Integrating upstream spill preparedness with maritime response systems: it's time to formalize the process

Presentation to PAJ Oil Spill Symposium

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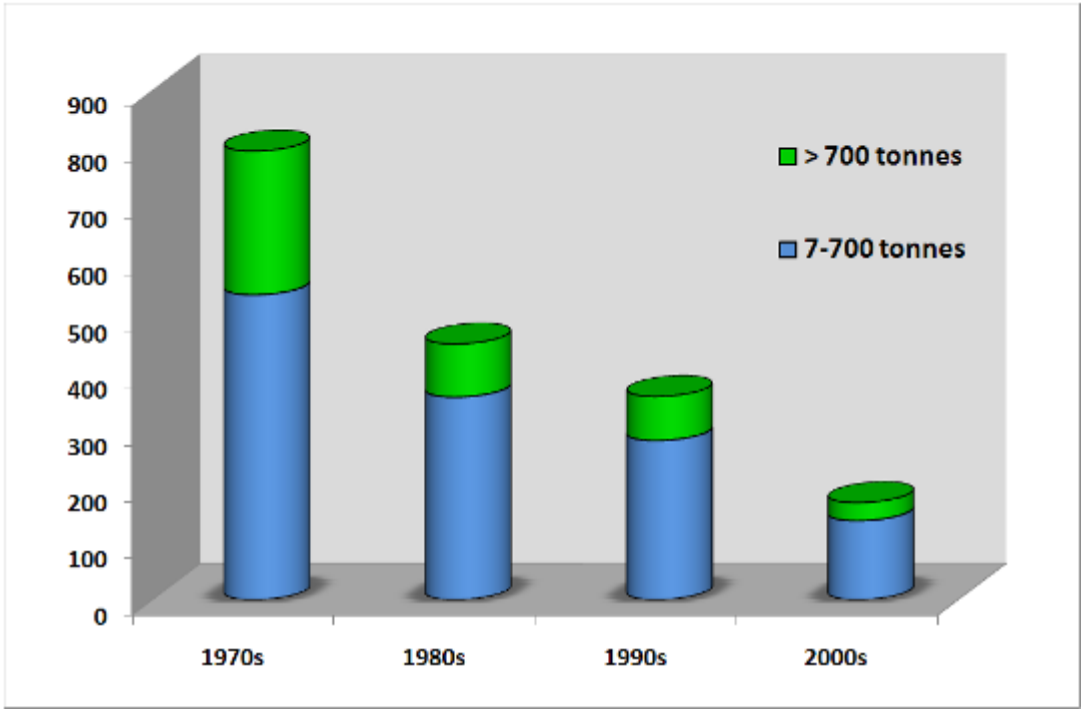
Point of departure for industry efforts

1. Oil spills present evergreen environmental, financial, and reputational risks

2. Sustainable long-term industry and government commitment are necessary to tackle this ongoing issue

Evidence points to success of industry efforts on shipping



ITOPF 2010

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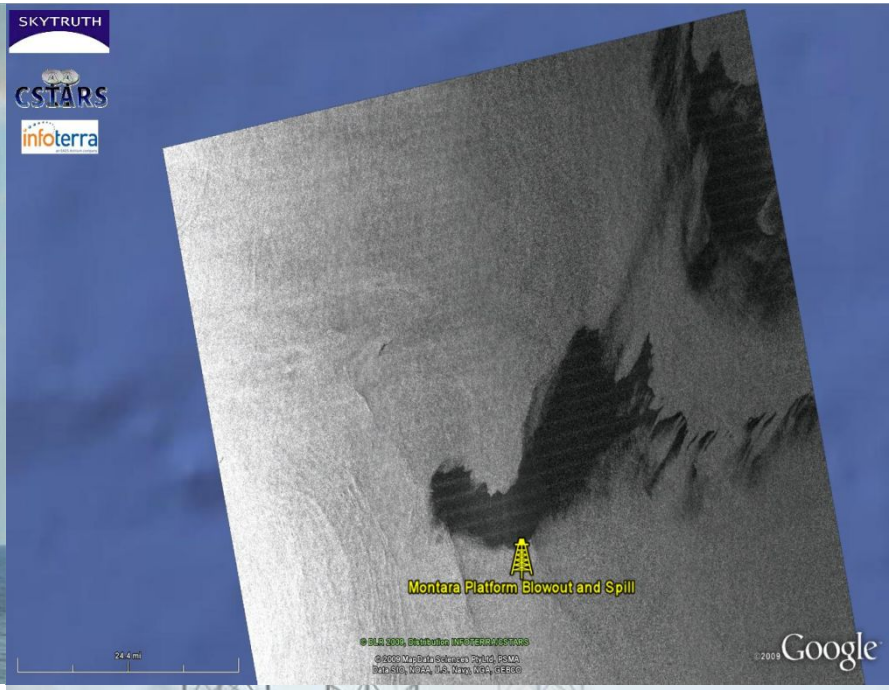
… but then came Montara



… and then, Macondo

The GIRG response

GIRG's task:

To improve the industry's well incident prevention, intervention and response capabilities.

And by doing so, reduce the likelihood and impact of future well incidents.

Global Industry Response Group (GIRG) recommendations

Prevention

Better capabilities and practice in well engineering design and well operations management

Intervention

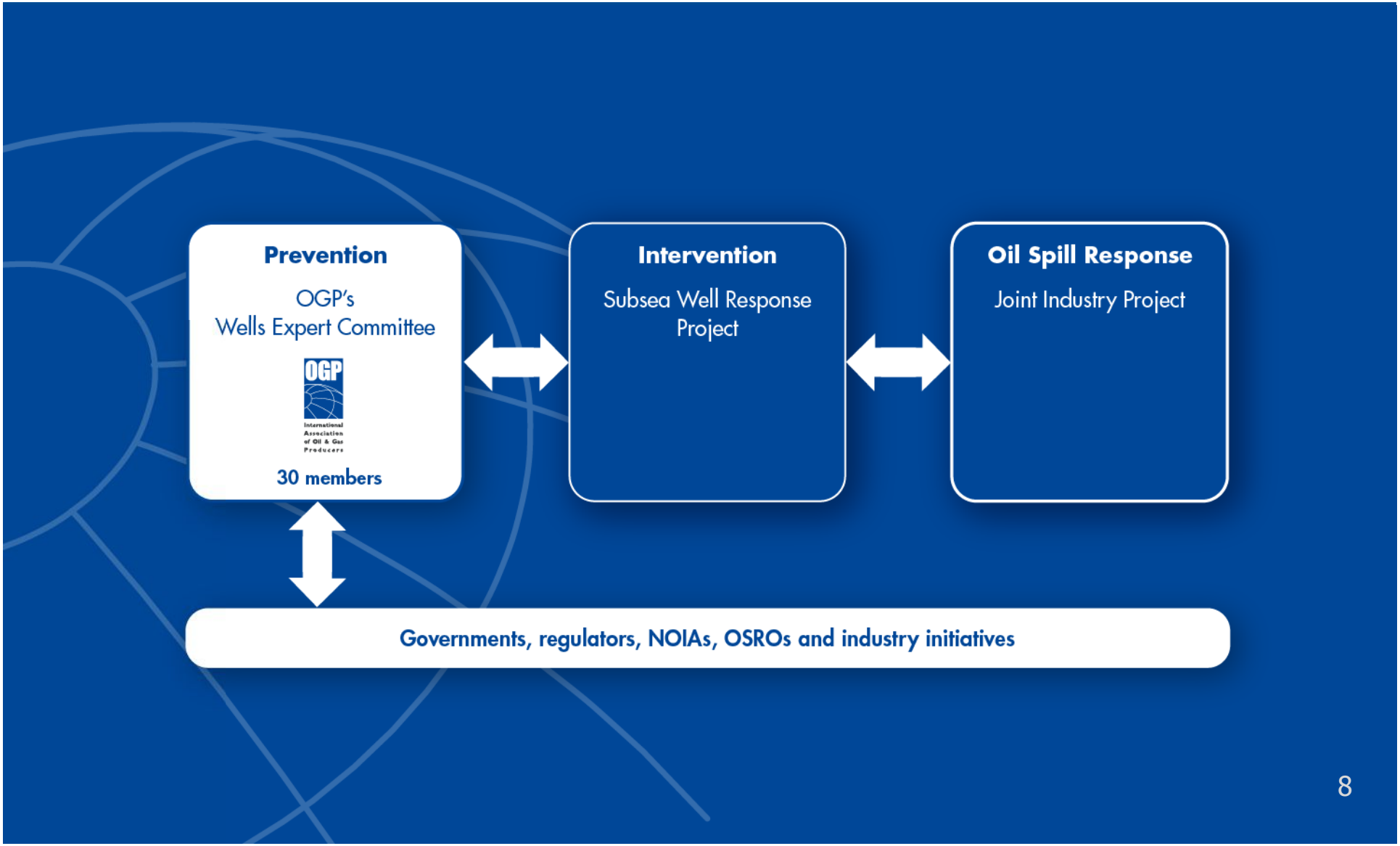
Improved capping response in the event of an incident and to study further the need for – and feasibility of – global containment solutions

Response

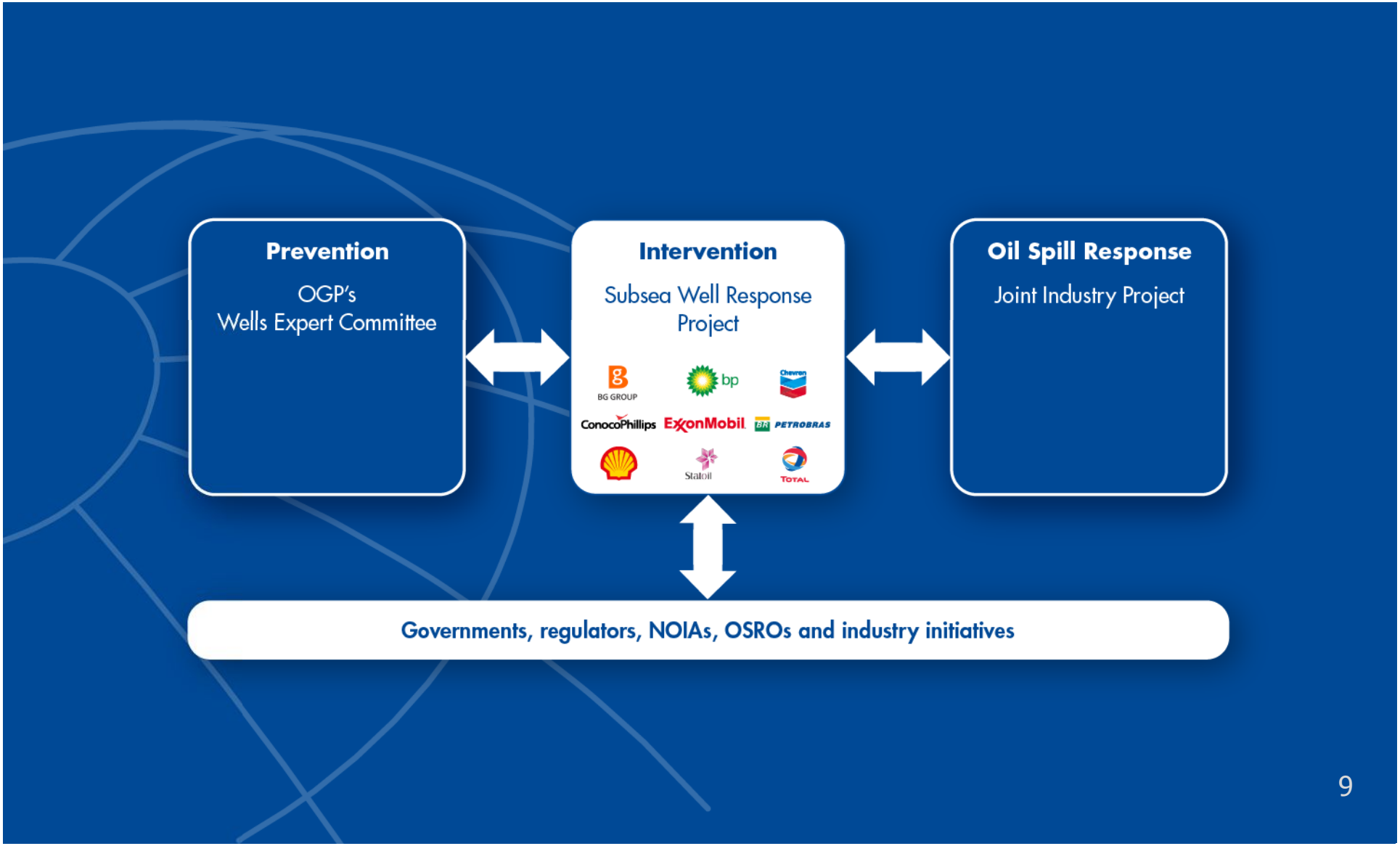
Effective and fit-for-purpose oil spill response preparedness and capability

Governments, regulators, NOIAs, OSROs and industry initiatives

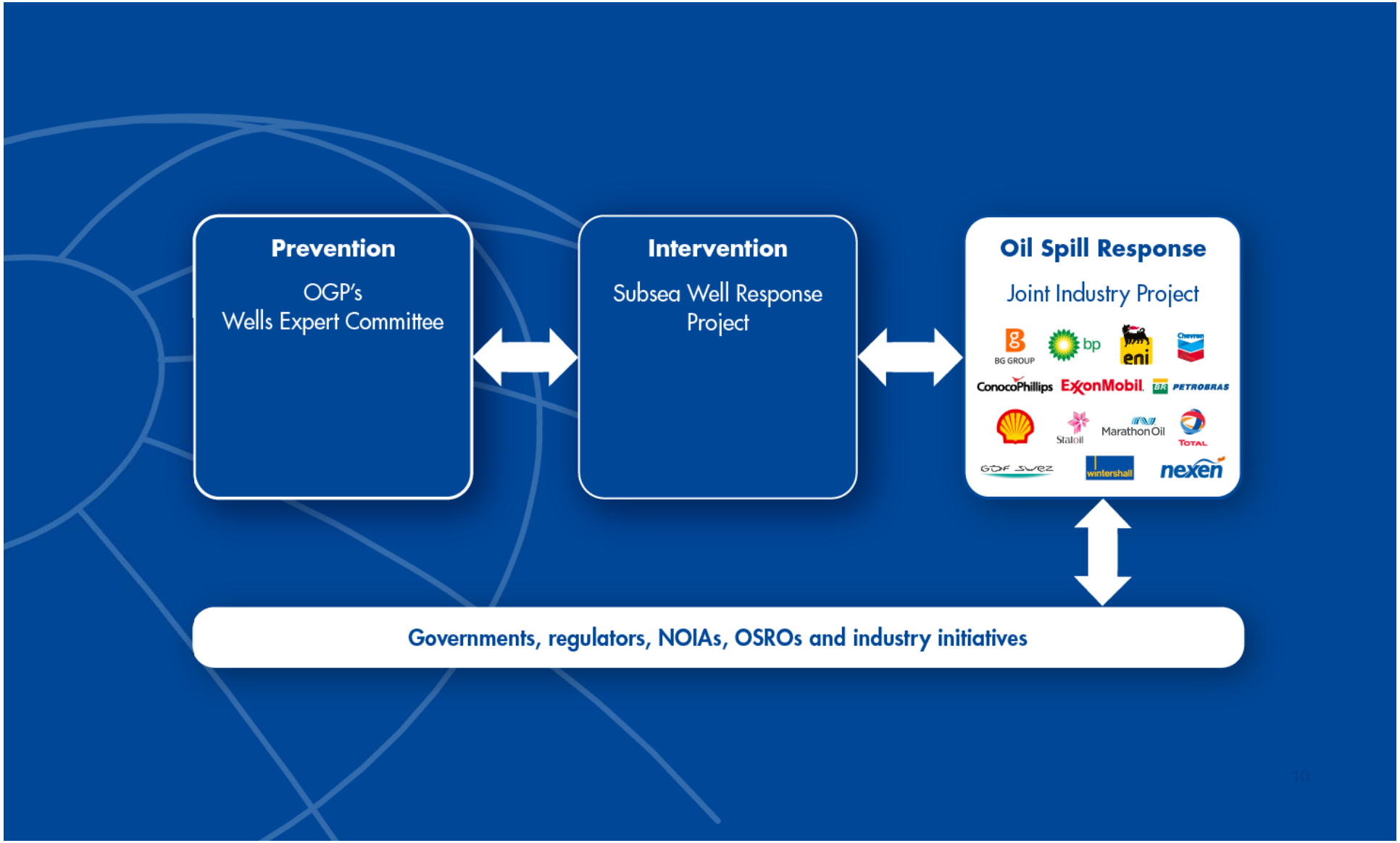
Wells Expert Committee



Subsea Well Response Project



Oil Spill Response Joint Industry Project



JIP membership

The OSR-JIP Mandate

- OSR-JIP has two key focus areas:
  - Looking at issues identified in the GIRG OSR process following Deepwater Horizon and Montara incidents and the implications for all aspects of spill response
    - Improve current “good practice” guidance particularly on dispersants
    - Nineteen different focus areas
  - Developing risk/hazard based strategies for response preparedness for the upstream
  - This is not just an extension of tactical response for shipping spills

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Shipping versus upstream

- Surface spills are different to subsea releases:
  - Mobile threat of known and finite size – weathering properties known
  - Fixed threat of unknown size - constantly replenished by fresh oil
- We need to propose and agree a global system of E&P spill response capability based on risk and hazard that is:
  - Compatible with the accepted Tiered Response Concept developed for surface spills/maritime protection
  - Scalable to take account of the actual need: worst credible case
  - Acceptable to regulators
  - Capable of being integrated into E&P risk management systems, safety cases, and operations

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Many definitions of risk and hazard but arguably:

In shipping, *probability* is to some extent more important in maritime response planning due to the uncertainty as to where a spill might occur and because volumes are limited

In upstream response planning, *hazard* and the receiving environment is often more important because of the fixed nature of the facilities, and the potential for extended timescales (and therefore volumes) in an incident

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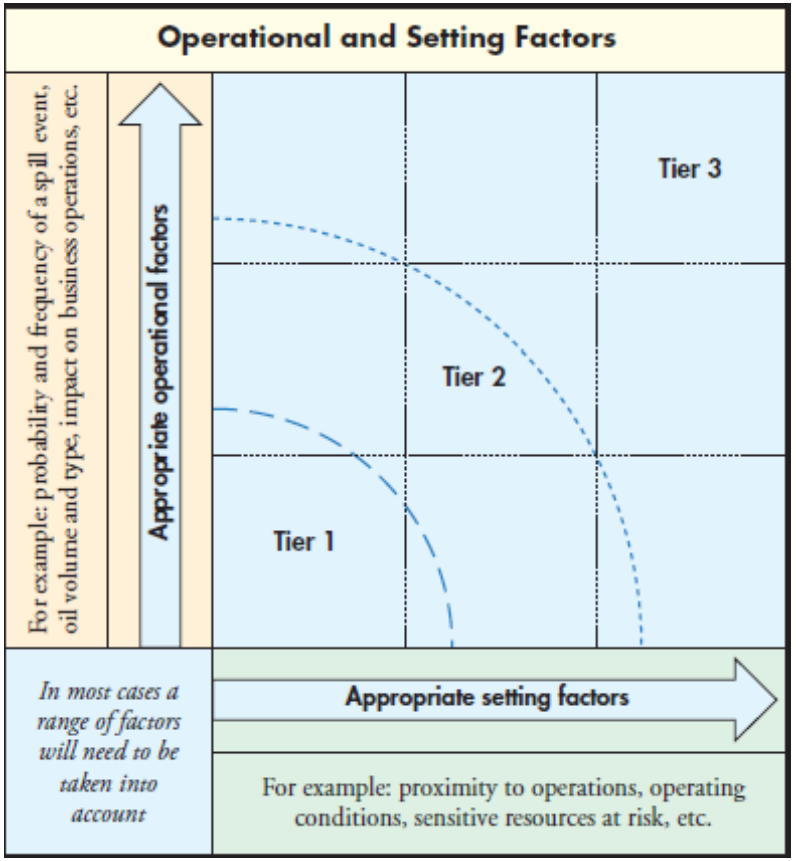
Tiered response concept

- Used by industry for over thirty years and is still valid as a response model
- Recognised by governments in international arena
- Introduced in recognition of probability, frequency and impact of spills
  - Shipping / terminal / pipeline spills have finite volume
- Tier definitions not always understood
- Historically, risk of well blowout mitigated against by use of statistical analysis of low probability/high impact event on the probability/impact matrix



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Traditional risk/response model

	LOSS OF CONTAINMENT EXAMPLES			
Tier	**Exploration**	**Production** (Including pipelines FSO / FPSO)	**Transportation**	**Downstream** (Product distribution)
1	Utility oil spill Fuel transfer spill Drilling mud spills Drain tank overflows	Utility oil spill Fuel transfer spill Drilling mud spill Drain tank overflow Hose connection spillages Tank overflows	Utility oil spill Fuel transfer spill Drain tank overflow Hose connection spillages Tank overflows	Utility oil spills Transfer spills Fuel transfer spills Hose connection spillages Road tanker spillages Tank overflows
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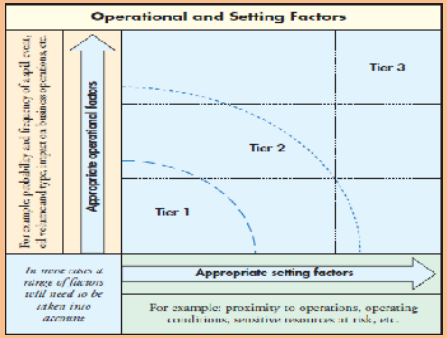
National Tier 2

Response Resources

- **Relevant**
- **Robust**
- **Reliable**

Credible Tier 3 response



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Tiered Response Concept

- Upstream spills introduce concepts of indefinite spill volumes and “resident risk”
- Nature and location of some upstream operations can make response difficult
- Reaction could be to define as an automatic Tier 3 risk
- Need for framework to apply internationally
- Introduce a Well Risk model in response
- Should lead to source control plan in addition to response if deemed necessary

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Revised risk response model

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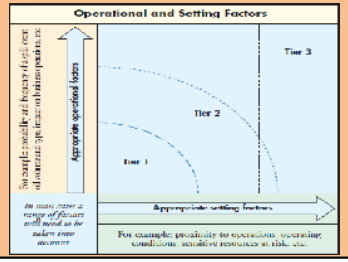
Well Risk Assessment

Credible Tier 3 response Plan



Additional Containment Requirement

Source control plan

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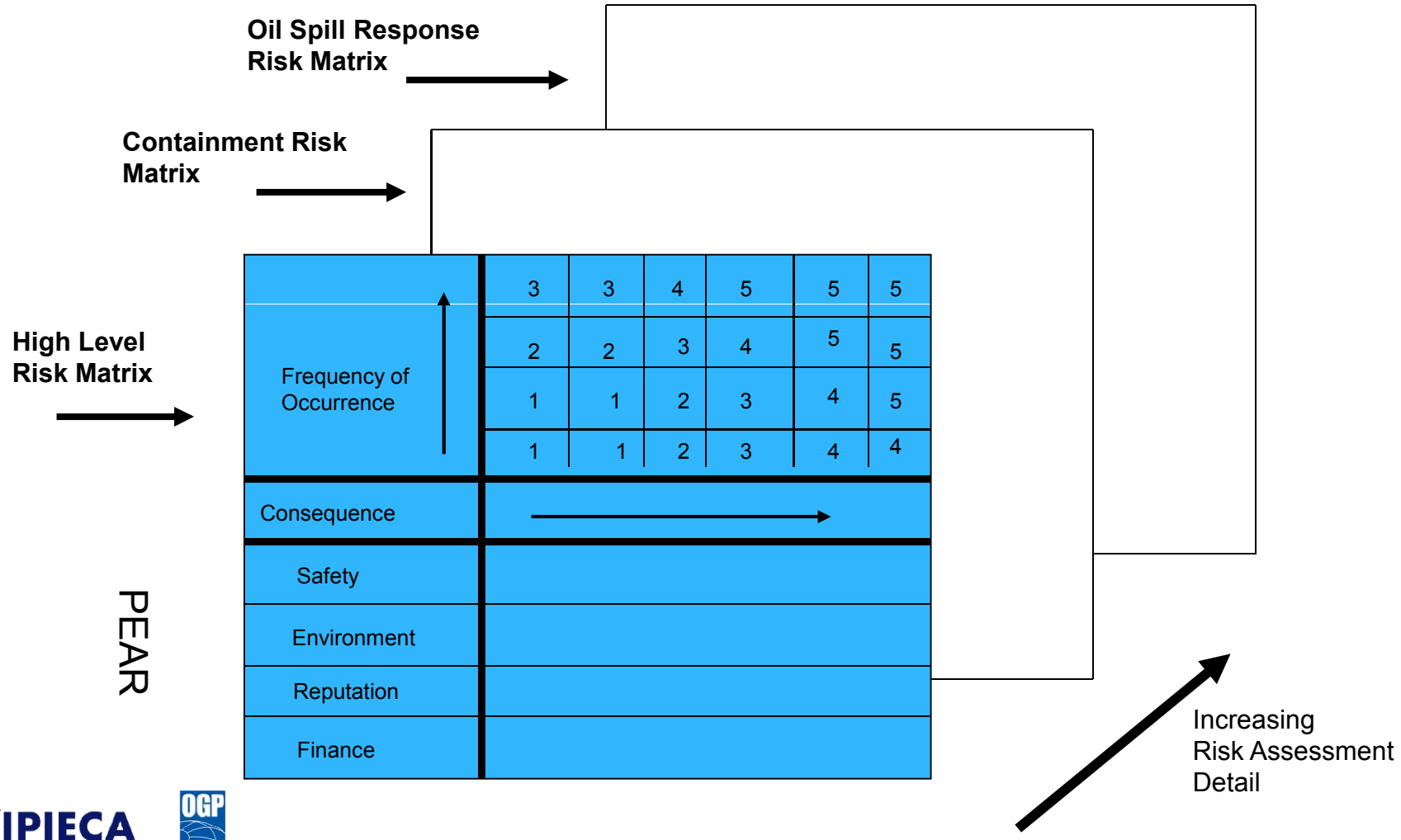
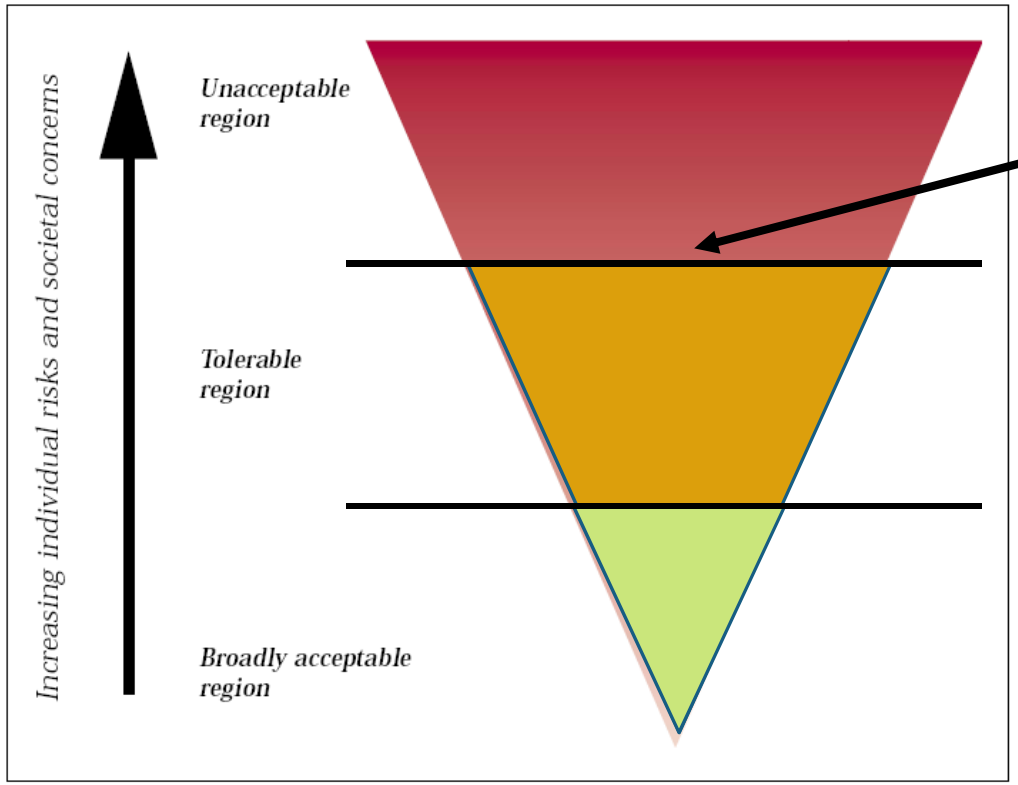
Risk Framework



As Low As Reasonably Practicable (ALARP) Concept



Limit of Tolerability Risk

ALARP Principle to be applied in this region

Note: *A Risk Tolerability Criterion is needed to define the limit of Tolerable Risk*

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Loss of Containment Risk Factors

- Well Potential Productivity
- Water Depth
- Sea Conditions
- Management System Compliance
- Marine Rig Integrity and Stability
- Design/ Maintenance and Reliability of Rig Utilities
- Rig Mooring System Integrity
- Ship Collision Potential
- Drilling and Marine Crew Competence and Training
- Well Drilling in compliance with Well Design
- Managed Pressure Systems Effectiveness (BOP, Cement/Mud, HPHT)
- Subsea Completion Tree integrity
- Availability of Drilling materials and key well components
- Safety Critical System Compliance with API, ISO, NACE, ASME etc.

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Response Preparedness Risk Factors

- Potential Well Productivity
- Oil Type
- Well Drilling Difficulty
- Well Head/BOP Containment
- Intervention Containment Unit
- Water Depth
- Geographical Location and distance from response base
- Distance from re-supply base
- Seasonal/Weather effects on sea conditions
- Distance to National & International boundaries
- Proximity to Navigation Hazards
- Proximity to vulnerable marine habitat and spawning area
- Proximity to mammal and bird habitat and feeding ground
- Proximity to other Offshore Assets
- Distance/time to Shoreline
- Shoreline Contamination Length
- Proximity to Coastal Utility Plant
- Proximity to Private Coastal Property
- Proximity to Tourist Activity
- Proximity to Fishing Grounds

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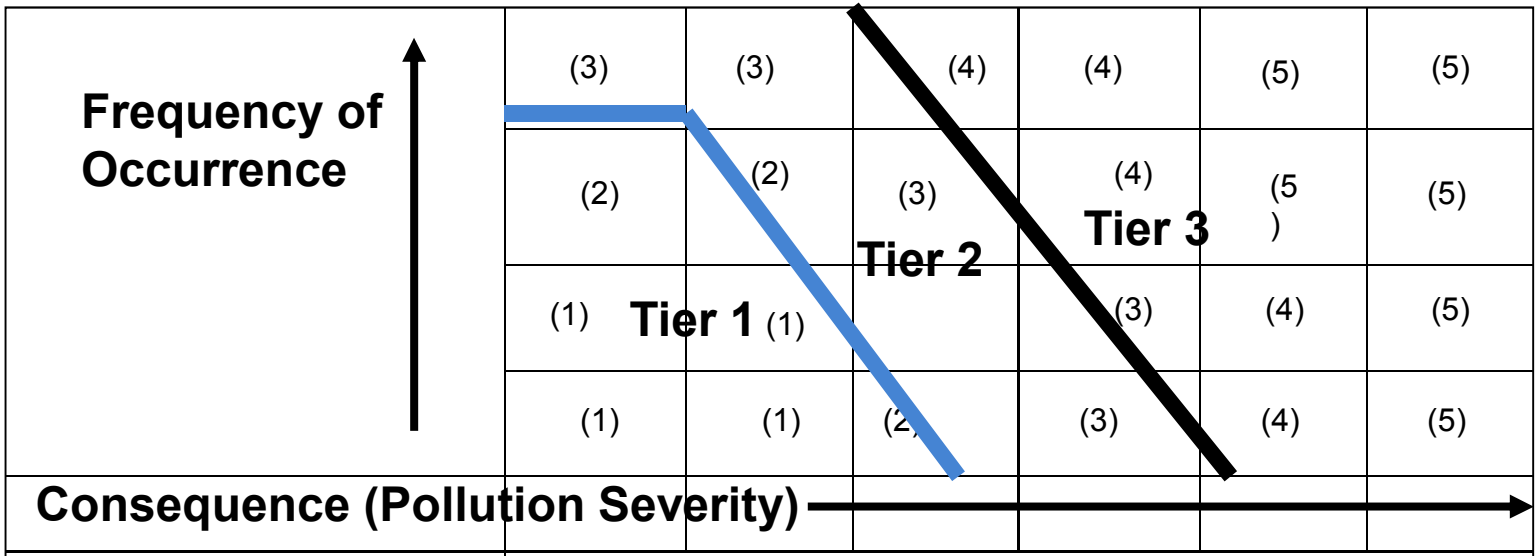
Oil Spill Risk Matrix

Risk Values represented on matrix as (n)



Risk Factor List

Factors must be considered according to their relevance in the scenario for which risk is to be assessed

For each Risk Factor, assess the likely frequency of occurrence with corresponding case specific pollution severity. These together will give a risk position on the matrix. The concentration of risk positions will be illustrative of the collective risk impact. Alternatively, the individual risk values can be calculated & aggregated to give a single overall value of risk to be represented on the matrix

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Revised risk response model

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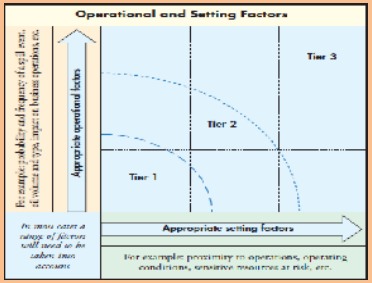
Well Risk Assessment

Credible Tier 3 response Plan



Additional Containment Requirement

Source control plan

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Containment / Source control plan

- Well risk Containment plan establishes extent of response requirement
- Is integral to response arrangements
- Identifies level of potential risk
- Source control plan seeks to mitigate:
  - Range of possible options
  - Does not have to always be at extreme end of spectrum

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We continue to look at standards worldwide, including:

- US Code of Federal regulations (CFR – EDRC approach)
- Brazilian and Russian regulated response approach
- IMO risk assessment approach
- NORSOK standard Z-013 Appendix G
- ISO 15544
- ISO 14001/14004
- ISO 17766
- OLF / DNV / NOFO oil spill response analysis guidance

…. and many others

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- Literature and standards review
- Basis of Risk Assessment model
  - Definition of Activities
  - Hazard Identification and Events
  - Evaluation Loss Potential (Risk Assessment)
  - Controls
- Inventory
- Risk Profiling/Identification/Classification
- Vulnerability analysis
- Risk perception
- Evaluation & Ranking
- Reporting
- Communication

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The goal

A standardized system of Risk and Hazard analysis for the upstream leading to:

- A Strategic Environmental Spill Response Plan *(how you do it)*

- A Tactical Spill Response Inventory *(what you do it with)*

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Thank you