Ballast Water Exchange plus Ballast Water Treatment

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Topics of Discussion

- Implementing CA Performance Standards
- BWE + BWT
- Existing BWE + BWT Requirements
- BWE + BWT in California
- Next Steps
# California Interim Ballast Water Discharge Performance Standards

<table>
<thead>
<tr>
<th>Organism Size Class</th>
<th>California</th>
<th>USCG/EPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisms greater than 50 µm in minimum dimension</td>
<td>No detectable living organisms</td>
<td>&lt; 10 living organisms per cubic meter</td>
</tr>
<tr>
<td>Organisms 10 – 50 µm in minimum dimension</td>
<td>&lt; 0.01 living organisms per ml</td>
<td>&lt; 10 living organisms per ml</td>
</tr>
<tr>
<td>Living organisms less than 10 µm in minimum dimension</td>
<td>&lt; $10^3$ bacteria/100 ml</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; $10^4$ viruses/100 ml</td>
<td></td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>&lt; 126 cfu/100 ml</td>
<td>&lt; 250 cfu/100 ml</td>
</tr>
<tr>
<td>Intestinal enterococci</td>
<td>&lt; 33 cfu/100 ml</td>
<td>&lt; 100 cfu/100 ml</td>
</tr>
<tr>
<td><strong>Toxicogenic Vibrio cholerae (O1 &amp; O139)</strong></td>
<td>&lt; 1 cfu/100 ml or &lt; 1 cfu/gram wet weight zoological samples</td>
<td>&lt; 1 cfu/100 ml or &lt; 1 cfu/gram wet weight zooplankton samples</td>
</tr>
</tbody>
</table>
BW Technology Assessment Report

• 18 months prior to implementation of California performance standards
• Review technology
  o Efficacy
  o Availability
  o Environmental impacts of ballast water treatment technologies
California Interim Ballast Water Discharge Performance Standards
History of Implementation

2007 Assessment of technologies to meet California standards
• No technologies available

2008 Senate Bill 1781
• Delay implementation by one year

2009 Assessment of technologies to meet California standards
• Systems show “potential” to meet standards
California Ballast Water Discharge Performance Standards

History of Implementation

2010 California performance standards implemented
  • Briefly

2010 Assessment of technologies to meet California standards
  • Systems show “potential” to meet standards

2013 Assessment of technologies to meet California standards
  • No technologies available
California’s Ballast Water Discharge Performance Standards
History of Implementation

2013 Senate Bill 814
• Delay implementation by two years

2014 Assessment of technologies to meet California standards
• No technologies available

2015 Senate Bill 1312
• Delayed to current implementation schedule
California Ballast Water Discharge Performance Standards Implementation Schedule

Interim standards
• Newly built vessels - construction on or after January 1, 2020
• Existing vessels – first regularly scheduled dry dock on or after January 1, 2020

Final standards – No living organisms in all size classes
• January 1, 2030

Date to apply to install experimental BW treatment technologies
• January 1, 2020
2018 BW Technology Report

- No ballast water treatment technologies available to meet interim California Performance Standards

- Shipboard ballast water management systems
  - Systems did not meet the interim standards

- Shore-based reception and treatment facilities
  - None available in U.S.
  - Shore-based feasibility study

- Ballast water exchange plus treatment
  - Not enough data
BWE + BWT

What is Ballast Water Exchange + Ballast Water Treatment?

How effective is BWE + BWT?
  - Briski and Paolucci studies
  - EPA study

Practicability and Safety Concerns
BWE + BWT

Current Requirements

- Oregon
- Great Lakes
- VIDA
BWE + BWT in California

BWE + BWT as a Percent of Total Compliant BW Discharged

- **Compliant BW Discharged**
  - **BWE + BWT**
  - **Other Discharges**

<table>
<thead>
<tr>
<th>Year</th>
<th>2016*</th>
<th>2017</th>
<th>2018***</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>20%</td>
<td>80%</td>
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<tr>
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<tr>
<td>100%</td>
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<td>0%</td>
<td>0%</td>
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</tbody>
</table>

*July 2016 - Dec 2016  *** Jan - Feb 2018
BWE + BWT in California

Number of Vessel Arrivals that Reported Using BWE plus BWT

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Arrivals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016*</td>
<td>1</td>
</tr>
<tr>
<td>2017</td>
<td>25</td>
</tr>
<tr>
<td>2018</td>
<td>70</td>
</tr>
<tr>
<td>2019**</td>
<td>5</td>
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*July 2016 - Dec 2016
** Jan - Feb 2019
Number of Vessels that Used BWE + BWT in CA by Vessel Type and Treatment Type July 2016 thru Feb 2019
BWE + BWT in California

Why are vessels using BWE + BWT?

- Confusion about requirements
- Contingency measures
BWE + BWT

California

- Recommendations from the 2018 BW Technology Report
- Research
Thank you!

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