Vessel Pollution and Dangerous Chemicals Regulations
(Phase 2)

Fall 2011

Canada

Purpose

- To provide an update on proposed regulations to address air emissions from the marine sector.
- Regulations will be published in two phases:
  - Phase 1:
    - brings existing regulations made under the previous *Canada Shipping Act* in line with the CSA 2001;
    - implements Canada's obligations under the MARPOL Convention;
    - anticipated pre-publication in Part 1 of *Canada Gazette* in Fall 2011.
  - Phase 2:
    - adds new provisions to address air emissions from marine shipping (including implementation of the North American Emission Control Area (ECA)) at-sea bulk oil transfers, and grey water from large passenger vessels;
    - anticipated for pre-publication in Part I of the *Canada Gazette* in Spring 2012.

Context

- As part of its Clean Air Agenda, Canada is regulating air pollutant and greenhouse gas emissions from transportation-- including the marine sector.
- For marine shipping, Canadian regulations are based on global standards set by the International Maritime Organization (IMO), including:
  - 2010: first of new standards for air pollutants from ships in force;
  - 2012: the North American Emission Control Area (ECA) enters into force;
  - 2013: new standards to reduce greenhouse gases enter into force.
- Dialogue with the U.S. is harmonizing each country's regulations to jointly reduce air pollution from marine sources while facilitating trade through shared waterways.
- Meanwhile, shipowners are eager to modernize Canada's fleet and government is working to expand Canada's trade.

Summary of Changes

The Phase 2 Regulations will address:

- Marine air emissions, to include:
  - MARPOL global standards for sulphur oxides (SOx) and nitrogen oxides (NOx);
  - NA-ECA emission standards for SOx and NOx, to be in place by August 1, 2012;
  - New standards for vessels operating in the Great Lakes and St. Lawrence, taking into account differences between the Canadian and U.S. fleets;
  - New standards for the Energy Efficiency Design Index & Ship Energy Efficiency Management Plan;
  - Technical standards for reducing greenhouse gases (adopted in July 2011);
  - Providing a framework for equivalent options under Regulation 4 of MARPOL Annex VI;
  - New standards for smaller marine diesel engines.
- Grey water discharge, to include:
  - New requirement to pass grey water through a marine sanitation device (vessels 500 passengers and above).

Regulation of Marine Air Emissions

- Expected Outcomes
- MARPOL Annex VI – Global Standards
- North American ECA Emissions Standards
- Great Lakes/St. Lawrence Emissions Standards
- Canadian Air Pollution Prevention Certificate
- Standards for Smaller Marine Diesel Engines

Expected Outcomes

- The ECA provides most of the public health and environmental benefits. It is expected to reduce ship emissions of
  - sulphur oxides by 95 percent
  - nitrogen oxides by 80 percent
  - particulate matter by 85 percent
- Environment Canada and Health Canada estimate the ECA will yield $900 million annually in health benefits.
- Canadian costs to the marine industry are estimated at $500 million in additional fuel costs.
- The Great Lakes standards will allow for fleet modernization while ultimately meeting the most stringent emission standards by 2020.
  - Will generate equal or better emission benefits than under a U.S. domestic regime, exempting steamships
  - Will minimize economic impacts on consumers
- While the marine sector accounts for less than 3% of Canadian GHG emissions, the IMO Energy Efficiency standards are important as first such standards to be globally binding on all countries.

MARPOL Annex VI – Global Standards

- Sulphur Oxides
  - The MARPOL standard for sulphur content in marine fuels for all ships is set at:
    - 4.5% sulphur until January 1, 2012
    - 3.5% sulphur after January 1, 2012
    - 0.5% sulphur after January 1, 2020 OR
    - 0.5% sulphur after January 1, 2025

Depends on IMO Fuel Study by January 1, 2018

Notes :

- Regulation 4: Equivalencies that promote alternative fuels, emission control technology, and procedures that allow ships to meet the standards.
- Fuel requirements apply equally to alternative "low-to-zero" sulphur fuels (e.g. biofuels, Liquid Natural Gas).

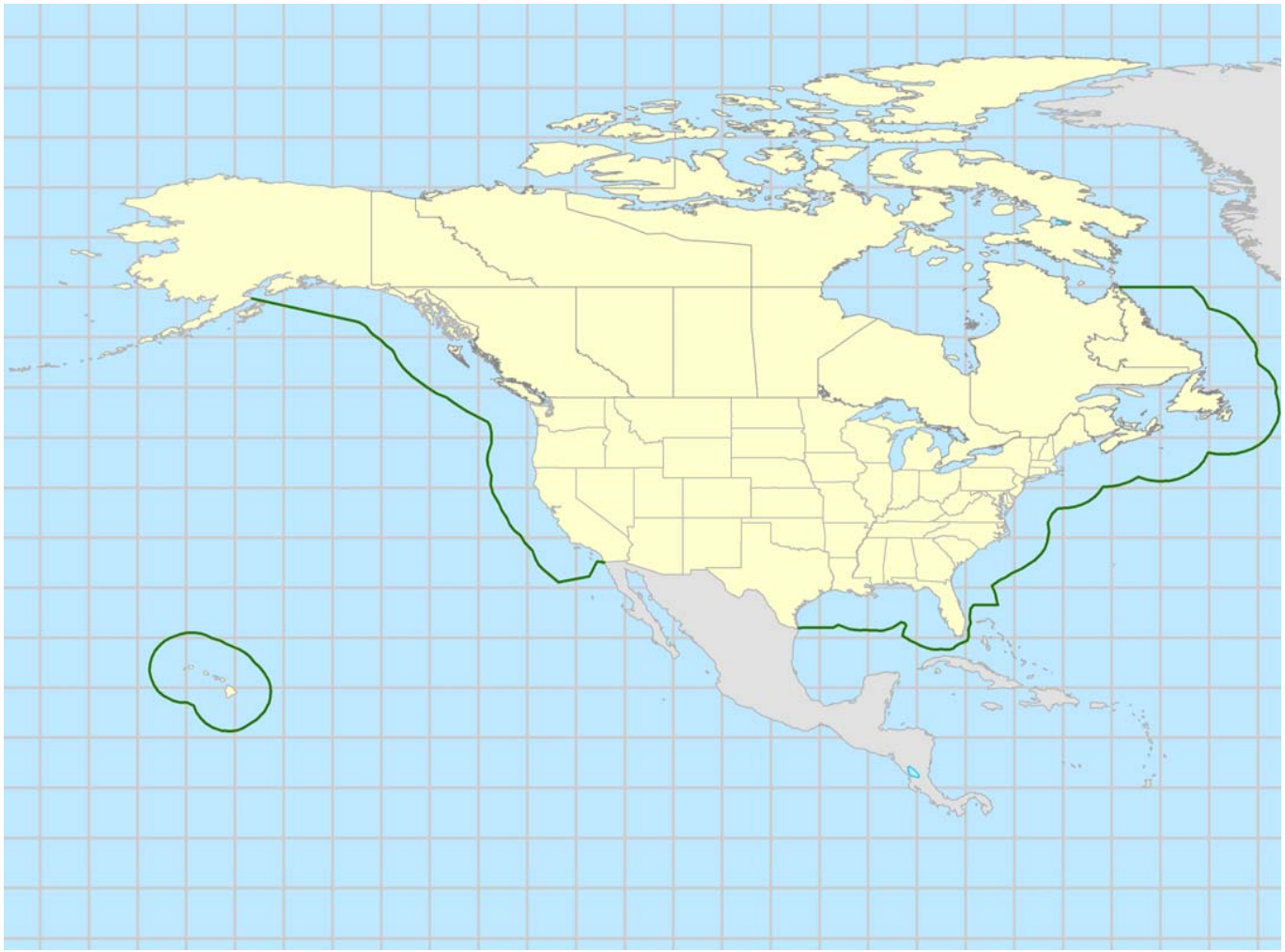
MARPOL Annex VI – Standards

- Nitrogen Oxides (NOx):

(Global)	Tier I - Engine built after January 1, 2000: • 17.0 g/kWh when n is less than 130 rpm; • 45 · n(-0.2) g/kWh when n is 130 or more but less than 2,000 rpm; • 9.8 g/kWh when n is 2,000 rpm or more
(Global)	Tier II – Engine built after January 1, 2011: • 14.4 g/kWh when n is less than 130 rpm; • 44 · n(-0.23) g/kWh when n is 130 or more but less than 2,000 rpm; • 7.7 g/kWh when n is 2,000 rpm or more.
(ECA)	Tier III – Engine built after January 1, 2016: • 3.4 g/kWh when n is less than 130 rpm; • 9 · n(-0.2) g/kWh when n is 130 or more but less than 2,000 rpm; • 2.0 g/kWh when n is 2,000 rpm or more.

n = rated engine speed crankshaft revolutions per minute)

North American ECA Standards



The NA-ECA as shown Includes waters under the jurisdictions of Canada, the United States, and France.

The NA-ECA enters into force on August 1, 2012.

In the ECA, emissions standards will be stricter than global standards.

Outside of the ECA, global standards will apply.

North American ECA Standards

- Key dates and standards to be set in Canadian regulations:
  - August 1, 2012 → sulphur content in marine fuel limited to 1%;
  - January 1, 2015 → sulphur content in marine fuel limited to 0.1%;
  - January 1, 2016 → new ships to meet strictest nitrogen oxide standard (Tier III).
- Canadian regulations will allow alternatives to using low-sulphur fuel:
  - Alternative fuels (e.g. liquid natural gas, biofuels);
  - Emission control systems (6 systems under development);
  - Alternative compliance methods allowed under IMO (guidelines required).
- For Canadian vessels, the *Canada Shipping Act, 2001* allows for assessment and approval of alternative compliance methods.
- For foreign ships, their flag states approve alternatives under IMO rules:
  - IMO has guidelines for fuel standards and emission control systems, but not for alternative compliance methods;
  - Canada to work with other countries to develop these guidelines;
  - Canadian regulations need only refer to IMO guidelines to incorporate flexibility.

Great Lakes Emissions Standards

- The U.S. Environmental Protection Agency applied ECA standards to vessels in the Great Lakes region, but exempted steamships:
  - Impacts Canadian vessels transiting U.S. waters;
  - Exemption addresses U.S. concerns, but not Canadian;
  - 55 ships, 13 steamships, remainder can comply with ECA standards.
- Canada's aging fleet is posed to modernize:
  - 95 ships, most depend on heavy fuel, 6 steamships.
- The government supports industry's work to modernize its fleet:
  - Government removed the 25% duty on imports of ships in October 2010 to allow construction of new vessels overseas;
  - New vessels will bring environmental and safety benefits;
  - Requiring an immediate switch to expensive low sulphur fuel would be more costly.

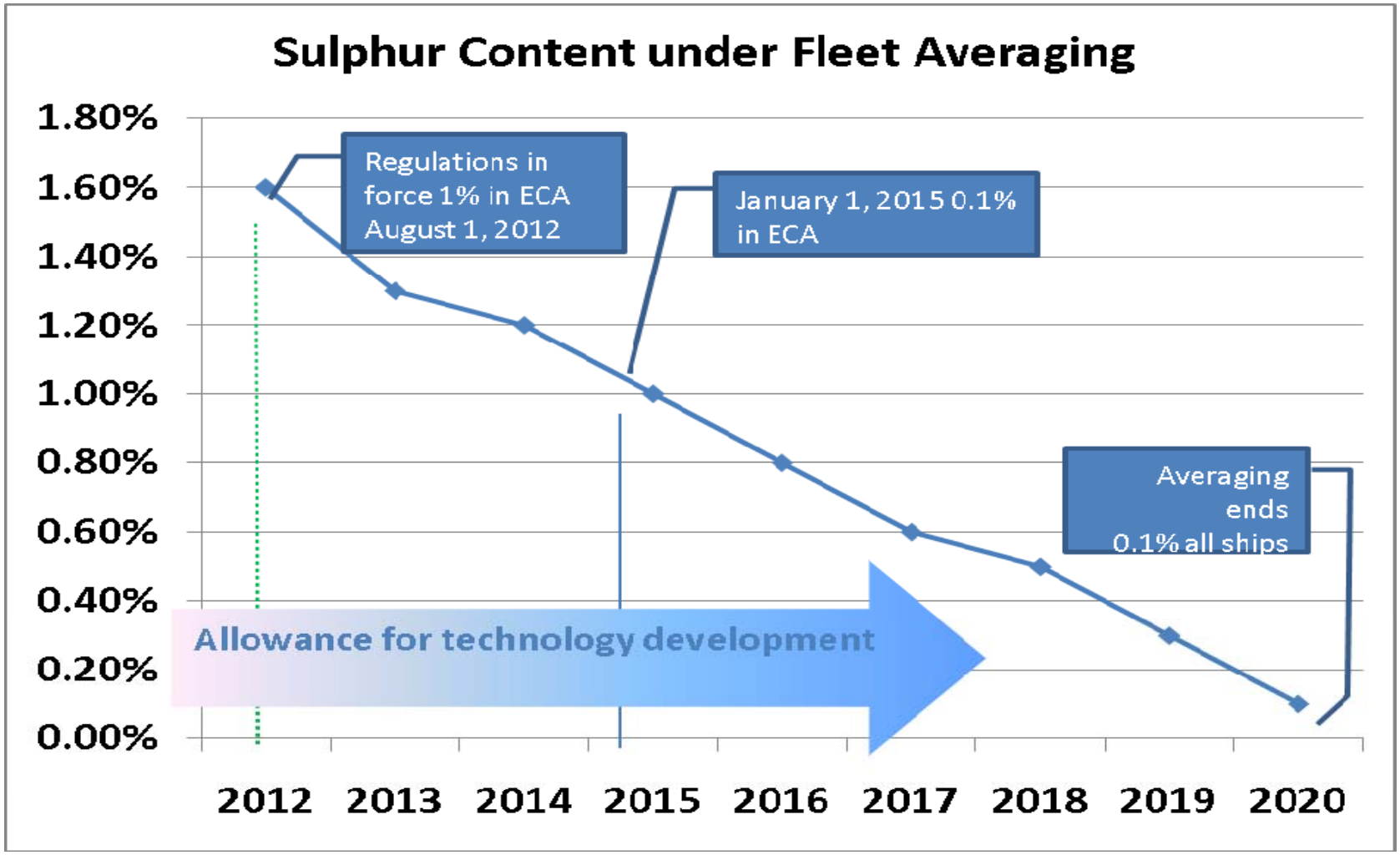
Great Lakes Emissions Standards

Studies of three options (Fleet Averaging, ECA Standard, and Phase-in) have determined that Fleet Averaging:

- Delivers the best long term performance;
- Allows for the greatest flexibility to meet performance;
- Encourages renewal of the fleet and adoption of emission control technology; and
- Provides the greatest environmental benefits.

Regulatory Option	2010-2020		2010-2030	
	Environmental Benefits	% Improvement	Environmental Benefits	% Improvement
ECA Standards	$ 832 M	24%	$ 1,213 M	23%
Fleet Averaging	$ 809 M	24%	$ 1,618 M	31%
Phase-In	$ 810 M	24%	$ 1,523 M	29%

Great Lakes Emissions Standards



Canadian Air Pollution Prevention Certificate

- To be issued to Canadian vessels to document compliance with fleet averaging measures.
- Issued by TC on acceptance of report outlining compliance plan for fleet.
- Canadian equivalent of the *International Air Pollution Prevention Certificate* (foreign vessels).

Standards for Smaller Marine Diesel Engines

- US has standards for makers of "smaller" marine diesel engines:
  - less than 30L per cylinder over 800kW
  - called "Category 2" engines
- A TC survey carried out in spring 2011 found there are no such manufacturers in Canada.
- Small firms re-building marine engines are predominantly rebuilding "Category 1" engines.
- TC intends to implement Category 2 rules to ensure future consistency between Canada and the US.

Overview of the New Air Emissions Standards

2011
- Global sulphur standard 4.5%
- Emission Control Areas at 1%
- New engines need to meet Tier II standards for NOx

2012
- January, global sulphur standard reduced to 3.5%
- August, North American ECA comes into force (1%)
- NOx technology study begins

2013
- EEDI required for new ships
- No EEDI reduction target
- SEEMP required for all ships
- NOx technology study due

2015
- All ECAs set to 0.1% sulphur
- EEDI target set to 10%

2016
- All new ships operating in an North American ECA must meet Tier III NOx (*If confirmed by study*)

2018
- Study of supply of low sulphur fuels to be completed

2020
- Based on fuel study, global standard for sulphur reduced to 0.5%
- EEDI target set to 20%

2025
- Based on fuel study, global standard for sulphur reduced to 0.5%
- EEDI target set to 30%

Regulation of Greenhouse Gas Emissions

- Energy Efficiency Design Index
- Shipboard Energy Efficiency Management Plan

Energy Efficiency Design Index

- Applies to new ships over 400 GT built after the MARPOL amendments come into force (2013).
- Detailed formula calculates estimate of efficiency expressed in CO_2 per tonne cargo carried by nautical mile.
- Attained efficiency for a vessel must meet an efficiency target, based on a reduction of CO_2 emissions against a baseline for its class.
- A *Canadian Air Pollution Prevention Certificate* will document compliance with standard.

EEDI Targets: Part 1

Ship Type	Size	Phase 0 1 Jan 2013- 31 Dec 2014	Phase 1 1 Jan 2015 – 31 Dec 2019	Phase 2 1 Jan 2020 – 31 Dec 2024	Phase 3 1 Jan 2025- onwards
Bulk Carrier	20,000 DWT and above	0	10	20	30
	10,000 – 20,000 DWT	n/a	0-10*	0-20*	0-30*
Gas Tanker	10,000 DWT and above	0	10	20	30
	2,000 – 10,000 DWT	n/a	0-10*	0-20*	0-30*
Tanker	20,000 DWT and above	0	10	20	30
	4,000 – 20,000 DWT	n/a	0-10*	0-20*	0-30*
Container Ship	15,000 DWT and above	0	10	20	30
	10,000 – 15,000 DWT	n/a	0-10*	0-20*	0-30*

* Reduction factor to be linearly interpolated between the two values dependent upon vessel size. The lower value of the reduction factor is to be applied to the smaller ship size.

EEDI Targets: Part 2

Ship Type	Size	Phase 0 1 Jan 2013- 31 Dec 2014	Phase 1 1 Jan 2015 – 31 Dec 2019	Phase 2 1 Jan 2020 – 31 Dec 2024	Phase 3 1 Jan 2025- onwards
General Cargo Ships	15,000 DWT and above	0	10	15	30
	3,000 – 15,000 DWT	n/a	0-10*	0-15*	0-30*
Refrigerated Cargo Carrier	5,000 DWT and above	0	10	15	30
	3,000 – 5,000 DWT	n/a	0-10*	0-15*	0-30*
Combination Carrier	20,000 DWT and above	0	10	20	30
	4,000 – 20,000 DWT	n/a	0-10*	0-20*	0-30*

* Reduction factor to be linearly interpolated between the two values dependent upon vessel size. The lower value of the reduction factor is to be applied to the smaller ship size.

Shipboard Energy Efficiency Management Plan

- Applies to all ships subject to Annex VI.
- All ships required to have a ship-specific management plan to increase energy efficiency.
- Can form part of Safety Management System.
- Part of survey for International Energy Efficiency Certificate.
- Supporting guidelines to be developed.

Clean Water Provisions

- Ship-to-ship Transfers of Oil in Bulk
- Grey Water Provisions

Ship-to-Ship Transfers of Oil in Bulk

- New requirement for ships which engage in ship-to-ship oil transfers at sea to carry a plan for to meet IMO standards.
- Came into effect January 1, 2011.
- Applies to oil tankers greater than 150 GT.
- Master must provide 48 hours notice to MCTS (or to the appropriate international authority) before the transfer operation.
- Other safety requirements are already set out in regulations.

Grey Water Provisions

- Applies to vessels carrying more than 500 passengers.
- Must ensure that any release of grey water:
  - Is passed through a marine sanitation device;
  - Is made at a distance of at least 3 NM from shore.
- Exemption may be considered for ferries and passenger vessels on short routes.

Next Steps

Next Steps

- Consultations on the regulatory approach with targeted implementation of August 1, 2012.
- Negotiation of reciprocity with U.S. EPA and U.S. Coast Guard for Canadian ships operating in shared waters of the Great Lakes and St. Lawrence Seaway System.
- Work with U.S. and other interested parties at IMO on equivalency guidelines.

Questions

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