

AAPA CRUISE SEMINAR
San Francisco, CA

“ECA Compliance - Technology Development and Operational Equivalencies as Effective Solutions”

April 24, 2013



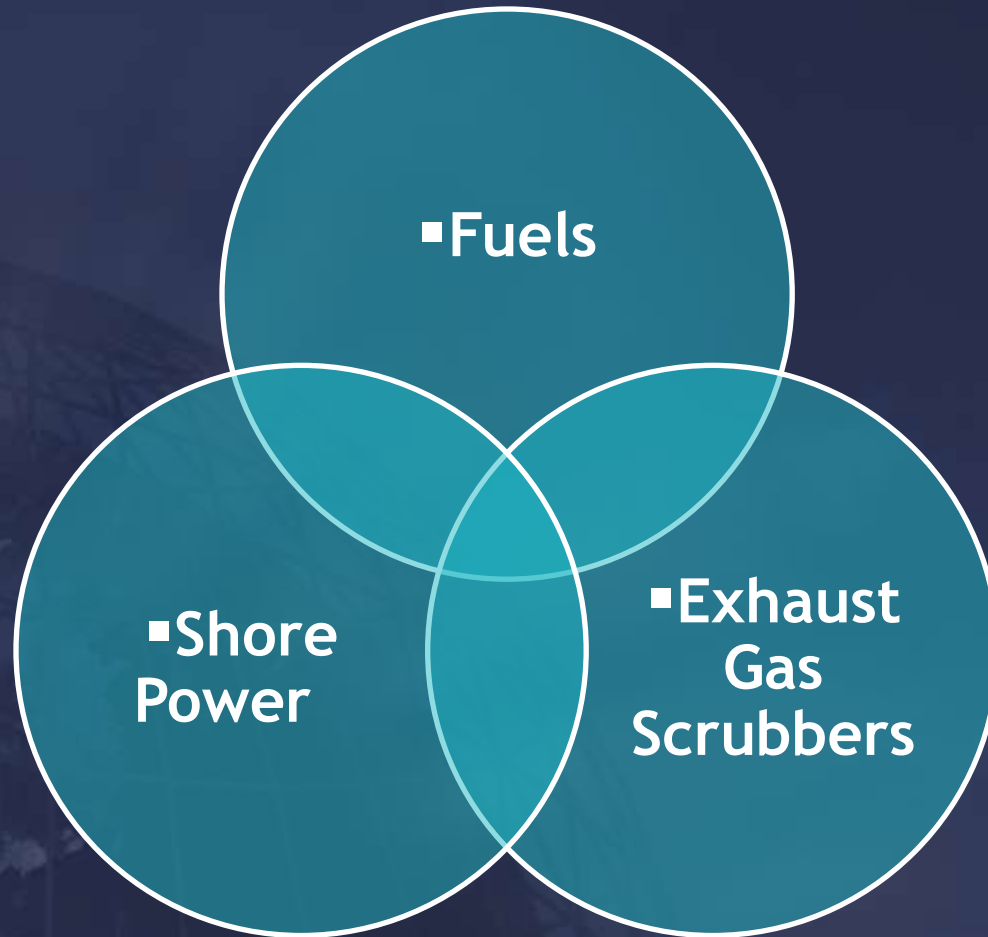
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Air Emissions from Ships

- Principally regulated via the International Convention for the Prevention of Pollution from Ships (MARPOL), Annex VI
- This is a convention developed and adopted by the International Maritime Organization (IMO)
- Both the US and Canada are parties



Air Emissions



EMISSION CONTROL AREAS

The U.S./Canadian petition for an ECA was adopted by the IMO and it became enforceable in August 2012. U.S. obtained approval to exempt most steamships from the requirements of the original ECA.

EPA published its related final rulemaking in April 2010.

MARPOL Annex VI provides for emissions control areas (ECA) that restrict sulfur content in fuel:

- 1.5% originally
- 1.0% in July 2010 (August 2012 for North America)
- 0.1% in 2015
- Worldwide sulfur fuel cap of 0.5% in 2020 (subject to 2018 availability review)



NORTH AMERICAN EMISSION CONTROL AREA



MARPOL ANNEX VI

- ▶ Annex VI, Regulation 4 provides for broad equivalencies. Specifically, the existing text provides that the requirements can be met by “any fitting, material, appliance, or apparatus to be fitted in a ship *or other procedures, alternative fuel oils, or compliance methods used as an alternative*” if they are “*at least as effective in terms of emission reductions.*”



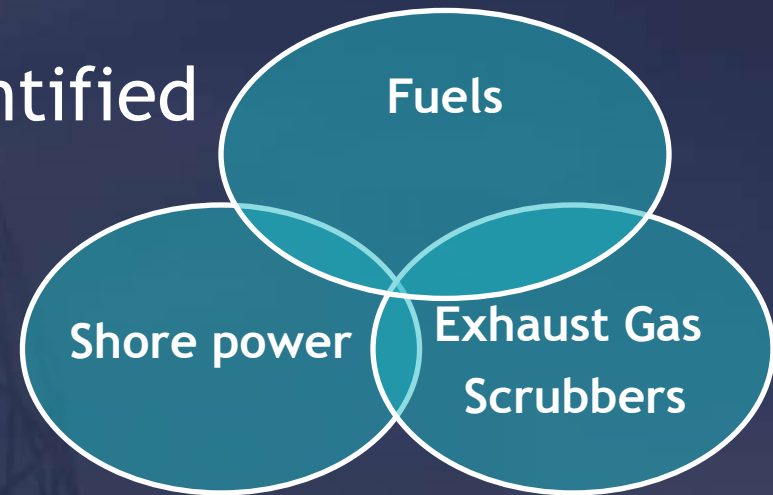
MARPOL ANNEX VI

- ▶ **Annex VI, Regulation 3 provides for exemptions in certain circumstances.**
 - To conduct trials for the development of ship emission reduction and control technologies
 - If the applications of specific provisions of the Annex...could impede research into the development of such technologies or programmes
 - Minimum number of ships necessary
 - Trial shall not exceed 5 years
 - May be withdrawn based on this review if the testing has not adhered to the conditions of the permit or if it is determined that the technology or programme is not likely to produce effective results
 - Permit may be renewed for an additional time period not to exceed 5 years



ALTERNATIVES & EQUIVALENCIES

- ▶ Potential alternatives or equivalencies include:
 - Mechanical removal (scrubbers)
 - Alternative fuels or non conventional power generation
 - Averaging or other operational means
 - Other means not yet identified



GOAL REGARDING OPERATIONAL EQUIVALENCIES

- Work within the existing MARPOL Annex VI framework to provide equal or greater public health and welfare benefit in a more economically efficient manner by:
- Focusing sulfur emission reductions where they provide the greatest benefit (more benefits to more people)
- Ensuring that air quality is not degraded for any persons affected by a cruise ship's sulfur emissions



MULTIPLE VESSEL AVERAGING

- Average total emissions and emission impacts over vessels or fleets of vessels
- Can work with or without weighting for impacts
- Emission calculations for each vessel (weighted)
 - By mode (berthing, maneuvering, transiting)
 - By vessel: total fuel consumed
 - Most cruise vessels use a diesel-electric design thus allowing emissions to be estimated directly from fuel consumption (no low load adjustment factors)



EMISSIONS CALCULATOR: HOW IT WORKS



GIS-Based Emissions Calculator

The screenshot shows the ArcMap interface with the 'NorthwestVoyages.mxd' file open. The 'Layers' panel on the left shows several layers, including 'Waypoints', 'Port Calls', 'Voyages', and 'Source Regions'. The 'Voyage Results' dialog box is open, displaying the following information:

Voyage Results

Summary | Totals | Detailed Results

ECA Scenario: ECA 2015 (0.1% MGO)

Route: Seattle WA To Glacier Bay AK

Vessel Name: M/S

Engine Type: MSD

Fuel Type	% Sulphur	Cost Per Ton
RO	1.96%	\$696.00
MGLO	0.1%	\$1,000.00
MGOL	0.001%	\$1,200.00
MDO	1%	\$805.00

	ECA 2015 (0.1% MGO)
Emissions Ratio (Equivalency / ECA)	0.65
% Cost of ECA Saved	20

Buttons: Update Fuel Value, Calculate, Save, Close

The map in the background shows a coastal area with a red route and a green area. The status bar at the bottom indicates the coordinates -2807617.577 1489314.987 Meters and the time 3:08 PM.

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