

# 2019 Ocean Ranger Annual Report

## COMMERCIAL PASSENGER VESSEL ENVIRONMENTAL COMPLIANCE (CPVEC) PROGRAM



December 2019



Alaska Department of Environmental Conservation

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Cover Photo: Over Board Discharge Valves Control Panel Large Cruise Ship (ADEC OR Program)

### Abbreviations and Acronyms

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AS	Alaska Statute
AMHS	Alaska Marine Highway System
BMP	Best Management Practice
BOD	Biological Oxygen Demand
CFR	Code of Federal Regulations
CPVEC	Commercial Passenger Vessel Environmental Compliance (Program)
ECA	Emissions Control Area
EGCS	Exhaust Gas Cleaning System
EPA	US Environmental Protection Agency
EU	Emission Unit
IMO	International Maritime Organization
LCPV	Large Commercial Passenger Vessel
MOU	Memorandum of Understanding
PAH	Polycyclic aromatic hydrocarbon
SO <sub>x</sub>	Sulfur oxides
TSS	Total Suspended Solids
USFS	US Forest Service
UW	Underway
VGP	Vessel General Permit (EPA)

## INTRODUCTION

This report is prepared annually by the Alaska Department of Environmental Conservation (ADEC, or the Department) Division of Water (DOW), Commercial Passenger Vessel Environmental Compliance Program (CPVEC or the Program). The intent of this report is to provide concise information on the Program's monitoring and compliance efforts with cruise ship pollution and the status of the Ocean Ranger program.

### OCEAN RANGER PROGRAM SUMMARY

#### Objective 1: Maximize Coverage

Ensure that Ocean Rangers are on board as many ships as possible to verify compliance.

**Authority.** AS 46.03.476 establishes the Ocean Ranger Program. The statute requires that all large commercial passenger vessels (LCPV) entering the marine waters of the state have an Ocean Ranger on board to act as an independent observer for the purpose of monitoring compliance with state and federal requirements.

**Implementation.** Ocean Rangers inspect enforceable conditions of state and federal requirements in an observer role only. Reports from Ocean Rangers are made from checklists and visual inspection of all areas onboard a cruise ship in Alaska waters during voyages and while in port. Reportable days are when a ship is in Alaska waters for at least three hours in a day. The contract for Ocean Rangers is with Crowley Maritime Corporation.

**Results.** In 2019, Ocean Rangers completed 1513 Daily Reports, which is decrease of 67 Daily Reports compared to 2018. The coverage rate for Ocean Rangers decreased 1.6% from 2018 to 2019. The decrease was due to more ships and more voyages, even while the number of report days remained almost the same. Additional reports saw a slight increase; the Ocean Rangers submitted 79 additional information project reports, 31 once a season reports and 131 other reports. A total of 44 oil spill or sheen reports were reported.

#### Products

Daily Reports:	1513 Daily Reports completed
Coverage Rate:	Ocean Rangers were aboard ships 55 % of the days ships were in Alaska waters.

#### Objective 2: Reduce Potential Compliance Items Observed

Reduce the annual infractions identified aboard cruise ships by the Ocean Rangers. Ocean Rangers observe and report compliance issues relating to public health, safety, and protection of the environment to vessel crew and ADEC. ADEC follows up with vessel operators regarding corrective actions or forwards to other state and federal agencies as deemed appropriate.

**Authority.** AS 46.03.476(a) authorizes Ocean Rangers to ensure that passengers, crew, and residents at ports are protected from improper sanitation, health, and safety practices.

**Results.** Ocean Rangers reported 263 noncompliance incidents, an increase from the 189 incidents in 2018. Table 1 provides a detailed breakdown of all noncompliant incidents.

The following additional observations were noted during the 2019 season:

- AK Fleet wide use of Exhaust Gas Cleaning System (EGCS) installations and operation;

- Overall reduction of the vessel visible stack emissions (e.g. issues with opacity and stack plume buoyancy resulting from use of ECGS systems noted in 2018) was reduced by operators switching to cleaner Low Sulfur Marine Gas Oil (LSMGO) while in port.
- Presence of plastics in the Food Waste Stream, for discharge outside AK waters;
- Continuation of access issues, preventing Ocean Rangers from completion of their job duties as agents of the State of Alaska.

**Compliance.** When Ocean Rangers reported potentially noncompliant issues the CPVEC Program immediately reported the condition to the cruise ship owner or operator. Standard procedure requires Ocean Rangers to inform the vessels crew of potentially noncompliant conditions. CPVEC staff worked with the owner or operator to stop or correct identified noncompliant items observed onboard.

For potential noncompliance items outside the authority of the Program, CPVEC notified the responsible state and federal agencies. CPVEC staff reported alleged noncompliant conditions to:

- Safety: U.S. Coast Guard Sector Juneau
- Health and Sanitation: U.S. Centers for Disease Control and Prevention, and the appropriate State of Alaska and local health agencies
- Vessel General Permit (VGP): U.S. Environmental Protection Agency (EPA) / U.S. Coast Guard Sector Juneau
- Oil Pollution Reporting: Because of the time-critical nature of oil pollution cases, Ocean Rangers submitted Oil Reports directly to ADEC's Division of Spill Prevention and Response (SPAR) and copied the Program and other relevant parties as needed
- Other Federal Agencies with jurisdiction such as National Park Service, US Forest Service, and US Customs and Border Patrol.

### **Objective 3: Alaska Resident Hires**

Maximize the number of qualified Alaskans hired as Ocean Rangers.

**Authority.** AS 39.25.150(5) authorizes preferential hiring for local applicants when appropriate.

**Results.** Six of the 22 Ocean Ranger hires in 2019 were residents of the state.

Alaskan Ocean Rangers:	6 of 22, or 27.2 % of deployed Ocean Rangers were Alaskan residents in 2019
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## **OCEAN RANGER ADDITIONAL OBSERVATIONS SUMMARY**

**Authority.** AS 46.03.476(a) authorizes Ocean Rangers to ensure that passengers, crew, and residents at ports are protected from improper sanitation, health, and safety practices. AS 46.03.476 (b) authorizes Ocean Rangers to monitor and record information on engineering, sanitation, and health related operations of the vessel.

### **2019 Additional Observations:**

1. Exhaust gas cleaning system (EGCS) installation or operation
2. Combustion Source inventory
3. Dry Cleaning Operations
4. Photo Processing Laboratories
5. Steam System Operations
6. Incinerator Systems
7. Ballast Water management
8. Oil to Sea Interface Systems

### **AO 1: Exhaust gas cleaning system installation or operation**

**Authority.** AS 46.03.465(h), AS 46.03.482, and AS 46.03.488, the CPVEC Program continues observations on EGCSs and their potential effect on environment of Alaska.

**Results.** The CPVEC Program monitors pollution from large commercial passenger vessels, or cruise ships. The US EPA and the International Maritime Organization (IMO) establish rules and regulations regarding fuel use and sulfur oxides (SO<sub>x</sub>) emissions worldwide; with lower limits established within designated waters referred to as Emission Control Areas (ECAs). State of Alaska waters east of the Kodiak area are part of the North America ECA.

Exhaust gas cleaning systems are designed to reduce exhaust SO<sub>x</sub> from entering the ambient air. This “exhaust scrubbing” process discharges “washwater” containing various pollutants pulled from the exhaust gases into the ambient water. Some of the resulting wastes of ECGSs (e.g. sludge) may be held or offloaded in port. Scrubber wash water is typically regulated by the IMO and the US EPA for pH, PAH, and turbidity with other pollutants potentially affecting Alaska water quality standards.

Through information requests and daily Ocean Ranger observations, the CPVEC Program has summarized ECGS installation status and operations during the 2019 cruise ship season (Table 2).

Since January 1, 2015 cruise ships operating within ECAs have been required to comply with more stringent limits on SO<sub>x</sub> emissions. In 2019, the 40 registered vessels operating in AK waters used one of two strategies to comply with low sulfur emissions requirements:

- 14 vessels exclusively used low sulfur marine gas oil (MGO; distillate fuel) to meet SO<sub>x</sub> limits.
- 26 vessels used higher sulfur residual fuel/heavy fuel oil (HGO) in combination with EGCSs:
  - 17 open loop EGCSs and
  - 9 hybrid EGCSs (capable of operating in either open- or closed-loop mode).

Of the 40 registered vessels, 35 vessels were participated in the EGCS project observations by Ocean Rangers. CPVEC and Ocean Rangers inspected several systems of each type in operation (closed loop as well as open loop systems that use seawater).

Based on observations made by Ocean Rangers, the program has identified the following areas of concern:

1. **Sulfur Emissions Compliance.** While the Program does not have direct jurisdiction over SO<sub>x</sub> emissions, Ocean Rangers continue to monitor for vessel compliance methods to meet ECA limit requirements. EGCSs can remove much of the sulfur from exhaust gases allowing the use of higher sulfur fuels; however, this requires proper operation and monitoring to ensure compliance. The regulatory EGCS system monitoring and utilization is a concern; Ocean Ranger observed that Combustion Source operations with non-compliant fuels while the EGCS system was not operated. The EGCS (regulatory) monitoring systems did not monitor / record this non “SO<sub>x</sub> emissions” compliance.
2. **EGCS Filtration Systems:** Ocean rangers observed that filtration systems in the EGCS system were not installed on *all* the EGCS units and that the filtration systems in place were *not* always utilized.
3. **Sheens and discoloration.** The EGCS process water in open loop systems is discharged overboard into ambient water. This discharge stream is required to be monitored for PAH content by the EPA VGP. Ocean Rangers continued to report oily sooty sheen / surface effects in the waterbody from the EGCS discharges in 2019. The EGCS operators claim that these “surface effects” do not contain any hydrocarbons, soot, or petroleum products. Alaska prohibits sheens or oily discharge. Most of the observations occurred while ships were docked or during maneuvering at low vessel speeds. Observations were predominantly with EGCS of the open loop type. A total of 22 EGCS sheens were reported by the Ocean Rangers. One vessel Self-Reported an EGCS sheen.
4. **Other Discharges.** In 2019 the Ocean Rangers continued to observe “foamy” soot discharges from the EGCS system. The EGCS discharged wash water can be hotter than ambient water temperatures.

These areas of interest were a repeat of ECGS System observations in 2018.

## **AO 2: Combustion Source Inventory**

**Results.** Evaluate combustion sources currently operating aboard cruise ships in Alaska waters and use data to assess potential air emissions impacts. Ocean Rangers attempted to complete an additional observation questionnaire first initiated in 2015. Data collected from this effort is still preliminary and will build on previously collected information.

## **AO.3: Dry Cleaning Operations**

**Results.** Ocean Rangers completed a project to gather information on Dry Cleaning operations onboard. Dry Cleaning operations and chemical handling questions are found in the OR Daily Report, but this was a more “focused” assessment of dry cleaning operations. 33 vessels participated in the Dry Cleaning Project. 20 Vessels do not have dry cleaning installations (operations) onboard. These are typically the ‘smaller’ category of the large vessels group. 13 Vessel did have dry cleaning operations. Chemicals used include PERC and the chemical DF-2000, a less hazardous alternative to PERC. 4 Vessels with Dry Cleaning operations used PERC while the remainder of 9 vessels used DF-2000. All the vessels with the dry cleaning installation had chemical handling plans in place and all the spent chemical were collected and off loaded to shore facilities outside Alaska. Off load records (manifests), records and plans are maintained on all vessels.

## **AO 4: Photo Processing Laboratories**

**Results.** Ocean Rangers completed a project to gather information on the current status and operations (e.g. chemical handling) of photo laboratories onboard vessels. With the increased use of digital photography and cell phones, there are fewer vessels that still produce photos from negatives. This investigation divides the Photo laboratories into 2 main groups:

- “All-In” Photo Labs: photos labs that offer chemical photo development from negatives, as well as digital photo printing.

- Digital-Only Photo “Labs”: photo labs that “print out” digital image to a photo printer. Photo (film) development is not done at these labs.

The Photo Laboratories Project included 33 vessels, 22 vessels (67%) had “All-In” Photo Laboratories. Typical photo waste generation for an “All-In” photo lab is ~ 175 – 201 liters (~ 46 – 55 gallons) per week. All generated liquid photo waste is processed through a silver recovery unit onboard. The silver content of the photo waste is chemically extracted, and sent to shore silver recycling facilities. The remaining photo waste after this recovery process is collected and off loaded to shore facilities outside Alaska. Off load records (manifests) and retained onboard.

### **AO 5: Steam System Operations**

**Results.** Ocean Rangers completed a project to gather information on the onboard steam system operations and associated waste streams and records. Generally, steam on board is generated by Oil Fired Boilers (OFB) and/or Economizers (ECO). ECOs recovery the exhaust gas heat from the combustion sources (e.g. Diesel Engines / Gas Turbine). In 2019, the Alaska Fleet did not include a large cruise vessel that solely relied on propulsion and power generation based on 100% steam. All the vessels do have ECO steam generating systems on their main combustion sources. For vessel with EGCS systems, the ECO is typically located between the combustion source exhaust and EGCS Inlet.

Steam Systems (boilers) need to regularly condition their boiler water. In this condition process, boiler water is “released” (tapped) from the boilers. This process is called Boiler Blow Down (BBD). This operation can be conducted manually or automatically. This operation is typically conducted outside Alaska waters.

34 vessel participated in the Steam System Project. All 34 vessels had ECO and OFB systems. 1 vessel treated the BBD flow in their WW treatment System. 10 vessels had dedicated BBD Tanks installed, the contents of these tanks were discharged outside Alaska. All vessel discharged their BBD waters outside Alaska. These BBD discharge operations are recorded by using dedicated Boiler BBD Logbook, or integrated in boiler chemical log book.

### **AO 6: Incinerator System**

**Results.** Ocean Rangers completed a project to gather information on onboard Incinerator Systems. Many operators have removed their redundant (stand by use) Incinerator Systems to provide the space onboard to accommodate EGCS systems. Removing one or more incinerators has led to a higher utilization of any remaining incinerator system(s) onboard and a significant increase of garbage offloads in Alaska. The project include 34 vessels.

All the vessels had an operational incinerator system onboard. All the vessel had incinerator maintenance records and Garbage Logbooks. 29 vessel had incinerators of the Co-firing Type. All the vessels offload their Incinerator Ashes to shore facilities outside of Alaska. The ash Offload records (manifests) and plans are kept on all vessels.

### **AO 7: Ballast Water Management**

**Results.** Following up on previous ballast water projects, Ocean Rangers documented onboard ballast water systems and management plans. Of the 40 registered cruise ships, 34 additional observation projects were completed. Most large cruise ships do not discharge ballast water in Alaska, however the CPVEC program recognized that many ballast water systems share tanks and equipment with wastewater treatment systems. Ballast Water tankage is available for WW handling, either as a dedicated tank or in combination with ballast operations.



Ballast water operations are covered under the EPA Vessel General Permit and are of interest as a vector for the spread of invasive species. 16 Vessels have a Ballast water treatment Systems installed. All these treatment system were based on filtration in combination with UV radiation technology.

In 2019, only 1 vessel conducted ballast water intake operations in Alaska waters; later this water was discharged into Canadian waters. It should be noted that this early season data (May/June 2019) is not necessarily representative for operations later in the season. Ballast water operations can change at the end of the Alaska Season when the vessel prepares for operations outside Alaska (new trade).

### **AO 8: Oil to Sea Interface Project**

**Results.** Ocean Rangers completed a project to gather information on oil to sea interfaces associated with propulsion systems, thrusters, stabilizers, and rudder systems aboard vessels new to the Alaska trade in 2019. Six “new vessels” participated in the project looking at marine interface locations with the potential to lose lubricant to the marine environment. The use of Environmentally Acceptable Lubricants (EALs) is preferred, but not always possible due to operational/system limitations.

4 Vessels use EALs in their propulsion system and 2 vessels used seawater lubrication in the propeller shaft system. Generally, newer vessels have EAL oils in all their “oil to sea interface” systems. All vessels had logs to record ‘consumption’ (losses) related to oil to sea interface.

## **OCEAN RANGER SUMMARY TABLES**

**Table 1: Ocean Ranger Alleged Noncompliant Incidents Reported (2019)**

<b>Alleged Noncompliant Condition</b>	<b>2018 Number of Incidents Reported</b>	<b>2019 Number of Incidents Reported</b>
Oil Pollution	40	44
Safety	11	49
Sanitation	6	14
Wastewater	56	28
Other Waste	23	20
Air Pollution	10	17
EPA VGP Items	32	72
Access	11	18
<b>Total</b>	<b>189</b>	<b>263</b>

Table 2: 2019 Vessel Emissions Unit and EGCS Details

Line	Vessel	EGCS/ EU	EU Inventory [EGCS EU]						EGCS	Port Fuel	UW Fuel
<b>SOx Controls / MGO Fuel</b>											
Ponant	Le Soleal	N/A	DG1	DG2	DG3	DG4	X	X	None	MGO	
Azamara	Quest		DG1	DG2	DG3	DG4	X	X			
Crystal	Symphony		DG1	DG2	DG3	DG4	DG5	DG6			
Disney	Wonder		DG1	DG2	DG3	DG4	DG5	X			
Seabourn	Sojourn		DG1	DG2	DG3	DG4	X	X			
Oceania	Seven Seas Mariner		DG1	DG2	DG3	DG4	X	X			
Oceania	Regatta		DG1	DG2	DG3	DG4	X	X			
Silversea	Silver Muse		DG1	DG2	DG3	DG4	X	X			
PCL	Sun Princess		DG1	DG2	DG3	DG4	X	X			
<b>SOx Controls EGCS Systems / HFO Fuel</b>											
CCL	Carnival Legend	3:6	DG1	DG2	DG3	<b>DG4</b>	<b>DG5</b>	<b>DG6</b>	OL	HFO	
Cunard	Queen Elizabeth	5:6	<b>DG1</b>	<b>DG2</b>	<b>DG3</b>	<b>DG4</b>	DG5	<b>DG6</b>	OL	HFO	
CEL	Eclipse	4:4	<b>DG1</b>	<b>DG2</b>	<b>DG3</b>	<b>DG4</b>	X	X	CL / OL	HFO+ HFO	
CEL	Millennium Δ	1:3	<b>DG1</b>	GT1	GT2	X	X	X	CL / OL	MGO Δ	
CEL	Solstice	4:4	<b>DG1</b>	<b>DG2</b>	<b>DG3</b>	<b>DG4</b>	X	X	CL / OL	HFO+ HFO	
HAL	Amsterdam	3:5	DG1	DG2	<b>DG3</b>	<b>DG4</b>	<b>DG5</b>	X	OL	HFO+ HFO	
HAL	Eurodam	4:6	<b>DG1</b>	<b>DG2</b>	DG3	DG4	<b>DG5</b>	<b>DG6</b>	OL	HFO+ HFO	
HAL	Nieuw Amsterdam	4:6	<b>DG1</b>	<b>DG2</b>	DG3	DG4	<b>DG5</b>	<b>DG6</b>	OL	HFO+ HFO	
HAL	Noordam	3:6	<b>DG1</b>	<b>DG2</b>	DG3	<b>DG4</b>	DG5	GT	OL	HFO+ HFO	
HAL	Oosterdam	4:6	<b>DG1</b>	<b>DG2</b>	DG3	<b>DG4</b>	<b>DG5</b>	GT	OL	HFO+ HFO	
HAL	Volendam	3:5	DG1	<b>DG2</b>	<b>DG3</b>	DG4	<b>DG5</b>	X	OL	HFO+ HFO	
HAL	Westerdam	4:6	<b>DG1</b>	<b>DG2</b>	DG3	<b>DG4</b>	<b>DG5</b>	GT	OL	HFO+ HFO	
HAL	Maasdam	3:5	DG1	<b>DG2</b>	<b>DG3</b>	DG4	<b>DG5</b>	X	OL	HFO+ HFO	
NCL	Norwegian Bliss	5:5	<b>DG1</b>	<b>DG2</b>	<b>DG3</b>	<b>DG4</b>	<b>DG5</b>	X	CL / OL	HFO+ HFO	
NCL	Norwegian Joy	5:5	<b>DG1</b>	<b>DG2</b>	<b>DG3</b>	<b>DG4</b>	<b>DG5</b>	X	CL / OL	HFO+ HFO	
NCL	Norwegian Jewel	5:5	<b>DG1</b>	<b>DG2</b>	<b>DG3</b>	<b>DG4</b>	<b>DG5</b>	X	CL / OL	HFO+ HFO	
PCL	Coral Princess	3:4	<b>DG1</b>	<b>DG2</b>	<b>DG3</b>	GT1	X	X	OL	HFO+ HFO	
PCL	Golden Princess	2:6	<b>DG1</b>	<b>DG2</b>	DG3	DG4	DG5	DG6	OL	HFO+ HFO	
PCL	Grand Princess	4:6	<b>DG1</b>	<b>DG2</b>	DG3	DG4	<b>DG5</b>	<b>DG6</b>	OL	HFO+ HFO	
PCL	Island Princess	3:4	<b>DG1</b>	<b>DG2</b>	<b>DG3</b>	GT1	X	X	OL	HFO+ HFO	
PCL	Royal Princess	4:4	<b>DG1</b>	<b>DG2</b>	<b>DG3</b>	<b>DG4</b>	X	X	OL	HFO+ HFO	
PCL	Ruby Princess	4:6	DG1	<b>DG2</b>	<b>DG3</b>	DG4	<b>DG5</b>	<b>DG6</b>	OL	HFO+ HFO	
PCL	Star Princess	4:6	<b>DG1</b>	<b>DG2</b>	DG3	DG4	<b>DG5</b>	<b>DG6</b>	OL	HFO+ HFO	
RCL	Ovation of the Seas	4:4	<b>DG1</b>	<b>DG2</b>	<b>DG3</b>	<b>DG4</b>	X	X	CL / OL	HFO+ HFO	
RCL	Radiance of the Seas	1:3	<b>DG1</b>	GT1	GT2	X	X	X	CL / OL	HFO / MGO*	
Viking	Viking Orion	4:4	<b>DG1</b>	<b>DG2</b>	<b>DG3</b>	<b>DG4</b>	X	X	CL / OL	MGO HFO	
<b>Notes:</b>											
DG = Diesel Engine / Diesel Electric Generator ( <b>DGs connected to ECGS system</b> = Bold + Underscore)											
EU = Emission Unit (Combustion Source) Power / Propulsion											
CL = Closed Loop EGCS Process											
OL = Open Loop EGCS Process											
* = HFO only used in combination with DG + EGCS   MGO for GTs only											
+ = Fuel preference HFO DG + EGCS   GT (if operated) always on MGO   <b>2019:</b> Vessels operated on MGO in Port of Juneau / Skagway											
Δ = Millennium → EGCS system DG1 not operated in AK 2019.											
EGCS Hybrid Systems (CL & OL). <b>2019:</b> operated ECGS in CL in AK waters and OL outside AK.											