

## **Appendix A. Water Sampling Plan**

This sampling strategy is modeled on the EPA sampling conducted in 2004 on board Oosterdam and Veendam. Some deviations from the EPA strategy are warranted to obtain data with further granularity with respect to sources and potential contributors

On board sampling will be conducted per vessel category, which also corresponds roughly to vessel age. The following vessels have been selected:

<b>Vessel</b>	<b>Vessel Class</b>	<b>Treatment System</b>	<b>Year of Delivery</b>
Statendam	“S” Class	Zenon	1993
Zaandam	“R” Class	Zenon	2000
Westerdam	Vista Class	Rochem	2005

### **Sample Locations**

Water will be collected at the following sample locations to inform the source reduction evaluation:

**Source Water:** The Alaska Cruise Association has been conducting sampling of water bunkered in the ports of Alaska, British Columbia, Washington State and California.

On-board sampling will be taken of evaporated water prior to entering the potable water storage tank, but after the chlorination stage, to determine water quality characteristics from this source. Technical water will be sampled from the technical water pump, prior to distribution through the plumbing system.

**Potable water at distribution point:** Similar to the EPA methods, samples will be taken in a cabin at the furthest reach from the potable water storage tanks. This will build on EPA’s data set, while providing a “worst case” data point with respect to possible metals leaching in supply plumbing.

**Wastewater:** Wastewater prior to treatment will be sampled at various locations in an effort to isolate sources contributing to the overall waste stream. As EPA did in 2004, galley and laundry waste will be sampled prior to mixing with other waste streams. Galley wastes will be sampled at the galley drain tank(s) after grease traps, rather than before as was the case with EPA sampling in 2004. This choice was made to evaluate the effect of grease trap treatment practices.

Accommodations gray water will be sampled at a representative gray water collection tank such as the AC compressor room gray water collection tank.

Should analytical results indicate exceptional values at this point, additional sampling upstream from this tank may be conducted.

As in the EPA study, Food pulper waste water will be sampled at the pulper collection tank for those vessels in the sample set that treat and discharge pulper water in Alaska.

**Combined Pre- Treatment Wastewater:** Combined influent to the treatment plant (gray and black water) will be sampled at the buffer or feed tanks supplying waste to the treatment plant.

**Table of Sample Descriptions and Locations**

<b>Sample No.</b>	<b>Description</b>	<b>Sampling Location</b>
1	Evaporator Water	Chlorination sampling point prior to tank storage
2	Technical Water	Discharge from Technical water pump
3	Potable Water (distributed)	Accommodation far from potable water stores (Forward, Navigation Deck)
4	Galley gray water	Galley drain tank
5.	Laundry gray water	Laundry drain tank
6	Accommodations gray water	AC compressor room gray water collection tank
7	Combined pre-treatment wastewater	Buffer/feed tank supplying bioreactor

**Post treatment wastewater:** Given the frequency of wastewater monitoring under the Alaska General Permit. No additional wastewater monitoring will be conducted as part of this effort. Sampling of wastewaters will be conducted as previously planned per requirements of the Alaska General permit.

## **Analytes**

Samples will be analyzed for the following constituents pursuant to this plan:

1. Ammonia
2. Copper
3. Nickel
4. Zinc
5. pH
6. Hardness (CaCO<sub>3</sub>)
7. Bromine
8. Free Chlorine
9. Total Residual Chlorine

As the evaporator cannot be run in port, the sample will be collected by the Environmental Officer prior to arrival in Juneau. Sample bottles, instructions and training will be provided by Admiralty Environmental. Since Admiralty Environmental will not be sampling the evaporator, field or time sensitive tests for pH, ammonia and chlorine will not be conducted for the evaporator. As evaporator water is treated for pH and chlorine, and is unlikely to be a source for ammonia, this will not detract from the SRE data gathering effort.

## **Sampling Schedule**

Samples will be collected from each of the listed vessels when alongside in Juneau, Alaska during the 2008 Alaska season per the following schedule:

<b>Vessel</b>	<b>Sample Date</b>
Statendam	August 25, 2008
Zaandam	August 27, 2008
Westerdam	August 28, 2008
Statendam	September 1, 2008

It is anticipated that only one round of sampling will be conducted, however anomalous results could trigger additional sampling. Schedules will be coordinated with previously planned wastewater monitoring conducted under the general permit.

It is expected that analytical results will be provided by the contracted laboratory within 2-3 weeks of the sampling events, and in no case later than October 21<sup>st</sup>, 2008. Data analysis and reduction will be conducted and reported in the Annual Progress Report due to ADEC no later than January 14, 2009.