

## Background:

Seven Seas Mariner (SSM) is a large vessel that is operated by Regent Europe. The SSM is a regular visitor, and visited in 2006, 2007, 2008 and 2009 Alaska. The vessel has excellent compliance record, and is very cooperative, and has shown over the years environmental pro-active and cooperative approach.

This review includes the review of the SSM Annual Report January 15, 2010.

The items are set out below.

## Discussion:

Silver Shadow's and SSM vessel management is done by Regent ship management. The vessel management visited the CPVEC team in JNU early in 2008, to obtain information regarding the General Permit and associated plans, and to get a feel for ADEC CPVEC regulatory expectations. This document discusses the 2009 submitted SRE updates. The SSM has a Hamworthy AWTS system, similar as the AWTS / MBR systems on the Princess fleet. The overall discharge quality of the SSM in 2009 season, compared to the other large vessels, is remarkable. The Seven Seas Mariner is not assigned for 2010 season to visit Alaska, and thus the vessel is not applying for a "new" authorization.

- The SRE is concise, easy readable, to the point, and it appears that SSM approaches the SRE actions seriously, and appears already working and fixing items. Pro-active approach.
- The 2009 update include a brief discussion of the "systems" respectively the capacities and how they "interact" with the SRE.
- AWTS system: According vessel based on "high strength biomass" process as aerobic process. Consumes and breaks down the sewage. Byproducts are water and Carbon dioxide. Membrane module contains ultra filtration tubes to achieve high permeate production. There are two Membrane Bio Reactors (MBR). Each MBR (240C type), has capacity of 180 m3/day (used) but are rated for 240 m3/unit.
- Vessel has two evaporators (Serck) each capacity of 400m3/day.
- Pipelines: List of functions medium type (GW BW) and materials.
- The SRE include two categories: 1) Source reduction influent evaluation and 2) Treatment Technology evaluation. The 2009 update include status of all the actions taken with regard the categories.
- SSM SRE included list of the use of chemicals and "interfaced" the volume used to the AWTS system. SSM is also using "Hepburn Bio Chemicals" to improve the effluent performance. Research was on- going in the 2009 season and use of certain chemicals limited / and changed (technical / hotel).
- Soda ash /acid/potable water stabilizer was added to the water and decreased bunkering water in ports. The vessel identified to increase homemade water to reduce the copper load.
- Mineralization of corrosion project started to treat the potable water with Unitor dosing system.
- Increased pipe monitoring integrated in vessel maintenance system (AMOS).

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- Seven Seas Mariner identified the future actions will be taken when vessel comes back to Alaska.
  - Follow up and continue to identify potential sources of copper , zinc, ammonia, and how to reduce them;
  - Continuation of chemical use and relations to influent quality;
  - Source water evaluation reduction etc.
- Seven Seas Mariner is working with Hamworthy to improve the ammonia levels of the AWTS process. However, at the time of report filing Hamworthy could not provide detailed solutions (yet)
- Seven Seas Mariner considers including / installing additional treatment systems to control, reduce ammonia metals.

### **Ocean Ranger Additional Observation:**

This project was started after the ADEC CPVEC NWCA meeting on August 14, 2009 (8/14/2009). During that meeting it was identified that ADEC CPVEC and the Ocean Rangers would conduct a "Source Reduction Plan Survey" on board of the vessels.

Scheduling (end of season) etc. made it possible that not a complete report could be done on the SRE of the vessel. However, the Ocean Rangers that did In Port inspections and visited the vessel were impressed by the open dialogue the vessel crew showed and was aware of the SRE and took actions.

### **Conclusion:**

The Vessel reported helpful information, and actively looked in to matter to reduce the pollutant loads. This shows in the 2009 sampling results compared to other vessels with similar AWTS systems.

### **ADEC Seven Seas Mariner Princess Future SRE Reporting Attention Items:**

None.

Juneau, February 26, 2010