NORTH AMERICAN EMISSION CONTROL AREA

CANADA’S COMPLIANCE AND ENFORCEMENT PROGRAM
BACKGROUND

- North American ECA proposed by Canada, the United States, and France was adopted by IMO on March 26, 2010, coming into force August 1, 2012
- May 8, 2013, Minister Lebel announces the ECA coming into force in Canada along with related regulatory changes.
NORTH AMERICAN EMISSION CONTROL AREA (ECA)
NORTH AMERICAN ECA: BENEFITS

Expected benefits

• The ECA is expected to reduce ship emissions of sulphur oxides by 95% and nitrogen oxides by 80%

• Annual benefits estimated to be over $1 billion in public health savings

Reduced health impacts attributable to ship emissions

<table>
<thead>
<tr>
<th>Health Impact</th>
<th>Percent reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premature Mortality</td>
<td>45%</td>
</tr>
<tr>
<td>Adult Chronic Bronchitis Cases</td>
<td>54%</td>
</tr>
<tr>
<td>Hospital Admissions and Emergencies</td>
<td>31%</td>
</tr>
<tr>
<td>Child Acute Bronchitis Episodes</td>
<td>52%</td>
</tr>
<tr>
<td>Asthma Symptom Days</td>
<td>25%</td>
</tr>
<tr>
<td>Minor Restricted Activity Days</td>
<td>19%</td>
</tr>
<tr>
<td>Acute Respiratory Symptom Days</td>
<td>37%</td>
</tr>
<tr>
<td>Restricted Activity Days</td>
<td>52%</td>
</tr>
</tbody>
</table>
TIMELINE FOR AIR EMISSIONS STANDARDS

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

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

2013
- May 8, 2013, Updated Canadian Regulations come into effect

2015
- All ECAs set to 0.1% sulphur

2016
- All new ships operating in an North American ECA must meet NOx Tier III standard
- Study completed on low Sulphur fuel availability for 2020.

2020
- Global standard for sulphur reduced to 0.5%, including Canadian waters north of 60 degrees
SULPHUR CONTENT IN FUEL

• Canadian Waters north of 60 degrees:
  • 3.5% sulphur content until December 31, 2019
  • 0.5% sulphur content after January 1, 2020

• Canadian waters south of 60 degrees:
  • 1.0% sulphur content until December 31, 2014
  • 0.1% sulphur content after January 1, 2015
FLEET AVERAGING PROGRAM

- Fleet targets for fuel sulphur content for domestic “laker” vessels compared to ECA

![Graph showing fleet targets for fuel sulphur content from 2012 to 2020.](image)
PRE-ARRIVAL INFORMATION REPORT SYSTEM (PAIRS)

• Required 96 Hours Prior To Arrival
• Vessels are required to report:
  • Classification society
  • Required certificates
  • P&I club
  • Master information
  • Cargo carried
  • Type and quantity of bunkers carried, including sulphur content
  • List of charts ID numbers and country catalogue to be used for transit approach to Canada
  • Any conditions of class against ship with brief details.
NON-AVAILABILITY OF LOW SULPHUR FUEL

• While voyaging in Canadian waters designated as an Emission Control Area, vessels must make an effort to obtain compliant fuel.

• If compliant fuel is not available, vessels must complete a Compliant Fuel Oil Non-Availability Report and submit it prior to arriving at the next Canadian port without deviating from the vessel’s planned route.
ALTERNATIVE COMPLIANCE

• Alternative compliance to meet SOx and NOx emissions is available through the use of:
  – Scrubbers
  – SCR’s
  – Alternative fuels
  – and other technology
TIER III NOx STANDARD

• Applies to marine diesel engines more than 130kW installed on:
  – A vessel constructed on or after Jan 1, 2016
  – A vessel constructed before January 1, 2016, whereby an engine is replaced by a non-identical engine after on or after January 1, 2016

• Does not apply to Canadian vessels operating:
  – in Arctic waters
  – in waters not under Canadian jurisdiction and not within an ECA

• Does not apply to foreign vessels operating in Arctic waters or in Hudson Bay, James Bay or Ungava Bay
ENFORCEMENT ACTIVITIES

- PAIRS report review, follow up
- FONAR review, follow up approve/reject
- Paris MOU – concentration inspection campaign for 2018
- Fuel testing during inspections followed by certified laboratory testing.

BRUKER XRF S1 TITAN FUEL ANALYZER
### FUEL NON-AVAILABILITY REPORTS (FONAR) 2013 – 2017

<table>
<thead>
<tr>
<th>Year</th>
<th>East</th>
<th>West</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013 (May – Dec)</td>
<td>36</td>
<td>20</td>
<td>56</td>
</tr>
<tr>
<td>2014 (Jan – Oct)</td>
<td>38</td>
<td>19</td>
<td>57</td>
</tr>
<tr>
<td>2015</td>
<td>50</td>
<td>22</td>
<td>72</td>
</tr>
<tr>
<td>2016</td>
<td>33</td>
<td>15</td>
<td>48</td>
</tr>
<tr>
<td>2017</td>
<td>27</td>
<td>10</td>
<td>37</td>
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LESSONS LEARNED/PATH FORWARD

• The fuel testing results have shown a 94% compliance rate
• Fuel non-availability reports are declining yearly
• There are significant challenges in applying NOx Tier III standards to smaller vessels
• Continuing to encourage alternative measures such as better technologies where applicable
• Continue to work with Industry Stakeholders and NGO’s to improve environmental performance which is achievable