Who is the Shipping Federation of Canada?

• Incorporated by an Act of Parliament in 1903

• Represents owners, operators and agents of ocean ships trading at Canadian ports, particularly in the Atlantic, St. Lawrence and Great Lakes regions

• Core membership of 75 Canadian companies that own, operate or act as agents for over 200 international shipping lines trading to Canadian ports

• Ships represented by Federation members transport over 90% of the trade moving between overseas ports and eastern Canada
Shipping Federation of Canada

Committed to a safe, competitive, environmentally-responsible and quality-oriented marine transportation system.

Our primary activities:

• **Promote and Protect the Trades**
• **Inform** members of legislative, regulatory or operational developments;
• **Support operations** (water levels, pilotage, port infrastructure, contracts with response organizations, Services to ships from Coast Guard navaids and icebreaking, waste management, waterway managers, etc.);
• **Provide training**;
• **Increase industry’s profile**
Environment: A Strategic Issue

The Federation’s approach to environmental issues is based on:

• Market access (including social licence to trade);
• Managing expectations & feasibility: technology and operational viability;
• Continuous improvement: from accident avoidance, to compliance, to quality management, to best practices, to sustainability;
• Relationships with regulators, environmental groups and coastal communities;
• Communications, public image (myth vs reality), branding.
Our Approach to Environmental Issues

Guiding principles:

- International framework
- Best practices (social licence to trade)
- Continental (trade route) perspective
- Federal context
Seaway Trade: Some Facts & Figures

• 2008 Seaway Navigation Season:
  – 4234 vessel transits through the Montreal / Lake Ontario and Welland Canal
  – 40.800 million metric tonnes of cargo

• Ocean-going vessels:
  – Traffic share: 25%
  – Origins / Destinations: Europe, South America, Middle East, Africa
• Key criteria for adopting & implementing a ballast water treatment system:
  – It must be **safe** (operational level and crew)
  – It must be **environmentally acceptable**
  – It must be **economically viable** (retrofits)
  – It must **work**
Ballast Water Convention: Implementation

- Current ratification status: 18 countries (15.27% world fleet tonnage).

- Implementation Deferral:
  - Ships constructed in 2009 with ballast water capacities of less than 5000 m³ are not required to comply with the ballast water discharge standard included in Regulation D-2 until their second annual survey, but no later than December 31, 2011.
IMO Approval Process

<table>
<thead>
<tr>
<th>Systems using active substances*</th>
<th>Approval of environmental impact of discharged ballast water (GESAMP BWWG)</th>
<th>Approval of system (Flag State)</th>
<th>Approval of environmental impact of discharged ballast water (GESAMP BWWG)</th>
<th>Issue of type approval certificate (Flag State)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial approval</td>
<td>Land based testing</td>
<td>Shipboard trials</td>
<td>Final approval</td>
<td>Type Approval Certificate</td>
</tr>
<tr>
<td>Systems not using active substances†</td>
<td>Land based testing</td>
<td>Shipboard trials</td>
<td></td>
<td>Type Approval Certificate</td>
</tr>
</tbody>
</table>

* Includes chemical disinfectants, e.g. chlorine, ClO₂, ozone
† Includes techniques not employing chemicals, e.g. deoxygenation, ultrasound

Source: Lloyd’s Register – Ballast Water Treatment Technology
Technologies: Current Status

• Basic Approval: 16 systems
  – First step in the approval process for systems using active substances

• Final Approval: 8 systems
  – Includes sea-based and land-based tests; the sea-based test alone requires six months of testing

• Type Approval: 6 systems
  – Certificate issued by the Flag Administration, usually 2 years after application for Basic Approval
## Some Numbers...

<table>
<thead>
<tr>
<th></th>
<th>Size (m²)</th>
<th>Height (m)</th>
<th>Capital Expenditures ($ ’000)</th>
<th>Operating Expenditures</th>
<th>Power (kW/1000 m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum</strong></td>
<td>200 m³/h</td>
<td>0.25</td>
<td>145 m³/h</td>
<td>175 $/1000 m³</td>
<td>4</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>25 m³/h</td>
<td>25</td>
<td>780 m³/h</td>
<td>2000 $/1000 m³</td>
<td>220</td>
</tr>
<tr>
<td><strong>Mean Value</strong></td>
<td>7</td>
<td>26</td>
<td>375 m³/h</td>
<td>875 $/1000 m³</td>
<td>47</td>
</tr>
</tbody>
</table>

Additional Technical Considerations

- Ballast water treatment technologies:
  - Power is the biggest operating cost; for some systems, power requirements may be an issue
  - Some systems (electrolysis and electrochlorination) are complicated to operate
  - Chemical systems: need to be neutralised before discharge in waters (up to 24 hours). Issues related to storage space, availability in ports of call
  - Deoxygenation: processes will take 1-4 days
Commercial Availability

- In July 2008, 56 units were installed on-board ships

- Possibility of up to 55,000 retrofits between now and 2016
  - Creates issues related to drydock availability for retrofits

- Projected production varies between 40 units/year for some manufacturer to thousands units/year
  - Few of these systems have been tested in freshwater
State Ballast Water Programs - Results

• Technology developers - Uncertainty over performance standards slows technology development:
  – Size of the potential market will influence technology development and investments
  – Some State standards cannot yet be measured, hindering technology developments

• Shipowners/operators - Delays in technology investments:
  – Disconnect between technology and regulations
  – Regulatory uncertainty inhibits investments

• Industry associations – Difficulty developing consistent and coherent compliance guidelines
## Impacts of Intermodal Shifts

<table>
<thead>
<tr>
<th>Effect</th>
<th>Ship</th>
<th>Rail</th>
<th>Truck</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel use – tonne-km per litre</td>
<td>312</td>
<td>181</td>
<td>75</td>
</tr>
<tr>
<td>Greenhouse gas emissions – grammes per tonne-km</td>
<td>10</td>
<td>17</td>
<td>33</td>
</tr>
<tr>
<td>NOx – g/tonne-km</td>
<td>0.253</td>
<td>0.3</td>
<td>0.83</td>
</tr>
<tr>
<td>VOCs – g/tonne-km</td>
<td>0.008</td>
<td>0.024</td>
<td>0.04</td>
</tr>
<tr>
<td>CO – g/tonne-km</td>
<td>0.011</td>
<td>0.092</td>
<td>0.49</td>
</tr>
<tr>
<td>PM10 – g/tonne-km</td>
<td>0.021</td>
<td>0.011</td>
<td>0.004</td>
</tr>
<tr>
<td>Land occupied – hectares</td>
<td>10,000</td>
<td>10-15,000</td>
<td>36,000</td>
</tr>
<tr>
<td>Accidents: injuries per tonne-km</td>
<td>0.23</td>
<td>3.12</td>
<td>13.22</td>
</tr>
<tr>
<td>Spills</td>
<td>L</td>
<td>Greater than ship</td>
<td></td>
</tr>
<tr>
<td>Noise – noise depreciation cost per tonne-km</td>
<td>L</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>Congestion – delay time or $ per tonne-km</td>
<td>L</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>L</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>Introduction of nonindigenous species</td>
<td>H</td>
<td>Less than ship</td>
<td></td>
</tr>
</tbody>
</table>
Environmental Advantages of Marine

Source: Great Lakes St. Lawrence Seaway System website, 2007.
Key Messages

• Regulatory fragmentation can hinder technology improvements

• Onboard ballast water treatment technologies are the optimal solution (but need UNIFORM STANDARDS THAT ARE EFFECTIVE AND ENFORCEABLE) National Academies

• Build on current efforts: the result may not be ideal, but it is a step in the right direction (adaptive management = NA)

• Collaboration with the regulated industry is essential: will result in more meaningful buy-in and faster implementation
• Fragmentation is current state of affairs

• State Permits
  – Multiplication of paperwork requirements
  – Zero enhancement to prevention

• No single standard
  – Moving target for technology developers
  – Production and installation retarded
On-board Treatment

• **On-board treatment** of ballast water
  – Optimal solution for international shipping
  – Needs attainable carriage requirement

• **Key criteria for adopting & implementing a ballast water treatment system:**
  – It must be **safe** (operational level and crew)
  – It must be **environmentally acceptable**
  – It must be **economically viable** (retrofits)
  – It must **work**
Guiding Principles

• Ballast water governance must fit guiding principles:
  – International framework
  – Best practices (social licence to trade)
  – Continental (trade route) perspective
  – Federal context
Build on Current Efforts

- Scientific research CAISN
- International Ballast Water Convention
- Seaway and Canadian Regulations:
  - Including effective bi-national enforcement
  - Proven track records, increasing compliance rates
- United States Coast Guard Discharge Standard
- Best practices
Collaboration

• Regulators work with regulated industry, resulting in:
  – Better communication and understanding of the industry
  – Effective, science-based prevention strategies
  – Realistic expectations related to development of technologies
  – Uniform application of enforcement measures, public reporting of results
Collaboration

• Ships districted by paperwork burden
• Production is prevention
• One stop shop for reporting
• Share reporting with science
• Focus on the product = prevention in action
Conclusion

• Great Lakes Shipping now subject to 5 levels of regulators:
  • Canada
  • Seaway
  • USCG
  • EPA
  • State

• Effective prevention is offered by Canadian Regulation and USCG proposed discharge standard.
National Academies Recommendations

• **Access to Great Lakes**
  – Only ships that manage the ballast
    • (including Coastal trades)

• **Uniform Standards**
  – Effective and enforceable

• **Monitoring and Compliance**
  – Enforcement and remediation

• **Early Detection**
  – Monitoring Great Lakes for new arrivals
National Academies Recommendations

• Emergency Response
  – Containment or eradication

• Adaptive Management
  – Use scientific findings (feedback) to amend

• Mandate bi-national oversight
  – Use existing bi-national agencies