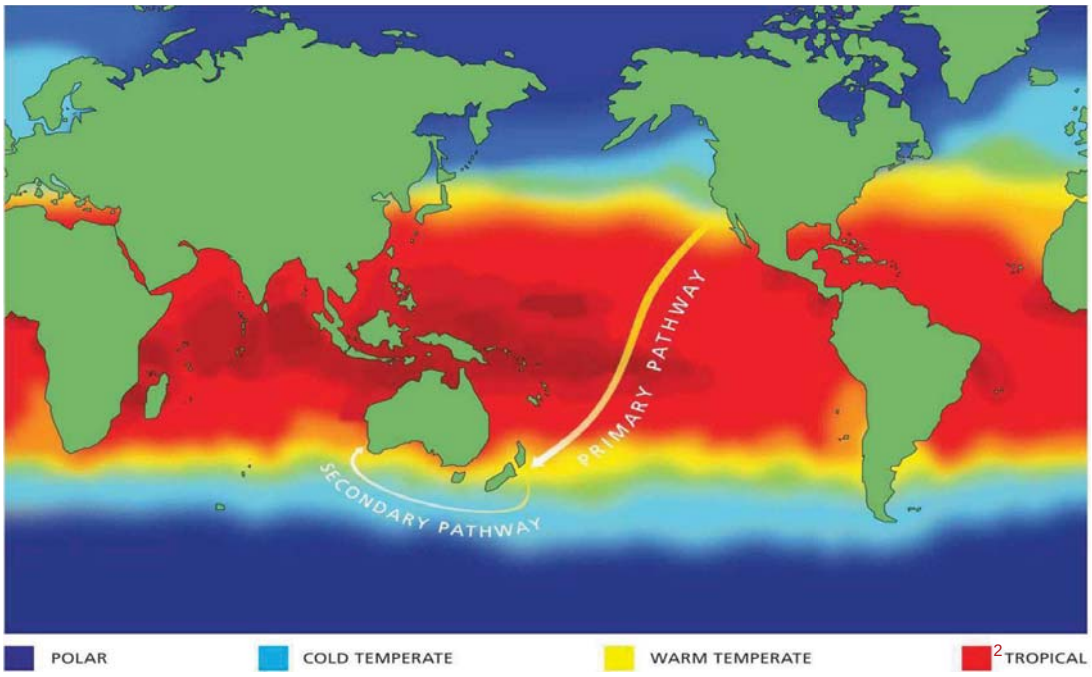
41. ISF TAGUNG - FLENSBURG MAI 2019

BALLAST WATER MANAGEMENT - UPDATE

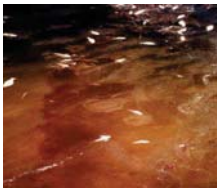
DIPL.-ING. RAMONA ZETTELMAIER
CUSTOMER RELATION & SALES MANAGER
ENVIRONMENTAL SPECIALIST

SHIPPING BREAKS NATURAL BARRIER FOR SPECIES DISPERSAL



IMPACTS: OIL POLLUTION VIA MARINE BIO-INVASION

Oil pollution is visible, has a strong media impact and usually triggers immediate political action. In time, the environment eventually recovers.



Bio-invasions may go unnoticed for some time, increase in severity over time and in most cases the process is irreversible.

COMPLEX PROBLEM

Engineering

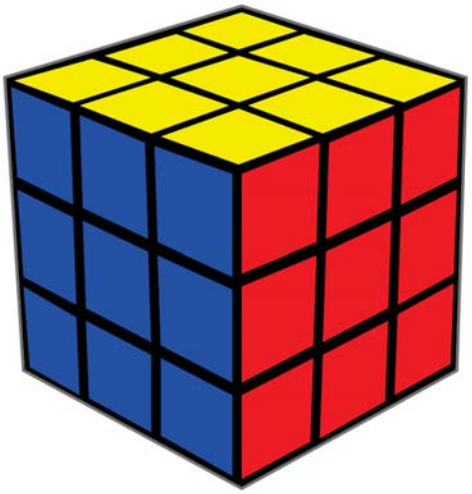
Mechanical

Physical

Chemical

Biology

Vessel operations (Worldwide)



ACTUALLY REALLY COMPLEX

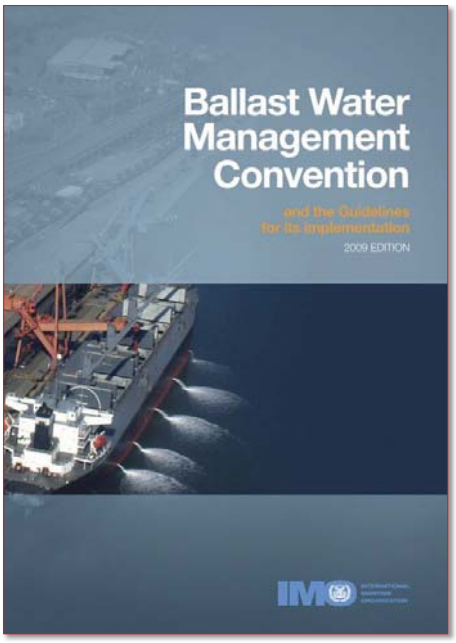
- **Invasion biology**
- **Salinity & Turbidity**
- **Naval engineering**
- **Fleet operations and management**
- **Compliance strategies**
- **Maintenance and Repairs**
- **Port operations and facilities**
- **Installation requirements**
- **Operational Requirements**
- **Volume/ Frequency of discharge**
- **Regulations leading technology**
- **Costs**

BRIEF HISTORY OF THE CONVENTION

- In 1988, Canada was the first to signal the negative effects resulting from migration of invasive species
- In 1991 the first set of voluntary guidelines to avoid the migration invasive species
- First IMO resolution in 1993, next in 1997
- In 1999, start of the Ballast Water Working Group at IMO tasked with the drafting of the convention
- In 2004 the Ballast Water Management Convention was adopted at IMO level
- Since 2004, the IMO has steadily worked on the implementation
- On 8 September 2016 Finland ratified the Convention
- Entry into force on 8 September 2017

IMO IBWM CONVENTION - NOW IN FORCE

- Does it become easier?
- Since months focus **changed / FOCUS** now on other things:
- "HOW TO COMPLY"
  "HOW NOT TO COMPLY"



MEMORY: SHIPS CONCERNED

The convention applies to **all ships** according to the definition:

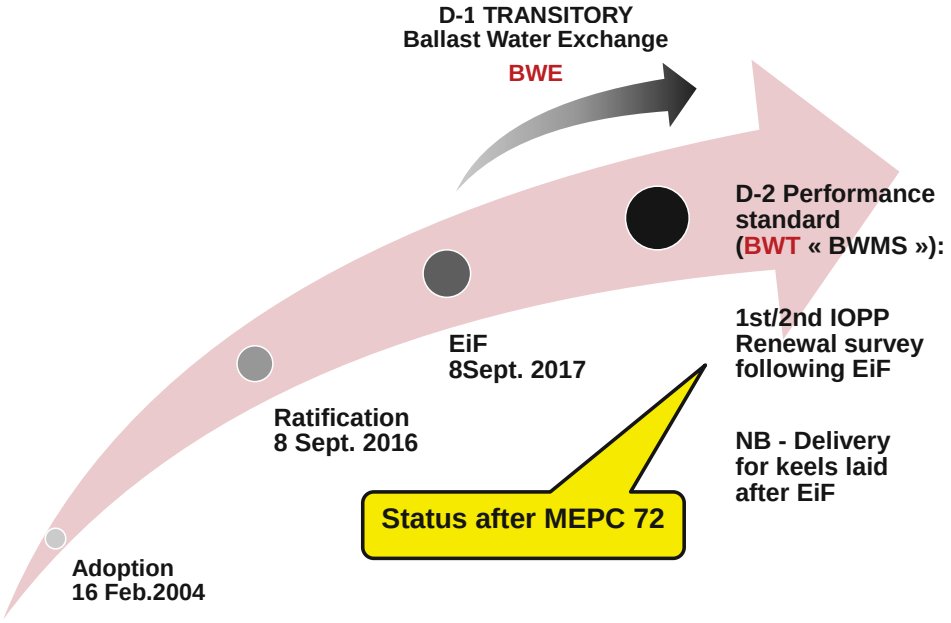
Ship means a vessel of any type whatsoever operating in the aquatic environment
and includes submersibles, floating craft, floating platforms, FSUs and FSPOs

- There will be no distinction according to type, tonnage, propulsion or usage (recreational or professional)
- No more favourable treatment will be given to ships flying the flag of a non-party to the convention
- Only few exemptions exist

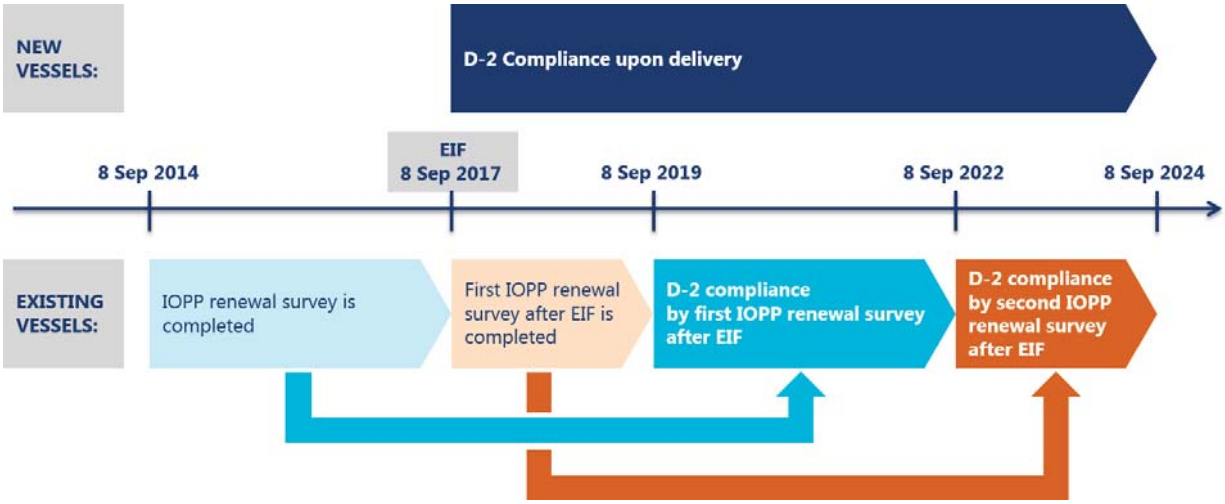
MEMORY: CONVENTION SHALL NOT APPLY FOR:

- Ships are **not designed to carry ballast water**
- Ships of **a party which only operate in waters under the jurisdiction of that party**, unless the party determines that the discharge of ballast water from such ships would impair or damage their environment, human health, property or resources, or those of adjacent or other states
- Ships which **only on non-commercial service**
- **Warships, naval auxiliary ships or other ships owned or operated by a state**
- Ships with **permanent ballast water in sealed tanks**

BWM CONVENTION IMPLEMENTATION SCHEDULE



BWM CONVENTION IMPLEMENTATION SCHEDULE



IMPLEMENTATION OF NEW G8 – BWMS CODE

► New G8 guidelines (MEPC.279(70)) added another issue about schedule

BWTS installed on or after 28 October 2020 should comply with the new adopted guidelines

BWTS installed prior to 28 October 2020 should comply with previous guidelines or preferably with the revised guidelines

► Committee agreed to make this G8 Guideline mandatory and to rename it as *Code for approval of ballast water management systems*

USA

USCG Regulatory Update

Compliance Date

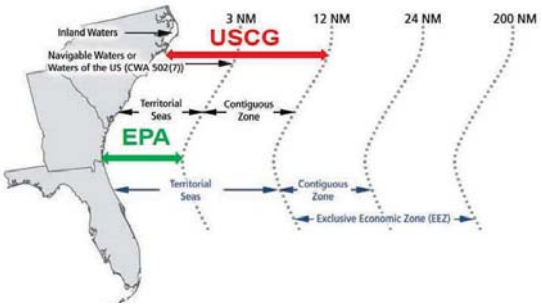
	Vsl BW capacity*	*Date constructed*	*Vessel's compliance date*
New vessels	All	On or after December 1, 2013	On delivery
Existing vessels	Less than 1500m³ or Greater than 5000m³	Before December 1, 2013	1st scheduled drydocking after January 1, 2016
	1500-5000m³		1st scheduled drydocking after January 1, 2014

"Ballast Water Capacity"** means the total volumetric capacity of any tanks, spaces or compartments on a ship used for carrying, loading or discharging Ballast Water, including any multi-use tank, space or compartment designed to allow carriage of Ballast Water.*

USCG - Requirements

The United States has not ratified the BWM Convention and has established **independent** ballast water regulations

- In the US, ships must be in compliance with:
  - USCG Ballast Water Regulations;
  - US EPA Vessel General Permit (VGP); and
  - Individual State requirements **16 States h**ave ballast water requirements (**California** is the **most stringent**)
- BWMS require **new testing** and type approval by the USCG
- General requirements for Ballast Water **Management** (BWM)
- practices, reporting, and recordkeeping.



USCG - Requirements (2) - VIDA

Vessel Incident Discharge Act (VIDA) was signed into law on Dec. 4, 2018 and is part of the CG Authorization Act of 2018
Establishes new responsibilities for USCG to enforce EPA performance standards for marine pollution
The EPA standards are the ones the industry are used to under the Vessel General Permit (VGP) currently enforced in US waters

VIDA divides responsibilities between EPA and USCG, → one Ballast Water Discharge Standard (BWDS), expected to be similar to the current standard.

VIDA effectively puts an end to the VGP

Current VGP remain in force until the new VIDA requirements are known and published by the EPA and USCG

New standards will be at least as stringent as the current VGP when it comes to implementation; but the new performance standards are not known yet and might be different

New vessels must apply to the EPA for a 2013 VGP until the VIDA regulations are finalized

USCG APPROVAL – CURRENTLY 18

Approved

Application Received	Manufacturer (Country)	Model	Independent Laboratory	System Type	Capacity	Certificate Issued* (Amended)
20 Sep 2016	Optimarin (Norway)	OBS/OBS Ex	DNV GL	Filtration + Ultraviolet	100 – 3,000 m^3/h	02 Dec 2016 (25 Feb 2019)
21 Sep 2016	Alfa Laval (Sweden)	PureBallast 3.0/3.1	DNV GL	Filtration + Ultraviolet	85 – 3,000 m^3/h	23 Dec 2016 (04 Apr 2019)
23 Sep 2016	TeamTec OceanSaver AS (Norway)	OceanSaver MK II	DNV GL	Filtration + Electrodialysis	200 – 7,200 m^3/h	23 Dec 2016 (18 Oct 2017)
24 Jan 2017	Sunrui (China)	BalClor	DNV GL	Filtration + Electrolysis	50 – 8,500 m^3/h	06 Jun 2017 (05 Jan 2018)
31 Mar 2017	Ecochlor, Inc. (USA)	Ecochlor BWTS	DNV GL	Filtration + Chemical Injection	500 – 16,200 m^3/h	10 Aug 2017 (26 Apr 2018)
02 May 2017	ERMA FIRST (Greece)	Erma First FIT	Lloyd's Register	Filtration + Electrolysis	100 – 3,740 m^3/h	18 Oct 2017 (13 Feb 2019)
31 Oct 2017	Techcross, Inc. (Republic of Korea)	Electro-Cleen	Korean Register	Electrolysis	150 – 12,000 m^3/h	05 Jun 2018
28 Sep 2017	Samsung Heavy Industries Co., Ltd (Republic of Korea)	Purimar	Korean Register	Filtration + Electrolysis	250 – 10,000 m^3/h	15 Jun 2018 (20 Jul 2018)
12 Mar 2018	BIO-UV Group (France)	BIO-SEA B	DNV GL	Filtration + Ultraviolet	55 – 1,400 m^3/h	20 Jun 2018
09 Apr 2018	Wärtsilä Water Systems, Ltd. (UK)	Aquarius EC	DNV GL	Filtration + Electrolysis	250 – 4,000 m^3/h	30 Aug 2018 (02 May 2019)
31 May 2018	Hyundai Heavy Industries Co., Ltd. (Republic of Korea)	HiBallast	DNV GL	Filtration + Electrolysis	75 – 10,000 m^3/h	26 Oct 2018
09 May 2018	Headway Technology Co., Ltd. (People's Republic of China)	OceanGuard	DNV GL	Filtration + Electrolysis	65 – 5,200 m^3/h	06 Nov 2018
29 Mar 2018	JFE Engineering Corporation (Japan)	BallastAce	Control Union	Filtration + Chemical Injection	500 – 3,500 m^3/h	13 Nov 2018 (08 Feb 2019)

USCG APPROVAL (2)

Approved						
Application Received	**Manufacturer (Country)**	**Model**	**Independent Laboratory**	**System Type**	**Capacity**	**Certificate Issued* (Amended)**
30 Mar 2018	Panasia Co., Ltd. (Republic of Korea)	GloEn-Patrol	DNV GL	Filtration + Ultraviolet	50 – 6,000 m^3/h	14 Dec 2018
03 Mar 2018	De Nora (USA)	BALPURE	Lloyd's Register	Filtration + Electrolysis	400 – 8,570 m^3/h	19 Dec 2018
20 Jul 2018	Envirocleanse, LLC (USA)	inTank BWTS	DNV GL	Electrolysis + Chemical Injection	Up to 200,000 m^3	01 Feb 2019
18 Oct 2018	DESMI Ocean Guard A/S (Denmark)	CompactClean	Lloyd's Register	Filtration + Ultraviolet	35 – 3,000 m^3/h	16 Apr 2019
19 Oct 2018	Wärtsilä Water Systems, Ltd. (UK)	Aquarius UV	DNV GL	Filtration + Ultraviolet	50 – 1,000 m^3/h	02 May 2019

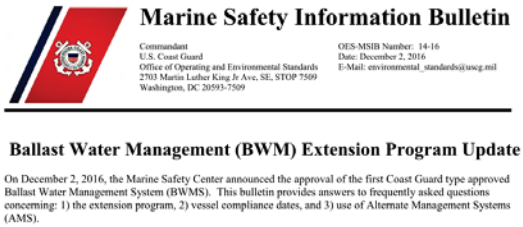
Some manufacturers have requested multiple amendments to their Type Approval Certificates. Copies of the US Coast Guard Type Approval Certificates can be found on the USCG Approved Equipment List at http://cgmix.uscg.mil/Equipment/Default.aspx

USCG APPROVAL – 11 UNDER REVIEW

Under Review						
Application Received	**Manufacturer (Country)**	**Model**	**Independent Laboratory**	**System Type**	**Capacity**	**Certificate Issued* (Amended)**
30 Aug 2018	NK BMS Co., Ltd. (Republic of Korea)	NK-O3 BlueBallast II	Lloyd's Register	Ozone	200 – 8,000 m^3/h	Pending
27 Sep 2018	NK BMS Co., Ltd. (Republic of Korea)	NK-O3 Blue-Ballast II Plus	Lloyd's Register	Ozone	200 – 8,000 m^3/h	Pending
19 Oct 2018	Cathelco Ltd. (UK)	Evolution	Lloyd's Register	Filtration + Ultraviolet	34 – 1,500 m^3/h	Pending
23 Oct 2018	Techcross, Inc. (Republic of Korea)	Electro-Cleen	Korean Register	Electrolysis	150 – 12,000 m^3/h	05 Jun 2018 (Pending)
27 Nov 2018	Semb-Eco Pte, Ltd. (Singapore)	LUV U1	Lloyd's Register	Filtration + Ultraviolet	500 m^3/h	Pending
23 Jan 2019	Miura Co., Ltd. (Japan)	HK-S(E)	NSF International	Filtration + Ultraviolet	200 – 900 m^3/h	Pending
18 Mar 2019	Alfa Laval (Sweden)	PureBallast 3.2	DNV GL	Filtration + Ultraviolet	85 – 3,000 m^3/h	Pending
26 Mar 2019	DESMI Ocean Guard A/S (Denmark)	CompactClean	Lloyd's Register	Filtration + Ultraviolet	35 – 3,000 m^3/h	16 Apr 2019 (Pending)
01 Apr 2019	Hyundai Heavy Industries Co., Ltd. (Republic of Korea)	EcoBallast	Korean Register	Filtration + Ultraviolet	250 – 2,160 m^3/h	Pending
16 Apr 2019	Miura Co., Ltd. (Japan)	HK-(E)C	DNV GL	Filtration + Ultraviolet	160 – 900 m^3/h	Pending
29 Apr 2019	De Nora (USA)	BALPURE	Lloyd's Register	Filtration + Electrolysis	400 – 8,570 m^3/h	19 Dec 2018 (Pending)

USCG – EXTENSION

"It's harder to justify extensions because more compliance options are available," Statement of USCG, Mr Reudelhuber



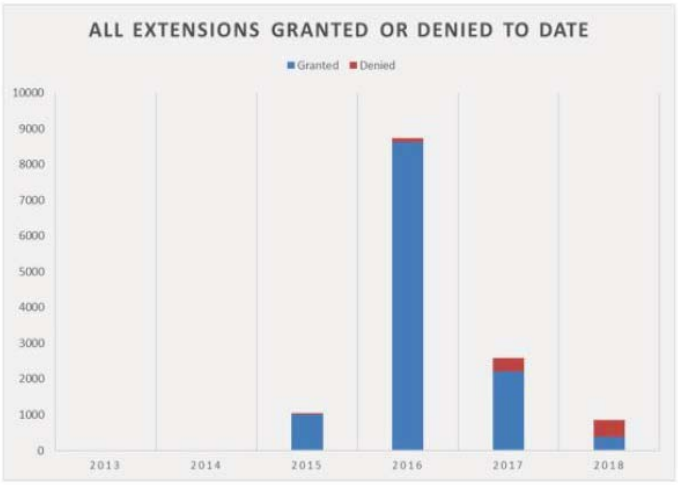
Marine Safety Information Bulletin

Commandant
U.S. Coast Guard
Office of Operating and Environmental Standards
2703 Martin Luther King Jr Ave, SE, STOP 7509
Washington, DC 20593-7509

OES-MSIB Number: 14-16
Date: December 2, 2016
E-Mail: environmental_standards@uscg.mil

Ballast Water Management (BWM) Extension Program Update

On December 2, 2016, the Marine Safety Center announced the approval of the first Coast Guard type approved Ballast Water Management System (BWMS). This bulletin provides answers to frequently asked questions concerning: 1) the extension program, 2) vessel compliance dates, and 3) use of Alternate Management Systems (AMS).



The Coast Guard has about 12,500 active extensions, two-thirds of which were granted in 2016 when no type approved systems were available. Most of these extensions will expire between 2021 and 2024, which aligns with the end of the IMO experience-building phase.

HOW TO COMPLY - SURVEY & CERTIFICATION

- This means that EiF, **ships of 400 GRT** and above will be required to have on board:

1. An approved Ballast Water Management Plan (BWMP) (according to D-1 or D-2 Standard)

2. A Ballast Water Record Book (BWRB)

3. An International BWM Certificate (according to D-1 or D-2 Standard). If vessel's flag has not ratified BWM Convention, then a Certificate of Compliance

BWMP's approved in accordance with resolution A.868 (20) will remain valid until a Ballast Water Management System has been installed which thus requires revision of the BWMP (MEPC.127(53))

HOW TO COMPLY - BALLAST WATER RECORD BOOK

Ballast Water Record Book , may be an electronic record system, shall be maintained on board the ship for a minimum period of two years , and shall contain:

- ➢ Each operation concerning Ballast Water (fully)
- ➢ Accidental or exceptional discharge of Ballast Water not otherwise exempted by this Convention, describing the circumstances of, and the reason for, the discharge

AGAIN - HOW TO COMPLY – D1 & D2

2 Options depending upon existence of an IOPP certificate

✓Regulation D-1 Ballast Water Exchange Standard as of 8 September 2017 (if no IOPP)

✓Regulation D-2 Ballast Water Performance Standard as of renewal survey of the IOPP (IMO res. A.1088(28))

HOW TO COMPLY – D1

- At least a 95%volumetric exchange of ballast water
- For ships exchanging ballast water by the pumping- through method, pumping through three times the volume of each ballast water tank shall be considered to meet the standard
- At least 200 nautical miles from the nearest land and in water at least 200 metres in depth
- At least 50 nautical miles from the nearest land and in water at least 200 metres in depth

HOW TO COMPLY – D1

Example - NorthSea?

- Dedicated ballast water exchange zone for intra NorthSea traffic

Red areas = No Ballast Water Exchange

HOW TO COMPLY – D1

How to comply when the voyage only passes limited time through the exchange zone?

A ship shall not be required to deviate from its intended voyage, or delay the voyage, in order to comply with any particular requirement of the D-1 Ballast Water Exchange Standard

HOW TO COMPLY – D1

How to comply when the voyage does not allow any ballast water exchange for safety reasons?

A ship conducting Ballast Water exchange shall not be required to comply with the D-1 standard, if the master reasonably decides that such exchange would threaten the safety or stability of the ship, its crew, or its passengers

HOW TO COMPLY – D1

Local authorities can always **refuse** the discharge of ballast water when the D-1 Standard is not met for any of the aforementioned reasons!

HOW TO COMPLY – D2 – BWMS PERFORMANCE STANDARD

Organisms	Discharge Limitation
Organisms ≥ 50 µm	< 10 viable organisms / m^3
50 µm > Organisms ≥ 10 µm	< 10 viable organisms / ml
Indicator Microbes	**Concentration**
Toxicogenic Vibrio cholera (O1 and O139)	< 1 colony-forming unit (cfu) per 100 ml
Escherichia coli	< 250 cfu per 100 ml
Intestinal Enterococci	< 100 cfu per 100 ml

EXEMPTIONS:

- The uptake or discharge of Ballast Water and Sediments in **emergency situations**
- The **accidental discharge** or ingress of Ballast Water and Sediments resulting from damage
- avoiding or minimizing pollution incidents from the ship
- **Return to origin**, same uptake/discharge

HOW TO COMPLY – D2 – BWMS PERFORMANCE STANDARD

Exemptions by adminsitration

- Can be granted to a ship or ships on a voyage or voyages **between specified ports or locations**; or to a ship which operates exclusively between specified ports or location
- Effective for a period of **no more than five years** subject to intermediate review
- Can be granted to ships that **do not mix** Ballast Water or Sediments other than between the ports or locations specified
- Can only be **granted based** on the guidelines on **risk assessment** developed by the IMO

HOW TO COMPLY – D2 – BWMS PERFORMANCE STANDARD

A vessel **sailing** between ports under the jurisdiction of **x-amount of parties** will need same amount of exemptions issued by the administrations of parties to the convention involved

MEMORY THE CONVENTION

BALLAST WATER MANAGEMENT PRACTICES

- ▶ Take precautions when ballasting
- ▶ Exchange Ballast
- ▶ Treat Ballast
- ▶ Retain ballast on board
- ▶ Discharge to shore reception facilities
- ▶ Control sediment built up

THE CONVENTION - CONTROL SEDIMENTS

Wash tanks regularly

Remove sediments regularly

Prevent sediment build up

Port state responsibility?? G1

Massenwanderung juveniler Krabben im Mai 1998 in Geesthacht - www.nobanis.org

MARKET PREDICTION

6.517 vessels delivered with BWTS installed and **2.391** vessels on teh orderbook

1.200 vessels that have been retrofitted and another **950** contracted

World cargo fleet is around **60.000 vessels,** which indicates a **sub-set** of around **11.000** vessels

Remaining **80%** of the world cargo fleet to be retrofitted with BWTS by end of **2024**

Source: Clarkson Research Services

Availability of sufficient production of BWMS?
Shipyard capacities available ?
Confidence on existing BWMS with regards to USCG requirements?
Prediction on inflation of the price of retrofit…

MARKET EXPERIENCES - OPEN QUESTIONS?

- **Costs !!**
- Equipment size, space requirements and location
- Ballasting operation affects/treatment system pressure drops
- Equipment protection (IP rating) and hazardous spaces
- Affect on power requirements – modified UV-Systems for USCG-aproval (double power requirements, half of flow rate!)
- Impact on ballast tank coatings and ballast pipe corrosion
- Handling and storage of any required chemicals
- Operation and maintenance requirements
- Emergency by-pass operation
- Sediment disposal ?
- **Top-Tank Ballastwater gravity discharge – how to retrofit ?**
- **Installed BWMTS without USCG-approval? No grandfathering by USCG! New installation after 5 years AMS-approval !!**
- **Future BW-Sampling ??!**
- **Near-coastal voyages – exemptions for Short Sea Traffic ??**

Source: VDR

SPOT ON ACTUAL DEVELOPMENTS

SAMPLING

- New technologies emerged for mobile testing equipments

FILTER Technologies

- Filtering out Type Approval concerns

TRAINING

- Lack of familiarity of crew members

PSC – HOW TO COMPLY

Deficienties can be

Absence of Ballast Water Certificate, Management Plan or Record Book

Indication that the vessel or its **equipment does not correspond** substantially with the particulars of the Ballast Water Certificate and/or Ballast Water Management Plan

The **designated personnel are not familiar** with essential shipboard procedures relating to ballast water management

No Designated Officer has been nominated

PSC – GUIDELINES

- Adopted Guidelines for Port State Control under the BWM Convention, Resolution MEPC.252(67)
- **First Stage** – "Initial Inspection"
  - Documentation–international BWM Certificate, approved BWMP, and Ballast Water Record Book
  - BWM Officer properly trained, and knows how to operate the BWMS
  - Maintain evidence that BWM system is type approved and has been maintained and operated in accordance with BWMP if the use of a BWMS is required
- **Second Stage** – "More Detailed Inspection"
  - Check compliance of operations in accordance with the BWMP
  - Operation of BWMS checked against records, crew knowledge, operating status and bypass records
  - BWMS operated in according to BWMP and self-monitoring indicators
- **Third Stage** – "indicative or detailed sampling would occur
- **Fourth Stage** – "Detailed analysis to verify compliance with D-2 Standard

PSC – ATTENTION

Deficiencies against the BWMC may warrant the detention of the vessel!

HOPE: MEPC (71) : EBP – experience building phase

Data collection

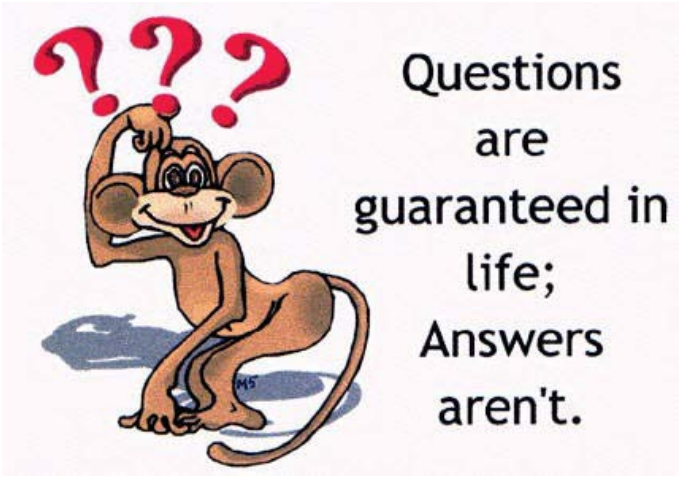
Data analysing

Convention review

✓ GLOBAL consistant way approach

Non- penalization arrangement
Extended period ?

QUESTIONS ?



THANK YOU !

Dipl.Ing. Ramona Zettelmaier

Ramona.zettelmaier@de.bureauveritas.com