

# YOUR PREPAREDNESS JOURNEY

## WEBINAR 1: Understanding the Oil Spill Landscape

Mr. Tristan Barston: OSRL Regional Representative (Americas)

# Welcome and Session Objectives

During today's webinar we are going to go back to basics and discuss oil spills, their causes, environmental and socio-economic impacts, response mechanisms, the current regulatory framework governing spill response, and look at some of the latest technological advancements in combating these potentially devastating events.

## Session Objectives:

1. Explore the changing landscape of how and why spills can occur.
2. Look at the potential environmental and socio-economic impacts.
3. Examine the International Regulatory Framework designed to prevent spills.
4. Discuss what being prepared to respond means to us.
5. Take a brief look to the future of spill preparedness.

# Some common factors that contribute to spills are:

## Human Factors ~ 40%

**July 2023.** Esmeraldas Maritime Terminal, Ecuador. 1,200bbls of crude oil lost after a storage tank overflowed.

## Equipment Failure or Malfunction ~ 30%

**December 2022.** Keystone Pipeline, USA. 12 - 14,000bbls of crude oil lost. Weld flaw led to a crack that grew over time as a result of bending stress fatigue.

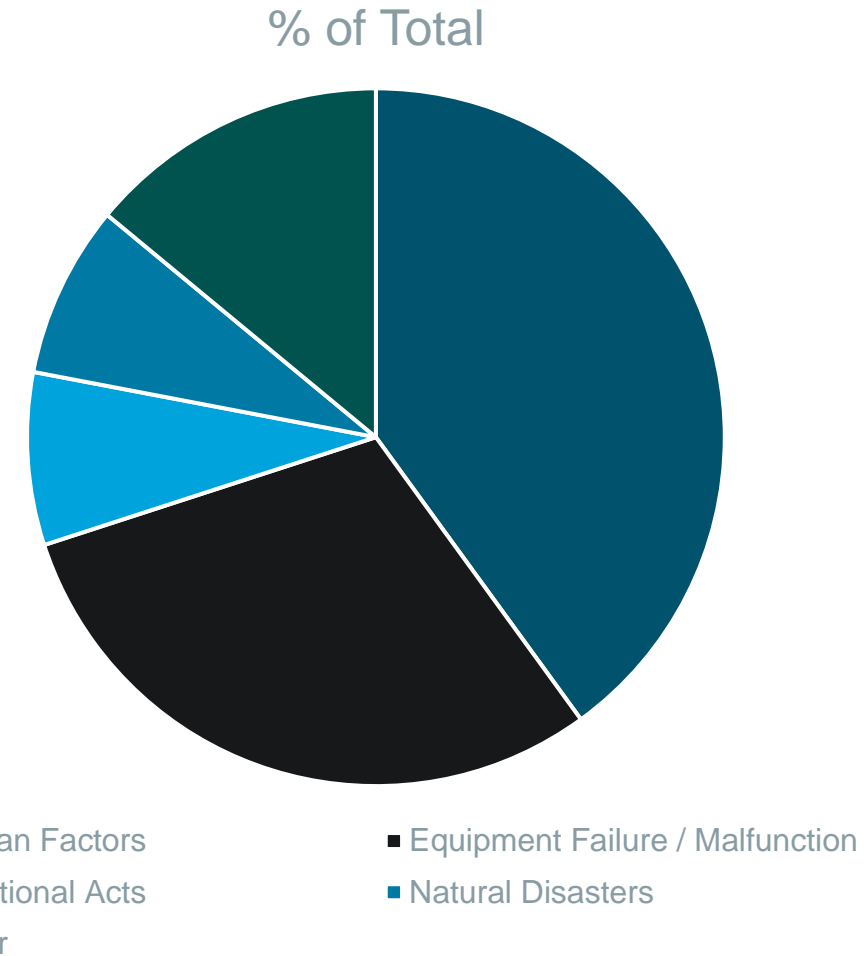
## Natural Disasters ~ 8%

**January 2022.** Callo Oil Spill, Peru. 6,000bbls crude oil lost. Abnormal waves caused by the volcanic eruption in Tonga impacted a tanker unloading operation.

## Intentional Acts for Criminal / Political Motives ~ 8%

**March 2022.** Houthi rebels attack an oil storage facility in Jeddah, Saudi Arabia.

**Other ~ 14%** i.e., Natural Seeps, Indirect Operational Accidents, Mystery Spills, etc.



# The Typical Environmental Impacts from Oil Spills

## Acute Toxicity

The ability of an oil to cause severe biological harm or death by poisoning by exposure. Volatile compounds in the oil can readily dissolve into the water and kill plants and animals on contact. They can also evaporate quickly, adversely affecting organisms that breathe air, such as birds and mammals.

## Smothering (Coating)

The smothering or coating of plants and animals by oil to a level that causes physical injury, i.e., affects an organism's physical ability to continue critical functions such as photosynthesizing, respiration, feeding and thermoregulation.

## Persistence

Persistence measures how long oil stays in the environment before breaking down and provides a rough measure of chronic (long term) toxicity. Some oils have components called polycyclic aromatic hydrocarbons (PAHs) which can cause long term, sublethal, chronic effects to organism growth, reproduction, and survival.

# Socioeconomic Impacts

## Impacts on Individuals

**Physical Health Effects:** Dermatitis, Headaches, Respiratory Distress, Fatigue.

**Psychological Health Effects:** Stress, Depression, Anxiety, Decrease in Healthy Behaviors.

## Shared Impacts on Individuals and Communities

### Economic Effects

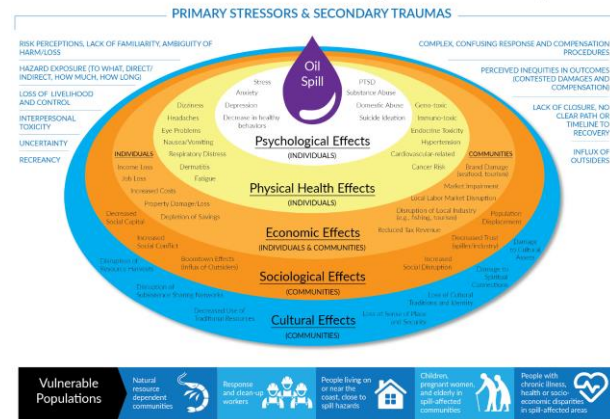
- **Individuals:** Income Loss, Property Damage / Loss, Increased Costs, Depletion of Savings.
- **Communities:** Disruption of Local Industry, Brand Damage, Reduced Tax Revenue.

## Impacts on Communities

**Sociological Effects:** Decreased Trust in Authorities, Population Displacement, Influx of Outsiders.

**Cultural Effects:** Loss of Sense of Place and Security, Decreased Use of Traditional Resources.

### Possible Human Effects of Large Marine Oil Spills



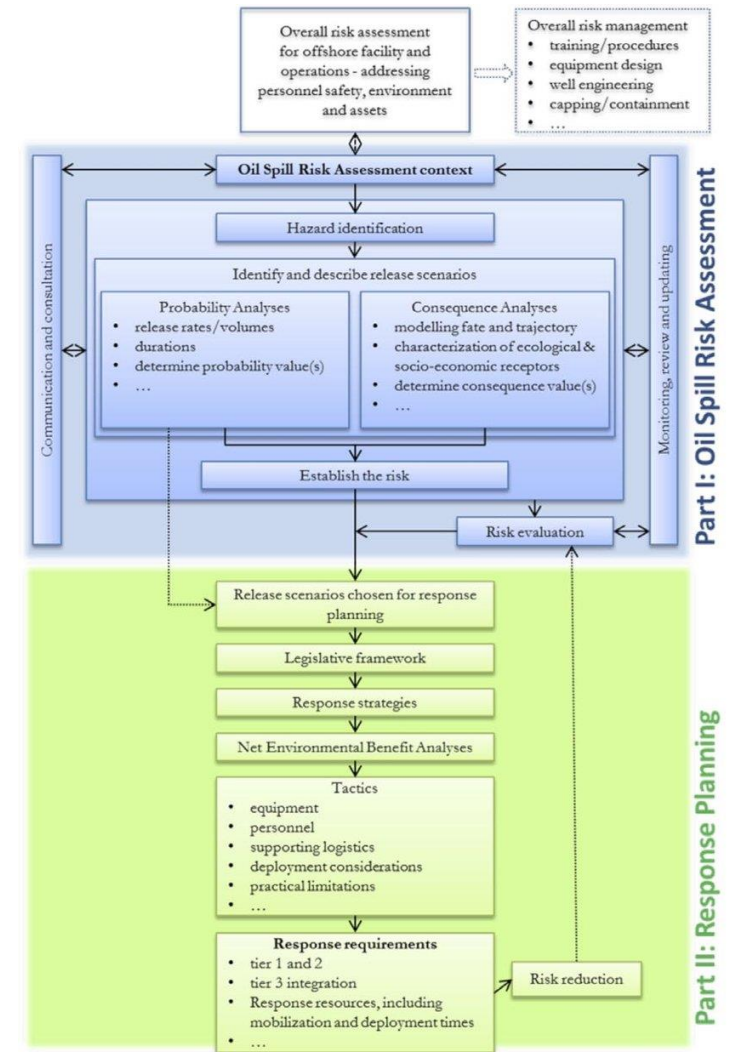


# Assessing your Current Oil Spill Risks, Likelihoods and Potential Consequences.

## Oil Spill Risk Assessment (OSRA)

- **What Can Happen?**
  - Identify Potential Release Scenarios.
- **Know Your Oil**
  - Oil Characterization.
- **Where Can It Go?**
  - Fate and Trajectory Modelling.
- **What is In its Way?**
  - Resources at Risk.
- **What are the Potential Consequences?**
  - Risk Evaluation

**Task:** Review your current risk assessment and engage with Operational and Facility staff to gather an understanding of any changes to the processes that may lead to, and issues that may result from, potential spills of oil and other hazardous materials used at your facility.



# International Regulatory Framework – Oil /HNS Pollution

## Prevention

**The International Convention for the Prevention of Pollution from Ships (MARPOL 73/78).**

- An international maritime convention establishing measures for dealing with marine oil pollution incidents nationally and in co-operation with other countries.

**International Convention for the Safety of Life at Sea (SOLAS) 1974.**

- An international maritime treaty that sets minimum safety standards in the construction, equipment and operation of merchant ships.

## Preparedness and Response

**International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) 1990.**

**International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) – HNS Protocol 2000.**

**International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (INTERVENTION), 1969.**

- International maritime conventions establishing measures for dealing with marine oil pollution incidents nationally and in co-operation with other countries.

## Liability and Compensation

**The International Convention on Civil Liability for Oil Pollution Damage, 1969, renewed in 1992 (CLC 92).**

- An international maritime treaty designed to ensure that adequate compensation is available where oil pollution damage is caused by maritime casualties involving oil tankers (i.e., ships that carry oil as cargo).

# IMO Regional Activity Centres (RAC)

The Marine Environmental Emergency Preparedness and Response  
Regional Activity Centre of NOWPAP (NOWPAP MERRAC):

- The Special Monitoring and Coastal Environment Assessment RAC (CEARAC)
- The Data and Information Network RAC (DINRAC)
- The Pollution Monitoring RAC (POMRAC)

The Regional Marine Pollution Emergency Information and Training Centre  
for the Wider Caribbean (REMPEITC-Caribe)

Marine Emergency Mutual Aid Centre (MEMAC)

Regional Organization for the Protection of the Marine Environment  
(ROPME)

The Regional Marine Pollution Emergency Response Centre for the  
Mediterranean Sea (REMPEC)

Partnerships in Environmental Management for the Seas of East Asia  
(PEMSEA)

The PERSGA Marine Emergency Mutual Aid Centre (PERSGA / MEMAC)  
Indian Ocean Commission





# Preparing to Respond

## The Tiered Preparedness Wheel for Oil Spill Response

The Tiered Preparedness Wheel is a three-tier system aligning the scale of an oil spill with escalating response levels.

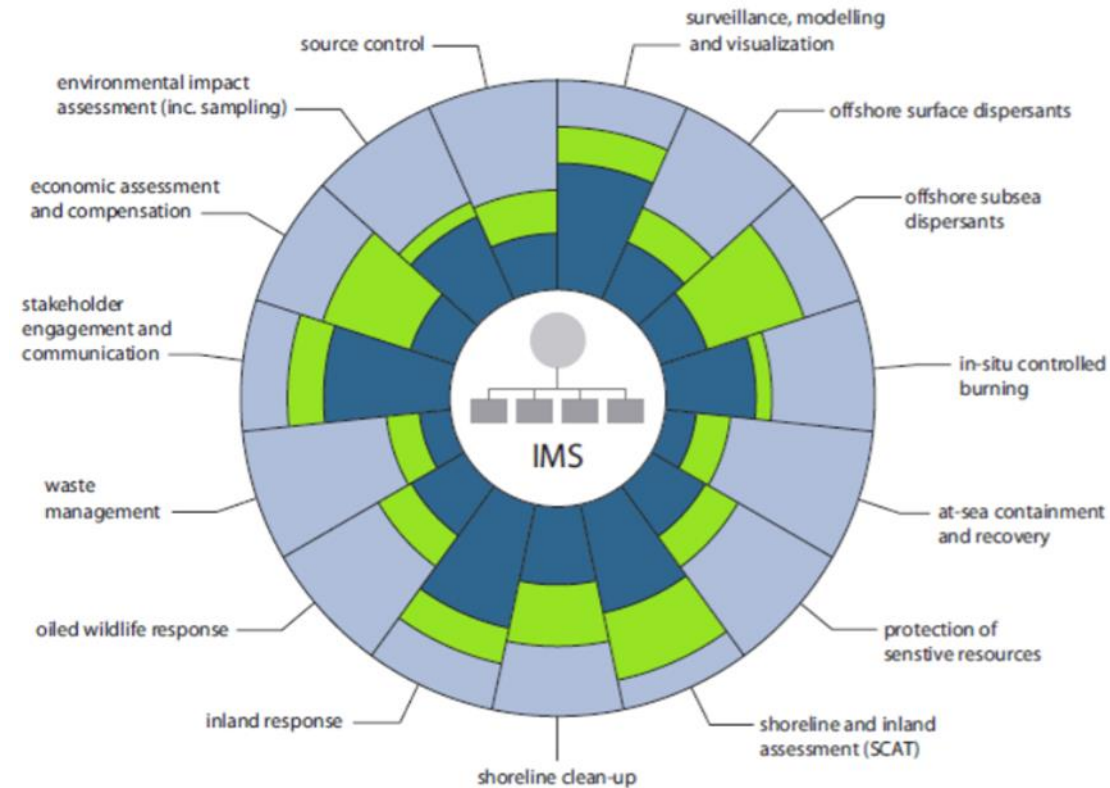
**Tier 1:** Handles minor spills with local resources and planning.

**Tier 2:** Addresses medium spills, exceeds local capacity, and needs regional help.

**Tier 3:** Manages major spills requiring national/international coordinated efforts.

Resource Allocation: Each tier demands varying resource levels, encompassing personnel, equipment, training, and managerial readiness.

Advantage: Adherence to this strategy promises prompt action, minimizing environmental harm and mitigation costs.



# The Future: AI is revolutionizing oil spill response management by:

## **Predictive Analysis:**

AI can analyze historical data to predict potential oil spills, helping companies prepare and possibly prevent future incidents.

## **Real-time Monitoring and Detection:**

AI can process vast amounts of sensor data in real-time to detect irregularities that could lead to spills. It can help identify leaks instantly and pinpoint their exact location, leading to quicker containment.

## **Impact Assessment:**

AI can assess the potential environmental impact of a spill, including predicting the spill's trajectory, speed, and dispersion pattern. This helps in planning an effective cleanup strategy.

## **Automated Response:**

AI can automate parts of the response process, such as deploying containment booms or autonomous cleanup robots, reducing response times.

## **Training and Simulation:**

AI can create simulated environments for training first-responders, allowing them to practice their responses to various spill scenarios.

## **Post-Impact Analysis:**

AI can assist in post-spill analysis, understanding the totality of the damage and effectiveness of the cleanup process, guiding improvements in future spill management.

By integrating these AI capabilities, companies can fundamentally improve their ability to prevent, detect, respond to, and study oil spills. This can lead to significant cost savings, reduced environmental impact, and improved regulatory compliance.

# OSRL Ready Check

<https://www.oilspillresponse.com/tools/ready-check/>

## Ready Check

This online tool will help you assess your level of preparedness to respond to an oil spill incident.

The Ready Check is divided into four sections:

1. Management organisation and training
2. Planning
3. Notification and Mobilisation
4. Response

## Guidelines for completion

- ✓ Complete the questions by selecting one of three responses. A 'How Do I Know?' button gives guidance on what response is appropriate for your organisation.
- ✓ You can move between the sections and questions as you wish.
- ✓ The 'Email this Report' button allows you to email the Action Summary Report to yourself in PDF format.
- ✓ The Action Summary Report contains an access code that allows you to reload your data into this on-line form to complete or amend it at a later time.

### SECTION 1: MANAGEMENT

#### Management Organisation and Training

It is essential that there is a robust management structure to lead the response to any incident. The members of the team should be aware of their individual roles and responsibilities and trained in oil spill response. The team should be aware of how OSRL fits in with their management organisation. The organisation should be regularly exercised.

Questions	1	2	3
M1 Are all levels of Management aware of your company's responsibilities in managing an oil spill?	1	2	3
M2 Is a recognised Incident Management System (e.g. Incident Command System or ICS) utilised?	1	2	3
M3 Is the Incident Management System regularly exercised?	1	2	3
M4 Have all the Incident Management Team members been trained in oil spill response?	1	2	3
M5 Have members of the Management team been briefed on how to effectively integrate response from OSRL into the Member's own response structure?	1	2	3
M6 Are all the members of the Management team aware of their individual roles and responsibilities in an oil spill incident?	1	2	3

### SECTION 2: PLANNING

#### Planning

There should be a contingency plan in place to coordinate the response to an oil spill. The plan brings together the various elements of the response and it should be kept up to date and tested on a regular basis. The plan should interface with other adjacent plans. The plan should have an appropriate and relevant risk assessment and identify where resources to support Tier 1, 2 and 3 responses can be accessed.

Questions	1	2	3
P1 Is there an oil spill contingency plan in place?	1	2	3
P2 When was the oil spill contingency plan last reviewed?	1	2	3
P3 When was the oil spill contingency plan last exercised?	1	2	3
P4 Does the plan risk assessment reflect the scope?	1	2	3
P5 Does the oil spill contingency plan incorporate Oil Spill Response roles and responsibilities?	1	2	3
P6 Does the plan interface with national and other adjacent local plans?	1	2	3
P7 Has a waste management plan been developed for the response operation?	1	2	3
P8 When was the waste management plan last exercised?	1	2	3

### SECTION 3: MOBILISATION

#### Notification and Mobilisation

An effective response is dependent on an effective notification and mobilisation system to alert the responders to the nature and scope of the emergency. This section deals with the system used for alerting OSRL to an emergency and ensures that both parties are aware of the information required by the OSRL Duty Manager to evaluate the best response options for the client, which ultimately will be translated into an agreed plan of action. The OSRL Duty Manager can also offer response advice to Members, should they require it.

Questions	1	2	3
N1 Is there a procedure in place to notify OSRL of an incident?	1	2	3
N2 When was the notification procedure for OSRL last reviewed/updated?	1	2	3
N3 When was the notification procedure last exercised?	1	2	3
N4 Is there a procedure in place to mobilise OSRL in the event of an incident that is tested regularly?	1	2	3
N5 Are you aware of the information OSRL will request when mobilised to an oil spill incident?	1	2	3
N6 Are you aware of the advice and support that can be accessed through the OSRL Duty Manager?	1	2	3
N7 Are you aware of the on-site advice and support that can be accessed through the OSRL Technical Advisor?	1	2	3
N8 Are you aware of the response time likely to be achieved in the event of a call?	1	2	3

### SECTION 4: RESPONSE

#### Response

In order to be able to respond effectively to the Member, there is a need for infrastructure items to support the response. This section deals with these elements.

Questions	1	2	3
R1 Is there a safety management plan in place for response operations?	1	2	3
R2 Have response personnel been trained in the safety aspects of oil spill response?	1	2	3
R3 Is there an effective communications system to enable the coordination of response?	1	2	3
R4 Have secure equipment stockpile areas been identified?	1	2	3
R5 Have the logistics arrangements been identified to import and deploy additional equipment delivered by OSRL?	1	2	3
R6 Have the customs arrangements been identified to import and deploy additional equipment delivered by OSRL?	1	2	3
R7 Are you familiar with OSRL's capability to provide wildlife response?	1	2	3

# Looking Forward

**Join us on the 10<sup>th</sup> October for our second webinar in this series, Risk Assessment and Contingency Planning.**

**In this webinar we will be walking through the steps involved in developing a thorough risk assessment and contingency plan and discussing why they are crucial for effective preparedness.**

**Our specialists will delve into the intricacies of identifying and assessing potential spill risks, evaluating response capabilities, and establishing contingency plans tailored to your organization's needs.**

**Discover practical methodologies and best practices for minimizing risk and maximizing response readiness.**

# Staying in Touch



## Support Services

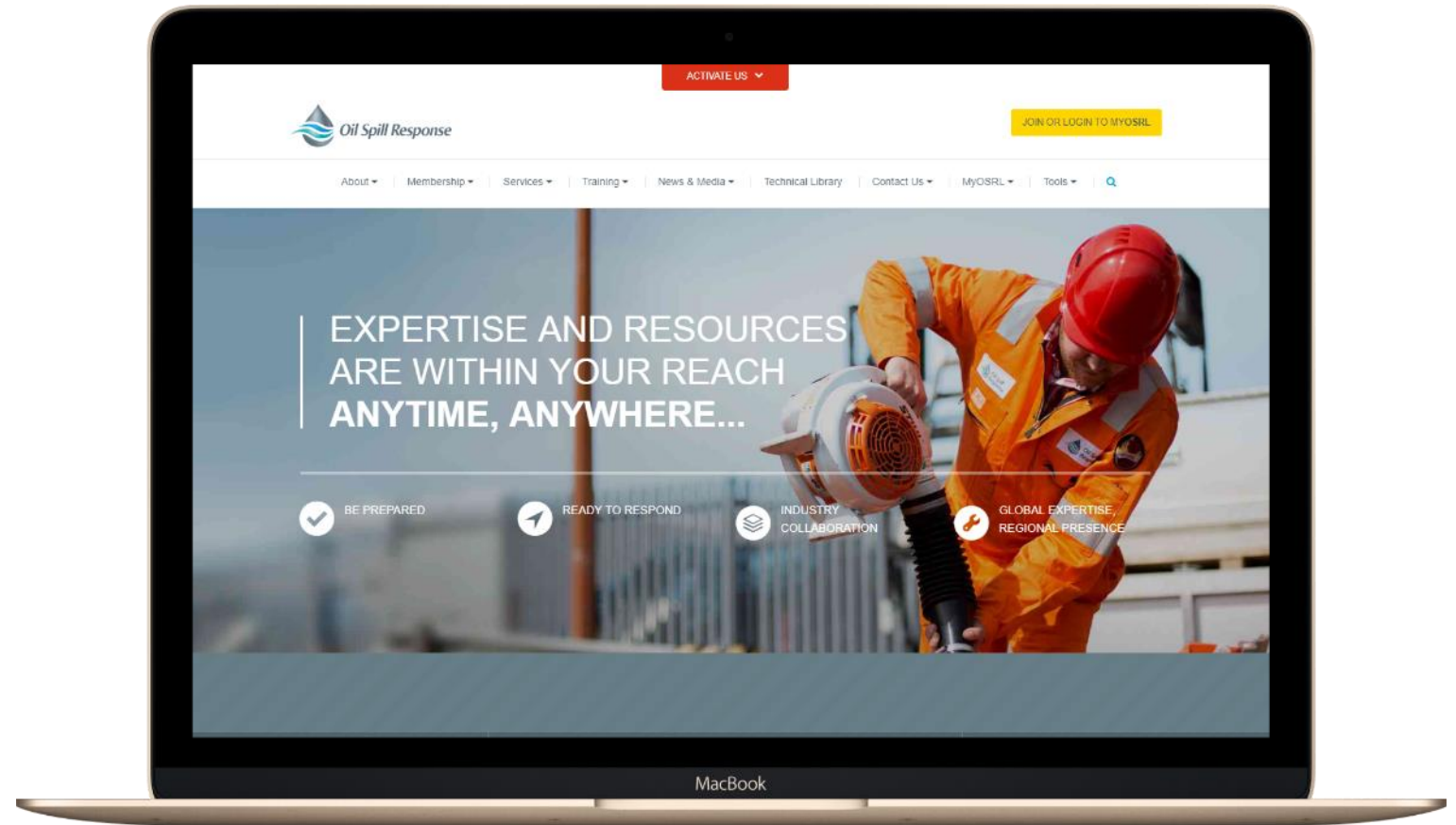
[www.oilspillresponse.com](http://www.oilspillresponse.com)

- > [TristanBarston@oilspillresponse.com](mailto:TristanBarston@oilspillresponse.com)
- > [Houston@oilspillresponse.com](mailto:Houston@oilspillresponse.com)
- > [DutyManagers@oilspillresponse.com](mailto:DutyManagers@oilspillresponse.com)



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- > [www.twitter.com/oilspillexperts](https://www.twitter.com/oilspillexperts)





# References

**Slide 3:** The Bureau of Safety and Environmental Enforcement (BSEE) District Investigation Reports

<https://www.bsee.gov/what-we-do/incident-investigations/offshore-incident-investigations/district-investigation-reports>

**Slide 4:** ITOPF TIP 02: Fate of Marine Oil Spills

<https://www.itopf.org/knowledge-resources/documents-guides/tip-02-fate-of-marine-oil-spills/>

**Slide 5:** Human Health and Socioeconomic Effects of the Deepwater Horizon Oil Spill in the Gulf of Mexico

By Paul A. Sandifer , Alesia Ferguson, Melissa L. Finucane, Melissa Partyka, Helena M. Solo-Gabriele, Ann Hayward Walker, Kateryna Wowk, Rex Caffey, and David Yoskowitz

<https://tos.org/oceanography/article/human-health-and-socioeconomic-effects-of-the-deepwater-horizon-oil-spill-in-the-gulf-of-mexico-1>

**Slide 6:** IPIECA JIP6 Oil Spill Risk Assessment and Response Planning for Offshore Installations

<https://www.ipieca.org/resources/oil-spill-risk-assessment-and-response-planning-for-offshore-installations>

**Slide 7:** International Maritime Organization (IMO) List of IMO Conventions

<https://www.imo.org/en/About/Conventions/Pages/ListOfConventions.aspx>

**Slide 8:** IMO Regional Activity Centres

<https://www.imo.org/en/OurWork/Environment/Pages/Regional-Centres.aspx>

**Slide 9:** IPIECA Tiered preparedness and Response GPG.

<https://www.ipieca.org/resources/tiered-preparedness-and-response#:~:text=Tiered%20Preparedness%20and%20Response%20is%20recognised%20as%20the,worst%20case%20release%20at%20sea%20or%20on%20land.>

**Slide 10:** How AI Can Be Used As A Disaster Preparedness And Support System. Forbes Technology Council Member Jeff Catlin

<https://www.forbes.com/sites/forbestechcouncil/2020/05/26/how-ai-can-be-used-as-a-disaster-preparedness-and-support-system/?sh=7889f7a11c72>