WASHINGTON ANNUAL CRUISE MEMORANDUM OF UNDERSTANDING & CRUISE SHIP UPDATE MEETING

Date/Time: 12/4/2007, 1:00 pm to 4:30 pm

Groups: Port of Seattle, Department of Ecology, Cruise Line Representatives

Location: Port of Seattle Pier 69, Commission Chambers

Attendees:

David Wetzel, Admiralty Environmental
Amy Jankowiak, Department of Ecology
Kevin Fitzpatrick, Department of Ecology
Dave Peeler, Department of Ecology
Norm Davis, Department of Ecology
Peter Christiansen, Department of Ecology
Marietta Sharp, Department of Ecology
Mark Toy, Department of Health
Bob Woolrich, Department of Health
Blain Reeves, Department of Natural Resources
Fred Felleman, Friends of the Earth
David Bain, GRR Rescue
Lincoln Loehr, Heller, Ehrman LLP
Bill Morani, Holland America Line
Dan Grabb, Holland America Line
Jon Turvey, Holland America Line
Bob Diaz, Holland America Line
Representative Mary Lou Dickerson, House of Representatives
Mark Buscher, King County Wastewater Treatment Division
Andrew Dalton, Muckleshoot Fisheries Division
John Hansen, Northwest Cruiseship Association
David Fyfe, Northwest Indian Fisheries Commission
Jim Jessernig, Pacific Coast Shellfish
Peter Ressler, Port of Seattle
Eric Hanson, Port of Seattle???
Mike McLaughlin, Port of Seattle
Andrew Lorenza, Princess Cruises
Selena Haza, Quay Cruise Agencies, USA
Doug Coburn, Quay Cruise Agencies, USA
Rich Pruitt, Royal Caribbean Cruises
Debbie Kay, Suquamish Tribe Fisheries
Cathy Stanley, Tulalip Tribes Natural Resources
Scott Meschke, University of Washington
Michael Antee, USFDA
Representative Mary Lou Dickerson, Washington State

Agenda

1:00 PM – 1:20 PM	**Welcome, Introductions** MOU introduction presentation	(Amy Jankowiak, Peter Ressler, All)
1:20 PM – 1:35 PM	**Compliance with the 2007 season** Findings from 2007 season inspections	(Amy Jankowiak, cruise line reps)
1:35 PM – 2:35 PM	**Department of Health Report – virus/cruise ships** *Assessment of Potential Health Impacts of Virus Discharge from Cruise Ships to Shellfish Growing Areas in Puget Sound*	(WA Department of Health, University of Washington)
2:35 PM – 2:45 PM	**Funding – for the MOU** Where we are, how it works	(Ecology, Port of Seattle, Cruise line reps)
2:45 PM – 3:00 PM	**BREAK**	
3:00 PM – 3:15 PM	**Biosolids Update**	(Amy Jankowiak, parties to the MOU)
3:15 PM – 3:30 PM	**Whole Effluent Toxicity Update**	(Amy Jankowiak, parties to the MOU)
3:30 PM – 4:00 PM	**MOU Amendments** What changes are needed	(Parties to the MOU)
4:00 PM – 4:25 PM	**Comments/Discussion from cruise lines and interested parties**	(All)
4:25 PM – 4:30 PM	**Looking Ahead** What to expect for next season, legislative…	(All)

Welcome, Introductions

Penny Mabie, EnviroIssues, introduced herself as the meeting facilitator and welcomed attendees to the annual Cruise Memorandum of Understanding (MOU) meeting. Meeting attendees and members of the public introduced themselves.

Amy Jankowiak, Department of Ecology, thanked meeting attendees for their participation in the annual MOU meeting. The purpose of the meeting was to provide a 2007 update on the MOU, invite suggestions for amendments, and to discuss any questions or issues of concern surrounding the MOU. Amy briefly noted Department of Ecology goals to prevent pollution, support sustainable communities & natural resources, and to clean up pollution in Puget Sound. She proceeded to show two PowerPoint presentations. The first provided an overview of MOU specifications and related issues, and the second reported on 2007 MOU compliance.

MOU Background and Specifications

Amy Jankowiak, Department of Ecology

Why Department of Ecology Focuses on Cruise Ships

- To protect State waters
- Cruise ships are similar to small cities
- Unique shape of state and marine waters
- Shellfish protection is a priority for public health
- Because of their mobility, cruise ships require specific regulation

Cruise ships in Washington Waters

- Cruise ships have docked in Seattle since 1999
- In early 2003, Ecology developed Best Management Practices (BMPs) for cruise ship maintenance while in Seattle
- In May 2003, sludge discharge from a vessel led to development of the MOU

Memorandum of Understanding (MOU) in Washington State

- Signed April 20, 2004
- Major components:
  - Defines "Waters subject to the MOU"
  - Prohibits untreated blackwater and untreated graywater discharges
  - No discharge in Washington waters without advanced wastewater treatment systems (AWTS)
  - Can discharge while > 1 mile from port, > 6 knots with AWTS
  - If certain conditions met, can continuously discharge even while at port.
- Ships covered by MOU:
  - NWCA member lines (over 250 people, at Port for more than 1 day)
  - 15 ships covered in 2007
- Ships not covered by MOU:
  - Non-NWCA cruise ships: 2 in 2007, 3 Port calls
  - Small cruise ships (less than 250 people)
  - Alaska Marine Highway System, Bellingham
  - Washington State Ferries
  - Other types of ships/boats

MOU Sampling Requirements

Ships approved for discharge agree to:

- Allow inspections a minimum of once per season, to verify compliance with MOU
- Submit Compliance/Non-Compliance Notifications
- Submit Annual Compliance Reports

MOU sampling procedures:

- Sample monthly in Seattle (BOD, TSS, fecal coliform, pH, residual chlorine)
- Meet limits (fecal GEM 20, BOD/TSS 30/45, pH 6-9, chlorine residual 10ug/l)
- Split samples with Ecology, upon request
- Whole Effluent Toxicity (WET) testing once every 2 years, or once every 40 calls

- Provide test results (Alaska and Seattle)
- Comply with vessel inspections by Ecology

MOU Residual Solids

- Residual Solids (biomass, sludge) discharges are prohibited in waters subject to the MOU, within 12 nautical miles from shore, and within the Olympic Coast National Marine Sanctuary.

Other MOU Specifications

- Solid waste discharge prohibited
- Hazardous waste management required
- Oily Bilge water
- United States Coast Guard (USCG) jurisdiction
- Annual meeting, Annual Report, Amendments, Funding

Benefits of Existing MOU

- MOU exists as an agreement to protect water quality
- Enforcement capabilities under Water Quality Standards and RCW 90.48.080
- Press coverage in cases of MOU violation
- Increases efforts for collection of sampling data
- Outlines procedure for notification of noncompliance
- Facilitates open communication with cruise lines and vessels
- Department of Ecology continues to learn more about vessels and equipment

Issues / Problems of Existing MOU

- Difficulty with enforcement of agreement
- No coverage for smaller passenger vessels or non NWCA vessels
- Air quality issues are not covered by the MOU

2007 Compliance

Amy Jankowiak, Department of Ecology

Discharge Approvals

If documentation is insufficient, cruise lines are notified as to which documentation is needed. In 2007, cruise ships Norwegian Pearl, Star, Sun, Golden Princess, and Sun Princess were approved for continuous discharge. Remaining vessels opted to hold discharges in 2007.

2007 Discharge Approvals

- 98% port calls from large cruise ships under the MOU, 6 vessels approved; 190 calls

Inspections

- Introductions/overview of plan for the day (prior notification given)
  - Approximately 2 hours in length
  - Similar to inspections for on-land plants

- Control room
  - Run-through of how system works
  - Variety of questions on staffing, training, protocols
  - Review of records
- Tour of treatment system(s)
- Observations of other waste streams on the ship
- Sampling

Inspections Conducted

- 8 inspections conducted as of December 2007 (all but one home-ported vessels).
- Inspection findings: evaluation is still in process, results thus far indicate compliance.
  - Operating well; more sampling on board for process control
  - Discharge protocols thorough with verification

2007 Sampling

- Sampling data still being received and evaluated. Summary of data and data will be included in the 2007 annual report
- WET testing
  - Required for vessels approved for discharge
  - Once every two years if home-ported (20 visits) or
  - Once every 40 port calls or turnarounds
  - All required WET testing submitted thus far (*Sun Princess* now at 2 years home-ported)

2007 Compliance Notifications

- One reported incident for 2007 season to date
- Compliance letters
  - All in except for one (extension requested)

Recommendations for MOU (from 2006 annual report)

- Ecology recommends MOU continue to be used as a complement to environmental regulations until regulations specific to cruise ship waste management in Washington are put in place
- Ecology continue to inspect ships that discharge, including closely looking at wastewater management and other waste streams
- Ecology and Health to work together to seek information on smaller passenger vessels
- Cruise lines to conduct a thorough review of records on an on-going basis and at end of season to evaluate compliance and inspection recommendations to be implemented

Questions / Comments about MOU Compliance

John Hansen, Northwest Cruiseship Association (NWCA), told the group he appreciates the work of the Department of Ecology, the Port of Seattle, and various partners in Canada and Alaska. The NWCA continues to learn more about the MOU and is pleased about clean reports that have followed each cruise season since the implementation of the MOU.

He noted the commercial success of operations, with 9 ships home-ported in Seattle and 17 in Vancouver. The association expects similar numbers in 2008. In addition to commercial success, the association measures success by environmental compliance. John pointed out the success of 2007, with no major issues surrounding environment, safety, or security. John explained that the objective of the cruise ship association is to do everything possible to maintain high environmental standards.

Amy Jankowiak, Department of Ecology, invited other cruise line members to offer information surrounding MOU compliance. No one responded and the meeting proceeded to the next agenda item.

Department of Health Report
Mark Toy, Department of Health

Since 1999, there has been a significant increase in the number of cruiseship calls to the Port of Seattle. The Department of Health (DOH) was tasked by the State legislature to study impacts of large cruise ship wastewater discharges on norovirus exposures to Puget Sound shellfish. DOH commissioned the University of Washington to conduct the study.

2005 Legislation

- Washington legislation sought to put MOU into law
- Questions about shellfish safety stopped passage of bill
- State legislature budgeted funds for virus study
- DOH commissioned the UW to conduct studies

Concern with Cruise Ship Wastewater Discharges

- CDC reported 18 norovirus outbreaks on cruise ships in the Northwest since 2000
- Cruise ships discharge to surface waters at shallow depths
- Cruise ships pass by approved WA commercial shellfish growing areas
- No empirical information on how well vessel treatment removed viruses

Advanced Wastewater Treatment Systems (AWTS)

- AWTS employ filters that effectively screen bacteria but only partially for viruses (disinfection at end of treatment inactivates viruses)
- Shellfish closure zone based on upset condition (loss of disinfection is most common wastewater plant problem)
- Existing pathogenic indicator standard of 14 Fecal Coliforms (FC)/100 ml no longer as reliable

University of Washington (UW) Major areas of study

- Estimation of virus discharge
- Dilution from ship to shoreline
- Uptake and retention of viral particles by shellfish
- Risk of disease

UW Study Findings Estimation of virus discharge

- Enormous variation in norovirus shedding between individuals

    - One person with high shedding rates can discharge as much or more virus than 100 people shedding at average rates.
- This variation blurs total virus discharge in outbreak vs. non-outbreak conditions
- Disinfection is key in determining level of norovirus discharge
    - Disinfection: 4 log inactivation
    - All other treatment: 2.5 – 4 log inactivation

UW Study Findings Dilution from Ship to Shore

- Near field dilution factor (initial dilution with propellers when ship moving) ranges from 30,000 to 200,000:1
- Far field dilution factor (remaining dilution to shore) not as significant, ranging from 50 to 2000:1, depending on conditions
- Total dilution multiplicative – even in worse case 30,000 x 50 = 1,500,000:1 dilution

UW Study Findings Uptake and retention of viruses by shellfish

- Bioaccumulation factors for shellfish 3-1000x the viral concentration in the overlying water
- Depuration rates of viruses much slower than for fecal coliform bacteria
- Calculated 'acceptable annual risk' +/- 1 norovirus/10,000 liters in overlying water

UW Study Findings Risk of Disease

- For shellfish consumption rates, used Suquamish Tribe (high values)
- Estimated annual risk of disease based on oyster consumption only
- Used dilution rates and travel time to most sensitive locations (Point Jefferson)

UW Study Findings Conclusions

- When AWTS functioning well, virus discharges should not lead to norovirus accumulation in shellfish beds
- Loss of disinfection can lead to potentially unacceptable virus levels in water over shellfish beds
- No empirical measurements of norovirus levels in ambient waters or shellfish of Puget Sound are available to confirm or refute results in UW report
- Hard to translate transient conditions to annual risk
    - complexity of water circulation patterns make it hard to predict dilution during specific episodic discharges
    - Not enough data on harvesting patterns to reveal locally higher risks
    - Probability of upset event not factored in

Issues for DOH Office of Shellfish and Water Protection (OSWP)

- AWTS renders fecal coliforms an unreliable indicator for measuring risk of pathogenic organisms
- No reliable viral indicator standard is established to set sanitary line
- Model Ordinance provides little guidance on setting closure zones based on viral risk
- Regulatory authority of ship wastewater discharge lies with federal (Coast Guard), not State agencies at present time
- Lack of empirical data on which to base decisions

Report Recommendations

- Request cruise ships maintain minimum distance (0.5 miles) from known shellfish beds - two geoduck tracts within 0.5 mile of traffic lane in Kingston growing area
- No discharge when AWTS upset occurs
  - Automatic or immediate shutdown capacity for all ships discharging in Washington waters
- NWCA members notify DOH immediately when AWTS upset
  - Short discharge transit time (+/- 1 hour) to closest shellfish beds if upset condition
  - DOH must notify growers quickly to avoid recall and/or consumption of unsafe product
  - Weekdays: (360) 236-3330. After Hours: (360) 786-4183
- Improve/ensure reliability of AWTS on cruise ships
  - Expand 'upset' condition to include disinfection adequacy for viruses
  - Set alarms for UV dosage as well as intensity, depending on target pathogen (4 log inactivation):
    - 8.4 mJ/cm2 for *E. coli* bacteria
    - 40 mJ/cm2 for Norovirus
    - 60 mJ/cm2 for Rotavirus and Hepatitis A Virus (HAV)
    - 186 mJ/cm2 for Adenovirus (drinking water standard)
- Work with USCG and Ecology to improve knowledge of small passenger ship discharges
- Request Ecology ensure UV disinfection is adequate for viruses.

For More Information:

DOH Office of Shellfish and Water Protection http://www.doh.wa.gov/ehp/sf/default.htm
Puget Sound Marine Modeling Partnership http://www.psmem.org/
National Shellfish Sanitation Program http://www.cfsan.fda.gov/~ear/nss2-toc.html

Funding for the MOU

Amy Jankowiak, Department of Ecology

Funding agreements were put in place for 2006 and 2007. Funding agreements for 2008 are currently underway. Actual costs have been lower than original estimates. As the MOU specifies, invoicing will take place on March 1, 2008. The port has 60 days to make payment.

Biosolids Update

Amy Jankowiak, Department of Ecology

King County recently released a 2007 wastewater report that investigated the need for infrastructure at Terminal 91 to manage cruise ship wastewater. The report discussed transport by pipe, among other methods. The Port of Seattle also held a meeting to discuss management of cruise ship wastewater and biomass (residual solids) from on-board treatment systems. MOU parties are discussing a variety of options for waste discharge, including, transport of biomass to land for treatment and ultimately beneficial use.

The Port of Seattle and Department of Ecology will hold a meeting in January 2008 to discuss next steps for biomass treatment. For the convenience of cruiseline representatives traveling from other regions, the meeting will take place in conjunction with discussion of other cruiseship topics. MOU parties are welcome, as well as anyone with a request to attend. Interested parties can contact Amy Jankowiak, 425-649-7195, or ajan461@ecy.wa.gov .

Whole Effluent Toxicity Update

Amy Jankowiak, Department of Ecology

Amy reported that a meeting with MOU parties was held earlier in the day to discuss Whole Effluent Toxicity (WET) testing. Ecology and the cruise lines believe that there are changes needed in the testing methodology. Next steps will be to evaluate various studies on mixing zones and effluent testing via a literature review. Based on this review, the WET testing guidelines will be reevaluated. Efforts will also be undertaken to help labs better understand cruise ship discharge testing so tests are run appropriately. Previous methodologies may not have been the most ideal for WET testing.

A follow-up meeting about this topic will be paired with the cruise ship biomass meeting in January 2008. MOU parties are welcome, as well as anyone with a request to attend. Interested parties can contact Amy Jankowiak, 425-649-7195, or ajan461@ecy.wa.gov .

MOU Amendments

Amy Jankowiak, Department of Ecology

The Department of Ecology has initially discussed the results of the DOH shell fish virus impacts study with the parties of the MOU. The intent is to incorporate these recommendations into the 2008 MOU, though Ecology recognizes there will be some technology development and/or acquisition needs on the part of the cruise lines.

Ecology proposes to allow cruise lines ample time to consider DOH recommendations and to examine new technologies. Ecology will work with DOH and the cruise lines on clarifying MOU language, by specifying notification procedures for upset conditions, defining upset conditions, expanding definitions to include ultra violet (UV) disinfection, and other points of clarification.

Questions / Comments about MOU Amendments

Amy Jankowiak, Department of Ecology, asked if anyone suggests other amendments to the MOU. She added that Ecology will work with the MOU parties to finalize MOU amendments prior to the start of cruise season.

John Hansen, Northwest Cruiseship Association, said the NWCA has no additional recommendations for additional amendments at this time. He assured NWCA participation in DOH studies and assistance in crafting language for the MOU.

Next Steps

At upcoming 2008 meetings, parties to the MOU will discuss implementation of effective WET testing and biomass treatment, among other issues. Interested parties will be kept abreast of legislation that emerges from the 2008 State Legislative session.

Questions / Comments

What experience has Royal Caribbean had in offloading solids and sending them to the King County Waste Treatment Plant?

Rich Pruitt, RCI/Celebrity Cruises, answered that Royal Caribbean has been offloading portions of sludge by truck to King County as part of maintenance activities. Because they were not offloading all the sludge on board, he did not feel their experience was directly useful to the issue of removing biomass from cruise ships via trucking.

For the King County study, did the West Point WET testing use zero dilution? Did the participants in the wet testing meeting this morning discuss Alaska's WET testing results, and has the Alaska study had been reviewed in consideration of dilution methods in the Northwest? It was suggested to increase the sample size of the testing by including data from other states, such as Alaska.

Amy Jankowiak responded that the specific results from King County were not on hand at the meeting, but that Ecology can obtain this information from King County. As for the Alaska study, the study from Dr. Kim has yet to be finalized and published.

Andrew Lorenzana, Princess Cruises, responded that the process of dilution needed to achieve appropriate standards occurs in matter of seconds, or less.

Would the cruise lines consider a no-discharge option for all of Puget Sound? The ICCL recommends no discharges in areas of decreased circulation. There are concerns about nitrification in the water as well as the presence of heavy metals and ammonia from discharges.

Jon Turvey, Holland America Line responded that discharge policies are evaluated based on scientific data, both in Puget Sound and Alaskan waters. Also, issues of discharge are not specific to cruise lines.

Why did the UW norovirus testing not include ambient water quality testing?

Response: The infrastructure is not in place to accommodate this kind of testing. Thousands of samples would be required.

Mark Toy, Department of Health, and Scott Meschke, University of Washington, explained that when advanced wastewater treatment functions properly, there should not be any significant impact on shellfish. When systems malfunction, shellfish beds may be closed up to 21 days. The Department of Health recommends improving the reliability of wastewater treatment systems.

Amy Jankowiak, Department of Ecology, asked cruise line representatives to discuss the ability to hold discharges until outside of Puget Sound and potential pros and cons associated with holding discharge.

Jon Turvey, Holland Armerica Line responded that the variability among ships makes it difficult to speak for all cruise lines. The cruise lines have invested heavily in making sure discharge is treated and safe. Jon added that according to a recent report from King County, the cruise lines' 2007 discharge record is cleaner than King County's record.

Wasn't it unfair to compare the cruise ship effluent to the West Point Treatment Plant's effluent? Shouldn't the County compare cruise ship effluent to Brightwater effluent quality, since it will be a modern treatment plant with the most up-to-date treatment systems?

Mark Busher, King County Wastewater Treatment Division clarified that the comparison between West Point treated effluent and that of cruise ships is very valid. He stated that both the West Point and the Renton treatment plants are modern treatment plants and meet and typically exceed all treatment standards.

A comment was made that the Cruise Lines want to be treated the same as all other treated wastewater discharges, that they should not be expected to meet more stringent standards. David Fife, Northwest Indian Fisheries Commission, suggested everyone should think carefully about that. Other dischargers have permanent shellfish closures enacted around their "outfalls". That could result in large shellfish area closures if it applied to cruise ship discharge.

How is the Department of Ecology monitoring the discharges and effects of nutrients on Puget Sound?

Kevin Fitzpatrick, Department of Ecology responded that Ecology has two big studies ongoing regarding nutrients in the water. The studies are currently focused in the South Sound area. There is still a lot of information to gather. Ecology is starting to look at whether nutrient removal at on-shore treatment plants makes sense in the future. However, implementation is years away. In addition to cost, several related issues need to be addressed before any standards changes are suggested.

State Representative Mary Lou Dickerson asked if Ecology or DOH will pursue agency legislation in 2008?

Amy Jankowiak, Department of Ecology, responded that she is unable to respond to that question at this time.

Can the MOU be amended to include recommendations for zero discharge in Puget Sound?

John Turvey, Holland America Line: This would not be appropriate for the cruiseship MOU, since discharge and water quality issues are not solely linked to cruise ship practices.

Will the public be involved in the WET testing discussions?
Amy Jankowiak, Department of Ecology, responded that anyone who is interested in attending the January meeting should let Amy know and she will send the information.

Do on-land treatment discharge systems record daily PH levels? Amy responded some do, some don't. It depends on the size of the facility. The smaller facilities typically do either monthly or weekly for certain parameters.

Comment: Additional measures should be taken to ensure discharge functionality and compliance on the part of cruise ships. The inspection frequency doesn't seem adequate. Since cruise ships are present at the Port for a shorter time, they should be tested at a higher frequency to meet the same standards as on-land treatment systems.

I understand that some cruise ships have electronic connections with their home ports and the treatment system manufacturers for ongoing monitoring. Could Ecology be included in that correspondence between ships and the home port so more monitoring data could be collected?

Ecology response – We try not to collect data just for data's sake. We only want to collect data that measures improvements to water quality. The data referred to is typically for process control, not effluent quality.

Comment: David Baine spoke about a study he is involved with looking at microbes in air affecting killer whales. One of the early findings from killer whale airways monitoring is the presence of antibiotic-resistant bacteria. These are due to human causes. One potential cause could be inadequately treated waste discharge.