Challenges and opportunities of Shale

Risk governance for Unconventional Gas and Oil Development

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Talk outline

- Shale risk management and standardisation
- The shale oil and gas global risks and challenges
- A risk management model for operators and regulators
- Our view of the key challenges
DNV GL

Europe / Africa / Middle East
10,000 staff

Americas
3,000 staff

Asia / Oceania
4,000 staff

2,500
Mill. EURO (2012)

100
countries

16,000
employees
Committed to innovation

5% of annual revenue reinvested into research and development every year

70 internal technology projects annually

170 industry standards and recommended practices

+65% of the world’s offshore pipelines are to DNV GL standards

100 joint industry projects each year

Dedicated R&D centres in the Netherlands, Norway, Singapore, the UK and the US.
DNV GLs Recommended Practice (RP) focuses on all relevant shale risk aspects in a life cycle perspective

- RP U301 “Risk Management for Shale Operators and Regulators”
  - Management systems
  - Safety, health, and the environment
  - Well integrity
  - Management of waste, resources, water and energy
  - Infrastructure and logistics
  - Public engagement
  - Stakeholder communication
  - Permits

- Our aim is to develop this into an international standard
The shale oil and gas global risks and challenges
Shale gas and oil – DNV GL a global risk assessment

Overall Evaluation
1. Immature
2. Some gaps but mostly in place
3. Advanced – in place

Technology and Infrastructure: T
Geology: G
Policy Regulations/Public Opinion: P
Economic Feasibility: E

Countries:
- USA
- Mexico
- Romania
- Argentina
- Africa
- Brazil
- Middle East
- UK
- India
- Denmark
- Russia
- Netherlands
- Ukraine
- Germany
- China
- France
- Indonesia
- Spain
- Australia
- Poland
- Canada
- Turkey
- Saudi Arabia
- South Africa
An exponentially growing industry - is the existing governance robust enough to handle it?

- From a few hundred in 2008 to more than 45,000 wells in 2014
- And, with TRR of 830 tcf (18%) and a mean EUR of 1 bcf/well, you need 830,000 wells to extract the resources
- Economies of scale needed on low margins

Image Source: Texas Railroad Commission, Woodmack,
Cheap gas has lead to economic boom and prosperity but, be careful what you wish for........

- Environmental shortcuts to reach the oil
- 40% of the gas (2MTpa) flared in the Bakken field (North Dakota) alone, $380M/year in revenues up in flames
- Same situation in Eagle Ford (Texas)
- Surreally flaring and emissions are restricted in Texas
The industry has gone from infancy to a substantial industrial operation

- Without increased governance or oversight
- With an increasing public outcry for governments to impose new regulations
- No effective system for accident data aggregation
- Is disaster looming?

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Marcellus Drilling News, February 2014

'Help us ... before we all die'

Centre for Public Integrity, February 2014
ELIMINATING RISK IS NOT AN OPTION

It’s how you manage your most critical risks that matters
The industry needs to impose on itself a degree of self regulation, demonstrating a safe and sustainable operation.
Key challenges for a sustainable and continued development of shale gas going forward

- Political will, courage, foresight and drive
- Economies of scale
- Dealing with less divergence and price volatility
- Dealing with public perception
- Demonstration of safe and sustainable development and production
Thank you for your attention

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