

Background:

ADEC provided SRE incompleteness letter to RCL CEL on July 28, 2008. This letter included the SRE items that needed more detail and or additional information.

On August 19, 2008 RCL CEL responded by providing updated SRE.

This review includes the review of RCL CEL updated proposed SRE of August 19, 2008.

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

The items are set out below.

Discussion:

This updated proposed SRE include all RCL CEL responses on ADEC's request for additional information. RCL CEL included in the SRE numerous remarks, comments, suggestions regarding effluent control technologies. RCL CEL Included in the SRE that NH₃ is and "given" in the waste water treatment process and is hard to control. Emphasis is on more "controllable items" like the metals in relation to piping systems. It appears that RCL CEL used HAL SRE plan application as example (framework)

- **I Source Reduction of Inflows:** RCL CEL identifies chemical research, bunker waters, additional waste handling, adoption of better operations, corrosion piping etc. SRE does not contain in this section the AWTS system influent from technical water sources, spa's, ponds etc.
- Cleaning product evaluations and possible switch to non-chemical cleaning products. RCL CEL mentioned that some floor cleaning products contains Zn components. Carpet cleaners will be evaluated as well.
- Chemical evaluation to be completed at the end of 2008.
- Bunker water testing and evaluation. RCL CEL does not include tank storage regime and how the potable bunker water is handled, treated. RCL CEL did include that more onboard water making will result in more emissions / fuel use. Absent support information ADEC could not validate this statement. Boiler water and other possible "process waters" (e.g. hair salon) are not included or mentioned.
- HVAC (technical water) water inflow, RCL CEL will study this as well. SRE suggested that storage regime /" origin" regimes for the study will be included (kind of storage / dedicated tanks).
- AC condensate is soft water and may be have a high corrosion rate. This water is used in laundry and window washing. RCL CEL mentioned that water balancing is already successfully done.
- Piping evaluation. RCL CEL has vessels built by several yard, secondly they are different. Evaluation should address each vessel with dedicated piping materials. RCL CEL will look at corrosion rates immediately. Note: RCL CEL did not include fittings, couplings, and other pipe system apertures.

Rev: 0

- **II Treatment Technology Evaluation:** Note: ADEC CPVEC staff does not have an updated effluent performance feel; RCL CEL did the last years not discharge in AK water. However, they did obtain USCG discharge approvals.
- RCL CEL going to consult AWTS vendors to find way to reduce metals and NH3.
- RCL CEL Rhapsody of the Seas has ne AWTS system on board the Hydroxyl, results are not known yet of the effluent performance.

Conclusion:

The proposed SRE is acceptable and ADEC staff recommends approving the RCL CEL 2008 SRE.

Please note that following items below are recommended for consideration of the review of future RCL CEL SRE reporting:

ADEC RCL CEL Future SRE Reporting Attention Items:

@RCL CEL included time line of reporting, but appears to identify "time ranges", for example fall 2009 etc. Future reporting will checked and tracked with the CPVEC Vessel Reporting Track System (VRTS)¹.

@Bunker water (water intake) is "lean" no ports or volumes clear listed. RCL CEL in future reports to include this data including the volumes, and storage regimes. For all bunkered waters for the "AK trade".

@RCL CEL Evaporator data is mediocre, more details and system discussions needed. Piping / bundle material of the EVAPs system in order to proper to evaluate.

@If RCL CEL operational changes of AWTS, use of products that could lead to pollutant reductions, the operations / procedures / products should be identified for future reference (compliance verification).

@Technical water, boiler water, equipment wash waters, spa and pool waters are not addressed in detail in SRE. The future reporting should include (if applicable) these waste streams as well / related systems.

@Wastewater volumes to be included in future SRE reporting. ADEC has not much information on file (regarding sampling) of the RCL CEL ships. RCL CEL needs to confirm the volumes and AWTS processed volumes. Current information too "generic".

@Technologies information to be included also the technologies recommended by AWTRS vendor.

@Operational changes to be documents and categorized in relation with the pollutant reduction.

@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, November 26, 2008

¹ On November 2008 CPVEC staff initiated VRTS system. VRTS is a tool that provides quick status of the SRE reporting, and is dedicated for the SRE future report tracking only. VRTS excel system will assist staff to track accurately the vessels SRE reporting requirements, as set out in the approved SRE plans. This system may be integrated in Project Navigator© system soft ware if ADEC decides to go that route.