PREAMBLE

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- Sustainability Risk in Major O&G Projects
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2. Overview

3. ERM

ERM

ERM is a long standing consultancy that specialises in creating business solutions concerning all aspects of addressing Environmental, Health, Safety and Social/Community risks as they arise in major capital developments. Over 40% of the Firm's fees are based in the O&G and mining industries.

1) INTRODUCTION

4. DH

On April 20th 2010, a blowout occurred at BP's MC252 well followed by an explosion on the Deepwater Horizon exploration rig and its subsequent loss. Eleven people lost their life and in the ensuring three months c. 650,000 tonnes of oil was released into the deepwater Gulf of Mexico.

5. GOM

6. UK

The resultant slick stretched from the equivalent of Rotterdam to beyond Swansea and from Southampton to beyond Birmingham. The estimated costs for capping the well, oil spill response and community compensation is estimated at somewhere between $20-30bn.

The distinctive features of this spill are the size (5 million bbls), duration (15 weeks), the sensitivity of its location (major source for the US seafood and recreation industries), the press coverage, loss of life and injury (28) and business interruption both offshore and onshore.

7. CNN

The Macondo-Deepwater Horizon disaster was not new to the industry. What was new was the scale of the resultant impact – social, environmental and ultimately financial. Not unlike the 9/11 NYC terrorist disaster, it had occurred previously at much lesser scale, but we were blind to the possible catastrophic impact of the combination of both advancing technology frontiers and human behaviour – technical and non-technical risk.

2) GLOBAL CHANGES – A POST MACONDO WORLD

8. Overview

The Macondo disaster has precipitated a wide range of both direct and indirect changes in the global O&G business. The playing field for upstream exploration and production developments has changed forever.

The direct changes include:

9. Post-Macondo Issues

Costs

- Increase time for Permits approval: 50-200 days (de facto moratorium)
- Increase of >25% in rig time to drill to comply with new regulations
- Reduced GOM production (400,000 bpd → 60,000 bpd (Nov 2010) → 100,000 bpd (2011)
- Well design - construction optimised for compliance, not production
- Rig availability decrease (46 Ap'10 → 12 Dec '10 → 34 Mid '11)
- Increased oil spill response prep costs ($1bn Marine Well Containment Company)

Insurance

Premium Increases

- Rigs in shallow water δ 15-20%
- Deepwater operations δ 25-30%
- Deepwater drilling δ 100%

Access

- Ban on GOM drilling → October 2010
- Continuing ban on Atlantic and East GOM (OCS)
- Alaska?

- Chevron in Santos Basin (Brasil)?

Regulation

- Drilling Safety Rule (BOEMRE) (US)
- The Workplace Safety Rule (US)
- OSPRAG Review (UK)
- Proposed EU Regulation (Oct 2011) (Europe)

Licence to Operate

- Reiterating the GOM Drilling Moratorium (April-October 2010)
- French and New York state Fracking Moratoriums
- Increased Liability Caps
    - EU $120m → $250m
    - US ???
- Difficulty for smaller operators

The preceding global changes as a direct result of the Macondo incident are clearly considerable and wide ranging. The role played by NTRs as opposed to technical risks as causes of the incident are more difficult to determine. What perhaps is more pertinent here is once the blow-out had occurred, the NTR issues significantly impacted the scale of the damages incurred by BP.

3) PRE-MACONDO DRIVERS FOR CHANGE

10. Overview

Despite the headline grabbing nature of the Macondo Deepwater Horizon disaster and the reported knock-on effect on global boardroom thinking regarding risk management in the O&G sector, there had been a lot of activity and momentum created in the industry towards long-term sustainable operation for some time before Macondo.

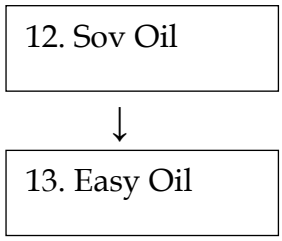
11. Pre-Macondo

A number of issues had been driving this thinking in the second half of the last decade – not necessarily catastrophic events, but equally critical to the future of the industry. The more macroeconomic of these include:

- Future Reserves Replacement
- Oil Price Escalation
- Global Financial Crisis (2008)

All of these perturbations have caused the industry to question how they can continue to operate in a sustainable manner – we have increasingly been forced to ask the question, **"How well prepared is our business to operate in an environment of increasing regulation, risk uncertainty and stakeholder scrutiny?"**

It is insightful to look further into the key factors or challenges that have created this change in the industry, especially as they relate to the search for replacement/future hydrocarbons. It is also useful to examine the roles of both technical risks and NTRs and in particular their interconnectedness. Addressing NTRs often involves technical solutions, and similarly technical risks are often put forward in the form of NTRs to enhance the emotive component.



SOVEREIGN OIL

Reserves replacement for IOC's has been the elephant in the room since the 90s. Roughly 70% of the world's future reserves are under sovereign control of national oil companies (NOCs) and usually accessed by formation of minority JVs. The valuation of IOCs for some time has been based on replacement ratio of reserves.

The rapid oil price escalation to $150 pb in second half of the decade saw short-term windfall profits being made by the industry but at the same time a rapid escalation in costs of materials, (i.e. steel, rigs etc.) which caused the cancellation or delay of many projects. This trend was further exacerbated by the transition from so called "easy oil" to "socially difficult oil" where non-technical factors were having significant impact on delays and subsequent costs of these emerging mega projects. The scenario is best typified by Shell's development of the Sakhalin II project where costs blew out from about $5bn to more than $20bn, ultimately resulting in Shell losing their controlling interest in the project to the Russian NOC Gazprom.

The ironic fact about this debacle for Shell is that the Russian Government used environmental non-compliance issues or NTRs to force Shell to forfeit control – issues that the local industry almost universally never are in compliance.

This was followed by the GFC in 2008 where global demand in the industry receded causing significant falls in O&G prices and putting further pressure on project sanctions.

- **TECHNOLOGY FRONTIERS**

14. Technology	→	15. Depth

The 30% of future reserves not under the control of NOCs is generally considered to be **Technically Difficult Oil**. These technology frontiers include drilling at depth – Shell has just completed the Perdido production well in the Ultra Deepwater GOM which is 3000m below the seabed in 3000m of water – the world's deepest production well and twice the depth of water of the Macondo well. The technology that has taken drilling in several hundred metres of water to 3km and from 1km below the seabed to 3km has taken 20 years to develop. But prior to Macondo, the industry had not identified the NTRs likely to be associated with a deepwater blow-out and improved the response capability on an industry wide basis.

16. Technical Frontiers

In the Unconventional Resources industry, directional/horizontal drilling technology when combined with hydraulic fracturing has created a revolution in gas production from tight shales/rocks at depths of over 3000m. From a fraction of a percent of US gas production, shale gas is now responsible for approximately a quarter of US production.

However, as I will discuss later in my talk, the majority of the UGR's risks are NTR issues. From the industry's perspective very little had changed from conventional gas drilling and production – except of course urban proximity! By claiming secrecy over proprietary compositions of Frac Fluids (Haliburton Exemption), the industry immediately created a position of distrust in the community which was leveraged by documentaries such as Gasland.

Operating in frozen Arctic offshore conditions presents a series of unique technical challenges, including functioning of electromechanical and hydraulic equipment at temps as low as -50^{0}C and ice scour of platforms from pack ice. An additional technical challenge has been the production from reservoirs high in either toxic or greenhouse gases (i.e. H_2S and CO_2), possibly requiring separation and sequestration technology. NTRs can also become non-technical opportunities that can be influential in swaying the communal attitude in favour of a project despite there being significant potential NTRs. The key here is to identify them early in the project development lifecycle such that they can be evaluated and built into the business case for project sanction. Large gas reservoirs high in CO2 for example have been difficult to develop primarily for NTR and ultimately financial reasons, but relatively technically straightforward. Possibly combining such a project with broader industrial CO2 sequestration needs may enable such a gas development to be viable – the realisation of a non-technical opportunity.

The technology associated with the deployment of remotely operated vehicles (ROVs) has played a major role in enabling the IOCs to operate at water depths down to 3000m.

Finally product transportation from deep, remote or hostile locations poses a unique set of challenges for the industry to progress. This is well illustrated by the rapid growth in production achieved by the US Shale Gas industry – until five years ago, conventional wisdom saw future US production coming from Alaska via pipelines with price tags of in excess of $50bn. Shale gas in Texas (Eagleford and Barnett) and Pennsylvania (Marcellus) is delivered short distances to the existing East Coast or Gulf Coast pipeline networks.

UNCONVENTIONAL RESOURCES

17. UCR

The last decade has seen a dramatic increase in the development of unconventional resources. These include:

- Shale Gas/Tight Gas & Liquids
- Coal Seam Gas or CBM
- Oil Sands – Mining and In-situ

18. CBM

19. Oil Sands

In the case of shale gas and coal seam gas, this sudden increase in development has been facilitated by advances in horizontal drilling and hydraulic fracturing stimulation technologies. The big advances in productivity from Oil Sands are yet to be realised from in-situ gasification technologies. We will return again to look at these issues and risk in more depth.

POLITICAL INSTABILITY

20. Political

Access to global resources is always a function of political stability. Traditional areas of significant resources limited by political turmoil are exemplified by Iran, Nigeria, Venezuela, Yemen and Iraq. More recently the Arab Spring uprisings have created problems for the industry in areas such as Libya and Syria that have been previously relatively stable. You could also take the view that BP may have thought it was operating in a politically benign or bipartisan environment in the US previous to the Macondo incident.

Political instability NTRs are not necessarily solely encountered in counties in a state of rebellion. Weak or under-pressure governments in strong democracies can use NTR issues to deflect or manipulate press and community scrutiny.

21. Remote

REMOTE LOCATIONS

Increasingly, the residual non-sovereign future reserves are being discovered in relative remote locations such as the Arctic, PNG/Timor Sea and West Africa. Each pose technical, logistic and of course social and political issues. Operating quasi failed states pose a range of complex risks associated with security, lack of infrastructure and perceived equitable distribution of government expenditure in a predominantly tribal environment.

22. Scale

SCALE OF PROJECTS

The combination of technical challenges, increased logistical costs, political risk and dwindling non-sovereign resource availability has driven IOCs to dramatically increase the size of new projects to achieve viability. Twenty years ago, a large LNG project (in Rankin on Australia's NW shelf) was between $2bn-$5bn. Five years ago, the average new project was of the order of $10bn, but with Chevron's Wheatstone LNG at $35bn – though to Kashagan at over $100bn, this average has escalated to $30-50bn range. As a result, no single IOC can carry the financial risk alone, leading to more complex shareholder structures, especially where sovereign NOCs participate.

During the last decade pre-Macondo, the industry has been confronted with how to ensure long-term business value and competitiveness associated with each of the preceding issues. In varying ways, they have been trying to integrate sustainability into their core business practices – with a range of success.

4) EMERGING ISSUES

23. Overview

24. Emerging Issues

At this juncture in late 2011, I would like to review the Emerging HSE Issues that are challenging the industry today. The key areas where these issues arise are as shown here:

- Offshore Drilling
- Arctic Exploration and Development
- Unconventional Resources
- Ageing Assets
- Decommissioning
- Energy & Carbon Management
- Social Licence to Operate

Within the limitation of today's timeframe, I will focus in more detail on what is happening in the top three areas.

OFFSHORE DRILLING

In the US, the Macondo disaster has precipitated major revisions in the regulation of offshore activities in US waters (OCS). Five months after the Macondo well was sealed, the US Bureau of Ocean Energy Management Regulation & Enforcement (BOEMRE) issued two new regulations

- Drilling Safety Rule (DSR)
- Workplace Safety Rule

25. DSR

The DSR imposes requirements that are expected to enhance the safety of O&G drilling operations on the Outer Continental Shelf (OCS). It addresses both well bore integrity (first line of defence against a blow-out) and well control equipment and procedures, in case a blow-out occurs.

The root cause investigation into the Macondo disaster has shown that the event was a result of a complex set of failures around well bore integrity and well control caused by human factors, equipment processes and management of change processes.

In October 2011, BOEMRE was formally split into entities

- BOEM }
- BSEE (Safety & Environment Enforcement) }

As a result of Macondo, BP has established an organisation called BP's Gulf Coast Restoration Organisation. The objective of it will be to manage BP's long term response to the oil spill.

The industry as a whole has created an organisation in GOM called the Marine Well Containment Company, initially funded by a $1bn contribution from COP/CVX/XOM/SHELL/BP. Its purpose is to capture the technology and know-how developed during the Macondo response together with constructing a universal well containment device capable of containing 100,000bbls and operate at 3000m (10,000ft).

In Europe in October 2011, the EU published a proposed new regulation targeted at setting the highest HSE standards for European operations, but which also have implications for worldwide operations of companies based in the EU.

The main post-Macondo drivers in Europe are threefold.

1) Increasing awareness of North Sea Member States of the oil spill consequences in an "enclosed" North Sea (80% of EU production in North Sea)
2) UK and Norway are engaged in Deepwater drilling in the North Sea
3) 13 Member States (UK, Netherlands, Denmark, Germany, Ireland, Italy, Spain, Greece, Romania, Bulgaria, Poland, Malta and Cyprus) have awarded offshore O&G exploration licences with HSE regulations varying greatly. There is also concern regarding Increasing activity in the Black Sea deepwater region.

Currently, the North Sea is considered well regulated and managed. This in the main was a result of the 1988 Piper Alpha disaster and the recommendations that were implemented following the Cullen Inquiry. Likewise the Norwegian regulatory regime is considered one of the world's most progressive. Underpinning both regulatory regimes is a risk based approach typified by the UK Safety Case process. Key aspects of the proposed EU Regulation will involve:

- Establishment of a National Competent Authority
- Use of Independent Verifiers for technology assessment
- Risk Based Approach
- Inspections by NCA
- Transparency – freedom of information access
- Emergency Response Capability
- Adequate Liability Capacity

26. OSPRAG

In the UK, a month after the Macondo disaster an inclusive combined industry/regulator/union group called Oil Spill Prevention & Response Advisory Group (OSPRAG) was mobilised to conduct a review of drilling practices on the UK Continental Shelf to determine if it was safe to continue to operate and what enhancements might be possible for the existing prevention and response practices.

The review was structured into four elements

- Technical Review
- Oil Spill Response
- Indemnity & Insurance
- European Issues

The major outcomes of this multiparty review were

- OSPRAG Capping Device Developed and Deployed – its existence evidenced in the picture
- Well Life Cycle Practices Guidelines and Forum
- Enhanced OSR Toolkit
- Improved Oil Pollution Emergency Planning (OPEP) process and Testing National Contingency Plan
- Increased Liability cap (OPOL) at $250m.

There are a number of key issues that are subject to on-going evaluation and resolution with the regulators – namely sub-sea dispersant use and in-situ burning.

ARCTIC EXPLORATION AND DEVELOPMENT

27. Arctic

The Arctic region is estimated to contain 22% of the worlds undiscovered hydrocarbon resources mostly in 5 relatively undisputed economic zones.

- Norway
- Russia
- US
- Canada
- Greenland

Access to the Arctic for exploration purposes in the US sector has been a contentious issue for the last decade, with Shell for example reportedly spending over $2bn in preparation for drilling in the Chukchi Sea before receiving approvals. Some of the key issues involved were protection of marine mammals and livelihoods and social impact of native/indigenous people.

Following the Macondo spill, there has been a lot of scepticism with regards to the industry's ability to respond to incidents in challenging environments. This is exacerbated by the lack of consistency in regulators acceptance of alternative strategies, especially involving the use of the likes of sub-sea dispersants and in-situ burning.

The key contingency planning issues which limit the effectiveness of the response in arctic environments include lack of infrastructure for equipment delivery, personnel support and waste management.

28. SPE

SPE recently held an Arctic Oil Spill Conference in Moscow with broad representation from the 4 Arctic member regulators, the oil and gas industry, research institutes, environmental specialists and NGO's. The key issues addressed at this conference, as shown here, were:

- Environmental Risk Assessment
- Environmental Impacts
- Fate and Behaviour of Oil
- Response Strategies

In terms of risk assessment, one of the biggest challenges is the difficulty in extrapolating results from open water to ice laden environments. Pre-spill baseline information is scarce and what is available is sometimes dated. The dosage and exposure time in past studies are frequently outside the range observed in actual spill events.

Assessing environmental impacts in the Arctic is a two edged sword – whereas most arctic ecosystems are considered more fragile than those in temperate climates, arctic coastal resources typically have a sensitivity that is limited in time and space, ie in specific locations that are generally small in area and are sensitive for a short season of the year.

There is sufficient knowledge on the fate and behaviour of oil in cold water to predict the likely opportunity of different response options. However, one area of uncertainty concerns the behaviour of oil spilled under multi-year (old) ice. Most of the information to date has come from laboratory scale testing with only a few historical large-scale field experiments being conducted in the 70's and 80's.

The key limitations to the success of the response strategies are cold temperatures, darkness in winter months, availability and logistics associated with personnel and equipment, and support for operations in remote locations.

29. JIP

Going forward, the oil and gas industry is funding a Joint Industry Partnership research project, to run over 4 years at a cost of $20m. The objective of the international research program is to further the industry's knowledge and capability in arctic oil spill response. Six working groups will be established for each of the specialist areas as shown here.

- Dispersants
- Environmental Effects
- Modelling/Monitoring
- Mechanical Recovery
- In-Situ Burning
- Experimental Spills

UNCONVENTIONAL RESOURCES

30. US Map

The explosion in the output of the US shale gas industry is underscored by its growth to provide approximately a quarter of US gas production in about 5 years. This is graphically illustrated in this map of the US deposits which are predominantly located in the more populous eastern half of the country.

30. UK Map

Likewise, the map of potential European shale gas basins raises similar urban proximity issues.

The key issues associated with shale gas and CBM extraction are:

32. Shale Gas

- Urban Proximity
- Water Resources – Volumes
- Groundwater Contamination
- Chemical Transparency – Frac Fluids
- Wastewater Treatment
- Seismic, traffic and noise issues
- Cumulative Impacts

Prior to this evening, the SPE has had an extensive presentation on issues associated with UG resources. I will simply outline the main risk issues here and draw your attention to how most of them are clearly in the non-technical risk category.

33. Risks

So what are the risks?

- Urban Proximity – Low oilfield tolerance
- Water Resources Competition
- Groundwater Contamination
- Hazardous Chemicals Spill
- Surface Ecological Damage
- Heavy Vehicle Traffic
- Perceived "HARM" Issues
- Social License to Operate

Over a million gas producing wells have been drilled in the US since the 1950s. Over the last decade, the majority of wells have involved some form of hydraulic

stimulation (Fracking) to enhance production. The USEPA has conducted a survey in conjunction with the states' drilling/licencing authorities to determine the frequency of occurrence of groundwater contamination issues associated with these activities. The results indicate very small occurrence of contamination by drilling and fracking fluids.

However this is not the perception gained by the community. A combination of initial entrepreneurial developers with limited financial backing, lack of understanding of the role of NTRs in gaining a Social Licence to Operate and a loss of trust by non-disclosure of the nature/composition of the materials being used for fracking – has resulted in an industry that could possibly make North America petroleum resource independent within 15-20 years being put at risk. Both New York State and France have implemented bans on hydraulic fracturing.

5) SUSTAINABILITY RISK IN MAJOR O&G PROJECTS

34. Overview	35. New Risk

The highlighting of the emerging risk issues raised in the preceding discussion on Offshore Drilling, Arctic E&P and Unconventional Gas Developments identified a series of challenges. The most critical of these are erosion of trust, understanding NTR, issues and Margin Erosion.

- Erosion of Trust
- Regulations
- Margin Erosion
- Non-Technical Risk
- Stakeholder Scrutiny
- Licence to Operate

These all converge on a common theme – recognising new sources of business risk that demand fresh approaches to resolve. These approaches involve engaging stakeholders, fully assessing the Enterprise Risk and finally ensuring that major capital projects are sufficiently advantageous. The ultimate opportunity is to achieve Sustained Competitive Advantage.

36. MCPs

However the growth in the scale of these Major Capital Projects over the last decade has resulted in them becoming substantially more complex and hence potentially impacted by a range of enterprise risks. These impacts are usually manifest as delays in completion, increased cost but ultimately in erosion of NPV.

37. Delays

The occurrence of delays in the oil & gas industry is surprisingly common, but what is more surprising is the cause. GS have prepared regular and exhaustive reviews of all major capital projects in the industry, and an analysis of this data shows that sustainability issues or non-technical risks are by far the main reason for delays.

38. Costs → 39. Impacts Project Delivery

Even more dramatic is the likely cost of these delays – measured in billions of dollars. The real costs play out in a multitude of ways across the value chain of major capital project delivery.

40. Problem

The challenge for companies with addressing NTRs in major project delivery is that the problem is typically a perceived issue – quite often there is little correlation between public concern and actual harm to health, safety and environment.

41. Root Causes

We often find that at the heart of these types of problems are a common set of root causes. These root causes are most effectively tackled by engaging leadership at corporate and asset level – in defining the real business case for change and establishing commitment to act.

6) THE NEW REQUIREMENTS ON THE BUSINESS

42. Overview

These factors have led to an important shift in understanding of the drivers necessary to integrate non-technical performance into a company's core business. For progressive companies which have already made significant investments in developing and integrating programs, valuable stakeholder and market recognition has resulted. Others are still seeking to understand the link between non-technical performance and positive market recognition as a key precursor to building reputational capital. They are beginning to ask a key set of questions:

- What is the value of NTR at the portfolio and project level? Is it material to our business?
- Do we have the right systems in place to manage and improve our non-technical performance?
- Are we structured correctly to deliver optimal non-technical performance?
- How will better non-technical performance help build and protect our social licence to operate and licence to grow?

The new business context creates a new set of demands for the leadership of organisations and creates a ripple effect felt across the entire upstream oil and gas industry. The impacts are even felt across other industries – each trying to anticipate its own unforeseeable incident. In summary, demands on the business include:

43 ST vs LT

- Balancing short-term versus long-term business needs
- Integrating technical and non-technical risk management
- Making informed non-technical decisions grounded in facts
- Addressing internal organisational interfaces and fragmentation

While these rather common management techniques are definitely in use across organisations, the consistency of their application is the more significant concern, requiring a review of our ability to effectively implement, especially in the post-Macondo world.

- **Balancing short-term versus long-term business needs**

While business has long been aware of the potential imbalance of the short-term focus on numbers, recent events accelerate the need to rebalance this focus with a more proactive, strategic and longer-term view.

The call for a longer-term view also means moving to a proactive stance on NTRs and a deeper exploration of the non-technical opportunities.

- **Integrating Technical and Non-Technical risk management**

Over the past year we have seen a greater requirement for aligning the organisation to crisply manage risk in an integrated fashion. The organisation must have clear visibility of both the technical and non-technical risks, and the interconnections between them. This interconnectedness can show up as technical solutions to NTRs or non-technical opportunities.

- Making informed decisions grounded in fact (42) – important for woolly NTRs so that they can be challenged and believable.
- Addressing internal organisational interfaces & fragmentation (42) – alignment in the organisation at all levels

The key to ensuring long-term business value and competitiveness is by integrating sustainability into the core business process.

44. Business Integrated Risk

Identifying the leadership team's NTR strategy is critical for guiding the performance of the portfolio of projects. A thorough approach to this can be done by an independent non-technical assessment across the portfolio of producing and developing assets and this fact-finding mission will allow for leadership decision-making and a clear view of the NPV erosion that is currently taking place.

However, matters can be expedited by taking an executive level look at the organisational commitment and relationship to NTR. The leadership team can be challenged as to what its level of ambition is with regard to NTR; is it to be Compliant, Fragmented or Transformational?

45. Discovery

A "Discovery Engagement" process can help the leadership team determine the appropriate level of ambition for their business. The approach provides a strategic perspective and builds alignment in the senior team around the NTR strategy and how to implement to achieve the transformation

46. Discovery Process

The Discovery process can be a challenging journey for the leadership team as new insights are revealed, established thinking is challenged and the extent of the NTR business opportunity is understood.

The approach is both thorough and factual, monetising the NTR's thus allowing them to be integrated into the Business Case which the executive can absorb to understand the magnitude and substance of the issues.

Underpinning the discovery process is a high degree of organisational engagement which builds the appetite and willingness of leaders at all levels to support the shift in thinking, attitudes and behaviours that will be required during implementation.

47. 3 Big Issues

Our experience of a range of Fortune/FTSE 100 type organisations operating in the Natural Resources sector is that they tend to focus in quickly on three main outputs from this Discovery Process

- Operational Excellence – Beyond Compliance
- Enterprise Risk Management
- Sustained Licence to Operate in Major Capital Projects

7) IMPLEMENTATION OF THE NEW REQUIREMENTS ON BUSINESS

48. Overview

The new NTR assessment process for major capital projects must begin earlier in the development lifecycle, ideally starting in the pre-lease phase. An in-depth understanding of the ecosystem, the potential socio-economic impacts of developing and then retiring an asset, and the community relationship to development projects for the O&G industry, must all be taken into consideration to ensure that NPV will be optimised. Proactive lifecycle assessments of regional considerations and local content by teams of anthropologists, economists and environmental specialists and contribute significantly to necessary financial decisions by both investors and leadership.

49. Accelerated Process

There is a rational process to building non-technical capability that can be executed within an oil & gas organisation. This can be done working non-technical risks and opportunities at the:

- Strategic Portfolio Level
- Specific Asset Level
- NTR Functional Support Level

The accelerated implementation requires alignment at all these levels, organisational change and cultural change.

"Project Acceleration" involves the agreement of additional, temporary structures and working rules in order to break out of the business-as-usual relationships

between business and functional team members in order to accelerate the resolution or avoidance of sustainability risks and hence, to enhance project performance.

The new working relationships that develop to achieve this goal become a model for successful project working elsewhere, resulting in long demarcated silos being replaced with collaboration, and the stereotype of the corporate project "tourist" is replaced by appreciated valued embedded team members. Finally, the endemic focus on internal issues and external issues from an internal perspective are replaced by external insights, change and improvements.

50. Expectations

BEHAVIOURAL CHANGE

Responding to rapidly changing expectations is challenging – ever more so when the key challenges are non-technical in nature. However the expectation of various stakeholders is ever increasing, unrelenting and always more complex.

51. Behaviour

Getting people to change their behaviour, by asking them or telling them to, does not work. People will only think differently by understanding and recognising the reason for doing so.

52. Interaction Dynamics

Transformation requires behavioural change from Corporate level through to the Asset level, and support at the Functional level. It begins with leader's behaviours, the culture they create and processes they use. This then feeds down to influence the behaviours of personnel on the front line on all aspects required to drive the business sustainably.

The Discovery process I referred to previously is the means by which this robust hazard and risk recognition catalyses the need for change. It needs irrefutable

physical evidence which can then be monetised to enable it to be integrated into the business case.

53. Alignment

This integrated approach to delivering and sustaining behavioural change has been by necessity a very short high level overview of the behavioural change approach that is necessary to achieve a "Sustained Licence to Operate".

Non-Technical Risk is both the biggest threat and the biggest opportunity facing the industry today. But addressing it is a tough challenge for most organisations – not because of the external issues (although these do need new thinking) but because of the demands it places on the leaders of the businesses and the internal challenges they face in driving the internal transformation that is needed. A small number of players have already made a strong start down that road.

54. Overview	55. Concluding Remarks

8) CONCLUDING REMARKS

I trust that I have shown today that the Macondo disaster has been a catalyst for increasing the momentum for change in the global industry, momentum that started to gather pace in the decade leading up to the incident.

The obvious immediate outcomes have been increased regulatory controls, increased costs, decreased access to some reserves and a more difficult insurance climate. However the most beneficial outcome for the industry as a whole will be the understanding and implementation of the NEW REQUIREMENTS ON BUSINESS – that is to understand both the technical and NTRs posed by development, and how to integrate this enterprise risk into the core business process. The prize is a Sustainable Competitive Advantage, but this can only be achieved if the NTRs are understood, monetised and form the executive decision basis for a transformational ambition. Leadership driven behavioural change underscores this corporate transformation.

Peter Rowley

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Email: peter.rowley@erm.com