2022 Annual Compliance Report Cruise Ship Wastewater

COMMERCIAL PASSENGER VESSEL ENVIRONMENTAL COMPLIANCE (CPVEC) PROGRAM

January 2023

Cover Photo: Carnival Cruise Lines Miracle Vessel docked at the FKL dock in Juneau, AK. May 7th, 2022

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INTRODUCTION

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

There were 41 large commercial passenger vessels (CPVs) that operated in Alaska in 2022. ADEC issued discharge authorizations under 2013DB0004 (2014 GP) to 24 ships and of those, 23 ships discharged treated wastewater and conducted sampling in Alaska waters. One vessel was authorized to discharge but opted not to during the 2022 season.

There were 17 small CPVs and 2 State ferries that operated in Alaska in 2022. All discharging small CPVs had current up-to-date Best Management Practices (BMP) Plans for the season and were required to follow the requirements outlined in 18 AAC 69.046.

To find all ADEC CPVEC reports go to https://dec.alaska.gov/water/cruise-ships/cruise-reports

WATER QUALITY SUMMARY

Objective 1:

All regulated CPVs operating in marine waters of the state shall have current, timely, and active permits, authorizations, or plans approved by the Department, as required by state law, which ensure protection of human health and water quality and are based on sound science, technology, and economics.

Authority. Alaska Statute (AS) 46.03.462 requires CPVs obtain and comply with terms and conditions of permits or alternative plans that meet all standards established for the protection of ambient water quality when discharging into Alaska marine waters.

Results. The CPVEC program receives notices of intent to discharge under the general permit for qualifying large CPVs or alternative BMP plans for small CPVs. All vessels also register annually with the CPVEC to outline their voyage plans for the season and pay applicable fees.

2014 GP Authorizations:	During 2022, seven new general permit (GP) authorizations were granted, thirteen previous GP Authorizations were reissued, and five active GP Authorizations remained in place from 2019.
Best Management Practices (BMP):	13 discharging small CPVs and two state ferries operated under approved BMP plans for the 2022 season. Three new BMPs were approved and were conditional, meaning they are valid for only one year. Six BMPs expire in 2023 and will need to have an approved BMP plan in place before they are allowed to discharge in Alaska waters. Prior the BMP approval, the vessel needs to apply provide a BMP application. This application may include updated wastewater treatment operations and plans.

Objective 2:

CPVs comply with all terms and conditions required by state and federal law and water quality standards are maintained.

Authority. AS 46.03.100 require the permitting and compliance of wastewater discharge permits in the State of Alaska.

Results.

Sample Events:	242 mixed wastewater effluent and 60 graywater effluent samples for large CPVs were collected for monitoring analysis. 53 effluent samples

for small CPVs were collected for monitoring analysis. This includes all resample results.

Enforcement: 24 violations of permit effluent limits by large discharging CPVs, 35 violations of permit effluent standard by small CPVs, and nine reported spills or unauthorized discharges, consisting of seven self-reported spills, one reported spill from a member of the public, and one discovered during a DEC inspection. All of these unauthorized discharges and violations of the permit standards resulted in the issuance of a total of 23 Notices of Violation (NOVs)[1]. Additionally, one Notice of Enforcement (NOE) was issued to a small CPV for continued effluent limit exceedances under their BMP since 2018.

Compliance: During the 2022 season, no monetary settlements were included for the issued NOVs. Instead, these will become part of the vessel's compliance file history and violation notices will be considered in the future if formal enforcement action is deemed necessary. Effluent exceedance NOV closures are pending for the 2022 season.

A Compliance Order by Consent (COBC) is pending issuance to a small CPV for continued noncompliance with the BMP plan during the period from 2018-2022. If this vessel returns in the AK trade, the vessel is required to have full compliance status with the BMP.

Monitoring: In addition to sampling, the Program monitors several areas of interest specific to small CPVs that may have environmental impacts:

[1] Some NOVs for effluent exceedances were for multiple exceedances (i.e. one NOV letter could cover two exceedances from a sample event).

Small CPVs:

- Small CPV marine sanitation devices (MSD) II performance and capability to maintain sufficient performance during the AK season.
- Concerns with fecal coliform levels found in average effluent results of small CPVs.
- High chlorine levels, particularly during resample events of small CPVs, where higher dosing is used as tool to lower fecal coliform counts before discharging the treated wastewater.

Large CPVs:

- Concerns with discharges of untreated or partially treated wastewater.
- Some vessels rely on sample monitoring on board. These "on board labs" are not able to consistently provide the vessel reliable results. For the vessels that engage in this sampling, better quality assurance/quality controls (QAQC) should be exercised.
- Concerns with an increase in dissolved copper levels in large CPV sampling results.

COMPLIANCE ANALYSIS

Large CPV operators reported 24 exceedances of the 2014 GP Water Quality (WQ) standards out of 242 mixed wastewater and 60 graywater samples. Small CPV operators reported 28 fecal coliform (FC) exceedances and seven total suspended solids (TSS) exceedances out of the 53 total samples taken during the 2022 season for mixed, black, and graywater effluent. Table 1 lists 2022 exceedances of general permit daily limits by pollutant type. Table 3 lists exceedances of GP limits by large CPVs.

The Department has concerns regarding minimal improvement regarding the 2014 GP fecal coliform (FC) maximum daily limit exceedances for large CPVs. Effluent sampling resulted in one exceedance in 2017, four exceedances in 2018, nine exceedances in 2019, and eight exceedances in 2022. Although the Department saw a slight decrease in FC daily limit exceedances this year, it is a parameter the

Department will continue to monitor as the FC daily limit is highly indicative of a working wastewater treatment system.

There was also a 100% increase in total dissolved copper exceedances on large CPVs from 2019 to 2022, going from two exceedances to now four, respectively. The department understands that not all advanced wastewater treatment systems (AWTS) remove dissolved coppers elements, however the increase of these sample results is indicative of either a change in operations, or a degradation of the vessel operational controls and piping systems. Additionally, we observed elevated values of oil and grease in the sample results for small CPVs, indicating that somehow oil and grease is not being managed properly, and entering the MSD systems on these vessels.

Unauthorized discharges were reviewed and NOVs were issued. These unpermitted discharges were caused by wastewater tank overflows or by discharging wastewater in areas where not permitted.

The Department issued 23 NOVs in 2022 for violations of wastewater effluent limits for large discharging CPVs and 4 NOVs for effluent limits exceedances by small CPVs, and one NOE. The Department also issued 7 NOVs in 2022 for unauthorized discharge events (see Table 2).

The Department monitored wastewater discharges from large CPVs for biological oxygen demand (BOD), TSS, fecal coliform, pH, and chlorine, ammonia, and dissolved copper at frequencies established in the general permit. Daily/monthly limits for these parameters of interest were established in the 2014 GP, and enforced during the 2015 through 2022 Cruise Ship Seasons.

Data results are available from the CPVEC Program on request, and summaries are available at http://dec.alaska.gov/water/cruise-ships/cruise-reports/.

TABLES

Table 1. 2022 Wastewater Exceedances of GP Daily Limits for Large Discharging CPVs

Parameter (GP Limit)	2022 Exceedances	Samples* (Mixed/Graywater)
Fecal Coliform (FC)	8	238/60
Biological Oxygen Demand (BOD)	7	238/60
Copper, Dissolved	4	117/57
pH	3	242/60
Chlorine, Total Residual	2	242/60
Total Suspended Solids (TSS)	0	237/60
Ammonia (Total)	0	118/56
TOTAL (2022 Events)	24	242/60
*Reported samples can vary based on Quality Assurance review and frequency of sampling based on GP requirements.		

Table 2. Overview of 2022 Unauthorized Discharge Events

Vessel	Date | Location	Filing	Item	Misc.
Majestic PCL	5 14 22 | WHT	SR	WW discharge 24 m3	Treated wastewater < 6 kts from AWTS direct ►NOV issued
Eurodam	6 22 22 | STK	SR	Fuel Spill Life Boat	Small volume forwarded to Spill Prevention and Response Division (SPAR)
NCL Sun	6 25 22 | Hub	SR	Ballast Water treated 179 m^3 discharged	Iceberg accident.
NCL Bliss	6 28 22 | H-Bay	SR	WW discharge 8 m3	Holding tank discharge ►NOV issued
Majestic PCL	6 29 22 | YKT	SR	EGCS discharge sheen	Vessel reported sheen condition from EGCS (SPAR Spill Report) ►NOV issued
Ovation of the Seas	7 31 22 | AK	SR	WW discharge 3.96 m3	Holding Tank discharge (overflow) ►NOV issued
Carnival Spirit	8 20 22 | TA	SR	GW Discharge in TA Volume unk	SR report through USCG ►NOV issued
Queen Elizabeth	6 7 22 | HNS	PC	EGCS discharge sheen	Pax reported discharge sheen from EGCS. FWD SPAR ►NOV issued
Star Breeze	2022 Season	Insp	Unauthorized discharge from holding tanks	Treated permeate but held in holding tank for unspecified time. ►NOV issued

Notes:
WHT: Port of Whittier
STK: Sitka
Hub: Hubbard Glacier
TA: Tracy Arm
SR= Self Report
PC= Public Complaint
HNS: Haines
YKA: Yakutat
JNU: Juneau
AK: Alaska Waters
H-Bay: Holkham Bay
Unk: unknown
FWD: Forward
USCG: United States Coast Guard
SPAR: Spill Prevention and Response Division of DEC

Table 3. 2022 Wastewater Sampling: GP Exceedances

Vessel	Sample Date	Sample No	Exceedance	Wastewater Type	pH (S.U.)	TR Chlorine (mg/L)	Fecal Coliform (FC/100mL)	BOD (mg/L)	TSS (mg/L)	Copper DISS (ppb)	Ammonia (mg/L)
Crown_UW	8/9/2022	AE 29843 R	BOD (D/M)	Mixed	7.89	0	0	82	0	2	67
Crown_UW	6/14/2022	AE 29193	FC	Mixed	7.92	0	42	8.4	0		
Crown_UW	7/12/2022	AE 29532	FC (D/M)	Mixed	7.70	0	44	3	0		
Eurodam	7/20/2022	AE 29704	BOD (D/M)	Mixed	7.60	0	0	62	0		
Grand_UW	7/31/2022	AE 29811	Chlorine	Mixed	8.00	10	0	blank	blank		
Jewel	10/12/2022	AE 30406	FC (D/M)	Mixed	7.05	0	690	0	0	0	35
Koningsdam	7/12/2022	AE 29533	FC	Mixed	7.47	0	60	0	0	1.1	44
Majestic_UW	7/13/2022	AE 29555	BOD	Mixed	7.65	0	0	61	0	4.6	50
Majestic_UW	7/27/2022	AE 29738	Chlorine	Mixed	6.56	0.1	0	3.4	0		
Ovation of the Seas	6/27/2022	AE 29434	BOD (D/M)	Mixed	7.36	0	0	98	0		
Ovation of the Seas	6/7/2022	AE 29164	FC	Mixed	7.43	0	50	9.7	10	14	27
Regatta_Port	6/6/2022	AE 29160	FC	Mixed	6.66	0	50	5.4	0	6.3	30
Royal_IP	8/3/2022	AE 29826	BOD (D/M)	GW	8.16	0	0	200	5.6	7	62
Royal_IP	9/20/2022	AE 30386	pH	GW	5.81	0	0	0	0	19	0.99
Royal_UW	5/18/2022	AE 28921	pH	Mixed	5.10	0	0	3.2	0	12	45
Ruby_IP	5/25/2022	AE 29041	pH, Copper	GW	5.99	0	0	4.1	0	91	0.34
Ruby_UW	6/13/2022	AE 29256	FC	Mixed	7.04	0	88	2.8	0		13
Ruby_UW	6/24/2022	AE 29398	FC (D/M)	Mixed	7.36	0	480	8.4	0		
Seabourn Odyssey	5/30/2022	AE 29064	Copper	Mixed	7.76	0	0	2.5	0	980	27
Seabourn Odyssey	7/31/2022	AE 29878	Copper	Mixed	7.53	0	0	3.8	0	97	
Spirit	10/6/2022	AE 30401	BOD (D/M)	Mixed	6.50	0	2	64	5.2	0	30
Star Breeze	5/24/2022	AE 29027	BOD (D/M)	Mixed	7.33	0	0	120	0		
Sun	5/23/2022	AE 29025	Copper	Mixed	7.03	0	0	9.3	5.6	110	37

Parameters exceed limits of GP limits.

Some vessels have different UW/IP discharges: UW=Underway, IP=In-Port(Stationary). Exceedances: D=Daily, M=Monthly. SampleNo.: R=Revised report received

INSPECTION FINDINGS

In 2022, onboard inspections were conducted both in-port and underway by ADEC inspectors. Most of the inspections were conducted and completed when the vessel was docked in-port or anchored in the port of Juneau, with a handful of vessels inspected in Sitka. The underway inspections included "one night" (vessel underway) on board the vessel when the vessel left Juneau to another port in Southeast Alaska. In-port inspections included both large vessels and small vessels whereas underway inspections were only conducted for large vessels.

The inspections included the large CPVs and small CPVs. Table 4 provides an overview of the conducted 2022 inspections.

Table 4. Inspection Reports 2022

2022 ADEC WQ Inspections Cruise Vessels	Total Inspections	In Port	Underway
Large CPVs	67	44	23
Small CPVs	18	18	0
Notes: Small vessels include Alaska Marine Highway System Ferries 8 of the in port inspections were re-inspections to follow-up on a specific compliance issue			

It should be noted that the underway inspections are limited in scope and observation of all the vessel environmental items due to time constraints. Also, the observations reflect only a part of environmental operation(s) of the vessel for that specific part of the voyage with a major focus on the operations of the discharges that occur in Alaska waters. When vessels are underway, their environmental operations are related to the area where the vessel is operating and the destination. The underway inspections that were planned between Juneau to the Port of Skagway, were revised due to landslides in the Port of Skagway. ADEC does not expect the railroad dock to be repaired for the 2023 season and vessels will need to take this into account when planning their voyages. ADEC plans to continue both underway and in-port inspections of all vessels entering Alaska in 2023.

Below is a summary of the operations of the vessels in 2022, based on the inspection observations of the large CPVs and small CPVs:

Large CPVs:

The large CPVs that were authorized to discharge in Alaska waters adhered to the set procedures and had their documentation in order. Large CPVs generally had all regulatory required documentation in place. However, some vessels that registered as 'non-garbage off-loading' vessels, had "garbage / waste" management procedures and plans on board, but these were not on file at ADEC CPVEC. ADEC was able to correct this during or immediately following inspections. Vessel Specific Sampling Plans (VSSP) were checked on-board during inspections and sample valves were correctly identified and marked (e.g., VSSP reference photo). Vessels had discharge procedures and overboard valve locking regimes in place. Wastewater discharge records (logbooks) were kept and maintained across the board and sample event observations confirmed that the field quality assurance/quality control was adhered to.

Early in the season, vessels did not operate with the maximum capacity of passengers, however, passenger capacity increased as the season progressed. When operating with a smaller number of passengers, some of the discharging vessels were able to operate their advanced wastewater treatment system (AWTS) at low capacity or could even hold all of their wastewater until it could be discharged outside of Alaskan waters (greater than three miles from shore). Some non-discharge vessels had vessel specific wastewater holding plans, to reflect the vessel holding operations. Such plans also demonstrated that the vessels could store the generated wastewater for the duration of the Alaska itinerary.

Most vessels use designated ballast water tanks (double bottom tanks) for treated, untreated wastewater and food waste storage. More information on ballast water tank operations and compliance with State and Federal law will be a focus for inspections in the 2023 season.

During underway inspections, it became apparent that some vessels need to check on the non-regulatory wastewater sampling methods and analysis that is being done on board. Some staff seemed unsure of what to test for or what limits they should expect the results to show. This could be attributed to new staffing after the COVID-19 pandemic, but ADEC hopes to see more confidence and knowledge regarding in-house sampling in following seasons. It should be a focus for industry to provide proper training the vessel staff.

There were two in-port discharges from exhaust gas cleaning systems (EGCS, also know as "scrubbers") this season that resulted in NOVs. An EGCS is designed to remove sulfur gas from stack

emissions allowing vessels to combust higher sulfur content fuels. Of the 41 large CPVs operating in Alaska waters this season, 28 vessels run heavy fuel oil and use EGCS, while the remaining 13 vessels run exclusively on low sulfur fuels (all of the inspected small vessels including the ferries run on low sulfur fuels). All vessels equipped with EGCS voluntarily switched over to the combustion of low sulfur fuels while in-port.

Small CPVs:

Small CPVs that discharged in Alaska waters had valid Best Management Practices (BMP) Plans and kept their wastewater discharge logbooks (records) up to date. Small CPVs had all their regulatory required documentation related to the Alaska regulations in place and an on board "garbage / waste" management procedure plan. Like large CPVs, the small CPVs had a slower start to the season and seemed to operate with less than the maximum capacity of passengers in the early months. Later in the season this changed, and passenger capacity ramped up.

ADEC conducted Vessel Specific Sampling Plans (VSSP) checks during inspections and sample valves were correctly identified and marked. In one case, an updated version of the VSSP was necessary and provided by the vessel after the inspection.

For the vessels operating under a BMP and alternative plan, the MSD wastewater treatment system was observed during the in-port inspection. Some vessels collected the regulatory BMP samples "in house" and delivered the samples to an approved laboratory. To do so the vessel samplers received quality assurance training for the sample draw, field testing, and chain-of-custody requirements. Observations were made that vessels that perform the regulatory "in house sampling" lacked correct instrument management, tracking, and the training provided did not include a curriculum of what was covered. This is currently under compliance review.

Discharges associated with small CPVs remains an area of concern, as the treatment capacity of these systems do not consistently produce the quality of treated wastewater that is expected from these systems. It appears that solids are not breaking down effectively during the treatment process, and, as a result, these MSD systems started to build up solids and sludge that resulted in high fecal coliform sample results. This is an issue ADEC expects to see improvement on in the upcoming season as 2 NOVs and 1 Notice of Enforcement were issued this 2022 season for high fecal coliform results.

Industry should make the operation and maintenance of their onboard MSD system a, if not 'the', highest priority prior to returning to Alaska for those systems that experienced substandard performance.

If there are any questions or concerns regarding this report, please contact the Cruise Ship Program Manager, Kaitlyn Raffier, at Kaitlyn.raffier@alaska.gov or 907-465-5138.

ONLINE RESOURCES

Alaska Department of Environmental Conservation (ADEC) Cruise Ship Program

http://dec.alaska.gov/water/cruise-ships/

2014 Large Cruise Ship General Permit

http://dec.alaska.gov/water/cruise-ships/cruise-general-permit/

Quality Assurance Project Plan

https://dec.alaska.gov/media/25446/clia-alaska-qapp-mar2022-finalweb.pdf

Alaska Cruise Ship Laws and Regulations

http://dec.alaska.gov/water/cruise-ships/laws-regs/