Vessel Name: MV Matanuska
IMO Number: 5228827

The sampler will use the Vessel Specific Sampling Plan (VSSP) as a guide to identify the specific onboard location(s) and sources to be sampled. To satisfy the VSSP requirement, you may fill in the blanks in this form starting on page 2 or you may submit an existing up to date VSSP if it contains the components listed in 18 AAC 69.030(b).

Please note for this VSSP:

- ADEC will not approve sampling locations more than 50 feet from the overboard discharge port.
- The wastewater samples that are taken to satisfy the state requirements must reflect the quality of the effluent that is being discharged into Alaska waters during standard operating procedures.
- Cruise ships operating under a DEC discharge permit must obtain the required number and types of samples as listed in the permit.

If you have questions concerning the components of the VSSP, please contact:

Kaitlyn Raffier (907) 465-5138 or Johnny Zutz at (907) 465-5317, johnny.zutz@alaska.gov

ADEC Use Only – ***Final Document will have Approval Stamp in this block.***

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
STATE OF ALASKA

APPROVED
By jdzutz at 3:38 pm, Feb 21, 2023

Vessel Information

Vessel Name	MV Matanuska
Year Vessel joined fleet	1963
IMO Number	5228827
Lower berth passenger capacity	212 (Double Occupancy), 243 (Total berths)
Maximum passenger capacity	450
Crew capacity	48

Treatment equipment

MSD system (USCG type)	Severn/Trent Omni-Pure 15 MXMP
Number of MSD units	3 (three) Units operated in parallel Each unit rated at 15,000 gals/day
Other wastewater treatment units not listed above (list types & capacity)	None

Note: Include all units. Examples: cubic meters, gallons, cubic meters per second as appropriate.

Generated Volumes

		Amount	Units
Blackwater generation per day		3,984	Gallon, max
Graywater generation per day (list units of measurement)	Accommodations	10,956	Gallon, max
	Galley	1,500	Gallon, max (estimate)
	Laundry	1,500	Gallon, max (estimate)
	Other		
Daily water use/individual		30 (22-gal fresh / 8-gal seawater)	Gallon/day
Seawater usage per day		3,984	Gallon, max
Sewage generated/individual		8	Gallon/day

Discharge Ports

(List all discharge ports which discharge graywater, blackwater or other wastewater)

Discharge port designation (name)	Wastewater types discharged	Diameter (list units)	Location	Vertical Distance from water line	Average Flow Rate
MSD STB Fr. 87-88	Black & Gray	2" size pipe	MSD room	6 ft	10.42 gal/min

Discharge Pumps

(Complete one line for each discharge pump (even if you have multiple discharge pumps per discharge port)

Pump Name or #	Pump Manufacturer and model	Maximum Flow Rate	Units
3 (Pumps)	Omnipure 15 MXMP units	31.26	Gal/min

Collection Tanks

(List all of the vessel tanks which are involved with collection of wastewater prior to treatment)

Tank / Name Number	Type of Wastewater Stored	Location	Volume (with Units of measurements)
V-1	BW & GW	FWD	1,894 gal
V-3	BW & GW	AFT	7,112 gal

Intermediate Tanks

(List all of the tanks which are involved with wastewater treatment)

Tank / Name Number	Type of Wastewater	Location	Volume (with Units of measurements)
V-2	BW & GW	MSD Room	2,929 gal

Holding Tanks List

(All of the tanks which are involved with collection of wastewater for storage)

Tank / Name Number	Type of Wastewater	Location	Volume (with Units of measurements)
N/A			

Wastewater Treatment

All black water and gray water drains into either the forward (V-1) or aft (V-3) collection tanks. The aft collection tank (V-3) holds 1,894 gallons. The wastewater collected in the aft tank is pumped to the forward collection tank (V-1) which holds 7,112 gallons. Float switches automatically start the transfer pump at 75% and shuts the pump off at 12% tank level.

All wastewater enters the forward collection tank (V-1) from gravity drains and sewage transfer pumps from the aft collection tank. The three treatment units operate automatically. Omnipure 15MX No. 1 unit starts when forward holding tank reaches 40% capacity and shuts off at 16% capacity. No. 2 unit starts at 50% capacity and shuts off at 20%. No. 3 unit starts at 60% capacity and shuts off at 30%.

When activated by V-1 tank level switches, the macerator pump for each treatment unit takes the

contents of V-1 tank, mixes with the incoming seawater and is pumped through the book cells to the V-2 (2,929 gallons) effluent process tank. The wastewater is chlorinated as it passes through the book cells. The seawater facilitates the electrolytic action in the book cells which create a hypochlorite generating system that produces sodium hypochlorite and in turn sanitize the water. The plates also cause “rapid chemical oxidation of organic constituents of wastewater”.

The V2 process tank is a 2,929-gallon tank. This tank is an independent tank located in the MSD room. The processed wastewater from the treatment units enters the tank in down comers to the bottom of the tank. The overflow discharge is near the top (80% – 90%) of the tank capacity. This flow pattern is designed to allow the processed (chlorinated) wastewater to reside inside this V2 process tank for at least a 30-minute period. This time is used for the chlorine to react completely with the wastewater prior to the effluent discharge overboard.

The (V-2) effluent tank discharges overboard using 3 ECO Model C-10A-OS-VD pumps rated at 10.4 gals/min. These pumps stop and start as each of the processing units start and stop. The 3 pumps are part of the 3 Omnipure 15MX units. The minimum discharge rate from the V2 tank with one MSD running and one ECO pump running; 1*10.42 gal/min= 10.42gal/min (minimum discharge rate). When all three MSD units are running, the V2 tank discharge rate is 3 x 10.42 gal/min= 31.26 gallons/min (maximum discharge rate).

A liquid chlorine chemical feed dosing system complete with chlorine tank and a dosing pump is part of the treatment system. This chlorine injection system is used as a backup treatment system if there is insufficient salinity in the seawater. In areas of low salinity, the MSD units will alarm on high voltage. The operator will either secure the MSD unit or put the MSD unit in the override mode and turn on the chlorine injection pump. The flow rate of the chlorine injection is adjusted so that the overboard effluent has free chlorine reading about 1 – 2 ppm.

Each Omnipure unit includes the following alarms any of which will set off a summary malfunction alarm in the engine control room:
• High level alarm
• High temperature alarm
• High pressure alarm
• System alarm (summary)
• Over voltage alarm

Discharges

All discharges occur automatically based on levels of the V-1 tank as described above. Operation in port is currently the same operation as at sea. Procedures for minimizing discharge in port are being updated in the Best Management Practice (BMP) plans and Standard Operating Procedures (SOP). The crew keeps a log of estimated discharges based on the number of persons onboard with an estimate of 22 gallons gray water and 8 gallons black water generated per person per day. The crew conducts a daily chlorine test of the wastewater effluent and records the readings in the Chief Engineers Weekly Report. This total chlorine test is the manufacturers recommended on-board method for determining the quality of the treatment being accomplished.

► **Port of Ketchikan Area:**

This area is part of a Small Vessel Discharge Control Area (BMP vessels). The *M/V Matanuska* has recommended wastewater discharge regimes for this area (voluntary requirement) in place.

See 'Ketchikan Beaches Reports'. Web link: Ketchikan Beaches (alaska.gov)

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 → ***Gravina Point to Mountain Point***
North Boundary	Line from → ***South of Guard Island***

Wastewater Sampling Port with suggested Locations and Timing

Sample Valve Identification [notation used in WW Discharge Logbook]	MSD 08 Test Point
Sample Valve Location	Frame 87-88, STBD

Photo of the Sample Valve:

Matanuska Sample Valve:| DEC Sampling | STBD Frame 87- 88 2" Pipe | MSD 08 Test Point

Sample Suggested Timing:

► Dependent upon vessel schedule – morning/afternoon

Flushing vessel Sample Valve / Sample Line:

Length of sample valve (from discharge pipe to where sample is collected.	~15" (including extension tubing)
Required minimum flushing volume [US gallons / Liters]	1.25 gal

Wastewater Sampling Overview

Sampling will take place in the Port of Juneau shortly after arrival during the day for samples to be delivered to the testing laboratory and kept refrigerated. The installed sample connection is located downstream of discharge piping from all three overboard discharge pumps. This representative sample is the combined black and gray wastewater going overboard after processing has been completed. Sampling valve will be labeled "MSD 08 Test Point". The sample valve is in the MSD Room STBD side in the overhead on the combined discharge pipe. Samples are to be taken 2 – 3 minutes after an overboard pump cycles on, not to exceed a 30-minute sampling event. The sample location is less than 50 feet from the overboard hull discharge with an estimated distance of 30 feet.

Wastewater Sampling Frequency

Conventional Samples – 1 for every three months of operation, Maximum 4 per year.

Priority Samples – 1 per year

Resampling – As needed to confirm MSD function

Description of the standards the owner or operator will use to determine a deviation from the plan.

The ship's crew will conduct daily onboard "total" chlorine testing from the "MSD 08 Test Point" connection using a Hach Company color comparator type test (Kit #2231-01) that reads from 0 to 3.5ppm. If the reading exceeds the 3.5 ppm, the operator will dilute the effluent sample with 50% distilled water and retest (test results are then doubled to a range of 0 – 7ppm). Readings are expected to vary from 0 to 5 parts per million depending on the loading of the system. 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. AMHS is requiring that if zero reading is found - that a 2nd reading must be taken within 24 hours. If there is a second zero reading, this requires shipboard investigation and repairs to commence. If there are 3 days with zero readings both the Environmental Specialist and the assigned Port Engineer must be notified by email providing information on what steps are being taken to resolve the situation and perhaps a request for outside assistance if necessary. A follow up email is required to the Environmental Specialist and the assigned Port Engineer when the problem is solved.

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 in use).
• Discontinue any double processing of wastewater. (Some operators feel it is helpful to pump the V-2 processing tank back to the V-1 forward collection tank to help reduce the cellulose mat buildup in the V-2 tank.)
• Discontinue use of Chlorine Bleach by staff cleaning rooms.
• Contact manufacturer for trouble shooting advice.

- 24- hour technical support: 1-800-524-6542
    - Robert Crutchfield: 281-274-8451
        - Robert.Crutchfield@denora.com

AMHS BMP C0-015-2021 11/10/2021 Part 7 Communications Plan [18 AAC 69.046(c) (7)]

- AMHS has implemented communication procedures to ensure that the proper operation of the MSD units on each ship is communicated to the ultimate decision makers.

Matanuska Wastewater Treatment System Overview:

See Matanuska 2023 VSSP Attachment A (Page 9)

Matanuska MSD Flow Diagram:

See Matanuska 2023 VSSP Attachment B (Page 10)

Wastewater Sampling Tables

►Dates of sampling can be submitted separately by operator or sampling contractor.
►Notification to ADEC CPVEC must be made 36 hours prior to a sample being taken.

Wastewater Type	Sample type	Sample Location	Representative times for Sampling
BW/GW mixed	Grab	MSD 08 Test Point Frame 87-88, STBD	Morning / Afternoon (AMHS vessel schedule)

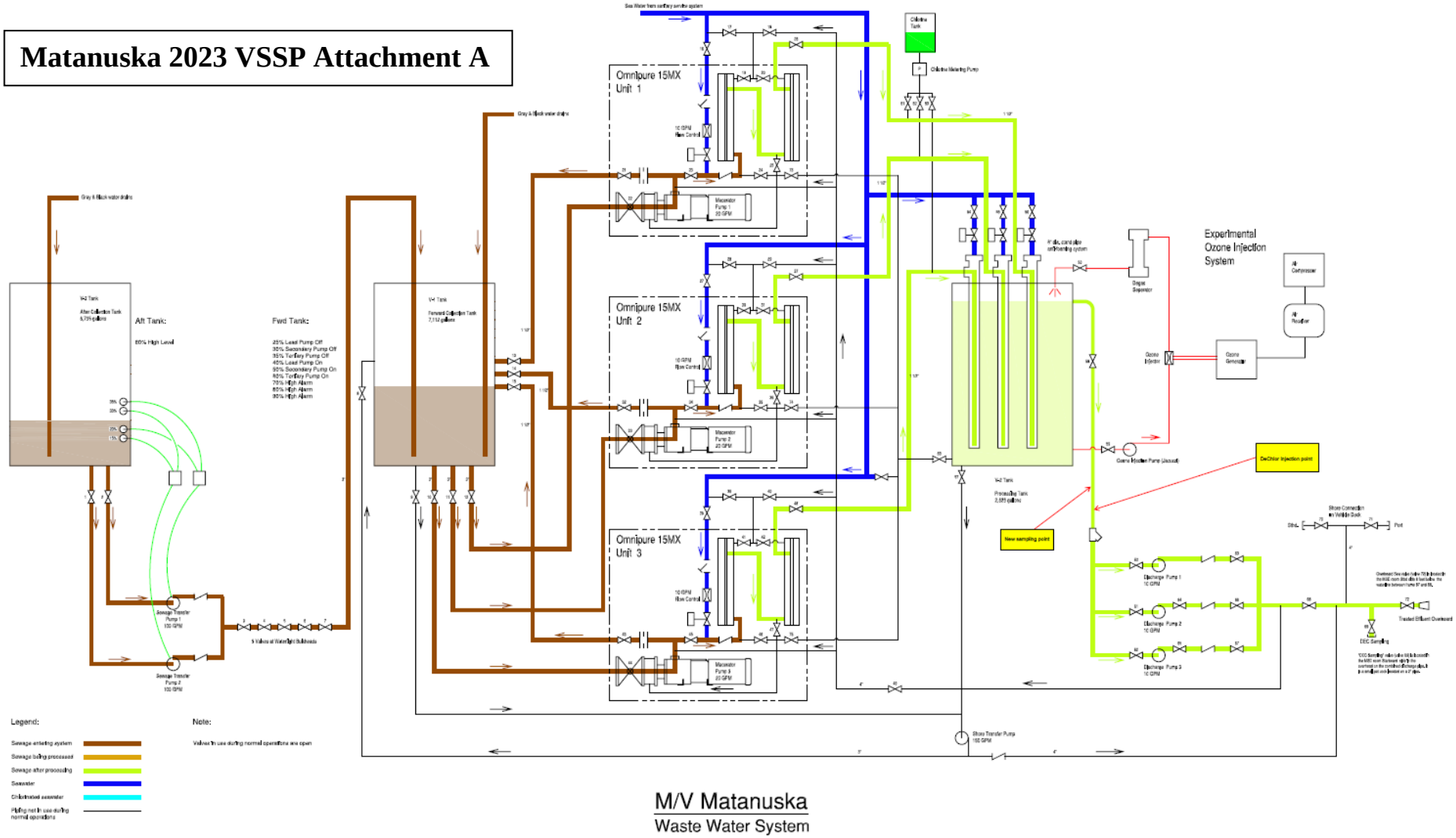
Matanuska 2023 Sampling Table

	Frequency
	Blackwater
Temperature, pH, Chlorine (residual and free)	Parameters measured in the field for every sample
Conventional parameters	
Fecal coliform, Total Suspended solids, Biochemical Oxygen Demand – 5-day, Specific Conductance	4 (max) – 1 Sample require for every 3 months of operation
Settleable Solids, Chemical Oxygen Demand, Alkalinity, Hardness, Oil and Grease	4 (max) – 1 Sample require for every 3 months of operation
Nutrients	
Ammonia – Total	0
Total Organic Carbon, Total Kjeldahl Nitrogen, Nitrate/Nitrite, Total Phosphorus	0
Priority parameters [1]	
BNA(TAqH)	1
VOCs	1
Total Recoverable Metals	1
Dissolved Metals	1

Table Notes:

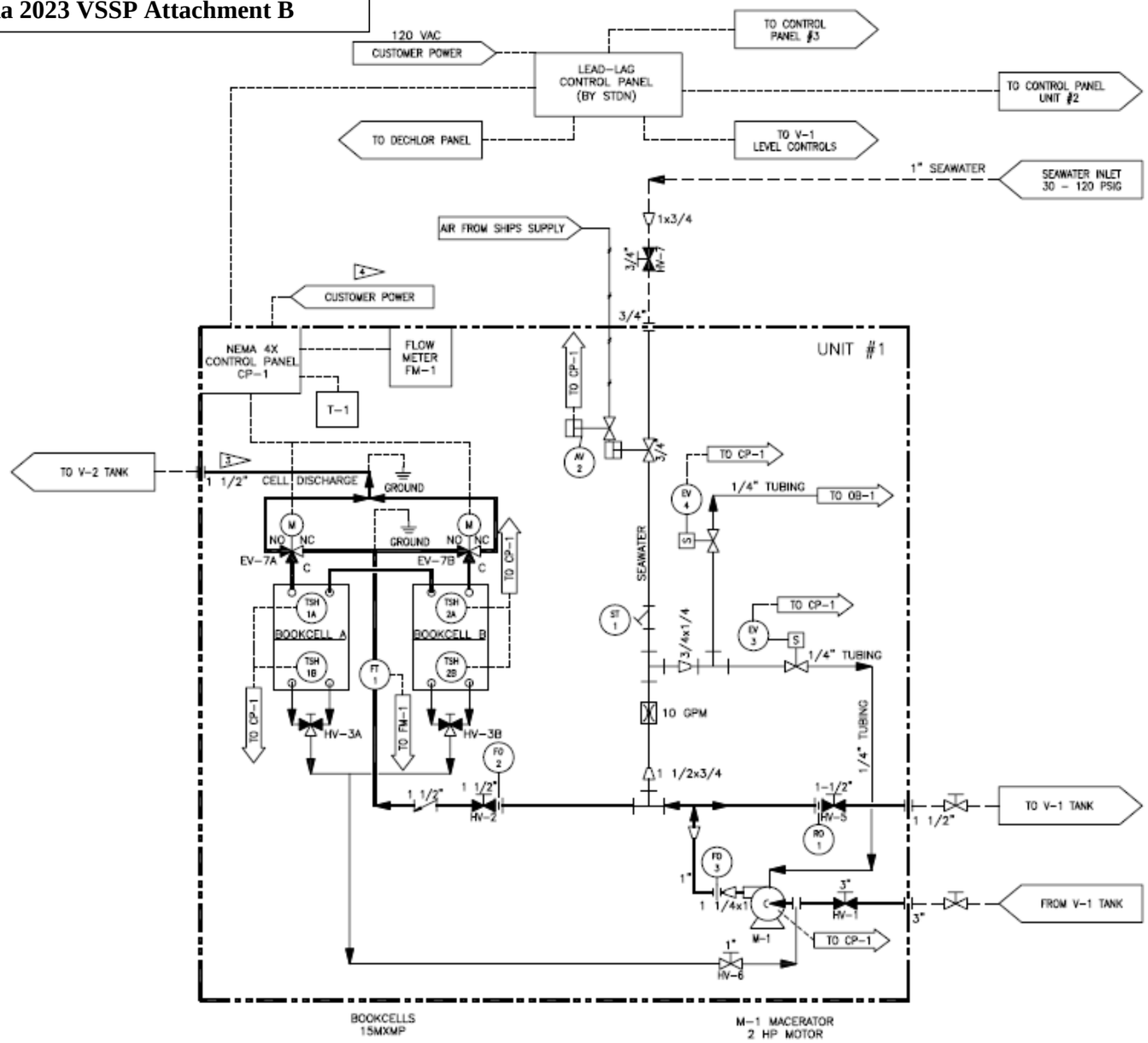
Refer to the QAPP/Discharge Authorization for analyte groupings (including resampling requirements).
[1] BNA, VOC, and Metals lists are found in the approved QAPP

Matanuska 2023 VSSP Attachment A



Matanuska 2023 VSSP Attachment B

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY	APPROVED BY
0		INITIAL RELEASE	JBN		



COMPONENT DESIGNATION

CP – CONTROL PANEL
ED – EDUCTOR
EV – ELECTRICAL VALVE
FCV – FLOW CONTROL VALVE
FI – FLOW INDICATOR
FO – FLOW ORIFICE
GT – GROUND TARGET
LG – LEVEL GAUGE
LSH – LEVEL SWITCH HIGH
LSL – LEVEL SWITCH LOW
NV – NEEDLE VALVE
PI – PRESSURE INDICATOR
PR – PRESSURE REGULATOR
PSH – PRESSURE SWITCH HIGH
RO – RESTRICTION ORIFICE
ST – STRAINER
TSH – TEMPERATURE SWITCH HIGH
T – TRANSFORMER

DESIGN SPECIFICATIONS

UTILITY REQUIREMENTS
ELECTRICAL: 30 KVA (480VAC,60HZ,3PH)
SEAWATER: 10 GPM or 37.8 L/min (IDLE)
12.56 GPM or 47.3 L/min (PROCESSING)
AIR CONSUMPTION: 80–150 PSIG
EJECTOR: 1 SCFM @ 6 PSIG (150PSIG MAX)

TREATMENT CAPACITY (PER UNIT):
BLACK ONLY: 500 PEOPLE
BLACK/GREY: 225 PEOPLE
TREATMENT VOLUME: 14,794 Gal/day or 56,000 L/day

ALL ELECTRICAL RATINGS ASSUME NORMAL OPERATING CONDITIONS AT NORMAL SEAWATER SALINITY LEVELS.

6. V–1 & V–2 TANKS NOT SHOWN (CUSTOMER SUPPLIED).

5. SEE SHEET 3 FOR MODES OF OPERATION.

4 CUSTOMER RECOMMENDED LOCKABLE: 440–480VAC 30A CB REQUIRED (MAIN FEEDER)

3 MAINTAIN AS A MINIMUM (6" [152]) – THE OVERBOARD DISCHARGE LINE BELOW THE BOOKCELL INLET LINE INTO THE V–2 TANK.

2. REFERENCE GENERAL ARRANGEMENT DRAWING FOR CUSTOMER CONNECTION SCHEDULE AND LOCATIONS.

1. ALL ITEMS SHOWN OUTSIDE OF SKID ASSEMBLY BOUNDARY TO BE SUPPLIED BY OTHERS UNLESS NOTED AS "SHIP LOOSE" (PIPING, VALVES, CABLING, ETC.....).

NOTES (UNLESS OTHERWISE SPECIFIED)

LEGEND

CENTRIFUGAL PUMP
MANUAL BALL VALVE – NORMALLY OPEN
MANUAL BALL VALVE – NORMALLY CLOSED
FLANGE
REDUCER
UNION
CHECK VALVE
Y– STRAINER
ORIFICE
SOLENOID
FLOW METER WITH VALVE
EJECTOR
COMPONENT INDICATION
MOTOR
INJECTION VALVE
NEEDLE VALVE
FIXED ORIFICE

LINETYPES
MAIN LINE(S)
SECONDARY LINE(S)
SKID BOUNDARY
ELECTRICAL
CUSTOMER LINES/OPTIONS
PNEUMATIC LINES

SYSTEM ITEM NUMBER(S)

SEVERN TRENT DE NORA
1110 INDUSTRIAL BOULEVARD SUGAR LAND, TEXAS 77478
TELEPHONE No: (281) 240–6770 E–MAIL: sales@severntrentdenora.com
FAX No: (281) 240–6782 WEB SITE: www.severntrentdenora.com

UNLESS OTHERWISE NOTED
TOLERANCES:

TYPE:	INCHES	[MM]
FRACTIONS	± 1/8"	
.X	± .1"	± 2.5
.XX	± .02"	± .51
.XXX	± .005"	± .127
ANGLES	± 1°	

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OMNIPURE
MARINE SANITATION DEVICE
U.S.C.G. CERT. NO. 159.015/7210/0
15MXMPPM LOW SALINITY
FLOW DIAGRAM
MATANUSKA
ALASKA MARINE HIGHWAY
P.O. # 0030209

SCALE:	EIC JOB No: 018681	SIZE: D	REV: 0
DWG No: D018681–F–01		SHEET: 1 of 3	