The Impact of Air Quality Issues on The Cruise Industry

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Starcrest Consulting Group
All Pollutants are Not Created Equal

- Magnitude of Emissions (How Much)
- Types of Pollutants (What)
- Boundaries of Inventory (Where)
- Issues of Exposure (When)
Emissions Inventory Estimation

• Inventory = Emission Rate (g/hp-hr) * Activity (hours per year) * Rated Horsepower * Load Factor * Correction Factor(s) * Control Factor(s) * Adjustment Factor(s)

• Basic Emission Rate = Zero Hour Emissions + Cumulative Hours * Deterioration Rate
Port Related Emissions

- Port Operations Almost Exclusively Diesel
- Diesels Emit High Levels of Oxides of Nitrogen (NOx), Particulate Matter (PM), and Oxides of Sulfur (SOx), Compared to Other Fuels
- NOx is Instrumental in the Formation of Ozone
- PM is listed as a Toxic Air Contaminant by the State of California
- SOx emissions lead to Secondary PM formation and Impact Visibility
Emissions by Source Category
(Port of Los Angeles-2001)

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Relative NOx Emissions (tons/year)
(Port of Los Angeles – 2001)

21%
62%

- Auto
- Bulk
- Container
- Cruise
- General Cargo
- Misc
- Tug
- Refer
- RoRo
- Tanker

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Relative PM Emissions (tons/year)  
(Port of Los Angeles – 2001)

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Contribution by Engine and Activity
(Cruise Ships – Port of Los Angeles – 2001)
Boundaries of The Emissions Inventory
(Port of Long Beach – South Coast Air Basin)

Over-Water Boundaries

Over-Land Boundaries

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Emission Reduction Strategies

• Lower Engine Out Emissions
  – Fuel Reformulation / Alternative Fuels
  – Improvement in Engine Technology
  – Use of After-treatment

• Lower Activity
  – Fewer Calls
  – Improved Efficiency

• Lower Loads
  – Reduced Speeds
“NNI” No Net Increase Process
Included a Total of 68 Different Measures
Regulatory Measures for OGVs

- OGV 1- New Engine Standards for Ships
- OGV 5- New Cat3 Engine Standards (U.S. Flagged)
- OGV 8- Cleaner Fuels for Ship Auxiliary Engines
- OGV10- SECA
- OGV13- Additional Aux. Eng. Reductions (Frequent Callers)
- OGV17- Additional In-Use Measures for Ships
Proposed POLA CAP Measures

- CAP OGV1- Vessel Speed Reduction
- CAP OGV2- Alternative Maritime Power
- CAP OGV3- Auxiliary Engine Fuel Improvement
- CAP OGV4- Main Engine Fuel Improvement
- CAP OGV5- Low Emission Main Engines
- CAP OGV6- Reroute Cleanest Ships
Proposed POLB Metrics Approach

• Separately Tracking Growth in Emission and Growth in Activity
• Pounds of Emissions per Passenger Moved
• Measure of Efficiency Recognizing the need for Growth
Future Efforts

• Establish new 2005 Emissions Inventory Baselines
• Compare Pervious and Current Baselines for Growth and Progress Toward Goals
• Investigate Key Factors Impacting Estimates of Emissions and Exposure
• Promote Cleaner Technologies as They Become Viable
• As Emissions are Reduced from Containerships – The contribution from the Cruise Industry will Increase
Ongoing OGV Related Activities

- Goods Movement Plan
- POLA Clean Air Plan
- POLB Green Ports Initiative