

<b><i>ADEC Question</i></b>	<b><i>HAL Response</i></b>
<p>1. Page 3/52 SRER: Table &lt;Source Reduction Effort / Mitigation Strategy&gt;. Please provide responses for each subject which actions HAL took in 2008 and intend to take in 2009 (e.g. items 1, 2, 3, and 4);</p>	<p>This information is provided in section 8 of the originally submitted SRER beginning on page 38. HAL’s basic strategy was/is to evaluate the influent to the treatment system, seeking to identify contaminant sources, before looking to treatment technology solutions. Those efforts are documented in the submitted SRER. Having done that, and drawn the conclusions regarding water sourcing, product usage and ship-board processes that are documented in the SRER, we are turning to the technology evaluation that is scheduled between now and the 2009 Alaska season. This approach was described in the August 2008 SRE which your letter described as “approved.”</p>
<p>2. Page 5/52 SRER: Table. Provide detailed clarification on the Westerdam “total average) and (normal operating conditions), what does the text between parenthesis mean?</p>	<p>This analysis was an attempt to distinguish between periods during which Westerdam’s discharge exceeded permit limits for ammonia and those during which the discharge was compliant. This was done in order to evaluate whether there were distinct operating conditions or defects that could be identified to assure optimum performance. The distinction was temporal – Westerdam had episodes early and late in the 2008 Alaska season in which the ammonia and BOD levels were elevated. As discussed in our response to comment 3 below, and in the DMR/NOV submittals of 2008, we believe we have identified operational issues that, with proper oversight, can be managed to meet the interim limits of the permit.</p>
<p>3. Page 6/52 SRER: Please provide clarification why in Figure 2 &lt;WW Average ammonia by Ship&gt; for the Westerdam are at such high values? Are the graphs in figure 2 based on 2008 sampling data? Provide on Ammonia graph in figure 2 the AWTS vessels installations. Is there a correlation of the AWTS operations, AWTS make model layout, that affect ammonia performance?</p>	<p>We believe the principal reason Westerdam ammonia levels were as high as they were is the fact that Westerdam treated a much higher percentage of blackwater in its overboard discharge in Alaska in 2008. The graphs are based on 2008 data.</p> <p>As discussed elsewhere in the SRER data, and in your own questions, the ratio of blackwater to gray water is much higher in Rochem black water treatment systems. Given the vacuum flush toilets used on board, and the segregation of other grey water on the Vista ships, the concentration of ammonia “in the bowl” is much higher than you would find in a shore based treatment facility; a fact which is reflected in the effluent data for Westerdam.</p> <p>The different wastewater systems employed on each ship is provided in the table on page 4 of the SRER.</p>

	<p>Additionally, as discussed in our response to the September 17<sup>th</sup> NOV for Westerdam (see letter October 8<sup>th</sup>, W. Morani HAL, to D. Koch ADEC), we believe the overarching treatment condition leading to elevated ammonia levels in the Westerdam Rochem system is the reduced oxygenation due to clogged air injectors. Rather than repeat that discussion here, please refer the previous submittals for additional detail.</p> <p>The question asks what effect the treatment system may have on ammonia levels. As we have discussed above, we believe the principal issue is the fact that the Rochem system treats only black water. As we described on page 5 of the SRER, the total mass of ammonia per person, from a properly functioning Rochem system, while slightly higher, is comparable to shore based or other systems</p>
<p>4. Page 7/52 SRER: Performance Conclusions. Figure 2 related: The conclusions are based on solely 2008 data? Is HAL “in house sampling” (non regulatory sampling) results use in the “conclusion” / “findings”. Provide clarifications.</p>	<p>This conclusion is based solely on 2008 data, incorporating results from as early as January 2008. Sampling for metals and ammonia was principally conducted during Alaska season in 2008 in order to comply with reporting requirements of the permit. HAL “in-house sampling” is in fact regulatory, just not Alaska regulatory. Typically these additional sampling events would be for USCG certification or in response to the upset conditions experienced by Westerdam last summer. Regardless, samples are drawn per the approved QA/QC plan and chain of custody requirements et. al. are maintained. All relevant data is evaluated in our conclusions.</p>
<p>5. Page 5/21 approved SRE: Figure 2 &lt; Gray / Black water ratios for Alaska Discharge by vessel&gt;. How is this information used by HAL in the SRER? How is the Gray Black waters ratios correlated per ship in the results in figure 2 (page 5/52). Provide in your response these ratios and correlation with the results.</p>	<p>The mixing ratios described in the Source Reduction Evaluation are estimates (subject to operational variation) and primarily based on the fact that the Rochem systems on Vista ships (OSDM, WEDM) treat the majority of their gray water separately from black water. Rochem gray water-only effluent is not discharged in Alaska. Rochem blackwater incorporates some percentage of gray water to provide a proper environment for microbial health and overall system operation.</p> <p>One consequence of this process is that the effluent from Rochem black water systems has higher concentrations of ammonia, owing to the absence of the balance of the graywater quantities in the influent to the treatment system. This correlation is described on page 5 of the SRER where we wrote, “In the case of Westerdam, ammonia concentrations were elevated because its discharge had a higher percentage of treated black water.”</p>

	<p>While it may be tempting to manage these ratios to manipulate the end-of-pipe concentrations, such actions would not address the mass-loading of the discharge, could have unpredictable impacts on overall operations of the vessel and itinerary, and could serve to merely transfer the problem elsewhere. Based on the data reviewed, our approach will be to address influents where they can make a difference, and to explore treatment technologies to achieve the long term limits by 2010.</p>
<p>6. Page 8/52 SRER: Figure 3 include the HAL fleet water sourcing. From the figure it appears that the Ryndam Volendam “use” technical water. In text is listed that Vista Class vessels (Oosterdam and Westerdam) use technical water for “conveyance” purposes. Provided clarification</p>	<p>All HAL ships use technical (non-potable) water for deck washing, hull cleaning and other cleaning in the engine spaces. Upon further review of fleet practices, we are now aware that some R, S and Vista class ships may use some portion of technical water to service laundry operations, depending on operational considerations, water savings initiatives, potable water inventories, etc.</p> <p>With regard to Vista ships, technical water is also used for “conveyance water” in the sewage system, which is to say this is the water used to flush and “convey” fecal solids and urine from the toilets to the sewage treatment system.</p>
<p>7. HAL’s SRER demonstrated that potable water intake my effect potentially the effluent quality. Especially for the Port’s where water will be bunkered with relatively high metals (e.g. Vancouver BC, Seattle WA, and Juneau AK). Provide in your response what HAL did to minimize water intake at these ports. Does HAL have a storage and bunker regime of the potable water (e.g. party separation / target consumption)?</p>	<p>As the data from ACA’s source water sampling was not concluded until September of 2008, HAL did not incorporate this information into any strategic sourcing of water in the 2008 Alaska season. The analysis was largely completed after the conclusion of the 2008 Alaska season.</p> <p>Typically bunkering decisions have been situational and itinerary specific – when and where bunkered water is available, what is the relative cost of making vs. buying water? What is the current inventory of evaporated water on board? In port evaporation restrictions and what is the consumption rate relative the itinerary? In short we have left it to the vessel to manage this decision.</p> <p>That said, previous practices have not been influenced by the data submitted in the SRER since it was not available until late in the Alaska season. Since then, we have been in discussion with the Port of Seattle, and will initiate discussions with the Ports of Juneau, Ketchikan and Skagway, regarding plumbing and fixtures that may contribute to contaminants. As has been noted, these values are all well below drinking water standards, and so those municipalities are not required to make <i>any</i> changes.</p>

	<p><b>The meaning of “party separation / target consumption” is unclear, please provide clarification.</b></p>
<p>8. What actions did HAL taken in 2008 to reduce water intake that had relatively high numbers of metals? Are sample results related to action regarding water in- take location available? What are HAL’s plans for 2009 season to minimize or to eliminate the impacts of bunkering potable water with relatively high metal numbers?</p>	<p>Regarding actions taken in 2008, please reference Item 7 above. HAL’s plans for 2009 are not yet formed, but will be affected by the factors discussed above. Suffice it to say that HAL will never allow a vessel to run out of potable water.</p> <p>As indicated in the SRER and other responses to ADEC questions, the source water described in fact meets all drinking water quality standards and HAL has concluded that treatment technology options offer the best opportunity going forward to attempt to meet the 2010 limits of the permit.</p>
<p>9. Page 12/52: Provide detailed information of the sampling point / location of the samples taken from the Evaporators. Are there different Evaporator units on board? Are all these units sampled? Include in your response the description of the evaporator systems, including make model. Are there corrosion controls on Evaporators?</p>	<p>The sampling points were described in detail in the Appendix A Source Reduction Evaluation Plan Water Sampling Plan submitted in August of 2008. HAL evaporators feed a common filling line that distributes potable water to all potable water storage tanks. There is a chlorination dosing system at this point, with an associated sampling valve normally used to draw combined flow for chlorination verification to comply with USPH requirements. This is located in the potable water room on each vessel. The samples were taken at this point and it is thus representative of all evaporated water.</p> <p>HAL vessels have multiple evaporators on board to match production with demand. We have provided a tabular inventory of these systems below. A description of these evaporator systems is found on page 9 of the approved August 2008 SRE. The basic evaporator configurations conform to those descriptions, while the differences in make/model number noted in the inventory are indicative of either water production capacity, or method of heating the evaporators (e.g. steam vs. exhaust gas heat).</p> <p>Evaporators are not equipped with corrosion control mechanisms</p>
<p>HAL Evaporator Inventory</p>	

INSTNAME	COMPNO	COMPNAME	COMPTYPE
505 mv Statendam	761460101	EVAPORATOR, NO. 1	DTU-4-1600FB-H1-MC3
505 mv Statendam	761460201	EVAPORATOR, NO. 2	DTU-4-1600FB-H1-MC3
506 mv Maasdam	761460101	EVAPORATOR, NO. 1	DTU-4-1600/FB-H1-MC3
506 mv Maasdam	761460201	EVAPORATOR, NO. 2	DTU-4-1600/FB-H1-MC3
507 mv Ryndam	761460101	EVAPORATOR, NO. 1	DTU-4-1600/FB-H1-MC3
507 mv Ryndam	761460201	EVAPORATOR, NO. 2	DTU-4-1600/FB-H1-MC3
461 mv Veendam	761460101	EVAPORATOR, NO. 1	DTU-4-1600FB-H1-MC3
461 mv Veendam	761460201	EVAPORATOR, NO. 2	DTU-4-1600FB-H1-MC3
510 mv Volendam	761460101	FRESH WATER GENERATOR, NO.1	DTU-3-1600 STEAM
510 mv Volendam	761460201	FRESH WATER GENERATOR, NO.2	DTU-3-1600 JCW
510 mv Volendam	761460301	FRESH WATER GENERATOR, NO.3	DTU-4-1600 JCW
511 mv Zaandam	761460101	FRESH WATER GENERATOR, NO.1	DTU-3-1600 STEAM
511 mv Zaandam	761460201	FRESH WATER GENERATOR, NO.2	DTU-3-1600 JCW
511 mv Zaandam	761460301	FRESH WATER GENERATOR, NO.3	DTU-4-1600 JCW
514 mv Oosterdam	FWG002001001	GENERATOR, FRESH WATER, MULTIPLE-EFFECT	MEP-4-650, 650M3/H
514 mv Oosterdam	FWG002001002	GENERATOR, FRESH WATER, MULTIPLE-EFFECT	MEP-4-650, 650M3/H
514 mv Oosterdam	FWG002002001	GENERATOR, FRESH WATER, MULTIPLE-EFFECT	MEP-4-400, 400M3/H
515 mv Westerdam	FWG002001001	GENERATOR, FRESH WATER, MULTIPLE-EFFECT	MEP-4-650, 650M3/H
515 mv Westerdam	FWG002001002	GENERATOR, FRESH WATER, MULTIPLE-EFFECT	MEP-4-650, 650M3/H
515 mv Westerdam	FWG002002001	GENERATOR, FRESH WATER, MULTIPLE-EFFECT	MEP-4-400, 400M3/H

10. What actions were taken in 2008 to reduce the high CU numbers in evaporator produced water? What actions are planned in 2009?

Sampling and analysis was not completed until after the conclusion of the 2008 Alaska season, therefore no action was taken in 2008.

Copper levels from the evaporators, while high relative to the extremely low 2010 copper limit, are well below drinking water standards and are quite acceptable for continued consumption on board. Evaporators are an essential source of potable water on cruise ships – particularly for vessels with one or more sea-days transit to and from Alaska. HAL does not plan to change out evaporators and instead has concluded it will be necessary to adapt treatment technologies in order to meet the long term limits of the permit. As indicated in the SRER, HAL will be exploring treatment technologies in the 2009 Alaska season per the approve SRE of August 2008.

11. Page 12/52: The Zaandam has relatively high numbers of CU and Ni, what is the cause of this? Is there a corrosion issue? Are there Evap bundle / plate problems?

While Zaandam produced higher copper and nickel values, Zaandam evaporator copper and nickel values are well within drinking water standards. Conversely, Zaandam discharge values for these parameters are well within the range of

<p>Did HAL evaluate evaporator related equipment? (e.g. distillate pumps and other apertures). [evap issue]</p>	<p>statistical variation in our fleet, or the Alaska fleet as a whole.</p> <p>In consulting with the vessel, Zaandam reports there have been no operational problems with the evaporators. Therefore HAL is not able to speculate as to why the numbers are as they have been reported.</p> <p>Per the approved SRE, as described in item 9 above, HAL evaluated the combined flow of water from evaporators at the chlorination point. HAL did not evaluate auxiliary equipment such as distillate pumps or other apertures as this equipment is too numerous to sample economically at this stage of our source reduction efforts. As discussed in our SRER and elsewhere in this reply, HAL will explore additional treatment technology in an effort to meet the 2010 limits.</p>
<p>12. Evaporator: Provide information if operation of the Evaporator may affect produced water quality levels with regard to the NI, Cu and Zn (e.g. operating mode fresh / brackish / saltwater intake / steam leakage etc.).</p>	<p>HAL evaporators have two operating modes: on and off. We have not correlated pH values relative to that of the seawater intake. Inasmuch as evaporated water is re-condensed water vapor, we would not expect evaporated water pH to be affected in any significant way by the pH seawater prior to evaporation.</p> <p>HAL ships never operate in other than a marine environment, and do not generate potable water when in ports, harbors or estuaries, so we have no data as to whether fresh water intake would produce a different result. Reference also question 15.</p>
<p>13. Page 13/52: provide location of the chlorination sampling point.</p>	<p>Reference item 9 above.</p>
<p>14. Figure 3 [page 8/52] include the HAL's fleet sourcing. In this overview the Oosterdam appears to produce "home made" contingent of 78% of the consumed potable water, are there samples available from the evaporator water of the Oosterdam? If no sample available, please explain why no sample are taken, and when sample data becomes available.</p>	<p>Evaporator sampling was done on one ship in each vessel class HAL sailed in Alaska in 2008: S-Class (Statendam); R-Class (Zaandam) and Vista Class (Westerdam). As Oosterdam did not discharge under the permit in Alaska in 2008, Westerdam was selected to represent the Vista class vessels. As Oosterdam is not sailing in Alaska in 2009, we do not have plans to sample Oosterdam at this time.</p>
<p>15. Page 14/52: Please clarify why "recorded pH [from evaporator] is slightly acidic". Also indicated that this does not indicate aggressive corrosive characteristic". Provide information on "corrosiveness of soft water". Is</p>	<p>The comment "recorded pH is slightly acidic" was merely observational in that the values were less than 7 – neutral. We do not speculate a reason as to why, but note that these values correspond roughly to that of clean rain (see chart, SRER page 25) and are not likely to indicate an accelerated corrosion of metals.</p>

<p>the pH of evaporator water dependant on the overboard water intake? (e.g. seawater, fresh water).</p>	<p>The question regarding ‘corrosiveness of soft water’ is a technical one and requires distinctions be drawn between “leachability,” which is essentially a solubility / saturation issue, and corrosivity which is essentially an ionic oxidation/reduction process. Leaching will cease once the saturation levels of the particular ion are reached in the particular solute, while corrosion may continue, releasing metals in both soluble and precipitate forms, as long as the corrosive reaction has not gone to completion. Solubility of metals can be impacted by pH; however the noted values are not extreme enough to cause a significant solubility/precipitation deviation from that which would be experienced by pH-7 water.</p> <p>While undoubtedly soft water has a higher leachability potential than hard water (due to the lower mineral content, thus farther from the equilibrium point of saturation), this would be distinct from the chemical reaction that would be caused by a more extreme high or low pH in the water (“etching”). Added to these factors is the likelihood that some metal particles are “eroded” from the plumbing system by the mechanical action of water flowing through the pipe. We are not able to distinguish between these interacting forces to attribute metals concentrations to one factor or the other.</p> <p>Regarding the pH of evaporator water as a function of source water, reference question 12 above.</p>
<p>16. Page 15/52: “Most technical water applications do not drain to the gray or black water system, and thus has diminished impact on effluent results AWTS systems discharged in AK”. Provided for each ship how on board the technical water stream are used, separated, treated and or processed. From earlier report part it was identified by HAL that technical water was used on board of some vessels as “conveyance water”. Include also for each technical water stream the daily flow of each production, storage and daily consumption.</p>	<p>As stated in item 6 above, upon further review of fleet practices, we are now aware that some R, S and Vista class ships may use some portion of technical water to service laundry operations, depending on operational considerations, water savings initiatives, potable water inventories, etc.</p> <p>Regarding daily use, stream flow data, etc., HAL does not track this data, and thus has not performed the analysis requested. Shipboard practices will vary from ship to ship, week to week and also by itinerary. At this point we believe it will be a more fruitful effort to focus our efforts on treatment technologies.</p> <p>Segregation is achieved by accumulating technical water in designated tanks. From there, technical water is sent only to those areas in which it is appropriate for use: decks, engine spaces, and in some cases, laundry. Technical water spigots are</p>

marked either “Technical Water” or “non-Potable Water, do not drink.” The great majority of water discharged under this permit originated from potable water tanks.

For Vista class ships, toilet flushing uses technical water, comprising approximately 60m<sup>3</sup> cubic meters per day as described in the Notice of Intent submitted for Westerdam before the 2008 Alaska season.

The various waste streams described by the question that are not covered under the ADEC Cruise ship permit, are in fact permitted and are managed per the effluent limitations specified under the newly issued EPA Vessel General Permit.

17. Page 16/52: Strategic Sourcing of bunkered water. Include your actions taken in 2008 season when the data of the evaluation became assessable for the HAL. What is the 2009 plan?

Reference item 10 above. Analysis of bunkered water data was not completed until after the 2008 Alaska season when the complete data set was available. A review of e-mail receipts indicates that a draft spreadsheet was provided by Admiralty Environmental on October 8<sup>th</sup>, 2008. In that email Admiralty cautioned that not all the data had completed a QA review. Therefore we did not incorporate this data in bunkering decisions in 2008.

18. Page 17/52: HAL include correlation of metals with “older / and younger” piping systems. HAL to provide if these systems really can compare. Are there in the older or younger systems upgrades, replacements done that may influence the numbers? HAL to provide per vessel an overview, including the regular maintenance on the piping systems Are there vessels with corrosion problems issues? Are there corrosion systems used on board to protect the piping systems from corrosion?

HAL has computed the correlation coefficient between vessel age and concentrations of the discharge for metals. These results are shown in the table below:

<b>Parameter</b>	<b>Computed Correlation Coefficient HAL Vessels</b>	<b>Computed Correlation Coefficient Industry Wide AK Vessels</b>
<b>Correl. Coef. Cu vs. Age</b>	0.26	-0.16
<b>Correl. Coef. Ni vs. Age</b>	0.93	0.19
<b>Correl. Coef. Zn vs. Age</b>	-0.28	-0.19

For HAL vessels, the data shows a weak correlation between age and copper, a strong positive correlation between vessel age and nickel, and a modest inverse relationship between age and zinc.

While this statistic shows a data correlation between nickel concentrations and vessel age, it does not establish “cause and effect.” Computing the same statistic

	<p>on data representing the <i>entire</i> 2008 Alaska fleet (as shown in column 3 above), shows the correlations, including for nickel, are much weaker. It is therefore unclear whether this relationship is causal or random variation.</p> <p>HAL provided a detailed description of its plumbing installations in the approved SRE submitted in August 2008 (see pp. 9-10, SRE). As described, LORO-X drainage pipes, which are resin lined to combat internal corrosion or erosion, are used extensively though not exclusively throughout HAL vessels.</p> <p>HAL does not maintain detailed records of pipe replacement as HAL performs condition-based maintenance on ship-board plumbing systems, replacing or repairing piping as needed. Certainly some plumbing has been replaced on every ship in the HAL fleet, though we are not able to provide a quantitative statistic or percentage.</p> <p>In evaluating our discharge, we compared effluent values with those from stationary discharges to evaluate whether there was something inherent in the vessel discharge that was unique and a target for elimination. This was discussed on page 5 of the SRER, where we concluded that vessel discharges were as good as or better than municipal discharges – which is to say that the data does not suggest that there is anything unique about the degree of metals leaching from shipboard plumbing systems. HAL has concluded that development of additional treatment technologies will be necessary to achieve the Long-Term-Limits of the permit.</p>
<p>19. Page 17/52: Potable water tanks are evaluated. Provide the results from the technical water storage tanks. Are there technical water storage tanks used? And if so are evaluation results available?</p>	<p>Reference items 6 and 16 above. Technical water results are provided in the graphs found on pages 19-26 of the SRER. This water was drawn from the technical water pumps used to distribute technical water throughout the vessel.</p> <p>Technical water tanks are essentially the same as potable water tanks; steel tanks lined with an epoxy coating, matching the descriptions for potable water tanks found on pp 9-10 of the August 2008 SRE. Sampling from those tanks was reported in the SRER.</p>
<p>20. HAL provided description evaluation on the potable water piping / plumbing but appears not to include the drain piping (GW and BW). Provide information</p>	<p>As describe on page 9 of the SRE submitted August 18, 2008, drainage pipes are galvanized carbon steel below the water tight bulkhead deck, and LORO-X (a resin lined galvanized carbon steel pipe) above the water-tight bulkhead deck (A-</p>

<p><b>evaluation</b> of these systems</p>	<p>Deck for Vista, B-Deck for S/R-class, typically the deck below the Engine Control Room).</p>
<p>21. Section 5: page 20/52: “The next highest concentration of copper are found in laundry waste water”. How is soaps detergent “interaction” with the metal levels? Provide information how these evaluated sources could be improved</p>	<p>It is not yet known how soaps/detergent may interact with the metal levels. As noted in the SRER and item 24 below, HAL will conduct additional investigation of the laundry processes to attempt to establish cause and effect or opportunities for reduction. We have initiated further study under the auspices of the Technical Evaluation Committee and will report findings in the 2009 Alaska Pre-Season report described in the approved August 18<sup>th</sup> SRE Plan.</p>
<p>22. Page 21 of 52: Nickel is a component of austenitic steel, is for example on the Zaandam relatively more stainless steel plumbing / appendages? Are source in the system to pin-point to this element?</p>	<p>Based on our general knowledge of the fleet but without having done an extensive inventory of installed plumbing, we have no information that Zaandam employs stainless steel plumbing to significantly different extent than other vessels in the HAL fleet.</p> <p><b>The second question(s) is unclear. Please re-phrase the question for clarification.</b></p>
<p>23. Page 26/52: include an explanation of soft and hard water, also the use and preferences. What actions has HAL taken / evaluated when these findings were made?</p>	<p><b>The first question is unclear. Please re-phrase the question for clarification</b></p> <p>With regard to the second question, HAL has not initiated any action on the basis of water hardness data. Hardening of water could have a negative impact on membrane clogging, laundry operations and guest satisfaction on board, and we are reluctant to alter current water provision systems.</p> <p>Implicit in the question is the idea that this water quality characteristic warrants correction. We do not concur. The on-board systems for producing, delivering, treating and discharging water are in fact working quite well and as designed. It should be noted that the discharge concentrations of metals are very low. Only when considering the extremely low 2010 limits of the permit are we led to further investigation of reduction opportunities.</p> <p>Therefore HAL has concluded a post-use treatment technology development is the more appropriate effort to meet those limits, given the limited source reduction opportunities identified in this influent analysis. The treatment technology option, if one is found to exist, is likely to be both more practical and economic, as opposed to re-engineering and/or replacing the water supply and distribution</p>

	system on board our vessels.
<p>24. Page 27/52: Copper levels from the laundry warrant further investigation. Provide information on when HAL intends to investigate this item. Include this in the timeline.</p>	<p>Having submitted the 2009 SRER, HAL has convened its Technology Evaluation Committee which is charged with evaluating treatment technologies to achieve the Long-Term-Limits. Parallel to this effort, HAL is exploring laundry operations and will update its findings in the Pre-Alaska Season Status Report referenced in the approved SRE submitted August 18, 2008 and incorporated in the timeline provided there.</p>
<p>25. Page 32/52:</p> <ul style="list-style-type: none"> <li>a. De-scaler in which vessels and vessel' department used?</li> <li>b. What is the average use of the de-scaler per vessel system?</li> <li>c. Provide how and where these de-scaler pipe conditioners are used (e.g. feed piping, drain piping etc.).</li> <li>d. Can descaler "attack" "leach" metal / metal coated piping and appendages?</li> <li>e. Provide info regarding the de-scaler.</li> </ul>	<ul style="list-style-type: none"> <li>a. BW100 descaler is used on board all HAL ships sailing in Alaska by the technical department to remove mineral and organic buildup and scaling in lined blackwater drain pipes in the sewage drain system.</li> <li>b. HAL does not maintain data specific to each system on board in which descaler is used, but rather provided the overall daily average used by our 2008 Alaska fleet in our January 14<sup>th</sup>, 2009 SRER. This average was 28.5 liters per vessel per day – a very small amount when compared to the approximately 600,000 liters of water used daily.</li> <li>c. Descaler pumps are located throughout the vessel, on nearly every deck, the intention being to provide coverage throughout the drainage system to minimize scale build-up in the gray and black water drainage systems. For example, dosing pumps may be located in public restrooms, passenger cabins, or in the spa.  The frequency, amount and duration of the dosing may vary, depending on the vessel, dosing pump location, and projected passenger usage. Dosing amounts typically range from two to six minutes in quantities ranging from 16 to 32 ounces. Such doses may occur as infrequently as once per week or as often as once per day, again depending on the location of the dosage pipe/drainage system served.</li> <li>d. If overdosed, descaler conceivably could affect metal drain piping if the lining has deteriorated to the point that metal is exposed (most drainage lines are LORO-X, a resin lined pipe). To avoid this, dosage is managed to provide sufficient product to remove pipe buildup, but to render the solution neutralized as it dissolves the scaling from the pipe walls.</li> </ul>

	<p>e. Descaler is a proprietary hydroxyacetic acid, with an un-diluted pH of approximately 1.5 S.U. As noted in “b” and “d” above, the quantities dosed are managed to minimize impact to the drainage pipes.</p>
<p>26. Page 34/52: Steiner Leisure Product information is not yet provided. Provide your time line (deadline) for submittal of this important information.</p>	<p>We are working with Steiner to provide the specified information. In our latest communication with Steiner, it was stated:</p> <p><i>As discussed by phone, we have 70 vendors that we have requested the required information from. We are receiving information, but not from all of the vendors yet. We have given a deadline of Feb 20 for all information to be submitted to us. Allowing for some time to compile of the information, we will be able to reply to you officially by the afternoon of Feb 20<sup>th</sup> or at latest by end of day on Monday, Feb 23.</i></p> <p>As of this writing, Steiner has not yet provided the requested information and we are in communication to rectify the situation.</p> <p>After receiving and analyzing the data, we will supplement the information provided in the SRER. Depending on the timing, this information may be included in the 2009 Alaska pre-season report due April 30<sup>th</sup>, 2009.</p>
<p>27. Page 36/52: HAL includes information of “extra” tank. Provide information of the size, location and other requirements for this “new” tank, and what impact would be.</p>	<p>As stated on page 36 of the SRER, installation of a pilot treatment plant would be necessary to make adequate engineering evaluations to determine appropriate sizing. Further determination of tank location or other requirements for this additional treatment stage would depend on results of the pilot study, vessel specific factors such as guest/crew complement, interference with previously installed systems or equipment, etc.. Per our schedule in the approved SRE, HAL has convened a Technical Evaluation Committee and we are commenced in a more detailed evaluation of potential treatment technologies during the period from January through April of 2009.</p>
<p>28. Page 36/52: Provide information, dimensions drawings (preliminary) Vendor based of the EDR units.</p>	<p>We refer ADEC to the following website maintained by General Electric, the vendor. This website provides a more detailed description and graphical display than we could reproduce in the SRER.</p>

	<p style="text-align: center;"><a href="http://www.gewater.com/products/equipment/ed_edr_edi/edr.jsp">http://www.gewater.com/products/equipment/ed_edr_edi/edr.jsp</a></p> <p>The request for drawings is premature. Such a system has not been deployed on a vessel, and certainly not for this application. Per our schedule in the approved SRE, HAL has convened a Technical Evaluation Committee and we are commenced in a more detailed evaluation of potential treatment technologies during the period from January through April of 2009. It is not clear at this time whether the EDR system will be the technology path selected.</p> <p>Having said that, the vendor provided a rough estimate of 5m x 3m x 3m, as we provided in the last paragraph of page 36 of the SRER.</p>
<p>29. Section 8 Next Steps: Page 38/52: “Product substitution Implementation” Provide expected status /time line of the implementation. Provide information on why limited opportunities exist.</p>	<p>The chemical usage analysis found on pages 27-34 of the SRER concludes that chemicals used on board are not a significant contributor of the contaminants of concern, and therefore offer limited opportunity to yield improvements in the effluent.</p> <p>While still awaiting information from Steiner Leisure, evaluation of Technical, Nautical and Hotel products revealed only three products with the potential to add contaminants of concern (Solid Power, Oasis 115XP and Gemstar Laser).</p> <p>We believe the analysis provided in this section of the SRER clearly indicates that even the total elimination of these products would not provide a measurable improvement in the effluent concentrations of the discharge. For example, it is estimated that Solid Power contributes approximately 2.02 ug of zinc each day to over 650,000 liters of an R-Class vessel discharge. This computes to a concentration of 2.02 ug/(6.5 x 10<sup>5</sup> liters)= 3.1x10<sup>-6</sup> ug/liter – well below detection limits.</p> <p>Therefore, HAL believes the next best effort will be treatment technology based, and is focusing its resources in that direction rather than a product substitution strategy that does not offer a prospect of reducing discharge concentrations sufficiently to meet the Long Term Limits of the permit.</p>
<p>30. Page 38/52: Treatment technology and Pilot study</p>	<p><b>Item a</b> - The timetable provided in the approved SRE of August 18, 2008,</p>

- a. Item 1: Provide “progress” overview of Vendors contacted and the status to date;
- b. Item 2: Which technology is HAL focused on? Provide current status to date.
- c. Item 4: Provide feedback on ship engineering lead and status to date.
- d. Item 7: Installation / Commissioning of pilot technology. Provide information regarding estimated delivery time of the selected equipment installation time on board.

indicates that preliminary conversations with vendors would occur prior to submittal of the annual report, while initial efforts would focus on water and chemical source evaluations for those materials in the influent to the system. These efforts are reported in the annual report submitted January 14<sup>th</sup>, 2009.

**Item b** – At this writing it is premature to specify a technology on which to focus. We are in contact with numerous vendors and attended the treatment technology workshop in order to broaden our perspective on potential technologies. It is the purpose of the Technology Evaluation Committee to set a direction which we are in the process of doing.

**Item c** – As per the approved August 2008 SRE, the ship engineering lead was identified as Jeen Bakker on January 30<sup>th</sup>, 2008.

As indicated in the approved SRE, we will be reporting on this progress in a pre-season report to be submitted April 30<sup>th</sup> of 2009.

**Item d** – This question is asking for precisely the information to be determined in phase four of the SRE, which is the next phase of the SRE. We refer to Item 5 on page 20 of the approved SRE in which the technology evaluation requested is scheduled for January through April of 2009.

It would be premature to establish a more specific schedule at this time, given that we are in the early stages of evaluating potential technologies.

We will provide an update to this schedule/information in the 2009 Alaska pre-season report per the approved SRE.