Economic Feasibility, Cruise Ship Wastewater

Presentation to
Cruise Ship Wastewater Science Advisory Panel

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Agenda

- Northern Economics overview
- Objective: assist OASIS, ADEC and the Wastewater Science Panel with economic analysis
- Economically feasible (HB 134) definition
- Preliminary Assumptions
- Treatment options
- Model based on assumptions
- Costs: Capital and Operating
- Cost challenges
- Data sources

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Staff

- Economists, analysts
- Experience
- Professional experience: over 210 years
- Alaska experience: over 120 years

Alaska Experience

Experience, Relevant Projects

- Alaska – 30 years, company
- Ketchikan to Kotzebue
- Prudhoe Bay to Aleutian Chain
- Applied Economics

- Cruise Ship Tax, State Department of Law
- Alaska Visitor Statistics Program
- Alaska Travel Industry Association
- Kodiak Cruise Ship Tariff
- MOA Cruise Ship analysis
- Seward Cruise Ship Dock
- Valdez City Dock

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Project Staff

- Wastewater Science Panel Project Team
  - Pat Burden
  - Dr. Trina Wellman
  - Cal Kerr
  - Alexus Bond

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Definition

Economically feasible wastewater treatment options meet Alaska Water Quality Standards using processes that are within the financial means of cruise ship lines operating in Alaska.

Within the financial means is defined as not creating a disproportionate impact such as major reductions in staff, cost increases that result in significant decreases in passenger demand, or a potential shift in operations away from Alaska.

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Preliminary Assumptions

- Existing cruise vessel wastewater operations are economically feasible

- Most existing onboard treatment systems meet the majority of Alaska's Water Quality Standards

- Existing cruise vessel wastewater treatment systems are, economically speaking, sunk costs

- Economically feasible refers to additional costs going forward

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Assumptions, Cont'd

■ Offshore or shoreside treatment options may be possible

■ Cruise ship companies will need to upgrade their existing infrastructure, such as adding polishing systems to fully meet Alaska Water Quality Standards

Assumptions, Cont'd

■ Source control, onboard treatment, shoreside treatment and offshore discharge should be considered as viable alternatives

Options for Meeting Alaska Wastewater Quality Standards

Source Control	• Modify Existing Conditions
Onboard Treatment	• Tertiary Purification Steps
Shoreside Treatment	• Install a Tertiary Unit On-Shore • Use Existing Shoreside Facilities
Offshore Discharge	• Expand Holding Tanks • Release Wastewater Outside of Alaska Waters

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Model, Approach

- Regulatory Driven (AS 46.03.462)
- Cost-focused: total costs (capital and operating)
- Data source dependent

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Regulatory Driven

- Alaska Water Quality Standards
- Minimum standards, point of discharge
- Wastewater science advisory panel established

Cost Components

- All options for meeting Alaska Wastewater Quality Standards are comprised of two components:

Capital Costs
System or Component
Purchase, Installation

Operating Costs
Time
Labor
Resources (including space)

Cost Challenges

- System (component) costs will differ
- Costs for installing and operating onboard treatment options will vary with vessel design and layout

Cost Challenges

- Shoreside treatment: location of discharge
- Operational costs of each vessel and the company's financial strength

Addressing Cost Challenges

- **Standardize when possible; emphasize the use of ratio metrics to facilitate comparison**
  - Cost per passenger, per volume of water
- **Use practical ranges**
  - Cost estimates may have an upper bound, a lower bound, and a most likely figure
- **Use third-party estimates**
  - Use information from panel members and secondary resources to verify assumptions and results

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Data Sources

- **Requests to Cruise Industry**
- **Industry Averages**
- **Annual Reports**
- **Cruise Vessel Head Tax program**
- **ADEC Sampling processes**
- **Other**

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Carnival 2010 Annual Report

- Carnival: largest in world
- Total of 98 ships (2010)
- Revenues of $14.5 billion
- Passengers: 9.1 million
- Brands: Carnival, Holland America, Princess, Seabourn, Cunard, P&O, four others
- *…commitment to maintaining oceans and air, as well as, the pristine destinations we visit.*

Holland America Princess Tours

- *Tour and other segment assets primarily include hotels and lodges in the state of Alaska…Yukon…motorcoaches…domed rail cars…two chartered ships.*
- 2010: Revenues of $403 million
- 2009: Revenues of $427 million
- 2008: Revenues of $561 million

Royal Caribbean 2010 Annual Report

- Royal Caribbean Cruises, Ltd. is 2nd largest in world
- Total of 40 ships
- Revenues of $6.8 billion
- Passengers: 4.6 million
- Brands: Royal Caribbean, Celebrity, two others
- *…a few highlights include installation of state-of-the-art wastewater treatment plants….*

Royal Caribbean 2010 Annual Report

- February (2011) – agreement with Meyer Werft to build 1st of new generation, 4,100 berths

- *We believe that the impact of cruise ships on the global environment will continue to be an area of focus by the relevant authorities throughout the world and, accordingly, will likely subject us to increasing compliance costs in the future*

Royal Caribbean 2010 Annual Report

■ *Additionally, the state of Alaska...also imposes a 33% tax on income from onboard gambling activities conducted in Alaska waters. This did not have a material impact to our results of operations for all years presented.*

Summary

■ Definition of economic feasibility
■ Assumptions
■ Options to meet Alaska Water Quality Standards
■ Model, approach, definition dependent
■ Cost components, challenges
■ Data sources