

CONFERENCE NOTES AND SUMMARY
SCIENCE ADVISORY PANEL FOR COMMERCIAL PASSENGER VESSEL
WASTEWATER DISCHARGE
AUGUST 15-16, 2002
NOAA Western Region Office, Seattle, WA

The Panel met August 15-16, 2002 at the NOAA Regional Facility in Seattle, WA. The focus of the meeting was to review the status of white topics developed at the December 2001 meeting, to identify additional research or issues that must be addressed, and to set a timeline for completing the white paper by October 31, 2002. A timeline summary for producing drafts of each topic appears below. A summary of the discussions of each topic, including significant issues and considerations, follows the timeline. A list of participants can be found at the end of this conference summary.

TIMELINE FOR PRODUCING WHITE PAPER WORK PRODUCTS

(panel member whose name appears in **bold** after each topic will produce the initial draft)

Dilution – August 21, revision of initial draft

LINCOLN LOEHR, KENWYN GEORGE, C. J. BEEGLE-KRAUSE and
CAROLYN MOREHOUSE

Bacteria – August 30

LINCOLN LOEHR, KENWYN GEORGE, and **CHARLES MCGEE**

On board chemical use – September 14

MIKE WATSON, **ALAN MEARNES**

Nutrients – September 23

MARLIN ATKINSON and LINCOLN LOEHR

Sediments – August 30

LINCOLN LOEHR, **KEN HALL**, KENWYN GEORGE, and ALAN MEARNES

Sensitive areas - September 15

CAROLYN MOREHOUSE, **CJ BEEGLE-KRAUSE**, and ALAN MEARNES

Samples - September 13

CAROLYN MOREHOUSE, MARLIN ATKINSON and DENISE KOCH.

Surface fresh water lens / micro layer – August 23

KEN HALL, ALAN MEARNES

Small cruise ships – September 15

DAVE ELEY, KENWYN GEORGE, CJ BEEGLE-KRAUSE and CAROLYN MOREHOUSE

Discharge and Tidal flux graphic – September 15

DENISE KOCH, CJ BEEGLE-KRAUSE

Risk screen scope of work – August 23

CAROLYN MOREHOUSE

Whole Effluent Toxicity testing – September 1

LINCOLN LOEHR, CAROLYN MOREHOUSE

SUMMARY NOTES OF CONFERENCE DISCUSSIONS

I. Introductory comments:

The Panel noted:

- That although their meetings need not be open to the public, they should continue the practice of making work products and meeting notes available to the public through the ADEC web site.
- That the number and rate of “environmental toxic interest” public inquiries have been down since 9-11.
- That the Panel members should make the effort to participate in public workshops, environmental programs, and scientific conferences. Possibilities include the Simon Fraser University Workshop on coastal tourism (Vancouver, December 2002), Seatrade Convention (Miami, April 2003), Alaska Forum on Environment (February 10-14, 2003), and the Environmental Technology Verification Program.
- The need to involve professors from the University of Alaska now that Professor Mike Stekoll is on sabbatical. Marlin Atkinson will follow-up.
- The suggestion that some type of peer review process should be pursued. Dave Eley and Marlin Atkinson will investigate the possibility of University of Alaska involvement. Ken Hall will pursue contacts through University of British Columbia.

II. Mid-season report on sampling and monitoring. ADEC presented 2002 analytical results to date. The Panel had the following comments:

- Galley tank samples, because of their high BOD load and low volume, can skew the data.
- Overall, the data obtained from sampling efforts over the last three years give a good indication of the big picture. Determining mass loading is still difficult.
- At some point, the Panel should address and comment on environmental trade-offs of best management and operating practice/technology. Examples include the fuel consumed and associated air pollutants to move a vessel offshore for wastewater discharge or the disinfection by-products of treatment such as trihalomethanes.

III. Order of white paper topics and discussion of risk assessment. Panel members suggested that the assessment framework developed for the December conference would be an appropriate model for addressing the order and risk. This should be revisited after the white paper topics are written. ADEC is developing a scope-of-work for a contractor to develop and apply a screening algorithm for ecological risk assessment. The Panel will review the SOW after it is developed.

IV. Background contaminants and long-term environmental monitoring. Alan Mearns briefed the Panel on “Mussel Watch”, a NOAA program that periodically analyzes contamination levels in mussels collected from 250 sites along the North American coast. There was discussion as to what the data means and whether a particular contaminant when measured at a certain level above background in mussel tissue would be a good marker for sewage. No conclusions were reached, but the concept of using mussels or some other long-term integrator (sediments for example) will continue to be reviewed periodically.

V. Discharge zones. ADEC presented preliminary data indicating where and how much wastewater is discharged in Alaska waters. The Panel asked ADEC to continue their efforts to develop a graphic that integrates wastewater mass loading with current/tidal flux.

VI. White paper issues

A. Dilution. The EPA Cruise Ship Plume Tracking Survey Report was reviewed and discussed. Based on this report and previous studies the Panel agreed there was sufficient data to complete the draft developed by Lincoln Loehr, including the promotion of the following dilution formula for large cruise ships:

Dilution factor = 4 x (ship width x ship draft x ship speed)/(volume discharge rate)

$$(\text{_____}m \times \text{_____}m \times \text{_____}m \text{ sec}^{-1})/(\text{_____}m^3\text{sec}^{-1})$$

To complete the paper the Panel suggested the principal authors:

- Address the factor of 4 in the formula and indicate what this constant incorporates.
- Add an executive summary.
- Add or address a time factor for mixing.
- Remove small cruise ship considerations.

B. Bacteria. The Panel developed the following outline for addressing this topic:

- Evaluation of effluent concentrations
- The relationship between fecal coliform and pathogens.
- The behavior of bacteria once discharged.
- Primary and secondary contact.
- Evaluation of concentration and effects after relevant dilutions.
- Near shore concentrations and effects.
- Bacteria in context (geometric mean, state and national standards, comparative data for communities and point sources)

- C. **Nutrient loading.** The Panel almost completed its work on this topic in 2001 but decided that additional data in 2002, particularly information on total nitrogen, was needed to be conclusive. The Panel felt that nutrient loading becomes a concern when the level of discharge loading is 10-20% of background. Therefore the paper and the data presented should be written or tabulated to address loading relative to this level or benchmark.
- D. **Chemical use on board vessels.** The Panel agreed that this section of the white paper should address the following topics:
- Pathways
 - Pharmaceuticals
 - Bioaccumulation
 - Data review
 - Suggestions for pollutants to monitor other than traditional priority pollutants
 - Comparisons and contrasts with chemicals found or processed through publicly owned treatment works (POTW).
- E. **Sediments.** This section should present background data for contaminants of interest and include contributions from mines, oil & gas, glaciers, and streams. The settling of suspended solid discharge from ships should be contrasted with the background sedimentation rate. The dynamic nature of Alaska waters and its effect of sedimentation should be described. Data from Victoria, BC and Washington State studies should be incorporated into this work.
- F. **Surface fresh water lens / micro layer.** Ken Hall presented a nearly complete study of this topic. The Panel discussed the need to address oils and grease in wastewater discharge and whether they, because of their low density, effect the microlayer.
- G. **Sampling.** The Panel agreed that obtaining samples on board a ship that is consistently representative of a discharge (particularly graywater) is difficult if not impossible. However, the Panel noted that data obtained over the last three seasons, when considered in its entirety, does provide a representative picture of the range and averages of pollutants in various types of discharge from cruise ships. Determining mass loading is difficult since certain tank or discharge samples can skew data, particularly samples of galley waste. The Panel agreed that this section should include or address:
- The adequacy of the guidelines provided by regulations. (Coast Guard and ADEC).
 - What the data from 2000-2002 reflects.
 - What sampling/analytical data is useful for.
 - Guidelines and suggestions for data presentation.
- H. **Sensitive areas.** The Panel reiterated that the focus of this section should continue to be how a sensitive area is defined in relation to wastewater discharge. Recommendations for dilution and distance from sensitive areas should be developed. However, the Panel recognized that “sensitive area” is a relative term and that presents difficulties in determining how best to proceed.

- I. **Small cruise ships.** This section should deal not only differences between large and small cruise ship discharges but the effects of differences in operating practice. Because the vessels discharge while stationary and close to the shore, and possibly sensitive areas, as well as having human recreation alongside the vessels, the approach to risk from these vessels will need to be considered in a totally different way to that from large cruise ships. A narrative format (“A Day in the Life of a Small Cruise Ship”) should be considered to help describe the differences and place small cruise ships in context. The validity of applying the dilution model developed for large vessels should be addressed.
- VII. **Whole Effluent Toxicity Testing (WET).** ADEC presented initial and preliminary results of the WET test of samples taken from 5 different commercial passenger vessels. The Panel agreed to comment on the results by September 1. Comments should address the legitimacy, indications and implications of the tests as well as the need, if any, for additional WET tests from either large or small vessels.

**SCIENCE ADVISORY PANEL ON CRUISE SHIP WASTEWATER DISCHARGE
AUGUST 15-16, 2002 SEATTLE CONFERENCE**

Members

Marlin Atkinson	University of Hawaii (participated by teleconference)
C-J Beegle-Krause	NOAA
Kenwyn George	ADEC
Ken Hall	University of British Columbia
Lincoln Loehr	Heller Ehrman
Charlie McGee	Orange County (CA) Sanitation District
Alan Mearns	NOAA
Mike Watson	EPA
Dave Eley	contract facilitator

ADEC members providing technical and program assistance

Denise Koch
Gretchen Keiser
Carolyn Morehouse