SPE DISTINGUISHED LECTURER SERIES
is funded principally
through a grant of the
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The Society gratefully acknowledges
those companies that support the program
by allowing their professionals
to participate as Lecturers.

And special thanks to The American Institute of Mining, Metallurgical,
and Petroleum Engineers (AIME) for their contribution to the program.
History of Supply / Demand and Growth

Potential Investment Levels Required

Six Competitive Forces Shaping the EP Industry

Profits

Conclusions
Aggregate global production decline is ~ 5+% per annum. Aggregate long term oil & gas growth is 1.5% per annum average.
Number of Vehicles Globally (History and Forecast)

Number of Cars & Light Trucks Globally (millions)

Range of Forecasts

[Assumes an 8 Bln population]
- The planet may have 40 - 100 years supply
- 80% of hydrocarbons are in onshore areas; 20% offshore
- Much is low cost access….most owned by governments…
- New ones (mature) opening each day.

**World Proven Hydrocarbons (Bln Boe)**

Hydrocarbon Demand from Wellbores Growing at ~1-2% pa

- Oil 1100 Bln bbl (Expect+ Undiscov.= 2000 Bln)
- Gas 700 Bln boe 4000 Tcf

Hydrocarbon Reserves (Bln boe)

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- Oil sands/Bitumen Heavy

- 2002 44 Bln boe
- 2030 88 Bln boe
- 3000 Bln boe
Private Oil Company Annual EP Capex Actuals & Forecasts

Assumed Reduced Impact of Technology
(30% Reduction in Investment)
Industry Sector Research and Development Spend 2001

Annual R&D Investment ($ Bln)

Industrial Sector

- IT & Hardware
- Automotive Industry
- Pharmaceuticals
- Electronics & Electrical
- Software & IT Services
- Chemicals
- Aerospace & Defense
- Telecoms
- Oil & Gas
- Personal Care
- Diversified Industrials (Conglomerates)

$3.3 Bln in total
EP ~ $2 Bln in total

Source: UK Financial Times Monday 14th October 2002 pages 10 -11
Oil & Gas Company Research and Development Spend

Annual R&D Spending ($ mln)

Source: Company Annual Reports
Six Competitive Forces Shaping the E&P Industry

- Cost Structure – Need for Continual Improvement
- E&P Portfolio Restructuring
- Shifting to Gas
- The Quest for Growth
- Need for improved financial management
- Industrial consolidation
Where to Exploit the Hydrocarbons in Longer Term

**“OLD” EP Business**
- USA, Canada, North Sea, Small ME Countries
- Selected others

**“NEW” EP Business**
- Brazil, Angola, Iran, CIS
- Sakhalin, Kazakhstan, China
- OPEC Countries, S. America
- Pakistan, Bangladesh
- India

**BIG 5 MEO**
- Saudi, Kuwait, Iran, Iraq, UAE

**BIG GAS**
- IRAQ, Russia

**“OLD” EP Business**
- Low Govt Take, stable terms
- High UTCs
- Mature Basins (limited growth)
- High costs on supply curve
- Long asset tenure
- High upside at higher prices
- Gas markets are developed

**“NEW” EP Business**
- High Govt Take, less stable terms
- Commercially risky
- Limited upside @ higher prices
- Gas markets are emerging
- Ultra competitive (“loss leading”)
- Lower degree of control with govt
- Green/Brownfield (high growth)
- Low UTCs resources

Natural Shift with Declines
- Where EP Industry made most of the money in the past ..... But margin is small @ low prices and where capex treadmill potential exists
- Where the EP industry must go in the future, but where EP margin may be thin..... at all oil/gas prices like R&M or Chemicals

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Which is better: “bond-like” investments or investments with more risks but with price upside?
50 years of EP Consolidation Continues, Nationals Join, What Next?

1950
Standard Oil (NJ)
Socony Vacuum
Superior Oil
Standard Oil (IN)
Standard Oil (OH)
Atlantic
Richfield
Sinclair
British Petroleum
Royal Dutch/Shell
Shell Oil
The Texas Co.
Tidewater
Pacific Western Getty
Skelly
Gulf
Standard Oil (CA)
Standard Oil (KY)
Occidental
Cities Service
Phillips
Aminoil
General American Oil
Continental
Union Oil
Pure Oil

1960
Exxon
/Mobil

1970
Mobil
Amoco
Royal Dutch
/Shell

1980
Arco
Vastar
BP

1990
Britoil

2000
Chev/Tex
Chevron

2005+
Occidental
ConocoPhillips

State Oils & Former State Oils
TFE, ENI, REPSOL, PETROBRAS,
<table>
<thead>
<tr>
<th>Year</th>
<th>Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>Exxon/Mobil, Royal Dutch/Shell, BP, Chev/Tex, Phillips/Conoco</td>
</tr>
<tr>
<td>2005 - 2010</td>
<td>TFE, ENI, YUKOS, Sibneft (?)</td>
</tr>
<tr>
<td></td>
<td>Statoil + Norske Hydro (?)</td>
</tr>
<tr>
<td></td>
<td>Petrobras + Repsol (?)</td>
</tr>
</tbody>
</table>
An Example of the Similar Behaviour in Independents


Devon

Hondo
Alta
Worland
Kerr McGee (N America)
North Star
Penz Energy
Santa Fe
Mitchell
Ocean Energy
United Meridian
Seagull
Anderson
Home
Ulster
Numac

USA Companies

Canada Companies

Source: Devon Annual Reports

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Big Four Major Oils E&P Net Income (CCS)

Annual Net Income ($ Bln)

Time (Years)

Source: Company Annual Reports
# The Ten Largest Market Capitalisations Versus Time

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Mkt Cap (S Bln )</th>
<th>Rank</th>
<th>Company</th>
<th>Mkt Cap ($ Bln )</th>
<th>Rank</th>
<th>Company</th>
<th>Mkt Cap ($ Bln )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>General Motors</td>
<td>22</td>
<td>1</td>
<td>IBM</td>
<td>159</td>
<td>1</td>
<td>GE</td>
<td>459</td>
</tr>
<tr>
<td>2.</td>
<td>AT&amp;T</td>
<td>18</td>
<td>2</td>
<td>AT&amp;T</td>
<td>102</td>
<td>2</td>
<td>Microsoft</td>
<td>335</td>
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<tr>
<td>3.</td>
<td>US Steel</td>
<td>9</td>
<td>3</td>
<td>General Motors</td>
<td>76</td>
<td>3</td>
<td>Citigroup</td>
<td>314</td>
</tr>
<tr>
<td>4.</td>
<td>Standard Oil (N.J. Exxon)</td>
<td>9</td>
<td>4</td>
<td>Eastman Kodak</td>
<td>51</td>
<td>4</td>
<td>Cisco</td>
<td>306</td>
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<tr>
<td>5.</td>
<td>General Electric [GE]</td>
<td>9</td>
<td>5</td>
<td>Exxon</td>
<td>51</td>
<td>5</td>
<td>ExxonMobil</td>
<td>284</td>
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<tr>
<td>6.</td>
<td>DuPont</td>
<td>8</td>
<td>6</td>
<td>Sears Roebuck</td>
<td>40</td>
<td>6</td>
<td>Pfizer</td>
<td>271</td>
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<tr>
<td>7.</td>
<td>F.W. Woolworth</td>
<td>7</td>
<td>7</td>
<td>Texaco</td>
<td>32</td>
<td>7</td>
<td>Intel</td>
<td>244</td>
</tr>
<tr>
<td>8.</td>
<td>S.H. Kress</td>
<td>7</td>
<td>8</td>
<td>Xerox</td>
<td>31</td>
<td>8</td>
<td>Wal-Mart</td>
<td>239</td>
</tr>
<tr>
<td>10.</td>
<td>New York Central Railroad</td>
<td>6</td>
<td>10</td>
<td>Gulf Oil</td>
<td>24</td>
<td>10</td>
<td>Nokia</td>
<td>187</td>
</tr>
</tbody>
</table>

Source: Various
Conclusions

- E&P is a dynamic, profitable, growth business
- E&P business is capital intensive and requires high technology like space travel or the defence industry
- We have interesting conflicts in meeting global hydrocarbon demand whilst meeting the needs of stakeholders
- The scale of investment required will be challenging and is not recognised in society.
- Sustaining the industry success will require R&D success levels at least equal to those of the past to keep future investment costs down. We need to avoid under-investing in the research we need.
- We have met the energy needs of the planet in the past and will do so in future. This is a great place to work.
Backup Slides

Not likely to be Used
Drowning in oil

March 1999
Is oil poised to strike?

September 2000
Possible Outlooks on Oil Prices?

Low Oil Price World
1910-1970

Volatile Oil Price World
1971-2002

Volatile Or Low Oil Price World again

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THE TRADITIONAL "S" CURVE FOR TECHNOLOGY

- Business Benefits
- Time

- Initiation Of New Technology
- First Trials
- Obvious Candidates
- Widescale Implementation of Technology
- Creaming of Candidates for Technology
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- Career-building opportunities