GESAMP
Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection

The Methodology to Evaluate BWMS for Risks to the Environment, Humans and Ship

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R&D Forum, Busan, Republic of Korea

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Contents

GESAMP
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- GESAMP
- GESAMP-BWWG
- Stock taking workshop #5
- Phase 2 database CHERABS
- Conclusions and Recommendations

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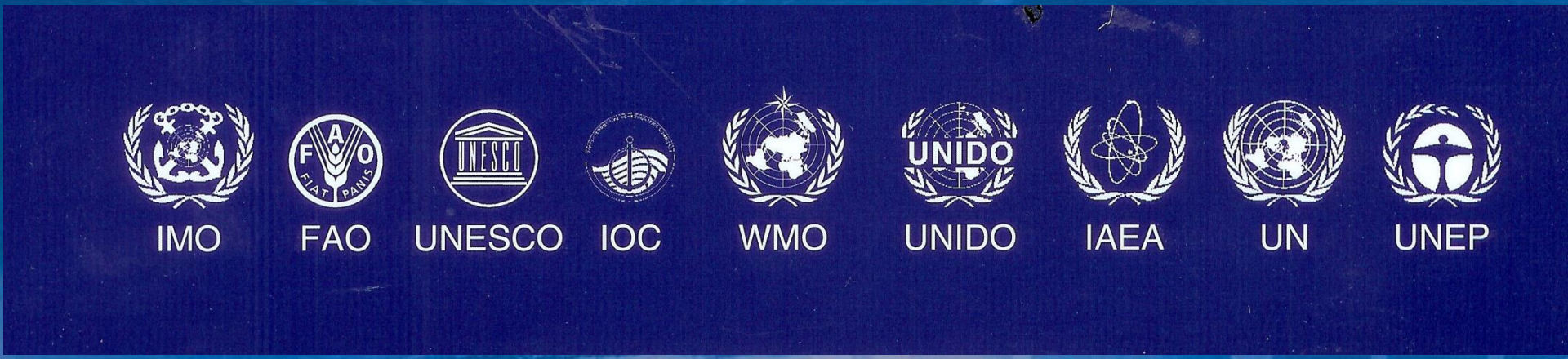
The Joint Group of Experts on the Scientific Aspects of Marine environmental Protection

an inter-agency advisory body of the United Nations system



UN-Organizations

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Member Institutions of GESAMP

- IMO
- FAO
- UNESCO-IOC
- WMO
- IAEA
- UN-DOALOS
- UNEP
- UNIDO
- UNDP

Organizational structure

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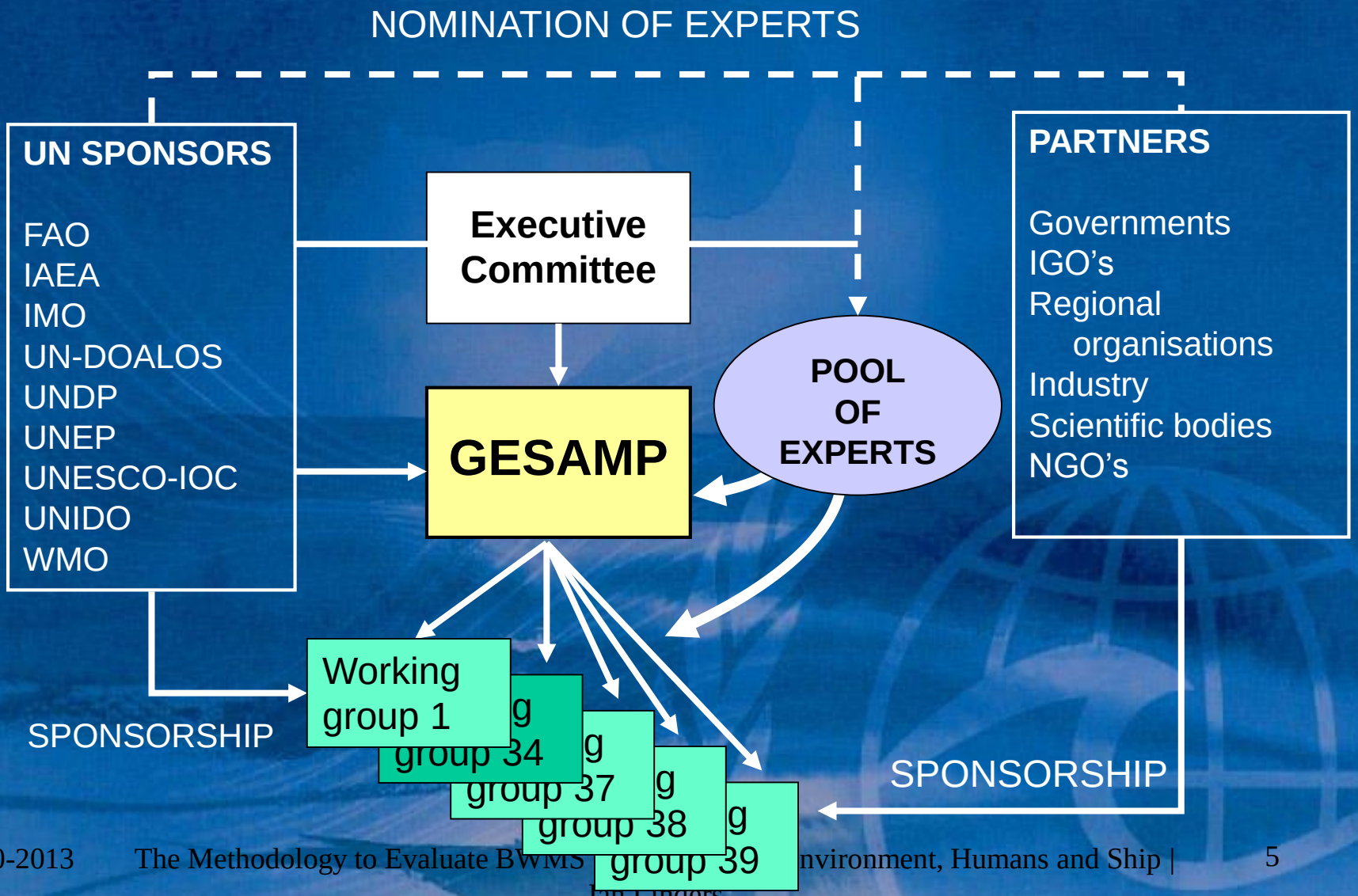

GESAMP-BWWG

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= WG34 (Standing, since 2006):

Scientific evaluation of the active substances and relevant chemicals in BWMS proposals on the potential for unreasonable risk to the environment, human health, property (i.e. ship) or resources in support of the Ballast Water Convention

(IMO; Jan Linders, The Netherlands, chair)

Members from different countries: Portugal, Sweden, UK, Japan, Republic of Korea, USA, Canada, Nigeria, selected on the basis of relevant expertise from the GESAMP pool of experts and supported by 1 or 2 consultants

Approval Process

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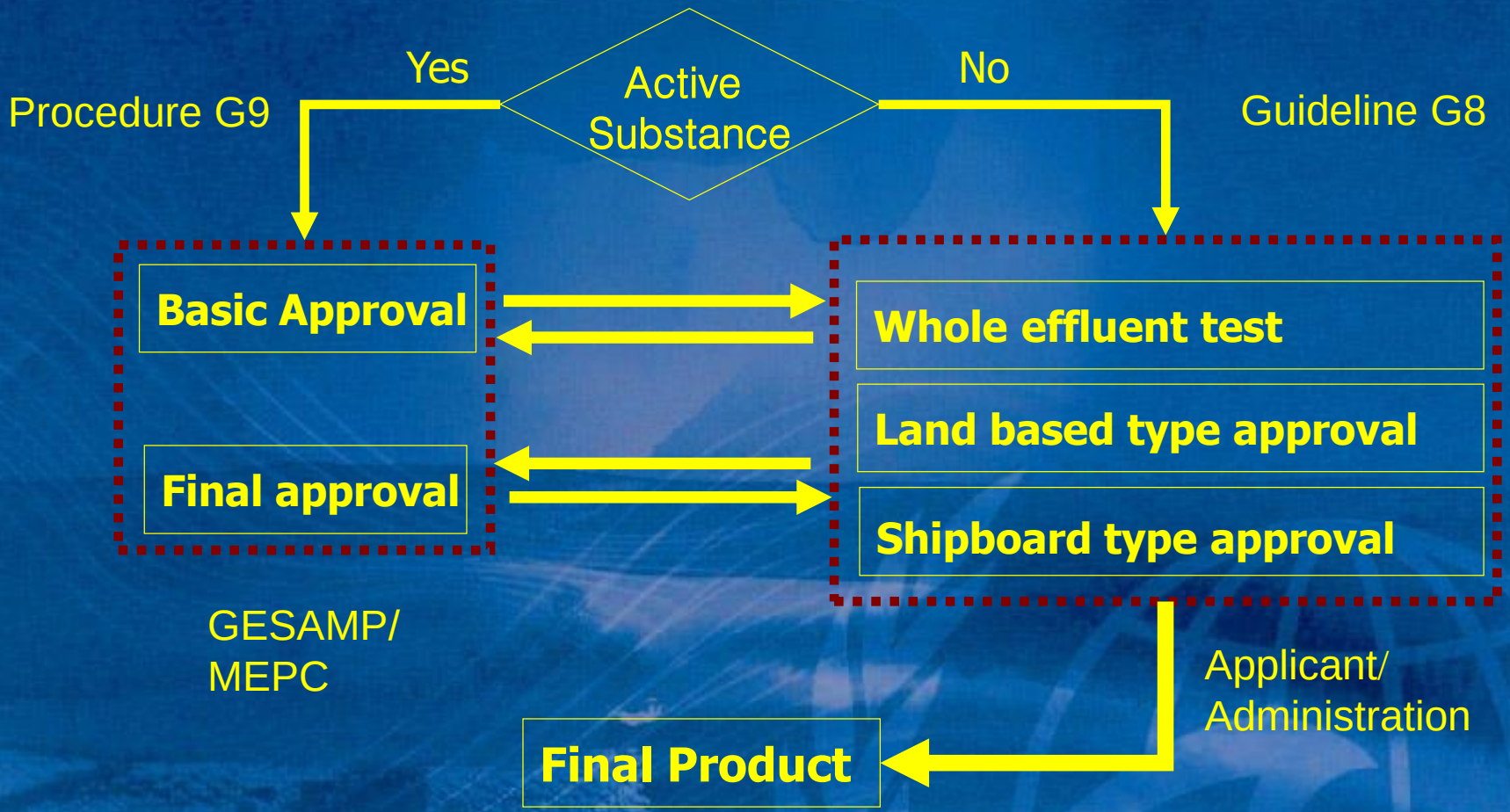

Risk Assessment

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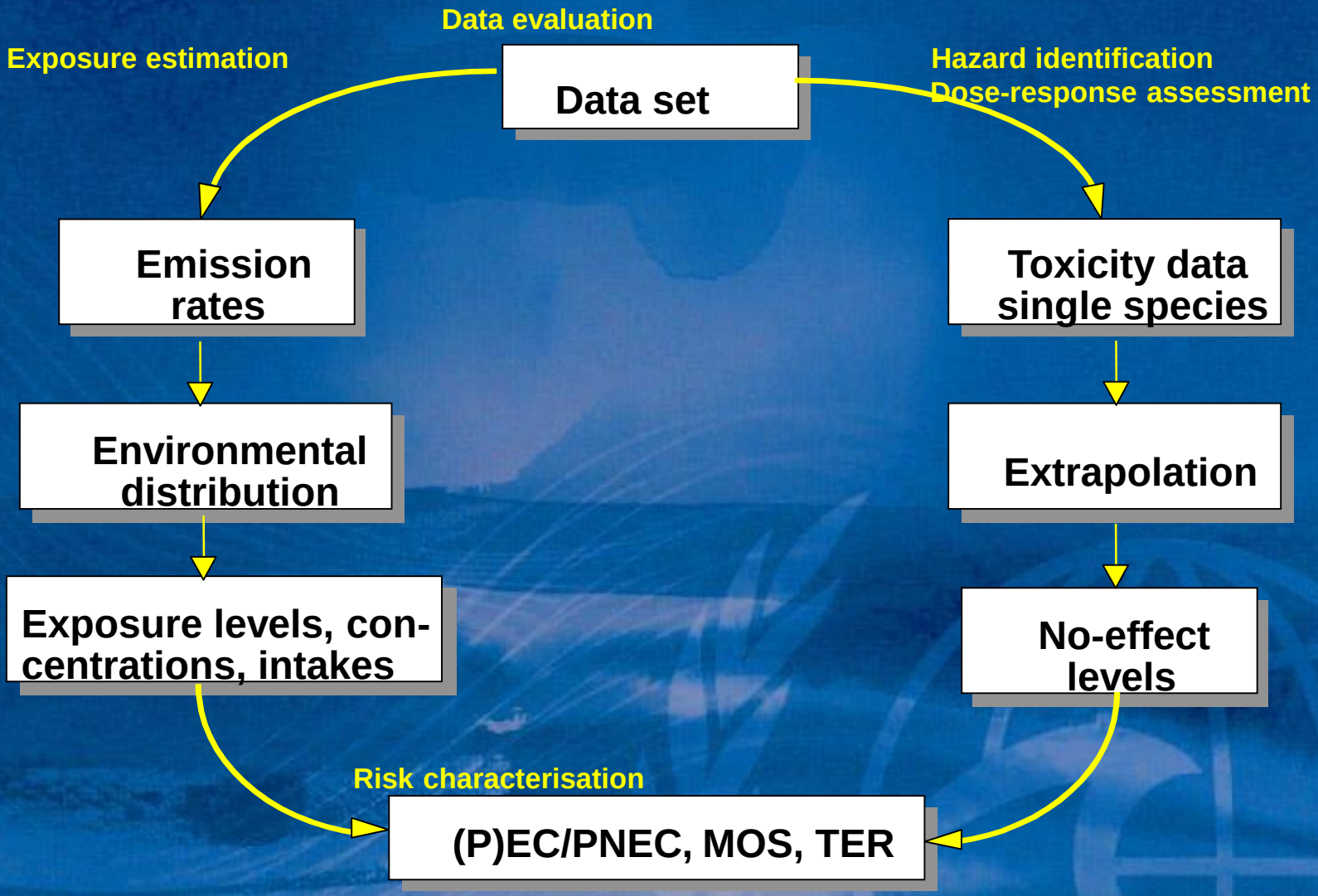

Evaluation of BWMS

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- Environment: Determination of PEC, PNEC and ratio PEC/PNEC
  - Relevant substances and **treated BW**
  - Water and sediment,
  - Fish, Daphnia and algae
  - Marine organisms
  - PBT (incl. CMR)
- Humans, treated BW
  - Workers
    - Crew and port state control
    - Unit operations, ventilation, storage, temperature
  - General public
    - Swimming (oral, dermal and inhalatory route)
    - Consumption of seafood
- Ship
  - Corrosion

Information on Effects

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- Literature data
  - From scientific papers
  - From evaluation by recognized bodies (EPA, EU, OECD, WHO, etc.)
- Acute and chronic tests
  - According to internationally accepted guidelines (OECD, EPA, etc.)
  - For fresh water and marine water environments
- Evaluation leading to a PNEC
  - For the active substance(s)
  - For relevant chemicals, like DBPs
  - According to accepted Methodology
- Laboratory toxicity tests with treated BW at Basic Approval
- Whole Effluent Toxicity (WET) tests at Final Approval

WET tests

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- 1 For the **Basic** Approval process, the discharge testing should be performed in a **laboratory** using techniques and equipment to simulate Ballast Water Discharge following treatment by the Active Substance or Preparation
- 2 For **Final** Approval, the discharge testing should be performed as part of the **land-based** type approval process using the treated ballast water discharge

Stock Taking Workshop #5

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- Structure ERA
- TRO measurements
- Temperature effects
- Corrosion
- Higher tier testing

Structure ERA, BA

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Risk assessment tier 1	PEC/PNEC, incl. near sea PEC/PNEC	Using modeling and literature data
Risk assessment tier 2	Effects in lab tests	-
Risk assessment tier 3	Tiers 1 and 2 in agreement?	Yes/No
Proposal	Preference Risk Assessment 1	

Structure ERA, FA

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Risk assessment tier 1	PEC/PNEC, incl. near sea PEC/PNEC	Using modeling and literature data
Risk assessment tier 2	Effects in WET tests	-
Risk assessment tier 3	Tiers 1 and 2 in agreement?	Yes/No
Proposal	Preference Risk Assessment 2	

Approach

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- Apply the quality validity criteria for ecotoxicity tests strictly, if appropriate, relying on expert judgment
- Literature data are preferred over laboratory-scale ecotoxicity testing at BA
- WET test results at FA are preferred over literature data
- Near sea scenario as defined

TRO measurements

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- Under current circumstances, the Group recommends TRO monitoring by the DPD colorimetric method as a preferred measuring method for the TRO
- The Group anticipated that monitoring technologies of TRO by the amperometric method are likely to be developed further by the industry
- Position may be changed in future

Temperature effects

- Temperature effects on degradation of AS and formation of DBPs will be described using the Arrhenius equation according to the Q10 approach with a Q10 value of 2.58 assuming the degradation of the AS found in literature is 20 °C except if stated otherwise
- Not more than to 10 °C
- $DT50_T = DT50_{20} \cdot e^{-0.095(T-20)}$
- Value of 0.095 is based on Q10-value of 2.58 (EFSA, 2007).

Corrosion

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- Left over from last MEPC
- Agreement reached between GESAMP-BWWG and NACE International and IPPIC
- Results:
  - For systems using TRO as Active Substance no corrosion testing is needed if TRO < 10 mg/L as Cl_2
  - Use of artificial seawater is preferred but natural seawater is acceptable
  - Final text for Methodology of BWWG is agreed

Higher tier testing

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- Several tests under discussion at BWWG:
  - Tests on CMR properties
  - Two algal species at BA and at FA
  - Inclusion of non-diatom algal test
  - Preferred algal species is *Skeletonema costatum*
  - Organism to remove is *Phaeodactylum tricornutum*
  - Introduction of TIE and/or micronucleus test
- However, not feasible until BWM Convention has entered into force

Phase II CHERABS

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1,2-dichloroethane
dibromomethane
acetaldehyde
formaldehyde
bromochloroacetonitrile
tetrachloromethane
chloral hydrate
dalapon
dichloroacetonitrile
dichloromethane
trichloroacetonitrile
chloropicrin
1,1-dichloroethane

monobromoacetonitrile
1,2-dichloropropane
2,4,6-tribromophenol
bromate ion
dibromochloroacetic acid
dichlorobromoacetic acid
1,2-dibromo-3-chloropropane
1,1,2-trichloroethane
trichloroethene
monochloroacetonitrile
1,1,1-trichloroethane
1,1-dibromoethane

CHERABS

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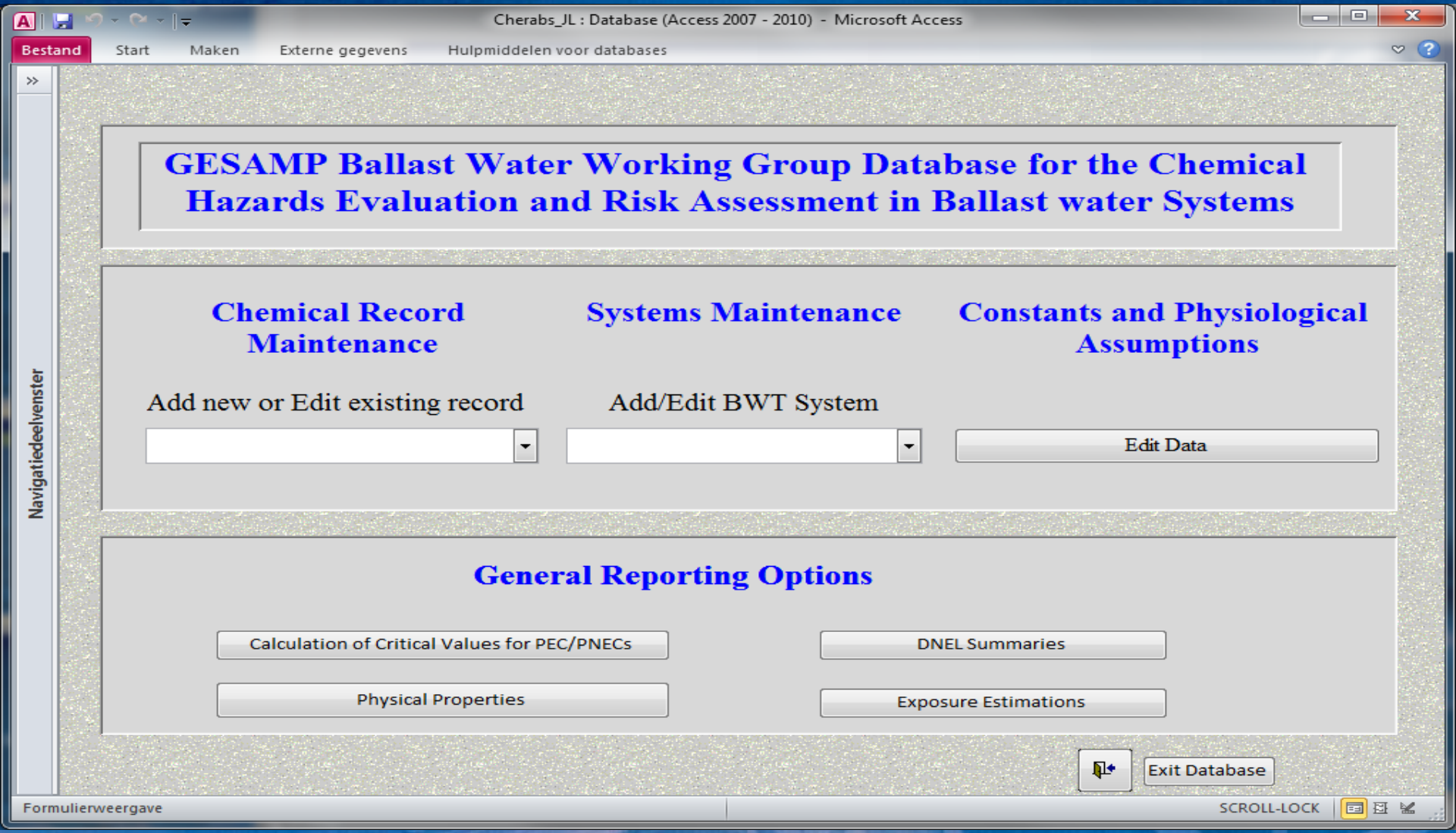

Conclusions

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- STWs show useful, yearly maybe too often
- Clear structure in Environmental Risk Assessment strategy
- Preferred method for TRO measurements
- Agreement on corrosion with NACE and IPPIC
- Phase II of GESAMP-BWWG database operational in 2014
- Database available at MEPC66

Recommendations

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- Applicants to make use of the database at submissions for BA and FA
- Application of near sea scenario
- Additional testing proposed if BWM Convention enters into force

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Thank you
for your kind attention