General insurance pricing seminar
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Offshore Energy
Black Swan events or just white covered in oil?

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What is upstream energy?

**Exploration**
- Seismic
- Exploration drilling

**Development**
- Development drilling
- Field development

**Production**
- Production facilities
- Transportation
- Drilling/workover

**Abandonment**
- Facilities removal
- Well abandonment
## Upstream energy coverages

<table>
<thead>
<tr>
<th>Covered</th>
<th>Not Covered</th>
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<tbody>
<tr>
<td>• Construction All Risks</td>
<td>• Geological risk</td>
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<tr>
<td>• Property damage</td>
<td>• Technology risk</td>
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<tr>
<td>• Removal of wreck</td>
<td>• Commodity Price</td>
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<tr>
<td>• Sue and labour</td>
<td>• Regulatory risk</td>
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<tr>
<td>• Business interruption</td>
<td>• Political risk</td>
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<tr>
<td>• Loss of production or loss of hire</td>
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<tr>
<td>• Well related expenses:</td>
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<tr>
<td>– Control of well</td>
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<td>– Redrill</td>
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<tr>
<td>– Pollution clean up / liability</td>
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<tr>
<td>• Collision liability</td>
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Industry features

Oil Industry Characteristics

- Technology
- New frontiers
- Price Volatility
  - Commodity
  - Resource availability
- High impact
  - Upside / downside
- Cat exposure
- Asset life
- Jurisdictions / regulations
- ‘Coal face’ with nature

Impact for Insurers

- Limited risk population
- Large vertical exposures
- Unpredictability
- Claims inflationary effects
Oil Insurance Limited incurred losses
1988 - Piper Alpha Disaster

Oil: $15 per barrel
Industry losses – high volatility

Incurred losses including windstorm

Windstorm losses  Risk losses

Source: Willis Energy Loss Database
1995 - Brent Spar high profile abandonment

Oil: $17
Frequency fairly stable, incurred claims increasing
1996 - Largest ever object moved (Troll Platform)

Oil: $21
Industry losses rising faster than CPI
2003 - First well drilled in 10,000 feet of water
Modelling losses – case study

- Semi-submersible units
- Roughly 300 in global fleet
- Typical values USD 150m – 750m
- 10 years of data used 2000-09 (largest loss $83m)
- No IBNR or inflation used in this example
- Excludes Hurricane losses

- FOR ILLUSTRATION ONLY
2004 - Magnolia ETLP is World’s deepest TLP

Oil: $38
10 year industry loss record for Semi-submersibles

Source: Willis Energy Loss Database
2005 - Hurricanes (Katrina & Rita)

Oil: $55
Severity distribution fitted to claims

Source: Willis Energy Loss Database
Aggregate annual losses modelled

- 1 in 250 year loss modelled at $580m
- 1 in 10 year loss modelled at $105m
And then...
How does model perform for 2010 and 2011?

- 2010 accident year is 1 in 500 year event
- 2011 is 1 in 20 return period already
2008 - Deepest extended reach well drilled (12,298m)

Oil: $97
Lessons from case study

- 10 year loss record didn’t include a total loss of a unit
- Need to adjust experience for potential extreme losses
- Estimate of volatility should include exposure rather than just historic losses
2009 - BW Peace sets new record for offshore production (2,500m water depth)
Extreme event modelling

- Look at potential exposures to events
- One event can wipe out many years of profit
- Clash events such as loss of platform and drilling rig
- Insured exposures in excess of USD 3.5bn
2010 - Macondo blowout

Oil: $80
Summary

• Rapidly changing industry
  – The ‘pioneering spirit’

• Scope to use actuarial techniques
  – But qualitative judgement needed

• Exposure to extreme events
  – Reliance on historic data is insufficient
Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.
The views expressed in this presentation are those of the presenter.