

Best Management Practices (BMP) Plan

M/V Kennicott

BMP Registration No. C0-012-2021

Approved: 9/27/2021



Prepared by the
Alaska Department of Environmental Conservation

2021

BEST MANAGEMENT PRACTICE (BMP) PLAN APPLICATION FORM

Alaska law prohibits each owner or operator of a small commercial passenger vessels (50 to 249 overnight passengers), from discharging wastewater into Alaska marine waters unless,

- the vessel obtains a discharge permit and meets the discharge permit requirements established in Alaska Statute¹ or
- the Department approves alternative terms and conditions², which allows operation under a Best Management Practices (BMP) Plan. BMPs include practices that protect the environment to the maximum extent feasible.

This is an application for Department approval to operate under alternative terms and conditions. Owners or operators must apply by submitting this form and the required Best Management Practices Plan for review³ not later than **March 1** of each calendar year, except in a calendar year in which a DEC approved Best Management Practices plan is effective.

If an owner or operator fails to operate in accordance with their department approved BMP, the vessel discharges must then meet the requirements of AS 46.03.462 (e) and limitations on discharges established in AS 46.03.463(b), (c).

If you have questions, please contact willow.weimer@alaska.gov or at 907-269-6096.

M/ V Kennicott

Box for ADEC use only:

☒ ADEC Approved BMP on **9/27/2021**

Bmp Plan Expires 5 years after this date.

¹ (AS 46.03.462, AS 46.03.463)

² (AS 46.03.462(k))

³ Requirements described in **18 AAC 69.046**

Applicant Certification:

I certify that the *M/V Kennicott* cannot practicably comply with the discharge permit requirements in Alaska Statute 46.03.462(e) because of

☒ Physical reasons.

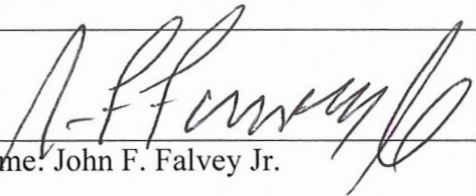
OR

☒ Economic reasons.

I have attached documentation to support my statement above.

- ☐ letter signed by a naval architect, professional engineer, or classification society inspector stating that new or modified waste treatment systems that would produce sewage, graywater, or other wastewater that complies with the discharge permit requirements in AS 46.03.462(e) could not be installed without requiring additional stability testing or relicensing by the United States Coast Guard.
- ☒ statement from the vessel owner or operator that provides the estimated costs of installing new or modified waste treatment systems on the vessel that would produce sewage, graywater, or other wastewater that complies with the discharge permit requirements in AS 46.03.462(e), the reasons why those costs are not practicable, and supporting information from vendors.

Signature:



Printed Name: John F. Falvey Jr.

Date: 9.22.2021

Contact Information for Person responsible for implementing the BMP Plan

Responsible Person:	John F. Falvey Jr.
Email Address	John.falvey@alaska.gov
Mailing Address:	7037 N Tongass Hwy, Ketchikan, AK 99901
Physical Address (if different)	Same as mailing
Telephone Number:	907-228-7250
Facsimile Number:	907-228-6873



THE STATE
of **ALASKA**
GOVERNOR MICHAEL J. DUNLEAVY

**Department of Transportation
and
Public Facilities**

ALASKA MARINE HIGHWAY SYSTEM

7559 North Tongass Highway
Ketchikan, Alaska 99901-9101
Main: 907.228.7250
Fax: 907.228.6875
dot.alaska.gov

ALASKA MARINE HIGHWAY SYSTEM

BEST MANAGEMENT PLAN (BMP)

**FOR THE OPERATION AND MAINTENANCE
OF MARINE SANITATION DEVICES ON
THE *M/V Kennicott***

BMP Registration No. CO-012-2021

Approved:

BMP Changes and Revisions

Revision Number	Date of Revision	Revision Description	Person Making Revision
1	08/ 2021	Table of Contents revised	C. Harrington
1	08/ 2021	Figure 3: ORCA II Marine Sanitation Device	C. Harrington
1	08/ 2021	Introduction	C. Harrington
1	08/ 2021	Owner Statement: Table	C. Harrington
1	08/ 2021	Part 1: Table, Compliance Plan, Maintenance & Inspection, Chlorine Monitoring, Dechlorination, Sampling, Training & Reporting & Critical Wildlife Habitat Areas.	C. Harrington
1	08/ 2021	Part 5 in accordance with 18 AAC 69.046(c)(5)	C. Harrington
1	08/ 2021	Figure 6: MSD Operation Communication Plan	C. Harrington
1	08/ 2021	Recordkeeping: Discharge log	C. Harrington
1	08/ 2021	Figure 8: AMOS Report	C. Harrington
1	08/ 2021	Appendix: MSD Maintenance & Chlorine Procedures	C. Harrington

Significant Changes - If any significant changes occur regarding vessels environmental systems, specifically the MSD systems, company environmental policies or updates to the Best Management Practices Plan (BMP), the BMP revision log will be updated, and an application will be submitted to ADEC CPVEC for reapproval.

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Prologue

Contact Information

Prepared for

M/ V Kennicott

Alaska Marine Highway System

7559 North Tongass Highway

Ketchikan, Alaska 99901-9101

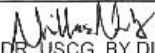
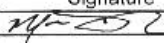
 United States of America Department of Homeland Security United States Coast Guard Certificate of Inspection For ships on international voyages this certificate fulfills the requirements of SOLAS 74 as amended, regulation VII/4, for a SAFE MANNING DOCUMENT.		Certification Date: 14 Apr 2020 Expiration Date: 14 Apr 2021				
Vessel Name	Official Number	IMO Number	Call Sign	Service		
KENNICOTT	1063644	9145205	WCY2920	Passenger (Inspected)		
Hailing Port		Hull Material	Horsepower	Propulsion		
Valdez, AK		Steel	13200	Diesel Reduction		
UNITED STATES						
Place Built	Delivery Date	Keel Laid Date	Gross Tons	Net Tons	DWT	Length
MOSS POINT MS	02Jun1998	25Oct1996	R-9378	R-7364		R-344.3
UNITED STATES			I-12625	I-3790		I-344.3
Owner			Operator			
STATE OF ALASKA DEPT OF TRANSPORTATION & PUBLIC FACILITIES 7559 NORTH TONGASS HIGHWAY Ketchikan, AK 99901-9101 UNITED STATES			Alaska Marine Highway System 7559 N. Tongass Highway Ketchikan, AK 99901 UNITED STATES			
This vessel must be manned with the following licensed and unlicensed Personnel. Included in which there must be 15 Certified Lifeboatmen, 0 Certified Tankermen, 0 HSC Type Rating, and 4 GMDSS Operators.						
1 Masters	0 Licensed Mates	1 Chief Engineers	3 Oilers			
1 Chief Mates	0 First Class Pilots	1 First Assistant Engineers	3 Patrolman			
1 Second Mates	0 Radio Officers	1 Second Assistant Engineers				
1 Third Mates	6 Able Seamen	1 Third Assistant Engineers				
0 Master First Class Pilot	3 Ordinary Seamen	0 Licensed Engineers				
0 Mate First Class Pilots	0 Deckhands	0 Qualified Member Engineer				
In addition, this vessel may carry 499 Passengers, 40 Other Persons in crew, 0 Persons in addition to crew, and no Others. Total Persons allowed: 559						
Route Permitted And Conditions Of Operation:						
---Oceans---						
NOT MORE THAN FIFTY (50) NAUTICAL MILES FROM SHORE IN WATERS OF THE UNITED STATES. NOT MORE THAN TWENTY (20) NAUTICAL MILES FROM SHORE IN INTERNATIONAL WATERS.						
WHEN THE VESSEL IS ON A VOYAGE OF LESS THAN FOUR HUNDRED (400) MILES FROM THE POINT OF DEPARTURE TO THE PORT OF FINAL DESTINATION, THE SECOND MATE MAY BE REPLACED BY A LICENSED MATE.						
A FEDERAL PILOT IS REQUIRED ON THE BRIDGE WHEN THE VESSEL IS OPERATED ON PILOTAGE WATERS IAW 46 USC 8502(A) SUBJECT TO THE WORK HOUR REQUIREMENTS OF 46 USC 8104(D).						
SEE NEXT PAGE FOR ADDITIONAL CERTIFICATE INFORMATION						
With this Inspection for Certification having been completed at KETCHIKAN, AK, UNITED STATES, the Officer in Charge, Marine Inspection, Southeast Alaska certified the vessel, in all respects, is in conformity with the applicable vessel inspection laws and the rules and regulations prescribed thereunder.						
Annual/Periodic/Re-Inspection				This certificate issued by:  N. E. NEELY CDR, USCG, BY DIR.		
Date	Zone	A/P/R	Signature			
23 JUL 20	KTN (MSD)	- P -		Officer in Charge, Marine Inspection		
				Southeast Alaska		
				Inspection Zone		

Figure 1: USCG current Certificate of Inspection (18 AAC 69.046(b)(1)], Continued

	United States of America Department of Homeland Security United States Coast Guard	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Certification Date:</td> <td style="padding: 2px;">14 Apr 2020</td> </tr> <tr> <td style="padding: 2px;">Expiration Date:</td> <td style="padding: 2px;">14 Apr 2021</td> </tr> </table>	Certification Date:	14 Apr 2020	Expiration Date:	14 Apr 2021																																																									
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Expiration Date:	14 Apr 2021																																																														
Certificate of Inspection																																																															
Vessel Name: KENNICOTT																																																															
AN HOURLY PATROL OF THE VEHICLE DECK SHALL BE CONDUCTED IN ADDITION TO THE EVENING PATROLS REQUIRED BY 46 CFR 78.30-10. THE VESSEL MAY TRANSPORT THOSE HAZARDOUS MATERIALS SPECIFIED IN DEPARTMENT OF TRANSPORTATION EXEMPTION LETTERS DOT-E 7465, DOT-E 7928 AND DOT-E 11232. THESE EXEMPTION LETTERS MUST REMAIN VALID AND COPIES SHALL BE CARRIED ABOARD THE VESSEL. ***LAKES, BAYS AND SOUNDS*** WHEN THE VESSEL IS OPERATED EXCLUSIVELY ON A LAKES, BAYS, AND SOUNDS ROUTE, INCLUDING THE SHELTERED WATERS OF THE WEST COAST OF NORTH AMERICA AS DEFINED IN ARTICLE ONE OF THE TREATY BETWEEN THE UNITED STATES AND CANADA DATED ON 26 JULY 1914, THE VESSEL'S MANNING MAY BE REDUCED TO: <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">1 MASTER/1ST CLASS PILOT</td> <td style="width: 33%;">4 ABLE SEAMEN</td> <td style="width: 33%;">1 CHIEF ENGINEER</td> </tr> <tr> <td>2 LICENSED MATES</td> <td>2 ORDINARY SEAMEN</td> <td>2 LICENSED ENGINEERS</td> </tr> <tr> <td>2 OILERS</td> <td>29 OTHER PERSONS IN CREW</td> <td></td> </tr> </table> HOWEVER, FOR LAKES, BAYS, AND SOUNDS ROUTE VOYAGES OVER FOUR HUNDRED (400) MILES FROM PORT OF DEPARTURE TO PORT OF FINAL DESTINATION, THREE (3) LICENSED MATES AND THREE (3) LICENSED ENGINEERS ARE REQUIRED. THE MASTER SHALL ENSURE THAT FOUR (4) PERSONS ON BOARD THE VESSEL ARE ASSIGNED AND QUALIFIED TO OPERATE EACH INSTALLED FAST RESCUE BOAT. THE MASTER SHALL ENSURE THAT THE RESCUE BOAT IS OPERATED WITH AT LEAST TWO (2) PERSONS QUALIFIED IN ITS OPERATION. ---Sea Valves/Chests--- <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Next Exam</td> <td style="width: 50%;">Last Exam</td> </tr> <tr> <td>31Jan2023</td> <td>05Jan2018</td> </tr> </table> ---Marine Evacuation System--- <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">EQUIPMENT</td> <td style="width: 35%;">Next Deployment</td> <td style="width: 35%;">Last Deployment</td> </tr> <tr> <td>#1 SLIDE (STBD)</td> <td>31Oct2023</td> <td>31Oct2019</td> </tr> <tr> <td>#2 SLIDE (PORT)</td> <td>31Jan2024</td> <td>24Jan2018</td> </tr> </table> ---Accommodation Ladder Weight Test--- <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Next Weight Test</td> <td style="width: 50%;">Last Weight Test</td> </tr> <tr> <td>PORT 23Mar2022</td> <td>31Mar2017</td> </tr> <tr> <td>STBD 23Mar2022</td> <td>31Mar2017</td> </tr> </table> ---Hull Exams--- <table style="width: 100%; border: none;"> <tr> <td style="width: 25%;">Exam Type</td> <td style="width: 25%;">Next Exam</td> <td style="width: 25%;">Last Exam</td> <td style="width: 25%;">Prior Exam</td> </tr> <tr> <td>DryDock</td> <td>28Feb2021</td> <td>20Feb2020</td> <td>04Feb2019</td> </tr> <tr> <td>Internal Structure</td> <td>28Feb2021</td> <td>20Feb2020</td> <td>04Feb2019</td> </tr> </table> ---Stability--- <table style="width: 100%; border: none;"> <tr> <td style="width: 25%;">Type</td> <td style="width: 25%;">Issued Date</td> <td style="width: 50%;">Office</td> </tr> <tr> <td>Book</td> <td>05Mar2014</td> <td>Marine Safety Center (MSC)</td> </tr> <tr> <td>Letter</td> <td>03Mar2015</td> <td>Marine Safety Center (MSC)</td> </tr> </table> --- Liquid/Gas/Solid Cargo Authority/Conditions --- Authorization: <table style="width: 100%; border: none;"> <tr> <td style="width: 15%;">Total Capacity</td> <td style="width: 15%;">Units</td> <td style="width: 15%;">Highest Grade Type</td> <td style="width: 15%;">Part151 Regulated</td> <td style="width: 15%;">Part153 Regulated</td> <td style="width: 15%;">Part154 Regulated</td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: center;">No</td> <td style="text-align: center;">No</td> <td style="text-align: center;">No</td> </tr> </table> *Hazardous Bulk Solids Authority* *Conditions Of Carriage* --- Inspection Status ---			1 MASTER/1ST CLASS PILOT	4 ABLE SEAMEN	1 CHIEF ENGINEER	2 LICENSED MATES	2 ORDINARY SEAMEN	2 LICENSED ENGINEERS	2 OILERS	29 OTHER PERSONS IN CREW		Next Exam	Last Exam	31Jan2023	05Jan2018	EQUIPMENT	Next Deployment	Last Deployment	#1 SLIDE (STBD)	31Oct2023	31Oct2019	#2 SLIDE (PORT)	31Jan2024	24Jan2018	Next Weight Test	Last Weight Test	PORT 23Mar2022	31Mar2017	STBD 23Mar2022	31Mar2017	Exam Type	Next Exam	Last Exam	Prior Exam	DryDock	28Feb2021	20Feb2020	04Feb2019	Internal Structure	28Feb2021	20Feb2020	04Feb2019	Type	Issued Date	Office	Book	05Mar2014	Marine Safety Center (MSC)	Letter	03Mar2015	Marine Safety Center (MSC)	Total Capacity	Units	Highest Grade Type	Part151 Regulated	Part153 Regulated	Part154 Regulated				No	No	No
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Figure 1: USCG current Certificate of Inspection [18 AAC 69.046(b)(1)], Continued

		United States of America Department of Homeland Security United States Coast Guard		Certification Date: 14 Apr 2020 Expiration Date: 14 Apr 2021	
Certificate of Inspection					
Vessel Name: KENNICOTT					
Fuel Tanks					
Internal Examinations					
Tank ID	Previous	Last	Next		
F/O STOR #2 S	01Nov2012	01Mar2017	31Mar2022		
F/O STOR #3 S	01Nov2012	01Mar2017	31Mar2022		
F/O STOR #2 P	01Nov2012	01Mar2017	31Mar2022		
F/O STOR #1 S	01Nov2012	01Mar2017	31Mar2022		
F/O STOR #1 P	01Nov2012	01Mar2017	31Mar2022		
F/O SETT S	01Nov2012	01Mar2017	31Mar2022		
F/O SETT P	01Nov2012	01Mar2017	31Mar2022		
F/O STOR #3 P	01Nov2012	01Mar2017	31Mar2022		
Boilers/Steam Piping					
Maximum Steam Pressure Allowed: 225					
Hydro Inspection					
Boiler/Piping ID	Previous	Last	Next		
34208	07Feb2018	24Feb2020	28Feb2023		
34209	07Feb2018	24Feb2020	28Feb2023		
SDW-350M	07Feb2018	24Feb2020	28Feb2023		
Mountings Inspection					
	Opened	Removed			
	24Feb2020	24Feb2020			
	24Feb2020	24Feb2020			
	24Feb2020	24Feb2020			
Fireside Inspection					
Boiler/Piping ID	Previous	Last	Next		
34208	07Feb2018	24Feb2020	28Feb2023		
34209	07Feb2018	24Feb2020	28Feb2023		
SDW-350M	07Feb2018	24Feb2020	28Feb2023		
Waterside Inspection					
	Previous	Last	Next		
	07Feb2018	24Feb2020	28Feb2023		
	07Feb2018	24Feb2020	28Feb2023		
	07Feb2018	24Feb2020	28Feb2023		
Pressure Vessels					
Type	Location	Previous	Last	Next	
Air Receiver	FIDLEY	28Feb2015	13Feb2020	28Feb2025	
Air Receiver	PORT FIN ROOM	28Feb2015	13Feb2020	28Feb2025	
Air Receiver	MSD SPACE	28Feb2015	13Feb2020	28Feb2025	
Air Receiver	MSD SPACE	28Feb2015	13Feb2020	28Feb2025	
Air Receiver	ENGINE ROOM	28Feb2015	13Feb2020	28Feb2025	
Air Receiver	ENGINE ROOM	02Feb2015	13Feb2020	28Feb2025	
Air Receiver	CO2 ROOM	03Mar2015	13Feb2020	28Feb2025	
Air Receiver	STBD FIN ROOM	28Feb2015	13Feb2020	28Feb2025	
Air Receiver	Upper Auxiliary	28Feb2015	13Feb2020	28Feb2025	
Tailshafts					
Tailshaft ID	Date Drawn	Next Due Date			
1	04Apr2019	04Apr2024			
2	04Apr2019	04Apr2024			
Lifesaving					

Figure 1: USCG current Certificate of Inspection [18 AAC 69.046(b)(1)], Continued

		United States of America Department of Homeland Security United States Coast Guard		Certification Date: 14 Apr 2020 Expiration Date: 14 Apr 2021		
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F/O STOR #2 P	01Nov2012	01Mar2017	31Mar2022			
F/O STOR #1 S	01Nov2012	01Mar2017	31Mar2022			
F/O STOR #1 P	01Nov2012	01Mar2017	31Mar2022			
F/O SETT S	01Nov2012	01Mar2017	31Mar2022			
F/O SETT P	01Nov2012	01Mar2017	31Mar2022			
F/O STOR #3 P	01Nov2012	01Mar2017	31Mar2022			
Boilers/Steam Piping						
Maximum Steam Pressure Allowed: 225						
	Hydro Inspection			Mountings Inspection		
Boiler/Piping ID	Previous	Last	Next	Opened	Removed	
34208	07Feb2018	24Feb2020	28Feb2023	24Feb2020	24Feb2020	
34209	07Feb2018	24Feb2020	28Feb2023	24Feb2020	24Feb2020	
SDW-350M	07Feb2018	24Feb2020	28Feb2023	24Feb2020	24Feb2020	
	Fireside Inspection			Waterside Inspection		
Boiler/Piping ID	Previous	Last	Next	Previous	Last	Next
34208	07Feb2018	24Feb2020	28Feb2023	07Feb2018	24Feb2020	28Feb2023
34209	07Feb2018	24Feb2020	28Feb2023	07Feb2018	24Feb2020	28Feb2023
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Air Receiver	MSD SPACE	28Feb2015	13Feb2020	28Feb2025		
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Air Receiver	CO2 ROOM	03Mar2015	13Feb2020	28Feb2025		
Air Receiver	STBD FIN ROOM	28Feb2015	13Feb2020	28Feb2025		
Air Receiver	Upper Auxiliary	28Feb2015	13Feb2020	28Feb2025		
Tailshafts						
Tailshaft ID	Date Drawn	Next Due Date				
1	04Apr2019	04Apr2024				
2	04Apr2019	04Apr2024				
Lifesaving						

Figure 2: Engineers Certification Statement Letter 2021 (18 AAC 69.046(b)(4)(A))



THE STATE
of **ALASKA**
GOVERNOR MIKE DUNLEAVY

Department of Transportation and Public Facilities

ALASKA MARINE HIGHWAY SYSTEM

7037 North Tongass Highway
Ketchikan, Alaska 99901-9101
Main: 907.228.6829
Fax: 907.228.6876
dot.alaska.gov

July 27th, 2021

Sarah Mutter
Compliance and Enforcement Program
Alaska Department of Environmental Conservation
P.O. Box 111800
Juneau, Alaska 99811

Marine Sanitation Devices (MSD) Upgrade – *M/V Kennicott*

The following information is submitted as supportive documentation in the application for the Alaska Marine Highway System "Best Management Practices Program" per 18 AAC 69.046(b)(4)(A), toward certifying that, for physical and economic reasons the *M/V Kennicott* is unable to practicably comply with the standard terms and conditions in AS 46.03.462(b).

Prior to 2009, the *M/V Kennicott* MSD system was comprised of three skid mounted on Evac Orca II 500 modules along with their Omega FTB740 Turbine Flow Meter, Omega CDTX-45-PT tee on sweeper line to the MSD unit, two float level flanges and new floats (V1 & V2) and the Aurora Hydromatic Pump for MSD 1 unit. A contract was awarded in 2009 for \$7,033.00 to upgrade the system. The work was started in Fairhaven Shipyard, Bellingham WA, on September 16th, 2009 and completed in February 16th, 2010. The new system components are still composed of the Evac Orca II 500 system with modifications to the piping system. The upgrades to the new system improved the MSD system and made it consistent with the other vessels, *M/V Matanuska*.

The upgrades have been made to improve the efficiency of the MSD system in order to comply with the State of Alaska (SOA) discharge standards. AMHS will continue to modify and upgrade the existing system with the expectations that the effluent continues to improve and meet SOA standards. At the current time, this is the most practical approach taking into consideration the best technology available for the *M/V Kennicott* and the space limitations aboard the vessel.

Sincerely,

A handwritten signature in black ink, appearing to read "Cisco Flores".

Cisco Flores
Marine Engineering Manager
Alaska Marine Highway System
cisco.flores@alaska.gov

"Keep Alaska Moving through service and infrastructure."

Figure 3: ORCA II Sewage Treatment System

ORCA II Marine Sanitation Device

For 165 to 500 People*

Process Description

Raw sewage from the sanitation facility enters the treatment tank and is macerated. The macerated sewage is continuously recycled back in the treatment tank until such times the solids are small enough to pass through the retention/reduction scree. This screen is continuously backwashed to prevent solids from building up and plugging. After passing through the retention/reduction screen, the sewage flows through a series of sedimentation tanks where movement of the solids is restricted. Suspended solids are allowed to settle and are returned to the treatment tank via a sludge return pump for reprocessing. The effluent passes through the sedimentation modules and is discharged overboard. Disinfection of the sewage is accomplished by liquid hypochlorination (household bleach) and chemical oxidation within the system treatment tank using a metering system that allows the appropriate amount of sodium hypochlorite into the treatment tank from a storage container. Sodium hypochlorite generators are available.

*For low volume flush or vacuum toilets, the maximum number of people can be doubled.

General Dimensions

Model	Capacity		Weight		Dimensions		
	No. of People	Per Day (gallons)	Dry (lbs.)	Wet (lbs)	Length (in)	Width (in)	Height (in)
ORCA II 500	500	15,000	3,000	6,400	94"	40"	78.75"

Technical Specification

Connections*

Sewage inlet	4 in 150 ANSI flange
Vent	2 in Female NPT
Backwash Water Inlet	2 in Female NPT
Treatment Effluent Discharge	2 in Female NPT
Bleach Tank Connections	¼ in O.D Polyethylene Tubing (15 ft)

*Mating fingers, gaskets and hardware are supplied by ENVIROVAC

Discharge Capacity

2.60 Hz power: 90 GPM @ 27 ft discharge head

3.50 Hz power: 90 GPM @ 21 ft discharge head

Backwash Demand

35 GPM @ 0.5 ft

Hypochlorite Requirements

1 gallon bleach per 480 gallons sewage

Electrical

A) 220/230 V.A.C., 3 phase, 60 Hz: 30 amp

Sewage Capacity

Daily Capacity: 15,000 gal Surge

Capacity: 900 GPM for 8 sec.

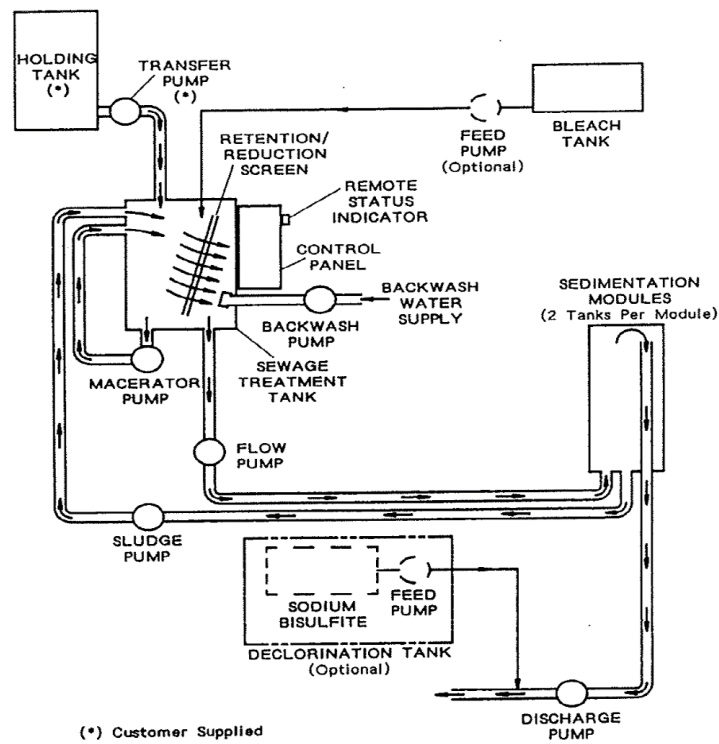
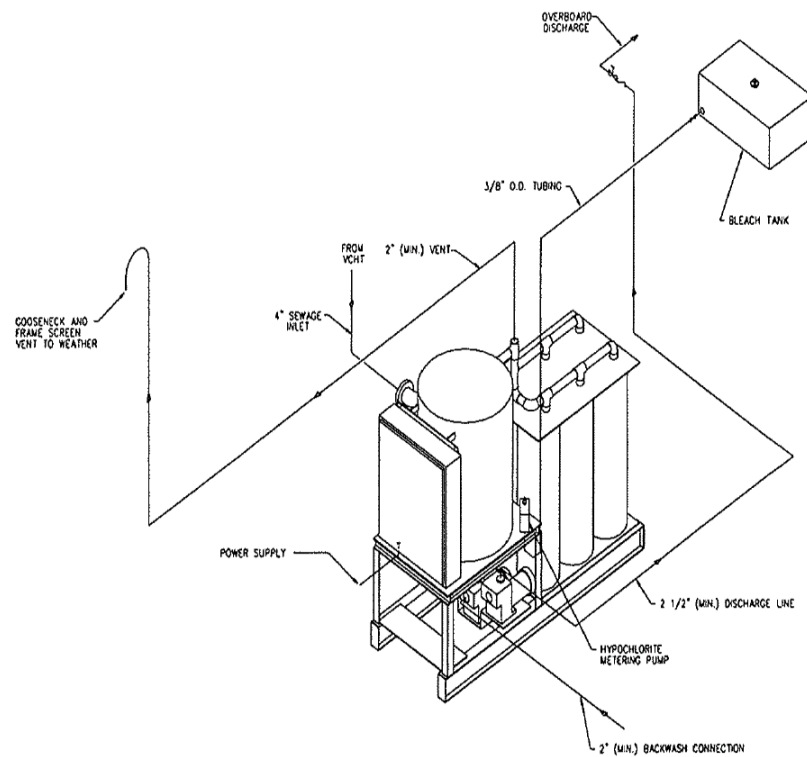
Intermittent Sewage Rating:

60 GPM – Standard Toilets

Effluent Standards National Sanitation Foundation, Ann Arbor, MI (2/27/81-4/8/81)

Suspended Solids: 50 mg/L Fecal Coliform: 250 (MPN) 100 ml B.O.D: 50 mg/L Residual chlorine: 50 mg/L

Figure 3: ORCA II Sewage Treatment System, Continued



Introduction

This Best Management Practices (BMP) Plan has been written and submitted to the Alaska Department of Environmental Conservation (ADEC) for the State of Alaska through the Department of Transportation and Public Facilities (DOT&PF) Alaska Marine Highway System (AMHS) to allow the *M/V Kennicott* to discharge under alternative terms and conditions as required by AS 46.03.46(c) and the Commercial Passenger Vessel Environmental Compliance (CPVEC) Program. This BMP Plan includes all the required information necessary to meet 18 AAC 69.046.

In addition to following the BMP Plan, AMHS vessels utilize the Vessel Incidental Discharge Plan (VIDA) Management Plan. The VIDA Management Plan is intended to provide guidance to AMHS vessel personnel on the proper procedures to maintain compliance with the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES).

The VIDA, issued by the EPA, regulates a large number of vessels under one overall permit. The VIDA applies only to discharges incidental to the normal operation of a vessel, such as deck runoff and boiler blowdown. For AMHS vessels, this amounts to 26 types of vessel discharges plus one additional type of discharge for large ferries. In the State of Alaska, small cruise ships and state ferries (commercial passenger vessels capable of carrying 50 to 249 overnight passengers) do not fall under the Alaska Cruise Ship General Permit but are regulated under the EPA VIDA. (commercial vessels >79 feet and operating as a means of transportation). *Please reference AS 46.03.490 (13).*

By utilizing both the BMP Plan and the VIDA management plan, AMHS personnel are better able to maintain compliance with State and Federal regulations governing vessel discharges.

Owner Statement

The State of Alaska through the DOT&PF's AMHS operates a fleet of 9 vessels, four of which are regulated by the ADEC's CPVEC Program. AMHS has been providing passenger and vehicle service since 1963. Two of the vessels (*M/V Matanuska*, *M/V Malaspina*) started service in 1963. The other two, the *M/V Columbia* and the *M/V Kennicott*, began service in 1974 and 1988 respectively. While these vessels were state of the art at the time of their construction, the regulatory world they are currently operating in is much different. The requirements and capabilities of marine sanitation devices (MSDs) have changed dramatically in the last 50 years.

AMHS vessels utilize self-contained Marine Sanitation Devices (MSDs) that meet the United States Coast Guard (USCG) Requirements of 33 CFR 159. The Omnipure units in use are USCG Type II certified and International Maritime Organization (IMO) approved for overboard discharge in territorial and international waters. The MSD systems were manufactured for smaller vessels and results have shown that these systems do not consistently meet the USCG Type II standards. There is not sufficient vertical space for the installation of newer Advanced Water Treatment Systems (AWTS) which require a larger footprint. Therefore, AMHS continues researching to find systems utilizing new technology that can physically fit on its vessels, meet USCG approval requirements, and meet the ADEC advanced treatment criteria. AMHS waste water systems discharge frequently and have only collection tanks. There are sewage holding tanks on two of the AMHS vessels.

AMHS vessels operate very differently from large and small cruise ships in that salt water is used to flush toilets. Fresh water is only used for sinks, showers, and food preparation (Potable Water Tank #1 & Tank #2). Salt water makes the treatment and disinfection of sewage more complicated. There is no room on the vessels to increase the amount of freshwater storage to allow it to also be used for flushing toilets.

AMHS upgraded the fleet MSD systems between June 2009 and April 2011. Modifications to the three skid-mounted ORCA 11-500 Units on the *M/V Kennicott* were requested by the onboard engineers that operate and maintain the units. Even though the units are high maintenance, they are very efficient, thus driving the cost-based decision to modify rather than replace them. The discharge from the MSD II overboard line is located on the Port side.

Year ship joined fleet	1998
Passenger capacity (#) per voyage average operation < 249 pax (2021 Registration)	249
Max. Passenger capacity (#) per voyage maximum allowed	450
Crew capacity	55

MSD system (USCG type)	ORCA II 500 – USCG Type II approval 1559.015/6310/0. Each unit rated at 15,000 GPD
Maximum Hydraulic Load	3 units in parallel: 45,000 GPD
Vessel: Maximum Potential to Discharge	15,150 GPD (Total Crew/Passenger Capacity: 505)
EPA: Maximum Potential to Discharge	9,120 (Total Crew /<250 Passenger Capacity:304)
Daily Water Usage (Average Gray & Black)	30 GPD (22 fresh & 8 seawater)

- Reference Vessel Specific Sampling Plan (VSSP) 2021 & AS 46.03.490 (13).

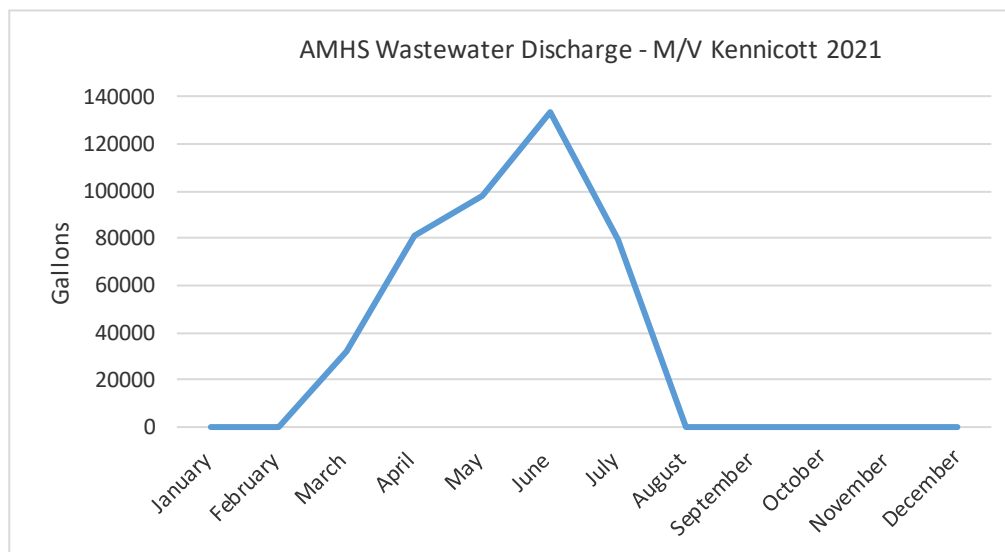
BEST MANAGEMENT PRACTICES PLAN

Part 1 Current Discharge Practices [18 AAC 69.046(c)(1)]

The *M/V Kennicott* combines all black water and gray water drains. The sewage is processed through a USCG-approved maceration/chlorination treatment system. The daily average volumes peak in the summer months when the passenger traffic is at the peak. The daily average discharge volume is based upon estimate of the actual outflow, changing upon passenger load. The treatment system capacity is 9,120 GPD. No other material is processed through the MSD system as it is considered hazardous material (Oil, Galley Grease, Cleaning products or COVID sanitary disinfectant). AMHS Safety Officer offload these hazardous materials and maintains AMHS hazardous waste database.

When in operation, the *M/V Kennicott* spends about 21% of its time in port and 79% of its time at sea.

Figure 4: AMHS Wastewater Discharges graph



When operating the AMHS vessels spend the majority of their time in Alaska as described below:

- The cross-Gulf run (*M/V Kennicott*) operates in Alaska 96% of the time. The remainder of the time, the vessel is regulated by USCG and Canadian rules.
- For the 2021 calendar year, the operation schedule shows the M/ V Kennicott in operation for 8 months

Marine Sanitation Device Compliance Plan

A ship inspection was performed on the *M/V Kennicott* in Ketchikan during the summer of 2009 by the Vessel Construction Manager. Specifications were completed on October 6, 2009, to include upgrading the existing MSD units with installation of some new equipment and some piping changes and repair.

The Marine Sanitation Device (MSD) system is composed of three skid-mounted ORCA 11-500 Units along with their macerators, transfer and discharge pumps, and control panels. The ship's sewage comprised of gray water (interior deck drains, showers, sinks, etc.) and black water (toilets and urinals) from the forward section of the vessel is collected by gravity to the forward (6,173 gallon) collection tank (V1) located in the MSD Room on the hold level, while the sewage from the vessel aft section is collected in the aft (2,863 gallon) collection tank (V2) located in the shaft alley space of the hold level. Two sewage transfer pumps periodically pump the sewage from the V2 tank into the V1 tank. The waste passes through a retention/reduction screen installed within the Sewage Treatment Unit. The screen is back flushed daily with a system-included backwash system. The tank and parts, including the retention/reduction screen are cleaned at least annually during ship availability. The raw sewage (influent) from the V1 tank is macerated / ground to fine particles and pumped into the ORCA treatment tank.

The upgrades to the system components included one Omega FTB740 Turbine Flow Meter, one Omega CDTX-45 conductivity monitor/analyzer on the line to the MSD units (monitors performance of water purification systems), two float-level flanges and new floats (one located near the top of each tank - V1 and V2), three manhole covers on the opposite side of the existing manholes on the ORCA units, one Aurora Hydromatic Pump for the #1 MSD unit, and a manhole for the V1 tank. All pipe hangers and piping was replaced. The discharge line from the recirculation pump located aft of the V1 tank was replaced. Eight float-level flanges located on the V1 tank and two on the V2 tank were replaced. The V1 tank was blasted and painted. The warranty period expired February 14, 2010. All amp meters were replaced with new 0-15 seal meters within the last year. Two recirculation pumps were installed during the vessels overhaul period between October 28, 2013 and March 6, 2014. They were installed on units that did not already have external macerator/recirculation pumps to replace the original, maintenance intensive, submerged pumps. The new pumps are designed to produce a finer particle size. There are three pumps that run continuously, or as often as the system deems necessary, when the MSD system is in operation.

Marine Sanitation Device Maintenance & Inspections

Regular maintenance and inspection of the units is scheduled and recorded in the AMHS Preventive Maintenance System (AMOS provided by SpecTEC) (Figure 8). The sewage and graywater discharge log are maintained on the vessel for 1 year detailing each discharge. Daily, weekly, monthly, quarterly, semi-annual, and annual work orders must be carried out by assigned engineering personnel. Upon completion of the scheduled work, the engineer logs the work performed and provides any additional comments including condition of the system, parts used, and any other general observations. Inspection and maintenance tasks include cleaning bipolar plates, inspecting all valves for proper operation, testing effluent chlorine levels, dismantling, inspecting and repairing pumps, visually inspecting tank interiors, renewing valves, testing electronic controls and their connections. Maintenance and inspections are based upon manufacturer's recommendations. Each work order includes a list of parts required to complete the job.

Marine Sanitation Device Chlorine Monitoring

AHMS has developed a policy to insure that the MSD units are properly monitored. This policy includes:

- Daily testing of the wastewater total chlorine reading
- Instructions that the crew must take action if the chlorine readings are not in the range of 0 to 5 ppm.
- AHMS requires that if a zero reading is found, a 2nd reading must be taken within 24 hours. A second zero reading requires shipboard investigation and repairs to commence.
- If there are 3 days with zero readings the assigned Port Engineer and Port Captain must be notified by an email providing information on what steps are being taken to resolve the situation.
- If the effluent chlorine reading exceeds 5 ppm (mg/liter) the ship is instructed to take corrective action. This corrective action could be any of the below actions:
 - Reduce the flow rate of the chemical feed pump (if it is used).
 - Discontinue any double processing of wastewater. (Some operators feel it is helpful to pump the V2 processing tank back to the V1 forward collection tank to help reduce the cellulose mat buildup in the V2 tank.)
 - Discontinue use of chlorine bleach by the cleaning staff
 - Contact manufacturer for troubleshooting advice.
- A follow-up email is required to be sent to both the Port Captain and the assigned Port Engineer when the problem is solved.

The sample location for Total Chlorine on each vessel is in a different location in the vessel due to the individual piping arrangement installed. Generally the sampling port is in the overboard discharge line after the de-chlorination pump. Each sampling port has a tag marked with "DEC Sampling" or similar language for easy identification. The crews use an EPA compliant Hach Pocket Colorimeter II or Hach Total Chlorine Test Kit (Model CN-65). An operating manual including test procedures and specifications for both methods are attached. The Pocket Colorimeter unit is zeroed as per the instructions for each use. The optimum reading is above zero but below .5 ppm as the lower chlorine levels are less harmful to sea life. An occasional zero is acceptable. A constant zero reading indicates a problem, which is to be repaired immediately.

Marine Sanitation Device Dechlorination

The dechlorination system operates in conjunction with the MSD sewage treatment systems. In operation, the MSD system uses a 5% sodium hypochlorite solution (NaOCl/common household bleach) to kill fecal coliform. This process (chlorination) causes the treated discharge (effluent) to contain a residual chlorine level. To reduce the amount of residual chlorine below an acceptable level, sodium bisulfite NaHSO_3 is added to the effluent (dechlorination process). The MSD system has two main networks (1) the sodium hypochlorite (bleach/chlorination) network and (2) the sodium bisulfite/thiosulfate (dechlorination) network. Both networks operate simultaneously with the ENVIROVAC ORCA II MSD. The dechlorination system is designed to operate in an automatic mode as called for by the ORCA II control panel. In normal operation, the ORCA II unit processes sewage for 18 minutes. The dechlorination solution feed rate is dependent on the amount of residual chlorine. After the chlorine feed rate has been set, the discharge (effluent) should be tested for residual chlorine and the dechlorination feed rate should be set accordingly. Spares kept aboard are determined by Manufacturer's recommendations and operator experience.

Marine Sanitation Device Sampling

In accordance with ADEC CPVEC program, the Quality Assurance Project Plan (QAPP) covers sampling and analysis for the parameters of Conventional and Priority Pollutants. The sampling of the vessel waste water discharge is defined in the Vessel Specific Sampling Plan (VSSP). All onboard sampling is conducted in accordance with the approved plans. The wastewater systems is sample twice per season for Conventional I & II Pollutants including Nutrients and once per season for Priority Pollutants. An independent laboratory samples and analyzes the treated effluent for each vessel. The vessels sampling schedule, per established sampling guidance, will be submitted to ADEC CPVEC prior to the operating season. The analytical results are reported to ADEC and to the AMHS Environmental Program Specialist. If there are any issues with sampling events, including delays in them occurring or missed sampling event, ADEC will be contacted. If a sampling event is delayed or missed, AMHS staff will engage with the sampling contractor to reschedule at the earliest opportunity. Additionally, if sampling results deviate significantly from the expected results of being at or reasonably close to the permit standards corrective actions are taken. Once the corrective actions have been made, a sampling event will be scheduled for the earliest opportunity. The contracted company is required under contract to share the preliminary sample results (lab) within 3 (three) days after sampling including Fecal Coliform, Total Suspended Solids and Chlorine (Free & Total).

Due to relatively high bacteria count of fecal coliform and enterococci, along the coastline and in the port region of Ketchikan in 2019, it is in the best interest of AMHS Best Management Practice to minimize / stop / limit wastewater discharges within vessel operations during the summer months of high revenue service (May – September). Chief Engineers are to adjust their vessels current MSD operating regime, in order to ensure the best possible adherence to these guidelines. Notification of entrance too, and departure from, controlled discharge areas will be communicated to the engineering department by the on duty Bridge crew. Records are to be kept of the time of cessation and re-establishment of any overboard discharging that takes place in and around these controlled areas.

Area of Non-discharge Small Vessels under BMP Plan: Port of Ketchikan Alaska	
► AK Boundaries of Non-Discharge Area is between:	
South Boundary	Line from → <i>Gravina Point to Mountain Point</i>
North Boundary	Line from → <i>South of Guard Island</i>

Marine Sanitation Device Training & Reporting

The assigned Chief Engineer is responsible for implementing the BMP and the BMP training onboard the vessel. The training occurs with new engineering crew and regular updates are communicated to the crew onboard. As operators become familiar with the units and offshore maintenance is needed, additional items are added or frequency of performing tasks increased as deemed appropriate by the Chief Engineer. Maritime engineers acquire Merchant Marine credentials including National and Standards of Training, Certification and Watching (STCW) officer endorsements and Ratings Forming Part of an Engineering Watch (RFPEW) set forth by the USCG. Upon entry to a new position training, individuals are assigned to a veteran

crew member to learn the daily duties of the system, technical issues, sampling procedures and all compliance regulations.

** The STCW are sets of qualification standards for personnel on seagoing ships (46 CFR 11.201). The RFPEW are a set of qualifications for engine department on seagoing ships powered by main propulsion machinery of 750 kW propulsion power or more.*

The Chief Engineers are ultimately responsible for tracking and reporting MSD maintenance, casualties, and test results. They designate a member of the engineering department the responsibility to carry out the day-to-day maintenance of the units. Relief engineers overseeing operations may take too great a time period to become knowledgeable in all the operational and maintenance procedures. To assist the relief engineers in learning the MSD system operation faster, AMHS has completed CAD line drawings, or supplied vendor drawings, of the waste water system and marked each valve on the drawing with valve numbers. The valves aboard are labeled to correspond with the numbers on the drawings. A laminated drawing is posted in the MSD room and available to all operators. The installation of the same MSD equipment in three of the AMHS vessels will also minimize the time necessary for the relief engineers to learn the operation of the system.

The Chief Engineer's reports are sent to AMHS headquarters with copies being sent to the vessel's respective Port Engineer, the Port Captain, and the Marine Engineering Manager. An administrative clerk will be responsible for posting these reports on a spreadsheet on a shared networked drive. This will allow AMHS management to easily ascertain that procedures are being followed and that the effluent levels are appropriate.

In addition to the Chief Engineer's reports, each vessel is required to keep the following vessel-specific documents in an accessible cabinet in the MSD room.

- ADEC-approved Best Management Practices Plan
- Vessel Specific Sampling Plan
- MSD unit training records
- Quality Assurance/ Quality Control Plan
- MSD unit operation manual
- Line drawings of MSD system

Any MSD unit failure is reported to shoreside management as required by the Engineering Standard Operating Procedure (ESOP) for all system failures. The engineering department then begins troubleshooting and makes repairs within its capabilities. If the failure cannot be resolved with shipboard resources, outside resources will be utilized at the earliest possibility. Outside resources include Manufacturer's Technical Representatives, additional parts, or both. The Port Engineer, as the shoreside manager for the department, is responsible for coordinating these efforts. After the failure is rectified, any lessons learned will either result in individual training, department wide training, additional instructions in the ESOP, updates to maintenance, updates to operational procedures, or a combination of these as appropriate.

The AMHS long-term plan is to continue to research new technology in an effort to locate MSD units that will meet the advanced water treatment standards and fit within the space constraints aboard the vessels. The Governor of Alaska outlines amended legislation approximately every 3 years. AMHS reviews the amendments with DOT &PF Commissioner and Legislation Liaison. AMHS also coordinates with Glosten Naval Architect and Marine Engineering Company and the MSD manufacture to find more viable solution for the vessels.

Critical Wildlife Habitat Areas – No Transient Zones

AMHS does not transit areas that are designated as state refuges, state critical habitat areas, or state sanctuaries as defined in AS 16.20, nor do AMHS vessels transit within 100 meters horizontally of mean lower low water (MLLW) of tidally affected portions of waters identified as important for spawning or rearing of anadromous fish.

*Note: Please reference: [State Refuges, Sanctuaries and Critical Habitat Area KMLs, Alaska Department of Fish and Game](#)

Herring Spawning occurs along the shoreline to a 20 meter water depth, measured vertically from the mean lower low water tidal datum. Only shallow draft vessels have the potential for entering the herring spawning areas and discharging wastewater.

*Note: Please reference: [Southeast Alaska Herring Spawn Locations, Alaska Department of Fish and Game](#) or ADEC Herring Spawning Areas in Alaska (2006)

Due to federally regulated navigational areas & security zones, all vessels in Alaskan waters are required to operate in accordance with the International Regulations for Prevention of Collisions at Sea, 1972 (72 COLREGS), also known as the Navigation Rules, per 33 CFR 80.1705.

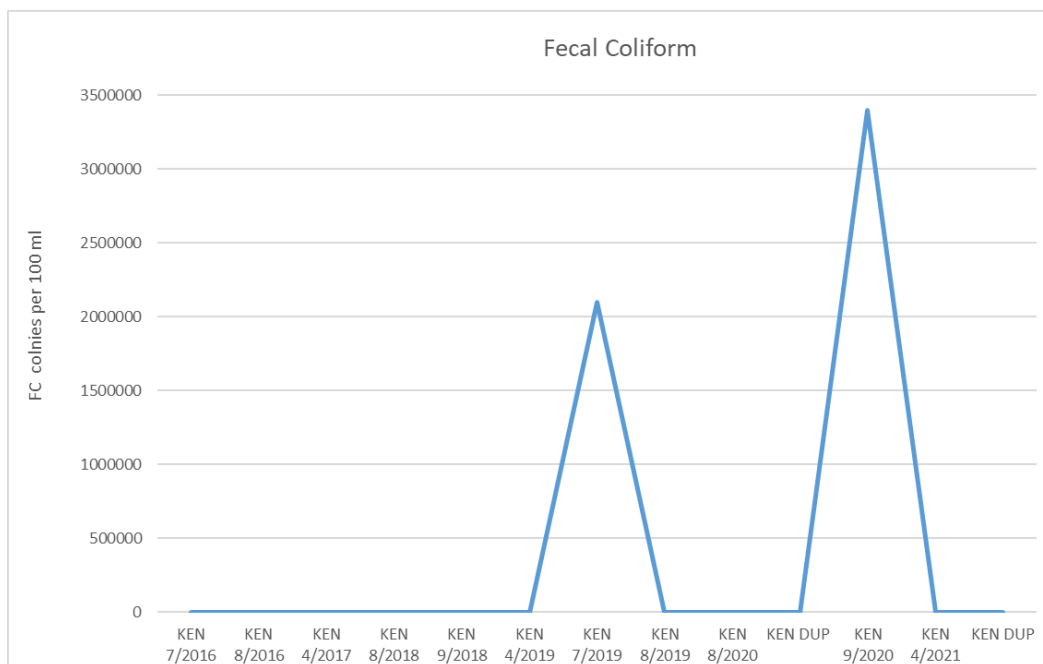
Part 2 Summary of Test Results [18 AAC 69.046(c)(2)]

On a fleet basis, the performance of the MSD units is directly related to the chlorine production during the treatment process. When the effluent has residual chlorine, the fecal coliform count is likely to be within limits. We will be focusing on the chlorine levels by having the ship's maintenance crew take daily free chlorine readings. Parameters other than chlorine and fecal coliform do not appear to be problem areas.

Table 1: MSD Unit Performance for 2017-2019 (18 AAC 69.046(c)(2)(A)(B))

Parameter	KEN 7/2016	KEN 8/2016	KEN 4/2017	KEN 8/2018	KEN 9/2018	KEN 4/2019	KEN 7/2019	KEN 8/2019	KEN 8/2020	KEN DUP 8/2020	KEN 9/2020	KEN 5/2021	KEN DUP 5/2021
Fecal Coliform (colonies/100ml)	6.0*	8	17	18	<10	5	2,100,000	72	250	160	3,400,000	48	64
Total Chlorine, Residual (mg/L)	0.2	1.73	0.56	2.6	3.3	1.57	<0.1	0.8	3.5	3.3	<0.1	2.02	2.16
Free Chlorine (mg/L)	0.4	2.5	0.39	2.14	3	1.41	<0.1	0.7	3.1	3	<0.1	1.9	1.42
Total Suspended Solids (mg/L)	3.65	4.74	8.56	14	18	8.4	424	6	8.4	8	54	13	10
Biological Oxygen Demand (mg/L)	2	2	2.16	18	2.7	<2.0	240	8.5	<7.0	7	120	13	14
Oil and Grease (ug/L)	2.09	2.17	2.15	NS	ND	ND	NS	NS	<5.0 mg/L	<5.0 mg/L	NS	<5.0 mg/L	<5.0 mg/L
Chemical Oxygen Demand (mg/L)	699	957	913	NS	840	840	NS	NS	360	430	NS	760	720
Ammonia (mg/L)	0.05	0.05	0.056	NS	0.17	ND	NS	NS	0.23	0.12	NS	<0.10	<0.11
Small Commercial Passenger Vessel/Alaska Water Quality Standards													
Tested 2x per month (small commercial passenger vessels only tests 2x per season)													
* Analyzed outside of hold time													
** Analyzed outside of temperature limits													
Exceeds WQS, Alaska or Federal secondary treatment standards: Not a violation under BMP													
NS: Not Sampled; Priority I and Priority II sampling regimes													

Figure 5: Kennicott Fecal Coliform graph [18 AAC 69.046(c)(2)(A)]



Part 3 Requirements for Vessels That Have Not Operated in Marine Waters of the State [18 AAC 69.046(c)(3)]

Not applicable for this vessel.

Part 4 Prohibition of Discharge While Traveling Less Than 6 Knots [18 AAC 69.046(c)(4)]

Not applicable for this vessel.

Part 5 Discharge While Traveling Less Than 6 Knots [18 AAC 69.046(c)(5)]

M/V Kennicott is allowed to discharge sewage, gray water, or other wastewater while the vessel stationed at port, traveling at a speed of less than 6 knots or is located less than one nautical mile from the nearest shore abiding by the criteria in 5.1.

*Note: When proper infrastructure is provided in all coastal cities, vessels will be able to have the ability to the most practical extent to offload wastewater shoreside.

5.1 Prohibition of Discharge [18 AAC 69.046(c)(5)(A)]

A prohibition on the discharge of sewage, gray water, and other wastewater:

- i. Within 100 meters horizontally of MLLW tidal datum of the tidally affected portion of a catalogued anadromous fish stream (18 AAC 69.046(c)(5)(A)(I));
- ii. Between March 1 and June 15 of each calendar year, within waters that are a depth of 20 meters vertically of MLLW tidal datum, and that are identified in the department's set of maps entitled *Herring Spawning Areas of Alaska*, dated November 2005 and adopted by reference (18 AAC 69.046(c)(5)(A)(ii)); and
- iii. Within areas designated under AS 16.20 as refuges, sanctuaries, or critical habitat areas under AS 16.20 [18 AAC 69.046(c) (5) (A) (ii)].

5.2 Protection of the Environment [18 AAC 69.046(c)(5)(B)]

Protect the environment to the maximum extent feasible by:

- i. Reducing the amount of sewage, gray water, or other wastewater discharges identified in Part 1 of this subsection to the maximum extent practicable (18 AAC 69.046(c)(5)(B)(i));
- ii. Improving the quality of sewage, gray water, or other wastewater discharged by reducing the fecal coliform bacteria and residual chlorine included under Part 2 or 3 of this subsection to the maximum extent practicable [18 AAC 69.046(c)(5)(B)(ii)];
- iii. Minimizing the risk to human health caused by exposure to the vessels sewage, gray water, or other wastewater discharges (18 AAC 69.046(c)(5)(B)(iii)); and
- iv. Dispersing sewage, gray water, or other wastewater discharged into the marine waters of the state to the maximum extent practicable (18 AAC 69.046(c) (5) (B) (iv)).

Part 6 Crew and Passenger Training Programs

[18 AAC 69.046(c)(6)]

Training Plan

The Chief Engineer was trained on the operation and maintenance of the new equipment by the vendor at the time of installation. He has written manuals for the purpose of training relief engineers. The manuals are in the process of being updated with pictures and step-by-step instructions. A training video DVD is currently under production and is scheduled for completion by the end of June 2014. The DVD will be designed to teach relief engineers who have never worked with the ORCA 11-500 system. The DVD will include the following:

- Safety and the proper use of personal protective equipment
- How to acid clean the cell probes in the chlorine generator
- Maintenance schedules and operation pertaining to:
 - Inspections
 - Chlorine testing
- Tips on pump overhauls and proper seal replacement
- Where inventory and parts manuals can be found and how to access them

AMHS believes that the engineers operating our vessels are competent. It is recognized that relief engineers who are not as familiar with a specific vessel's system may have some difficulty in ensuring that MSDs are operated to their maximum efficiency. However, the installation of the same equipment on three of the vessels will minimize the need for cross training for engineers who are filling in for the vessel's usual engineering crew or for engineers who are transferred from vessel to vessel. AMHS believes that the procedures put in place will further alleviate this problem and that a structured training program is not necessary at this time. If there are problems with specifically relief engineers, we will address their competency on an individual basis. The Chief Engineer is responsible for insuring that the MSD operating personnel have the knowledge necessary to operate the systems correctly onboard their assigned vessel. The Chief Engineer of each vessel will conduct individual crewmember training necessary to maintain optimum operation of the MSD system.

Water Reduction Plan

An integral part of the Best Management Practices is the Water Reduction Plan. Signs are posted in all restrooms and staterooms encouraging passengers and crews to minimize water usage. Exact sign language varies from vessel to vessel and location to location. Announcements are made to the same effect, especially when in port. Crewmembers are trained to be aware of any leaking valves that may increase water usage and repair them in a timely manner. Frequent routine checks are conducted on any device that has the potential to leak thus affecting water usage.

Part 7 Recordkeeping Practices [18 AAC 69.046(c)(7)]

Communications Plan

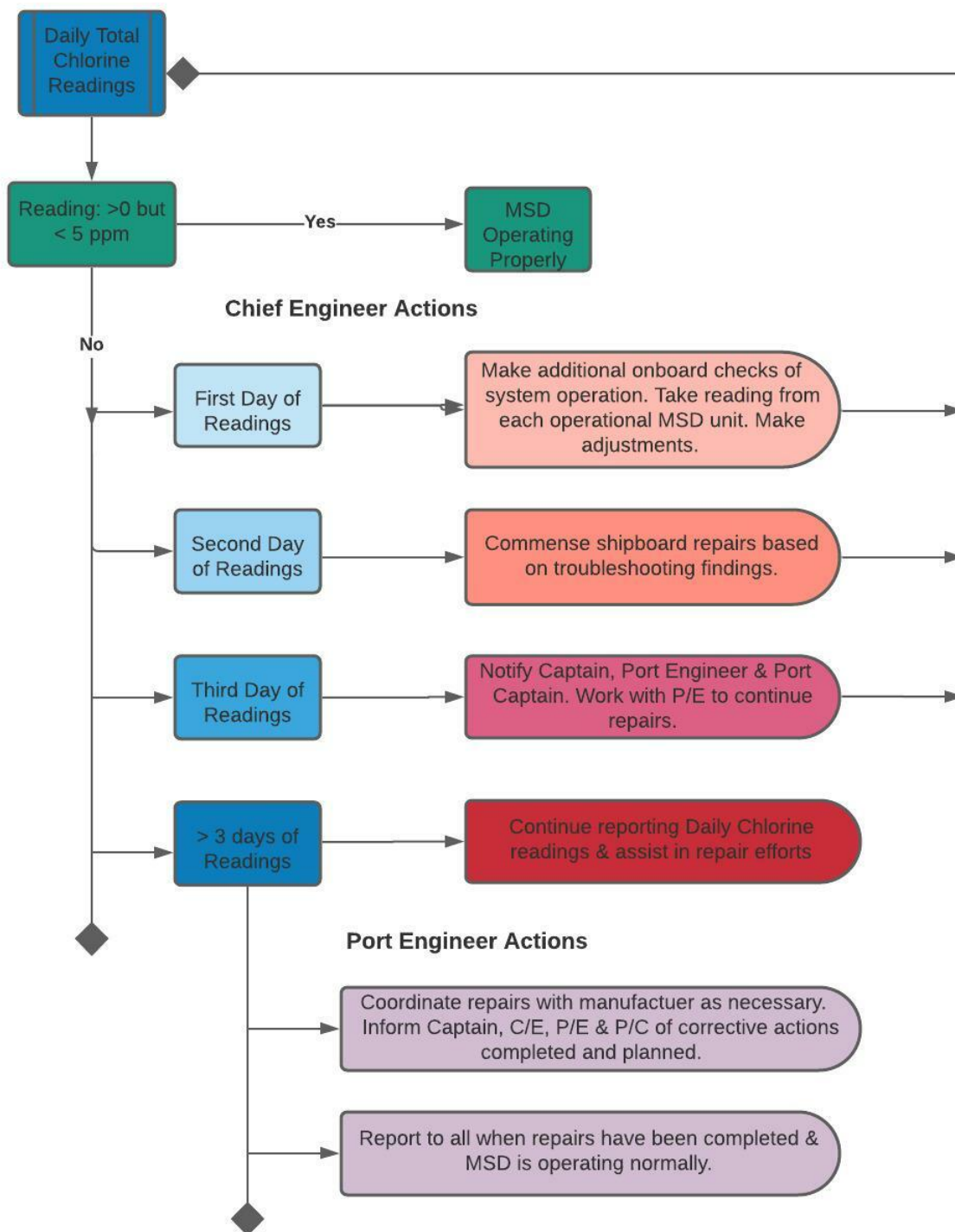
AMHS has implemented the following communications procedures in order to insure that the proper operation of the MSD units on each ship is communicated to the ultimate decision makers.

- The AMHS Environmental Officer is responsible for the fleet wastewater program.
- The Chief Engineer on each vessel is responsible for that vessel's shipboard wastewater program.
- The Chief Engineer's weekly report requires tracking of the daily residual total chlorine level. The Chief Engineer's weekly report results will be tabulated and tracked by ship at headquarters. Three days of zero chlorine residual require email communication with the assigned Port Engineer and the Port Captain's office providing information on:
 - What the problem is;
 - What is being done to correct it and,
 - Email notification when problem is resolved.

The Master will be notified when the MSD is not operating properly.

In August of every year, the Chief Engineers from each of the regulated vessels will prepare a memo to the assigned Port Engineer and the Port Captain's office describing recommendations for upgrades and changes that need to be made in order to increase compliance. This information will be used by the Engineering Manager and the General Manager in developing the upcoming budget.

Figure 6: MSD Operation Communication Procedures



Record keeping

AMHS has implemented the following recordkeeping examples in order to insure that the proper documentation of the MSD units on each ship is communicated to the ultimate decision makers.

Table 2: Sample Wastewater Discharge Log for M/ V Kennicott

M/V KENNICOTT WASTEWATER DISCHARGE LOG									Calculations Area		
	Continuous Discharge System based on 1.25 gals/person/hour							Use Alaska times only.			
DISCHARGE FROM MSD OVERBOARD LINE, PORT SIDE											
Date	Start Time	From (port)	To (port)	Hours (at sea)	In Port	Hours (in port)	Number of Crew plus Passengers	Gallons Wastewater Discharged	AVG SPEED NMPH	Port Arrival Date	Port Arrival Time

*GPH per person is an estimate of the actual outflow, changing upon passenger load. Hours (at sea) x Hours (in port) x crew/pax # x1.25.

Table 2: Latitude and Longitude of Ports: SE Alaska Example

SE ALASKA	
BELLINGHAM	48-43.39N, 122-30.81W
PRINCE RUPERT	54-17.32N, 130-21.91W
KETCHIKAN	55-20.56N, 131-39.12W
METLAKATLA	55-07.06N, 131-32.84W
WRANGELL	56-28.47N, 132-23.49W
PETERSBURG	56-48.51N, 132-58.54W
KAKE	56-57.73N, 133-55.32W
ANGOON	57-28.36N, 134-34.09W
TENAKEE	57-46.76N, 135-13.16W
SITKA	57-02.99N, 135-20.73W
AUKE BAY/JUNEAU	58-22.93N, 134-41.05W
HAINES	59-16.88N, 135-27.55W
SKAGWAY	59-26.93N, 135-19.51W
HOONAH	58-07.34N, 135-27.38W
GUSTAVUS	58-27.33N, 135-53.19W
PELICAN	57-57.57N, 136-13.79W
YAKUTAT	59-32.91N, 139-44.03W

Table 2: Distance of Port: Example

DISTANCE BETWEEN PORTS		
Port	Port	Distance NM
Akutan	Unalaska	45
Akutan	Cold Bay	158
Angoon	Hoonah	63
Angoon	Tenakee	35
Bellingham	Ketchikan	595
Bellingham	Seymour Narrows	156

Figure 7: Sample Chief Engineer's Weekly Summary Log

Chief Engineer's Weekly Summary													
M/V Kennicott													
Starting Date <u>Sunday June 20, 2021</u>										0001 Hours			
Ending Date <u>Saturday June 26</u>										2400 Hours			
Equipment Status		Hours				Consumption				Rate			
		End Week		Grand Total		Fuel Oil		Lube Oil		Fuel Oil		Lube Oil	
Port Main Engine		132	Hr	111,778	Hr		Gal	80	Gal		gal/hr	0.606	gal/hr
Starboard Main Engine		132	Hr	111,305	Hr		Gal	403	Gal		gal/hr	3.053	gal/hr
#1 Generator		52	Hr	42,340	Hr		Gal	0	Gal		gal/hr		gal/hr
#2 Generator		79	Hr	41,828	Hr		Gal	0	Gal		gal/hr		gal/hr
Boiler		9	Hr	10,411	Hr		Gal				gal/hr		
Miles	N/A	MPG	#VALUE!	GPM	#VALUE!	MPH	#VALUE!	GPH	394.4				
Liquid Status		Fuel		Main Eng. Lube		Aux Eng Lube		Oily waste		Potable Water			
Date	Place												
6/20	HOM	17,032	Gal		Gal		Gal		Gal			Gal	
6/26	BEL	67,974	Gal		Gal		Gal		Gal	23,000		Gal	
			Gal		Gal		Gal		Gal			Gal	
			Gal		Gal		Gal		Gal			Gal	
			Gal		Gal		Gal		Gal			Gal	
			Gal		Gal		Gal		Gal			Gal	
			Gal		Gal		Gal		Gal			Gal	
Total Received		85,006	Gal	0	Gal	0	Gal	0	Gal	23,000		Gal	
On Hand 1st Week		122,362	Gal	2,557	Gal	374	Gal	1,974	Gal	84,800		Gal	
Total		207,368	Gal	2,557	Gal	374	Gal	1,974	Gal	107,800		Gal	
Generated									Gal				
Sent Ashore		0	Gal	0	Gal	0	Gal	0	Gal				
On Hand End Week		155,303	Gal	2,433	Gal	379	Gal	3,023	Gal	73,400		Gal	
Consumed		52,065	Gal	483	Gal	0	Gal			34,400		Gal	
MSD effluent readings :total chlorine in ppm	4.0 ppm	4.0 ppm	4.0 ppm	4.0 ppm	4.0 ppm	4.0 ppm	4.0 ppm	4.0 ppm	4.0 ppm				

Figure 8: Sample MSD History AMOS Report

AMOS - MV KENNICOTT/ENGINE - [Components]

File Edit Options Maintenance Stock Purchase Budget Tools Window Help

General

DetailsJobsPartsCountersAttachmentsW.O.HistoryMaint. LogFunctions Performed

Number:MSD 003 001Type Number:MSD 002Status:In Use

Name:MSD, SEWAGE TRANSFER SYS (ORCA)

Maker:0Purchased Date:

Type:ORCA II-500Component Class:MSD SYSTEMPrice:USD0.00

Serial No.:N/ADATABASE

Location:MSDMSD - RoomDeprec. time (Months):0

Parent Comp.:MS00 000 003MSD SYSTEMS

Vendor:3158Bellingham Warehouse

Rating:MAX TRANSFER RATE 25 PSIGPrice:USD0.00

Specs:CTL PANEL 460VAC, 60HZ, 3PHUnplanned Maint. Template:

Function:562.136.10MSD, SEWAGE TRANSFER SYSTEMWarranty End:

Maint. Budget:

Stock Budget:

Number	Name	Type	Serial No.	Rating	Specs	DATABASE	Status	Func. No.	Func. Description
MSD 003 001	MSD, SEWAGE TRANSFER SYS (ORCA II-500)	ORCA II-500	N/A	MAX TRANSFER RATE CTL PANEL 460VAC, 60HZ, 3PH			In Use	562.136.10	MSD, SEWAGE TRANSFER SYSTEM
MSD 003 003	MSD, ORCACLOR CHLORINATION UNIT (589A)	589A	N/A	USCG CERT 159.01'			In Use	562.136.23	MSD, ORCACLOR CHLORINATION UNIT, NO.3
MSD 003 002	MSD, ORCACLOR CHLORINATION UNIT (589A)	589A	N/A	USCG CERT 159.01'			In Use	562.136.22	MSD, ORCACLOR CHLORINATION UNIT, NO.2
MSD 003 001	MSD, ORCACLOR CHLORINATION UNIT (589A)	589A	N/A	USCG CERT 159.01'			In Use	562.136.21	MSD, ORCACLOR CHLORINATION UNIT, NO.1
MSD 001 002	MSD, ENVIROVAC (ORCA II-500)	ORCA II-500	N/A	CAP 56.8 CU M/DAY TANK 210 GAL.			In Use	562.136.02	MARINE SANITARY DEVICE, NO.2
MSD 001 001	MSD, ENVIROVAC (ORCA II-500)	ORCA II-500	N/A	CAP 56.8 CU M/DAY TANK 210 GAL.			In Use	562.136.01	MARINE SANITARY DEVICE, NO.1
MSD 001 003	MSD, ENVIROVAC (ORCA II-500)	ORCA II-500	N/A	CAP 56.8 CU M/DAY TANK 210 GAL.			In Use	562.136.03	MARINE SANITARY DEVICE, NO.3

Appendix:

ORCA II Marine Sanitation Device

MSD Maintenance

Daily

Every Watch: make rounds, visually check for “any” leaks, if a minor leak of a seal, make a note and keep an eye on it. If water (liquid/sewage) is running out while it is not running then you will have to secure the Unit and do a Drain down and prepare to exchange the pump out with one that is ready to go.

Safety: Must Wear Proper PPE!

When you Acid Clean or open a Treatment Unit or remove the window on the V-1 to wash it out – please wear full PPE including Full Face Respirator, Poly Lab coat, gauntlet sleeve gloves and a poly coated Tyvek hood.

Daily:

- Chlorine test & adjust. Log in the E.C.C’s Log Book in the lower L/H corner & the MSD’s Chlorine log. DEC will request these logs during inspections. Please keep all readings including Daily, Weekly & Monthly log books.
- Inspections for leaks, piping, pumps, Treatment Unit, Sediment Module tank (6 per unit).
- Cycle all Units. Ones that are not on-line, cycle with the Reset Switch on the Treatment Unit “No Sewage”.
- Inspection “visually” the Chlorine Cells for buildup and check amperages - NEVER exceed 7 amps. Test & diagnose any Cells that are NOT working when the Treatment Unit is running. Make appropriate repairs or replacements.
- Keep the MSD room clean & sanitized. Do a spray down and wash down. Use the sandpiper pump to pump down the bilge pocket. Keep the (3) pockets cleaned out.
- **AMOS:** make sure to make daily, weekly & monthly entries.
- Fill out Daily notes & the MSD Chlorine Log Book.

Every (3) days of use on a Treatment Unit, complete the following on the 4th day:

- On the (4th), **MUST** complete Acid Clean of the Cells that have been online (PPE)
- Wash off as much of the calcification build up as you can in the deep sink with warm/ hot water. Otherwise you will load up the Calci-Solv Acid too fast. Acid container will hold 4 each Cells at one time.
- Soak the Cells for a minimum of 30 minutes then rinse off in the deep water sink.
- While the 4 each Cells are soaking, rinse out the Cell housing with hot water and use the Toilet mop with Calci-Solv to clean the housing salt build up. Then rinse again.
- While acid cleaning, remove the Inspection Window and clean the Screens and wash out the Treatment Tank.
- Use Vaseline on the O-rings using an acid brush.
- Do **NOT** stretch the O-rings. Handle with care, they can last for years.
- Make sure the Arrow on each Cell points at 12 o’clock. This is **REQUIRED** or the Cell will not work. If you install a new Cell make sure to mark the embossed arrow with a Black Paint stick. Mark the date installed and which Unit and Cell # it is. This will help with future diagnostics.

- There are two little tabs on each side of the O-ring groove that must be trimmed off, flushed and smoothed. Be careful **NOT** to trim below the surface edge, as this is an alignment tab for the new style housing which ours are not.
- After acid cleaning of the Cells, do a Chlorine Test and adjust appropriately. Run at least one cycle without sewage then on the second cycle run your test. This will flush the sediment modules with fresh chlorine.
- Disinfect the MSD Treatment Unit and area after having it open.

The Cleaner the system, the better the system works!

Weekly:

- Clean the Reduction Screens and wash out the Treatment Tank.
- Open the “drain” valve and ball valve, just below the suction valve on the shore transfer pump. Need to use your toe to open & closed this valve. Make **SURE** the suction and discharge valves are **CLOSED** on the Shore transfer pump.
- Use the Shore Transfer pump to pump down the Treatment Tank back to the V-1 Tank.
- Clean and Wash the inspection window. Joy soap with toilet mop – no ammonia products. Use Calci-Solv to remove salt build up. Rinse well.
- Clean and Wash the top window.
- Clean the tips on the level sensor – use a Scotch-brite pad.
- Remove but keep the screens inside the Treatment tank until these are cleaned.
- Remove one screen at a time. Hose off & scrub with S.S Wire brush. Hose off as cleaning continues. **NOT FUN BUT NEEDED TO DO CORRECTLY**. Scrub and wash both sides until the screen is completely clean then set it aside and do the next one. Repeat until all (4) are done.
- Hose out the Treatment Tank and inspect coating. If there is an issue with the coating, put a work light on the area to dry it out and do a touch up re-coat job. This will put the unit out of service for a couple of days. Make sure the other two units are in good working order.
- Clean the Sight level tubes on both the V-1 & V-2 Tanks
- Use the built in V-1 & V-2 Wash down the System. May need to put a second Unit on-line to keep up with processing.
- Clean the Y-Strainer screen on the Salt water supply line to each unit. Use Joy soap with toilet mop.
- After having the Treatment unit open, wearing your PPE, spray down the Treatment Unit and area with Simple Green “D” and Joy soap. Use Joy soap with toilet mop on the Treatment Tank.
- Use the long handled deck brush on the deck plates and rise with hot water.
- Disinfect the MSD room at least (3) a week to keep the bilge well pockets cleaned out.
- **AMOS**: Make weekly entries

Monthly:

- Change oil on all the Hydromatic Pumps: use Turbine synthetic oil. Not the color and condition of the oil. Note if it has water or metal in it or turns a dark color.
- Inspect all TDR’s as per their time setting and adjust if needed.
- Slight Level Tube condition. Clean and replace as needed.
- Wash the Bilge and clean the bilge pockets.

- Clean the Sand-piper strainer basket
- Wash & sanitize the MSD room.
- Clean Inventory. Order when needed.
- **AMOS:** Make monthly entries.
- **Safety and Protective Gear (PPE):** Full face respirator, cartridges (2 sets per week minimum) 3-M only. Lab aprons “poly”, gauntlet sleeve gloves (Grainger – stock up), Vinyl inspection gloves (better than Nitril gloves). Keep up on the stock and be SAFE.
- **MSD Safety Supply locker located in the baggage room as you enter thru the Water Tight Door #4. Keep it locked!**

Bellingham: see the Bellingham Sewage Hook up instructions

- After the V-1 tank has been pumped down completely via shoreside connection, Remove the V-1's viewing/inspection window.
- Install a ‘clip’ through the Jog button bezel hole in order to hold the shore pump in the continuous run mode. Do **NOT** leave the MSD room, eyes needed on the system.
- Use the wash down system except the FWD wall wash. Use the STBD wall and bottom wash.
- Allow the shore pump to keep up.
- Allow the shore pump to pump tank until almost dry.
- Use hose and wash down all that was missed by the built in wash down and wash the bottom. Clean thoroughly!

Will have better test results and reduction screens will stay cleaner longer!

Every two months:

- Drain and pump down each Unit.
- Replace Zincs in the Treatment Unit & Sediment modules (6 each tanks).
- Change oil in the Hydromatic pumps
- Clean Reduction Screens & inspect if any are getting holes. Replace when needed.
- Inspect the coating. Make touch up when needed. Must clean with thinner – Bed-liner by Rust-O-lum.
- Replace the V-1 & V-2 level sight tubes.
- Perform a weekly & monthly inspection maintenance
- **AMOS:** Enter as required

Keep up on the pumps. Make sure spares are kept rebuilt and ready to go.

Check and see if any of the volutes show sign of wear. If needed, clean & coat line with BelZona or Devcon ceramic epoxy lining (supply chain lock).

Always check the impeller diameters before you install. Not all are correct from Cascade. The impellers are manufactured in 5” diameter and machined down to 4.625”. This will be difficult to diagnose if installed. It will either cause the Treatment tank or module to overflow.

The backwash pumps are still the Bronze housing with 316 S.S impeller, wear plate and drive sleeve. If you ceramic line the Bronze housing on the Backwash pump it will last for years. The all 316 S.S Pumps (FloMax 8) require an inline swing check valve. There is zero room for this type of pump. **DO NOT** change it to an all 316 S.S unit.

Do not cut short the maintenance. It is an easy system to take care of but it will come back to bite you if you neglect it.

The average maintenance time spend each day is ~ 2 hours. There will some days with only 1 hour and some that take you 4 hours.

Treatment Pumps:

- FloMax 8, 316 S.S: Flow and Discharge only.
- FloMax 8, Bronze pump with all 316 S.S hardware & impeller: Backwash pump
- Sludge pump: small MP-Bronze pump change out with the new S.S pump unit. AMT pump/IP pumps #370C-98 with electric motor with a #56 frame.
- Grinder pump: mounted under control panel: Hydromatic

Vender on all pumps is Cascade machinery

AMOS: Enter all pertinent information when pump requires repair or replacement.

MSD Chlorine Test Procedure

- Identify the Unit to be tested.
- Make sure all other units are off and not able to come on during your sample taking. This will ultimately affect your chlorine test.
- Wait until the unit being testing has cycled OFF.
- In the Auto & Time mode operation, cycle the Auto switch to manual and back to Auto quickly. This will cycle the transfer pump ON once it comes up to the Level Probe inside the Treatment Tank.
- Start your 14-15 minute count at this point.
- Flush the sample port prior to taking the sample.
- At minute 14 take your sample from the overboard pipe at the deep sink.
- Pour sample to the 40 mil. Mark
- Add (1 each) Reagent No. 1 to the sample & swirl. The sample should turn dark, indicating there is chlorine.
- Add Reagent No. 2 to the same sample & swirl.
- The test tube level should be full – not concaved or overfilled.
- Invert the square test bottle over the test tube and invert both, emptying the test tube into the square test bottle.
- Use the test drops, one drop at a time, swirling between each drop. Watch the dark color disappear. Each drop = 1 ppm.
 - If the sample is almost clear but not totally & you fill the tube with less than a whole drop which makes the sample completely clear, this would = 0.5 ppm.
- Fill out the MSD log book and enter the Chlorine reading in the ships log (lower left hand corner)
 - Example: MSD Chlorine Test: No. 2 Unit @ 4 ppm
 - If the Unit tested is either lower than 3 ppm or higher than 5 ppm, the amps on the Cell Probe need to be adjusted.

- Increasing the amps, increases the Chlorine and thus for opposite. Normal setting is btw 5 to 6 amps.
 - For example: If the unit is set @ 5 amps and your chlorine level is too low. Look at the following possible causes.
 - Location: brackish water such as Auke Bay will result in low reading
 - Solution: Wait until docked and retest. If still low, adjust half amp and retest.
 - For example: If the amps are 4-5 and the chlorine level is high (6 ppm or higher). Look at the following possible causes.
 - Sample was taken at the wrong time: past 15 minute point.
 - Solution: Retest at the 14 minute point.
- Note* Test time starts once the Treatment Unit comes ON, not from the beginning of Transfer Sewage. A complete cycle occurs from the start of the Treatment Unit until it cycles OFF. The cycle is 18 minutes.

Sampling Information



Admiralty Environmental
641 W. Willoughby Ave., Suite 301
Juneau, AK 99801
(907) 463-4415

Alaska Marine Highway System Sampling Field Notes

Date: _____

Vessel Name: _____

Sampler(s): _____

Sample Port ID #1: _____ (Grab / Composite) (Blackwater / Graywater / Mixed)

Notes: _____ Total time of sample collection (min): _____

Latitude: N/A Longitude: N/A Speed: N/A Itinerary: _____

Sample Port ID #2: _____ (Grab / Composite) (Blackwater / Graywater / Mixed)

Notes: _____ Total time of sample collection (min): _____

Latitude: _____ Longitude: _____ Speed: _____ Itinerary: _____

Sample Port ID #3: _____ (Grab / Composite) (Blackwater / Graywater / Mixed)

Notes: _____ Total time of sample collection (min): _____

Latitude: _____ Longitude: _____ Speed: _____ Itinerary: _____

pH meter ID / Date Calibrated	Thermometer ID / Date Calibrated	Colorimeter ID / Date Calibrated

Field Test Results

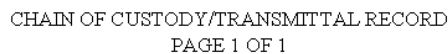
	#1	#2	#3
Time, 24-hour	:	:	:
pH, units			
Temp, C			
Free Chlorine, mg/L			
Total Chlorine, mg/L			

As the accompanying shipboard personnel, I hereby acknowledge that I have witnessed this sampling event and can attest that the samples were collected from the correct sampling port(s) as designated in this vessel's Vessel Specific Sampling Plan (VSSP):

Signature _____

Printed Name _____

Date _____



PROJECT NAME:					ADEC Compliance																		
REPORT TO:				PHONE#:	# of Bottles															Initial Temp. (°C)			
ADDRESS:				SAMPLED BY:															Small Temp. Blank: _____ Large Temp. Blank: _____				
Samples taken in the presence of:																							
DATE	TIME	SITE DESCRIPTION / IDENTIFIER				MATRIX													pH	Temp °c	Total Cl	Free Cl	

DATE	RELINQUISHED BY: (signature)	RECEIVED BY: (signature)	DATE	Section to Be Completed by Receiving Laboratory
TIME	RELINQUISHED BY: (print)	RECEIVED BY: (print)	TIME	
DATE	RELINQUISHED BY: (signature)	RECEIVED BY: (signature)	DATE	
TIME	RELINQUISHED BY: (print)	RECEIVED BY: (print)	TIME	

Temp °C/Loc:	_____	_____	_____	_____
Thermo ID#:	_____	_____	_____	_____
Condition of Custody Seals	_____	_____	_____	_____
Initialed By:	_____	_____	_____	_____
Shipped Via:				