

2021 Annual Compliance Report Cruise Ship Wastewater

COMMERCIAL PASSENGER VESSEL ENVIRONMENTAL
COMPLIANCE (CPVEC) PROGRAM



November 2021



Alaska Department of Environmental Conservation

Cover Photo: Locked greywater overboard valve aboard the Carnival Miracle (8/7/21 DEC Inspection)

Abbreviations:

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AMHS	Alaska Marine Highway System (State Ferry System)
AS	Alaska Statutes
AWTS	Advanced Wastewater Treatment Systems
BMP	Best Management Practices
BOD	Biological Oxygen Demand (sampled parameter)
BW	Blackwater
CDC	Centers for Disease Control & Prevention
CLIA	Cruise Lines International Association
COD	Chemical Oxygen Demand (sampled parameter)
CPVEC	Commercial Passenger Vessel Environmental Compliance
FC	Fecal Coliform (sampled parameter)
GP	General Permit
GW	Graywater
MSD	Marine Sanitation Device
ND	Non-detect value
NOV	Notice of Violation
QAPP	Quality Assurance Project Plan
SC	Specific Conductance (sampled parameter)
LCPV	Large Commercial Passenger Vessel
TSS	Total Suspended Solids (sampled parameter)
VSSP	Vessel Specific Sampling Plan

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INTRODUCTION

This compliance report is prepared annually by the Alaska Department of Environmental Conservation (ADEC or the Department) Commercial Passenger Vessel Environmental Compliance Program (CPVEC or the Program). The intent of this report is to provide information on the Program's vessel wastewater monitoring and summary of compliance items¹.

- Large Commercial Passenger Vessels (CPVs): Eight (8) large cruise ships registered for the 2021 season; all eight vessels operated in AK waters. The reduced volume of large cruise ships was a result of the COVID-19 pandemic. The large cruise ships returned to Alaska on a limited scale, which included CDC limits on passenger capacities. As a result, a significant reduction of large cruise ship volume in the 2021 trade compared to the 2019 season. All the large vessel completed their 2021 itineraries, and the last vessel departed the Alaska trade on October 17, 2021 (e.g., Port of Juneau).
- Small CPVs: Of the eight (8) large vessels 6 (six) were non-discharge vessels, two (2) vessels registered as dischargers (i.e., were authorized to discharge to AK waters). The Norwegian Encore obtained a new 2021 the Authorization to discharge while underway in Alaska water under the State of Alaska General Permit (GP). The Silver Muse was previously authorized to discharge but did not discharge while in AK waters (The Muse obtained a waiver exempting them from sampling, so long as no discharges occurred). Fourteen (14) small vessels registered for the 2021 season, thirteen discharge vessels and one non-discharge vessel. Thirteen (13) vessels operated and discharged to AK waters under State approved Best Management Practices (BMP) plans. The National Geographic Orion (the only small non-discharge vessel, cancelled AK operations and did not operate in the state. All the small vessels completed their 2021 itineraries. Two Alaska Marine Highway System vessels, Matanuska and Kennicott, operated in AK waters in 2021.

The 2021 wastewater sampling reports include the sampling results of the large vessels, discharging under the Department General Permit, and the small vessels, operating under BMP plans.

- 2021 Large Cruise Ship Wastewater Sampling Report
- 2021 Small Cruise Ship and Ferry Wastewater Report

Both reports can be found at <https://dec.alaska.gov/water/cruise-ships/cruise-reports/>

¹ This report does not summarize emissions or air opacity items. The responsibility for those items was transferred to the ADEC Division of Air in 2019.

WATER QUALITY SUMMARY

Objective 1:

All commercial passenger vessels (>50 passengers, determined by lower berths) operating in marine waters of the state shall have 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. AS 46.03.100. Waste Management and Disposal Authorization. Statute requires the permitting and compliance of wastewater discharge permits in the State of Alaska.

Results. The CPVEC program receives notices of intent to discharge under the general permit for qualifying vessels. All authorizations were granted before vessel discharges in state waters.

2014 GP Authorizations:

For 2021, one (1) new GP authorization was granted to the Norwegian Encore, a new vessel to the Alaska Trade. The remaining seven (7) large vessels did not discharge in Alaska waters.

BMP plans:

Six (6) BMP plan approvals covered the thirteen (13) small ships operating in AK waters in 2021. UnCruise Adventures operated under a fleetwide BMP plan covering four vessels. Two recent vessel builds operated by Lindblad Expeditions (NG Quest and NG Venture) operated under Conditional BMP Plans.

Objective 2:

Commercial passenger vessels comply with all terms and conditions required by state and federal law and water quality standards are maintained. This includes sampling two times a month while discharging in Alaska waters. The 2021 AK had only one large commercial passenger vessel discharging wastewater; one (1) vessel out of eight (8) large vessels operating in AK in 2021. This was a decrease in wastewater sampling compared with the 25 large vessels discharging wastewater in 2019, the last full season prior to Covid-19. Regarding small vessels, all operated under approved BMP plans. Effluent sampling resulted in repeated exceedances of wastewater effluent. Four routine samples were conducted on the two AMHS ferries resulting in one exceedance for fecal coliform, but the 360 FC/100ml value did not warrant a resample.

Authority. AS 46.03.462. Terms and Conditions of Discharge Permits.

Statute requires commercial passenger vessels obtain and comply with terms and conditions of permits or meet all standards established for the protection of ambient water quality when discharging into Alaska marine waters.

Results. Norwegian Encore was sampled six times in 2021 with no wastewater exceedances.

For small vessels there were 31 BMP effluent exceedances (FC, TSS, or TRC) in 2021, 25 of the 41 samples (61%) had at least one exceedance. In 2019 there was 20 effluent exceedances, 17 out of 34 samples (50%). Small vessel compliance items related to sampling are listed in Table 5 at the end of the report.

Products

Sample Events: Large Vessel: 6 large cruise ship effluent samples (one vessel)
Small Vessels: 41 small cruise ship effluent samples were collected

Enforcement: Large Vessels - Sampling:
 No violations of wastewater occurred.

Large Vessels – GP/Monitoring:
 Two unauthorized discharge events

- Celebrity Millennium (Alleged Wastewater spill, Public complaint, reviewed and source of spill undetermined.)
- Nieuw Amsterdam self-reported a spill of spa water resulting from a broken pipe.

Four EPA Vessel General Permit (VGP) Self-Reported Items

Small Vessels - Sampling:
 31 violations of BMP wastewater treatment system effluent quality.

Small Vessels – BMP/Monitoring:
 Eleven (11) small vessel BMP violations resulting from onboard inspections. (See Table 6) resulting in nine Compliance Letters and 2 Notices of Enforcements.

Related primarily to:

- wastewater discharge record keeping,

- MSD records retention,
- Sampling QA QC

Compliance:

Small Vessels:

Nine (9) Compliance Letters were issued, all vessels that received Compliance Letters are working to resolve the identified noncompliance conditions and these cases are pending resolutions. In most cases this involves updating their BMP plans and getting revisions approved by the ADEC permitting group in Anchorage. Settlement of the 2 (two) Notices of Enforcement is ongoing.

Monitoring:

In 2021 ADEC CPVEC conducted in port inspection for most vessels operating in AK waters; six of the eight large vessels and all 13 of the small vessels were inspected while in-port. One underway was conducted on the Norwegian Encore, the only discharging large vessel during the 2021 AK season.

Table 6 includes a brief overview of compliance observations made during onboard inspections on small vessels. No compliance items were documented onboard large vessels in 2021. Vessel inspections times were announced in advance and COVID-19 protocols (varied by vessel, some requiring COVID-19 testing prior to entry) were accommodated.

Inspections allow the program to review documentation, observe the wastewater/MSD system onboard, review items related to waste production/disposal (solid waste, hazardous waste, etc.), and observe items relating the EPA-VGP.

Large Vessels:

- Environmental (regulatory) documentation (e.g., logbooks)
- State of Alaska GP
- Waste handling plans
- Valve operating and locking regimes
- Wastewater discharge items (Table 3)
- EPA VGP Items (Table 4)

Small Vessels:

- MSD II performance and capability
- Elevated fecal coliform levels found in average effluent results
- High chlorine levels, mostly during resample events where chlorine is over-used to lower fecal coliform counts
- Discharges of untreated or partially treated wastewater

Norwegian Encore had no exceedances of the 2014 GP out of six samples during the abbreviated season. During the inspection of the large vessels was identified that the large vessels had accrued during the lay-up period during the COVID pandemic, significant layers of under waterline marine growth. Some of the large vessels underwent in the Port of Ketchikan underwater hull cleaning. During the cleaning process was only micro hull (marine) growth removed. Because most of the large vessels, if not all, did not receive underwater hull maintenance during the non-revenue service period (e.g., lay-up); for the vessel that visit Alaska this is a concern.

The Department has concerns regarding the upward trend of fecal coliform (FC), total suspended solids (TSS), and chlorine values in the BW and GW discharges under the BMP.

Enforcement. The Department issued a total of nine (9) Compliance Letters, from which six (6) compliance cases are resolved and three (3) vessels noncompliance conditions are pending completion (resolution), and two (2) Notices of Enforcement are pending resolution.

Compliance. The Department monitored for the large vessel the wastewater discharges for 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, enforced during the 2015 through 2019 cruise ship seasons.

BMP Vessels. The overall effluent quality from small commercial passenger vessels and state ferries has improved since the implementation of the BMP plans. However, in 2021 the small vessels, except for the AMHS Ferries, were not able to maintain acceptable wastewater discharge quality levels under the BMP's.

The 2021 BMP compliance Items can be divided in two groups:

- BMP compliance items related to the BMP plan conditions: This includes operations conducted onboard, such as wastewater discharge record keeping and MSD maintenance / operation record keeping. These items are typically identified during field inspection conducted onboard.
- BMP MSD performance items: This includes effluent sample results used to confirm the effluent quality and proper MSD operations. These items are typically identified by the preliminary sample results and confirmed with review of the final sample report.

Table 6 includes a summary overview of 2021 compliance and enforcement actions and overall compliance status of the small vessels. The noncompliance items were identified by ADEC CPVEC inspectors during the on-board inspections in the 2021 cruise season. Two vessels left AK waters (or ended revenue service) prior to achieving acceptable performance (sample based) results from their MSD effluent. Three vessels were unable to meet their sampling goals as outlined in their VSSP. One vessel, American Constellation, failed both goals. Because the entire season was spent resampling due to effluent exceedances those vessels that needed more than one routine sample event were unable to meet that goal. It should be noted that these vessels are continue working with ADEC CPVEC to resolve these BMP noncompliance conditions.

In general, the 2021 inspections and sample results included significant increase of non-compliance items, poor effluent quality for fecal coliform and TSS compared to the 2019 season. The vessel operational changes and or vessel management changes associated with the Covid-19 pandemic

most likely contributed to the increase of noncompliance items. Most noncompliance items were related to the MSD / wastewater treatment system (effluent / discharge) performance. Many vessels were taken out of service for a prolonged period and placed in lay-up status following the 2019 season. In the absence of voyages (fall 2019 – spring 2021) the wastewater treatment systems and related tanks were not used or operated at very reduced capacities (i.e., lack of passengers). MSDs and wastewater tanks not properly prepped for storage or operated at reduced loads are subject to significant bacterial aftergrowth and solids accumulation. This will result in a deteriorated wastewater influent (untreated wastewater) quality (load), which the MSD / wastewater treatment system cannot handle upon return to revenue service. These conditions in addition to new officers in charge (i.e., chief engineer, assistants, vessel technical management etc.) would explain the high number of poor-quality effluent samples (high fecal coliform and TSS levels) encountered in 2021. The AMHS ferries sample results were in line with the BMP expectations; the Matanuska had similar results to 2020 (it did not operate in 2019) and Kennicott showed improved effluent quality compared with 2019 and 2020, in both years it had one(1) FC exceedance for every three (3) sample events. This shows that sound operational practices, regimented maintenance operations and overall commitment to the environment, and the dedication to aim for continuous improvement of the effluent discharge quality.

However, additional work is still needed on some ships to meet the standards for suspended solids, fecal coliform, BOD, and chlorine.

Conclusion the path forward:

Overall results of the BMP sampling program and the inspection results in 2021 revealed that there is ample room of improving for the future upcoming seasons. The 2021 sample results represent an unacceptable performance of the SCPVs MSD / wastewater treatment systems. To avoid a repeat of the MSD / wastewater treatment systems performance issues as we have seen in 2021, the CPVEC program will require the following steps before and during the 2022 season:

- SCPVs that opt to discharge under a BMP Plan in 2022 are required:
 - o Before initial arrival in Alaska waters, the vessel must provide written documentation ('proof') that the vessel wastewater treatment process related tanks, including the MSD unit, are cleaned, and inspected.
 - o Before initial arrival in Alaska waters, a representative sample result (not older than 10 days) must be provided, to confirm that the MSD / wastewater treatment system, and the applicable after treatment systems, are working and properly operated. If the (preliminary) sample result points to a not working MSD / WW treatment system, the vessel shall provide any corrective actions and schedule a resample.
 - o Upon initial arrival at the first Port in Alaska, an MSD / wastewater treatment system discharge representative sample must be taken to verify proper working / treatment of the generated wastewater. The preliminary results are required within three days of the sample date.
- If the vessel initial sample results indicate a problem with the wastewater treatment system, the Department may request that weekly sampling and corrective action reports be submitted until acceptable results are obtained. Timely assessment, corrective actions (including vendor/manufacturer assistance) and resamples will be requested to reduce the discharge of poor-quality effluent to AK waters.

The CPVEC program will continue to work with small cruise ships and AMHS to improve overall wastewater effluent quality. Small cruise ships and state ferries continue to balance bacterial

digestion processes with chlorine disinfection. Chlorine is used to sterilize effluent, but it is toxic to marine organisms and high residuals (over-dosage) must be avoided. Several vessels have installed equipment to dechlorinate the treated wastewater. For the MSD / wastewater treatment systems that rely on the chlorination aftertreatment and for GW tank treatment, de-chlorination may be required.

Since the beginning of the CPVEC program and implementation of the small cruise ship BMPs several vessels have shown improvements and more consistent performance of their MSD units. Unfortunately, for the 2021 season it became evident that some ships continue to exceed standards for fecal coliform, TSS, chlorine. Most of these treatment systems are not designed to treat BOD, but perhaps high values can be minimized.

In 2021, two major compliance issues were identified that warrant 2022 oversight that is focused to avoid a repeat of the 2021 issues.

The small vessel compliance focus / actions for the 2022 season include:

- 1) MSD Wastewater treatment System Operational Instructions: Accessible operational instruction for the wastewater treatment system must be onboard. This includes a trouble shooting process, action-plans and other documented elements that support good operation practices of the wastewater treatment system. A copy of this documentation must be on file with CPVEC and submitted before the vessel arrives in Alaska waters. Most vessels already have these plans in place.
- 2) Fecal coliform + TSS levels: Multiple vessels had FC exceedances that resulted from influent bacterial loads and the influent ‘solids load’. In addition, some vessels struggled with maintaining sufficient chlorine levels. By correcting the mechanical and process issues and or increasing the dosage the vessels were able to arrive to some degree to reduce the FC levels, but the process was slow. Several vessels required multiple re-sample events to correct and improve the performance. About 25% of blackwater samples contained high chlorine levels; TRC > 5 mg/L while AKWQS are exceeded at 0.10 mg/L.>

Raising the chlorine dosage was in many cases not a “tool” that was effective to increase the overall MSD / wastewater treatment system performance. A more structural approach is required to improve the effluent performances. This includes the tanks cleaning, pre-season performance sampling, initial arrival sampling and finally more specific operational instructions for the operators, including process monitoring and troubleshooting. The vessels will need to work within their ADEC approved BMP plans to diagnose and conduct corrective actions to improve overall effluent quality entering Alaska waters.

- 3) Process Sampling Monitoring: The vessels typically do not engage in frequent MSD / wastewater treatment system process monitoring by sampling. Vessel could improve their wastewater treatment process by regular (daily) sampling and adjusting the process parameters (e.g., de-sludging, chlorine injection, pH etc.). Although ‘process sampling’ on board is not the same as the regulatory sampling it does help to support the process and could identify issues early. Manufacturer/vendor recommended MSD maintenance and operational instructions must be adhered too, this item will again be included onboard inspections conducted in 2022.

ADEC CPVEC is looking forward to work with the vessels to maintain more solid compliance status then was observed in 2021.

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

Table 1. 2021 Large Commercial Passenger Vessel Inspections

Vessel	Status	Inspection	Date	Location	Reports
Carnival Miracle	Non-Discharger	Yes In Port	8/7/2021	JNU	1
Celebrity Millennium	Non-Discharger	Yes In Port	8/17/2021	JNU	1
Nieuw Amsterdam	Non-Discharger	Yes In Port	8/9/2021	JNU	1
Norwegian Encore	Discharger	Yes In Port + Underway	8/11/2021	JNU / AK waters	2
Majestic Princess	Non-Discharge	Yes In Port	8/3/2021	JNU	1
Serenade of the Seas	Non-Discharge	Yes In Port	8/19/2021	JNU	1
Ovation of the Seas	Non-Discharge	No delay weather / Covid	N/A	N/A	0
Silver Muse	Non-Discharge	No delay weather / Covid	N/A	N/A	0
Total					7

Table 2. 2021 Small Commercial Passenger Vessel Inspections

Vessel	Status	Inspection	Date	Location	Reports
Kennicott	Discharger	Yes In Port	7/7/2021	JNU	1
Matanuska	Discharger	Yes In Port	8/1/2021	JNU	1
Admiralty Dream	Discharger	Yes In Port	6/18/2021	JNU	1
Chichagof Dream	Discharger	Yes In Port	6/11/2021	JNU	1
American Constellation	Discharger	Yes In Port	6/14/2021	JNU	1
NG Quest	Discharger	Yes In Port	6/12/2021	JNU	1
NG Sea Bird	Discharger	Yes In Port	7/6/2021	JNU	1
NG Sea Lion	Discharger	Yes In Port	6/30/2021	JNU	1
NG Venture	Discharger	Yes In Port	6/6/2021	JNU	1
S.S. Legacy	Discharger	Yes In Port	5/22/2021	JNU	1
Wilderness Adventurer	Discharger	Yes In Port	6/11/2021	JNU	1
Wilderness Discoverer	Discharger	Yes In Port	5/30/2021	JNU	1
Wilderness Explorer	Discharger	Yes In Port	5/30/2021	JNU	1
Total					13

Table 3: 2021 LV Wastewater Reported Spills and Unauthorized Discharges

Ship	Date	Location	Discharge	Volume	ADEC Action
Millennium	7/29/2021	Tongass Narrows	Wastewater discharge (Public complaint)	Unknown	Closed
Nieuw Amsterdam	8/19/2021	Ketchikan	Hot tub water (EPA VGP)	0.5 m ³	Closed

Table 4: 2021 LV General Incidents – EPA Vessel General Permit Items

Ship	Date	Location	Incident	Self-reported	ADEC Action
Nieuw Amsterdam	8/8/2021	Sitka	Lifeboat steel pin fell overboard	Yes	Not recoverable
Majestic PCL	9/9/2021	Lynn Canal	Mobilephone fell overboard	Yes	Not recoverable
Majestic PCL	9/22/2021	Skagway	Washbrush fell overboard	Yes	Not recoverable
Nieuw Amsterdam	8/23/2021	Underway	Mobilephone fell overboard	Yes	Not recoverable
Majestic PCL	9/22/2021	Skagway	Gangway Shackle pin fell overboard	Yes	Not recoverable

Table 5. 2021 SV Wastewater Issues

Operator	Vessel	Date (initial sample)	WW Compliance Item	Action	Outcome - End of Season
Alaska Dream Cruises	Admiralty Dream	6/26/2021	Initial sample Rejected by Lab (Temperature Item)	1 X resampling event	no wastewater issues
Alaska Dream Cruises	Chichagof Dream	6/21/2021	Wastewater Treatment Performance / Effluent Quality Items	3 X resampling events	MSD performance issues not resolved
American Cruise Lines	American Constellation	6/14/2021	Wastewater Treatment Performance / Effluent Quality Items	1 X resampling event	MSD performance issues not resolved
AMHS	Kennicott	5/12/2021, 8/4/2021	quarterly samples \ no issues		no wastewater issues
AMHS	Matanuska	6/6/2021, 8/1/2021	Quarterly samples \ Effluent Quality Items	No Re-sampling Required	MSD Effluent Quality Item within BMP Range, Slightly elevated fecal coliform for 8/1 sample.
Lindblad Expeditions	NG Quest	6/12/2021	Wastewater Treatment Performance / Effluent Quality Items	2 X resampling events	Corrective Actions Reports Wastewater treatment operations / MSD System Completed
Lindblad Expeditions	NG Sea Bird	7/16/2021	none		no wastewater issues
Lindblad Expeditions	NG Sea Lion	7/10/2021	Wastewater Treatment Performance / Effluent Quality Items	1 X resampling event	Corrective Actions Reports Wastewater treatment operations / MSD System Completed
Lindblad Expeditions	NG Venture	6/20/2021	Wastewater Treatment Performance / Effluent Quality Items	3 X resampling events	Corrective Actions Reports Wastewater treatment operations / MSD System Completed
Uncruise	SS Legacy	5/22/2021	Wastewater Treatment Performance / Effluent Quality Items	2 X resampling events	Corrective Actions Reports Wastewater treatment operations / MSD System Completed
Uncruise	Wilderness Adventurer	6/11/2021	none		no wastewater issues
Uncruise	Wilderness Discoverer	6/20/2021	Wastewater Treatment Performance / Effluent Quality Items	4 X resampling events	MSD performance issues not resolved
Uncruise	Wilderness Explorer	5/30/2021	Wastewater Treatment Performance / Effluent Quality Items	4 X resampling events	Corrective Action Reports Wastewater treatment operations / MSD System Completed

Table 6. 2021 SV BMP Issues

Operator	Vessel	Facility Number	Date	Event	Action
AMHS	Kennicott	920.45.067	8/3/2021	QAPP onboard Incomplete Discharge Logs	Compliance Letter
AMHS	Matanuska	920.45.085	8/1/2021	Wastewater discharge Log Item	Resolved during Inspection
Alaska Dream Cruises	Chichagof Dream	920.45.105	6/29/2021	Failure to maintain MSD logs onboard Incomplete Discharge Logs Failure to provide Sampler Qualifications	Compliance Letter
American Cruise Lines	American Constellation	920.45.063	8/6/2021	Incomplete Discharge Logs Failure to maintain MSD logs onboard No Alaska Agent provided with Registration Failure to maintain BMP Training logs Failure to maintain current VSSP onboard	Compliance Letter
Lindblad	NG Quest	920.45.061	7/7/2021	Failure to provide Sampler Qualifications	Compliance Letter
Lindblad	NG Sea Bird	920.45.092	7/26/2021	Discharging in AK waters without an approved BMP Failure to use V2 Tank, an integral component of MSD Failure to provide Sampler Qualifications Failure to maintain Discharge Logs onsite	Notice of Enforcement
Lindblad	NG Sea Lion	920.45.093	7/30/2021	Discharging in AK waters without an approved BMP Failure to provide Sampler Qualifications Failure to maintain Discharge Logs onsite	Notice of Enforcement
Lindblad	NG Venture	920.45.068	7/1/2021	Failure to provide Sampler Qualifications Incomplete Discharge Logs	Compliance Letter
Uncruise	SS Legacy	920.45.095	7/2/2021	Incomplete Discharge Logs Failure to maintain MSD logs onboard	Compliance Letter
Uncruise	Wilderness Adventurer	920.45.096	6/22/2021	Failure to maintain Discharge Logs onboard Failure to maintain MSD logs onboard	Compliance Letter
Uncruise	Wilderness Discoverer	920.45.097	6/28/2021	Failure to maintain Discharge Logs onboard Failure to maintain MSD logs onboard Failure to provide preliminary sample results to ADEC	Compliance Letter
Uncruise	Wilderness Explorer	920.45.098	6/16/2021	Failure to maintain Discharge Logs onboard Failure to maintain MSD logs onboard	Compliance Letter