Implementing California's Performance Standards for the Discharge of Ballast Water

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2006 Coastal Ecosystems Protection Act

- Implement performance standards for the discharge of ballast water
- Assess the efficacy, availability and environmental impacts, including water quality, of currently available ballast water treatment technologies

Performance Standards

Organism Size Class	California	IMO Regulation D-2
Organisms greater than 50 µm in minimum dimension	No detectable living organisms	< 10 viable organisms per cubic meter
Organisms 10 – 50 µm in minimum dimension	< 0.01 living organisms per ml	< 10 viable organisms per ml
Living organisms less than 10 µm in minimum dimension	< 10^3 bacteria/100 ml < 10^4 viruses/100 ml	
Escherichia coli	< 126 cfu/100 ml	< 250 cfu/100 ml
Intestinal enterococci	< 33 cfu/100 ml	< 100 cfu/100 ml
Toxicogenic *Vibrio cholerae* (O1 & O139)	< 1cfu/100 ml or < 1cfu/gram wet weight zoological samples	< 1 cfu/100 ml or < 1 cfu/gram wet weight zooplankton samples

California Implementation Schedule

Ballast Water Capacity of Vessel	Standards apply to new vessels in this size class constructed on or after	Standards apply to all other vessels in this size class beginning in
< 1500 metric tons	2010	2016
1500 – 5000 metric tons	2010	2014
> 5000 metric tons	2012	2016

Technology Assessment

Assessment vs. Approval

- Reports assess the availability of treatment systems to meet CA standards. Reports are not an approval or endorsement of any technology.
- Commission staff do not have the practical ability to test and approve ballast water treatment systems.
- Staff will focus on dockside inspection of vessels to verify compliance with performance standards.

Technology Assessment Reports

- Key components:
  - Efficacy
  - Availability
  - Environmental impacts, including water quality
- If technologies to meet the standards are unavailable – why?
- Reports completed Dec. 2007, Jan. 2009, August 2010
  - Similar reports due 18 months prior to each implementation date.
  - Inter-report update (not legislatively mandated)
    - October 2009
  - Copies of all reports available on SLC website

2007 Report Summary

- 28 treatment technologies reviewed
- No single technology able to meet more than four (out of 7) of CA's performance standards
  - Legislature delayed initial implementation of standards from 2009 to 2010
- Lack of standardized testing procedures makes evaluation of systems difficult
  - Commission staff developed "Ballast Water Treatment Technology Testing Guidelines"
  - Guidelines combine draft EPA ETV protocols with methods specific to CA standards and water quality concerns

2009 Report

- 30 treatment systems reviewed
- No methods to assess number and viability of all bacteria and viruses. Based on best available techniques, 2 systems demonstrated potential to comply with CA standards.
  - Potential = 1 replicate in compliance with each of CA standards
- Not all systems meet the EPA and California water quality standards for Total Residual Chlorine (TRC).
- Technologies advancing, but methods for performance evaluation not keeping pace
- Commission moving ahead with implementation of standards beginning January 1, 2010 for new build vessels with BW capacity <5000 MT.

2010 Report Findings

- 46 treatment technologies reviewed
- *Efficacy* – 8 systems demonstrated potential to meet California's standards.
  - Potential = one test (averaged) at land or ship scale in compliance with CA standards
  - 3 systems passed more than 50% of the time over multiple tests.
  - 2 vendors willing to self-certify CA compliance
- *Availability* – All 8 systems are commercially available. 7 of 8 can treat ballast water at flow rates above 2500 m^3/h.
- *Environmental Impacts* - 28 of 46 systems use biocide/active substance and will require toxicological testing and analysis. All 8 either meet EPA standard for TRC (<100 µg/l) or not do produce chlorine residuals.

2010 Report Conclusions

- Report is snapshot of available data, predicting system availability 3-4 years in future
  - Vessels that initiate construction in 2012 won't be operational until 2014 or later
- More, better quality data, but uncertainty remains
  - Limited testing on vessels, range of env. conditions
- Staff will prepare report update by September 1, 2011
  - Convene scientific advisory panel to review data
  - Verify technology development progressing on schedule
- Recommendations - Proceed with implementation of standards on January 1, 2012 for new build vessels with BW capacity >5000 MT

Vessel Compliance Verification

Compliance Verification Protocols

- Methods for use by Commission Marine Safety personnel to verify vessel compliance with performance standards
  - Commission staff inspect 25% of arriving voyages
- Combination of administrative inspection (BW reporting form, treatment technology reporting forms) and BW sampling
- Being developed in consultation with scientific and industry experts

Treatment Technology Reporting Forms

- CA Assembly Bill 248 (2009) provides authority to develop technology reporting forms
  - Rulemaking should be complete by November 2010
- Goal - gather information about the installation, use and maintenance of ballast water treatment systems
- Two Forms
  - Treatment Technology Annual Reporting Form
    - Type of system, installation info, active substances, upgrade and/or maintenance records, performance verification
  - Ballast Water Treatment Supplemental Reporting Form
    - Malfunctions, ballast water treatment history

BW Sampling

- Discharge standard – cannot sample “in tank”
- Sampling Ports
  - Amendments to Article 4.7 regulations approved late 2009
  - Require installation of in-line sampling facilities (i.e. ports) on vessels discharging in CA waters
  - Similar to req’s for IMO Guideline (G2) and draft ETV protocols
  - Implemented on same schedule as performance standards
- Developing rapid methods to analyze samples and assess compliance with standards

Next Steps

- Convene scientific advisory panel to review available system performance data
  - Treatment assessment update by September 1, 2011
- Continue developing ballast water compliance verification procedures
  - Essential to beta test methods on vessels (volunteers?)
  - New vessels that must meet standards may start arriving as soon as 2011
- Funded research
  - Golden Bear Facility (Cal Maritime)
    - Stand by for talk by Kevin Reynolds
  - Bulk viability assays (Moss Landing Marine Lab)

Closing Thoughts

- Goal - reduce/prevent the introduction of nonindigenous species in CA waters
- Adaptive management
  - Moving forward using <u>best available</u> information
  - Think out of the box
    - Use of engineering metrics, alternative approaches to assess compliance
  - CA standards are technology forcing, so systems will be modified as standards implemented and problems identified
- Open communication amongst international community, federal and state agencies as well as vessels and treatment vendors

Questions?

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