

SOURCE REDUCTION EVALUATION - SRE

Pursuant to section 1.9.1 in Alaska Department of Environmental Conservation Large Commercial Passenger Vessel Wastewater Discharge Permit No. 2007DB0002, Princess Cruises is requesting approval from the Department to discharge the following parameters – ammonia, copper, nickel, zinc – at concentrations in compliance with the interim limits for these constituents as identified in the referenced permit.

Pending this approval, Princess Cruises is submitting this Source Reduction Evaluation (SRE) to identify methods to reduce the presence of these constituents in the discharges authorized by this permit. It should be recognized that this Source Reduction Evaluation plan has been developed in response to the General Permit issued March 25, 2008. As such, it is anticipated that this plan will be updated and amended as further information is gathered in the process of completing this evaluation.

Source Reduction Evaluation Overview

Efforts under our plan will fall into one of two categories of activities:

1. Source Reduction of inflows to reduce introduction of constituents to the waste water stream
2. Technology Evaluation / Implementation to identify and install (as necessary) technology to reduce effluent concentrations.

It should be noted that technology solutions are not yet commercially available for application on a large cruise ship, and therefore at present there remains much uncertainty in the evaluation and potential implementation of such technologies.

Activities under each of these categories is described further below:

Influent Source Reduction Evaluation

A Source Reduction Evaluation will commence immediately and will include:

- 1) Identification of cleaning products, rodenticides, pesticides, or other industrial products that may be the source of the loading;
- 2) Identification of other sources such as shore-based drinking water supply;
- 3) Adoption of operational practices to reduce pollutant sources such as use of alternative cleaning products.
- 4) Substitution of non-chemical methods for methods that involve chemicals.

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The purpose will be to identify potential sources of copper, zinc, nickel and ammonia as they may enter the waste water stream, and to investigate and implement means to reduce their presence in the influent to the Advanced Waste Water Treatment Systems (AWWTS) on board. The major phases of this evaluation will be:

1. Document influent to waste streams as potential sources:
 - a. Most significant cleaning or other chemicals in terms of volume and/or concentration of constituents
 - b. Source water evaluation
 - c. Other potential contributors

To be completed by September 30th, 2008

2. Evaluation and estimation of potential contributions from cleaning products or source water to copper, nickel, zinc, ammonia in the effluent?

To be completed by October 31, 2008.

3. Identification of potential product / source water substitution to reduce constituent concentrations or environmental loading.

To be completed by December 30th, 2008.

Treatment Technology Evaluation

Identification of potential treatment technologies for addressing the target parameters is both more complex than, and yet will be considerably informed by, the influent source reduction evaluation described above. Therefore during the next 24 months Princess Cruises will work with our AWWTS vendors and evaluate additional treatment technologies as may be appropriate for reduction of these pollutants that are practicable for implementation in a cruise ship environment. We will update this plan and report on our technology evaluation progress by **September 30, 2008**.