

North American Emission Control Area: A More Flexible Approach

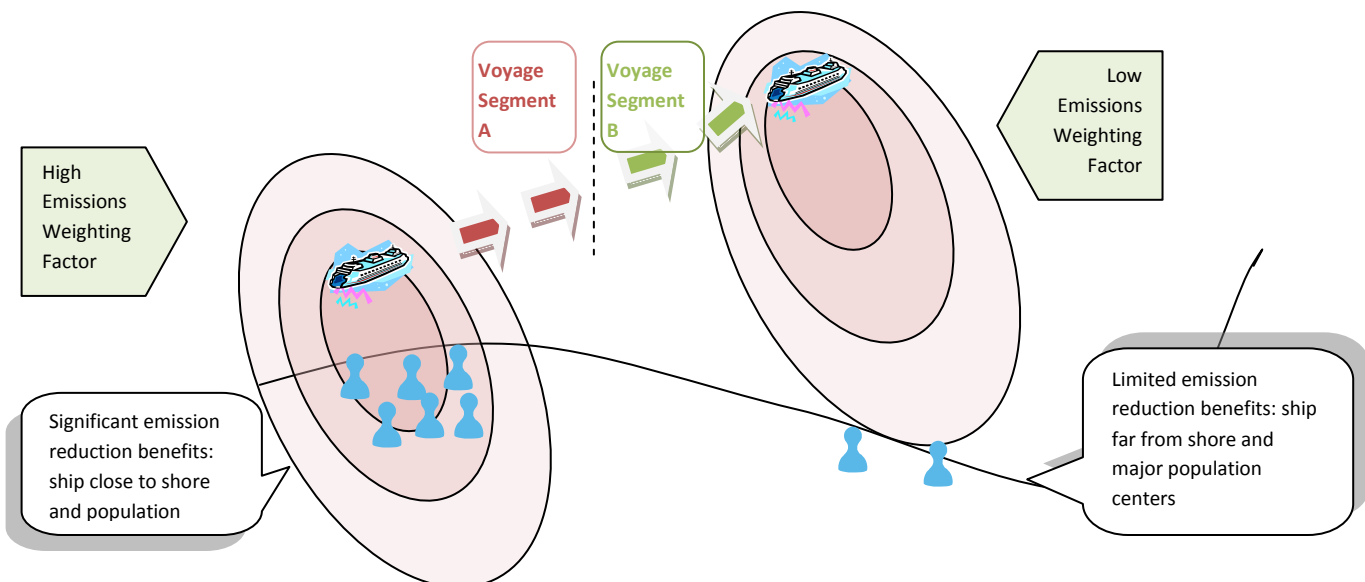
Members of the International Maritime Organization have been working to reduce the environmental impact of international shipping for many years. A newly established North American ECA extending out to as much as 200 nautical miles from the mainland U.S., Alaska (except for the Aleutian Islands) and Hawaii takes effect in August, 2012. Under MARPOL Annex VI, most ocean-going vessels operating *anywhere* within the new ECA must comply with emission limits equivalent to the use of fuel meeting stringent sulfur content limits (1% by Aug 2012; 0.1% by Jan 2015).



Use of Averaging as an Equivalent Method

Annex VI includes provisions for equivalencies if they are “at least as effective” as use of fuel complying with ECA standards. We believe that environmental protection consistent with the goals of the ECA can be achieved via a more flexible regulatory approach that allows for the averaging of fuel sulfur “credits.” For example:

- **Single Vessel Averaging:** Cruise ships typically have multiple diesel electric engines which can be used in any combination to satisfy required propulsion and auxiliary loads and different engines can be run on different fuels with sulfur contents less than (for example, via use of gas turbine engines) or greater than the ECA requirement. Some engines may be fitted with aftertreatment devices (e.g., scrubbers) while others may not depending on space and scrubber capacity constraints. Vessel operations can thus be configured to achieve average emissions equivalent to the use of ECA compliant fuel in all engines.
- **Multiple Vessel Averaging:** The concept of single vessel averaging can be extended to averaging over multiple vessels operating on similar itineraries, thereby further increasing the range of available options for achieving compliance.
- **Distance-Weighted Averaging:** Replacement of higher sulfur residual fuel oil with the distillate fuel needed to meet ECA limits will reduce population exposures to particulate matter from ships operating near shore. Substitution of residual fuel oil with distillate fuel when operating further out but still within the 200 nautical mile ECA zone will result in limited additional public health protection. A more flexible approach to compliance allows weighted averaging of fuel sulfur content with the weighting factors based on distance of the ship from the greatest potential for public health exposure impacts.



Demonstrating Equivalence

Equivalence with the ECA requirements can be demonstrated by tracking fuel consumption rates and other operating parameters and calculating resulting emissions for a particular itinerary. Equivalence is demonstrated when weighted average emissions for vessels operating on a given set of itineraries are less than or equal to what they would have been had the vessels simply used ECA compliant fuel. Emissions weighting factors can be assigned to different segments of the itinerary when calculating averages to account for the degree of potential public health exposure from emissions occurring along those segments. For example, in the above figure, emissions occurring within Segment A would have a high weighting factor as compared to those occurring in Segment B. Dispersion modeling, based on EPA methodology, is used to assign appropriate weighting factors to each segment of the voyage. Voyage data and weighting factors are input into an emissions calculator which computes weighted average emissions for comparison to emissions produced by simply using ECA compliant fuel.

