



# Trading in U.S. Waters: USCG Pollution Prevention Programs



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Thank you. I am (name and title). I'll be happy to answer any questions after the presentation.



# Presentation Topics



- MARPOL Annex IV, V (sewage, garbage)
- MARPOL Annex VI (air emissions)
- Emission Control Areas and compliance
- Ballast Water Management program



# MARPOL Annex IV: Sewage



- U.S. is not a party to Annex IV.
- U.S. Clean Water Act directs domestic sewage regulations.
- U.S. Environmental Protection Agency (EPA) and states (for example, California) administer in their jurisdictions.
- Administration is not proposing any changes to current U.S. regulations.



# MARPOL Annex V: Garbage




- U.S. is a party to Annex V, and participates in IMO efforts to implement requirements.
- U.S. focus for compliance is on availability of reception facilities (Great Lakes, Arctic).
- Administration is not proposing any changes to current U.S. regulations.




## MARPOL Annex VI: Prevention of Air Pollution by Ships

- U.S. is a party to Annex VI.
- U.S. Act to Prevent Pollution from Ships (APPS) and Clean Air Act help implement Annex VI.
- IMO confirmed 2020 global sulphur cap
  - Marine Environment Protection Committee to develop measures for consistent implementation.
  - Intersessional working group meeting in July 2018.
  - Recommendations due to MEPC 73 in October 2018.



# Emission Control Areas



Emission Control Areas	Adopted	Entry into Force	In Effect*
North American ECA	26 Mar 2010	1 Aug 2011	1 Aug 2012
U.S. Caribbean Sea ECA	26 Jul 2011	1 Jan 2013	1 Jan 2014

- ECAs set limits for nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and particulate matter (PM<sub>2.5</sub>).
- Ships constructed after 1 January 2016 and operating in these ECAs shall comply with NO<sub>x</sub> Tier III standards in regulation 13.5 of MARPOL Annex VI.

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**Nothing new here – can be covered quickly**

### **North American & U.S. Caribbean Sea Emission Control Areas (ECAs)**

- August 01, 2012, established a 1.00% sulfur limit for vessels operating within the ECAs.
- On January 01, 2015, the ECA fuel oil sulfur limit was lowered to 0.10% .

### **Vessels subject to Annex VI and ECA must:**

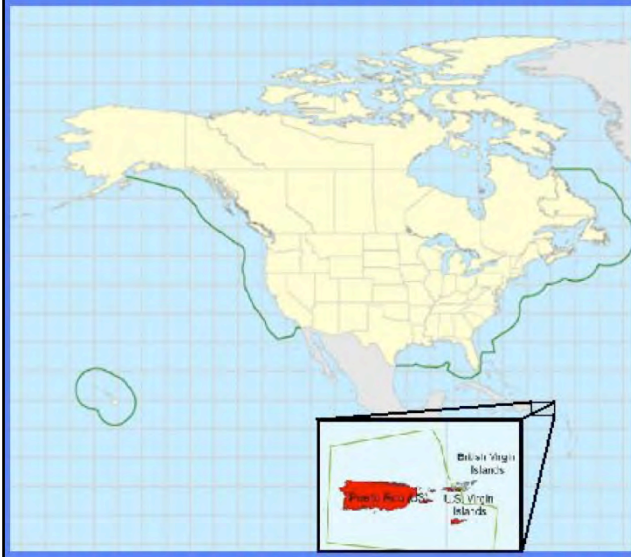
- Use compliant fuel; or
- Satisfy an Annex VI, Reg. 3 exception or exemption (Like exhaust gas scrubbers); or
- Satisfy an Annex VI, Reg. 4 equivalent (e.g., alternative fuels, like LNG, or, a proven technology after successful trials).

### **NOX Tiers**

- Marine diesel engines installed on ships after January 01, 2011 must have IMO Tier 2 engines.
- Marine diesel engines installed on ships after January 01, 2016 must have IMO Tier 3 engines.



# North American ECA



➤ As of January 2015, vessels in ECA must use low sulfur (<1,000 ppm) compliant fuel.

➤ Effective January 2020, global sulfur content limit is 5,000 ppm.

North American Emissions Control Area includes Canada, United States, and France (French islands off eastern Canada)



## ECA Benefits

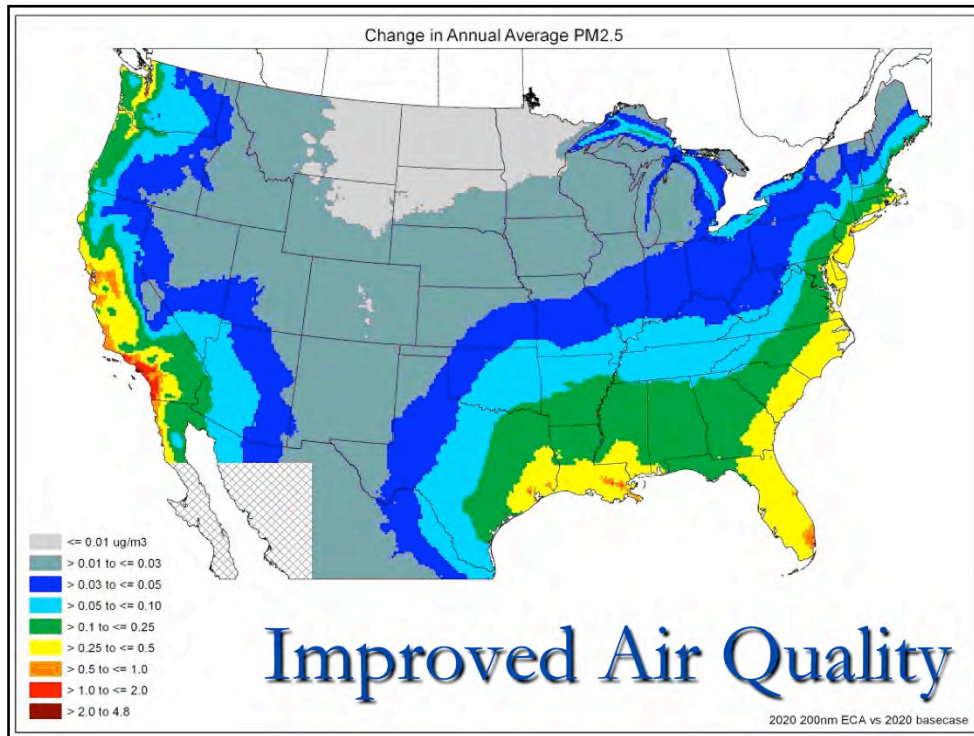


- Health-based initiative to reduce emissions and improve public health in the North American and U.S. Caribbean Sea ECAs.
- Expected reductions in air pollution by 2030:
  - Nitrogen oxides (NO<sub>x</sub>): 1.2 million tons
  - Sulfur oxides (SO<sub>x</sub>): 1.3 million tons
  - Particulate matter (PM<sub>2.5</sub>): 143,000 tons
- By 2030, these reductions are estimated to prevent between 12,000 and 31,000 PM-related premature deaths; 1,400,000 work days lost; and 9,600,000 minor restricted activity days.

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Summarize and discuss in general terms of health-based requirements, in part to set up graphic on next slide





2020 Reduction in annual average Particulate Matter (PM<sub>2.5</sub>) with a 200-nm ECA compared to base case.

Most dramatic improvements occur in port communities, but even areas far from ports see benefits.



# ECA Fuel Oil Requirements



Annex VI, Reg. 14 and 18:

SO<sub>x</sub> and PM Emissions & Fuel Oil Availability and Quality

- Shipboard Requirements
- Fuel Oil :
  - Sulfur Content Caps
  - Fuel Quality Standards
- Operations:
  - Bunker Delivery Notes & Samples
  - Fuel Oil Change-Over Procedures
  - Fuel Oil Change-Over Logbook Entries

Annex VI , Reg. 14 Fuel Oil Sulfur Content Limits	
ECA Sulfur Content Cap	
<i>Effective Date</i>	<i>Sulfur Limit %m/m (ppm)</i>
July 1, 2010	1.00% (10,000)
January 1, 2015	0.10% (1,000)
Global Sulfur Content Cap	
January 1, 2012	3.50% (35,000)
January 1, 2020	0.50% (5,000)

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This is not new. Presented to set context of discussions.

MEPC 70 (OCT 2016)  
affirmed with wide support,  
to keep the 2020 schedule  
for 0.5% sulfur cap.



## Availability of Low Sulfur Fuel Oil (LSFO)



- A vessel is expected to use compliant fuel when operating in the ECAs. Voyage planning should include fuel availability.
- If a vessel is not able to obtain compliant fuel because it is not available, a Fuel Oil Non-Availability Report (FONAR) must be submitted.
- If 0.10% (1,000 ppm) is not available, another available ECA-compliant fuel must be used.
- A FONAR is not a waiver! It is a formal statement of noncompliance.

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## Fuel Oil Non-Availability Reports (FONARs)

Currently vessels may submit fuel oil non-availability reports (FONARS) when compliant fuel is not available (EPA/USCG option, not identified in MARPOL). Vessels should make every effort to obtain compliant fuel, and Vessels must include the plan to obtain enough compliant fuel as part of their voyage plans.

- If a ship owner is not able to obtain compliant fuel because it is not available, a Fuel Oil Non-Availability Report (FONAR) must be submitted.
- FONARS should not be sent in for failure to appropriately plan for and acquire enough compliant fuel. A FONAR is not a waiver! It is a formal statement of noncompliance.
- If 0.10% (1,000 ppm) is not available, another ECA-compliant fuel, such as ultra low sulfur or another low sulfur marine distillate (for example, 15 or 500 ppm), must be used if it is available.

Examples of when FONARS may be used inappropriately – using smallest fuel tank, failing to go to pier in the port being called on to get compliant fuel. While a ship is not required to deviate from or unduly delay voyage, planning to go to pier in port calling on to get compliant fuel (where compliant fuel may not be sold at every pier in a port), is not a deviation or undue delay.



# Joint USCG-EPA Annex VI Implementation



## ■ EPA Role

- Engine Emissions (NO<sub>x</sub>) EIAPP Certificate
- Shore-side fuel supplier compliance
- Joint USCG-EPA inspections and vessel fuel sampling
- Lead for civil enforcement
- Assistance in criminal investigations



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In 2011 the Coast Guard and the EPA entered into a Memorandum of Understanding (MOU) order to clearly define the respective roles of each agency, which was further refined in 2015 via Revised Protocol on Referral.

- Coast Guard is responsible for conducting foreign and domestic vessel exams to verify Annex VI compliance. This is primarily completed through a document and certificate review, unless clear grounds exist for a more thorough exam. When evidence of non-compliance is detected during the course of a Coast Guard examination, the Coast Guard may take enforcement actions or refer to EPA for enforcement.
- EPA is also responsible for shore-side fuel supplier compliance and can provide technical expertise during vessel exams if requested by the Coast Guard.

More recently, the Coast Guard completed a four week voluntary fuel sampling program working in conjunction with the EPA. The purpose of the program was to determine if there are non-compliance issues with fuel oil.

- A total of 47 vessels were requested to take samples (25 vessels at LA/LB, 22 vessels at Baltimore). Out of that 47, 10 (21%) declined to provide samples.
- 37 vessels agreed to provide samples for a total of 74 samples.
- Nine of the vessels that declined were in Baltimore and one was in LA/LB.
- We have received all results back from EPA from all 37 of the vessels that volunteered samples.
- Most results came back stating that the fuel oil was compliant except for 6 vessels (16% of the vessels) (9 Samples or 12% of all samples taken).
- The highest non-compliant sample was 0.387% and the lowest non-compliant sample was 0.101%.
- After reviewing MISLE and receiving feedback from the unit we think the 0.387% tank sample was contaminated since the fuel line sample result came back as compliant (0.086%).
- The rest of the non-compliant results ranged from 0.101% to 0.155%. This very minimal and, after reviewing MISLE and receiving feedback from the units, we think this is a result of contamination in the sample lines.



## USCG Verification of Shipboard Compliance



During Coast Guard Port State Control (PSC) Exam, ship operators should be prepared to do the following:

- Demonstrate that fuel change over occurred before the vessel entered the ECA
- Show established fuel change over procedures
- Show entries in logbook regarding:
  - Volume of low sulfur fuel oil in vessel tanks
  - Date, time, position of ship during change over
- Show Bunker Delivery Notes
- Show MARPOL fuel samples

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## USCG Verification of Shipboard Compliance



If no LSFO is on board, the ship should be able to

- Present a record of actions taken to attempt to achieve compliance
- Provide evidence the vessel attempted to purchase compliant fuel oil in accordance with its voyage plan, and if not available where planned, that attempts were made to locate an alternative source
- Provide documentation that the Flag Administration and EPA were notified compliant fuel oil was not available



# Referral to EPA



- USCG refers deficiencies identified during a PSC exam of ECA non-compliance to EPA (Reg. 14/18).
- EPA may adjudicate civil penalties for non-compliance.
- EPA enforcement is particularly targeting:
  - Ships that consistently fail to get or do not make best efforts to get compliant fuel
  - Ships detained by Coast Guard for substandard MARPOL Annex VI compliance issues

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## Annex VI Resources



- USCG Office of Commercial Vessel Compliance
  - <https://www.dco.uscg.mil/CVC>
  - CG-543 Policy Letter 09-01 (Annex VI Implementation)
  - CG-CVC Policy Letter 12-04 (ECA Compliance)
  - CG-CVC Policy Letter 13-02 (IEE/SEEMP)
- EPA Office of Transportation and Air Quality
  - <https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-marine-vessels>





## USCG Support for Technology Development



- USCG is working with industry to advance the state of air pollution prevention technologies.
  - Exemptions and equivalencies under MARPOL Annex VI
  - USCG market study for exhaust gas cleaning systems (EGCS) or “air scrubbers”
- We welcome proposals for innovative applications of treatment technologies.

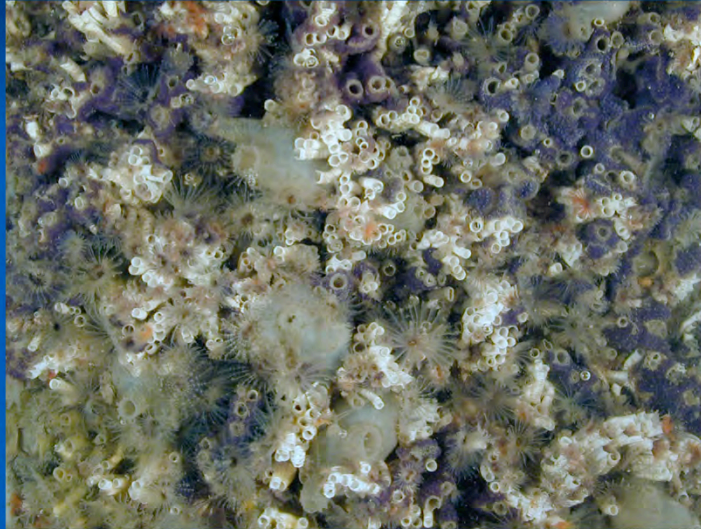
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Ships may be exempted from fuel sulfur limits for a period of time to allow operational trials for the development of new emission reduction and control technologies or other engine design improvements (for example, development of exhaust gas scrubber technologies or conversion to LNG fuel).

Exemptions require robust goals, specific terms, and an aggressive schedule for technology testing.



# Ballast Water Management



Thank you. I am (name and title). I'll be happy to answer any questions after the presentation.

## ABSTRACT FOR CONFERENCES, ETC:

A rule published by the U.S. Coast Guard in March 2012, and effective as of June 21, 2012, established a standard for the allowable concentration of living organisms in ships' ballast water discharged into waters of the U.S.

The rule also established Coast Guard requirements for type approval of ballast water management systems, or BWMS for short.

The U.S. ballast water discharge standard aligns with the International Maritime Organization's Ballast Water Management Convention adopted in 2004. A 2011 report by the U.S. Environmental Protection Agency Science Advisory Board concluded the standard specified in the final rule is the most stringent standard that vessels can practicably implement and the Coast Guard can enforce at this time.

As technologies advance and as treatment efficacies improve, the Coast Guard plans to revisit the standard to determine if more stringent requirements are practicable and enforceable.



# Ballast Water Convention



- Convention entered into force September 2017.
- U.S. is not a party to the Convention.
- U.S. sends delegations to IMO bodies, and provides support to other nations implementing the Convention.
- USCG personnel assigned to United Nations Environment Program (UNEP) in Curacao
  - Also support oil spill contingency planning and marine environmental response.

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RAC-REMPEITC

UNEP



# USCG Ballast Water Program



- Implementation of 2012 Regulations
- Options for Compliance
- USCG compared to IMO Type Approval
- Compliance and Enforcement
- Contingencies
- Next Steps

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Main topics that will be discussed in this presentation:

Refer to [USCG.mil](http://USCG.mil) website for more info on these topics, and link will be listed at end of presentation.



## Six Years of Implementation



- USCG Final Rule published March 23, 2012
- 4 CG-approved Independent Labs
- 9 CG type-approved BWMS
  - More systems under review or in testing phase
- Extensions to compliance dates: ~12,500 granted
- IMO Convention entered into force Sept 8, 2017
- New guidance in March 2018 (NVIC, policy letters) consolidates a variety of previous documents

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Reason why the Coast Guard is moving from implementation to compliance:

With all of the challenges, there is good news. The Coast Guard continues to improve and evolve the BW program in response to changing circumstances.



## You should know.....



- Coast Guard has transitioned from implementation to compliance mode

- Compliance with BWM is as important as other pollution regs



- USCG Type Approved systems are now available for most vessels

- Vessels need to have a contingency plan if BWM method is not available

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Important points on the current status of the USCG BW program:

Coast Guard recognizes that the continuing challenge to select an appropriate technology or management method that fits a vessel's needs. However, the Coast Guard is required to protect the marine environment from pollution, including biological pollution via invasive species.



The slide is titled "Options for Compliance" and features logos for the U.S. Coast Guard and the U.S. Department of Justice. It is divided into two main sections. The left section lists four options: 1. No BW Discharge (with a red prohibition sign), 2. Coast Guard Approved Ballast Water Management System (with an image of blue machinery), 3. Discharge to Facility Onshore or to Another Vessel for Purpose of Treatment (with an aerial view of a treatment facility), and 4. Use only water from a U.S. Public Water System (with an image of water being poured). The right section, titled "Two Temporary Compliance Alternatives", lists: 1. Alternate Management System (AMS) – Temporary Designation for up to 5 years (with an IMO logo) and 2. Receive an Extension to Vessel's Compliance Date - extension period will vary depending upon TA system availability (with a document image).

Now that compliance is the focus, we will discuss options:

It is important to know that a vessel does NOT need to install a Ballast Water Management System to meet the discharge standard.

The Final Rule has several options to meet the discharge standard:

- 1) Retain ballast water on board while in waters of the U.S. (i.e., within 12 nm) - lots of innovation here
- 2) Install a Coast Guard-approved Ballast Water Management System - most selected method
- 3) Discharge to a facility onshore or to another vessel for purpose of treatment – overseas this is emerging as an option, not in US yet
- 4) Use ONLY water from a U.S. Public Water System (PWS).

There are also two temporary compliance options:

- 1) Use an Alternate Management System, or AMS. - 110 options (This is a foreign-approved BW treatment system reviewed and accepted by the Coast Guard.) Or,
- 2) The Coast Guard may grant a vessel an extension to its compliance date. – more difficult to justify



# Options for Compliance



1. No BW Discharge 

2. Coast Guard Approved Ballast Water Management System 

3. Discharge to Facility Onshore or to Another Vessel for Purpose of Treatment 

4. Use only water from a U.S. Public Water System 

Two Temporary Compliance Alternatives

1. Alternate Management System (AMS) – Temporary Designation for up to 5 years 

2. Receive an Extension to Vessel's Compliance Date - extension period will vary depending upon TA system availability 

First discuss option to temporarily comply via an installed AMS:





## Temporary Compliance: Alternate Management Systems



- A BWMS is accepted for use as an AMS based on its type approval by a foreign administration.
- AMS may be used for 5 years after expiration of the vessel's compliance date.
- Vessels with AMS can comply and must operate the AMS once their original/extended compliance date has passed.
- Extension will not be granted to facilitate installation of an AMS.

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The AMS program supports the development of a healthy marketplace for these new treatment technologies

- 111 AMS acceptance letters issued to manufacturers as of August 2018.
- 24 of them are accepted for use in fresh water.


AMS is a bridging program for vessels that installed foreign type-approved systems prior to their compliance date. 60 months of usage allows time for the AMS manufacturer to pursue type approval.


The manufacturer must work with the Coast Guard to update its AMS acceptance letter to reflect any changes to its foreign type approval, including renewals, revisions, restrictions, and additional equipment or configurations approved. Often only authorized for two salinities. Can be amended by manufacturer to reflect all three.


Temporary compliance via extension cannot lead to temporary compliance via AMS, so extensions are not used to facilitate AMS installation.





# Options for Compliance



1. No BW Discharge 


2. Coast Guard Approved Ballast Water Management System 


3. Discharge to Facility Onshore or to Another Vessel for Purpose of Treatment 

4. Use only water from a U.S. Public Water System 

Two Temporary Compliance Alternatives

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1. Alternate Management System (AMS) – Temporary Designation for up to 5 years 

2. Receive an Extension to Vessel's Compliance Date - extension period will vary depending upon TA system availability 

Next discuss option to temporarily comply via an extension:



## Temporary Compliance Extensions



- Coast Guard grants extensions on case-by-case basis after vessel-specific application and review.
- Program has evolved to balance Coast Guard goals and industry considerations.
- New NVIC and Policy Letter issued March 2018 to assist in understanding Coast Guard requirements.
- Coast Guard determines the minimum time needed to come into compliance with regulations.

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•The goal of the Coast Guard compliance extension procedure is to provide reasonable flexibility to vessel owners and operators, where appropriate, while ensuring steady progress toward achieving the statutory intent of enhancing protection of U.S. waters from invasive species in ballast water that can damage the environment and harm our economy.

•The Coast Guard is balancing the dual missions of environmental protection and facilitating secure maritime trade. The Coast Guard is committed to assisting vessels' pursuit of a thoughtfully developed and well documented compliance option. However, vessels must be aware that a lack of foresight and planning will not be considerations in granting extended compliance.

•Factors affecting Coast Guard approach to extending compliance include the number, type, and operating profile of approved systems, the capacity of manufacturers and shipyards, and vessel's normal operating and maintenance schedules. The dynamic nature of these factors result in ongoing review and update of our procedures.

•The Coast Guard understands that no single system is appropriate for every vessel, so it is incumbent upon vessel owners/operators to employ engineering and operational solutions in order to install a treatment system at or before the vessel's compliance date. Where technical and operational accommodations can be made, the Coast Guard may consider extending the compliance date based on an installation plan.

•As of May 2018, OES received 14,780 extension requests (12,241 granted and 2,539 not granted).



## Temporary Compliance Extensions




- Applicants must document their assertions
  - Have acquired BWMS
  - BWMS is type-approved or expected to be
  - Installing within 12 months of compliance date
- Common issues with applications
  - Compliance is possible, or missing supporting info
- Common concerns
  - Drydock slips may result in less time than planned
  - Failure to plan ahead may result in ship delays or lapse in eligibility to trade in U.S. waters

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- Assertions must be capable of being supported with documentation
  - Examples of acquisition = contract, purchase order, completed analyses demonstrating that system will be integrated
  - Examples of expected TA = on list of systems under review by MSC, statement from IL on status of testing
  - Examples of install = contract with installer, shipyard or manufacturer
- Where acquisition of an approved system is not reasonable, the Coast Guard will consider a detailed analysis, such as completed engineering studies and 3D scanning, that support the owner/operator efforts to match the vessel with an approved BWMS at a future date before considering any extension request. Vessel owners/operators should be working closely with BWMS manufacturers to ensure the systems in development meet the needs of their vessels.
- Reasons and common errors regarding extension requests
  - ✓ Compliance is possible by upcoming compliance date.
  - ✓ Information missing, or assertions not supported.
- Common concerns
  - ✓ Letter transferable in case of new owner or vessel name, issued to IMO#.
  - ✓ Drydock slips may result in less time than planned.
  - ✓ Failure to plan ahead may result in ship delays or lapse in eligibility to trade in U.S. waters.


While not required by regulation, requests for extension should be maintained onboard the vessel as a best practice and be available for inspection and validation by Coast Guard Marine Inspectors and Port State Control (PSC) Examiners. If inconsistencies are detected, or a vessel, which is otherwise required to be in compliance lacks the appropriate documentation, the marine inspector or PSC examiner should expand the PSC Exam. Compliance is expected after extensions expire.




# Options for Compliance



1. No BW Discharge 

2. Coast Guard Approved Ballast Water Management System 

3. Discharge to Facility Onshore or to Another Vessel for Purpose of Treatment 

4. Use only water from a U.S. Public Water System 


Two Temporary Compliance Alternatives

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1. Alternate Management System (AMS) – Temporary Designation for up to 5 years



2. Receive an Extension to Vessel's Compliance Date - extension period will vary depending upon TA system availability



USCG type approved BWMS is most often the selected compliance method:



## Type Approved BWMS



Manufacturer & Model	System Type	Capacity (m <sup>3</sup> /h)
Optimarin OBS/OBS Ex	Filtration + UV	167 – 3,000
Alfa Laval Pure Ballast 3	Filtration + UV	150 – 3,000
TeamTec OceanSaver MK II	Filtration + Electrodialysis	200 – 7,200
Sunrui BalClor	Filtration + Electrolysis	50 – 8,500
Ecochlor BWTS	Filtration + Chemical Injection	500 – 16,200
Erma First FIT	Filtration + Electrolysis	100 – 3,740
Techcross Electro-Clean	Electrolysis	150 – 12,000
Samsung Purimar	Filtration + Electrolysis	250 – 10,000
BIO-UV Group BIO-SEA B	Filtration + UV	55 – 1,400

As of 22 Aug 2018:

- 9 type-approval certificates,
- current range of flow rates: 50 to 16,200 m<sup>3</sup>/hr – three systems have capacities over 10 K,
- and 10 more applications under review (three of which are updates).

In 2018, we expect 7-10 more applications:

- Total of 56 Letters of Intent, including those mentioned above (not all are expected to follow through).



## Typical Ballast Pumping Rates



Vessel Type	Flow Rate (m <sup>3</sup> /h)
Tanker	5,000 – 20,000
Float-on, float-off	10,000 – 15,000
Ore	10,000
Liquefied-gas	5,000 – 10,000
Dry bulk	5,000 – 10,000
Heavy lift	5,000
Barge-carrying cargo	1,000 – 2,000
Roll-on, roll-off	1,000 – 2,000
General cargo	1,000 – 2,000

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Because flow rates of type approved systems meet average flow rate, it is generally possible to comply via USCG type approved BWMS. The available systems may not be suited for a specific vessel's operational or technical profile, so each situation is reviewed on a case-by-case basis.

Data source: ABS, 2014



## Plug-N-Play Myth



- Ship owners/operators want to :
  - Buy, install, use: Plug and Play
- Frustration with installed BWMS
  - Source water is not right (salinity, murky, etc.)
  - Replacement parts, repair, training issues
- Concerns prior to investing
- BWMS is a cargo management system
- Further delay is not the solution

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Not a simple integration process:

Coast Guard has heard from shipowners who are frustrated with the quality of equipment and availability of technical support and timely resolution of issues in the global BWMS market. As the U.S. has transitioned to a compliance regime, and now requires vessels to use type approved systems or AMS, vessel operators will bear the burden of familiarization with new technologies.

We've listened to owners, and one phrase inevitably comes up – they want a "Plug and Play" system. Owners who bought new ships in the last several years, wrote BWMS-ready specifications into contracts to ensure there was adequate space, power, and piping available for a future "plug and play" system. Owners who bought/installed BWMS describe problems with it not effectively treating water in ports where either the water doesn't have enough salt or its too murky. These owners express frustration that the system doesn't seamlessly integrate into their existing operations. As these owners begin to realize that the systems are not "plug and play", they also express further frustration with the lack of training, repair and maintenance follow-up for the installed systems...the support side for these systems are also not "plug and play" with owners' operations. Lastly, the owners who have not yet invested in a BWMS, and who are seeking extensions, point to the lack of "plug and play" capability--for any of the reasons described above--as their primary concern for not investing.

The Coast Guard understands the frustration. While many shipowners want to do the right thing, market forces haven't incentivized them to spend the necessary capital to fully invest in BWMS. Hence, instead of "owning" this problem, they are looking for vendors and partners who can integrate into their operations and provide this capability without disruption. Herein lies the problem. The breadth of BWMS impact on vessel operations means that a "plug and play" solution is not possible for many ships. In order to comply with the BWMS regulations, all ships will have to modify their design, operations and support to some extent; some ships will require more fundamental changes. This is unlike what we've seen before when addressing environmental regulations.

If you look at BWMS through the lens of other environmental standards, there are interesting parallels. Whether its oily water separators, air emissions, or other waste management there are things that we can learn from past examples of when regulations led change. However if you look closer, the comparisons between BWMS and the other environmental regulations quickly fade away. In most cases, cargo loading and discharge weren't dependent on the operation of an OWS, exhaust scrubber, or tank cleaner in the same way that BWMS are. So while the mindset and desire for "plug and play" was reasonable for these types of environmental technologies, it is not adequate for BWMS. Because BWMS is so closely linked to the ability to load or discharge cargo in real time, owners shouldn't expect "plug and play" and instead should require the same level of diligence and integration as any other cargo management system onboard.

In the same conversations, we often hear owners/BWMS manufacturers acknowledge that the market is not 'there' yet with respect to integration and that more time is needed. While we appreciate that it will take time for integration to occur, the Coast Guard is not convinced that it will occur without a forcing function. Postponement is not the answer. We suspect that if the compliance dates were postponed (assuming we could without regulatory changes), market forces would simply stall and we would find ourselves in a similar situation several years from now. We know that for the regulations to meet the societal expectations to prevent the spread of invasive species, that continued integration, familiarization, and technology development are necessary. Owners and manufacturers who can navigate this market and adjust their design, operations and support to sustainably achieve the intended results will ultimately prevail.





# Type Approval Review



Six-step application review process:

1. Application screening
2. Engineering review
3. Land-based test review
4. Shipboard test review
5. Component test review
6. Scaling review

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USCG type approval is a limited, but robust, review of the BWMS:

Engineering Review:

1. IL assess BWMS compliance with design and construction of §162.060-20

2. Bill of Materials and drawing to verify

46 CFR Subchapter F- Mechanical Engineering

46 CFR Subchapter J- Electrical Engineering

USCG recognized class society rules

3. ATEX certification

Not accepted by CG as equivalent to Subchapter J

May not be installed on US flagged vessels in hazardous locations

Biological efficacy testing is conducted at land based test facilities to ensure treatment systems do in fact kill organisms.

Shipboard testing takes place for 6-month trials aboard commercial ships to verify systems work as designed.

Component testing is performed on electrical and electronic parts to prove long term marine use.

Ships come in many types and sizes, and so must treatment systems. This is problematic because testing durations and costs make it impractical to test all versions of the system. Most manufacturers plan to offer multiple sizes and variations of their base unit. Filters are key components that vary with different size models. Manufacturers want to offer many sizes of treatment systems with filter options without having to test each variation. Scaling may be used to assess the system adequacy.



## How Type Approval Works



An Independent Laboratory (IL) evaluates:

- a.) Test Data & Information from type approval testing by a foreign administration. (Additional testing and evaluation by an IL may be required.)
  
- b.) Test Data & Information produced and submitted by an IL.

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Data can come from two sources:



## Accepted Independent Labs



- Det Norske Veritas-Germanischer Lloyd (DNV-GL; Norway)
- Korean Register of Shipping (ROK)
- Control Union Certifications (Netherlands)
- Lloyd's Register EMEA (UK)
- NSF International (Ann Arbor, MI)
  - December 2017 announced it would wind down

Coast Guard is in contact with other test organizations interested in acceptance as IL for BWMS testing.

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DNV GL in Hovik, Norway (merger of Det Norske Veritas and Germanischer Lloyd in 2013) includes:

- Danish Hydraulic Institute (DHI) in Denmark
- California Maritime Academy's Golden Bear research facility and training vessel.

Korean Register of Shipping, which includes:

Korea Marine Equipment Research Institute (KOMERI), Busan Techno Park (BTP), Korea Testing Laboratory (KTL), SDS Korea, Korea Testing and Research Institute (KTR), Lab Frontier (LF), Marine Eco-Technology Institute (MEI), and NLP Co.

Control Union Certifications based in Netherlands

Lloyd's Register EMEA (Europe – Middle East – Africa), includes DHI (Denmark), DHI Singapore, and Delta (Denmark).

NSF International in Ann Arbor, MI included:

- For biological testing – the Great Ships Initiative (GSI) in Superior, WI, and Maritime Environmental Resource Center (MERC) in Baltimore, MD.
- For environmental testing – Retlif Labs, which has locations in the eastern U.S.



## USCG v IMO

- U.S. is not party to the IMO Convention. There are no plans to change our requirements or implementation dates due to changes to the IMO Convention.
- USCG Regulations are not the same as the IMO Implementation.
- Discharge standards are similar but not exactly the same – limits on Viable (IMO) v. Living (USCG) organisms
- Differences between IMO and U.S. type approval testing

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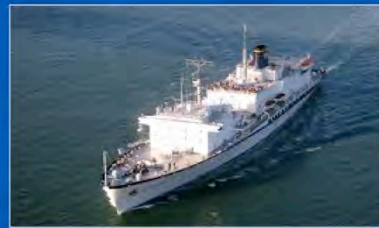
Do do the USCG and IMO type approval processes relate?



## Type Approval Similarities IMO (G8) and U.S.



1. Readiness evaluation
2. Land-based testing
3. Shipboard testing
4. Environmental/  
Component testing
5. Treatment system scaling



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In these areas, the G8 Guidelines and U.S. testing requirements are similar.

Vessel pictured is California Maritime Academy's Golden Bear.



## Technical Differences



1. Discharge Standard
2. Shipboard Testing
3. Hold Time
4. Component /  
Environmental Testing



There are 4 key technical differences in the type approval process, including discharge standard, shipboard testing, hold time, and component or environmental testing.

This picture shows a component undergoing incline testing.



## Summary of Technical Differences



	IMO G8	USCG
Discharge Standard	< 10 Viable Organisms	< 10 Living Organisms
Shipboard Testing	3 Test Cycles	5 Test Cycles
Hold Time	> 5 Days	> 24 Hours
Component / Environmental Testing	2 Hour Endurance Test	4 Hour Endurance Test

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The Hold Time refers to the procedure that samples are “held” for a time before measuring organisms to observe and measure if re-growth occurred.

2016 Guidelines for approval of ballast water management systems (G8) (resolution MEPC.279(70)) (this will be superseded by the BWMS Code (resolution MEPC.300(72)), in October 2019) <http://www.imo.org/en/OurWork/Environment/BallastWaterManagement/Pages/BWMFAQ.aspx>



## Compliance and Enforcement



- Regular vessel inspections include ballast water management (BWM)
  - BWM exams on foreign vessels: 9,000/year
- Follow existing compliance approach
  - Documentation, Equipment Condition and Operation, & Crew knowledge
- Deficiencies issued since 2012 Final Rule: ~800
- Enforcement actions: ~30 (warnings to fines)

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Coast Guard issued on March 1, 2018:

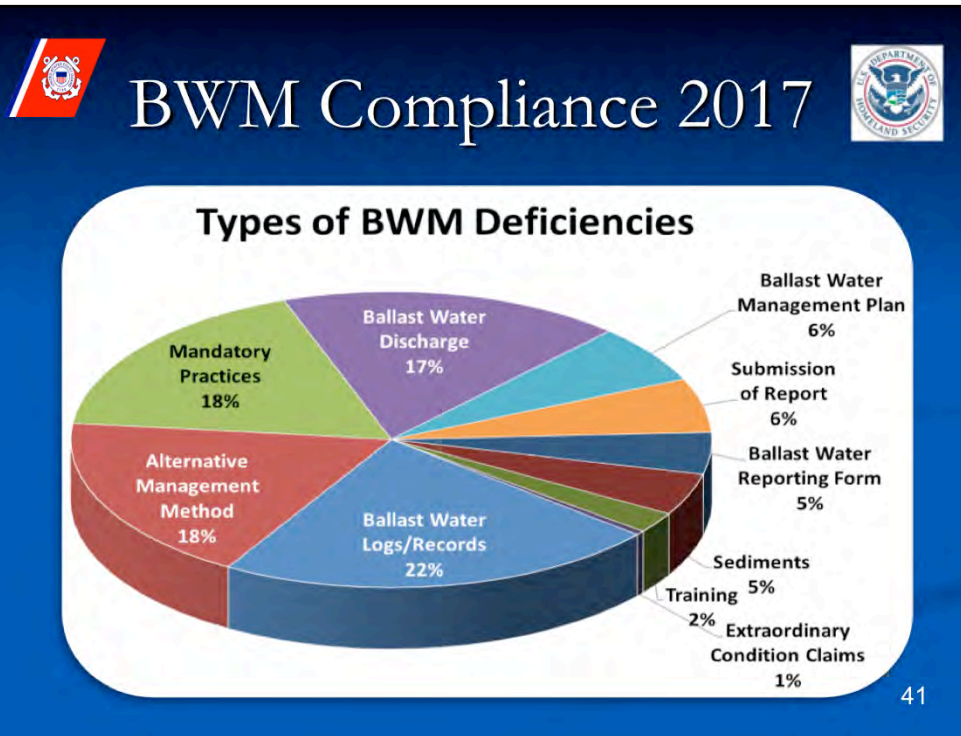
NVIC 01-18 – “Ballast Water Management For Control Of Non-Indigenous Species In Waters Of The United States”

This compliance approach will follow a similar regime in place for all other CG equipment inspection (OWS, MSD, etc.) A Coast Guard inspector will review documentation including the type approval certificate or AMS acceptance letter. The inspector will verify the crew’s knowledge regarding use of the equipment and verify the equipment’s condition.

If an inspector is not satisfied by these results, they can take samples of the ballast water discharge.

(The Coast Guard continues to develop more rapid and accurate methods for sampling and analysis.)





- 8,277 BWM exams, 1.9% increase
- Deficiencies increased from 110 in 2016 to 219 in 2017
- Majority of the deficiencies were: logs/records, alternate management systems (AMS), mandatory practices, BWM plan, and the discharge of untreated ballast water into waters of the U.S.
- Operational control restrictions imposed on 17 vessels
- Sanctions ranged from warnings, Notice of Violations (NOV), and Administrative Civil Penalty (Class I) against several vessels for failure to implement BWM requirements

Example A

- Vessel allegedly drydocked after extended compliance date
- After the PSC team went on board it was determined that the vessel did not go to drydock
- COTP accepted BWE as one of the BWM methods and allowed the vessel to discharge BW

Example B

- Master was not aware of the implementation schedule for approved BWM methods
- Unit required the vessel to go out 12 NM and conduct BWE and use its AMS as exchanged BW
- Manufacturer's instructions required BW to be filtered and UV'd on the uptake and discharge
- Vessel went beyond 12 NM and conducted exchange as described, then returned

EXAMPLE C

- AMS inoperable for almost a year; when it arrived in US, it asked for an extension
- Extension denied; it was apparent that AMS wouldn't be repaired unless owner was required to
- AMS repaired after COTP Order was issued prohibiting discharge
- Vessel used National Cargo Bureau (NCB) to certify cargo holds (serving as BW tanks) clean before lifting BW

EXAMPLE D

- Vessel failed to use the AMS while conducting a BW operations in the river
- Manufacturer advised vessel that AMS was not affected by salinity, but that because IMO requires testing of 2 of 3 conditions (salt water, brackish water, and FW), they only tested 2
- Vessel prohibited from discharging untreated BW until one of the BWM requirements is met
- USCG unit received documentation that vessel was able to use AMS prior to discharging into river



## Non-compliance can be costly



- COTP may impose operational controls that restrict vessel's movement or cargo operations
  - These may cost \$30,000 - \$150,000 for port, agent, or pilot fees; additional fuel; cargo delays and lost income; or other penalties.
- Violators may have higher priority consideration for future examinations
- Civil penalties are being issued
- Criminal penalties are available (Class C felony)

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### Why not just take the ticket?

- **Education** - Ensure vessel is aware of their BWM obligations through outreach before enforcement become necessary
- **LOW** - Formal written notice of minor violations (LOW in lieu of CP and in lieu of S&R)
- **NOV** - Pre-determined monetary penalty (max \$10K)
- **CP (Class I)** - Adjudicated by a CGHO and owner/operator may be subject to CPs, as updated annually for inflation
- **S&R Proceeding** - Presentation to an ALJ of all evidence surrounding a specific offense committed by a mariner holding merchant mariner credentials issued by CG
- **LOU/Surety Bonds** - Whenever a violation case is pursued, the MI/PSCO should normally require a LOU or a Surety Bond from the owner/operator to ensure payment of a penalty/fine
- **Criminal Proceedings** - Person knowingly violates the BWM regs may be guilty of a Class C Felony and be subject to criminal proceedings.



## Planning for contingencies



- USCG issued Policy Letter CG-CVC 18-02
  - Guidelines for potential courses of action
  - Does not allow for long-term outages
- Report immediately to the cognizant COTP
  - Present your plan
  - COTP may allow other methods in regulations
- An inoperable BWMS needs to be fixed
- May require voyage deviation for BWE

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Inoperable systems are a reality:

• **CG-CVC Policy Letter 18-02** – “Guidelines For Evaluating Potential Courses Of Action When A Vessel Bound For A Port In The United States Has An Inoperable Ballast Water Management (BWM) System”

• Ship owners have complained that this letter does not allow for long-term outages. That is correct. If a manufacturer does not repair the system, the ship owner must find another qualified service provider.



## Next Steps



- USCG R&D - Sampling and analysis method and tools in development
  
- New NVIC for field units and industry published March 1, 2018
  
- Address challenges to type approval
  - Modification of system components (filters)
  - Scaling (size, flow rates)



## Other news



- California biofouling provisions as of Oct 1, 2017  
<http://www.slc.ca.gov/Laws-Regs/Regulations.html>
  - Adopted an Annual Vessel Reporting Form.
  - Repealed reporting requirements for Hull Husbandry, BW Treatment Annual and Supplemental Forms.
  - Remaining requirements after delivery or drydock.
- EPA Vessel General Permit
  - Current VGP expires December 2018.
  - EPA has not issued revised draft for public comment.
  - Possible next step – EPA may decide to extend current VGP for additional time period.



## USCG Program Offices



- Commercial Vessel Compliance (CVC)
  - Compliance manager, NVIC owner
  - <https://www.dco.uscg.mil/CVC>
  - [cgcvc@uscg.mil](mailto:cgcvc@uscg.mil)
  
- Operating & Environmental Standards (OES)
  - Regulation & policy program manager
  - <http://www.dco.uscg.mil/OES>
  - [environmental\\_standards@uscg.mil](mailto:environmental_standards@uscg.mil)

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In general, the Coast Guard's Office of Commercial Vessel Compliance (CG-CVC) is the appropriate point of contact for questions about current USCG requirements: [CGCVC@uscg.mil](mailto:CGCVC@uscg.mil)

Extension requests for compliance dates under Ballast Water Management regulations should be directed to [environmental\\_standards@uscg.mil](mailto:environmental_standards@uscg.mil)

The USCG Marine Safety Center manages the U.S. Type Approval process, and applicants should send questions to [msc@uscg.mil](mailto:msc@uscg.mil)

Questions about testing facilities and acceptance as Independent Labs for the purpose of evaluating Ballast Water Management Systems should be sent to [typeapproval@uscg.mil](mailto:typeapproval@uscg.mil)

Details regarding USCG approved equipment can be found at the Coast Guard Maritime Information Exchange (CGMIX) at <http://cgmix.uscg.mil>

### NOTE:

The Coast Guard does not administer the Vessel General Permit (VGP) program. Please visit the U.S. Environmental Protection Agency's website for more information at <https://www.epa.gov/npdes/vessels-incident-discharge-permitting-3> or email [vgp@epa.gov](mailto:vgp@epa.gov)

Commercial Vessel Compliance (CVC) - Compliance manager

Operating & Environmental Standards (OES) - Regulation & policy program manager



## USCG Program Offices



- Design & Engineering Standards (ENG)
  - 3<sup>rd</sup> Party Independent Lab manager
  - <http://www.dco.uscg.mil/CG-ENG>
  - [typeapproval@uscg.mil](mailto:typeapproval@uscg.mil)
  
- Marine Safety Center (MSC)
  - Type approval manager
  - <http://www.dco.uscg.mil/MSC>
  - [msc@uscg.mil](mailto:msc@uscg.mil)

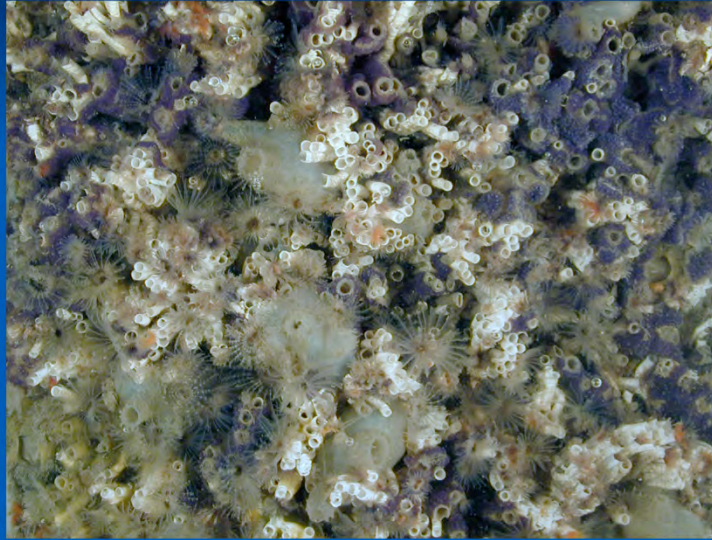
Continued

Marine Safety Center (MSC) - Type approval manager

Design & Engineering Standards (ENG) - 3<sup>rd</sup>-party Independent Lab manager



# Questions?



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Fouling plate test, Smithsonian Environmental Research Center