ARM 7.5.5B DISTILLED WATER PLANT OPERATION

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1. References:

a) Technical Manual - Maxim Desalinator, Model HJ-3C
b) Drawing 65411-532-01, Auxiliary System Diagram Potable Water

2. Description:

The distilled water evaporator, Maxim HJ-3C, is a flash type evaporator that receives its heat source from a Heatrex, HX-350, 28 KW electric heater. The evaporator is rated to produce 140 gallons per day or approximately 2-8 gallons per hour at 70°F sea water temperature. A decrease in sea water temperature can increase the fresh water output because the colder sea water flowing through the fresh water condenser will increase the condensation action of the rising vapor. Therefore, with sea water at 65°F., fresh water output will be approximately 20% greater than with 85°F sea water if there is additional heat available from the heat source. Where the sea water temperature is greater than 85^{o}F the output (GPH) of fresh water will be reduced accordingly. Additionally there will be some loss of production due to the relatively high head for a small system. If required the distilled water for deionization can be collected at the unit.

The intended purpose is to provide distilled water to the scientific deionized water tank. It is not intended as potable water for human consumption.

*Note the following:

*Distiller output rating @ 70^{o}F Seawater is 8 GPH or 192 gallons per 24 hour day
Seawater Pump Total head is 20’ or 7.9 psi seawater discharge above suction pressure.
Deionizer Pump Total Head is 18’ or 7.8 psi discharge above static head of 6 psi.
Safety Relief Valve setting is @ 10 psi
1 Grain per Gallon (GPG) = 17.1 PPM
0.25 GPG = 4.275 PPM

3. Startup Procedure:

1. If empty, prime the distillate pump system with fresh water via vacuum breaker located in distillate line above salinity probe (Figure 1, Key No. 119 in manual).

2. Inspect sea water pump suction strainer and clean as needed. Open the sea water supply valve and the sea water overboard valve.

3. Turn on sea water pump. The overboard discharge line should be fully open to keep back pressure at a minimum. The sea water pressure gauge should read a minimum of 30 PSIG.

4. Close vacuum breaker valve.

5. Note the vacuum being created in the shell by observing the compound gauge. When the indicator shows from 24-28 inches of vacuum, proceed to next step.

6. Ensure hot water circulation valves are fully open. Turn on the hot water pump at the pump control, and the heater at the control panel, thereby permitting the hot water to circulate through the sea water heater. When proper operating temperature is reached boiling action can be seen through the sight glass.

7. Start distillate pump (switch on the FWD side of the heater control panel)

8. Turn on salinity control panel.

   NOTE: The amount of time it takes for the unit to warm up and make good water is generally 10 to 30 minutes. If after 30 minutes, you notice that the unit is not making pure water in the expected quantity, inspect the unit and check the Troubleshooting Guide (page 11 of the manual) for probable causes.

4. Shutdown Procedure:

1. Secure water heater and hot water circulation pump.

   CAUTION: WITH THE EVAPORATOR SHUTDOWN, A LEVEL OF SEA WATER WILL BE CONTAINED IN THE EVAPORATOR SHELL. IF THE HOT WATER IS ALLOWED TO CIRCULATE THROUGH THE EVAPORATOR, THIS SEA WATER WILL EVENTUALLY REACH THE SAME TEMPERATURE AS THE HOT WATER AND WILL CAUSE EXCESSIVE SCALING OF THE SEA WATER HEATER TUBES RESULTING IN THE NEED FOR MORE FREQUENT CLEANING..

2. Turn Salinity Control Panel Power switch OFF.
3. Turn off distillate pump.
4. Open petcock vacuum release valve.

5. After a cool down period, when evaporator shell has reached ambient temperature the sea water pump can be secured.

6. Close the sea water supply and overboard valves. When the evaporator is located below the water line, it is particularly important that the intake and discharge valves are closed. Otherwise, with the vacuum broken, sea water will be siphoned in, and the evaporator will be flooded, thereby causing a saline condition in the fresh water trough. While not serious, it will require additional start up time to free the condenser chamber of this saline condition before fresh water can be produced.

7. Drain left over sea water from evaporator shell, and then refill with fresh water – to the bottom of the sight glass. This will prevent scale from forming and will be easier to start unit next time.