and disposed of?

Galley stations separate non food stuff out of food waste. The food waste is pulped at each station and drained to the two silos for storage. When the ship is in a permitted area the food waste is discharged into the ocean.

4.1 Completed by:

Richard Ekstrom (richard.ekstrom)

4.2 Average food waste production per day (kgs/day)?

Average of 2m3 per day

4.2 Completed by:

Richard Ekstrom (richard.ekstrom)

4.3 Is the food waste de-watered? If yes, provide dewatering volumes and handling information.

The food waste is not dewatered.

4.3 Completed by:

Richard Ekstrom (richard.ekstrom)

4.4 How are glass bottles, broken crockery, and ceramics handled?

Glass bottles are crushed and recycled ashore. Broken crockery and ceramics are collected in large cardboard boxes and offloaded as waste.

4.4 Completed by:

Richard Ekstrom (richard.ekstrom)

4.5 How is food waste monitored and/or recorded?

The quantity of the two food silos can be determined by the computer screen in the ECR. Quantities are calculated by the difference between the volumes at the start of discharge and at the end of discharge. These quantities are entered into the garbage record book.

4.5 Completed by:

Richard Ekstrom (richard.ekstrom)

5: Sea Water Intakes

5.1 List all of the seawater intakes (chests); include the locations, frame, side (PS/SB) or compartment.

In the chiller room can be found port and starboard sea chests which are used for general service. There are sea chests on the port and starboard sides in the gas turbine room and are used as cooling water for the gas turbine. There is a sea chest on the starboard side and a sea chest on the port side in the evaporator room which serve the chillers and evaporators.

There is one sea chest in pump room 5 which is used for the swimming pool and fire pump.

Richard Ekstrom (richard.ekstrom)

5.1 Completed by:

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?

There is a strainer on each of the above sea chests. Cleaning varies depending on location but roughly once a month the strainers are cleaned.

Richard Ekstrom (richard.ekstrom)

5.2 Completed by:

5.3 How is debris and mud from filtration/strainers handled?

When strainers are cleaned mud and debris is double bagged in garbage bags and offloaded ashore.

5.3 Completed by:

Richard Ekstrom (richard.ekstrom)

5.4 Marine Growth Protection Systems in the sea intakes. Description of the control systems and information on chemicals if used.

No chemicals are used. The Cathelco system uses anodes in the sea chests which generate a small electrical current which serves to inhibit marine growth.

5.4 Completed by:

Richard Ekstrom (richard.ekstrom)

5.5 Hull cleaning in place in Alaska 2018?

No plans for hull cleaning in Alaska in 2018.

5.5 Completed by:

Richard Ekstrom (richard.ekstrom)

6: General

6.1 Is vessel crew cooperative on this project?

Yes. Met the scrubber engineer and staff chief for information.

6.1 Completed by:

Richard Ekstrom (richard.ekstrom)

6.2 Do you feel the vessel has a clear understanding of compliance requirements?

Yes. The scrubber has been up and running long enough for them to understand the system.

6.2 Completed by:

Richard Ekstrom (richard.ekstrom)

6.3 Are there other remarks/ comments the OR wants to share?

With enough experience hopefully the EGCS in place on this ship and others will be fully compatible and work as advertised.

6.2 Completed by:

richard.ekstrom

Z: Signature & Submit

Ocean Rangers contributing to this report:

Richard Ekstrom (richard.ekstrom)

Ocean Ranger Signature:

