Mediterranean Marine Oil & HNS Pollution Cooperation

Webinar to enhance regional cooperation in responding to marine Oil and HNS pollution in the Mediterranean (MEDEXPOL 2020)

Draft outline of the West MOPoCo

Marine HNS response manual

REMPEC, HELCOM, Bonn Agreement

27th October 2020

Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

Partners

- Collaboration between Cedre, ITOPF, ISPRA
- In cooperation with REMPEC, HELCOM, Bonn Agreement and their contracting parties for validation

Initial Timeline

From April 2019 to December 2020… March 2021

Deliverable (English)

Marine HNS response manual / Inter regional - REMPEC, HELCOM, Bonn Agreement:

- PDF format downloadable from the West MOPoCo website
- Word format provided to regional secretariats

Main objective

To provide operational guidance for first responders and decision makers on marine incident involving HNS: preparedness and response phases.

Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

State of progress and Consultation Process

Phase 1: April 2019 - June 2019:

Definition and adoption of the working methodology, scope of the Manual, Manual Structure, working programme, targeted end-users, Manual Title, etc.

11-13 June 2019: 13th Meeting of the Focal Points of the REMPEC in Malta

Phase 2: June 2019 - February 2020:

Progress on Manual Structure and content definition, Definition of a first list of Operational Sheets, proof of concept of the Manual, Writing of a first section and first operational sheets, first proposal for the layout, etc.

26-28 February 2020: 27th Meeting of the HELCOM Response Working Group in Velje, Denmark

Phase 3: March 2020 - May 2020:

Progress on Manual writing, sheets on behaviour (SEBC classification), Decision-making Flowcharts, Example of sheet on hazard-based approach, Template for case studies.

26-28 May 2020: OTSOPA 2020 meeting, webex

Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

State of progress and Consultation Process

Phase 4: May 2020 – July 2020:

Progress on Manual writing taking into account feedbacks from Regional Secretariats, contracting parties, IMO, EMSA, DG-ECHO.

- 13 July 2020: Version 3 of the manual forwarded to regional secretariats for a last review during the summer period

Phase 5: July 2020 – October 2020:

Finalisation of the Manual in Word Format, excepted Case Studies and Annexes

- 27-28 October 2020: MEDEXPOL 2020 Meeting

Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

3 parts:

Part 1

- Narrative part
- Methodological approach
- Seven chapters

Part 2

- Operational sheets (**62**), numbered in relation to each chapter

Annexes

1 with general information
3 on Regional specificities on Bonn Agreement, REMPEC, HELCOM

1 Introduction	**0**
2 IMO Conventions, Protocols and Codes	**1**
	2
3 HNS Hazards and Behaviours	**6**
4 Preparedness	**45**
5 Response	**2**
6 Post-spill management	**5**
7 Case-Studies	

Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

Part 1 - Word

3 Characteristics of HNS

Introduction to be written

3.1 Behaviour of HNS when spilled at sea

HNS can be gaseous, liquid or solid and be transported in bulk or packaged form. Predicting the behaviour of a substance when spilled at sea is a key component in the development of a response strategy.

The Standard European Behaviour Classification (SEBC) determines the theoretical behaviour of a substance according to its physical and chemical properties, and classifies it into one of the five main categories: gases (G), evaporators (E), floaters (F), dissolvers (D) and sinkers (S). However, substances might not only show one but several behavioural phases / stages throughout a spill – depending on the product(s) characteristics and its / their exposure to environmental factors / processes; this explains why seven further sub-categories were developed (Figure 1).

The **three physical/chemical properties** necessary to predict a substance's behaviour are solubility, density and vapour pressure. Each of these are usually stated for a certain temperature, typically 20°C, which is generally used in the SDS. Atmospheric temperature during an incident should therefore be taken into consideration as it will influence these properties.

- **Solubility (S)** is the ability of a given substance (the solute) to dissolve into a liquid (the solvent); it is usually measured in mg/L (or in ppm) or in percentage (1% means 1g of solute in 100mL of solution). Therefore, a solubility of 500mg/L equals to 0.05%.

  A substance is soluble if S>5%

- The relative **density (d)** (or specific mass) of a substance is defined as its mass per unit volume – or its "compactness". It is often measured in g/cm³ or kg/m³ and used to understand if the substance is heavier or lighter than a reference (air or water typically)

  A liquid floats if its $d<d_{seawater}$

- **Vapour pressure (Vp)** is an indicator describing the tendency of a material to change into the gaseous state. Its standard unit is Pascal (Pa)

  A substance is an evaporator if its Vp>3kPa

If a substance is carried in packaged form, the weight (w)/volume (v) ratio of the unit will give an indication whether a package will float, immerse or sink. The formula given below is indicative only, as it does not take into consideration if a package is airtight

If $w/v>d_{seawater}+0.01$*, the package sinks*

⚠ Classifications are based on laboratory experiments conducted in a controlled environment. Therefore, a substance's behaviour observed during an incident might differ significantly from the predictions.

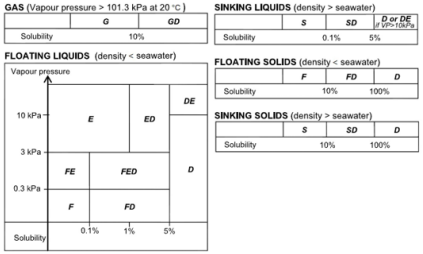

Figure 1: Using solubility, vapour pressure and density to determine a substance behaviour in seawater (Source- HELCOM HNS manual)

3.2 Hazards

The chemical and physical properties not only determine a substance´s behaviour but also its hazard(s). In general terms, a hazard is defined as something that can **cause** harm to people and the environment whereas a risk is the **probability** to be harmed if exposed to the hazard. Flammability, explosivity or toxicity are some of the hazards that are crucial to assess in order to understand the potential effects and risks of an HNS spill on human health, the environment, and other resources.

3.2.1 Standardisation of hazards

In order to standardise the identification and communication of hazardous properties, chemicals are classified under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) established by the United Nations Economic Commission for Europe (UNECE). Key aspects of the GHS include the standardization of hazard testing criteria, universal warning pictograms, signal words, hazard and precautionary statement and standardized → safety data sheets (SDS).

GHS uses three main hazard groups: physical hazards, health hazards, and environmental hazard. These groups are subdivided into hazard classes (*i.e.* flammability), associated hazard categories (usually numbered, where category 1 represents the most severe hazard).

The GHS complements the UN Numbered system (Chapter 2) for governing hazardous substances transport → GHS and UN Transport Regulation Comparison.

Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

Part 1 after Desktop publishing

4.5.2 Communication

Cooperation at all levels is likely to be a key factor in the success of an effective and coordinated response. Two very distinct communication strategies need to be established:

- **Internal** which highlights how the various teams involved in the response communicate with each other ;
- **External** which deal with how the information is shared with the wider public using various media.

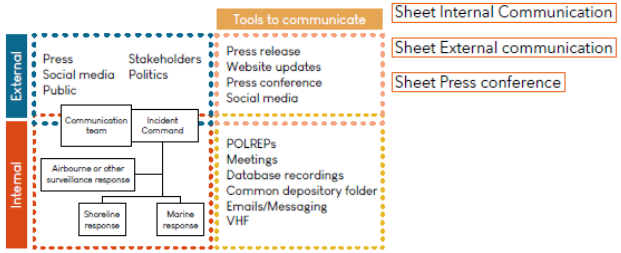

Figure 21: Flowchart illustrating an example of a typical communication structure in a function-based structure

4.6 Scenarios and strategies

4.6.1 Level of response - Tier system

Tiered preparedness and response are recognized as the basis for a robust framework. It establishes capability that can be escalated and cascaded to the scene. This avoids the proliferation of impractical stockpiles of large quantities of response resources yet can still provide an appropriate and credible response through the integration of local, regional and international capabilities.

The established three-tiered structure allows contingency planners to describe how an effective response to any spill will be provided, i.e. from small operational spillages to a worst credible case release at sea or on land.

The tier classification helps to define the resources required to deal with potential spill scenarios and are broadly considered as follows:

INTRODUCTION
IMO CONVENTIONS, PROTOCOLS AND CODES
HNS BEHAVIOURS AND HAZARDS
CONTINGENCY PLANNING
RESPONSE
POST-SPILL MANAGEMENT
CASE STUDIES

5.1 Notification and Information Gathering

5.1.1 Notification

A notification of an incident involving HNS can be received in the form of a

- Maritime alert message, called a Pollution Report (POLREP) produced by either the casualty's / a responding / passing vessel's captain or a coastal state as part of their intergovernmental pollution notification system Sheet Incident Notification ;
- Pollution observation report / detection log produced by a trained aerial observer Sheet Incident Notification;
- Automated spill response notifications (satellite-based surveillance)
- Unofficial written / verbal reports from members of the general public (report of visually observed pollution in port for example)

The level of detail of any initial report will be dependent on if there is a direct link between the pollution observed and the polluter. If there is no attributable source to the pollution observed, information about the type of cargo spilled will not be immediately available but instead will need to be gathered by first responders on site through monitoring and sampling (see Chapter 5.3).

5.1.2 Information Gathering

Once the initial incident notification has been received, it is crucial for decision makers and responders to gather objective information about the case to support the first response actions Sheet First Actions Responder. Initially the data available might be scarce and difficult to verify. However, with time and access to various information sources, the overall understanding of the situation increases. The quantity of incoming information might be challenging to verify, prioritise and filter.

All information should be funnelled and relayed to the Command Centre, which is in charge of analysing and communicating to responders Sheet External communication Sheet Internal Communication and to the relevant stakeholders

There are two types of data that can be collected:

1. **Information specific to the incident that could not have been known ahead of time.**

Responders should aim to obtain essential information on the location of the incident and the status of the vessel, bunkers and cargo as quickly as possible Sheet Incident Data Gathering.

The first information likely to be received would be from the captain and the vessel's crew as they follow the procedures from the Shipboard Marine Pollution Emergency Plan (SMPEP) onboard, which includes reporting requirements, response protocols / procedures and national and local contact points. Sheet First Actions (Casualty).

Intralinks and weblinks

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WP 3.1
Marine HNS Response Manual

Part 2 – Operational sheet – Word

Sheet 5.20. Personal Protective Equipment

Objective

How to choose protection level as well as to wear PPE.

Introduction

PPE refers to the clothing and respiratory equipment necessary to protect a person from the hazardous properties of chemicals. Its selection should be appropriate to the particular hazards associated with the chemicals spilt. The following should be considered:

- Chemical spilt (concentration, exposure time)
- PPE material (durability, heat-resistance)
- Level of respiratory protection required,
- Responder's ability to undertake specific work tasks

General considerations to add: all PPE needs to be certified and might have expiration date. Always follow manufacture's instructions, store appropriately, train donning / doffing.

In all cases communication systems have to be considered.

EU Categories

In Europe, Regulation (EU) 2016/425 of 9 March 2016 on personal protective equipment (the PPE regulation) covers the design, manufacture and marketing of personal protective equipment. It specifies three categories I, II and III, with category III addressing all risks that "may cause very serious consequences such as death or irreversible damage to health".

Category I: products of simple structure, used in a low-risk environment. The user is able to independently assess the PPE protection effectiveness.

Category II: products protecting against hazards which can cause injuries. The hazard for injury is determined as "not very low and not very high".

Category III: products of complex structure, protecting in the situations of serious or permanent hazard which can affect the user's life and health

Chemical protection suits are classed in six types (table 1).

If the spilled chemical has not been identified, responders should assume a worst-case scenario and wear the highest level of protection. It is important that responders are thoroughly trained in the use of PPE to minimize the risk of harm.

PPE American Certification System

A number of government agencies, including the US Occupational Safety and Health Administration (OSHA) have devised four categories of PPE based on the level of protection required (Levels A, B, C and D). Generally, number of chemicals and conditions for test is higher compared to EU level. These four levels are recognised by most response organisations:

- Level A offers the highest level of respiratory, skin, eye and mucous membrane protection
- Level B protection should be selected when the highest level of respiratory protection is needed, but a lesser level of skin and eye protection is needed. Level B is to be considered the minimum level of protection where the nature of the product and the relative danger

has not yet been defined and therefore before any monitoring, sampling and all the related analysis methods

- Level C protection should be worn when the type of airborne substance is known, concentration measured, criteria for using air-purifying respirators met, and skin and eye exposure is unlikely. A full-coverage mask of the face can be considered sufficient, with suitable filters
- Level D is similar to a work uniform and should only be worn when it is certain that personnel will not be exposed to harmful levels of HNS.

Table 1 compares the two classification systems

Table 8: EU and US PPE Classification System

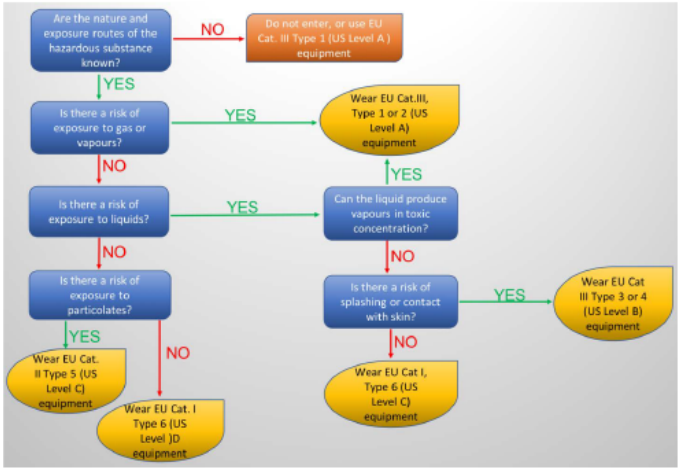
European level	Type 1 Category III	Type 2 Category III	Type 3 Category III	Type 4 Category III	Type 5 Category II	Type 6 Category I
Level of protection	Protects against liquid and gaseous chemicals (gas tight)	Protects against liquid and gaseous chemicals (non-gas tight)	Protects against liquid chemicals for a limited period (liquid tight)	Protects against aerosol chemicals (spray tight)	Protects against aerosol chemicals for a limited period	Protects parts of body against liquid chemicals
Respiratory equipment	Self-Contained Breathing Apparatus	Self-Contained Breathing Apparatus	Self-Contained Breathing Apparatus Or Air-purifying respirator	Air-purifying respirator	Air-purifying respirator	Air-purifying respirator
American level	approx. equivalent to US level A	approx. equivalent to US level B		approx. equivalent to US level C		approx. equivalent to US level D

Flowchart below help in the choice of more appropriate PPE in case of HNS incident

Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

Part 2 - Operational sheet – Word



List of equipment with respect to level protection

Below is a list of PPE according to the level of protection required (European categories)

Introduction | IMO Conventions, Protocols and codes | HNS hazards and behaviours | Preparedness | Response | Post-spill management | Case studies

Category III Type 1 ⊙ SCBA-self contained breathing apparatus; ⊙ Full coverage anti-chemical suit (gas tight); ⊙ Internal anti-chemical gloves; ⊙ External anti-chemical gloves; ⊙ Anti-chemical boots with steel toe; ⊙ Long sleeve cotton shirt (under the suit); ⊙ Helmet (under the suit); ⊙ Work overalls (under anti-chemical suit); ⊙ Radio communication system (under the suit)	**Category III Type 2** ⊙ SCBA-self contained breathing apparatus; ⊙ Full coverage anti-chemical suit (non-gas tight); ⊙ Internal anti-chemical gloves; ⊙ External anti-chemical gloves; ⊙ Anti-chemical boots with steel toe; ⊙ Disposable boot covers ⊙ Radio communication system ⊙ Helmet (optional) ⊙ External protective visor (optional)
Category III Type 3 ⊙ SCBA-self contained breathing apparatus or air-purifying respirator; ⊙ Full coverage temporarily anti-chemical suit (liquid tight); ⊙ Internal anti-chemical gloves; ⊙ External anti-chemical gloves; ⊙ Anti-chemical boots with steel toe; ⊙ Disposable boot covers ⊙ Work overalls (under disposable clothes); ⊙ Radio communication systems; ⊙ Helmet (optional); ⊙ External protective visor	**Category III Type 4** ⊙ Full coverage mask with filters; ⊙ Disposable anti-chemical clothes (spray tight); ⊙ Internal anti-chemical gloves; ⊙ External anti-chemical gloves; ⊙ Anti-chemical boots with steel toe and leg; ⊙ Disposable boot covers; ⊙ Work overalls (under disposable clothes); ⊙ Radio communication systems; ⊙ Helmet (optional); ⊙ External protective visor (optional); ⊙ Escape mask (optional).
Category II Type 5 ⊙ Air-purifying respirator ⊙ Disposable anti-chemical clothes (spray tight); ⊙ anti-chemical gloves; ⊙ Anti-chemical boots with steel toe and leg; ⊙ Disposable boot covers; ⊙ Radio communication systems; ⊙ Helmet (optional).	**Category I Type 6** Uniform for not dangerous chemicals ⊙ Work overalls ⊙ Safety shoes or boots Other protective devices are to be considered according to specific needs (eg air-purifying respirator). It is essential to have certified absence of risks to the respiratory tract and of other possible potential risks.

Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

Part 2 - Operational sheet – Word

Category III Type 1

(source HELCOM)

Category III Type 2

(source HELCOM)

Category III Type 4

(source HELCOM)

PPE for Category I Type 6 (source ISPRA)

Increase or decrease level of protection

Consideration criteria for increasing the level of protection:

- √ Confirmed or suspected presence of risk through skin contact;
- √ Potential or highly probable emission of gases or vapours;
- √ Change of tasks that increase level of (potential) contact with dangerous substances;
- √ Reporting from responders that describe a scenario worse than expected;
- √ risk of encountering unknown substances.

Consideration criteria for decreasing level of protection:

- √ Information indicating the presence of risk lower than originally expected;
- √ Decreased hazard due to effectiveness of intervention;
- √ Change of tasks that decrease the level of contact or potential contact with dangerous substances.

Introduction | IMO Conventions, Protocols and codes | HNS hazards and behaviours | Preparedness | Response | Post-spill management | Case studies

Donning of PPE

Donning:

Wearing protective suites could be difficult, then it is advisable to be assisted by another person. Supervisors need to keep track.

The order may differ depending on the PPE.

For Category III suit:

- √ remove jewellery or any personal things potentially dangerous: pen, cell phone, belt, etc.;
- √ place suit on ground in a clean, flat location;
- √ open the cylinder, check the volume of air available (regulator pressure) and put the equipment on its back.
- √ open zipper completely;
- √ put suit on;
- √ carefully close the locking system of the suit;
- √ put on gloves and boots and fasten closures;
- √ Check that the pressure relief valve is functional.

Doffing:

- √ Decontaminate before removing PPE suit; → Decontamination
- √ When removing the PPE suit, take precaution to avoid contact with any potential traces of the substance.

Personal Protective Equipment for divers

The main objectives of safety measures are to minimise the possibility of skin contact and inhalation of pollutant that can penetrate both suit materials and the diver's skin. Therefore, equipping operators with suitable diving support system (including both respiratory and physical protection) must be the primary concern (IMO, 2017).

The standby divers must be equipped at least with an equal level of protection

Mask

A full-face mask may reasonably protect mucous membranes of eyes, nose, and mouth. Full-face masks can be configured to operate with compressed gas SCUBA tanks, a configuration that affords a diver freedom of movement and provides moderate protection. Most full-face masks can also be configured to operate from surface-supplied compressed gas which affords greater endurance but restricts mobility compared to SCUBA. Moreover, a full-face mask which incorporates a positive-pressure regulator, will help eliminate water entering the mouth. Additionally, full-face masks offer no protection for the diver's head, neck, or ears, all potential sites exposed to waterborne hazards.

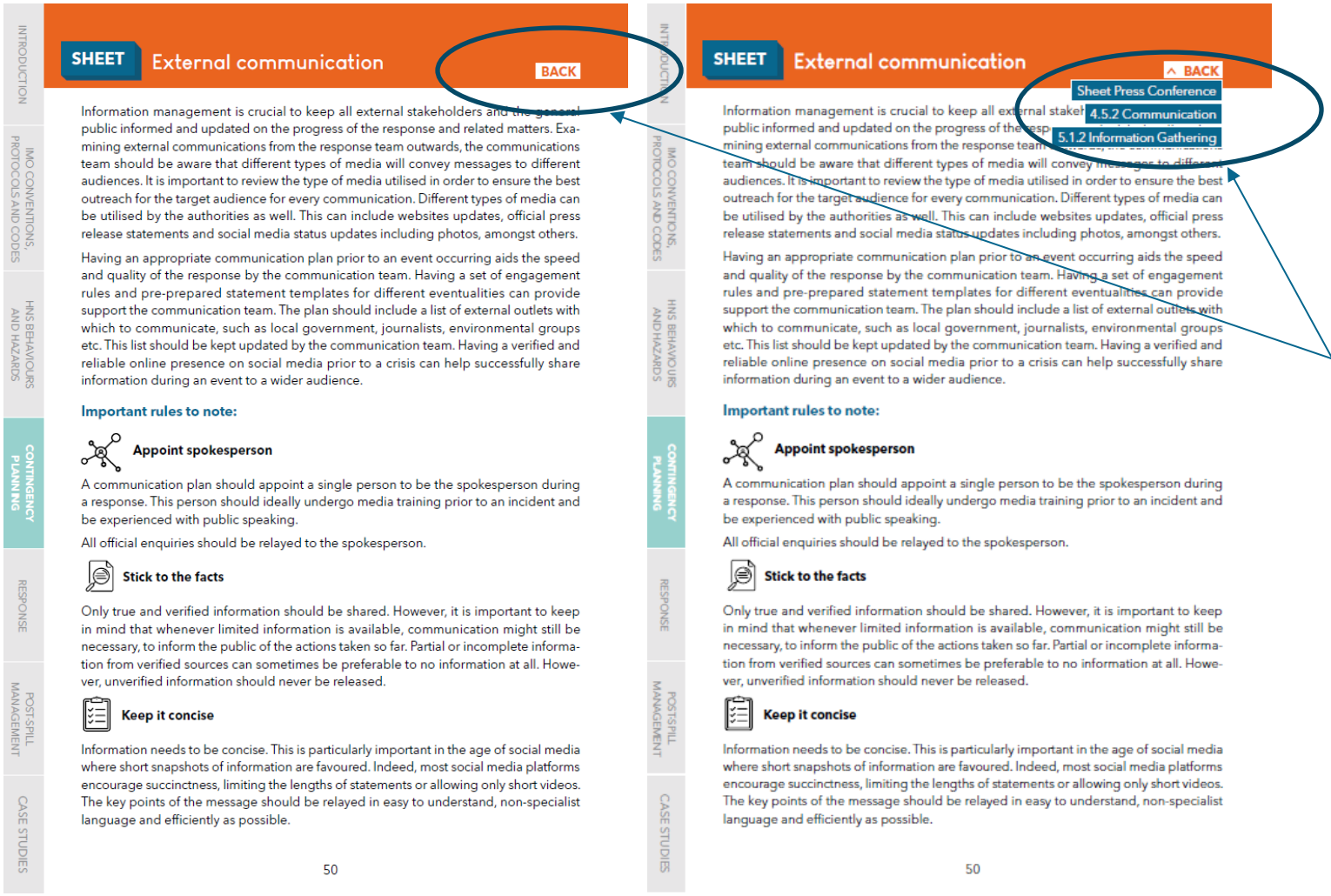
As regards the first stage of the breathing apparatus, the so called "environmental kits" is often optional; it prevents water entrance and even if it is ideated for dive into ice water it seals the mechanism from polluted waters.

Rigid Helmet is coupled to a vulcanized dry suit; it put in isolation the diver in contaminated water. In this case the level of protection for divers is highest. Main problems of using helmets are represented by the amount of air consuming which requires a supply boat with air compressor on

Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

Part 2 - Operational sheet after Desktop Publishing



INTRODUCTION
IMO CONVENTIONS, PROTOCOLS AND CODES
HNS BEHAVIOURS AND HAZARDS
CONTINGENCY PLANNING
RESPONSE
POST-SPILL MANAGEMENT
CASE STUDIES

SHEET External communication

BACK

Information management is crucial to keep all external stakeholders and the general public informed and updated on the progress of the response and related matters. Examining external communications from the response team outwards, the communications team should be aware that different types of media will convey messages to different audiences. It is important to review the type of media utilised in order to ensure the best outreach for the target audience for every communication. Different types of media can be utilised by the authorities as well. This can include websites updates, official press release statements and social media status updates including photos, amongst others.

Having an appropriate communication plan prior to an event occurring aids the speed and quality of the response by the communication team. Having a set of engagement rules and pre-prepared statement templates for different eventualities can provide support the communication team. The plan should include a list of external outlets with which to communicate, such as local government, journalists, environmental groups etc. This list should be kept updated by the communication team. Having a verified and reliable online presence on social media prior to a crisis can help successfully share information during an event to a wider audience.

Important rules to note:

Appoint spokesperson

A communication plan should appoint a single person to be the spokesperson during a response. This person should ideally undergo media training prior to an incident and be experienced with public speaking.

All official enquiries should be relayed to the spokesperson.

Stick to the facts

Only true and verified information should be shared. However, it is important to keep in mind that whenever limited information is available, communication might still be necessary, to inform the public of the actions taken so far. Partial or incomplete information from verified sources can sometimes be preferable to no information at all. However, unverified information should never be released.

Keep it concise

Information needs to be concise. This is particularly important in the age of social media where short snapshots of information are favoured. Indeed, most social media platforms encourage succinctness, limiting the lengths of statements or allowing only short videos. The key points of the message should be relayed in easy to understand, non-specialist language and efficiently as possible.

50

INTRODUCTION
IMO CONVENTIONS, PROTOCOLS AND CODES
HNS BEHAVIOURS AND HAZARDS
CONTINGENCY PLANNING
RESPONSE
POST-SPILL MANAGEMENT
CASE STUDIES

SHEET External communication

BACK

Sheet Press Conference
4.5.2 Communication
5.1.2 Information Gathering

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"Back Button" and Drop-down Box

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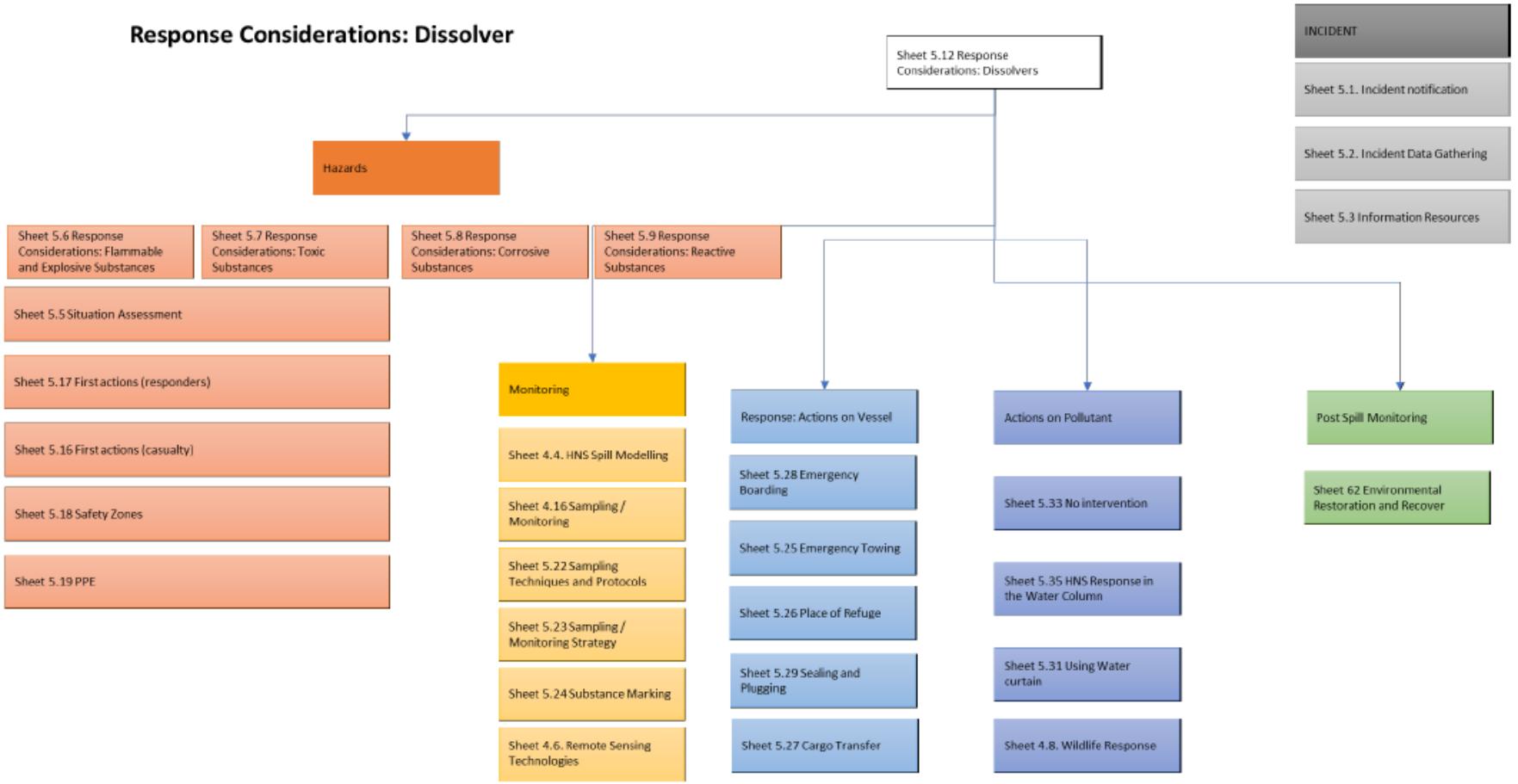
WP 3.1
Marine HNS Response Manual

Part 2 – Example of Flowchart



Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

Part 3 – Annexes

WestMOPoCo, template proposal for general information

International level	IOPC https://www.hnsconvention.org/ IMO - List of conventions: http://www.imo.org/fr/About/Conventions/ListOfConventions/Pages/Default.aspx - Chemical response: http://www.imo.org/en/OurWork/Environment/PollutionResponse/Inventory%20of%20information/Pages/Chemical%20Response.aspx - Global Integrated Shipping Information System https://gisis.imo.org/Public/Default.aspx EQUASIS http://www.equasis.org/EquasisWeb/public/HomePage UNECE - http://www.unece.org/trans/danger/danger.html
European level	European Commission - Transport Data Hub: https://ec.europa.eu/transport/facts-fundings/statistics_en - Chemical substances: https://ec.europa.eu/jrc/en/scientific-tool/european-union-system-evaluation-substances EMSA - MAR-ICE http://www.emsa.europa.eu/chemical-spill-response/mar-ice-network.html - Vessel traffic monitoring in EU waters (SafeSeaNet) http://www.emsa.europa.eu/ssn-main.html - Clean Sean Net http://emsa.europa.eu/csn-menu.html - Port State Control inspection Database –THETIS http://www.emsa.europa.eu/ship-inspection-support/thetis.html INTERSPILL Conference&Exhibition https://www.interspillevent.com/
Useful tools or manuals	SAR - https://www.raja.fi/chemsar Emergency Response Guide - https://tc.canada.ca/en/dangerous-goods/canutec - Chemical response guides https://wwz.cedre.fr/en/Resources/Publications/Chemical-Response-Guides - MIDSIS-TROCS https://www.rempec.org/fr/resources/outils-d2019aide-a-la-decision/midsis-trocs - Knowledge tool to access projects related to HNS: http://knowledgetool.mariner-project.eu/

WestMOPoCo, template proposal for regional specificities

Website of regional

Preparedness	
Maritime traffic - HNS transported - Maritime lines	 Weblink to the updated version Weblink to statistics or real time AIS or report on traffic
Regional plans	Weblink to the updated version
Training courses	Weblink(s) to training centers and contact detail
Exercises	Weblink(s) to know the date of last exercise and contact detail

Operational concern	
SAR	Contact for emergency Existence of special rescue team (for instance MIRG)
Emergency response on HNS	Contact for emergency
Environmental Sensitive Index	Weblink to online ESI, wildlife
List of equipment	Weblink or contact to access to list of equipment + contact or procedure for mobilization

Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

The participants are kindly invited to:

- Endorse the version 4 of the manual (Word document),
- Endorse the Template on general information and regional specificities Annexes and provide relevant weblinks to be included,
- Provide high resolution pictures (see list of missing photos in Annex 2 of the Working document) by the end of November,
- Approve the following way forward:

Mediterranean Marine Oil & HNS Pollution Cooperation

WP 3.1
Marine HNS Response Manual

The way forward:

1. Finalisation of the annex on regional specificities,
2. Integration of the 5 case studies,
3. Selection of the pictures to be included in the manual,
4. Desktop publishing by the end of 2020,
5. Final check of the document by the secretariats in the beginning of 2021,
6. Proofreading of the manual by an English native consultant,
7. Last correction and Publication of the manual on West MOPoCo website by the end of March 2021,
8. Delivery to the secretariats of the Word version of the manual for further up-dating,
9. Adoption by the regional secretariats and contracting parties during Spring/Summer 2021.