

## Background:

HAL provided on January 14, 2010 the "Source Reduction Annual Report"; dated January 14, 2010.

This Source Reduction Annual report will be referenced in this review as SRE 2009. Please note that this SRE 2009 includes an evaluation of the actions taken by HAL in 2009.

The review items in this internal document identifies the items that are to be addressed / included in future Source Reduction Evaluation (SRE) reporting by HAL.

The items are discussed below.

## Discussion:

The SRE include all HAL actions taken on board of the vessels that are discharging. In 2009 HAL had in Alaska water a fleet of 8 vessels, only 4 vessel s were authorized to discharge. These discharge vessels were in 2009: Statendam, Ryndam, Volendam and Zaandam. The Volendam stopped discharging after one sample due to a fecal upset during the 2009 season.

In 2008 the following HAL vessels discharged: Statendam, Ryndam, Veendam, Volendam, Westerdam and Zaandam. The 2009 SRE does not include in detail why in 2009 the number of the HAL "non-discharging" vessels was increased.

Previous SRE reports including progress reports, include a categorical overview of "overview Groups", respectively Group I, II, III, IV and V. In the SRE 2009 this is not consistently done by HAL. This review include the SRE 2009 items categorized in each of the in the initially application used groups.

HAL did not "split" for each specific fleet vessel (Class / or yard built) the vessel specifics, but instead used the subject, and where applicable made reference to the vessel.

- **I Source Reduction Evaluation Review:** This Group included the following items:
  - **Source Water Evaluation / Water Supply Waste Collection Evaluation:** HAL identified that water bunkered in certain Ports contained high levels of metals.
  - On Page 9 /21: HAL identified the "mixture" of bunkered and on board produced water. However, the HAL did not identify the volumes of on board produced water (evaporator). HAL identified earlier that water produced by evaporator is very soft and contributes to "leaching effects" of the copper / copper alloys components in the evaporators and water distribution system.
  - On Page 8 /21: HAL identified that on "August 14, 2009" instructions were issued to the vessels regarding preferences water sourcing. It should be noted that the vessels were already operating in Alaska water for almost 2 months. HAL appeared to not start the 2009 season immedately with "preference water sourcing".

Rev: 0

- Page 10 /21: HAL identified that water produced from Evaporators are soft and potentially cause "copper leeching". In figure 4, it appears that for the Statendam and Zaandam more than 50% of the total volume of potable water is from evaporators. Was this produced water sampled for metal concentrations?
- Page 11 /21: Potable water tank concentrations are listed and expressed in graphs. "Strategic bunkering had an impact", however it appears that the contingent of water from the evaporation system is not sampled or accounted for, to establish the "contribution of metals of this water source."
- Page 11 /21: Figure 5 Included Potable Water Tank Metals Concentrations. Provide the sample results, sample conditions and used potable water sampling Quality Assurance Quality Plan. HAL did not identify the specific potable water tanks.
- Page 12 /21: Figure 6. HAL identified for example for the vessel Statendam in figure 4, "Strategic Water Sourcing" in 2009 for the Statendam in August / September 2009, the evaporator contingent of the total volume was approximately 78%, in Figure 6 Statendam effluent Copper Concentrations is identified (after strategic bunkering) an significant *increase* of copper in effluent.
- Page 11 / 21: HAL identified that source water strategies are difficult to implement, and the need to reinforce of it implementation.
- Page 13 /21: HAL identified <There may, however be some brass or bronze fittings>; identification of corrosion / replacement maintenance of these parts was not provided in the SRE 2009 report.
- Page 31 /21: HAL identified that 22% of the water usage (daily) is used is Laundry. HAL did not include the volume of Technical Water used water in the Laundry operations.
- Page 14 / 21: Figure 7, Laundry Cycle Metals concentrations "Westerdam and Ryndam Copper Concentrations" on 7/21/2009 was a sample taken, and it appears the results for copper concentrations were extremely high (approximately Cu 360 ug/l). The sample event on the Ryndam on 7 21 2009 identified in Figure 5 (page 11 /21) for the Ryndam Potable water tank a sample result of approximately Cu 25 ug/l. How is this possible? Where is the increase of the sampled Copper concentrations coming from?
- Page 14 / 21: Figure 7. This figure includes the Graph "Percentage Increase in Metals Concentration before and after Laundry Cycle". HAL did not identify how they planning on primary reduction of the metals at the source. Nor was identified in which Laundry process the "metal concentration increase" occurs. This was not identified in the SRE Report 2009.
- Page 15 / 21: HAL conducted a pilot study "Ozonator study" to reduce water use by the laundry. The SRE 2009 report does not discusses in detail the pilot study, nor includes a detailed description of the Ozone Process and pilot time line.
- Page 15 /21: Water meters will be installed, identification location and other details are not included in the report. Nor is a specific time line provided for this subject.
- Page 16 /21: HAL indentified that less water use (conservation), will reduce the risk of mechanical erosion of chemical leaching of metals form pipes. HAL did not expand on water conservation related to relatively "high metal sources", or root causes of the high

Rev: 0

metal concentrations. A review is included that list all the volumes the HAL discharges in Alaska waters. It appears that specific concentrations will not reduce significantly with water use reduction.

- **Chemical Use / Processes Evaluation:**
- Page 3 /21: Hal identified that products were reviewed, from all the vessel departments (Nautical, Technical, and Hotel). Constituents of concern were not found in the chemical products and other cleaners currently used. In 2010, products will be reviewed again. HAL did not provide a complete overview list of the reviewed products in 2009.
- **II Influent Source Reduction Evaluation:** This Group was initially included in HAL previous SRE reporting. Elements of this Group can be found in Group I.
- **III Treatment Technology Evaluation & Implementation:**
  - HAL combined the Pilot Project with the Golden Princess. HAL's SRE 2009 report refers to the Golden Princess Pilot Process.
  - Page 6 /21: HAL identifies the Pilot Project, but in general does not identify how the Pilot Project results "lessons learned" would "correlate" to the HAL fleet AWTS systems that are of other manufacturer, than the AWTS system of the Golden Princess.
  - Page 6 / 21: HAL mentioned "the pilot study thus far not demonstrated the feasibility of achieving the long term ammonia limit in a ship board application". HAL did not provide any support information, detailed strategies to back up this statement.
  - Page 16 /21: HAL identified the delay of the pilot study of the use of nitrifying bacteria. HAL did not identify in detail what the problems were, nor was set out why these problems made it not possible to conduct the study on the Volendam AWTS system.
  - Page 17 /21: HAL identified that in December 7, 2009 this project started on the Zaandam. Detailed discussion of the preliminary sample results of 12/7/2009 was not included. A detailed time line and actions to be taken were not included in this SRE 2009 Report.
- **IV Influent Source Reduction Evaluation Milestones:** This Group initially included in previous SRE's was not included in the SRE 2009 Report. However, a brief "timeline" (page 20 of 21) was included.
  - Page 20/ 21: HAL include a brief description of "Next Steps". Detailed timelines actions taken, sampling regimes related to the SRE project, installation, operation or use of certain waste water operations were not identified.
- **V Treatment Technology Evaluation & Pilot Study Milestones:** This Group initially included in previous SRE's was not included in the SRE 2009 Report.

## Ocean Ranger Additional Observations:

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.

Rev: 0

The Ocean Rangers provided feedback regarding their impressions on board what was done regarding the Source Reduction Plans. Below are in (concise), listed the “general” findings for the HAL Vessels:

**Ryndam:**

- Crew is familiar with the SRE plans and actions;
- Production of potable water (evaporator) is on average 300 ton/day;
- Recently repairs are made on evaporator. Replaced parts / upgrades for better water production;
- AWTs system is operated as designed, no additional procedures in affect;
- Eliminated Phosphate from the used chemicals on board; and
- Ozonator is recently installed (July 2009) in the Laundry will reduce water consumption and laundry detergent.
- Selective bunker strategy in effect August 14, 2009.

**Veendam:**

- Crew is familiar but detailed questions must be addressed to ADEC. HAL HQ is working with ADEC on the SRE plans.
- Vessel started replacing piping, including replacing piping for PVC.

**Volendam:**

- Crew is familiar with SRE and related operations;
- SRE plan was implemented in august 14, 2009. (Note: vessel did have AWTs issues and did not discharge after May 2009).
- Use of Ecolab cleaners;
- Bunker strategy implemented on August 14, 2009.

**Zaandam:**

- Crew is familiar with SRE and related operations;
- Production of potable water (evaporator) is on average 264 ton/day;
- Use of Ecolab cleaners;
- Bunker strategy implemented on August 14, 2009.
- No recent repairs maintenance made on potable water distribution / evaporator systems.

**Statendam:**

- Crew is familiar with SRE and related operations;
- No specific instructions to ship from HQ. SRE documentation on board;
- Evaporator chemicals changed from Vaptreat to Multivap;
- Use of Ecolab cleaners;

Rev: 0

- Food processing water “Somat” equipment not feed in the AWTS GW flow. The flow is now diverted to the biomass holding tanks;
- Mixing ratio GW to BW changed.

## Conclusion:

The SRE 2009 Report does not provide detailed information regarding the actions taken. Also it appears not to show that actions are taken to identify and to remedy the potential “metal sources”. The SRE 2009 Report appears to introduce “new” metal reduction technologies by water conservation. The SRE 2009 Report does not appear to include the lessons learned from the Golden Princess Pilot Project, and or anticipations how these pilot project findings correlated to the HAL specific AWTS systems in the future. Detailed timeline and detailed description of actions and follow up are not included. Please note that following items below are recommended for consideration of the review of future HAL SRE reporting:

### ADEC HAL Future SRE Reporting Attention Items:

@HAL to do SRE reporting more in a consistent (subject) outline; this makes progress / SRE reporting review more effective.

@HAL to provide more details in SRE reporting; recommend to include detailed “clarification questions” for the HAL.

@ HAL appears not to investigate potential source in detail. A good example is the water source metal loads, investigations were conducted in the Laundry, but the root cause of the metal source was not identified.

@ HAL used Golden Princess pilot study to get more information regarding their nitrification process; however it appears that HAL is not “correlating” (yet) the gained information from the Golden Princess to their specific AWTS systems.

@HAL mentioned in earlier SRE report potential corrosion (piping systems evaporators) the SRE 2009 report is silent regarding this matter. In short the HAL appear not to describe / follow up on previously identified potential sources with metal loads.

@Spent Bio products may harm full for the environment and should stored / handles / disposed off according existing laws and regulations. The off load of these products should be included in the “AK Garbage off load plans”, and reporting is required.

Juneau, January 21, 2010