European Maritime Safety Agency

Training for the Jordan Commission

Response to HNS emergencies at sea

Unit 1.1 – Sustainability - Pollution Response Services

Jordan / 15-16 June 2021

EMSA

HNS DEFINITION

OPRC-HNS Protocol (2000) - Protocol on Preparedness, Response and Cooperation to pollution Incidents by Hazardous and Noxious Substances.

HNS are defined as:

"***any substance other than oil which, if introduced into the marine environment, is likely to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate use of the sea***".

Challenges – CONTAINER vs BULK

- A ship is a condensed space where **hundreds of different substances** can be transported simultaneously (e.g. ultra-large container ships);
- In case of a chemical carrier (e.g. liquid bulk substances), fewer substances, but in **much larger amounts**;

LEGAL FRAMEWORK - HNS

-SOLAS CHAPTER 7

PART A Packaged form

Part 1A Solid in Bulk

CARRIAGE

-MARPOL

Annex 2

liquid in bulk (4 classes: X, Y, Z, other);

CONSTRUCTION

IBC Code (dangerous chemicals in bulk)

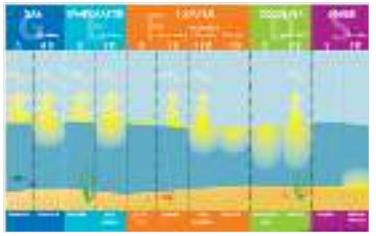
IMDG Code (packaged goods)

IGC Code (liquefied gases in bulk)

Challenges

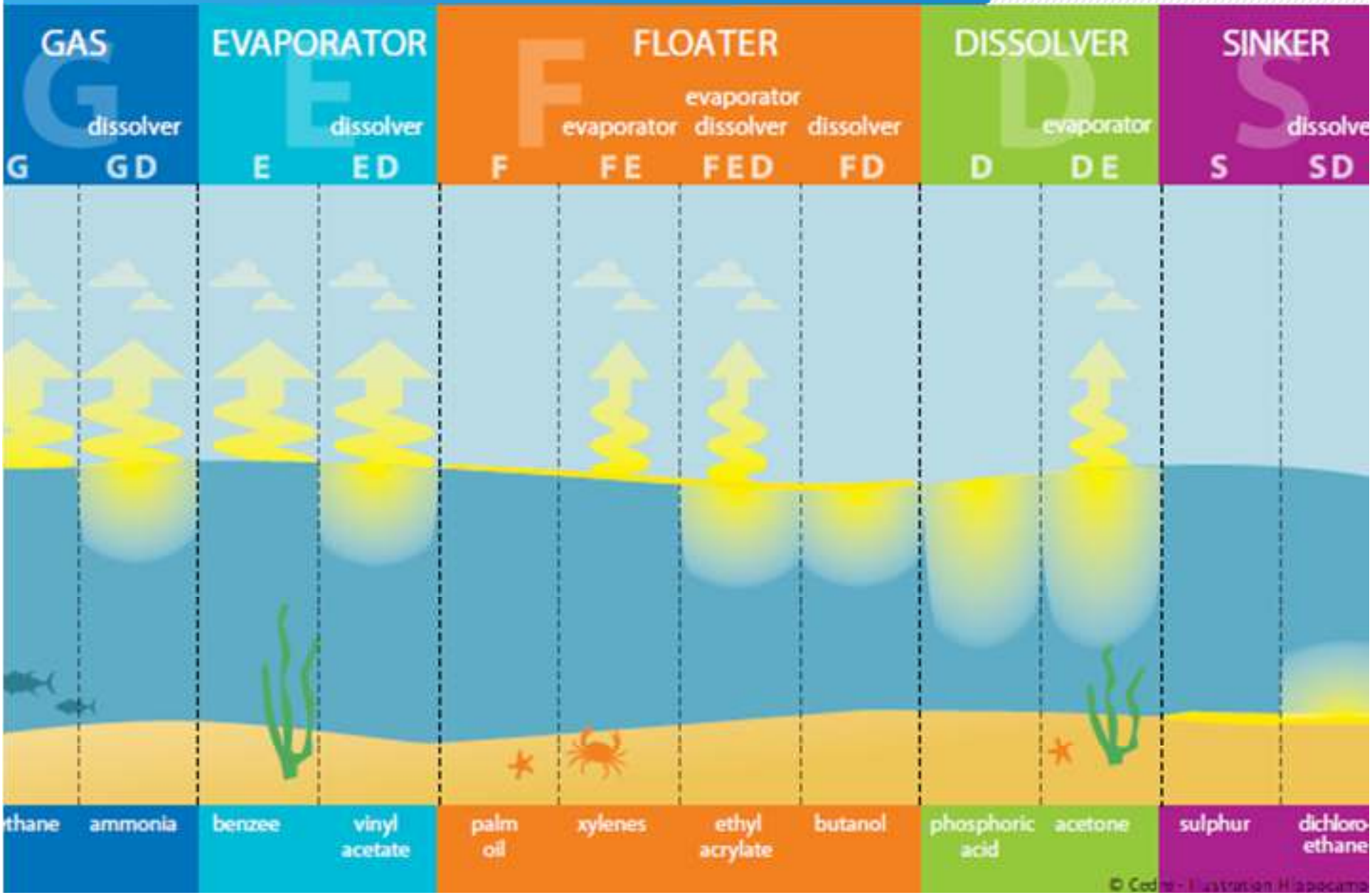
- In an emergency at sea the ship **is dependent on its own resources.** Without the immediate support of the emergency teams/other ships (radio communication only);
- The **crew are the 'first'** responders;
- Confined spaces on board;
- Limited emergency resources on board;
- Weather / sea conditions may pose additional constraints;
- Far from land.

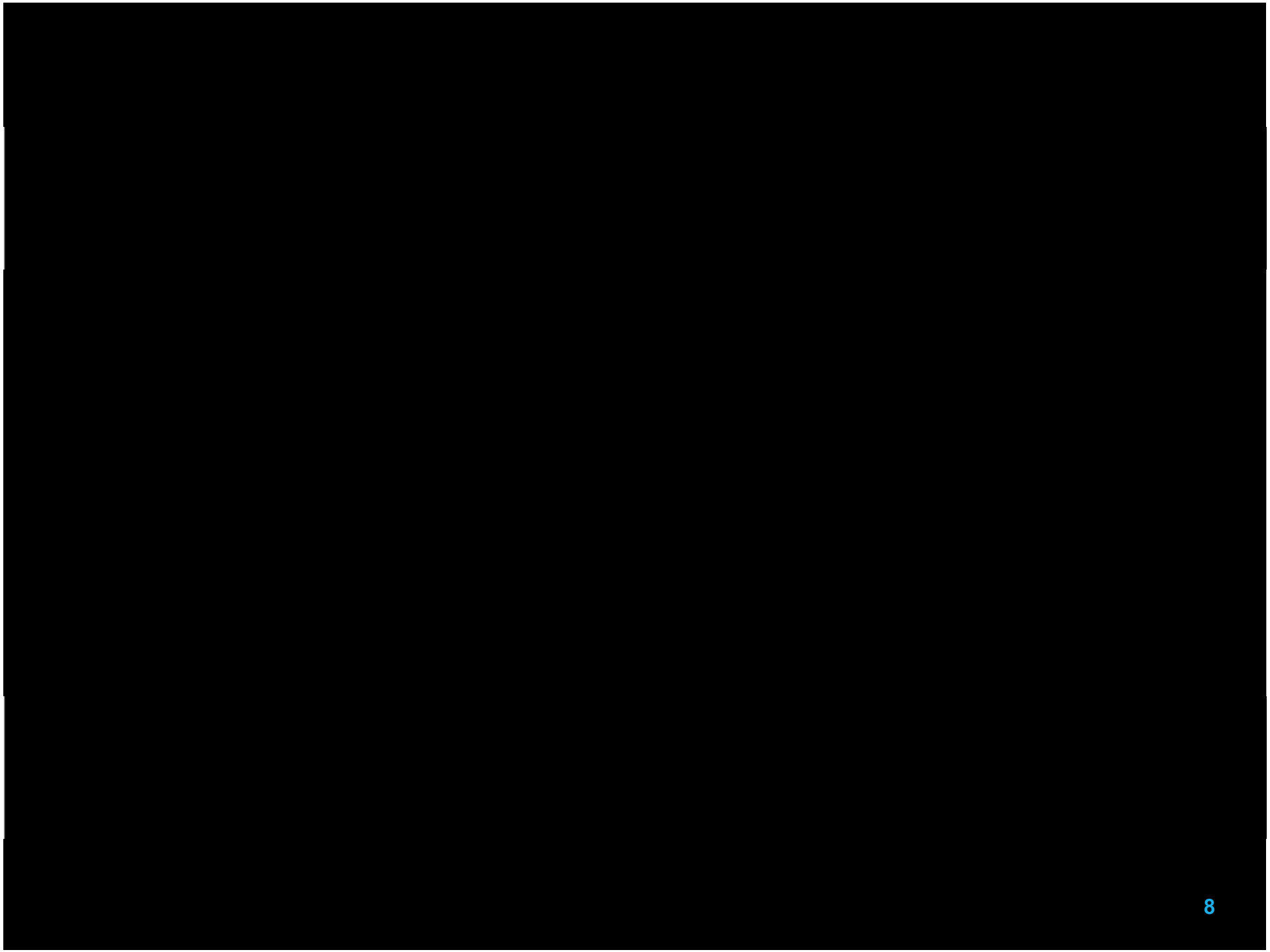
Challenges



- Substance release/leak - exposing its **intrinsic** hazards.
- **Fire / explosion** that may compromise the structure of ship and lead to the release/leak of substances on-board.
- If in addition there are potential hazards of **interaction/reaction** between substances on board – escalation of the incident.

Physical behaviour of chemicals at sea





In an emergency

Mis/non declaration of dangerous and polluting goods!!

1 **Identification of hazards and risks**

- Identification of all substances/cargo on board (location!);
- Information on the hazards, physical behaviour, physical and chemical properties of each substance.

2 **Prioritisation/assessment of hazards and risks**

- Analysis of all the information available;
- Prioritize the hazards considering the potential risk.

3 **Response**

Response options to HNS, 1

Response Option	HNSType	**Description**
Changing position of vessel	Toxic gas or smoke plume	Change vessel position with regard to wind direction so that plume moves away from windward areas, e.g. boarding area for response crew
Towing vessel to less vulnerable area	HNS has risk area capable of wide area impact	Due to explosion or toxic cloud risk near centre of population or if cargo is a marine pollutant within/ or adjacent to a sensitive site, the vessel is towed to remove centre of population & environmental resources from potential risk area, depending on HNS type
Ship to Ship Transfer (Packaged)	Packaged goods	Packaged cargo removed from casualty; requires vessel equipped with lifting gear derricks etc, or third specialist salvage platform with similar capability
Ship to Ship Transfer (Bulk)	Normally bulk liquid cargoes	Bulk cargo removed from casualty into vessel alongside, in-line with OCIMF guidance
Controlled release with dilution	Gas, evaporator or dissolver which is not an environmental pollutant	Intentional release of ship's cargo to reduce risk of loosing vessel or entire cargo (e.g. refloating, reducing list, reducing pressure in damaged cargo tanks, fire prevention, etc). HNS is diluted by air (gas/ evaporator) or water (dissolver)
Controlled release with sprinkler system (knockdown)	Gas	As above, with incorporation of a sprinkler system to produce water air combination that reduces concentration and scrubs material from air due to entrapment of material in water droplets

Response options to HNS, 2

Destruction of ship and/or cargo	Evaporators, gas, dissolvers. (Floaters or sinkers, only if can be destroyed by action)	By destroying the source of risk, the problem may be removed; however, a careful assessment of risk is required to ensure this action does not lead to more serious risks to human health or the environment . This response option should only be used if absolutely necessary
Monitoring, survey and inspection	Floaters, floating packages, sinkers and wreck/ casualty	Floating packages and bulk floaters may be observed using aerial surveillance; remote sensing systems used for oil spills may also be able to detect floating HNS spills. Drifter buoys with transponders can be deployed within surface spill to mark drift patt ern. Remote Operated Vehicles (ROVs) and diver skilled eyed surveys (where safe to do so) can be used to monitor wreck sites or sunken packaged HNS (containers, etc)
Use of oil spill response techniques	Floaters	Equipment commonly deployed for oil spills may be useful for HNS with similar properties to oil, allowing the deployment of booms, skimmers, etc. However, care should be taken to undertake a risk assessment due to the potentially more hazardous nature of HNS when compared with oil
Neutralisation	Acids or bases	Apply acid or base to a spill to form a neutral base, although care should be taken not to overdose, leading to a substance more acidic (low pH) or alkaline (high pH) than the original spill
Airlift dredge	Sinkers	Pneumatic dredge used to remove sinker/ contaminated sediment; material must be capable of transport through pipe work. Some dredges can be operated by diver however care must be taken not to expose the diver to contamination
Capping	Sinkers	Use of inert material, i.e. clean sediment, to overlay contaminated material/sinkers; HNS is then sealed and not available to environment

EMSA's Pollution response mandate

- **Operational tasks in marine pollution response (2004)**
  - "To provide to Member States & the Commission with **techncial and scientific assistance** in the field of ship-sourced pollution"
  - "To support on request with **additional means** the pollution response mechanisms of Member States in a cost efficient way"
- **Oil spill response (inital focus)**
- **Chemical spills (phased-in gradually)**

HNS Action Plan

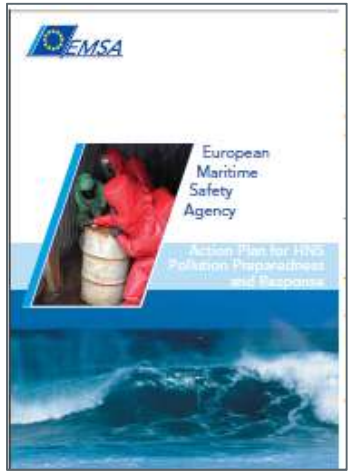
HNS definition as per OPRC-HNS Protocol

"Any substance other than oil which, if introduced into the marine environment, is likely to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea"

HNS Convention / HNS Protocol: liability & compensation!

HNS Action Plan (2007): Framework for EMSA's activities

- Focus on **information** (help decision-making)
- **Cooperate** with existing actors (chemical / salvage industry)
- **Build on** existing expertise
- **Top-up prepardness & response** capacities



How to help Member States to be prepared to respond to such unpredictable and potentially high impact accidents?

HNS information services

Information services for marine chemical emergencies

CONCEPT/APROACH

- **MAR-CIS Information**
  (Marine Chemical Information Sheets)

- **MAR-ICE Service**
  (Marine Intervention in Chemical Emergencies)

(1) MAR-CIS Information

MAR-CIS MARine Chemical Information Sheets

Compile critical information needed for emergency response at sea for the initial stage of chemical incidents

OBJECTIVE

- The datasheets are updated yearly (e.g. IMO codes, GESAMP, CLP classification)
- The information is static & meant for the initial response to a chemical incident at sea
- Status: 217 datasheets

GET IT ON Google Play

Download on the App Store

(2) MAR-ICE Service

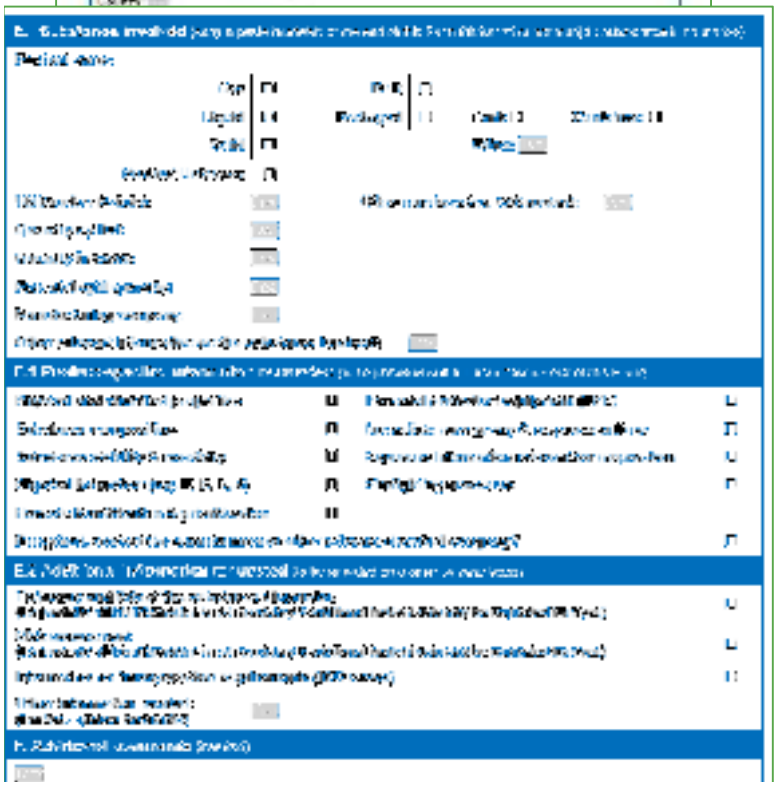
MAR-ICE Service - WHAT?

24/7 expert information service for marine chemical emergencies

- **Rapid** access to **chemical expert(s)** specialised in marine pollution response
- **1h** Product specific & incident relevant **information, documentation & advice**

- Input from **chemical industry**
- On a case-by-case basis:
  - **# Risk assessment** (responders & environment);
  - **#** 3D drift & weathering **modelling** results;
  - **# Advice on response** methods and options

MAR-ICE Service – HOW?



How does it work:

Contact MAR-ICE, via phone/email;

Availability 24/7; Remote assistance (free);

Requesting parties:

EU Member States;

Coastal EFTA/EEA;

EU Candidate Countries

EMSA

Activations:

3-4 activations / year

Primarily for exercises

Increased understanding of the service

MAR-ICE Service – WHO?

- **Chemical industry (Cefic)**

  # ICE Network (voluntary mutual assistance for incidents on-land)

  # 3 levels of support: 1 - Remote information / 2 – Expert on site / 3 – Equipment

- **Expand scheme to maritime transport emergencies**

- **MAR-ICE particularities:**

  # Single contact point for MS requests (Cedre)

  # Special Contact Form (maritime)

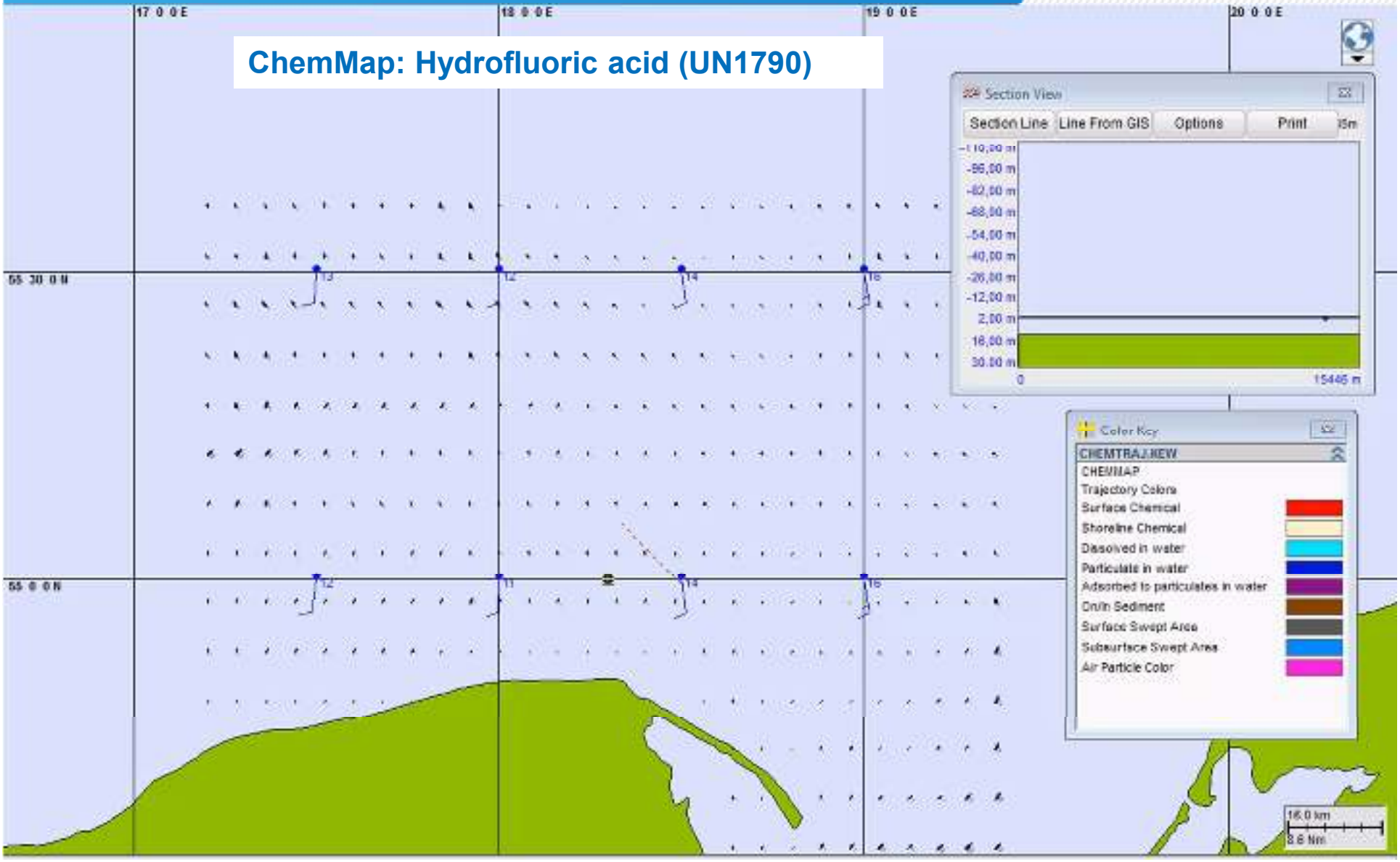
  # MAR-ICE level-1 (remote)

→ **3-Party Cooperation Agreement (2008)**

 # Expanding to 'level 2' – Chemical expert at command centre

Demonstration of MAR-ICE service

ChemMap: Hydrofluoric acid (UN1790)



Demonstration of MAR-ICE service

MAR-ICE Test with chemical industry (May 2019)

- **ICE Network (BASF Germany)**
- **Scenario**: Ammonium nitrate based fertiliser, self-sustained decomposition

Questions:

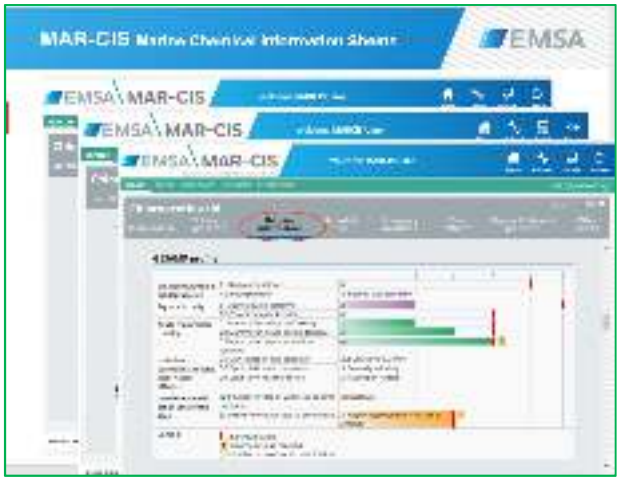
- Composition of toxic cloud (**risk** of corrosive fumes **for responders**?)
- **PPE** to enter area?
- Risk of corrosion/damage to the ship linked to **extinction waters**?
- Other ways to stop chem. reaction without compromising ship's stability?
- **All questions answered / Focused & useful information (+)**

Due to the high temperature inside the product by the decomposition reaction there is a **real danger of an explosion** of the ammonia nitrate. **Cooling with water is the only possibility to fight** against this danger; inside or near the fumes is heat protection and a **self-contained breathing apparatus mandatory**

Key messages

1) MAR-CIS Information:

- Static information focused on maritime incidents
- Initial stages of response

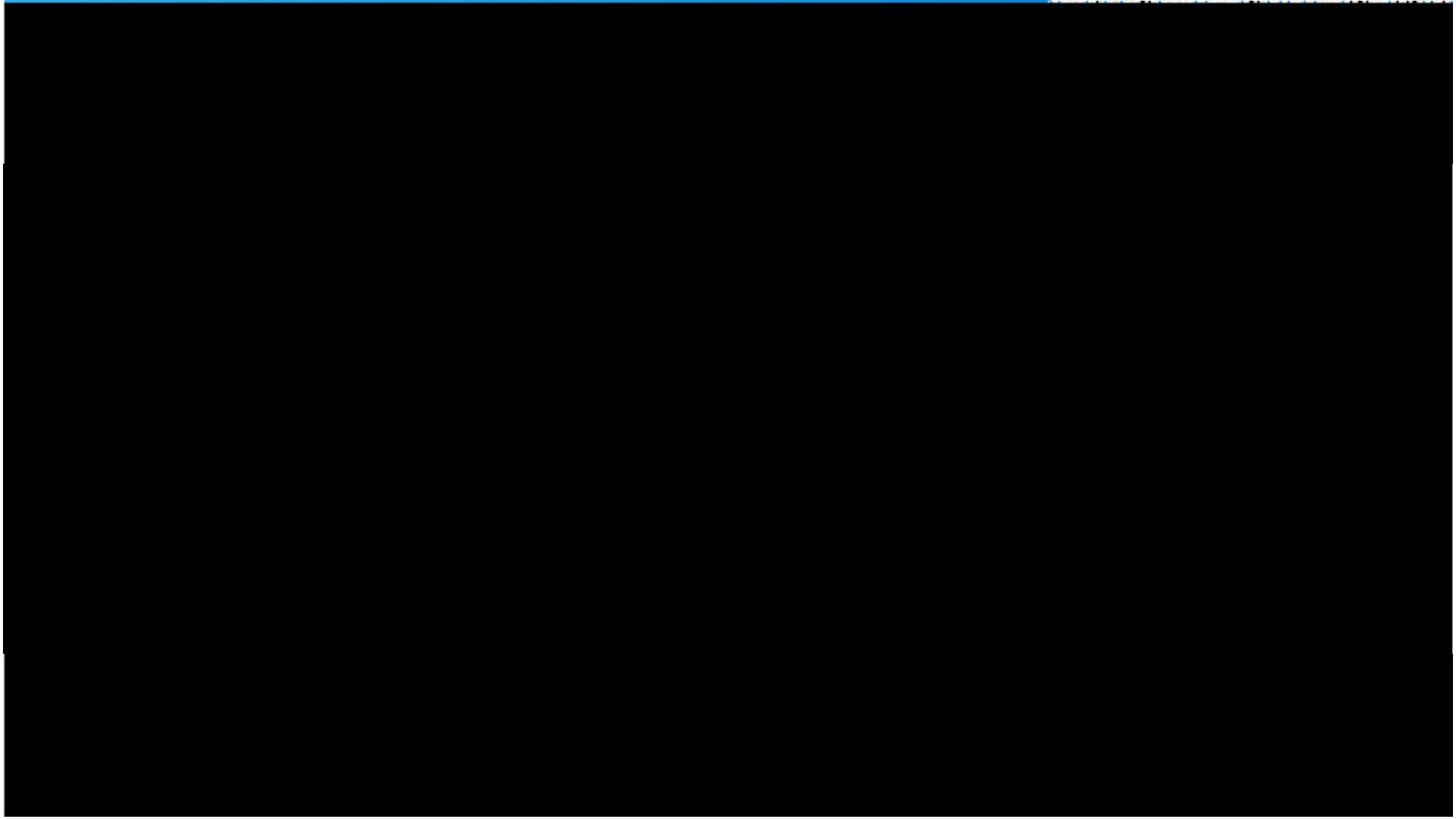


2) MAR-ICE Service:

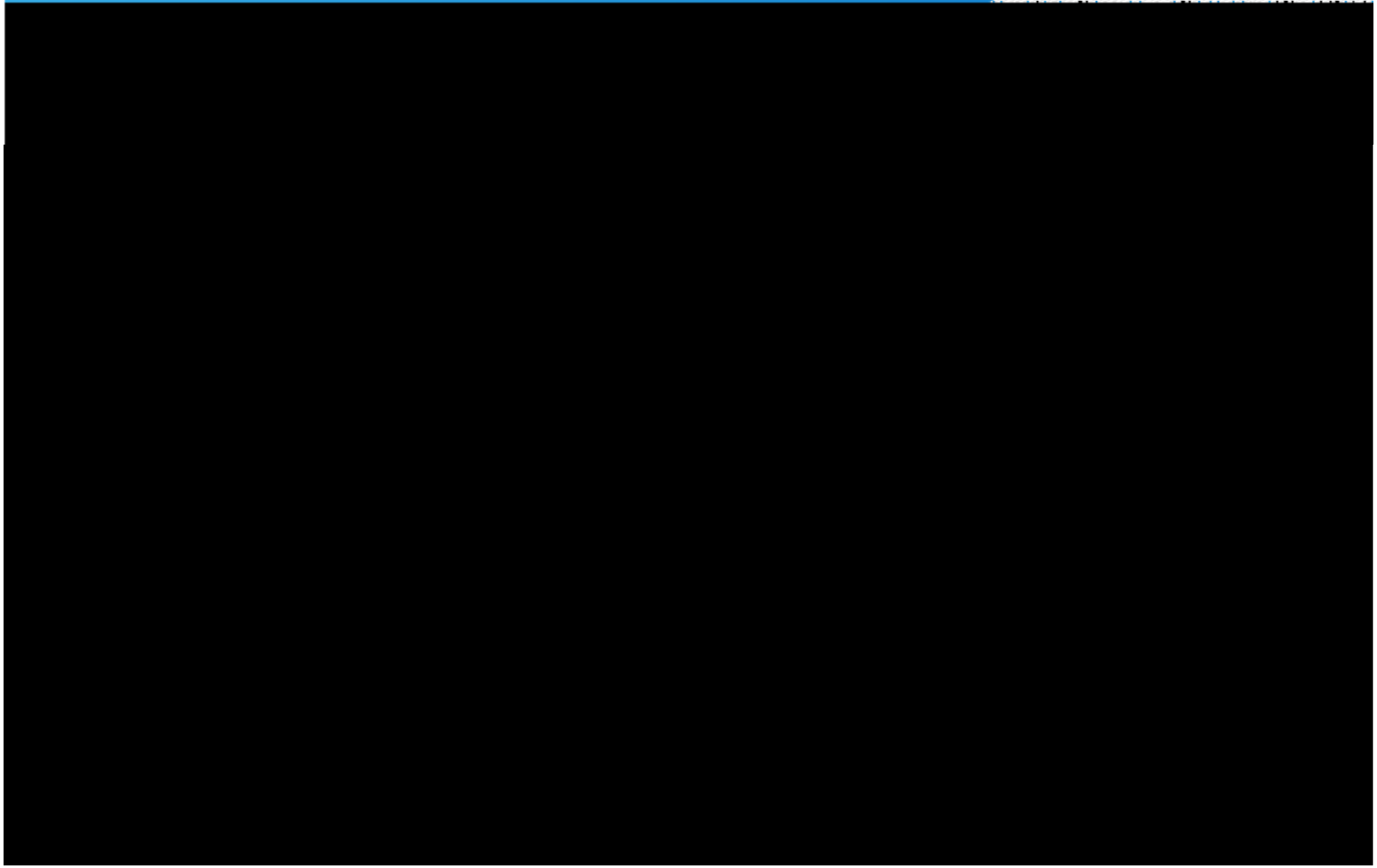
- 24/7 expert available to talk to
- “Open door” to the industry
- Interpretation of information

HNS biggest challenge!

MSC FLAMINIA 2012



MV CHESHIRE 2017



Central Hazmat Database (CHD)

To improve the quality of HazMat reporting in the SafeSeaNet system

Central Hazmat Database

- To be used as reference and verification tool
- Compiles all IMO codes for dangerous and polluting goods

Thank you for your attention!

An(d)y Questions?

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