

HAZRUNOFF

PROJECT

Prevention, Preparedness and example of response options

CEDRE

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Methodological approach



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Preparedness & Response

- Preparedness is based on 3 pillars

- Organisation
- Human resources
- Materiel resources

- Response is based on the chemical behaviour

- Floater
- Evaporator
- Dissolver
- Sinker

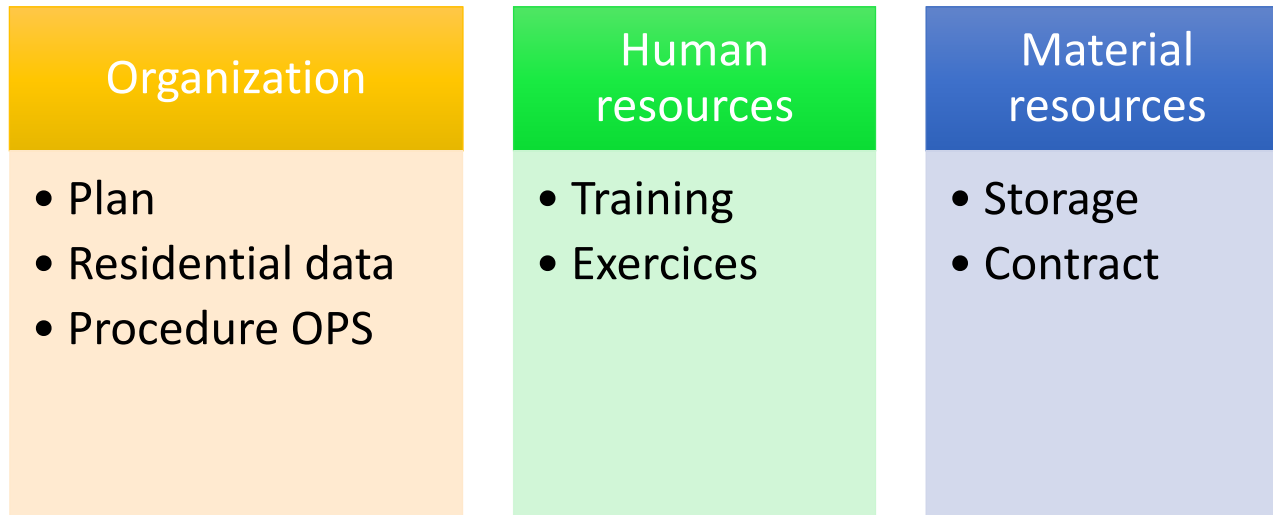


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Preparedness



Preparedness represents 90% of the response efficiency



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Organisation

Plan
Residential data
Procedure OPS

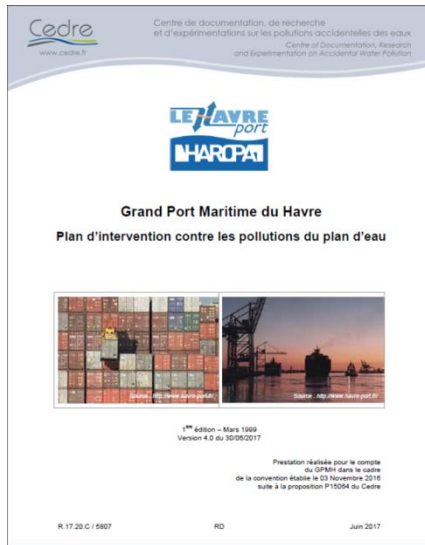


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Objectives of a Contingency plan



Protect potential targets

People

Environment

Goods

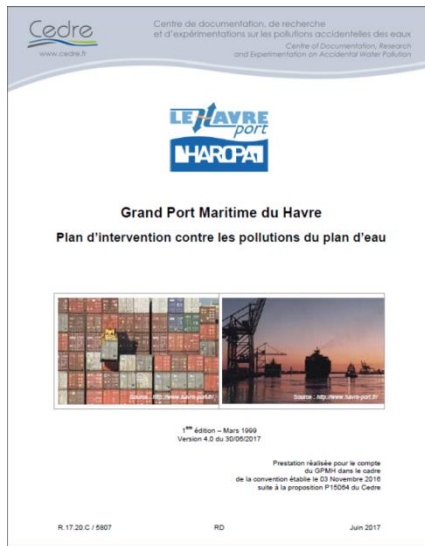


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Expectations



Real efficiency

Operational

- Concise & complete
- Realistic
- Easy to use

Universality

- Known, understood and agreed by all users

Adaptability

- Tested
- Reviewed
- Upgraded regularly



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Contingency plan annexes



Every operational info useful
for response



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Contingency plan : key points

Operational : concise & complete, realistic, easy to use ...

Known, understood & agreed by all users

Tested, reviewed and upgraded regularly



Human resources

Training
Exercises
Communication



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Training

- Employer is responsible for the safety of employees,
- Responders must be trained on the materials they will wear or deploy,
- Stakeholders must aware of field reality.



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Exercises

3 Phases

Preparation

Exercise

Assessment



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Communication & media relation plan



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Human resources: key points

Training

Organize exercises

Communication is essential
(Internal & External)



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Material and Resources

Storage Contract



I. Contingency plan II. Human resources III. Material resources



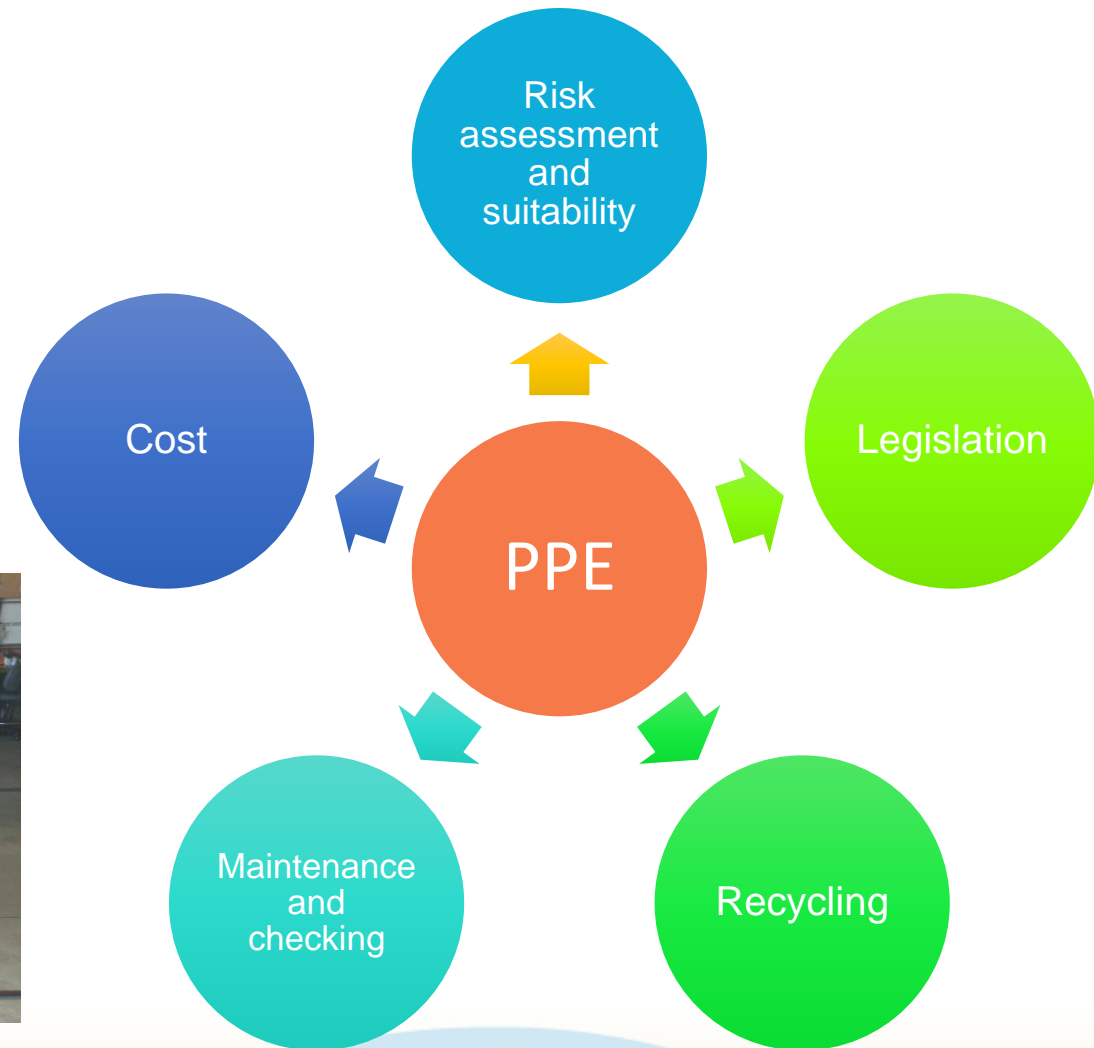
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Which material to acquire ?

Personal
Protective
Equipment



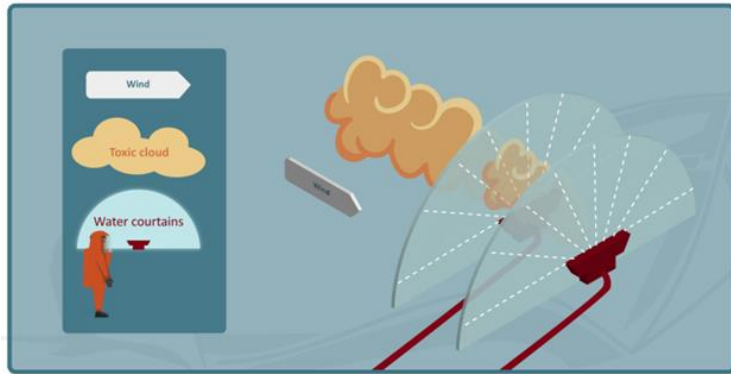
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Which material to acquire ?

Response
material



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Material resources: key points

Acquisition of PPE must be considered with care

Specific hazard require specific material

Be prepared for every cases, know the limit of each material

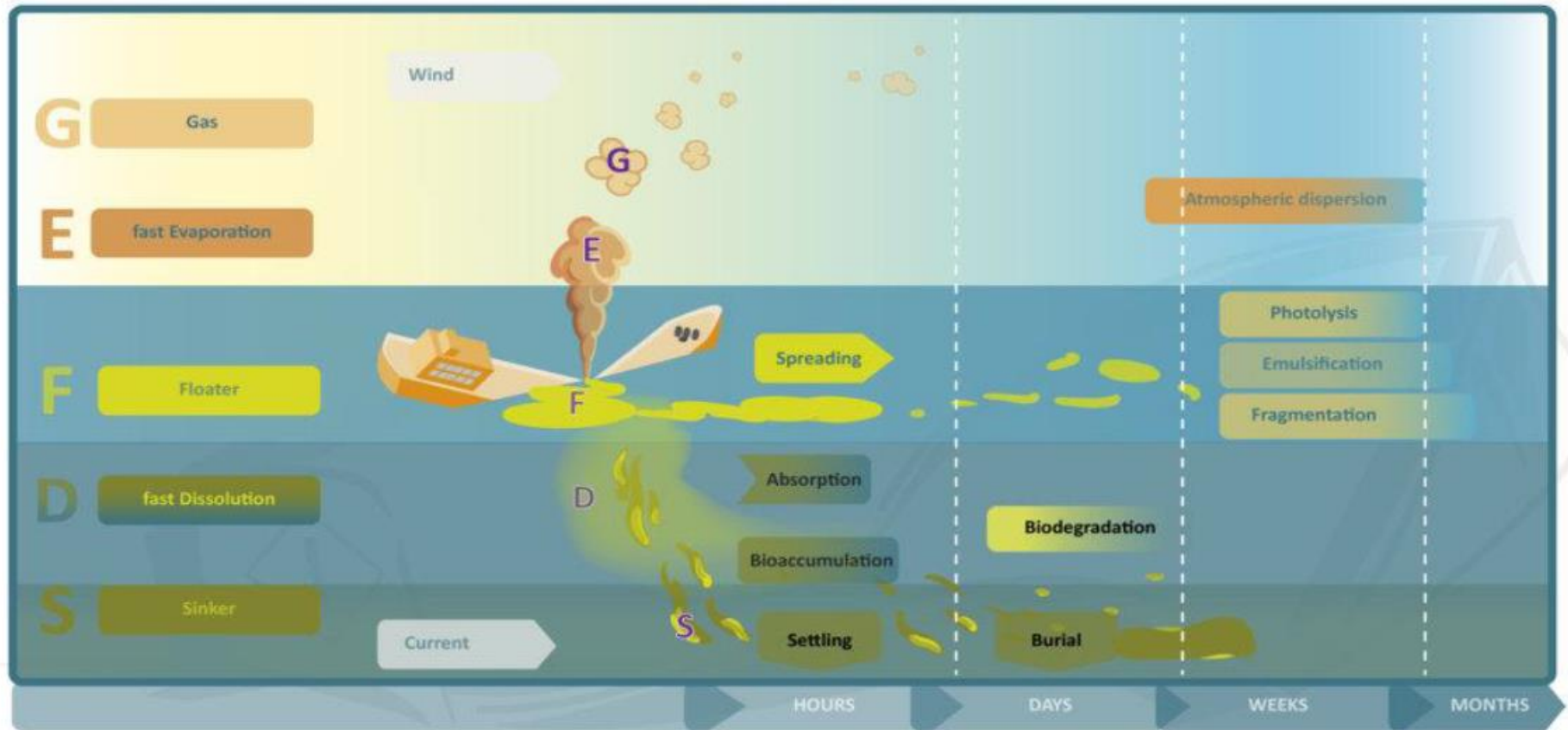


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Response



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Response: Evaporators

Measuring



Vapour cloud

Use :

- Sensors
- Gas detector
- Thermal Imaging Camera



- Can be :
 - Corrosive
 - Flammable
 - Toxic



Neutralizing



Protect and limit evaporation

Use :

- Water curtain
- Mist
- Foam



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Gaps....

Detection

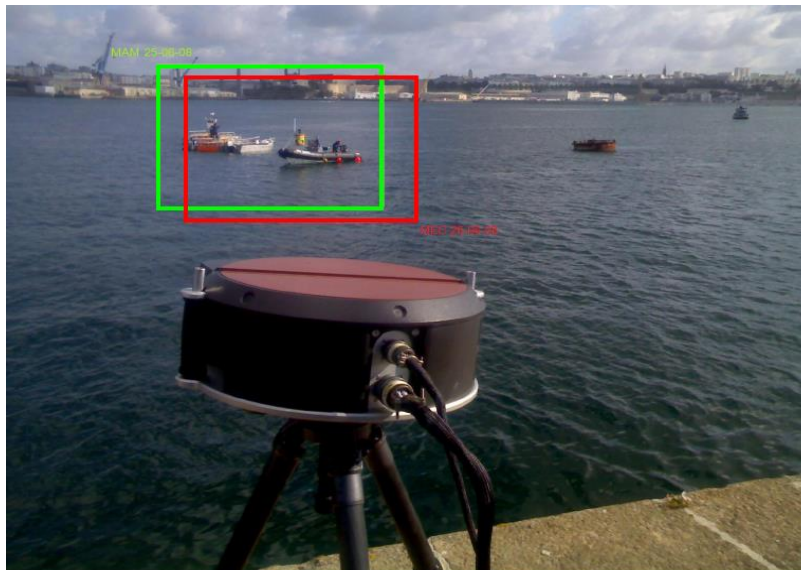
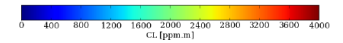
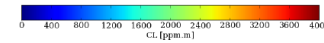
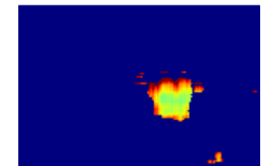
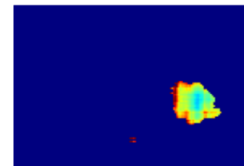


Figure 5 Champs surveillés avec le SPIM pour le MAM le 25/06/2008 (en vert) et pour le MEC le 26/06/2008 (en rouge)



Modelling validation

Response: Floaters

Measuring



Sampling the slick

By :

- Ship or helicopter
- Airborn sensors
- Measuring UV or IR

Neutralizing



Recovery

Only on pesisting and low toxicity product (animal and vegetable oils)



Marking by drifting buoy



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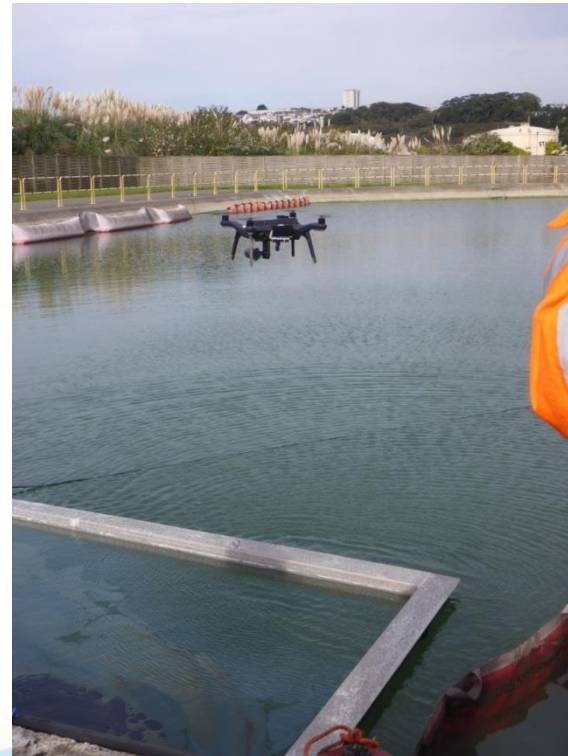
Gaps....

Teledetection of chemical pollution at sea

Detectors



Vehicles (satellite, plane, drone)



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Response: Dissolvers

Measuring



The water column

By :

- Classic sampling
- ROV or AUV
- In situ sensors

Neutralizing



Seldom possible

- Impossible recovery of the dissolved part
- Displacement of the spill



Marking by drugged buoy



Long-lasting monitoring of the pollution



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Dosing Units – Water Based

Water-Based Mills



Earth Systems' water-based mixing and dosing units are suitable for many water treatment applications. Why pump water to a centralised plant when it is more cost effective to treat at the site of your issue or directly in your water body? These units avoid pumping and piping costs, and despite their size, have large reagent throughputs. If you are seeking cost effective, flexible, dependable and robust mixing and dosing units, then consider a water-based system employing our patented Neutra-Mill technology.



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Response: Sinkers

Measuring



On the sea floor

- Sampling by protected divers
- By ROV or AUV
- Acoustic imaging

Neutralizing

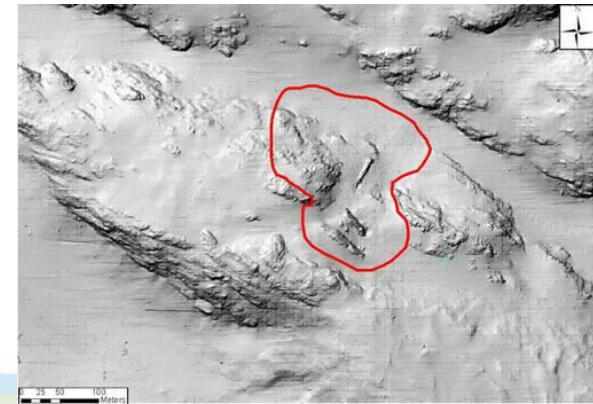


Recovery

- In low depth area



Can be hard to detect



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Neutralization option

Sinking the ship

- Only with good reasons
- Used about 20 times in 35 years
- Adamandas (2003); Turtle (1983); Stade (1972); Ammersee (1974); Circe (1967); Cavo Cambanos (1981)...



Insurances !



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Keypoints

Identify the exact nature of the chemical(s)

No rush, get information by sampling

Response depends on HNS behaviour and reactivity

Mark the spill to monitor it

Sinking must be the last response available



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