

OIL SPILL RESPONSE LIMITED LESSONS FROM MACONDO – HOW BETTER PREPARED IS THE INDUSTRY NOW?

PAJ OIL SPILL WORKSHOP
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LESSONS FROM MACONDO – HOW BETTER PREPARED IS THE INDUSTRY NOW?

Ho Yew Weng

April 20th 2010



In Monetary Terms

**Total cost of the disaster estimated
at US\$61 Billion**

Facts and Figures

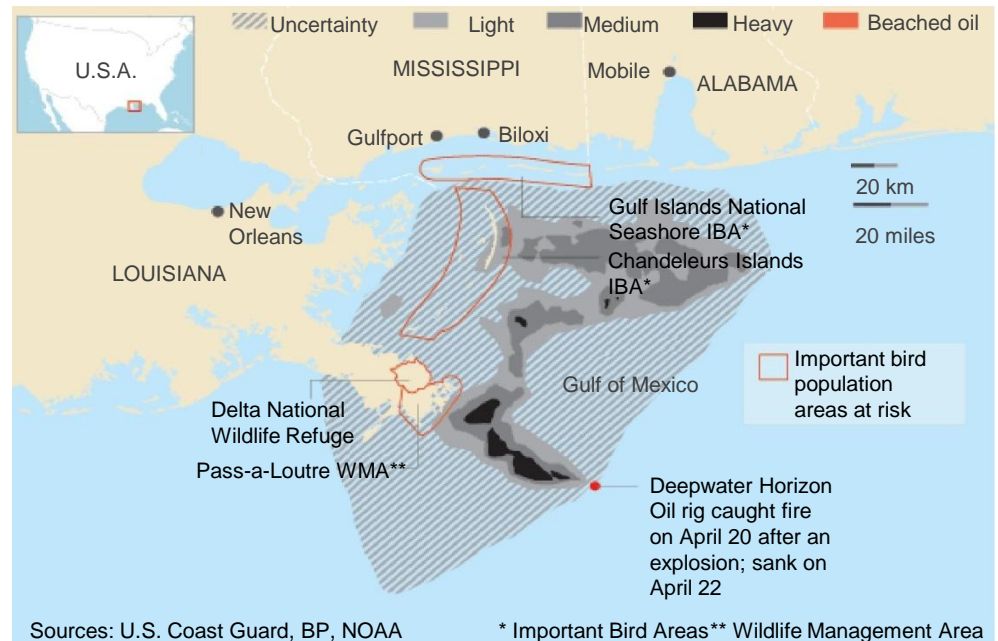
- > **Spill Source:** Macondo Well
- > **Location:** Gulf of Mexico, USA.
- > **Date:** 20 April 2010
- > **Reason:** subsea blowout and rig explosion
- > **Oil:** 5,000,000 bbl crude oil estimated
- > **Sensitivities:** Industry, ecology, fishing,
livelihood, politics...

Facts and Figures

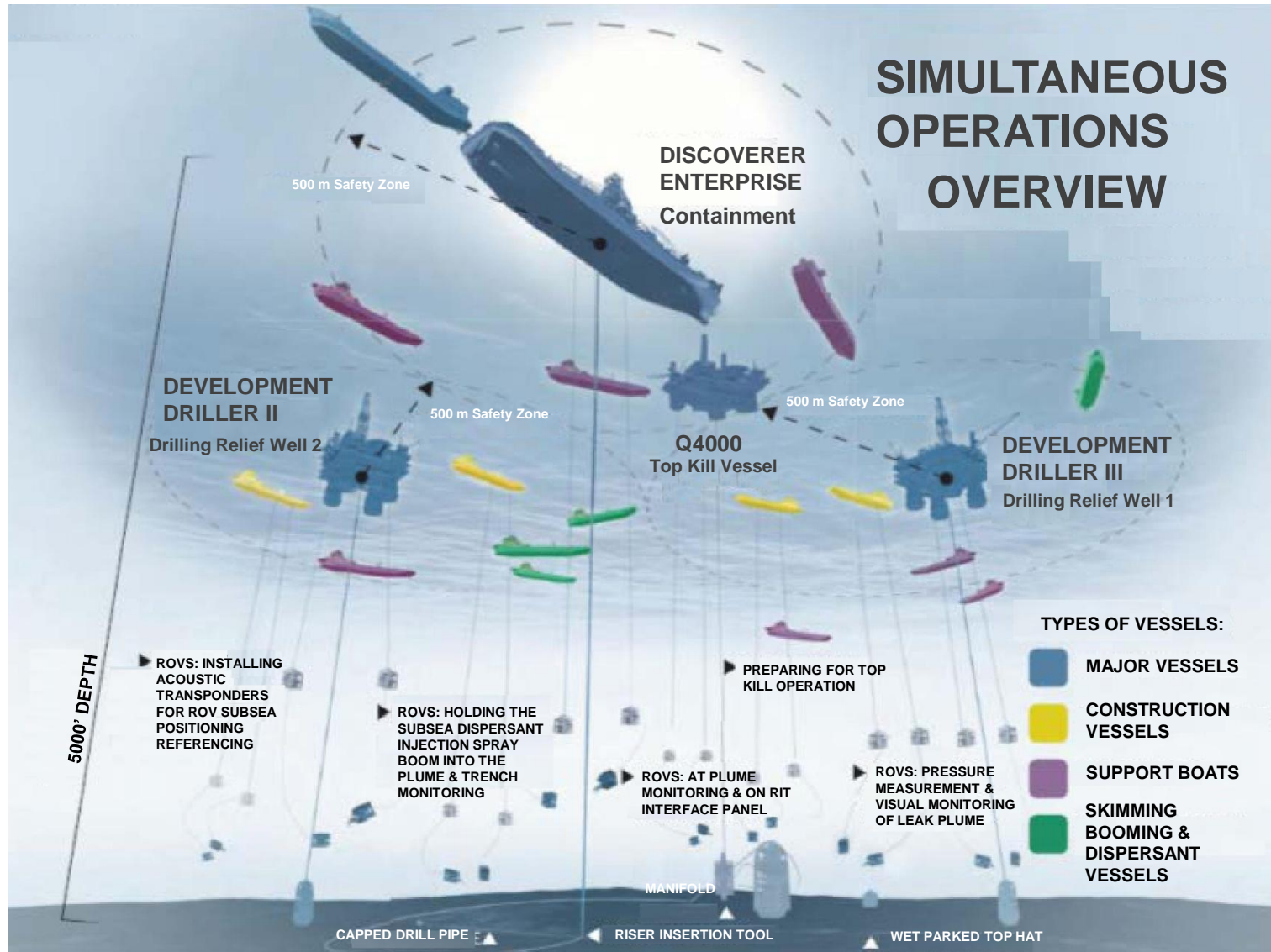
- > 35 API oil
- > High evaporation rates
- > High asphaltenes
- > Oil weathering during surfacing
- > Emulsification of oil
- > High level of dispersion - subsea and surface / natural
- > Low level of oil shoreline impact in comparison to reported volume spilled

Scale of Response

- > 48,000 Responders
- > 6,500 VOO
- > 150 Aircraft
- > 2 FPSO's
- > Multiple Agencies
- > International Involvement
- Unified Command



Assets at Site



Oil Spill Response Plans

What Went Well

- ◆ Despite the magnitude and intense pressure the Response System functioned well

Top 3 Recommendations

- ◆ Speed of Ramping up
- ◆ Plan Content / Structure
 - calculating worst case discharge
- ◆ Coordination with Regulatory Agencies

Oil Sensing & Tracking

What Went Well

- ◆ Surface oil was successfully detected, tracked and modeled. Subsurface oil tracking was less successful

Top 3 Recommendations

- ◆ Advance Methodology for remote sensing of subsurface oil
- ◆ Improve connectivity of sensing data / trajectory modeling
- ◆ Expand new technology e.g. ROV

Use of Dispersants

What Went Well

- ◆ Dispersant use prevented significant oiling of sensitive shoreline habitats
- The capability is based on the past decades' improvement



Top 2 Recommendations

- ◆ Need Common Understanding on
 - Risks / Benefits
 - Safety / Effectiveness
- ◆ Research on behavior / long term fate of dispersed oil in water column & when dispersants are applied at sea floor

In Situ Burning

What Went Well

- ◆ Valuable component of this Response
 - Due to research and regulatory changes of the past 20 years



Top 2 Recommendations

- ◆ Focus research on boom performance
- ◆ Educate / publicize advantages and benefits of *in situ* burning as a Response strategy

Mechanical Recovery Systems

What Went Well

- ◆ Assets mobilized effectively, relatively well organized response
- ◆ Adequate local storage capacity



Top 3 Recommendations

- ◆ Continue boom / skimmer design
- ◆ Need to maximize encounter rate: tactical use of booms, aerial surveillance
- ◆ Develop ability to function in higher sea states / current

Shoreline Cleanup / Protection

What Went Well

- ◆ Resources were rapidly deployed and an aggressive shoreline protection and cleanup program was mounted



Top 3 Recommendations

- ◆ Increase number of trained Responders
- ◆ Strengthen Command and Control for a cooperative joint effort
- ◆ Accept limitations of booming

Alternative Technologies

What Went Well

- ◆ An active program solicited and field tested innovative alternative technologies
- ◆ Success stories included
 - The Big Gulp Skimmer
 - Dispersants to dissipate concentration of VOC
 - Subsea injection of dispersant

Top 2 Recommendations

- ◆ Continue support of innovations
- ◆ Develop a clear process and responsible organization to deal with ideas

Macondo – Impact

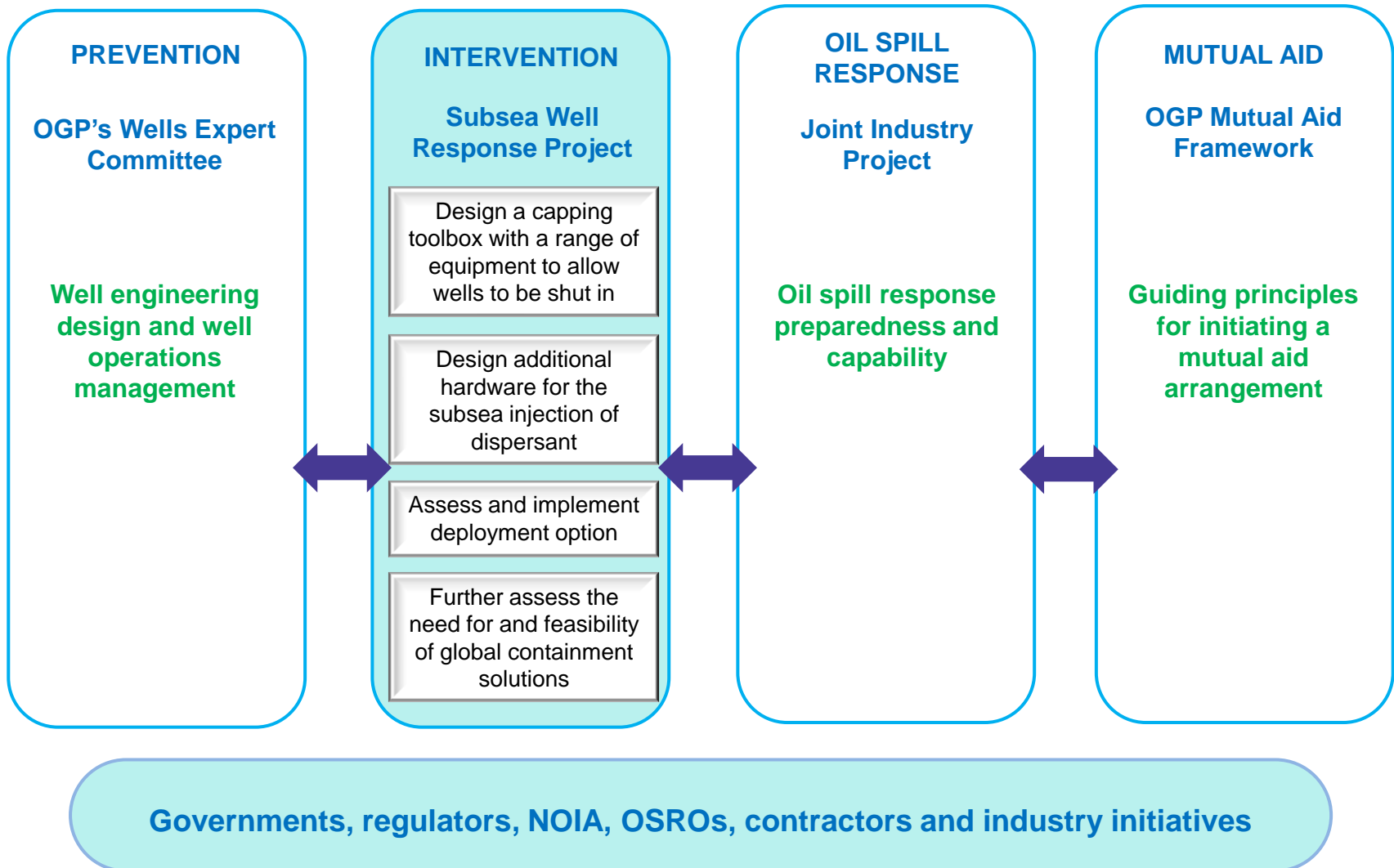
While the technical response to Macondo was effective (at least from an industry perspective), the incident

- Cast industry in a very negative light (again)
- Highlighted deficiencies in government regulations
- Raised concern about industry capability to respond to E&P incidents

Montara in Australia (2009)



Global Industry Response Group



OSPRAAG Capping Device

Design

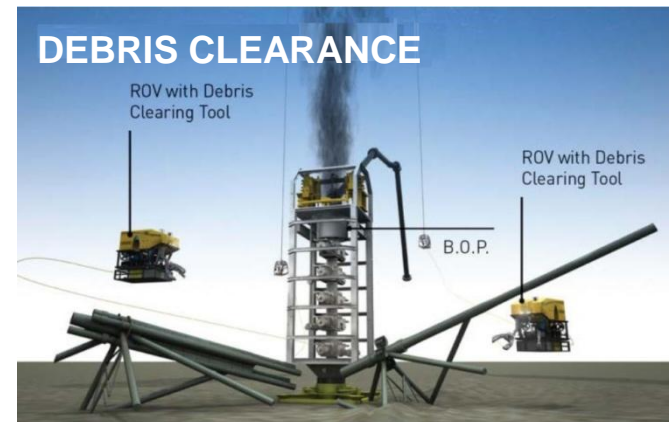
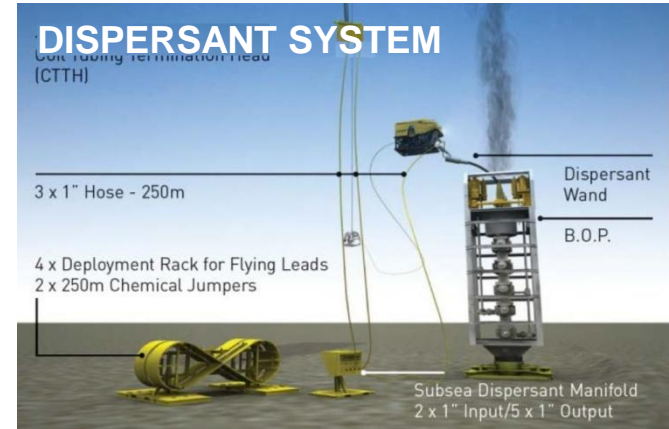
- > 15,000 psi rated equipment;
- > 250 degF temp rating;
- > Water depth up to 5,500ft (1,670m)
- > Handle 75 KBD of fluids;
- > Configured for H₂S service;
- > 1 year continuous immersion on any single application;
- > 20 year design life



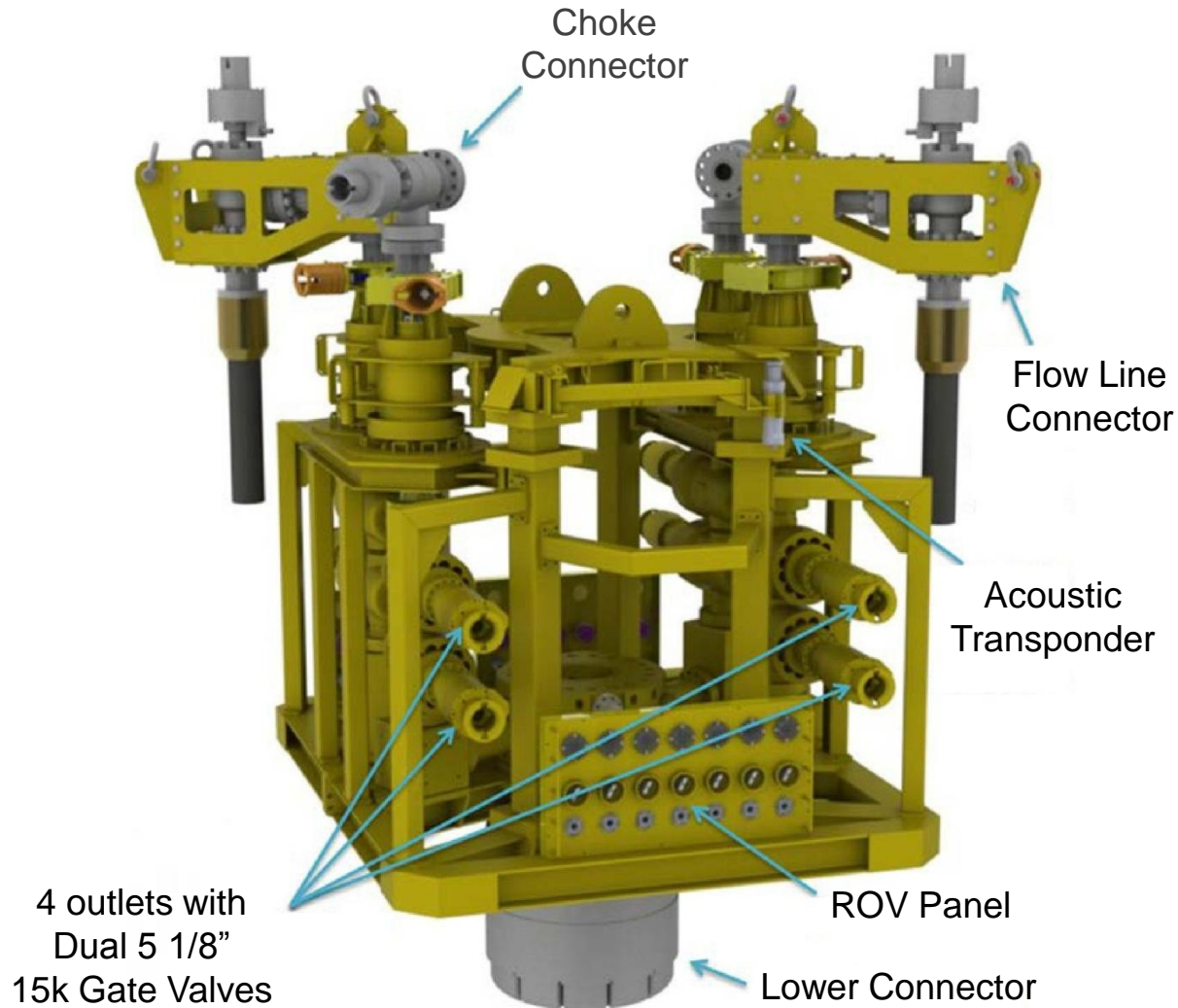
Subsea Incident Response Toolkit

- > Subsea application of dispersant at a wellhead:
 - Safer surface working conditions for Responders
 - Enhances the degradation of the oil

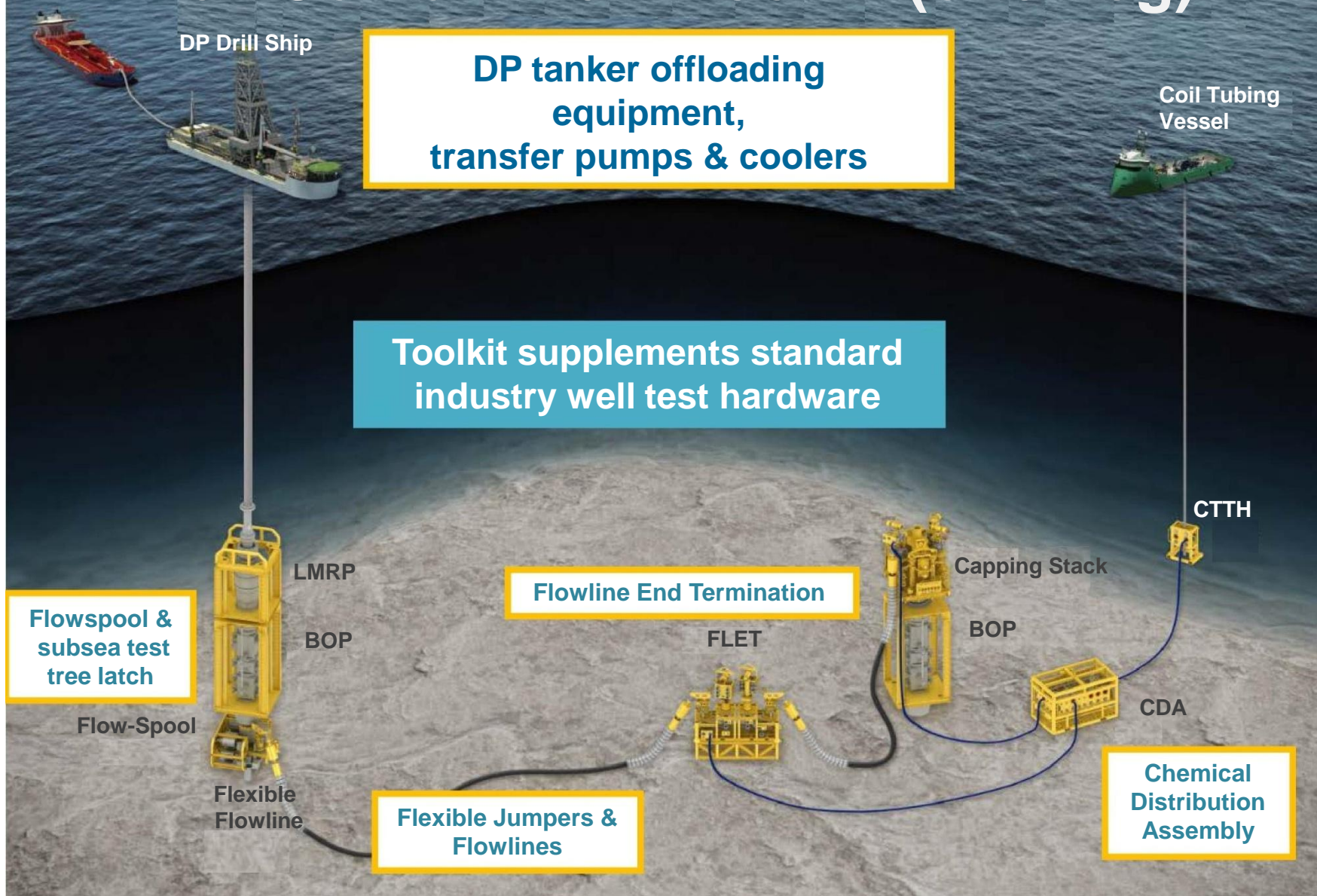
- > Toolkits include:
 - Tools for site surveys
 - Debris clearing equipment
 - Distribution manifold and dispersant wands
 - BOP intervention equipment



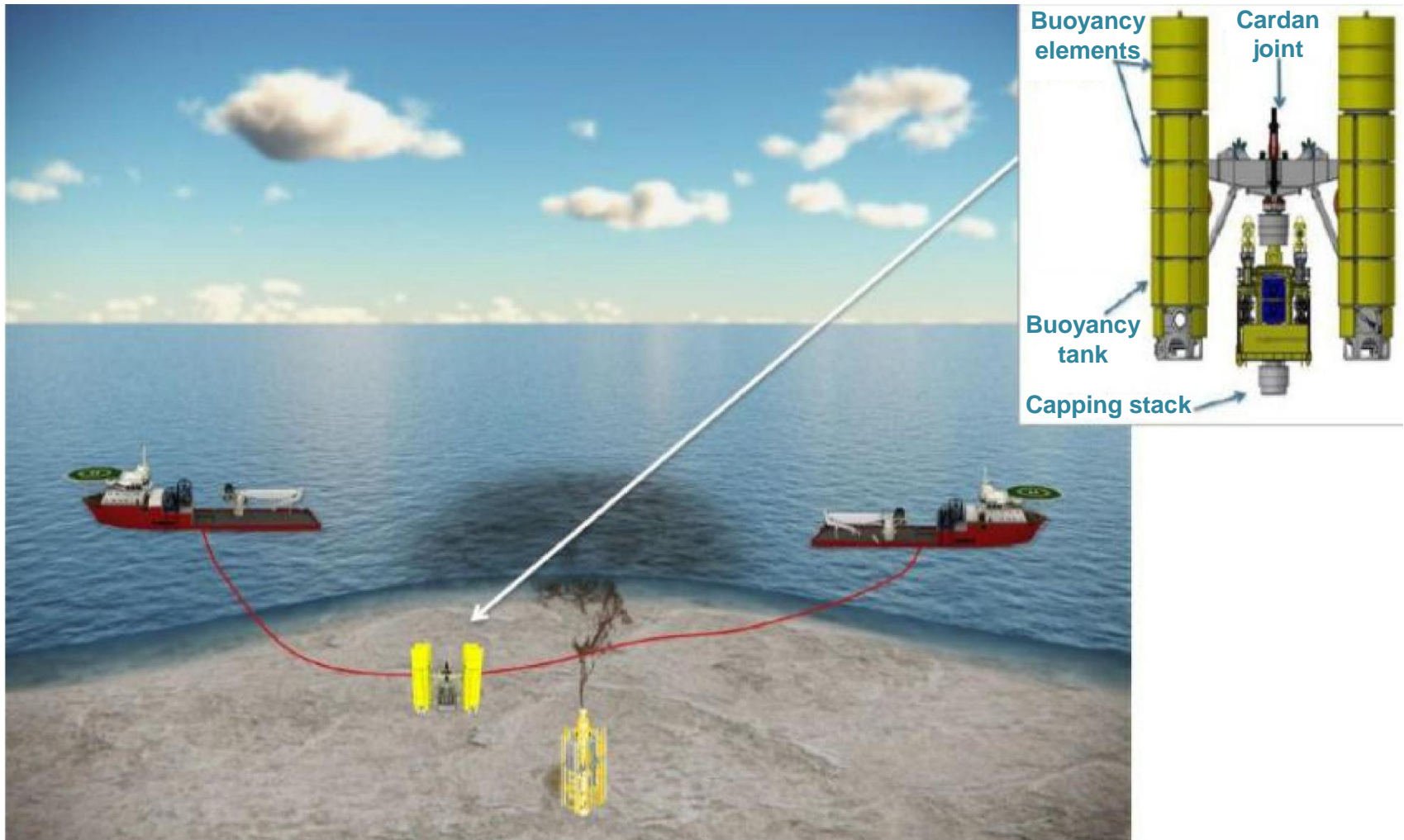
Standardised capping platform



Well Containment Toolkit (one Leg)

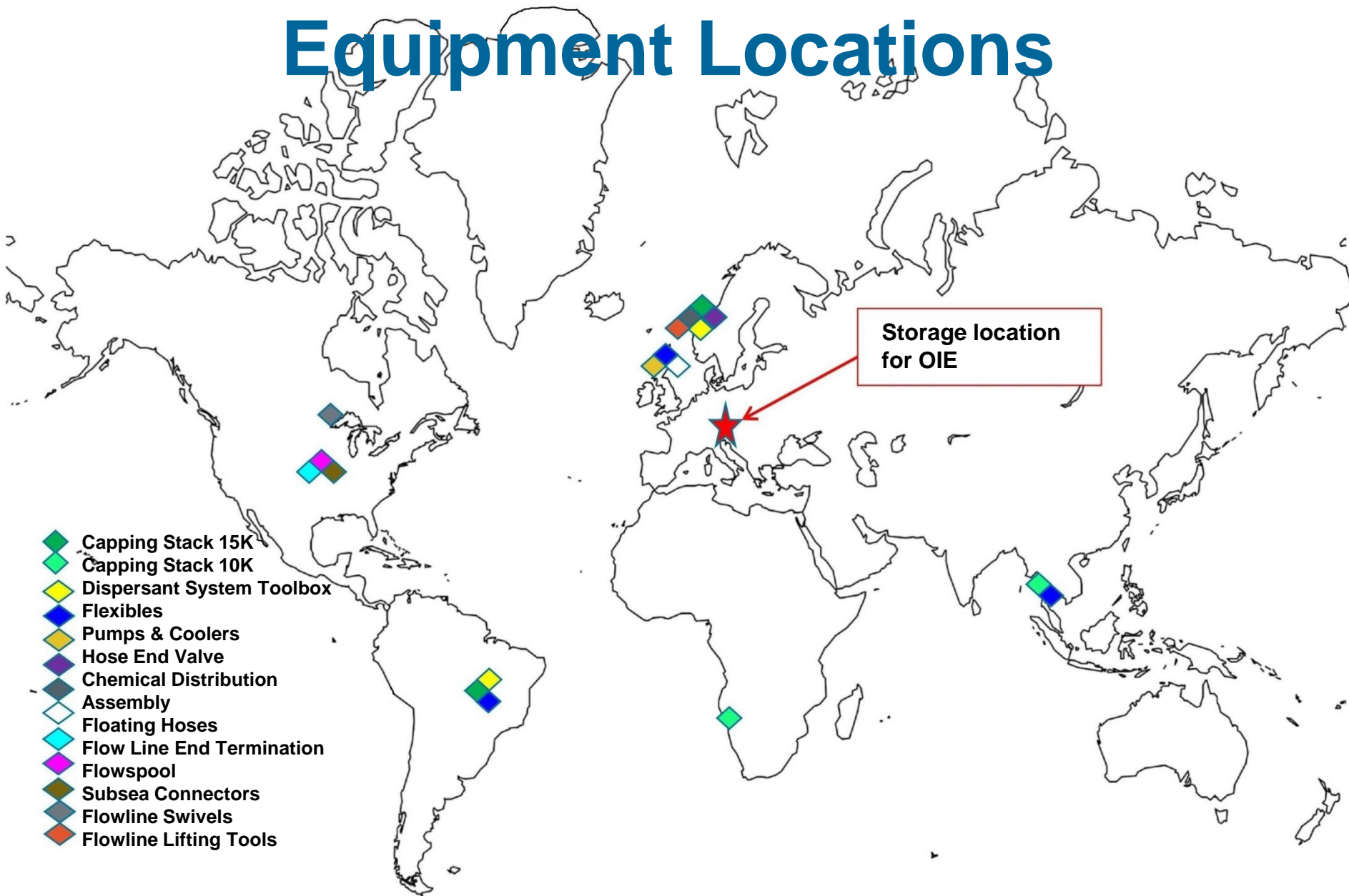


Offset Installation Equipment (OIE)



Offset Installation Equipment

Equipment Locations



Global Dispersant Stockpile

Stockpile amount and locations –5000 cu.m.

Type	Quantity (m ³)	Location
Dasic Slickgone NS	500	OSRL Base UK Southampton
Finasol 52	500	OSRL Base UK Southampton
Finasol 52	350	OSRL Base Singapore
Dasic Slickgone NS	350	OSRL Base Singapore
Finasol 52	1500	Supplier Warehouse – Europe
Finasol 52	800	OSRL Base South Africa
Corexit EC9500A	500	Florida / Texas USA
Corexit EC9500A	500	Brazi

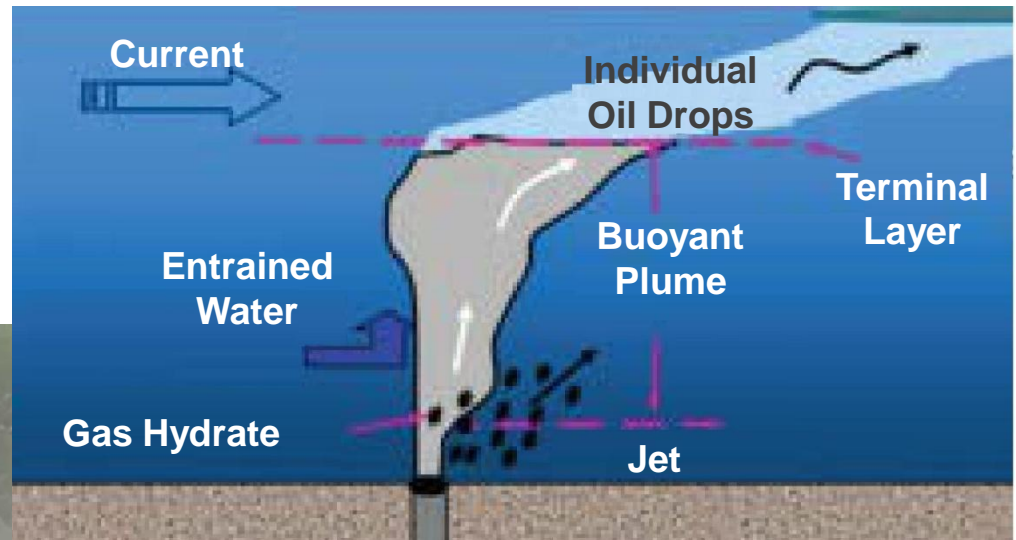


Boeing 727 -252F Jet

New aerial dispersant spraying platform



Subsea Spill Modeling & Satellite Imagery



Strategic Alliance Partners

- > **Trendsetter and Boots & Coots** – Capping and Containment preparedness, operations, deployment support
 - **Agreement has been signed and is operational.**
- > **Saipem** – OIE preparedness, operations, deployment support
 - **Currently being developed**
- > **Oceaneering** – SIRT preparedness, operations, deployment support
 - **Currently being developed**

Strategic Alliance Partners

Other Agreements being developed

- > **Genesis O&G** – Containment preparedness, operations, deployment support
- > **Inocean** – Containment preparedness, operations, deployment support;
- > **Delmar** –Capping & Containment preparedness, operations, deployment support;
- > **Freight Forwarders to support logistics**

Air Freightable Capping Stack (AFCS)

AFCS Project

Members Request

Capping Stacks to be air freightable for faster response

Objective

Provide a capability to airfreight the 15K PSI capping devices in an assembled configuration using an AntonovAN-124 aircraft

Air Freightable Capping Stack (AFCS)

AFCS Project

- Task Force formed late 2017
- Fabrication completed in July 2018
- Integration testing completed August.
- Reviews completed with lifting specialist, crane company and transportation firm.
- Load Master sign off completed.
- Demonstration exercise took place August in Stavanger

AFCS Video

Air Freightable Capping Stack



Looking Forward ...

- **What will not change**
 - The Tiered Response Philosophy
 - Importance of Dispersants
 - Working Closely with Governments

Looking Forward ...

- **What Needs to be Considered**
 - Resources for a Credible Loss of Well Scenario
 - Ensure all tools are in the toolkit
 - Source Capping and Storage
 - Access to International Resources
 - Incident Management System

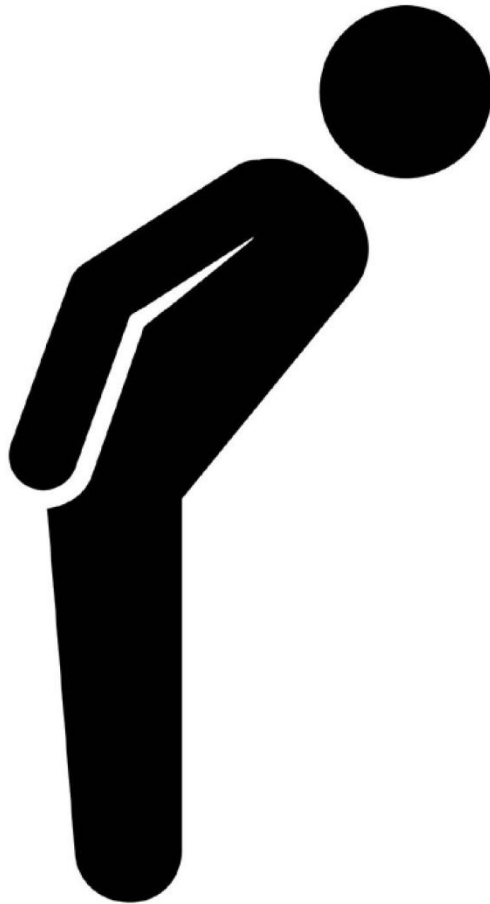
A New Paradigm?

Exxon Valdez

led to significant changes in the way the shipping industry prepared for and responded to oil spills

Macondo

will have a similar impact on the way E&P manages the preparedness and response to well control spills, especially in deep water



Thank You