

AAPA CRUISE SEMINAR MIAMI, FL

February 9, 2011



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DEVELOPMENTS RELATED TO EMISSION CONTROL AREAS

The U.S./Canadian petition for an ECA was adopted by the IMO and it will become enforceable in August 2012, absent any unforeseeable action by the member States. 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% today;
- 1.0% in July 2010;
- 0.1% in 2015
- Currently, worldwide sulfur fuel cap of 0.5% in 2020
- Provisions for equivalence through technical solutions
 - Exhaust Gas Scrubbers (EGS)

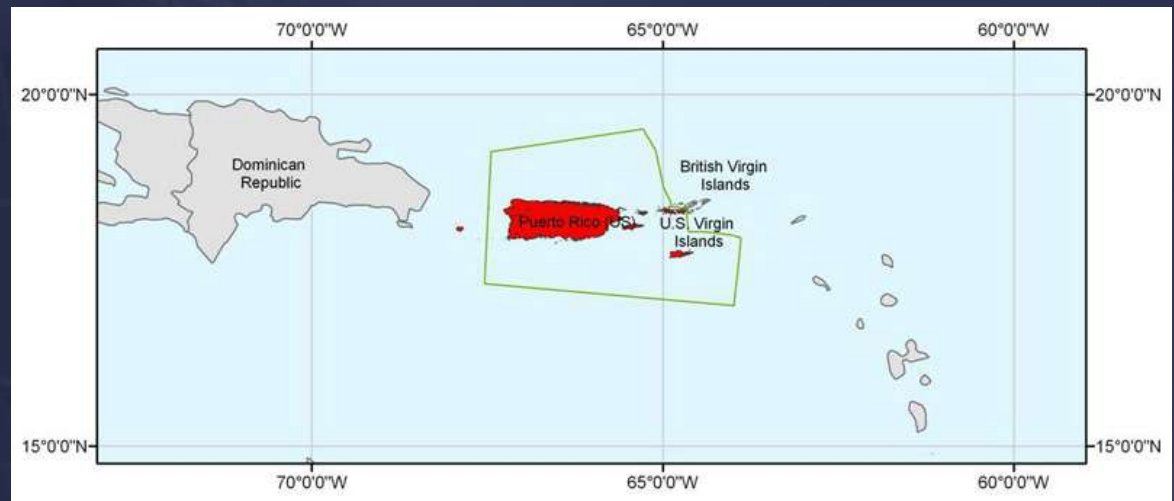


PUERTO RICO ECA

The United States submitted a proposal to IMO to designate an area off the coasts of Puerto Rico and the U.S. Virgin Islands as an ECA.

- Beginning in 2015, fuel used by all vessels operating in these areas cannot exceed 0.1 percent fuel sulfur (1,000 ppm). This requirement is expected to reduce PM and SOx emissions by more than 85 percent.
- Beginning in 2016, new engines on vessels operating in these areas must use emission controls that achieve an 80 percent reduction in NOx emissions

***Final action as early as
IMO'S MEPC 62
session in 2011***



ECA FUEL REQUIREMENTS

Today ships are permitted to use residual fuel up to 3.5% sulfur content

ECA's will require distillate fuel at a significant price penalty.

This will make certain North American itineraries uncompetitive.



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.*”



IMPORTANCE OF EQUIVALENCIES

The fuel sulfur quality requirements of Annex VI, Regulation 14 are not the most economically efficient way to improve and protect public health and welfare via application of the Annex.

ALTERNATIVES AND EQUIVALENCIES

Potential alternatives or equivalencies include:

- Mechanical removal (scrubbers)
- Alternative fuels or non conventional propulsion
- Averaging, banking, and trading
- Other means not yet identified

ABT POTENTIAL PROGRAMS

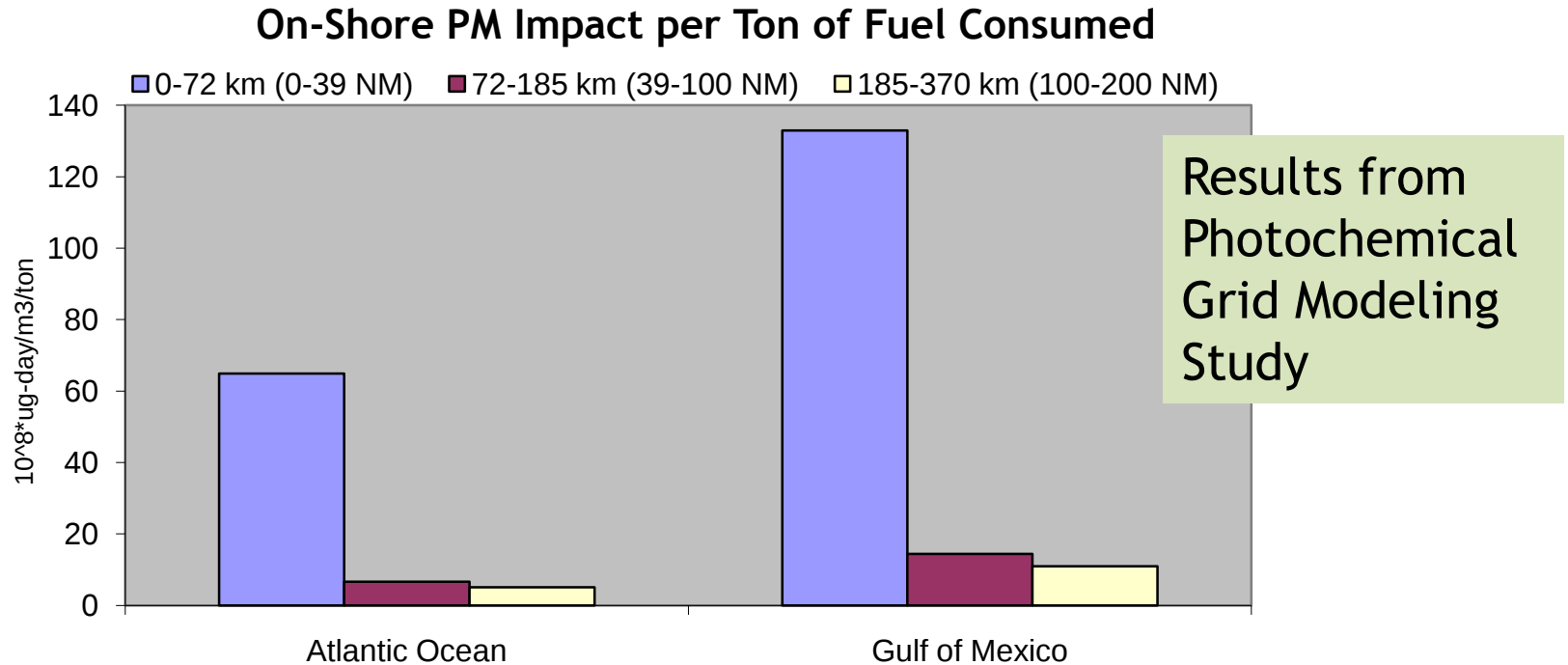
Averaging, Banking, and Trading (ABT) Concepts

1. Within and between vessel fleets
2. Distance weighting by route with a vessel fleet
3. Interaction with other trading programs

MULTIPLE VESSEL AVERAGING

- **Average total emissions and emission impacts over vessels or fleets of vessels**
- **Emission calculations for each vessel**
 - Consult with EPA and address all sources:
 - 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)
 - Activity:
 - Time and load (# engines on) in each mode, or
 - Fuel consumption (which can be accurately measured and verified through accounting documentation)

Distance-Weighted Averaging



- On-shore impacts decrease as ships move further off-shore
- Use cleanest fuels closest to shore, higher sulfur fuels further out
- Total impacts at or below levels achieved by spatially uniform ECA requirement

DISTANCE-WEIGHTED AVERAGING

- **Modal Emissions**

- Routes routinely determined using precise GPS data
- Route links defined by off-shore distance bins
- Emissions estimated from engine load/fuel consumption by link/mode
- Emissions weighted by off-shore distance

- **Averaging conducted for vessels or among multiple vessels**



INTERACTION WITH OTHER PROGRAMS

- **State Implementation Plans (SIPs)**
 - Multiple vessel averaging (same effect as other diesel engine ABT programs)
 - Distance-weighted approach (should have equivalent on-shore benefits to current ECA regulations)
- **Other Programs (Stationary source and other local or State credit trading): Need Further Exploration of Possibilities**

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