PAJ Symposium 2012

Transcript: Rob Cox

SLIDE 1 (TITLE SLIDE)

Good afternoon Ladies and Gentlemen. Firstly, thank you very much for inviting me to give a presentation on the work of the Oil Spill Response Joint Industry Project – or "J.I.P." – and in particular integrating upstream oil spill preparedness with maritime response systems: with the advent of all the attention on upstream spills, we believe it's time to formalize the process for dealing with the assessment of risk and hazard from Oil Spills and how that translates into an assessment of the amount of equipment required. Over the next 30 minutes, I would like to give you an overview of why the J.I.P. was formed, describe to you how it is structured, and then move on to talk about one project in particular which we call J.I.P. 6 – that looks at developing a formal methodology for determining risk and hazard in the context of preparedness.

SLIDE 2

The point of departure for this presentation – and one that I am sure you will agree with – is that oil spills present ever present environmental, financial, and reputational risks, and that sustained long-term industry and government commitment are the only way we will tackle this ongoing issue

SLIDE 3

The last time I was in Tokyo was in March 2010, on the occasion of the 2010 PAJ Oil Spill Symposium, and if you had asked me then whether we were doing a good job in preventing and preparing for oil spills for shipping, I would have said…. "absolutely!" and I would pointed to the decline in volume and frequency of oil spills from Tank Ships which is so well evidenced in the ITOPF statistics that you see on this slide.

SLIDE 4

But then came Montara.

In the early hours of 21 August 2009, a small pocket of oil and gas was reported as having escaped from the H1 Well at the Montara Well Head Platform (WHP). The oil and gas had travelled a distance of over four kilometres from the reservoir beneath the sea bed. Whilst the initial release subsided, approximately two hours later the H1 Well kicked with such force that a column of oil, fluid and gas was expelled from the top of the well, through the hatch on the top deck of the WHP, hitting the underside of the West Atlas drilling rig and cascading into the sea.

For a period of just over 10 weeks, oil and gas continued to flow into the Timor Sea, approximately 250 kilometres off the northwest coast of Australia and approximately mid-way between Indonesia and Australia. Patches of sheen or weathered oil potentially affected an area as large as 90,000 square Kilometers.

And just when we thought we had understood Montara …..

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On the evening of April 20, 2010, a well control event allowed hydrocarbons to escape from the Macondo well onto Transocean's Deepwater Horizon, resulting in explosions and fire on the rig. Eleven people lost their lives, and 17 others were injured. The fire, which was fed by hydrocarbons from the well, continued for 36 hours until the rig sank. Hydrocarbons continued to flow from the reservoir through the wellbore for 87 days causing a spill of national significance.

SLIDE 6

Many lessons on spill response were learned as a result of these two incidents and I will go on to explain what the International Association of Oil and Gas Producers and IPIECA are doing about it. As a result of these incidents, OGP formed the Global Industry Response Group or "GIRG". GIRG's task was 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.

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The GIRG recommendations are divided into three parts as you can see in this slide, and they are PREVENTION, INTERVENTION, and RESPONSE.

PREVENTION focusses on better capabilities and practice in well engineering design and well operations management.

INTERVENTION focusses on improved capping response in the event of a release of hydrocarbons and the study of global containment solutions.

RESPONSE focusses on ensuring that we have effective and fit-for-purpose oil spill response capabilities for the upstream – as we do for shipping and downstream.

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On prevention, OGP have set up a special "Well expert committee" or "WEC" which is embedded in OGP and is open to any OGP member. That committee consists of 30 experts from the oil & gas industry and service companies.

Four task forces are working on:

- A database of well control incidents – so we can learn from experience
- Blow Out Preventer or "BOP" reliability and technology development
- Human factors, which is training, competence and behaviours
- The development of international standards

In addition, there is on-going liaison with relevant bodies such as the American Petroleum Institute, the International Association of Drilling Contractors, the International Standards Organization, and the Well Life Cycle Practices Forum.

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Intervention is provided by the Subsea Well Response Project or "SWRP".

This is a group of nine leading oil and gas companies working and delivering together in a not-for-profit joint initiative, in order to enhance the industry's international capabilities to respond to a serious subsea well control incident.

The system not only provides the ability to contain or cap the well, it also provides the opportunity to inject subsea dispersant, which reduces environmental impact and ensures safe surface working conditions above the well. The SWRP are designing a toolbox that has cutting, grappling and dragging tools to gain access to the Blow Out Preventer, as well as flying leads, manifolds, and wands to initiate dispersant injection. The SWRP is collaborating with my project - the Oil Spill Response Joint Industry Project on stock management of dispersant.

SLIDE 10

This brings us on very neatly to my own project and the Oil Spill Response Joint Industry Project or "J.I.P."

The GIRG process was established by OGP and the International Petroleum Industry Environmental Conservation Association (IPIECA) to address Oil Spill Response issues relating to offshore spill incidents. The team consisted of over forty specialists drawn from environmental management and oil spill response, and mirrors the two teams set up on well design/control and capping which I have just now described.

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The J.I.P. is made up of fourteen members which you see on the slide. We expect more to join, and we would very much like at least one Japanese member with offshore assets to join. The membership fee of the project is 100,000 US dollars each year for the three year lifespan of the project.

SLIDE 12

While the Macondo and Montara spill response efforts are widely acknowledged to have been successful, post-event analysis has identified potential opportunities to further strengthen future spill response plans, which could be developed as 'good practices' and promoted internationally. The team also documented issues that were not considered to have had direct relevance to the Macondo response but could potentially have been an issue if the blow out had happened elsewhere, where perhaps there were fewer resources or less infrastructure, e.g. Angola. Longer–term issues that are not considered pressing now, but may potentially become more visible in the next few years, were also identified. The report made nineteen recommendations which look at issues identified in the GIRG-OSR process following the Macondo and Montara incidents and the implications for all aspects of spill response. Apart from improving current "good practice" guidance (particularly on dispersants), probably the most important work is for us to develop risk and hazard based strategies for response preparedness for the upstream. This is not just an extension of tactical response for shipping spills, this is a defined project to try to understand, in the case of upstream spill response, and answer the question "how much equipment do I need to prepare for an upstream spill?"

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When we look at upstream spills, it is immediately apparent that surface spills from shipping are different to subsea releases. In the case of shipping spills, we have a mobile threat of known and finite size – even if two ships collide, the amount of oil is finite and the window of weathering, when the oil and emulsion remains amenable to dispersant, is known. The offshore case – where there is a deep ocean subsea release – is very different. In that case, we have a fixed threat of unknown size - constantly replenished by fresh oil, and so is amenable to application of dispersant.

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, and one that is scalable to take account of the actual need (which for the upstream is the worst case discharge).

The system also has to be acceptable to regulators and have to be capable of being integrated into upstream risk management systems, safety cases, and operations.

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The project on risk and hazard modelling in the J.I.P. is J.I.P. 6 and this requires an understanding of the difference between Risk, Hazard, and Probability. It is unfortunate that the terms are often used interchangeably whereas in reality they mean very different things. In shipping, probability is to some extent more important when looking at 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 are often more important because of the fixed nature of the facilities, and the potential for extended timescales (and therefore volumes) in an incident.

SLIDE 15

In order to understand how we might wish to change the risk / response model we first have to understand the "Tiered Response Concept" - something that is not always understood despite being in use for over 30 years. I think most people in this room would understand the use of this concept, and certainly it is recognised by governments in the international arena. It was introduced in recognition of the fact that for shipping, terminal and pipeline spills we are dealing with a finite volume and with a knowledge of the operation it is possible to define spill probability, frequency and the likely impact of a range of spill sizes: this in turn enables you to efficiently categorize your response resources that can be cascaded in as the spill size becomes apparent. The question to ask is "why did offshore well blowouts never make it on to this planning system?" The answer is that because well blowouts were regarded as "High Impact" but "Extremely Low Probability" they tended to be discounted in the planning cycle.

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This slide shows the types of incident that are classified in the Tiered Response system and gives examples of each.

[Note to translator: I will describe using examples from this slide]

	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
2	Loss of supply boat fuel inventory Total Loss of platform fuel inventory Well test spillages	Loss of supply boat fuel inventory STS transfer spillages Export pipeline spillage Collision off-take tanker	Collision with Tug / jetty Loss of cargo containment in one two tanks	Pipeline total failure Storage tank failure Collision product tanker / tug
3	Loss of well containment	Platform loss Loss of well containment	Hull structural failure Ship loss (Collision /Grounding/ Fire/ Explosion)	Facility loss Hull structural failure Ship loss (Collision /Grounding Fire/ Explosion)

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The previous slide showed you typical examples of a standard tiered response classification for shipping spills. However, upstream spills introduce the concept of indefinite spill volumes and “resident risk” rather than “mobile risk”. One reaction could be to define upstream spills as an automatic “Tier 3 plus” risk but that does not cater for the extended type of event that can arise from an upstream well blowout.

We need an internationally agreed framework to assess the need for response resources in respect of upstream operations. We can achieve this in two ways.

Firstly, we can use a “Well Risk Model”, and secondly, if the risk is determined to be unacceptable, by introducing a “Source Control Plan” as well. It should be remembered that some depleted formations are under zero pressure, and require enhanced methods – such as water injection – to be productive. As the productivity of the well declines, the risk score reduces to be close to zero. Of course there will still be an incremental risk driven by the environment that the well is located in and the receptors surrounding it.

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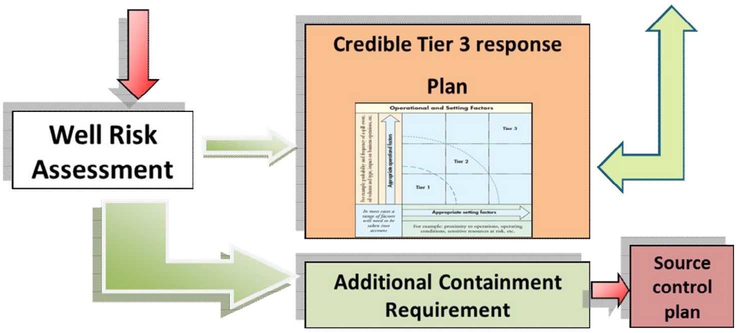
This is shown graphically in the current slide. [Note to translator: I will describe using examples from this slide]



SLIDE 19

But how is this managed in practice? Determining a risk can be done using a set of risk overlays – called a Risk Framework. The Risk Framework utilises a series of Risk Matrices to address the main elements of risk. These main elements of risk contribute to the risk headings that we all recognise as being of paramount importance at a Corporate level – Public and Personnel Safety, Environmental Damage, Company Reputation and Financial Impact

SLIDE 20

It is possible to use this system in the context of what is known as “ALARP” or “As Low As Reasonably Practicable”. The ALARP Concept is well tried in the U.K. and depends on determining a Limit of Tolerable Risk above which risks are deemed to be unacceptable under any circumstances. There are then risk levels that we regard as being Broadly Acceptable without further risk reduction. Between these two extremes is the Tolerable Region. In this region the ALARP Principle requires that we irrespective of the calculated risk level, we continue to seek risk improvements until we have achieved a level the is As Low As Reasonably Practicable--- This means a level below which further technical improvement would be either impossible or extremely difficult and for which the small risk improvement would not justify the relatively large cost expenditure. This means that the use of the ALARP Principle includes the use of Cost Benefit Analysis by default.

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When considering offshore structures we need to consider the risk of loss of containment (which is assumed to lead to and environmental incident) as well as the environmental risk posed by the hazard of a release of hydrocarbons – which in turn leads to an assessment of response preparedness.

Factors important in loss of containment might include:

- 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

SLIDE 22

Similarly, factors that could be included in an assessment of response preparedness might include

- Potential Well Productivity (Worst Credible Case Discharge)
- 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

SLIDE 23

So we have our Risk Framework, and for each Risk Factor, we can 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. This has many uses but the important thing is that it can be used to simulate a worst-case scenario and utilized to determine what response resources should be available in response – and how they can be cascaded in to the operational area.

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When we discussed this slide earlier, I indicated that the provision of response resources for the upstream required, in our opinion, the need for a well risk assessment and a source control plan.

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We have just discussed the Risk Assessment: this establishes the extent of the response requirement and is integral to response arrangements.

A source control plan on the other hand seeks to mitigate the flow of hydrocarbon (for example through capping). To the extent that this is accepted by local regulators, this may also affect the response requirement.

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Our ultimate aim is to encourage a level playing field through the development of a Recommended Practice and possibly even an ISO standard – or a revision to an existing ISO standard – on Risk Assessment for response resource assessment.

We continue to look at standards worldwide, including:

- US Code of Federal regulations (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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Our first task is to review objectives, review the literature, understand the current situation, understand the needs and gaps to assess what already exists so we avoid duplication of efforts, and build on existing information and capacities

We will then build the Risk Assessment Model which will show how to define activities, identify hazards and events, evaluate the potential for loss, and so on through to Risk Profiling and Identification, etc, as well as all the classic steps on Risk Assessment with which you will be familiar.

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Our goal is ultimately to develop a standardized system of Risk and Hazard analysis for the upstream leading to:

- A Strategic Environmental Spill Response Plan (in other words, how you do it)

- A Tactical Spill Response Inventory (in other words, what you do it with)

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Thank you