2020 Small Cruise Ship and Ferry Wastewater Sampling Report

COMMERCIAL PASSENGER VESSEL ENVIRONMENTAL COMPLIANCE (CPVEC) PROGRAM

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Revision 0

Alaska Department of Environmental Conservation

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)
CLIA	Cruise Lines International Association
COD	Chemical Oxygen Demand (sampled parameter)
FC	Fecal Coliform (sampled parameter)
GW	Graywater
MSD	Marine Sanitation Device
ND	Non-detect value
QAPP	Quality Assurance Project Plan
SC	Specific Conductance (sampled parameter)
TSS	Total Suspended Solids (sampled parameter)
VSSP	Vessel Specific Sampling Plan

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REVISION NOTES

Revision 0 | Revisions not applicable

INTRODUCTION

This wastewater sampling report is prepared annually by the Alaska Department of Environmental Conservation (ADEC or the Department) Division of Water Commercial Passenger Vessel Environmental Compliance Program (CPVEC or the Program). This report summarizes wastewater sampling results for small commercial passenger vessels (SCPVs or cruise ships)[1] and Alaska Marine Highway Ferry System (AMHS) vessels discharging in Alaska waters[2] in 2020. Appendix A provides vessel information and Appendix B provides wastewater sampling results.

For 2020, 19 vessels registered with 14 of those intending to discharge to AK waters: 12 SCPVs and 2 AMHS vessels (Table A1). Due to the impacts of COVID-19, and circumstances beyond the control of the State of Alaska or the cruise industry, only one SCPV, Uncruise Wilderness Adventurer, operated in AK waters. The vessel was unable to complete the voyage and subsequently cancelled operations and left Alaska. Two AMHS vessels, Kennicott and Matanuska, operated and conducted sampling (n=4, two events per vessel).

Discharging SCPVs are required to sample once during the season and AMHS vessels sample every 3 months of operation (4 samples total, assuming year-round operation). Sampling is necessary to:

- Verify that Marine Sanitation Devices (MSD) onboard are achieving good effluent quality in accordance with their BMP Plans;
- Document treatment system performance for future BMP Planning; and
- Gather information on potential environmental impacts from smaller commercial vessels operating in AK waters.

Alaska law (AS 46.03.463) puts discharge limits on Fecal Coliform (FC) and Total Suspended Solids (TSS). If an exceedance of FC or TSS occurs, then the vessel's Best Management Plan (BMP) directs them to take corrective action, report to ADEC, and resample to confirm compliance. To ensure quality data is obtained, each vessel must have a Vessel Specific Sampling Plan (VSSP) and Quality

[1] SCPVs have overnight accommodations (lower berths) for 50 to 249 passengers.

[2] Alaska water extends 3 miles from the coastline and includes the Alexander Archipelago.

Assurance Project Plan (QAPP), approved by ADEC. Deadlines for these and other required documents are listed in Table A2.

BACKGROUND

SCPVs and AMHS vessels produce two types of wastewater: sewage[3] and graywater. Sewage is wastewater from ship's toilets and medical facilities. Graywater is wastewater from accommodations (showers/sinks), galley areas, and laundry. Any combination of sewage and graywater will be referred to as mixed wastewater in this report, but technically it is considered sewage.

Marine Sanitation Devices (MSD) are required for the discharge of treated sewage and must meet performance requirements[4] for US Coast Guard approval of Type II MSD systems for vessels operating in US waters. AMHS vessels and many small cruise ships process graywater through their MSD, although due to limited holding capacity, some vessels discharge untreated graywater directly overboard. Advanced Wastewater Treatment Systems found in larger cruise ships are not feasible on smaller vessels due to physical constraints (stability/space), economic feasibility, or both. These limitations led the State of Alaska to implement a Best Management Practices (BMP) program for SCPVs and AMHS vessels.

Regulations require the BMP to include certain elements, such as inclusion of no discharge areas, (18 AAC 69.046 (c)). Though not in regulation, the Department has begun working with operators to avoid discharges in the Port of Ketchikan. The National Park Service prohibits discharge in several federally managed areas of concern, such as Glacier Bay Park and Preserve.

REQUIREMENTS

SCPVs and AMHS vessels may not discharge sewage unless the sewage has been processed through a properly operated and maintained marine sanitation device (AS 46.03.463)[5]. SCPVs and AMHS vessels are required to meet standard terms and conditions, or seek alternative terms and conditions with BMP plans, to discharge wastewater in Alaska marine waters. Alaska State Statues allowing alternative terms and conditions were updated in 2017. Subsequently, regulations were updated, and multiple ships modified their BMPs in 2018.

[3] Previous reports use the term "blackwater" in place of sewage.

[4] Performance is measured under controlled test conditions.

[5] Determination of a properly maintained MSD is described 18 AAC 69.080.

Standard terms and conditions for treated sewage, graywater, and other wastewater in AS 46.03.463 align with the USCG limits for approved Type II MSDs in 33 CFR 159.53(b). Wastewater must contain no more than 200 FC per 100 milliliters and no more than 150 milligrams per liter of TSS. Traditionally sewage has had the highest median fecal coliform results, although very high results have also been found in graywater. Since 2016, the Department has allowed vessels with separate graywater discharges to sample graywater every other year.

METHODS

Wastewater sampling consists of grab samples taken from the MSD overboard pipe (described in the VSSP) while the vessel is discharging. The VSSP also describes appropriate sampling times, to ensure samples are representative of wastewater discharges into Alaska waters. Sampling follows the requirements in the vessel's approved QAPP. The QAPP specifies minimum requirements for collection and analysis of wastewater samples. It includes a list of approved methods, data quality objectives, and responsibilities of the parties that approve the document.

Sampling may occur while underway or while docked (stationary), typically in Southeast Alaska. Most samples are obtained in Juneau (or underway in route to Juneau), to meet sample holding times requirements in the QAPP.

Laboratory analysis was conducted locally by Admiralty Environmental, with some samples being shipped to the lower 48 for analysis by a subcontractor (Microbac Laboratories, Inc). The CPVEC Program reviews results submitted by the SCPV and AMHS vessel operators for compliance with the QAPP and VSSPs.

RESULTS

Laboratory results are presented in Appendix B. No summary data is provided for the 4 samples taken in 2020.

Duplicate Samples

One duplicate sample was taken during the 8/5/20 Kennicott sampling event, Sample Number AE 25051. This duplicate is a quality control sample taken in accordance with the approved QAPP and

is not included in Table B1, however the fecal coliform result was 160 FC/100 ml; hence the reported sample number of 250 FC/100 mL was not flagged as an exceedance in this report.

EXCEEDANCES

Table 2 provides an Exceedance summary for discharging vessels sampled in 2020. Most MSD systems on small vessels incorporate chlorination into the treatment process. Chlorine is sampled, but resampling is only requested when FC or TSS is exceeded.

2 AMHS vessels were sampled during 4 sampling events in 2020. All four samples were composed of mixed wastewater.

Table 2. 2020 Wastewater Exceedance Summary

2020 Wastewater Exceedances: Small Cruise Ship and AMHS Vessels

Vessel Name	WW Type	Samples Taken (Total)	2020 Exceedances (count)			VESSEL Resampled (Y/N/NR)
			Fecal Coliform (>200FC /100ml)	Total Suspended Solids (>150 mg/L)	Total Chlorine[1] (>1 mg/L)	
Kennicott	MIX	2	1	0	1	No

[1] Resampling is not reuired for Total Chlorine exceedances.

CONCLUSION

Due to insufficient sampling in 2020, no conclusions are warranted.

ONLINE RESOURCES

Alaska Department of Environmental Conservation (ADEC) Cruise Ship Program

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

Small Cruise Ship Discharge Options

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

Alaska Cruise Ship Laws and Regulations

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

Sample reports and summaries from other years

https://dec.alaska.gov/water/cruise-ships/cruise-reports/

APPENDIX A: SMALL COMMERCIAL PASSENGER VESSEL AND AMHS VESSEL INFORMATION

Table A1: 2020 Wastewater Discharge Status for Small Commercial Passenger Vessels

Alaska Department of Environmental Conservation FINAL 2020 Season Status (11.25.20)

2020 Small[1] Commercial Passenger Vessels Discharge Status & Wastewater Treatment

Vessel Operator	Vessel Name	Wastewater Treatment System [2]	Units	Passenger Capacity [3]	Crew Capacity	Planned Voyages [6]	Annual Passenger capacity [4]	2020 Discharge in AK waters [5, 6]
AMHS, State of Alaska	*Kennicott*	Orca II 500	3	748	42	Varies	N/A	Yes
AMHS, State of Alaska	*Matanuska*	Omnipure 15MX	3	498	50		N/A	Yes
Alaska Dream Cruises	*Admiralty Dream*	Omnipure 12M	1	66	21	19	1254	AK Season Cancelled
Alaska Dream Cruises	*Chichagof Dream*	Orca II A-500	1	81	27	14	1134	AK Season Cancelled
Columbia CS	*Bremen* ND	Hamworthy RT 80	1	155	94	1	155	AK Season Cancelled
Columbia CS	*Hanseatic Nature* ND			240	175	1	240	AK Season Cancelled
Lindblad/Nat. Geographic	*NG Orion* ND	Triton Format MSTP 7 Standard	1	102	69	7	714	AK Season Cancelled
Lindblad/Nat. Geographic	*NG Quest*	G&O Bioreactor BR-37000 BG-V	1	100	50	16	1600	AK Season Cancelled
Lindblad/Nat. Geographic	*NG Sea Bird*	Omnipure 12MX	1	62	28	20	1240	AK Season Cancelled
Lindblad/Nat. Geographic	*NG Sea Lion*	Omnipure 12M	1	62	28	24	1488	AK Season Cancelled
Lindblad/Nat. Geographic	*NG Venture*	G&O Bioreactor BR-37000 BG-V	1	100	50	20	2000	AK Season Cancelled
Silver Expeditions	*Silver Explorer* ND	AquaMaster Unex Bio 200 E	1	144	130	3	432	AK Season Cancelled
UnCruise Adventures	*Safari Endeavor*	Omnipure 12M	2	86	35	18	1548	AK Season Cancelled
UnCruise Adventures	*S.S. Legacy*	Red Fox RF-2000-FP	1	92	34	14	1288	AK Season Cancelled
UnCruise Adventures	*Wilderness Adventurer*	Omnipure 12MX	1	64	23	25	1600	AK Season Cancelled**
UnCruise Adventures	*Wilderness Discoverer*	Headhunter TW-HMX-6004LP	2	78	24	20	1560	AK Season Cancelled
UnCruise Adventures	*Wilderness Explorer*	Headhunter TW-HMX-6004LP	2	76	26	22	1672	AK Season Cancelled
Vships	*Scenic Eclipse* ND	Martin BMA 600S (AWTS)		237	176	2	474	AK Season Cancelled
Windstar	*Star Breeze*	Rochem Biofiltration (AWTS)	1	312	155	8	2496	AK Season Cancelled
					Totals [6]	**234**	**20,895**	

[1] Small commercial passenger vessels have overnight accommodations for 50 to 249 passengers (based on lower berths).

[2] Nondischarging vessels are not required to provide treatment system information. AWTS=Advanced Wastewater Treatment System (not typical on small vessels).

[3] Based on the number of lower berths for small cruise ships. Based on max. passenger capacity for Alaska Marine Highway System (AMHS) vessels.

[4] Assumes full capacity on every voyage.

[5] Alaska water extends 3 miles from the coastline and includes the Alexander Archipelago.

[6] AK Season cancelled due to COVID-19 and **no** voyages completed. Table shows original voyage count (uncompleted) from 2020 Registration. ** One voyage attempted but ended early.

Vessels highlighted in gray (and indicated by 'ND') have registered as non-discharge vessels for the 2020 Cruise Ship Season.

Table A2: Requirements and 2020 Deadlines for Small Commercial Passenger Vessels

Document	Authority	Due Date
PRE-SEASON Requirements:		
REGISTRATION & Notarized Signature Page	AS 46.03.461, 18 AAC 69.010	March 1, 2020
Non-hazardous Solid Waste Offloading and Disposal Plan	AS 46.03.475(e)(1), 18 AAC 69.035	March 1, 2020
Hazardous Waste and Substance Offloading Plan	AS 46.03.475(e)(2), 18 AAC 69.040	March 1, 2020
Requirements if Discharging IN ALASKAN WATERS:		
Quality Assurance Project Plan (QAPP)	AS 46.03.465, 18 AAC 69.025	3/1/2020 (new plans)
Best Management Practices (BMP) Plan [1]	AS 46.03.462(k)	March 1, 2020 (new plans)
Vessel Specific Sampling Plan (VSSP)	18 AAC 69.030, AS46.03.465 (b)	VSSP is required 21 days before sampling
Wastewater Sampling - LAB RESULTS	18 AAC 69.055	21 days after analytical testing is complete
OTHER Requirements:		
Documents referenced in vessel BMP. MSD Documentation (Maintenance, Daily Logs), Discharge Logs, and other documents required to be maintained onboard.	18 AAC 69.045	Upon Request from ADEC
Voyage Report and Deviation Report to document any	18 AAC 69.015, 18 AAC 69.065	November 15, 2020

[1] For discharge under alternate terms and conditions. Vessels with no BMP need to apply for a permit meeting terms under Alaska statue 46.03.462(b).

APPENDIX B: WASTEWATER RESULTS

Table B1. 2020 Mixed Wastewater (SEWAGE + GW) Sampling: AMHS Vessels

				Field				Convention I			Convention II							Nutrients			
Analyte[1]				**Temp**	**pH**	**Free Cl**	**Total Cl**	**Fecal Coliform**	**TSS**	**BOD**	**Ammonia (as N)**	**COD**	**S.Conductance**	**Oil & Grease**	**Alkalinity (Total)**	**Hardness (CaCO3)**	**Settleable Solids**	**TOC**	**Nitrate-Nitrite**	**Kjeldahl Nitrogen**	**Phosphorus**
Units			**IP/UW (InPort/ Underway)**	°C	SU	mg/L	mg/L	FC/100ml	mg/L	mg/L	mg/L	mg/L	umhos/c	mg/L	mg/L	mg/L	ml/L	mg/L	mg/L	mg/L	mg/L
Alaska Marine Water Quality Standards, AS 46.03.463, or Secondary Treatment Standard.				N/A	6.5-8.5	N/A	0.008	200	150	60	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vessel Name	**Date**	**Sample #**																			
Matanuska	7/28/20	AE 25049	IP	18.5	6.58	0	0.81	54	101	190	11	580	17,600	17.7	100	1,700	0.2	7.4	0.15	33	3.14
Kennicott	8/5/20	AE 25047	IP	16.3	7.94	3.1	3.5	250	8.4	0	0.23	360	28,300	0	71	3,100	0	0	0	0	0
Matanuska	9/8/20	AE 25050	IP	16.2	7.44	0	0	27	37	81											
Kennicott	9/16/20	AE 25048	IP	16.7	7.30	0	0	3,400,000	54	120											

[1] Not Analyzed or "No Data"

Table B2. 2020 Metals Results: AMHS Vessels

			DISSOLVED [1]				**TOTAL** [1]				
			Copper	Lead	Nickel	Zinc	Copper	Lead	Nickel	Zinc	Mercury
Units			µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg	µg/mg
Alaska Marine Water Quality Standards			3.1	8.1	8.2	81	N/A	N/A	N/A	N/A	0.94
Vessel Name	**Date**	**WW Type**									
Matanuska	7/28/20	Mixed	340	ND	43	80	600	ND	43	110	ND
Kennicott	8/5/20	Mixed	38	ND	ND	ND	54	ND	ND	ND	ND

[1] ND=non-detect. **Note:** Lab analysis conducted for: Antimony, Arsenic, Beryllium, Cadmium, Chromium, Selenium, Silver, and Thallium. All results were non-detects so these metals were omitted from the table.