



CALIFORNIA BALLAST WATER SAMPLING FOR COMPLIANCE ASSESSMENT and lessons learned

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Pacific Ballast Water Group | APRIL 2024

California State
Lands Commission



BALLAST WATER DISCHARGE PERFORMANCE STANDARDS (BWDPS)

- CA adopted and implemented federal BWDPS in 2022
- Numeric standards
- Authority to assess compliance against those standards
- Direct counts -Detailed Analysis

Size class	CA and Federal Standards
Organisms greater than or equal to 50 micrometers in minimum dimension	Fewer than 10 organisms per cubic meter
Organisms less than 50 micrometers and greater than or equal to 10 micrometers	Fewer than 10 organisms per milliliter (mL)
<i>Escherichia coli</i>	Must not exceed a concentration fewer than 250 colony forming units (cfu) per 100 mL
intestinal enterococci	Must not exceed concentration fewer than 100 cfu per 100 mL
toxicogenic <i>Vibrio cholerae</i> (serotypes O1 and O139)	Must not exceed a concentration of more than 1 cfu per 100 mL

Detailed Analysis for Compliance Assessment

1. PRE-ARRIVAL ASSESSMENT

- Opportunistic selection
- Incorporating risk

Start planning sampling event:

Send pre-sampling questions via email

2. SAMPLING:

Samples are collected by CSLC and sent to an independent lab, results within a few hours

- Follow pre-established scientifically defensible SOPs
- Chain of Custody
- Training logs

Fail

3. ENFORCEMENT ACTIONS:

- Schedule subsequent sampling event if possible.
- Inform the vessel
- Issue violation
- Start enforcement process

Pass

Compliant (low priority for inspections over x months)



Standard Operating Procedures Development

1. Phase: Testing and development

- Learning from Commissioning testing
- Sampling device

- Started testing
- Contract with an independent lab
- Develop scientifically defensible protocols

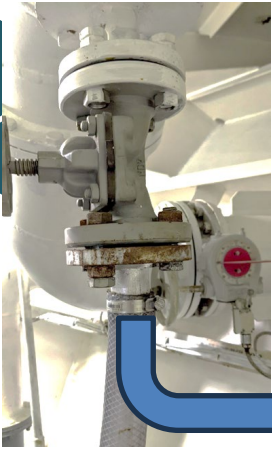
- Draft protocols
- Peer reviewed

2. Phase: Implementation and enforcement processes

Enforcement process layout

Amendments to regulations to include monetary penalties

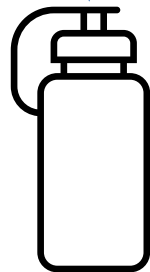
Start assessing compliance and enforcing standards



Sampling port

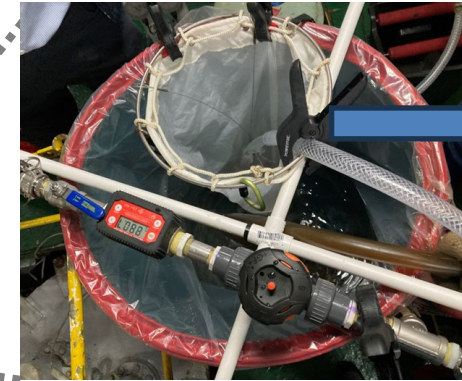


Sampling tool with flow meter

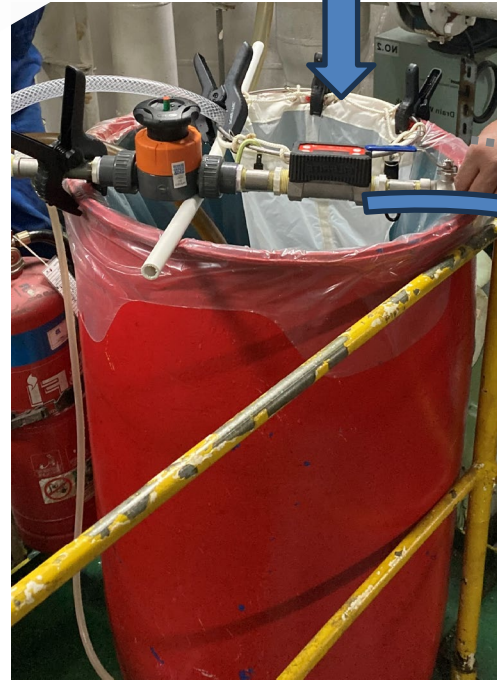


Unfiltered BW sample (1L) dripping into sample bottle

~1000L of BW concentrated in a 500mL sample



Plankton net with sample collector (cod-end)



Waste sampled water overflow into bilge or pumped out (~1000 L)









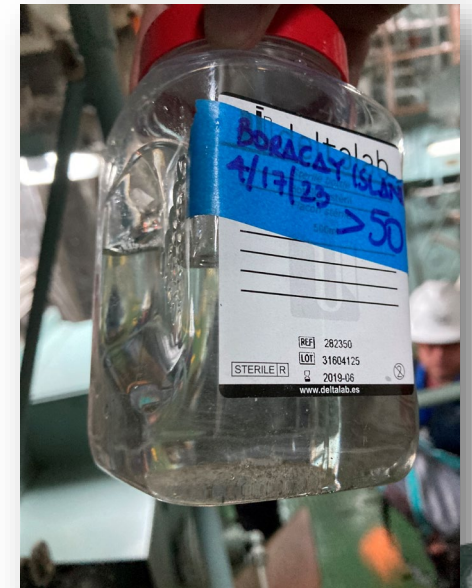
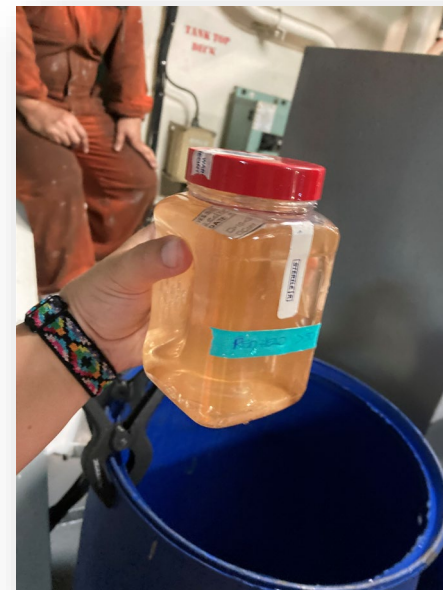
NUMBERS...

- 13 Vessels sampled
- 7 “Different” BWTS, 4 types
 - Filtration/Chemical Injection (2)
 - Filtration/Electrochlorination (5)
 - Filtration/UV (3)
 - Filtration/Electrolysis (3)
- 1 vessel type - Bulk
- Average sampling time: 1:40 min

RESULTS FROM 13 VESSELS

> 50 um	10-50um
10 Passed	9 Passed
2 Slightly above	3 Slightly above
1 Failed*	1 Failed*

*same vessel failed both



LESSONS LEARNED

- Communication with the vessel pre-sampling is key
- Communication with vessel crew onboard
- Schedule flexibility (Sampling personnel, analysis lab)
- Proximity to analysis lab
- Understanding of BWD processes and BWTS functionality
- By tank assessment
- Time limitations



THANK YOU & QUESTIONS

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