

# Petroleum review

MARCH 2003



## IP Week 2003

- David O'Reilly: Looking beyond today's headlines
- Sir Philip Watts: Dusk is far from falling
- Highlights: Hopes and fears for the industry's future
- Exhibitions: Oil and gas on show

## Seismic

- Scant reward for technology success

## Refining

- Margins to improve after tough 2002

Covering the international oil and gas industry from field to forecourt –  
exploration, production, refining, marketing and e-business



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## ABBREVIATIONS

The following are used throughout *Petroleum Review*:

mn = million (10 <sup>6</sup> )	kW = kilowatts (10 <sup>3</sup> )
bn = billion (10 <sup>9</sup> )	MW = megawatts (10 <sup>6</sup> )
tn = trillion (10 <sup>12</sup> )	GW = gigawatts (10 <sup>9</sup> )
cf = cubic feet	kWh = kilowatt hour
cm = cubic metres	km = kilometre
boe = barrels of oil equivalent	sq km = square kilometres
t/y = tonnes/year	b/d = barrels/day
	t/d = tonnes/day

No single letter abbreviations are used.

Abbreviations go together eg. 100mn cf/y = 100 million cubic feet per year.

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Front cover: Sir Philip Watts KCMG, Chairman of the Committee of Managing Directors, Royal Dutch/Shell Group, speaking at the IP Annual Dinner at the Grosvenor House Hotel, London (Full IP Week 2003 reports start on p22)

All IP Week 2003 photos: Jim Four

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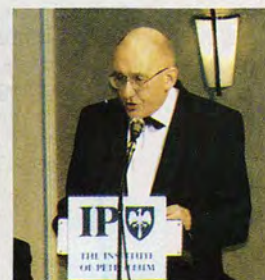
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The Institute of Petroleum as a body is not responsible either for the statements made or opinions expressed in these pages. Those readers wishing to attend future events advertised are advised to check with the contacts in the organisation listed, closer to the date, in case of late changes or cancellations.



### Restoring the industry's reputation

This year's IP Week was once again highly successful with at least two of the conferences standing room only – a clear testament to the attraction of the event and the very high quality of the speakers. The speaker for the IP Lunch was David O'Reilly, Chairman and CEO of ChevronTexaco, who spoke eloquently of the way 'that in many places around the world energy is at the nexus of social, economic and political change' and the way that national and energy security are not the same thing but are intertwined. He went on to note that although two-thirds of Europeans see Iraq as a threat to world peace 'a shocking 70% believe that oil is the main reason the US wants to intervene in Iraq. He then went on to argue that the 'No blood for oil' sentiment of the anti-war protestors had caught on partly because 'our industry's reputation is so impaired that the protestors can discredit action in Iraq simply by associating it with us.'

He further developed his main theme – the restoration of the industry's reputation and the need for all to cooperate to enhance this and improve communication of the industry's achievements and the benefits it brings. (The full speech is on p22).

Sir Philip Watts KCMG was the main speaker at the IP's Annual Dinner. Sir Philip effectively took up David O'Reilly's challenge to enhance reputation by addressing the gibe that the oil industry has become a sunset industry. He started by noting that modern society depends on secure energy supplies and went on to point out that at a time of political and economic uncertainty it was 'fortunate that our industry is as vigorous and creative as it has ever been'. He went on to describe the way that trust in business had declined and the ways that the oil industry could restore its reputation, outlining a number of areas such as the development of the North Sea and the production of clean fuels as well as other areas in which the industry had every reason to be proud. (The full speech is on p25).

In introducing the first day of the conferences the IP's President Dr Pierre Jungels tackled the challenge of resource depletion and the possibility of reaching the King Hubbert peak (when further supply increments become impossible). Various speakers tackled this particular challenge generally concluding that capital constraints and access to resources were more immediate concerns than Hubbert peaks. (See p33).

At the time of writing oil supply

remains extremely tight. A combination of a cold Northern Hemisphere winter, the prolonged strike in Venezuela and the likelihood of a war in Iraq have driven stocks to near record lows, particularly in the US. However, it is possible that significant volumes have flowed from secondary to tertiary storage. Opec members other than Venezuela appear to have risen to the production challenge and the general consensus is that world production is currently flat out apart from around 1.5mn b/d shut-in by the strikers in Venezuela and around 1mn b/d of high sulphur, high-metals crude in Saudi Arabia.

There is little doubt that Iraq has large-scale resources that could provide significant new low cost production. An article by a consultant (p18) shows just how large these potential resources could be, however, the fabulous resources of Iraq's western desert are starting to sound a little like El Dorado, although it is to be hoped they are more than just legend. It should be remembered, however, that the oil industry can only operate in conditions of stability and reasonable social harmony.

### Euros for oil?

In an ironic twist of history Saddam Hussein's decision to sell his oil for Euros has produced a massive windfall gain on the dollar's recent devaluation. Once again there are rumours of oil producers moving to euro pricing. There is another irony here. For the oil companies to pay for dollar denominated sales in dollars and euro denominated sales in euros would minimise currency risks and costs. But for the US, the lack of daily multi-million dollar purchases would lead to rapid dollar devaluation and financial crisis.

### And finally ...

An Australian researcher has recently established that oil and water do mix – but only if the water is degassed first. This may be more than just a scientific curiosity. It is known that the addition of small quantities of water improves combustion of most fuels, which can now potentially be done without detergents. There is also the possibility that increasing the gas content of water might improve its separation from oil. Should we be gasifying injected water to improve recovery or gasifying the well flow ahead of the separators?

The opinions expressed here are entirely those of the Editor and do not necessarily reflect the view of the IP.

A new CD-Rom designed to attract new players to the North Sea oil and gas industry has been launched by UK Energy Minister Brian Wilson. The 'Promote UK' CD-Rom will provide potential newcomers with a simple, user-friendly guide to the North Sea, its tax regime, regulatory framework and geology. It also provides a sample of exploration prospects available for licensing, undeveloped discoveries and future opportunities. Visit [www.og.dti.gov.uk](http://www.og.dti.gov.uk) for more details.

London-based Control Risks Group has launched a new web service – Iraq TimeLine – that brings together events, issues, analysis, scenarios and practical advice to companies based in the Middle East. In a period of continued troop build-up in the Middle East and Persian Gulf region, companies need to have contingency plans in place for a war in Iraq. Iraq TimeLine will provide users with up-to-the-minute information, analysis of the real threat and advice as events begin. For further information visit [www.crg.com/iraqtimeline](http://www.crg.com/iraqtimeline)

Ofgem has launched a microsite that will provide smaller generators access to factual and simplified information from the energy regulator on understanding their trading options in the electricity market. The microsite can be found under the NETA section on the Ofgem homepage at [www.ofgem.gov.uk](http://www.ofgem.gov.uk) or at [www.ofgem.gov.uk/smallergen/index\\_sg.htm](http://www.ofgem.gov.uk/smallergen/index_sg.htm)

The Process, Power & Offshore division of Intergraph Corporation has released the new 5.5 version of its web-enabled Marian® materials procurement and supply chain management software which features new functionality and a number of improvements. For more information visit [www.intergraph.com/ppo/marian](http://www.intergraph.com/ppo/marian)

InterContinental Exchange (ICE) has unveiled its enhanced and redesigned website at [www.theice.com](http://www.theice.com)

As a follow up to the Johannesburg Summit call on the corporate sector for increased accountability the World Business Council for Sustainable Development (WBCSD) is launching a web-based 'reporting portal' to bolster companies' efforts to report on their sustainable development activities. The portal can be accessed from [www.wbcd.org](http://www.wbcd.org)

The US authorities are reported to have approved Texas Gas Transmission Corporation's plans to hold web-based auctions to sell short-term shipping capacity on its natural gas pipeline network in Texas and Louisiana to utilities and large industrial customers.

### UK

Shell is understood to be planning to divest some \$2bn worth of mature North Sea assets during 2003. It is already selling a 41% interest in the Arbroath, Montrose and Arkwright fields – valued at £60mn.\*

ChevronTexaco has produced first oil from the Caledonia field in North Sea block 16/26. Production is expected to average 10,000 b/d over the first year, with a peak output of 13,000 b/d achieved shortly after start-up.\*

The UK Government has approved the £71.5mn field development plan for Petro-Canada's Clapham field in block 21/24 in the central North Sea. The field has recoverable reserves of 19.5mn barrels of oil and is expected onstream in 2004.\*

### Europe

ExxonMobil has brought onstream the Ringhorne field in the Norwegian sector of the North Sea. Production is expected to peak at 80,000 b/d of oil and 28mn cfd of gas.

OMV of Austria has acquired the entire international E&P portfolio of Preussag Energie for €300mn. The deal will add 20,000 boe/d to OMV's 2003 production.\*

### North America

EnCana has asked federal and provincial regulators for a 'time out' in the regulatory approval process to allow it time to review its Deep Panuke gas project in

### Complete news update

The 'In Brief' news items in *Petroleum Review* represent just a fraction of the news we regularly publish on the IP website @ [www.petroleum.co.uk](http://www.petroleum.co.uk) via the 'News in Brief Service', together with our daily News 'ticker' on the main home page.

Furthermore, those news stories marked with an asterisk (\*) in the magazine are covered in more detail on the News in Brief Service.

Why not visit the site to find out more about the latest developments and trends in your industry? Click on

[www.petroleum.co.uk](http://www.petroleum.co.uk)

## New licence to promote oil and gas exploration

The UK Government has launched its 11th onshore and 21st offshore licensing rounds, the latter covering some 612 blocks and including 12 significant discoveries and some fallow blocks. It has also unveiled a new type of licence designed to increase the amount of activity in the North Sea and maximise recovery of UK oil and gas.

Under the new 'Promote' licence the rental fee will be cut by 90% for the first two years of a standard initial four-year term, after which the licensee will be required to provide a work pro-

gramme including a commitment to drill at least one well by the end of the initial term or relinquish the licence. It is hoped the new licences will improve the flexibility of the licensing regime and encourage smaller newcomers to the North Sea to increase their exploration activity. Companies will be able to bid either for a traditional licence or the new Promote licence. Bidding for Promote licences has been limited, however, to five contiguous blocks for any play and a maximum of 10 blocks for any company.

## Green light for Carrack gas development

Shell and ExxonMobil have been given the green light to develop the Carrack gas field in southern North Sea block 49/14b at a cost of £150mn. Field reserves are put at 300bn cf of gas, which will be exported via an 85-km pipeline to the existing Sole Pit Clipper complex and from there to the Bacton gas terminal. First gas is expected in late 2003, with production forecast to peak at 160mn cf/d.

The project will be developed around a central hub platform that will facilitate tie-backs of any future marginal fields in the surrounding area. The Carrack pipeline will also be designed to tie in potential exploration discoveries as well as stranded gas fields along its route.

The £40mn contract for platform construction has been awarded to SLP Engineering of Lowestoft. Two platforms will be built, one a larger hub platform to be located over the Carrack field from where three wells will be drilled in 2003/2004, with the capacity for additional wells should they be required. The second, smaller platform will be installed adjacent to the Sole Pit Clipper platform complex to act as a reception facility for the Carrack gas production. The £34mn contract for the 85-km pipeline construction has been awarded to Allseas Marine Contractors, with Corus of Hartlepool manufacturing the pipeline material.

● The two companies have also announced a gas discovery in blocks 49/20a and 49/20b, close to the Shell Expro-operated Brigantine gas field. Data is currently being evaluated.

## Major new North Sea pipeline

Norsk Hydro has received approval from the Ormen Lange licence to proceed with work to build a direct pipeline from Aukra in Møre og Romsdal County, via the Sleipner installation in the North Sea, to Easington/Dimlington in the UK. Ormen Lange will increase Norwegian gas exports by 25%, making it the world's second largest gas exporter after Russia, comments Bengt Lie Hansen, Norsk Hydro's head of Mid-Norway sector of Exploration and Development.

The Norwegian's believe a new export pipeline to the UK is the most reasonable and flexible solution for transporting gas from Sleipner and on to the market. The field needs to have access to a pipeline of at least 60mn cm/d capacity. 'The total export pipeline system tied into Ormen

Lange will be the most significant pipeline project ever in the Norwegian offshore sector,' claims Norsk Hydro. The combined length will be 1,200 km.

The Plan for Installation and Operation (PIO) of the most southerly stretch of pipeline – between Sleipner and Easington/Dimlington – is to be presented to the relevant authorities in June 2003. The corresponding PIO for the northern section will be delivered by October 2003, together with the Plan for Development and Operation (PDO) on the Ormen Lange field itself.

However, a treaty needs to be signed with the UK if the pipeline is to be built. BP is pushing for the use of the existing CATS, Miller and SEAL pipelines, in each of which it has an interest.

## New FPSO for Marlim Sul

Petrobras has completed the bidding process for the charter and provision of operational services of a FPSO for the supplementary development of Module 1 in the Marlim Sul field in the Campos Basin offshore Brazil. The winning bid came from SBM do Brasil, associated with Dutch group IHC Caland.

Initially designed for interconnection with the P-40 platform, all Module 1 wells in Marlim Sul entered production in December 2001. However, productivity has been above initial expectations and today the P-40 is producing at its maximum 155,000 b/d capacity. The chartered FPSO will help produce an additional 100,000 b/d. It will operate for seven years and 10 months, after which it will be deactivated and its nine well producers will be transferred to the P-40. The FPSO will also be capable of compressing 2mn cm/d of gas and injecting 126,000 b/d of water. It is due to be commissioned in 2Q2004.

## Kazakh asset sale

Shell has acquired Kerr-McGee's assets in Kazakhstan for \$165mn. The assets comprise Kerr-McGee's 1.75% equity in the Caspian Pipeline Consortium (CPC), its 50% interest in the Arman oil field in the Mangistau region and 100% of the Mertvyi Kultuk exploration licence on the northeastern shore of the North Caspian Sea.

The deal boosts Shell's holding in the CPC pipeline to 9.25% and adds a further 55,000 b/d in capacity rights, providing the company with the ability to export up to 110,000 b/d in the medium term.

Shell will take over as operator of both Arman, which currently produces 5,000 b/d of oil, and the Mertvyi Kultuk block.

## African upstream

Stella Zenkovich reports on recent E&P developments in Africa:

- Due to disinvestment during the Milosevic years, oil production has been declining over the past decade at the Angolan concession of NIS-Naftagas, the exploration subsidiary of state-owned Serbian oil company NIS, according to Deputy Director General Igor Korac. Production was just 122,000 tonnes, or 2,440 b/d, in 2002, down from 299,000 tonnes in 1999.
- Houston-based Vanco Energy is planning to drill a number of wells in the deep waters offshore Morocco, Cote d'Ivoire, Namibia and Equatorial Guinea. Vanco aims to keep a 50% stake in each well, and to offer 25% each to two partners.

## Climate change

ChevronTexaco reports that its proprietary system for estimating and managing greenhouse gas emissions and energy utilisation data – SANGREA™ – is now available free of charge to the worldwide energy industry. The company has released the system to promote standardisation of methodologies used and comparability in gathering of greenhouse gas inventory information.

The automated, electronic data management information system has been designed to gather greenhouse gas emissions and energy usage data from exploration and production, refining and marketing, petrochemicals, transportation, electricity generation, manufacturing, real estate and coal activities. ChevronTexaco believes the system is unique as it enables facilities to set up reports, enter monthly data, review results and to revise the report set-up as operations change. Data can also be sent automatically to management for review on a quarterly basis.

## Developments upstream Middle East

Stella Zenkovich reports on recent upstream developments in the Middle East:

- Following positive seismic surveys by Spectrum of the UK, which indicated the presence of hydrocarbons beneath the territorial waters of the Lebanon, Lebanese Energy and Water Minister Abdel-Hamid Beydoun has announced that drilling will take place for siting oil and gas reserves over the next four years. Spectrum's Mike Johnson has divulged that the presence of oil had been verified earlier on the basis of satellite photos. Prime areas pinpointed so far are 20 km southwest of Beirut and an 8 sq km area near the coast of Batrun.
- The pace of EU gas liberalisation is deterring investment in exploration for gas according to Qatari Energy Minister Abdullah bin Hamad Al-Attayah who claims that the process is tailored to suit EU interests alone through short-term contracts without taking into account producers and the needs of the overall market.

## In Brief

Nova Scotia in order to strengthen anticipated project economics.\*

**BHP Billiton has brought onstream the Boris field in Gulf of Mexico Green Canyon block 282. Output is expected to peak at 18,000 b/d of oil and 27mn cfd of gas.\***

**Canadian Oil Sands Trust is reported to have bought EnCana's 10% stake in the Syncrude Canada oil sands project in a deal valued at \$705mn, boosting its interest to 31.74%.**

**Shell Canada (31.3%) is reported to have reduced its gas reserves estimate for Nova Scotia's Sable Island project from 790bn cf to 700bn cf after assessing new data. The company has also classified another 200bn cf of reserves as 'proven undeveloped' from 'proven developed'.**

**ChevronTexaco has announced an \$8.5bn capital and exploration spending programme for 2003, of which \$1.7bn will be spent in the US.**

### Middle East

**Zarubezhneft of Russia is reported to have signed an agreement with Syria to form a joint oil and gas company – Amrit – that will undertake exploration and drilling projects in Syria.\***

**A Japanese National Oil Company (JNOC)-led consortium is reported to have bought for an undisclosed sum a 20% stake in Shell's project to develop the Soroosh and Nowrooz oil fields in Iran.**

### Russia & Central Asia

**Lukoil and Norsk Hydro have signed a protocol of intent for cooperation in various joint projects, including development of the Khariyaga oil field in Timan Pechora province. In addition, Lukoil Overseas and Norsk Hydro have signed a contract relating to Lukoil's 25% participation in the Anaran block in Iran, in which Norsk Hydro has a 100% stake. Potential reserves at Anaran are put at 350mn tonnes.**

**The International Finance Corporation has persuaded a number of top commercial banks to join it in investing in Russian oil giant Lukoil so it can exploit the Karachaganak oil, gas and condensate field, reports Keith Nuthall.\***

Lukoil is understood to be planning to commence drilling at its Yalama prospect in the Azeri sector of the Caspian Sea, estimated to hold 800bn cm of oil and 50bn cm of gas.

Sakhalin Energy, operator of the Sakhalin-2 project, has confirmed that it plans to bid for a 25-year, 1.7mn tly LNG contract in Taiwan as part of a process of firming up LNG sales before approving Phase 2 development, reports UFG. Phase 2 includes the construction of a 9mn tly LNG export terminal on the south coast of Sakhalin Island.

**ADDENDUM:** It was recently reported in Petroleum Review that Romania's Romgaz Medias was to spend \$5.7mn in 2003 on the drilling of six wells by two contractors on the Transylvanian plateau. We would like to point out that the Plateau is located in Europe, not Russia/Central Asia, and that drilling will take place in Todiresti, Soimus Est, Ruja, Chiheru, Magherani and Targu Mures.

## Asia-Pacific

More than two dozen oil and gas blocks are to be offered under India's fourth NELP licensing round, beginning in April 2003.

ExxonMobil is reported to have selected the Pacific Ocean route linking Cape Soya in Hokkaido with the Tokyo metropolitan area over the alternative Japan Sea route linking Cape Soya with Niigata prefecture for its Sakhalin-1 gas pipeline. The pipeline will supply 8bn cmy of gas, meeting some 10% of Japan's total gas demand.\*

CNOOC has acquired a 12.5% stake in Indonesia's Tangguh LNG project from BP for \$275mn. Tangguh has proven reserves of 14.4tn cf of gas.

Eni has brought onstream Pakistan's \$236mn Bhit gas field, which is expected to reach a plateau production of 40,000 boe/d by late March 2003. Reserves are put at 172mn boe.

BHP Billiton is understood to have reported that production from its Bass Strait oil fields is declining more rapidly than originally forecast, falling 16% year on year by 4Q2002.

The Papua New Guinea Government is understood to be planning to collaborate with Oil Search, InterOil Corporation and other PNG-focused companies to develop the country's oil

## New opportunities on UKCS

Oil and gas production from the UK Continental Shelf rose in November 2002 and levels were broadly in line with those a year earlier, according to the latest (January 2003) Oil and Gas Index from the Royal Bank of Scotland.

Commenting on BP's disposal of its Forties field to US independent Apache, who will take a 98% controlling interest in the field, Senior Economist Tony Wood said: 'Markets were surprised by the timing of BP's decision to sell. It is not yet clear how many more oil and gas assets will be sold by major oil

companies. However, the entry of more independent operators highly focused on small numbers of assets will result in increased investment in the UK Continental Shelf. It will create new opportunities and challenges for all providers of services to the industry.'

UK oil production in November 2002 was up 1.5% on the month at 2,165,277 b/d and was broadly similar to levels in November 2001. Gas output for November was up 10.8% on the month at 11,113mn cf/d, but down 7% on the year.

Year Month	Oil production (av. b/d)	Gas production (av. mn cf/d)	Av. oil price (\$/b)
Nov 2001	2,161,755	11,949	18.80
Dec	2,425,159	12,621	18.60
Jan 2002	2,270,322	12,303	19.30
Feb	2,247,395	11,732	20.20
Mar	2,153,321	11,640	23.80
Apr	2,230,781	11,175	25.70
May	2,106,088	10,227	25.50
Jun	2,142,356	9,128	24.10
Jul	1,938,677	7,569	25.70
Aug	1,831,386	8,744	28.40
Sep	2,001,329	8,699	28.40
Oct	2,133,641	10,033	27.60
Nov	2,165,277	11,132	24.20

Source: The Royal Bank of Scotland Oil and Gas Index

### North Sea oil and gas production

## Latest European Commission news

The European Commission has approved the proposed acquisition of Norwegian oil and gas company Fortum Petroleum by Eni of Italy, reports Keith Nuthall. The Commission stated that the deal would not damage the current competitive situation in the gas markets in either Italy or in southern Germany, where Eni is present through GVS. Fortum Petroleum is currently wholly owned by Fortum Oyj of Finland.

Other recent petroleum industry EU news includes:

- The European Investment Bank is planning to provide Italy's EniPower with a €400mn loan to help design, construct and operate five combined cycle gas turbines at petrochemical sites in Brindisi and Mantova.
- Norway and the EU have agreed to further develop energy cooperation, notably keeping energy prices stable and reasonable.
- The European Bank for Reconstruction and Development is planning to lend Hungarian oil and gas company Mol some €18mn to expand and upgrade wastewater treatment facilities at its Duna refinery near Budapest.

## Petroleum Review Online

Petroleum Review is now available as an online benefit to IP Members. Click on the Petroleum Review Online link from the IP Home Page @ [www.petroleum.co.uk](http://www.petroleum.co.uk)

### New profit centres for BP include Russian JV

BP has posted full-year 2002 profits of \$8.7bn and announced plans to buy back \$2bn of company stock. The company also reported that it replaced 175% of the oil and gas it produced in 2002 and has outlined plans to invest more than \$20bn over the next five years on five new global profit centres that will more than offset decline in mature provinces such as the North Sea. According to Chief Executive Lord Browne, the new profit centres – the deepwater Gulf of Mexico, Trinidad, Angola, Azerbaijan and Asia-Pacific LNG – are as significant in scale, capital and reserves for BP's future as was the development of the North Sea and Alaska some 30 years ago.

The five centres are expected to absorb some 50% of likely annual spend by BP's exploration and production business between now and 2007, with post-tax earnings and cashflow per barrel rising as output from the new areas increases. Investment in a sixth profit centre – BP's 50% stake in a new Russian business joint venture with the Alfa Group and Access-Renova (AAR) – should be self-financing.

Under the strategic partnership with AAR, the companies have agreed in principle to combine their Russian interests to create what will be the country's third largest oil and gas business, behind Lukoil and Yukos. BP will hold a 50% stake in the new business, which is to incorporate TNK and Sidanco that, between them, produce 1.2mn b/d of oil. The new operation will also own significant exploration interests in Siberia and Sakhalin, together with a major downstream business that includes interests in five refineries and a retail network of more than 2,100 sites in Russia and Ukraine.

For its 50% stake in the new company BP will pay AAR up to \$3bn in cash on completion of the deal, and three subsequent annual payments of \$1.25bn in BP shares.

### Atlantis reserves on the up

BHP Billiton (44%) reports that the CG 743-5 appraisal well (also referred to as Atlantis-6) in Gulf of Mexico Green Canyon block 743 has confirmed the presence of hydrocarbons in the previously unexplored northern part of the Atlantis field. Additional drilling will be required to further appraise this portion of the field. Prior to the drilling of Atlantis-6, estimated gross proven and probable reserves for the BP-operated field were 635mn boe.

BHP Billiton has also approved \$1.1bn investment for development of Atlantis

oil and gas reserves. This figure includes the \$355mn approved in May 2002 to advance the project by funding detailed engineering and design work, the purchasing of long-lead items, and awarding major contracts.

The field is to be developed using a moored semi-submersible production facility with a gross design capacity of 150,000 b/d of oil and 180mn cf/d of gas. First oil is slated for 3Q2006, with production expected to reach plateau levels within the first six months of operation. Field life is put at 15 years.

### BP sells southern North Sea assets

BP is to sell a package of its UK southern North Sea gas production assets to Perenco UK for \$162mn in a cash transaction. The sale includes BP's share in 14 operated gas fields, including Indefatigable, East Leman, Davy, Trent, Tyne, Pickerill and Waveney, together with associated pipelines and onshore processing facilities including the Bacton terminal. Combined proven gas reserves for these fields is 274bn cf; BP's share of production is 150mn cf/d. Perenco hopes to become operator of the assets, subject to government and licence partner approvals.

BP states that the sale will improve returns on its upstream portfolio by reducing operating costs and freeing up capital for investment in other projects offering better profit margins.

The company retains a significant business in the southern North Sea, operating nine gas fields, associated pipelines and the onshore terminals at Dimlington and Easington. It also owns substantial interests in the Conoco-operated Viking, Valiant and Vulcan fields, and the Shell-operated Sean field. BP's share of production from these fields is some 380mn cf/d of gas.

and gas resources in response to the delayed development of the \$3.5bn PNG to Queensland gas pipeline. The collaboration is also to examine the development of a downstream hub and assess potential export markets such as California and India.\*

A joint venture comprising OMV New Zealand (39%), OMV Australia (30%), Todd Petroleum (16%), Horizon Oil (10%) and Delta Oil Taranaki (5%) is reportedly planning to invest between \$200mn and \$300mn on developing New Zealand's 25mn barrel offshore Maari oil field over the next few years.\*

#### Latin America

Venezuela's President Hugo Chavez is reported to have sacked over 30% of PdVSA's workforce for participating in the two-month-old general strike that sought to oust him from power.

BP is to swap its 25% stake in block A018 of the Malaysia-Thailand Joint Development Area (JDA) for Amerada Hess' interests in Colombia, adding some 58mn barrels to BP's Colombian portfolio. Amerada will also make a balancing payment to BP of \$10mn.\*

Petrobras is understood to have discovered a new oil field near the Marlim Leste field in the Campos Basin offshore Brazil. Reserves are put at 150mn barrels.\*

Repsol YPF has exercised an option to acquire an additional 20% interest in BP assets in Trinidad and Tobago, raising its total stake to 30%.\*

El Paso Corporation is understood to have made its first significant oil and gas discovery in Brazil's BM-Cal-5 block.\*

#### Africa

The Multilateral Investment Guarantee Agency of the World Bank is providing investment guarantees worth \$72mn to Sasol of South Africa, reports Keith Nuthall. The funds will be invested in the development of gas fields in Mozambique, including the construction of a central processing facility and an 865-km cross-border gas pipeline.

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## UK

Shell has reported 4Q2002 earnings of \$2.8bn, up 46% on a year ago. Full-year 2002 profits fell, however, by 23% to \$5.6bn.

## Europe

Italian company Enel is to become a 50% shareholder in BG's Brindisi LNG project in Italy. The €330mn, 6mn tly LNG project is due to be commissioned in 2007.\*

## North America

Calgary-based Enbridge is considering a C\$3bn stand-alone pipeline project from Alberta to the British Columbian coast, reports Monica Dobie.\*

Marathon Oil has set a \$2bn expenditure budget for 2003 and is planning to sell some \$400mn in non-core assets\*

Bechtel Enterprises Holdings, the last backer of California's \$1.5bn Mare Island LNG terminal is reported to have pulled out of the project following Shell Gas & Power's withdrawal.

US dependence on oil imports will grow over the next 22 years, according to the US Department of Energy, reports Philip Fine. It predicts that petroleum imports, which accounted for 55% of total national demand in 2001, could, by 2025, reach 65%-70% of demand.

ExxonMobil has reported a 4Q2002 net profit of \$4.09bn, up from \$2.68bn a year earlier, while ConocoPhillips posted a loss of \$410mn after taking charges to account for service station sales and restructuring after its merger. Petro-Canada posted a 440% increase in income to \$356mn, the massive rise primarily attributed to higher energy prices, although the company also gained from its acquisition last year of the international assets of Veba Oil & Gas. Amerada Hess reported a net loss of \$371mn and is to take a \$530mn after-tax writedown on its Ceiba field investment in Equatorial Guinea, while Occidental Petroleum reported a profit of \$322mn compared with a net loss of \$247mn in 4Q2001. Marathon posted a net income of \$194mn for the quarter, Anadarko Petroleum a rise in earnings to \$309mn, and Murphy Oil a net income of \$57.6mn. Imperial Oil more than doubled 4Q2002 profit to \$454mn.

## Russian companies look to secure export routes

Russian oil companies whose production is growing are proposing new ways of raising their export capacity, reports UFG. In particular, they suggest that one pipeline that ships the Siberian Light blend from Western Siberia to the Tuapse port on the Black Sea would be capable of shipping more crude if the Siberian Light were to be mixed with Urals crude.

It is understood that in a letter that was signed by the CEOs of Yukos, TNK, Surgutneftegaz and Sibneft and sent to Deputy Prime Minister Victor Khristenko it is stated that higher utilisation of the pipeline would allow exports of crude to increase by 300,000 b/d. Changing the profile of the pipeline would, however, require some modifications and the approval of the Russian Government.

Looking to secure other export routes, Lukoil, Yukos, TNK, Sibneft and Surgutneftegaz are reported to have sent another letter to the Russian Government in a bid to force the acceptance of the proposed Murmansk pipeline project. Some analysts suggest the letter may have been provoked by the recent announcement by Prime Minister Mikhail Kasyanov that trunk pipelines will remain under the government's control.

The five oil companies are willing to

either build the pipeline independently (which, according to UFG, contradicts the government's view on this important strategic sector) or provide guaranteed throughput volumes and investments. In the latter case, however, the companies are demanding changes to pipeline legislation that would abolish the equal access principle as well as a new tariff-setting mechanism for pipelines that would take private investments into account.

In the letter the Murmansk project is described as a panacea that would provide vital additional export capacity of between 1.6mn to 2.4mn b/d for situations such as the current one, in which Russian oil production has rapidly increased. At the same time Transneft awaits a government decision on the expansion of the Baltic Pipeline System from its current 240,000 b/d capacity to 600,000 b/d (and to add a further 1mn b/d in the distant future).

Russia will not produce enough crude oil to fill both pipelines in the medium term, if ever, comments UFG. Moreover, the analyst points out, the Transneft project does not require the government to make any changes to trunk pipelines legislation or to surrender control over this sector.

## Vernolab acquires BP Castrol lab



Vernolab, the oil condition monitoring specialist laboratory, has acquired the business, assets and staff of BP Castrol's laboratory at Stanlow, Ellesmere Port, Cheshire, for an undisclosed sum. As well as providing BP and Castrol heritage customers with services, the laboratory will continue to provide quality control testing to the manufacturing plant at Stanlow on an 'arms length' basis. Vernolab plans considerable investment in both IT systems and laboratory equipment and is expecting to soon announce a number of new client contracts.

## Call for 'step change' in UK Government

The UK Government must make achieving a radical reduction in carbon dioxide emissions the primary aim of its energy policy if it is to meet long-term climate change objectives according to a report published by the Institute for Public Policy Research (IPPR).

The Generation Gap report argues that a revolution in political commitment is needed if a low carbon economy is to be achieved at least cost by the end of this century. The government must prioritise energy efficiency above all, despite existing formidable barriers to the rollout of state-of-the-art energy saving technologies.

The report's findings also suggest that a strong commitment to renewable energy will help to reduce gas import dependency. As such, the government

should use the forthcoming Energy White Paper to announce a target of 25% of electricity to come from renewable sources by 2020, says IPPR.

Alex Evans, IPPR Energy Research Fellow, warns: 'Targets alone are not enough. The government is way off track in meeting its goal of a 20% reduction in carbon dioxide emissions by 2010. A step change in delivery will be needed to achieve the UK's climate change objectives in 2020. Building more nuclear power stations – which are less cost effective than renewables, open to security risk and still pose the unsolved problem of nuclear waste – would do more harm than good. Instead the government must commit to the long and difficult transition to a completely safe and sustainable energy system.'

## Lukoil unveils plans for 2003

Lukoil produced 78.2mn tonnes of oil in 2002, up 2.2% on 2001, while gas production rose to 5.1bn cm (including 3.9bn cm of associated gas). The company's resource base increased significantly on the year, rising to 196mn toe. Some 10 new fields and 16 hydrocarbon deposits were found, the replacement ratio of 2.5 times being the highest since the company's founding.

Throughput at gas processing plants reached 2.4mn tonnes of NGLs, 2.2% higher than in 2001, while throughput at Lukoil's own refineries amounted to 41.5mn tonnes, up 9.2%. The company's petrochemical plants produced over 1.6mn tonnes products, up 34% on 2001 production. Oil exports increased by 4.9% on the year, reaching 34.3mn tonnes.

The company is targeting an additional 150mn tonnes of hydrocarbon reserves in 2003 in order to replace production and prepare the resource base for large-scale oil and gas production in the Northern Caspian, Nenets and Yamal Nenets Autonomous Districts. It is also targeting production of over 80mn tonnes of oil and 5.7bn cm of gas. Refining throughput is forecast to rise to 44.5mn tonnes. Capex for the year has been put at \$2.4bn.

## Latest news from Russia and Central Asia

Stella Zenkovich reports on recent industry developments in Russia and Central Asia:

- Gazprom's tolerance for Itera, the Russian gas trader associated with the previous Gazprom management, appears to be subsiding. Hungry for funds and squeezed by low domestic gas prices, Gazprom is moving to recapture CIS markets – following its clamping back of subsidiaries Purgas and Zapsibgazprom – hitherto the near-exclusive domain of Itera. Although the company is targeting supplies to Azerbaijan, Belarus, Georgia, Kazakhstan, Ukraine and the Baltic states, analysts believe it is not aiming to squeeze out Itera alto-

gether, but looking for outlets for seasonal surpluses to avoid storage charges and keep its gas fields pumping all year round.

- Gazprom and Lukoil are proposing the reconstruction of the gas pipeline supplying Kaliningrad, Russia's Baltic enclave, and to develop production facilities. Plans include raising local oil extraction to 1.4mn t/y.
- Construction of OMV's 'TAG Loop 2 Phase 3' project – a 119-km, \$200mn onshore gas pipeline carrying Russian gas from Baumgarten in Lower Austria to gas markets in Austria, Italy, Slovenia and Croatia – was scheduled to start in February and to complete in December 2003.

Want to know the latest rig count from Baker Hughes?  
Visit the IP website home page @ [www.petroleum.co.uk](http://www.petroleum.co.uk)

## In Brief

### Middle East

*Lukoil is understood to have confirmed plans to supply National Iranian Oil Company with up to 1mn t/y of crude oil from March 2003. Iran is hoping to increase imports of Caspian oil to as much as 500,000 b/d.\**

*Gazprom has signed a Memorandum of Understanding with the Pakistani Ministry of Petroleum and Natural Resources for conducting a feasibility study for the construction of a \$3.5bn gas trunk pipeline from Iran to India across the Pakistani shelf in the Arabian Sea, reports Stella Zenkovich.\**

*Japanese company Chiyoda and Foster Wheeler of the US have been contracted to establish a third train at the Oman LNG facility at Qalhat. The 3.8mn t/y train is to be commissioned by the end of October 2005, with the first cargo to be exported to Union Fenosa of Spain in January 2006.*

### Russia & Central Asia

*Sibneft revenues from oil and gas sales rose by 40.2% to \$4.835bn in 2002, up from \$3.449bn the previous year.\**

*Shareholders of Eastern Oil Company (VNK) have approved the company's merger with Yukos, reports UFG.*

### Asia-Pacific

*South Korea, the world's fourth largest oil importer, is reported to have cut oil import taxes by 43% amidst fears that the breakout of war in Iraq could send oil prices soaring. The tax was previously set at approximately \$0.5lb.*

*The North West Shelf LNG Sellers have signed a 24-year contract with Shizuoka Gas for the supply of LNG, peaking at 135,000 t/y. First deliveries are expected in 2005.*

### Africa

*The Nigerian Federal High Court in Lagos has endorsed the merger of Unipetrol Nigeria and Agip Nigeria.\**

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UK

Researchers based at the University of Warwick's Warwick Process Technology group are leading a programme called 'Hydrofueler' that aims to connect service stations to the normal natural gas supply in order to fuel hydrogen-powered vehicles. The €2.8mn EC-funded research programme has already drawn interest from ExxonMobil and BMW. For further information, e: Ashok.Bhattacharya@warwick.ac.uk

Pembrokeshire County Council is reported to have given Petroplus its consent for the construction of a new gas storage depot near Milford Haven. Final approval for the project is expected in June, but is dependent on Transco extending its pipeline as far as Milford Haven. The depot will store the equivalent of 5% of total UK gas demand.

Power stations and other electricity generators are reported to have accounted for more than half of the gas sold in the UK during 3Q2002, according to the UK Department of Trade and Industry.

The International Petroleum Exchange (IPE) reports that, for the first time in its history, January 2003 saw it trade over 3mn contracts for the month, representing an underlying value of over \$95bn. The monthly total of 3,274,809 contracts eclipsed the previous record of 2.89mn contracts set in October 2002, with IPE Brent Crude futures, IPE Gas Oil futures and IPE Natural Gas futures all achieving new monthly volume records.

UK energy regulator Ofgem has outsourced statutory inspections and approvals of gas and electricity meters to auditing and inspection company SGS UK.

Following a review of Shell's main fuel distribution arrangements in the UK, Shell UK Oil Products and Wincanton have decided to end their current contract that covers the supply of fuel to Shell's 1,100 service stations as well as to over 3,000 marine, aviation and commercial customers. The fuel supply contract was originally signed with P&O Trans European, which was taken over by Wincanton in January 2003.

EnMO, claimed to be Europe's largest prompt gas exchange, reports that it

## Fortum and E.On agree major asset swap

Fortum and E.On have agreed asset swaps worth nearly €800mn that will allow the former to strengthen its position in the core business areas of the Nordic countries and the Baltic rim. Under the deal Fortum is to acquire 21.4% of the shares in Hafslund, the second largest electricity company in Norway, as well as all the shares in Norwegian utilities Ostfold Energi Nett, Ostfold Energi Kraftsalg and Ostfold Energi Entreprenor, and 49% of Fredrikstads Energi. Fortum is also to

acquire 9.3% of Lenenergo, the largest utility company in northwest Russia, increasing its total share to 15.7%.

In return, Fortum is to sell its power plants in Burghausen, Germany, and Edenderry in Ireland to E.On. E.On will also acquire the shares and business of Fortum Distribution Smaland, an electricity distribution company in southern Sweden.

To balance the swap Fortum will pay a total consideration of 150mn euros to E.On.

## Downstream Russia and Central Asia

Stella Zenkovich reports on recent developments downstream Russia and Central Asia:

- The Russian Customs Committee has harshly criticised neighbouring Poland for limiting without advance notice the duty exemption on fuel oil – 40% cheaper in Belarus – to 52 gallons (200 litres) in line with EU regulations, causing massive backup queues of tankers at the border. Many entrepreneurs had been making a living by hauling fuel into Poland in tanker trucks of 240 gallons capacity. Caught at the border they are having to pay unexpected fees or turn back.
- INA's planned refinery upgrades will restore balance in the Bosnian fuel market, where the Croatian oil company's market share dropped significantly following the government's introduction of stricter petrol standards, according to CEO Tomislav Dragicevic.
- Lukoil is planning to considerably increase LNG exports to Poland after a major gas terminal goes into operation within 17 months in the Guriiev district of Kaliningrad.
- MPs of the Albanian Parliamentary Committee on Finance and the Economy in Tirana have been protesting against a government attempt to stimulate oil and gas exploration and development projects in the country through the abolition of fuel excise duties.

## FTA calls for EU diesel tax harmonisation

The UK Freight Transport Association (FTA) has called for the House of Lords European Union Sub-Committee inquiry into diesel tax harmonisation to recognise the wider implications which diesel tax differences have on UK competitiveness. In its evidence FTA highlights the problems already faced by UK transport operators, particularly at a time when economies are converging under one currency and cross-border competition is increasing.

Simon Chapman, FTA Chief Economist, said: 'It is essential that any proposals on tax harmonisation recognise the need for the implementation of Lorry Road User Charging (LRUC) as well as the problems that are likely to occur with the accession of new member states from eastern Europe which benefit from very low levels of fuel tax.

'A lower single diesel duty rate

alongside LRUC in the UK would go some way to address problems of unfair competition currently faced by UK based road freight operators. As we have seen, the premise that high levels of duty reduces vehicle utilisation and the level of pollution from lorries simply does not stand up as fuel efficiency is the main driving factor in vehicle manufacturing and logistics management.

'High levels of fuel duty have not forced freight onto rail either – an issue further highlighted by the recent announcement from the SRA of the withdrawal of rail freight facilities grants and track access grants. Rail freight problems stem from an inherent weakness in the ability to meet customer needs for flexible supply chains rather than fuel duty levels.'

### UK pre-tax unleaded petrol is cheapest in EU

The average pump price of unleaded 95 octane petrol, excluding duty and VAT, on the UK's forecourts was the lowest amongst major EU countries during 2002, reports the UK Petroleum Industry Association (UKPIA).

Opal (Oil Price Assessments Ltd), a leading European energy information company specialising in the downstream sector, monitored major brand pump prices across 10 EU member countries. Data collected revealed that the UK average pre-tax pump price of unleaded 95 petrol was a full 1 p/l cheaper at 16.6 p/l than the next lowest countries, France and Germany on 17.7 p/l.

The UK was also second cheapest pre-tax for diesel, averaging 18.3 p/l compared with 17.9 p/l in Germany and 18.4 p/l in France.

Malcolm Webb, UKPIA Director General, commented: 'This data from Opal underlines just how competitive

fuel retailing is in the UK. Pre-tax pump prices have been consistently amongst the lowest in the EU over the last six years. At the same time, our members have introduced cleaner low-sulphur fuels well ahead of the EU mandated deadlines, which combined with new engine and exhaust clean-up technologies, have made a significant contribution to reduced exhaust emissions.

'Competition in fuel retailing is also reflected in the level of gross margin on each litre of petrol sold – the difference between the selling price of petrol and the open market cost – which, Opal figures show, averaged just over 4 p/l in 2002. This compared with close to 7 p/l in 1992. The gross margin is not the profit available to a retailer but represents the sum available to cover costs such as transporting fuel from a refinery, marketing and promotion, and operating a filling station.'

### Faster fuelling

Shell reports that 12 service station sites in Finland and France have been converted into Shell Express unmanned outlets, where customers pay for fuel at the pump using debit or credit cards. If the pilot scheme proves successful, the company hopes to roll out unmanned service stations across Europe.

Since its launch in June 2002, the Shell Express initiative has achieved significant increases in fuel sales. At the Lahti site in Finland, for example, there was a 300% rise in fuel volume, states the company, while in France the sites are reported to have attracted customers from hypermarkets more quickly than expected.

Shell claims that it takes just three minutes to fill a vehicle at one of its Shell Express stations, compared to an average of six minutes at a traditional outlet.

### Cutting gas-guzzling

Two Californian Senators are reportedly planning to introduce legislation aimed at controlling sales of fuel-guzzling sport utility vehicles (SUVs) in the state. Senator Barbara Boxer is proposing to close a tax loophole that currently allows small businesses to deduct up to \$25,000 from the purchase price of such vehicles, while Senator Dianne Feinstein wants to force SUVs and light trucks to meet the same fuel efficiency standard of 27.5 miles/gallon (m/g) that passenger cars will have to meet over the next nine years.

US President Bush, meanwhile, has proposed expanding the tax write-off for SUVs to \$75,000 as part of tax cut plans aimed at stimulating the US economy, and has called for the annual mileage requirement for such vehicles to be increased by 1.5 m/g to 22.2 m/g by 2007.

### OMV on track for forecourt expansion

OMV has acquired 313 Aral and BP service stations in southern Germany (247 sites), Hungary (55) and Slovakia (11) from Deutsche BP, increasing its total Central and Eastern European network to 1,615 outlets. It has also acquired a 45% stake in Bayernoil, a network of three refineries in the Ingolstadt area, and an 18% interest in the Trans Alpine Pipeline (TAP) from Trieste to Bavaria. The purchase price of €377mn is to be financed through debt. The deal meets OMV's strategic target of achieving a 10% market share in Bavaria and is in line with plans to double the company's size by 2008.

OMV has also opened its first nine service stations in Bosnia-Herzegovina as part of its programme to achieve a 20% market share in the region's fuel retail market by 2008. It currently holds a 3% market share and is planning to invest up to €70mn to build a further 70 outlets. The service station network will be operated by Interoil, a newly established company in which OMV holds a majority stake.

has 'seen huge volumes of trading' on its EnEx Gas Physical Futures (GPF) market since its launch in 4Q2002, trading over 25mn therms in November and December. EnMO's GPF market facilitates strip product trading for weekend, balance of week and working days next week, whilst also allowing single day contracts to be traded seven days ahead.

#### Europe

ICF Consulting has released a new multi-client study that illustrates how the different choices made by each EU country regarding emissions permit allocation plans will drastically affect power plant asset values and the competitive landscape in the European power sector from 2005. For more information about ICF Consulting, visit [www.icfconsulting.com](http://www.icfconsulting.com)

Tigaz, controlled by Eni subsidiary Italgas, has acquired from Mol controlling stakes in Hungarian gas distributors Mol-Gaz, Zsamberkgaz, Gerecsegaz and Turulgaz in a deal valued at 80mn euros.

The way is reported to have been cleared for German utilities company E.ON to acquire gas distributor Ruhrgas for €10bn after nine companies withdrew their objections to the takeover which they declared would make the German energy market uncompetitive. It is thought some form of out-of-court deal has been agreed.

#### North America

Shell Pipeline Company is planning to sell the majority of its onshore crude pipeline systems in the US, which are reported to 'no longer play a key role in Shell's integrated plan'.

ConocoPhillips has acquired Amerada Hess' 1.5% stake in the Trans Alaska Pipeline System (TAPS), bringing its total share to 28.2%.

#### Middle East

Saudi Aramco is reported to be planning to increase refining capacity by 200,000 b/d to 2mn b/d when its Ras Tanura Khuff project completes later this year.

Technip-Coflexip has secured a \$674mn contract from Qatar Petroleum and Sasol of South Africa to

## In Brief

design and build a gas-to-liquids complex at Ras Laffan in Qatar. First production is slated to begin in late 2005.

### Russia & Central Asia

Gazprom and Bulgaria are understood to be planning to draft a new agreement on gas transit through Bulgaria to southern Europe and Turkey after 2010, the year in which the current contract expires.

### Asia-Pacific

BP is reported to be planning to build 1,000 service stations in China by 2007. It has already established hundreds of outlets in Guangdong Province with joint venture partner PetroChina.

### Africa

The UN Environment Programme says that within five years most African countries will be close to phasing out leaded petrol, writes Keith Nuthall. Egypt, Libya, Mauritius and Sudan are already lead-free, and are to be joined this year by Morocco, Reunion and Tunisia. A further 22 countries, including Eritrea, Ghana, Kenya, Nigeria, South Africa, Togo and Uganda have, or are drawing up, action plans to phase out leaded fuel by 2005–2006.

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# NEWS Downstream

## Police and supermarket fuelling firsts



Wiltshire's Chief Inspector Dave Bennett (left) fills up with GlobalDiesel, watched by Fleet Manager Steve Botham

Wiltshire Constabulary has set a new environmental standard for police forces across the UK, having recently taken its first delivery of Greenery GlobalDiesel – a blended fuel made with ordinary ultra-low sulphur diesel and a 5% blend of biodiesel. The GlobalDiesel fuel can be used immediately in any diesel vehicle without any costly modifications or impact on manufacturers' warranties, states Greenery. Furthermore, tests are reported to have shown improved fuel consumption by up to 1%, a guaranteed 5% reduction in emissions of carbon dioxide and up to 20% less particulate emissions.

The Wiltshire Constabulary's 350-strong vehicle fleet clocks up an average annual mileage of more than 5mn miles. Stephen Botham, Fleet Manager for Wiltshire Police said: 'We are committed to improving the environmental performance of the Force whilst maintaining and improving standards of service. Moving to Greenery GlobalDiesel allows us to take action today to reduce our fleet's emissions of greenhouse gas carbon dioxide while continuing to explore zero emission technologies for tomorrow.' The Force is also trialling LPG-fuelled and electric vehicles as well as increasing the number of foot and bicycle patrols.

More recently, Sainsbury's has become the first UK supermarket to sign up for supplies of Greenery's GlobalDiesel fuel at its Greenwich store. The supermarket believes that if every diesel vehicle in the UK switched to GlobalDiesel total emissions savings would be the equivalent of taking over 200,000 cars and vans off the road. Sainsbury's will be selling the fuel at the same price as ordinary diesel.

### UK Deliveries into Consumption (tonnes)

Products	†Dec 2001	†Dec 2002	†Jan–Dec 2001	†Jan–Dec 2002	% Change
Naphtha/LDF	151,205	210,738	1,570,544	1,578,456	1
ATF – Kerosene	675,728	883,501	10,164,987	10,383,625	2
Petrol	–	–	–	–	–
of which unleaded	1,672,836	1,565,288	20,015,146	19,394,498	–3
of which Super unleaded	44,050	77,816	432,475	626,446	45
of which Premium unleaded	–	–	5,465,882	–	–100
ULSP (ultra low sulfur petrol)	1,628,786	1,487,472	14,116,789	18,768,052	33
Lead Replacement Petrol (LRP)	58,051	21,980	873,775	509,786	–42
Burning Oil	423,146	483,175	4,381,133	3,859,322	–12
Automotive Diesel	1,391,508	1,319,756	16,143,301	16,948,757	5
Gas/Diesel Oil	520,277	525,531	6,229,665	6,060,124	–3
Fuel Oil	183,169	226,532	2,028,324	1,984,530	–2
Lubricating Oil	83,444	67,657	926,078	800,988	–14
Other Products	598,250	619,740	7,597,217	8,045,597	6
Total above	5,757,614	5,923,898	69,930,980	69,565,683	–1
Refinery Consumption	456,895	337,888	5,007,341	4,792,311	–4
Total all products	6,214,509	6,261,786	74,938,321	74,357,994	–1

† Revised with adjustments

All figures provided by the UK Department of Trade and Industry (DTI)



# Seismic's scant reward for technology success

The geophysical services industry continues to surprise with the pace and variety of its technology innovation for E&P operations around the world. But its contribution has come at a price, reports *Andrew McBarnet*.\*

Looking around at today's carnage amongst the main geophysical contractors serving the E&P industry worldwide, it is hard to believe the extraordinary technological achievements attributable to the seismic business. The current snapshot of misfortune would include WesternGeco's closure of its North American land seismic operations, the virtual bankruptcy of Petroleum Geo-Services (PGS), the restructuring and sell-offs at Compagnie Generale de Geophysique (CGG) and the profit warnings from Veritas DGC.

In retrospect, a cocktail of circumstances – some of its own choosing, for example chronic over-capacity – caused the geophysical services industry to overdose on technical ingenuity at the cost of economic sense. During the 1990s the seismic business responded in spades to demand from the E&P oil and gas companies to reduce costs. The decade witnessed the introduction of a raft of stunning cost-saving innovations

affecting every aspect of seismic activity, including acquisition of data, processing, visualisation and interpretation, and even data management. The catch for the geophysical services providers was that too many companies were chasing a shrinking oil industry market. As a result oil companies were able to squeeze the seismic sector on costs. To add insult to injury, oil companies under shareholder pressure to consolidate, downsize and outsource effectively transferred much of their R&D costs to the service sector, expecting it to come up with the new cost-saving ideas.

Oil companies acknowledge the debt they owe to new seismic developments. Andrew Mackenzie, at the time Group Vice President, Technology at BP Amoco, told the annual meeting of the International Association of Geophysical Contractors (IAGC) in 1999: 'No part of the industry has improved its performance and productivity more than yourselves in the past 10 years. No part of the industry has contributed more to the quantification of risk, the increases in recovery factor and the reduction in cost multiples. No part of the industry has leveraged its performance more both via the pull-through of enabling technologies from other industries and the initiation of its own technical breakthroughs.' Mackenzie followed this with the kicker – 'and now we need to go even faster.'

## Industry plight

Recognition that things had got out of hand came with last year's frantic lobbying by the IAGC to explain the industry's plight. Some companies such as BP, which had been aggressive in its purchasing decisions in the past, offered a life raft of sorts to the main seismic contractors in a memorandum of understanding agreed last year. The agreement was designed to ensure some continuity in ordering of seismic services to mitigate the effect of the oil industry business cycle.

Awareness of the problem has yet to translate into an improved business climate, yet the progress of technology in the geophysical services sector continues to shine brightly, comparable with advances you might find in more glamorous fields such as space research and medicine.

## Change of focus

The focus has definitely changed, from exploration seismic to reservoir geophysics. In the 1990s the biggest advances came in marine seismic, transformed by the competition created by Petroleum Geo-Services when it introduced the Ramform design vessel with its massive advance in productivity

and by impressive improvements in the processing turnaround of survey data results.

The task PGS and subsequently other marine seismic contractors set themselves was to make large volume, high resolution 3D surveys the affordable norm for oil company exploration budgets. Through the development of new vessels with increased streamer towing capacity, onboard data processing, satellite communications, and improved navigation and positioning, they provided the equipment and the improved turnaround necessary, while the marketing of 3D seismic surveys on a multi-client basis helped to make them accessible to the widest possible customer base.

If you ask any seismic contractor these days they'll tell you that the reservoir is where it's at. This is because oil companies have come to realise, firstly, that the most economic route to new reserves will come not from exploration but from known structures and existing reservoirs, and secondly, that advances in seismic imaging over producing reservoirs can be very helpful, ie cost effective, in optimising hydrocarbon recovery strategies. This is why 4C (or multi-component) and 4D seismic are the hot button words of the moment, and why there is much talk of integration meaning a multi-disciplinary approach to reservoir production and monitoring that includes geoscientists working alongside petroleum engineers. In fact the seismic community is becoming to be regarded as a vital component to every stage of the oilfield life cycle.

## Technology in its infancy

Today the potential of multi-component and 4D survey operations is still in its infancy. Up to now 4C has been developed mainly as an ocean cable technology, although CGG has demonstrated that the strategic placing of recoverable nodes on the seabed will work. The multi-component refers to the fact that the recording system in the cable is made up of a hydrophone and three geophones that enable both P-wave (pressure) and S-wave (shear) data to be recorded. Conventional towed streamers using hydrophones only measure P-waves, which suffer from limitations when imaging difficult settings such as complex fault zones, below salt domes and shallow gas. Recording both compressional and shear waves provides a solution and also enables geoscientists to analyse reservoir lithology and fluid content. However, the data acquisition has to be carried out on the seabed and this restricts the scope of any survey to targeted areas. Water depth is also an issue because the cable has to be con-

nected to a surface vessel during the shooting of a survey.

The smaller scale of 4C operations has had the effect of attracting new operators into the market, notably from Norway where such companies as Multi-Wave Geophysical and InSeis Terra are offering this specialised service with some success. These two companies have also worked with another Norwegian company – ElectroMagenetic GeoServices – carrying out the first non-exclusive survey using Sea-Bed-Logging. This is a remote sensing technique that uses a mobile electromagnetic source and an array of seafloor electric field receivers to measure resistivity and is regarded as a useful addition to seismic for detecting and characterising hydrocarbon reservoirs in deepwater areas.

PGS can probably claim to have as much 4C survey experience as anyone, and claims that its FORCE seafloor seismic acquisition system is the only one able to operate in water depths greater than 1,000 metres. Acquisition involves one recording and handling and one shooting vessel. To overcome the depth limitation of 4C acquisition systems and in anticipation of deeper water exploration and production, a German company – OBS-Systems – in association with the Research Centre for Marine Geosciences (GEOMAR) has been working on a self-landing and ascending ocean bottom seismic system based on technology used by the ocean science research community for many years.

In some respects 4D seismic has not developed as expected since BP and Schlumberger in 1997 pioneered buried cable in the seabed over the Foinaven field, northwest of Shetland, in order to carry out repeatable 3D surveys over the reservoir to monitor its performance. Although buried cable may be the ultimate solution, recent work has focused on improving the quality and resolution of towed streamer technology so that new surveys can be compared with legacy data. Partly with this in mind, WesternGeco has staked a great deal on the success of its Q-Marine system, the outcome of 10 years' research by Schlumberger.

The distinctive characteristic of the Q system, which has applications for land and borehole seismic, is that it records data from closely spaced single sensors as opposed to clusters of sensors in conventional systems and as such addresses the problem of noise in seismic acquisition. Variations in source characteristics and receiver sensitivity, swell noise from wave action, and positioning errors associated with receiver groups are all said to be minimised or suppressed. In addition to the improved resolution and bandwidth, Q-Marine is designed to deliver properly calibrated data for 4D

time-lapse analysis of reservoir fluid movement. WesternGeco has begun to publish results from Q-Marine, which are regarded in the industry as impressive but costly. Competitors argue that similar effects can be achieved more cheaply, and also point to the well-publicised difficulties WesternGeco has had with Q-Land.

### Solid streamer future

Virtually everyone is now convinced that the solid cable is the future as far as conventional towed streamers are concerned. The competition is between Thales Underwater Systems and the CGG company Sercel which both produce solid streamer designs that are gradually catching on with the marine seismic contractors. Solid streamers are basically more robust and offer increased noise attenuation compared with conventional fluid filled cables during periods of marginal weather. They are not affected by so called bulge waves caused by the pulling of the vessel and the sea on the streamer,

Compared with marine seismic acqui-

sition, land seismic has not undergone any great changes. The problems of equipment, logistics and safe operations in a multitude of environments have still to be fully addressed and in the currently depressed market the investment in new technology is limited mainly to Sercel and Input/Output, the dominant manufacturers of recording units. For transition zone, shallow water and land, Fairfield Systems came out three years ago with The Box, a cable-free recording system based on radio technology, which has had some success, particularly in the Russian and Chinese markets. A UK start-up company Vibtech, based in Scotland, has been developing something similar using cellular radio technology.

### Computer-based technology

Much of today's sophistication in the geophysical services industry is actually reserved for computer-based technology. This starts with the super-computing involved in modern seismic data processing, which has increasingly

become an interpretive task in its own right. The most conspicuous example would be prestack depth migration (PSDM), which was once purely the domain of the majors and larger independents working in the highest risk, highest cost plays such as the subsalt deepwater Gulf of Mexico. But GXT, a Houston-based specialist, is to be believed when it says that improvements in the price-to-performance of super-computing has made the technique accessible to other companies working on a variety of projects where the highest fidelity image of the subsurface is required to reduce drilling risk.

When it comes to understanding the reservoir using software solutions and services, all the major companies in the field – such as Landmark Graphics, Schlumberger Information Systems and Paradigm – now offer integrated E&P workflows to accommodate every stage of the exploration and production process with a continuous release of updates. But niche companies abound. The role of rock properties in the modelling of reservoirs is a hot topic right now, with companies such as Rock Solid Images, Ødegaard and Jason Geosystems providing a market. Visualisation of data both for data interpretation but also for asset team collaboration has probably attracted more than its fair share of attention, partly because the 3D images now possible in an immersive environment are so exceptionally vivid. Even so, many eyebrows were raised when Halliburton and its subsidiary Landmark paid the best part of \$100mn for Magic Earth, which specialises in high volume data visualisation and interpretation solutions. Industry observers wonder whether the immersive environment is worth the money and effort when there are cheaper alternatives provided by visualisation centres in most oil cities around the world. Significantly Magic Earth itself has now come out with a scalable desktop visualisation solution.

### Looking ahead

Down the road, the vision for the seismic industry may well be the so-called instrumented oil field where every form of monitoring is hooked up to the reservoir, including effective seismic equipment in the borehole to produce more accurate information. Hopefully this and other technology challenges will still appeal to an industry that may need some incentives to carry on its current pace of innovation. ●

*\*Andrew McBarnet is Publishing Editor of First Break, the monthly publication of the European Association of Geoscientists and Engineers.*



# Waiting for a new dawn

Economic crisis, the election of populist leaders, strikes, violence and a broadening social polarisation continent-wide has combined with a dearth of large new discoveries and an increasing role of the state in the energy sector to project a doom-laden image for oil and gas investors in Latin America. Risk-averse companies may choose to wait for calmer times, but in countries where oil output is falling exploration opportunities are there for those willing to gamble. Meanwhile, the past decade of gas industry expansion has come under serious scrutiny. *Maria Kielmas* reports on the latest Latin American developments on a country-by-country basis.

## Argentina

A 70% devaluation and emergency economic legislation in January 2002 – which switched the denomination of public utility tariffs from US dollars to Argentine pesos – placed oil and gas producers at the very forefront of Argentina's economic crisis. The imposition of oil and gas export taxes of 20% and 5% respectively set the industry against the interim government of President Eduardo Duhalde, with the industry eventually winning a battle against proposals by congressional legislators to oblige oil and gas companies to keep all their export earnings inside Argentina. As a result, foreign companies will be allowed to keep to the present rule that allows them to remit to their domiciles 70% of their export earnings from Argentine production.

However, the government remains split while foreign and national companies continue to fight each other over the increasingly sensitive issue of utility tariff reform. Companies have been pushing for rises of between 10% and 50%, supported by the International Monetary Fund (IMF). But both local and federal courts have twice ruled that tariff rises cannot be implemented without an overall revision of each individual concession.

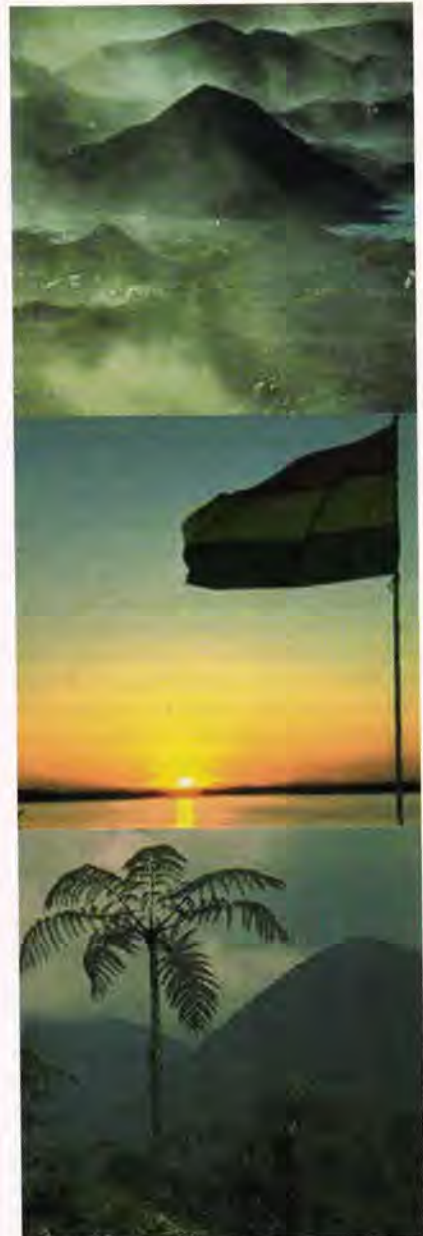
The government complicated the matter further in late 2002 by permitting a partial liberalisation of wellhead gas prices. These were laid down unofficially by the previous government at \$1.30/mn Btu. In theory wellhead gas prices were free but this price was the highest producers could pass through to buyers. Following the devaluation prices translated roughly as 36 cents/mn

Btu, which the government wanted to increase to the peso equivalent of 70 cents/mn Btu. However, industrial gas buyers are unwilling to pay such higher tariffs. Furthermore, low gas prices have already led a TotalFinaElf-operated group to suggest that it will probably not drill further wells on the Carina and Aries blocks offshore Tierra del Fuego, where the optimists have estimated reserves could be over 5tn cf, until the energy situation clarifies.

Smaller foreign operators have been trying to buy up exploration acreage from distressed local companies. However, the government has cast another pall on the sector by questioning the \$1.2bn purchase by Brazil's Petrobras of a controlling state in Pecom Energia, the energy arm of the Pérez Companc group. Upstream interests are not the concern, rather the new buyer's dominant position in gas and electricity transmission. Petrobras has since announced that it hopes to buy up 100% of Pecom Energia, although it will not increase its holdings in gas and power transmission.

## Bolivia

The Bolivian Government continues to delay a final decision on the location of a LNG export terminal. Popular opinion in the country is firmly against a Chilean export terminal unless Chile restores some of the coastal territory that Bolivia lost in the 19th-century Pacific war. Meanwhile, investors argue that an export route via a Peruvian port, the only other option, is much less economic than the Chilean solution. In January 2003 the government commissioned a fourth independent report on



Bolivian landscapes

the issue, this time from the Port of Rotterdam authorities. Nevertheless, Pacific LNG, the project operator, is negotiating a gas supply contract with US firm Sempra Energy International, with the aim of signing a contract as *Petroleum Review* went to press.

The future of Bolivian gas exports to Brazil remains uncertain. Exploration companies underspent their 2002 exploration budget because of poor Brazilian gas demand. Gas exports fell off as Brazil's gas-fired power generation programme was shunned by investor doubts while dollar-denominated, oil

price-linked gas prices in Brazil made gas the most expensive fuel.

Approximately 60% of the Bolivia-Brazil gas pipeline's 30mn cm/d throughput capacity lay idle in early 2003. The new Brazilian Government has signalled that it hopes to renegotiate the gas supply contract with Bolivia, although Bolivia should not expect an increase in gas exports.

## Brazil

The election of Luiz Inácio Lula da Silva ('Lula') as President signals a radical reversal of Brazil's energy sector liberalisation. The roles of regulator agencies for oil (ANP) and electricity (Aneel) will be changed from ones of independence and policy initiatives to becoming essentially divisions of the Energy and Mines Ministry. Under current plans their roles will be to carry out the directives of government and not make decisions on fuel prices or policies, or to award oil exploration or other concessions.

This has brought doubts about the planned fifth exploration round that was due to take place in June 2003. In contrast to previous rounds, the fifth round was to provide initiatives for smaller companies – although some smaller operators complained that even the new terms would be prohibitively expensive. In addition, a new bidding system would have allowed companies to define the minimum exploration programme for the areas they chose.

The four previous rounds have only brought a limited exploration success. However, Shell is set to become the first foreign oil producer in the country when its Bijupirá and Salema fields in the Campos Basin come onstream in 1H2003. Reserves are estimated at a combined 330mn barrels and are expected to produce at some 70,000 b/d. Petrobras, meanwhile, believes its block B-60 discovery in the Campos Basin could become the country's fourth largest oil field if its estimated 300mn barrels of reserves are connected to the recently discovered Jubarte field, which holds 600mn barrels.

The new government is also expected to enforce contractual obligations on foreign investors to choose Brazilian goods and oilfield services. This has coincided with an intense lobbying effort by local companies for more offshore platform construction at home. Petrobras has been the main object of criticism on this score and the company has twice delayed a tender for two platforms, P-50 and P-51, destined for the Campos Basin. In the past the company has preferred to contract overseas companies for platform construction, arguing that local industry does not have sufficient qualified manpower or

the financial strength for such projects. This view has been confirmed by Brazilian companies' difficulties in finding insurance and other financial guarantees for any loans they contract for Petrobras projects.

The governing Workers Party (PT) now controls all of the important posts in the energy sector – Dilma Rousseff as Energy and Mines Minister, Mauricio Tolmasquim as Executive Secretary at the Energy Ministry, José Eduardo Dutra as head of Petrobras, and Luiz Pignatelli Rosa as head of federally-owned power generator Eléctrobrás. All of these officials reiterate the policy that, from the outset, the new government will use energy as a tool of national development and that the energy sector will provide support for the government's anti-poverty, or 'zero hunger,' campaign.

In contrast to the past decade, when previous governments were hoping to expand the domestic gas market through increasing gas-fired power generation, the new government says that gas will have only a marginal role in Brazil's future energy mix.

## Colombia

The Colombian Government is studying further incentives to boost oil exploration as oil production declines. One suggestion is to abolish fixed-term production contracts and to allow companies to operate fields until depletion. Another idea is the provision of insurance to cover material damage from terrorist attacks – although the creation of such an insurance fund would require cooperation with multilateral agencies.

State oil company Ecopetrol is still seeking industry interest for bids in six previously offered blocks in the Caribbean offshore and has also been looking for seismic operators for speculative surveys in the Caribbean and Pacific offshore areas. The areas targeted are around San Andrés Island in the Caribbean, over which sovereignty is disputed with Nicaragua, and the offshore Choco Basin in the Pacific.

Oil production has dropped about 9% over the past 12 months to an average of 578,000 b/d in December 2002. New field developments are sparse, as foreign operators have quit the country because of the escalating violence. So far only Petrobras has applied for a commerciality agreement to develop the 130mn barrel Guando field. BP plans to spud a well on its Niscota project in its Piedemonte permit some time in February 2003.

Ecopetrol has taken over the Siriri licence area in the northern Llanos foothills previously held by Occidental Petroleum. Exploration in this area, pre-

viously known as Samoré, has been the subject of several years of protests by the U'wa indigenous tribe. But the tribe's leaders have indicated that they are willing to allow the state oil company to explore.

## Ecuador

The incoming government of President Lucio Gutiérrez has inherited a long-running \$200mn dispute with foreign oil companies about the reimbursement of advanced VAT payments. Occidental, EnCana and Repsol-YPF have all said that they will seek international arbitration on the matter, a concept that remains ill-defined under Ecuadorian constitutional law. So far the tax authorities have agreed only to argue in an international court that an Ecuadorian court should hear the dispute.

Investor interest in new exploration opportunities has been thin following the removal in November 2002 of two blocks in the prolific Oriente (jungle) region from offer. The remaining blocks are all in the coastal basin, one partly onshore, one in shallow water and two in deep water.

Foreign investors are also nervous that the new government will apply more stringent environmental controls. A review of the environment licence granted for the project to construct a new heavy oil pipeline (OCP) is underway. This project, which is already 80% complete, has been fiercely opposed by environmentalist groups and confrontations between militant indigenous organisations and the oil industry have been increasing. The groups often also demand an end to oil exploration on their territories. The Pachakutik party, the political arm of Ecuador's most radical indigenous grouping Conaie, is a member of the governing coalition. Oil companies fear that the new government will not follow the previous practice of intervening in such disputes on the side of the companies.

## Mexico

State oil company Pemex is to seek bids from private sector companies as *Petroleum Review* went to press for gas exploration under multiple service contracts (CSM). The company hopes to sign the first of such contracts by September this year. It hopes that CSMs will add a further 1bn cf/d of gas production to an average gas output of 4.4mn cf/d. Pemex had already increased 2002 oil production by 9% over 2001 to 3.5mn b/d.

However, Mexico's growing dependence on gas imports has become a political issue. Gas imports from the US

in 2002 more than doubled in comparison with 2001. At this rate the country could be importing half of its gas needs by 2010. The gas debate has prompted a review of future energy options. One growing view is that the last 10 years of gas expansion may be heading for a close in favour of increasing power generation through the use of fuel oil and coal. In addition, because Mexican gas prices are linked to those in the US, local industry has become disillusioned with high gas prices since the California crisis. There are also worries that potential reservoirs in the Burgos Basin, essentially an extension of the South Texas Basin, may be quite scrappy.

## Peru

The Peruvian Government is hoping for a boost to new exploration after modifying the royalty regime for new discoveries in late October 2002. The state agency Perupetro will have the power to cut oil royalties by 30%, according to the decree. The minimum royalty will remain at 13.8%. But existing discoveries still carry royalties of between 20% and 37%.

Oil industry investment had fallen by a factor of 10 over the last three years due mainly to the lack of any new discoveries since the Camisea gas field in the 1980s. A new exploration round is being prepared for 2003. UK-based Robertson Research has been hired to design another national oil exploration strategy.

The Camisea project continues to acquire financing, with a loan of \$315mn granted by the Interamerican Development Bank in January 2003. Various advocacy groups and non-governmental organisations have been renewing an international campaign against Camisea but both the Energy Ministry and the operating consortium have refuted all reports that the project will be delayed. Camisea shareholding remains the same with Argentina's Pluspetrol as operator in spite of the efforts of Algeria's Sonatrach to buy Pluspetrol's 36% stake. Representatives from TotalFinaElf have both confirmed and denied that the French company is interested in joining the project.

## Venezuela

Seven weeks into the Venezuelan oil strike called on 2 December 2002, the protest was at a crossroads. The government claimed the protest was crumbling and oil production rising once more, while the opposition was debating whether to seek the support of electricity sector workers. By mid-January 2003 the strike had cost the country \$4bn, according to government figures while oil production was



Photo: Øyvind Hagen/Statoil

**Production lines to be installed in one of the 300-plus wells drilled on the Sincor project in Venezuela**

between 413,000 b/d, according to the opposition, or 800,000 b/d, according to the government. Spanish bank BSCH claims that the economy will contract by 40% during 1Q2003.

According to the International Energy Agency, Venezuela may have lost between 300,000 b/d and 400,000 b/d of oil production capacity. In January the Hamaca, Petrozuata, Sincor and Cerro Negro heavy oil production and upgrading projects remained shut in as operators were nervous of using unskilled workers while state oil company PdVSA announced that it was 'indefinitely' delaying plans for two nitrogen injection projects where investment would have totalled \$2.7bn.

President Hugo Chávez responded to the strike by personally taking charge of oil exports, earning him the epithet of 'Commentate Petrolero.' Five out of six export cargoes went to PdVSA's US subsidiaries, refiner Citgo Petroleum and chemical company Lyondell, with the remainder heading for markets in the Caribbean. Chávez also reorganised PdVSA to consolidate his grip on the company. PdVSA now comprises two mainly upstream divisions, PdVSA Oriente and PdVSA Occidente, whose heads report directly to Chávez not the company President Ali Rodríguez.

The country faces a financial squeeze as credit rating agencies and multilateral institutions review their terms. In addition, the World Bank affiliate

International Finance Corporation (IFC) put 'on hold' loans totalling \$225mn for the Venezuelan subsidiary of Argentina's Pérez Companc. The funds were slated for new wells and field facilities. Credit rating agencies have also downgraded PdVSA's US subsidiaries amidst doubts that the parent company could support the subsidiaries' business operations. There were doubts in late January whether PdVSA management in Caracas could ensure sufficient funds for the company's offshore finance vehicle, PDV Finance. According to Standard & Poor's credit rating agency PdVSA has been burning \$10mn/d during the conflict, which is believed to have cost the country some \$50mn/d in total.

The opposition called the strike on the gamble that President Chávez would prefer to negotiate with them rather than let the country descend into chaos. The gamble appears to have been wrong and by late January Chávez was preparing to sit it out for as long as it takes while the opposition was becoming more divided and under increasing fire from the foreign media. But even if Chávez were to defeat the strikers this time, with no solution to the country's fundamental political problems credit rating agencies will be reluctant in reversing their downgrades. Although PdVSA has never defaulted on foreign debt payments, its future financial situation remains uncertain. ●

# Iraq – the re-emerging frontier

Few doubt that Iraq has significant development potential. *Geoff Eyre*, Managing Director, and *Malcolm Brierley*, Technical Director of the Bayphase consultancy enumerate their analysis of just how large the potential is and its likely cost.

Whatever your political views on the Iraq situation today there is one inescapable fact – Iraq contains massive oil and gas reserve potential that could ultimately reach over 300bn barrels, offering huge investment opportunities in the upstream, midstream and downstream sectors of between \$4.9bn and \$7.7bn/y for the next 15-plus years. The reasons for this are not difficult to understand. Since nationalisation in 1975 Iraq's oil and gas industry has suffered from a severe lack of investment and technology integration because of inadequate management, isolation and lack of central funding following the wars waged from 1980–1990 and the UN Sanctions being imposed from 1990 to date. The country will, therefore, sooner or later re-emerge as a major frontier for oil and gas investment.

Bayphase has conducted a detailed study aimed at identifying the reserves plus the investment potential in Iraq today, as we believe that in the foreseeable future these opportunities will be opened up to international investors in a variety of ways.

Despite the UN sanctions international activity in Iraq is already high, with companies from over 30 countries, including the main EU countries, pursuing deals.

A total of 12 major agreements have already been signed pending sanctions relaxation.

Iraq itself clearly recognises the need for international investment and has an initial programme of 33 oil and gas field development and rehabilitation projects to be awarded, along with a revised set of legislation covering the terms and conditions for a new production and development contract. Plus alongside these projects significant regional infrastructure upgrades and newbuilds are required in the refining, processing and transportation sectors.

## Reserves assessment

Overall the status of Iraq's upstream oil industry is probably best expressed in terms of its reserves. We have classified these into five basic categories listed in **Table 1**. Our assessment has been based on published information and data gathered whilst executing studies for a number of clients. Although reserves available in Iraq's producing and non-producing fields are around 103.8–112.9 (bn barrels) these are stated as proven reserves, based on our assessments and represent a conservative assessment of the country's reserves base. We believe that with investment considerable

improvements can be made in recovery. In addition, Iraq has a significant number of world class exploration opportunities available in each of its three primary hydrocarbon provinces. It has the potential to add considerably to its reserves base through both of these routes.

## Investment assessment

We have implemented a detailed assessment of the whole of Iraq's oil and gas sector to determine the range of the investment required should its published plans for the country's upstream, midstream and downstream sectors come to fruition. We have also conducted an assessment of the investment requirements of Iraq's infrastructure.

**Table 2** summarises the results of this analysis. These are capital costs that will be encountered in the refurbishment and further development of Iraq's oil and gas industry and infrastructure. This opportunity is based on an assessment on the known status of each facility and, where available, on published plans for expansion.

For full details on all elements of Iraq's oil and gas industry, Bayphase's reserves assessment and its investment analysis can be found in a detailed report at [www.bayphase.com](http://www.bayphase.com)

Field area	Number of fields/prospects	Remaining recoverable oil reserves (bn barrels)	Remaining recoverable gas reserves (tn cf)
Northern producing fields	9	17.8	12.4–13.0
Central and southern producing fields	8	57.5	24.9
Northern discovered, non-producing fields	17	5.0	32.4–33.3
Central and southern discovered, non-producing fields	17	28.9	41.7
Exploration and enhanced recovery potential	over 350	222.0	211.0
<b>Total</b>		<b>331.2</b>	<b>322.5–323.9</b>

Table 1: Reserves base of Iraq's upstream oil and gas industry

Sector	Total capital investment projected (\$mn)
Upstream – oil and gas fields	40,560–78,810
Midstream – pipelines and terminals	2,700–3,240
Downstream – refineries, petrochemicals and gas processing	8,770–9,800
<b>Subtotal</b>	<b>52,030–91,850</b>
Infrastructure – transportation and power	45,000–61,000
<b>Subtotal</b>	<b>45,000–61,000</b>
<b>Total</b>	<b>97,030–152,850</b>

Table 2: Capital investment requirements of Iraq's oil and gas industry and associated infrastructure

# Trinidad steps on the gas

Its going to be another good year for gas in Trinidad and Tobago, reports *David Renwick*. The Atlantic LNG Company's 3.3mn tonne third train is due to commence production at the company's Point Fortin site in southwest Trinidad around May and the green light is almost certain to be given for a mammoth 5.2mn tonne fourth train, the world's largest, to be ready by end-2005.

**T**hese two projects alone will need no less than 1,280mn cf/d of natural gas feedstock and between them will push gas consumption up to about 3.3bn cf/d by 2006. A number of other gas-using plants may come onstream in Trinidad and Tobago between now and 2006, including the world's largest methanol plant built to date – Atlas, with a capacity of 1.7mn t/y – which is due for completion in 4Q2003. Owned 63.1% by Methanex of Canada, the largest international methanol trader in the world, and 36.9% by BP, the plant will add a further 164mn cf/d of gas consumption. An additional 180mn cf/d will be required for an even bigger methanol plant, the 1.8mn tonne M5000 facility that is majority owned by the local C L Financial Group, which is due to enter production in 4Q2004.

Smaller claimants on gas, such as the Nitro 2000 ammonia plant that will need about 60mn cf/d when it starts up in 2004, must also be factored in to the overall gas picture. In fact, so successful has been the small Caribbean island nation – 5,128 sq km, 1.2mn people – at commercialising its gas reserves that some fear it is in danger of using them up too rapidly.

## Contracts outstrip proven reserves

BP Trinidad and Tobago (BP TT), the country's largest gas reserves holder and producer, estimates that 25.1tn cf of gas is now committed to contracts already signed and those with a strong likelihood of being brought to fruition. This actually exceeds the present proven reserves figure of 20.3tn cf accepted by the Ministry of Energy and Energy Industries, although demand can be met if probable gas reserves of 8.1tn cf are included.

The planners themselves, however, do

not seem unduly worried. The overall reserves base was calculated by US consultant Ryder Scott to be 34.3tn cf in early 2002. This figure did not include a further 30.7tn cf in 'identified exploratory gas resources' (areas where new finds are likely) or an additional 28tn cf in 'unidentified exploratory resources' (an intelligent guess about what may lie in the rest of the Trinidad basin).

As gas demand builds up and exploration continues, more and more reserves are expected to be shifted to the 'proven' category. In fact, Dr Peter Rattey, the President of BP TT's Exploration Performance Unit, is convinced that he will eventually confirm the presence of between 25tn and 30tn cf of reserves in the deeper continental shelf off Trinidad's east coast, following a \$25mn seismic survey this year and subsequent exploratory drilling in the company's offshore licenced area.

## Promising prospects

Newer offshore acreage is also considered very prospective for gas. Of the three production sharing contracts (PSCs) signed by companies and the Energy Ministry last year, two relate to blocks that are considered likely to be gas prone. They are the 36,382 hectare Lower Reverse L block, adjacent to the maritime border with Venezuela off the southeast coast of Trinidad, and the 39,928 hectare Modified Ub block located northeast of Lower Reverse L and away from the border.

The aggressive US independent EOG Resources, hived off from the ill-fated Enron many years ago, holds the 100% interest in Lower Reverse L and a 55% stake in Modified Ub, as operator. Lindell Looger, Managing Director of EOG Resources Trinidad, prides himself on probably being the only international

energy company executive operating on the local scene who is 'looking to find gas, hoping to find gas and expecting to find gas.'

Such confidence is reflective of the certainty with which the likelihood of continually identifying new gas plays offshore Trinidad is viewed. So much so, it is a fair bet that the country's gas successes were largely responsible for Trinidad and Tobago's inclusion last year in a list of the 10 countries in the world most attractive for new ventures to international oil and gas companies operating outside North America.

The poll was carried out by UK-based geoscience services and consulting company Robertson International, now part of the Fugro Group. Companies engaged in exploration and production activities were asked to rank their interest in 147 countries of the world.

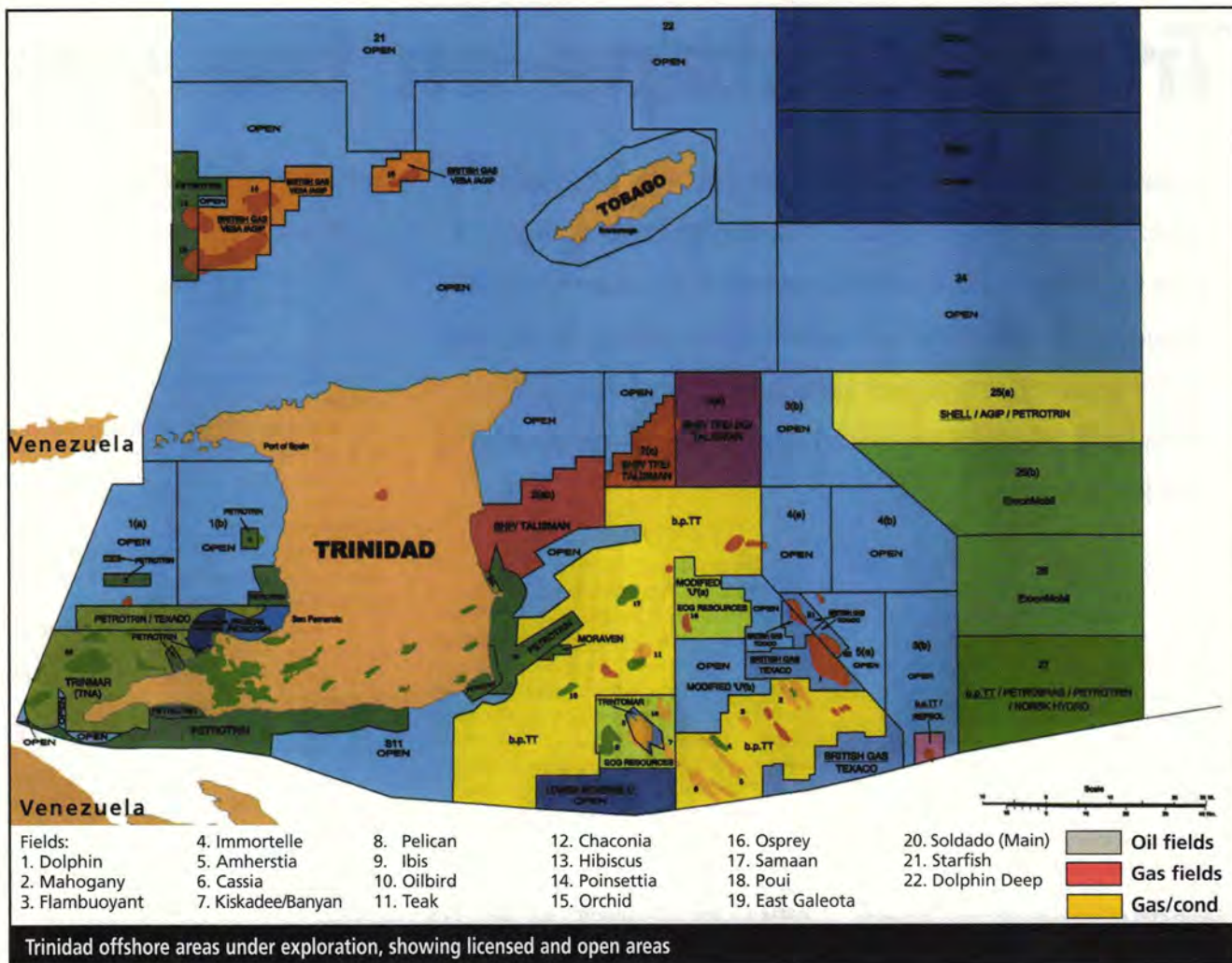
That a small Caribbean state could be in the company of such heavyweights as the UK, Australia, Algeria, Qatar, Brazil and Mexico, speaks volumes for its success in re-establishing itself on the global energy scene following a lean period in the late 1980s and early 1990s when the state assumed a commanding role in the industry.

## Looking to land

While the gas prospects that rekindled foreign interest have so far been almost totally identified offshore, respectable gas reserve pools are now being discovered in mature land acreage thanks to the application of 3D seismic by onshore operators for the first time. Associated gas in land oil fields has never traditionally been counted as reserves.

About 65bn cf of proven reserves were found in the Central Block in southeast Trinidad a year ago and this is now being produced at the rate of 20mn cf/d for sale to the Petroleum Company of Trinidad and Tobago (Petrotrin) refinery at Pointe-a-Pierre. Very small potatoes indeed when compared with 800mn cf/d for Atlantic LNG's fourth train, but hugely significant beyond the simple volume of gas involved since geologists consider it may well portend the emergence of the land region as an alternative source of monetisable gas reserves.

Not only does the operator of the Central Block, Vermilion of Canada, think so, but even a much bigger player like BG International is of the same mind. BG, which has been in Trinidad since 1994



and is operator of offshore blocks that contain about 6tn cf of gas, has shown strong interest in joining forces with state-owned Petrotrin, which controls the majority of the land acreage, to conduct a joint study of onshore gas prospects.

According to Peter Dranfield, the President of BG Trinidad and Tobago: 'The Central Block discovery was a significant one which whetted people's appetite to look around and see whether that constitutes a new play or whether it was a one-off, so we are not closing our eyes to anything.'

## Oil lagging behind

While the gas sector is apparently enjoying an uninterrupted run of successes, oil production – and, equally important, oil discoveries – are lagging behind.

It is true BHP Billiton made what it has estimated to be a 750mn to 1bn barrel find in the Greater Angostura Structure (GAS) in block 2c, 30 km off the north-east coast of Trinidad in 2001. It is also a fact that oil production turned around

between March and September 2002 according to the latest figures available from the Energy Ministry, rising from 122,947 b/d to 136,491 b/d – but this was wholly attributable to BP TT being able to tap into oil legs in its Mahogany and Amherstia fields, which are essentially gas producers.

In other words, even short-term improvements in oil production rest on gas activities, since these fields would not have been developed for the oil alone. Condensate yields from gas wells are also helping to prop up oil output.

BHP Billiton's GAS find is actually the first real offshore oil discovery in 33 years and was made in a geological formation – the Oligocene – never before penetrated in Trinidad and Tobago. In that sense it is hugely significant since, according to Energy Ministry officials like Permanent Secretary Andrew Jupiter: 'The geological trend may run back westwards towards land, perhaps through other blocks, which could now become of interest to companies that showed no interest before.' Certainly, BHP Billiton believes the Oligocene sand may be

present in block 3a to the east, since it led a consortium that bid \$19mn in signature bonus for the block plus an extensive work programme.

However, the company has begun to dampen expectations about the size of the initial production that can be expected from 2c. Nick de Verteuil, the company's Trinidad and Tobago Vice President and resident manager, originally suggested production of as much as 100,000 b/d in GAS's early years but told *Petroleum Review*: 'We are not absolutely sure yet because this is the first reservoir of its kind in Trinidad and Tobago and, depending on the energy mechanism in the wells, we may get less than that.'

## Big disappointment

The really big disappointment in oil, however, has been the failure to make any headway with the Trinidad east coast deepwater region (750 to 1,500 metres). Companies have been trying since 1998, when four deepwater blocks – 25a, 25b, 26 and 27 – were allocated to operators Shell, ExxonMobil (two) and Arco, now

BP, respectively. After six wells, with a seventh being drilled by Shell at the time of writing, no oil has yet been discovered, only an uncommercial quantity of gas in Shell's first well.

ExxonMobil, which drilled two wells each in blocks 25b and 26 and came up with nothing, is so frustrated it has offered to divert the money it would have spent on three more obligatory wells to other areas outside the deepwater that the Energy Ministry considers may produce better returns. Energy Minister Eric Williams is not averse to this and it is likely that \$25mn of ExxonMobil's money that would, from all the evidence, have been wasted on further drilling in its blocks, will now be diverted to the state-owned Trinmar, which operates fields in the near-shore Gulf of Paria area off the west coast.

Trinmar, whose own production has fallen from 70,000 b/d 24 years ago to about 32,000 b/d today, has been unable to discover any new oil reserves and is badly in need of capital, so it sees ExxonMobil's intervention in a way as a Godsend.

Since the Gulf of Paria is an already established production area, the three to five exploration wells that the US super major will fund in Trinmar stand a good chance of identifying new oil pools. ExxonMobil will also support a joint geotechnical study to develop an inventory of prospects, the re-processing of older 3D seismic, the shooting of new 3D in Trinmar's North Marine area and the

establishment of an Integrated Reservoir School for the staff of Petrotrin, of which Trinmar is a subsidiary.

But all this still leaves the deepwater, in which the Energy Ministry had invested high hopes, in limbo. Does it, or does it not, contain oil reservoirs?

### Providing the answer?

Shell's second well in its 25a block may provide the answer. The company has been given a one-year extension on the first phase of its work programme and has two more obligatory wells to spud. Pepper Sauce was still being drilled at the time of writing and will be followed by a well in either the Roti or Callaloo prospect (the names are those of local foods).

Whether Shell can break the deepwater jinx remains to be seen, but its local General Manager, Daniel Trumpy, admits that 'the results of these wells will decide the future of our operations in 25a.'

For its part, the Energy Ministry is not giving up. It coordinated the recent 9,100 km of 2D seismic in the ultra-deep region, east of the deepwater, where water depths range from 1,700 to 3,000 metres. The survey was paid for by 12 international companies, including Shell and BP, whose own deepwater well in block 27, called Catfish, was also non-commercial.

Minister Williams, a geophysicist by profession, told *Petroleum Review*: 'It is always advisable to go as far out as geo-

Proven	810
Probable	510
Possible	1,400
Total	2,720

*Source: Ministry of Energy and Energy Industries*

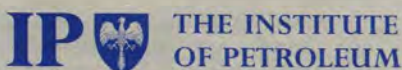
**Table 1: Trinidad and Tobago oil reserves (mn barrels), November 2002**

Proven	20.3
Probable	8.1
Possible	5.9
Total	34.3
Identified exploratory resources	30.7
Unidentified exploratory resources	28.0
Grand total	93.0

*Source: Ryder Scott/Ministry of Energy and Energy Industries*

**Table 2: Trinidad and Tobago gas reserves (non-associated) (tn cf), January 2002**

logically feasible to look for structures that are potential and the ultra-deep survey is part of that process.' He is clinging to the hope that 'if we don't get oil in the deepwater, we may well get it in the ultra deep.'



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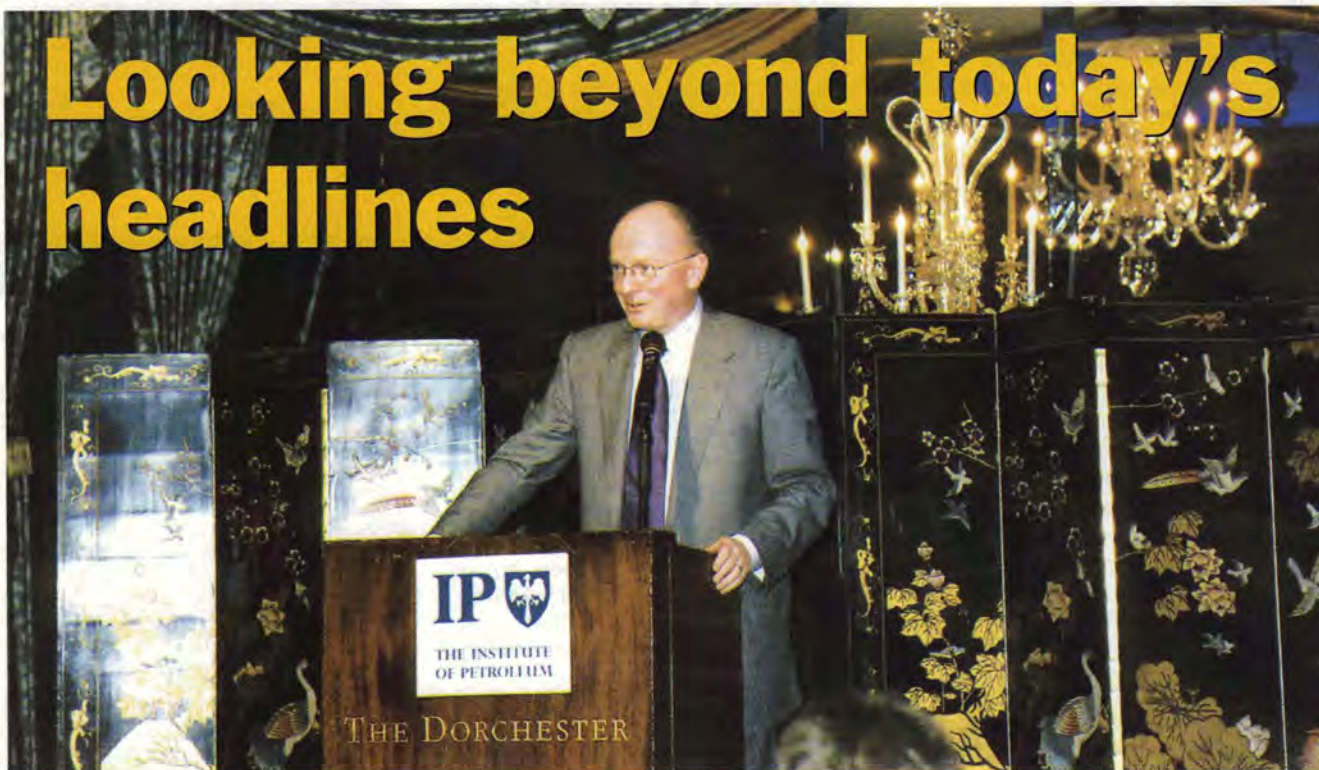
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# Looking beyond today's headlines



Addressing the IP Annual Lunch at the Dorchester Hotel, London, *David O'Reilly, ChevronTexaco* Chairman and CEO looked at the long-term challenges facing the international oil and gas industry, including the reputation of the energy sector and what companies can do to strengthen it.

**W**e gather today in interesting times – even more than usual – against a backdrop of conflict and civil unrest, from Venezuela to Iraq to the Korean Peninsula. The outcome of these crises may define, in many ways, the shape of the world in this new century.

Petroleum may not be the reason for these conflicts. But it's no coincidence that energy is a central element in each.

- In North Korea, energy production is being offered as a carrot – an incentive for Pyongyang to adhere to prior agreements on nuclear arms.
- In Venezuela, each side in the constitutional crisis appears to be using oil to force the hand of the other.
- And in Iraq, which holds the world's second largest oil reserves, we're witness to a conflict that's already creating a ripple effect on the global energy markets.

These dramatic events remind us that in so many places around the world energy is at the nexus of social, economic and political change. The diversity and continuity of the world's energy supply are vital strategic concerns. National security and energy security are *not* one and the same thing – but they are clearly intertwined.

So it's hardly surprising that current events have put our industry in the spotlight. They raise familiar questions about what we do, how we do it, and the costs and benefits of our products.

It wasn't unexpected, then, that the Iraq conflict would be used by some as a vehicle to attack the industry. I am talking, of course, about the protests that say: 'No blood for oil.' The slogan rests on two assumptions: first, that the conflict with Iraq is about nothing but oil; and second, that energy security is not a legitimate reason – even as one among many – to go to war.

We might be inclined to attribute this view to a very vocal minority – to anti-globalisation protestors who have found a new target. But consider this statistic from a recent European Gallup poll – although two-thirds of Europeans see Iraq as a threat to world peace, a shocking 70% believe that oil is the main reason the US wants to intervene in Iraq. The protests of this past weekend vividly demonstrate this.

I would argue that 'No blood for oil' has caught on partly because our industry's reputation is so impaired that the protestors can discredit action in Iraq simply by associating it with us. That's a sad commentary... and it brings me to the topic of my speech today.

## Strengthening our reputation

I want to talk about the reputation of the energy industry – and what we can do to strengthen it.

Like you, I share, of course, the concern about current threats to global energy security. But today I want to take a longer view... because the challenge to our reputation will be with us regardless of whether we have peaceful resolutions in Iraq, Venezuela and North Korea. If we do not act together to address this challenge, I believe our performance will be impaired and our basic mission imperiled.

What do I mean by 'reputation'? I define it as three elements – perfor-

mance, behaviour and communications – all connected. At their intersection is reputation. We can improve reputation only by improving all three. And we have our work cut out for us.

Although public opinion appears more positive in the developing world, a majority in Europe and North America view us unfavorably. In the US the number of people who say the industry provides 'a much needed, valuable resource' is no greater than those who see us as 'motivated by greed.'

I'm sure that many of us, at one point or another, have thought: 'When I joined the industry, people felt more positively.' That was certainly the case 35 years ago when I started as a young engineer straight out of university. There was no other industry I'd rather have joined... no other that could match this blend of cutting-edge technology, economics and geopolitics.

That blend still exists. Today our products and high-tech tools are applied even more widely and effectively to improve standards of living. None can dispute the direct correlation between access to reliable, affordable energy and advances in economic well-being and the quality of life. Energy is the fuel that has driven progress in so many sectors – including transportation, education, communications and health-care.

So here's the paradox – if the importance of our work is so great, why is our reputation so poor?

The answer can be found if we look at the three elements of reputation, starting with performance.

## Operational performance

I'm not referring to financial performance. Rather, I'm talking about operational performance. And what we've got is a performance problem with a twist. In some ways, we're doing our jobs too well. We have been so efficient at discovering and producing



IP President, Pierre Jungels



IP President, Pierre Jungels, greets David O'Reilly at the Dorchester

oil and gas that the relative cost of our products has gone down considerably – and demand has gone up. And that drives public expectations even higher.

But along with those higher expectations comes heightened concern over the impact of our operations – over environmental disasters like spills in the short-term – and over consequences like climate change in the longer-term.

In many respects our industry is invisible to the public – until there is a big price spike or something worse happens, like the *Valdez* or the *Prestige* – disasters that grab the headlines and infuriate the public. Because these events are relatively rare, they're much more dramatic when they do happen. And the public response is understandably severe and long-lasting.

Frankly, it doesn't matter to most people whether the responsible party is a super-major or a marginal operator. That distinction counts for little when a coastline is covered with oil. The public – rightly – has higher expectations for our collective performance.

## Spotlight on behaviour

The second aspect of reputation is behaviour. Our industry operates in some of the most challenging places in the world – places where tax, trade and investment policies are evolving as developing nations evolve; where the distribution of wealth is uneven; where environmental and social policies differ widely. And, increasingly, there is a spotlight on our behaviour in these places that once stood in the shadows.

Companies like ours must answer to a growing range of stakeholders. We are held to standards for corporate citizenship, human rights and the environment that are no less rigorous than the requirements of the financial

community. And still, too often our behaviour seems to suggest that our mere presence is enough, that we have no further responsibility to the communities where we operate. Few things could be more damaging to the way the world sees us.

## Effective communications

The third aspect of reputation is communications. Frequent and effective communications are the key to winning supporters and answering critics. Without a strong commitment to communicating openly and honestly, a bad reputation will only get worse. Indeed, some of the criticisms we face are worsened by how we react. Too often we act defensively about what we do wrong – and sheepishly about what we do right. Too often we respond with delay and denial. While some of these criticisms are out of proportion, others are based in reality. Until we acknowledge the valid criticisms, we can't really rebut the invalid ones.

Many of us here are working to right the balance between credit and criticism, but most of our efforts are competitive rather than collaborative. As companies we tend to seek advantage over one another, instead of coming together to meet common challenges involving reputation. The industry-wide efforts we do see are neither sustained nor sufficiently resourced. As a result, these efforts have not been good enough or widespread enough to make a lasting difference.

The consequences go far beyond public relations. They extend to the bottom line – and far into the future. At risk is nothing less than our basic mission – providing reliable, efficient, affordable energy over the long term. I believe that if we do not act individually and collectively to improve our reputa-

tion, over time it will constrain us in critical areas. Frankly, it already has.

## Understand the consequences

We must have a clear understanding of the consequences of a poor reputation. That's the only way we're going to be moved, as an industry, to take real responsibility for the solutions. And let's remember, if we don't, others will.

The most obvious consequence is one we are, unfortunately, well accustomed to – regulation. When we fail to raise our standards we invite governments to do it for us, through regulations that can be costly and onerous. If we prefer market-based solutions to government mandates, the burden is on us to confront the consequences of business as usual.

The second consequence is equally straightforward – access to resources. The industry's access to resources is the product of many things, but partly it is a matter of reputation. In some parts of the world the desire – or the need – to develop oil and gas resources outweighs many other considerations. But that's not necessarily true of every community where resources are found, or of the NGOs and international organisations that play a role in the lives of the people there.

Governments may invite us in with great fanfare, but to what avail if – because of our reputation – protests, boycotts and unrest make it increasingly difficult to fulfill our mission?

In wealthier countries, just about any oil and gas development is politically contentious. Think of the opposition to drilling in the Atlantic Margin a few years ago, or in parts of Alaska. If we want access to resources to be decided on the merits, we have to make our reputation a help, not a hindrance.

But perhaps the most damaging consequence has to do with the most important resource – talent. People are the lifeblood of our industry. Yet I fear that recruiting and retaining talent is made more difficult by every spill and every cyclical downturn. Recruiting – and retaining – the very best talent is vital to maintaining the vision, passion, creativity and diversity we need to succeed. If we fail to improve our image among potential recruits, we won't be able to attract the best people.

Our industry commits massive resources to develop new technologies, new products and new fields for exploration. And yet we've been unwilling to apply the same effort to the shared challenges of reputation. Why? One reason is because the industry's reputation has suffered for so long. Some of

us have come to believe that improving our reputation is a lost cause.

Well, I disagree. This is far too important for reputation to be a lost cause.

## Rethinking old models

So... what's the answer? I believe it's time to rethink the old models. Recalling the three elements of reputation, we should start by improving communications. As I've said, we provide the energy that powers the world's economic engines. Energy is essential to improving the quality of life – especially in developing countries. That's something to be proud of... and we need to *reinforce* that value proposition through effective communications.

And yet, there are some in our own industry who are doing just the opposite. They're sending the message that fossil fuels are on their way out... soon to be replaced by alternatives. In my view that's simply *not* realistic. While alternatives may have an increasing role to play, fossil fuels will be the primary source of energy for a number of generations to come. To suggest otherwise calls into question the importance of petroleum products, ignores the vital role they will continue to play, and undermines the reputation we should all be working to improve.

I'm proud of what the energy industry contributes. We have a powerful and positive story to tell – and we should be neither shy nor apologetic about telling it. But we need to do it together, to build public awareness about our contributions. Through these shared efforts we can lift *all* boats, not just our own.

I recognize that it won't be easy – but progress begins with a single step. Several years ago the UK Offshore Operators Association developed a good model aimed at improving the industry's reputation – and initial results were encouraging. But, unfortunately, the effort was not sustained. We should learn from this and support initiatives that will lead to real and meaningful progress.

While we need to tell our story better, we also need a better story to tell.

So, we have to improve performance – doing more to protect the environment and communities where we operate, while improving our operations themselves. It's not enough to say: 'My company operates safely and smoothly; others are the problem.' It may be that others are the problem – but they're a problem for us all. We cannot let the lowest performers become our lowest common denominator.

So we need more self-policing. Industry associations still control their membership, and it should not be seen as a

birthright. Membership will mean more if we expel companies that fail to meet higher standards of performance – as groups in other industries do.

Finally, our industry must improve its behaviours. Behavior is how you express your values in practice. I think you'll agree that performance without values is no better than values without performance. We can't focus on one at the expense of the other – like looking at how our products are *made* and not how they're *used*.

For example, we should be encouraging consumers to use our products more efficiently. Why? Because we're in this for the long haul. If we want our products to continue supporting economic growth, conservation will help keep energy plentiful and affordable. Conservation indeed makes a difference. Over the last 20 years, global improvements in energy efficiency were so significant that it's as if the world 'discovered' an extra 20mn b/d of oil. With global energy demand expected to grow significantly, we're going to need all the energy we can get.

From an environmental standpoint, conservation may be the single most effective way to reduce greenhouse gas emissions – so its importance can't be overstated. As an industry we must do more to use energy efficiently, and lead others to do the same.

## Turning the tide

As we consider ways to improve the industry's reputation, I realize that I've spelled out quite a 'to-do' list. And I know that we can't fix a reputation – that's been a century in the making – overnight. But I do believe we can turn the tide if each of us leaves this conference determined to do our part – and to encourage others to do the same.

As leaders, let's work harder, smarter and *together* to improve our industry's reputation through better performance, more effective communications and a higher standard of behaviour. Let's be passionate about developing the next generation of talent, promoting conservation and telling our story. Because one thing is certain, if we don't do it we can't expect others to do it for us.

The commitments we make *here* and *now* will have a powerful impact on our future – and they will make us an even greater force for positive change. If we do these things we can strengthen our collective reputation as well as our individual performance. And we can better fulfill the mission that is unique to our industry – and so vital to our world. ●

# Dusk is far from falling on oil and gas



Addressing the IP Annual Dinner at the Grosvenor House Hotel, London, *Sir Philip Watts KCMG* (above), Chairman of the Committee of Managing Directors, Royal Dutch/Shell Group, stated that the oil and gas business was far from being a 'sunset industry,' but that innovation, investment, business transformation and recruiting (and retaining) the right people would be crucial to success.

If ours is a sunset industry it is going to be a long, cold and dark night. Modern society depends on secure energy supplies. We face great energy challenges, nationally and globally – meeting them is fundamental for our future. So, it is very fortunate that our industry is as vigorous and creative today as it ever has been.

Our customers depend on those qualities. We serve them in a difficult and uncertain environment. The events in the Middle East are deeply troubling. It

is not just the present uncertainty, but also the longer term potential for instability and the alienation of many in the Islamic world from the West that concerns me. And this comes at a time when the outlook for the global economy is particularly uncertain.

The lesson from Japan is surely that the bursting of an asset price bubble can have profound and long-lasting consequences. The economist Stephen Roach warns of the risk of a double dip recession with the US economy at stall speed.

That sense of alienation in the Islamic world reflects wider social tensions in a world of stark inequalities. Many are fearful of the speed of change and the impact of globalisation. And we surely all worry about the pressures on our environment. We also have to recognise that trust in business has declined sharply.

## Responding to the challenge

I think this industry is in far better shape to respond to these challenges than we would have been a decade ago. Competitive pressures have driven a transformation in how we operate. We should not underestimate what has been achieved.

I believe there has been great overall improvement in:

- the quality of our people;
- our effectiveness;
- our ability to develop and harness technology; and
- the way we respond to the expectations of our customers and of society.

I saw another side of that question of trust at the Johannesburg sustainable development summit... when I think business was able to demonstrate that it really is part of the solution.

That puts the onus on us all to earn trust by showing that we are:



IP Past President, Charles Henderson, on the top table during the toasts



The top table waiting to be seated

- responding to people's concerns and aspirations;
- acting responsibly everywhere and always;
- contributing to sustainable development; and
- being transparent.

One of the key areas that will affect how people see this industry is how we respond to the climate threat. I have no doubt that precautionary action is needed and that there is much that we can do – indeed are doing – that is economic and also helps to tackle other energy challenges such as security of supply.

I think that everybody in this industry can be proud of what it has contributed to this country by developing its offshore resources, by maintaining the highly efficient energy system on which our pros-

perity depends and by the international success of British energy companies.

The tragic loss of 11 people in last year's helicopter accident in the southern North Sea is a salutary reminder that it is not just money that is invested but human courage and commitment. It is very important that this contribution is not taken for granted.

## Investment and innovation

Let me touch on some issues. The future of the mature North Sea depends on continuing investment and innovation. The recent development of the Penguin fields in the northern North Sea is an example. They were discovered nearly 30 years ago but development depended on recent advances in subsea and well technology.

The industry has invested over £200bn in the North Sea since the 1960s – encouraged by the UK's reputation for fiscal stability. I do hope last year's unexpected and unwelcome tax change was an aberration.

There is still great scope for applying the sort of advances that made Penguins possible – sustaining the British offshore industry not least as a strong base for exporting our skills. We announced the Carrack development in the southern North Sea this month. Getting the most out of the North Sea requires a tax regime that recognises both the pressures of maturity and the volatility of oil and gas prices.

Turning to gas, we need to recognise that Britain will soon become a net importer. But we shouldn't get too worried – there is ample gas available to meet our needs, although with very big investment and long lead times. Norway is obviously an attractive and secure nearby source and I'm pleased at the progress the Ministers are making in their discussions.

But we don't require a one-track approach. Both existing and new infrastructure will be needed to supply our future gas needs. For wet gas, it is critical to take advantage of the UK's world class processing system. Fiscal barriers to using this must be removed if Britain's petrochemical industry is to continue getting the cost-effective ethylene it needs. For dry gas, we must make the best commercial choices about using existing capacity or building new infrastructure. I believe new infrastructure has been justified.

Europe will also need gas from further afield. But the massive up-front



Full capacity for the IP Annual Dinner in the Great Room, Grosvenor House Hotel, London



Guests being called for dinner



IP Director General, Louise Kingham (centre), talks to guests at the Presidents Reception, with Guest Speaker, rally-driving champion and TV presenter, Penny Mallory (right).

investment will only happen if there is security of demand. I'm glad the EU is now sending clear signals to Russia and other exporters that they understand the need for long-term contracts. We need to resolve further issues quickly and get started on developing the supplies Europe needs.

## Driving business transformation

I spoke about the competitive pressures driving business transformation. Nowhere is this more true than in the British downstream industry. The industry's efficiency delivers pre-tax prices lower than in most other industrialised countries while collecting over £27bn/y for the Treasury from the highest tax levels in the OECD.

At the same time we make a major contribution to improving air quality by reducing emissions from refineries and petrochemical plants, and marketing cleaner fuels.

Environmental regulation is an essential part of driving the improvements we all want. But it should not jeopardise the efficiency that this industry has worked so hard to achieve.

Developing renewable energy is an important part of this drive. There is great potential to expand the use of renewables, particularly wind. But we will all depend on fossil energy for a very long time.

This country benefits greatly from the strength and efficiency of its energy industries – both here and abroad. Sustaining those industries is vital for our future.

## Attracting the best

Let me end by commending the IP for its contribution, which will be enhanced by the merger with the Institute of Energy. One vital role is to encourage young people to enter the industry, which depends on getting more of them to appreciate the joy of science at school and university. We can only sustain this industry by attracting the best talent demonstrating that it still offers challenging, rewarding and worthwhile careers.

I started by dismissing the idea of this industry as a sunset industry. The world faces great energy challenges. It depends on our vigour and creativity to offer solutions – I am sure we won't disappoint.

I could end by talking of a new dawn – but that might be prosaic. Rather, I think we are extending an already long day and there's not a hint of dusk yet. ●



## Seizing opportunities while tackling challenges head on

*Pierre Jungels (above), President of the Institute of Petroleum, addressing the annual IP Dinner at the Grovesnor House Hotel, London, outlined the opportunities and the challenges facing the international oil and gas industry, and provided an update on the proposed merger between the IP and Institute of Energy.*

**D**uring this highly successful IP Week we have heard from leaders of some of the largest companies in the world energy business. From Rex Tillerson of ExxonMobil on Monday, from David O'Reilly of ChevronTexaco on Tuesday, and now from Sir Philip Watts of Shell. All presented similar messages about the challenges faced by the oil industry and, from all, there was a will to face them with integrity.

With slight differences in emphasis reflecting the men and the cultures of their companies, the fundamental issues are the same. Supply and demand over the next decades is one of those issues. Depending on the assumptions and the accuracies of the models, world

energy demand is seen to increase by between 40% and 60% over the next 30 years – and 90% of that growth is seen as coming from fossil fuels. In most models this still leaves between 2bn and 3bn people without access to electricity and relying on biomass for heating and cooking. All of this with wind energy seen as capable of providing 12% of electricity generation in Europe.

### Opportunities and challenges

This spells opportunities for all companies, but not without serious challenges – but it also gives an unsustainable growth in carbon dioxide emissions.

A nearer term projection by

ExxonMobil indicates that over the next decade we need to put into production oil and gas reserves delivering half present-day production in order to cater for growth and depletion. This implies not only capital investment of some \$1,000bn, but also the work of some 350,000 engineers and scientists as well as acceleration of technological innovations in an industry that is already at the forefront of science and technology. The industry can do it – but only if technology, finance and people are available, and if politics does not disturb the smooth running of the industry.

### Resource availability

Accepting for a moment that all the above is at hand, something still needs to be available to meet the continuous demand of hydrocarbons to fuel the world economic growth – and that something is oil and gas inventory in the ground and access to it.

Leaving aside the debate about the total inventory and when we start having trouble finding more, the problem of resource availability is real.

We heard yesterday from David O'Reilly a deeply held concern that availability of high calibre graduates and access to opportunities may be more problematic in the future than in the past because of the bad reputation

of the oil industry. He defined the reputation as being a mixture of performance, behaviour and communications, all of which need to seriously improve for the whole industry. This is not far removed from corporate social responsibility, which needs to be addressed as seriously as shareholder returns.

I would add that there is an additional element to the reputation issue, linking into anti-globalism. This leads a lot of people around the world to fear or resent what they see as the power and size of the main players. During the anti-war protests of the last weekend there were a lot of posters saying 'No blood for oil'. We may feel that it is wrong and irrational, but it is there and must be addressed by behaviour and communications. As Mark Moody-Stuart said during his Cadman Lecture at the IP: 'If something becomes a problem for our societies it should become a problem for us since we are part of that society.'

We should accept that in this increasingly transparent world there is a heightened concern about the impact of our operations, over environmental disasters such as the *Prestige* in the short term and over consequences like climate change in the long term. Facing the challenge to supply affordable energy to the world over the next generation must include a willingness to manage the transition to hydrogen and solar energy.

It may not make economic sense today, but the potential is there to substitute hydrocarbon in most applications. We must pursue that potential with the same enthusiasm and energy that we deployed in looking for hydrocarbons in 10,000 ft of water or impossible places such as northern Alaska or Chad.

It is with that sort of intellectual creativity that we will again attract the best graduates we need. It might also help our reputation if we can face the challenge as an industry and, working all together, bring our performance and behaviour to the highest common denominator.

There is no need to apologise or to criticise the bad performers amongst us. Since public opinion will lump us all together we should all help the bad performers to bring their standards to the level of the best. The Institute of Petroleum will play its part in this, as you will hear in a moment.

As an aside, but speaking about bad behaviour and not pulling together, allow me as an old continental European, educated in the US and married to an English lady, with a son in the Scots Guard, to say that I wish that our democratic world would spend more time stressing what unites us rather than having spats about our perceived

differences or criticising each other's behaviour.

We all share in one form or another the three tenets of the French Revolution – liberty, equality and fraternity – all inherited from the American Constitution. Liberty or freedom to have your opinion, your belief and your values, and to respect others' right to them. Equality of man and woman, and equal access to opportunities. Fraternity meaning we look after each other as family, neighbours, citizens and members of an interlocking system of international bodies.

The oil industry could do no better than to apply all this in its relationships with all its stakeholders.

### IP/InstE merger

I now turn to the Institute itself. As with many of our supporters, the IP has to change to continue to meet the needs of its industry. Over the last two years a team of IP trustees and staff has been working in the background to develop a proposal for the IP to broaden its horizons – the aim being the creation of a strong, single body that will serve the needs of the energy business, globally, in the 21st century.

It was very quickly apparent to all concerned, when the trustees of both Institutes first met, that the potential merger represented an exciting opportunity to create a unique body – one that was truly representative of the entire energy sector and that could ably serve both its corporate and individual supporters' needs both in today's uncertain times and well into the future.

During the autumn of 2002, supported by an extensive exploration of members' views, work commenced on building the business case for the merger and gaining early acceptance from our key supporters, industry peers and regulators.

### Overwhelming majority in favour

In January of this year, the 12,000 members of the IP and InstE received a merger prospectus and a ballot paper. Members were asked whether they supported the merger proposal to create the Energy Institute. I am very pleased to say that well over 40% of our combined membership voted – to put that into context, it is nearly double the accepted turnout for professional bodies. With over 94% of votes cast in favour of the merger you, our members, have given us a clear mandate for change and a solid base from which to build the Energy Institute.

The new Institute will provide acad-

emic, professional and technical support for individuals and companies involved in all aspects of the energy industry, from those concerned with the exploration and production of hydrocarbons through to the rapidly developing renewable energy sector. The Institute will combine the skills and reputations of its two founding bodies to form a single organisation of some 12,000 individual members and over 400 company members, which will carry much greater influence both domestically and internationally.

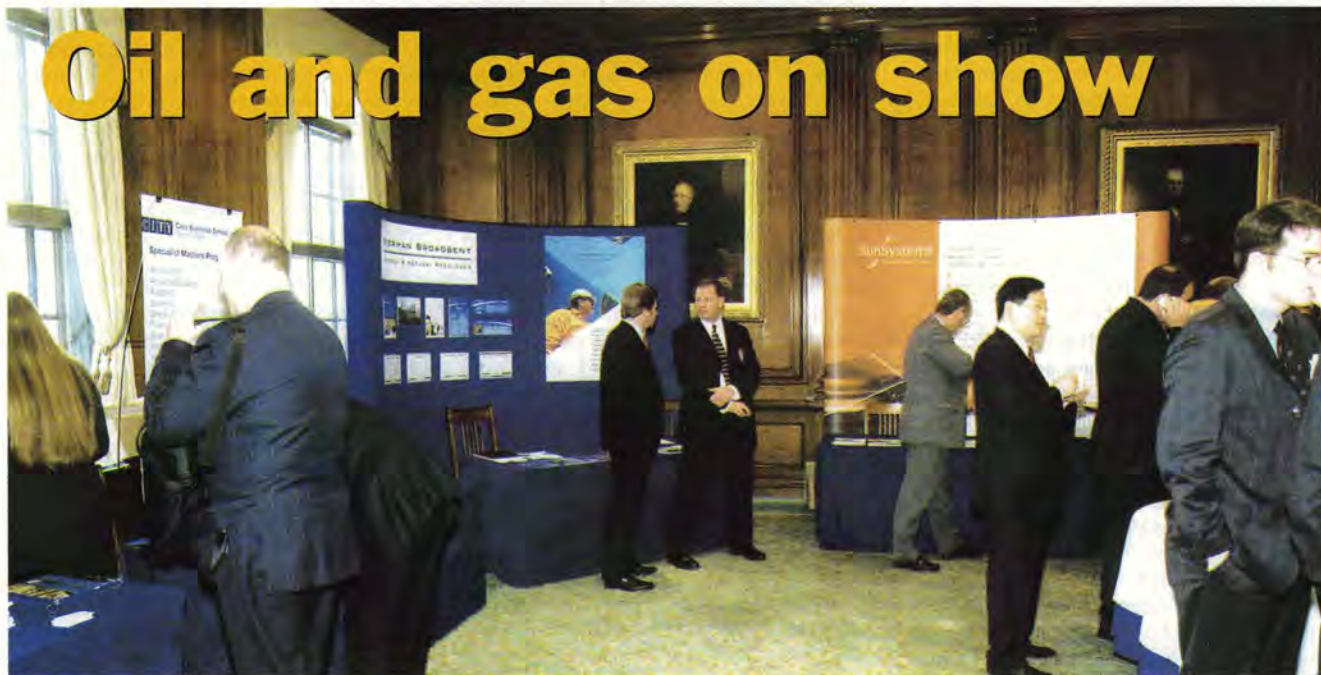
Given the tremendous breadth and speed of developments within the energy sector, great attention is being paid to ensure that all stakeholders in the industry will have a voice in the new Institute. This will be achieved through a stronger branch network and the introduction of Special Interest Networks, which, resulting from consultation with our members, could include areas as diverse as upstream developments, refining advancements, energy efficiency, renewables and power generation. Throughout the UK in particular the potential benefits of merging are very visible, with many organisations becoming increasingly involved in projects across the whole energy sector.

The Energy Institute will form a focus for professionals and companies in energy the world over. Some may consider this to be a bold claim. Time will tell. If, however, we harness just some of the tremendous support that we have received over the past few months from government, industry and members alike, I am certain that the new Energy Institute will succeed. Its worldwide impact should be helped by the fact that English is now overwhelmingly the second language of most people in the world.

Both the IP and the InstE were created by men of vision and have served their memberships over many decades. But with the advent of an integrated global energy sector, I and my fellow trustees firmly believe that the new Institute is needed – not only to mirror developments in our market, but also to lay the foundations for the foreseeable future. We are convinced that this merger will create such an Institute – one that will have the strength and reach to cover energy and fuels in all their forms, giving it both authority and influence.

### Words of thanks

Thanks go to our staff at the Institute. As many of you present tonight will be aware, mergers create their own pressures. So the success of this event and of IP Week itself, and indeed the success of all our activities over the past year is a credit to them all. ■



**The IP Week 2003 Exhibition and AAPG Prospect & Property Expo (APPEX) took place alongside the events at One Great George Street, London, throughout IP Week. Kim Jackson reviews some of the latest news from some of the exhibitors.**

All conference and seminar breaks during the IP Week programme at One George Street were held in the exhibition hall, providing delegates with an ideal opportunity to look around the IP Week 2003 Exhibition. Exhibitors included the Centre for Global Energy Studies (CGES), Commodities Now, FMA Systems, the Institution of Gas Engineers and Managers (IGEM), Hewlett-Packard, Norman Broadbent, Nymex, Oil & Gas Eurasia, Petroleum Argos, Petroleum Economist, the Russo-British Chamber of Commerce (RBCC), World Petroleum Congress (WPC) and, of course, The Institute of Petroleum.

### Computing power

Various of the exhibitors had news to tell, including Hewlett-Packard (HP), who is developing an upstream business focusing particularly on reservoir modelling and seismic analysis, according to Iain Gunn, Manager, High Performance Computing Sales.

Gunn explained that HP had been working closely with Intel for a number of years, developing a close engineering relationship from which was born the Itanium family of processors. The Itanium processors are 64-bit, industry strength, high performance CPUs that, according to Gunn, when used with Linux, 'produce a price performance ratio that I believe is unmatched in the industry'.

Tasked to start an upstream business selling HP's supercomputer solutions, Gunn reports that: 'HP identified this sector as an area of opportunity because we can provide highly scaleable, price performant compute power compared to our competition.'

He stated: 'We can offer those people running large computer farms – using computers from the likes of Sun Microsystems, IBM and Silicon Graphics – the chance to greatly reduce their procurement and running costs for the same or greater computing power.' [For more information, e: [iain.gunn@hp.com](mailto:iain.gunn@hp.com)]

Meanwhile, the New York Mercantile Exchange (Nymex) was keen to explain to market participants how they could take advantage of the financial depth and integrity of the Exchange clearing house through its ClearPort<sup>SM</sup> technology network comprising trading platform, clearing website and confirmations.

The ClearPort<sup>SM</sup> technology network is reported to be an extremely flexible system offering users wide latitude in meeting their needs. 'It is an open system, which allows trading firms to use front-end applications that best fit their trading requirements,' explained the company. 'The system lets commercial traders quote transactions in standard commercial units, such as barrels or British thermal units, while converting them to cleared contract equivalents. It uses enterprise-wide credit limits across both traded and cleared-only transactions to allow for prudent risk management. It also supports negatively priced contracts, allowing the trading of basis differentials, and is scaleable, allowing for future growth.' [Visit [www.nymex.com](http://www.nymex.com) for more information.]

Recruitment consultancy Norman Broadbent [[www.normanbroadbent.co](http://www.normanbroadbent.co)] reported that it had recently added to its Energy and Natural Resources Practice in a move that, according to Director Jon Glesinger: 'Changes the



## Establishing a new gas market

Forest Oil International, which has a range of ready-to-drill opportunities in Romania, Albania, Germany, offshore Sicily and South Africa, was particularly keen to promote its South African block 2 interests near the Nambian border, an area where only limited hydrocarbons have been found in the past. Steven Veal, Consultant for Forest Oil, explained that early this year the company signed a Letter of Intent with state-owned Petroleum Oil and Gas Corporation (Petro) under which Petro will invest some \$30mn for a drilling programme in 2003 in return for a 24% stake in the block which contains the Ibhubesi gas field. Ibhubesi, located in the shallower water of the block, is particularly important to this western region of South Africa as it will play a key role in the development of a gas market. The field is due onstream in 2006 and plans are to build a new pipeline to shore, running down the coast to Cape Town and on to the industrial complex at Saldanha Bay.

Forest Oil has also identified a number of sizeable prospects in the deeper waters to the west of block 2, including Elephant that may contain some 400mn barrels of oil.

Occidental was offering a 25–35% working interest in blocks 2 and 3 of Albania's onshore Ionian Basin. It wants partners to participate in the evaluation of this prospective play, including the confirmation and development of the recent Shpiragu discovery.

Meanwhile, Phoenix Hydrocarbons was, according to Edouard B Movshovitch, Petroleum Geology Head of the Moscow Office, seeking an investor(s) to explore the potential of the company's two western India explo-



ration blocks – RJ-ON-6 and GK-ON-4. He also reported an interest in applying some of the technologies that were being showcased at APPEX. These included Geo-Microbial Technologies' (GMT) hydrocarbon microseepage surveys using microbial and soil gas technologies that, when integrated with geochemical, geological and geophysical data, are reported to significantly improve drilling success rates and reduce overall expenditure. GMT President, Daniel Hitzman, claimed that by using both microbial signatures in rock samples and soil gas technologies his company had achieved a 90% success rate in predicting dry holes and a 70–80% success rate for commercial production.

## Seismic seeking partners

TGS-Nopec Geophysical was seeking to farm out acreage on its licence in the Rhone Delta offshore southern France

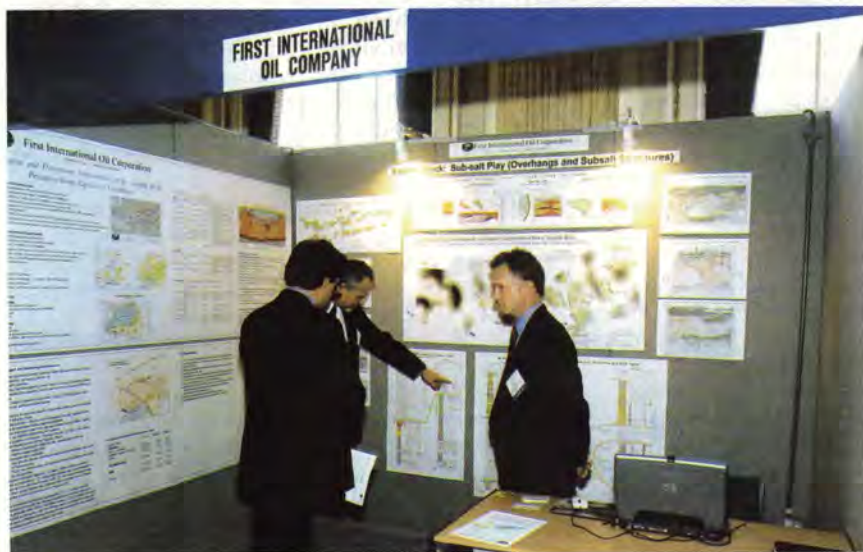
and another offshore Malta. New seismic has indicated that the basins may be deeper than first thought. According to Stein Ove Isaksen, VP New Ventures South Europe, the Rhone Delta licence may hold in excess of 1bn barrels of oil, with some 17 prospects already identified, while reserves for blocks 2 and 7 offshore Malta are put at 1.4bn barrels of oil and 570bn cf of gas.

He also reported that the company was planning a regional 2D seismic survey in the UK, Norwegian, Dutch and German sectors of the North Sea that would involve several vessels over several seasons. He explained that today's 2D technology was capable of identifying deeper plays than in the past by using long offset cables that offered better penetration and better amplitude control – a concept that had been proven in the Gulf of Mexico. It is hoped that this latest survey, using 8-km cables, will identify a number of new opportunities in the North Sea.

## Buying and selling

Other exhibitors included Envoi, an independent advisory group based in London that assists international oil and gas companies facilitate the buying and selling of predominantly upstream opportunities. Founder Mike Lakin reported that the company is currently promoting a number of 'active projects' in Mongolia, Australia, East Africa, Italy, Ecuador, Peru, Scotland and Georgia, details of which can be found at [www.envoi.co.uk](http://www.envoi.co.uk)

*\*The IP's 'Upstream Business of Oil and Gas' conference on Thursday 20 February was held in association with AAPG and sponsored by IHS Energy – see April 2003 issue for highlights.*



# Hopes and fears for the oil and gas industry

*Petroleum Review* Editor *Chris Skrebowski* briefly reviews some of the highlights during IP Week 2003.



The Institute of Petroleum's President Dr Pierre Jungels introduced this year's first IP Week conference entitled 'Fuelling the World Economy: Future Risks and Opportunities' by noting that predicting the future was always fraught with difficulties and that data on production and demand was subject to considerable uncertainty. However, there were very real challenges ahead for the industry.

He continued: 'Recent analysis by ExxonMobil, for instance, indicates that over the next ten years oil and gas demand will increase by around 2%/y whilst present fields in production will deplete at an average of 3-5%/y. The consequence is that the equivalent of half present-day production will have to be added over the period, indicating a requirement for about \$1,000bn of capital investment, the work of some 350,000 engineers and scientists and advances in technology at least as great as those of the last 30 years. Pretty heroic assumptions. This is not going to happen if oil prices drop below \$15/b, as some economists predict, since at these low prices the cash flow of the industry is just not sufficient.'

'We all know that the oil and gas that we produce today were made from sunlight over geological time and that the total resource available is finite. Oil and

gas production is by definition unsustainable in the long term. The US Geological Survey made, over a five-year period, an exhaustive estimate of worldwide oil supply. The resulting report concluded that there was a 95% certainty that the total resource available when we started pumping oil was 2tn barrels, with a 50:50 chance that there were 2.7tn barrels.

'This includes the Middle East countries where published reserves are probably optimistic for political reasons, but where significant new discoveries could be expected if the international oil companies were allowed entry to explore. Since we have already produced a little more than 1tn barrels it puts us about 10 years away from the famous King Hubbert peak, which occurs when about half of all possible reserves has been produced. The 2.7tn high case of the USGS assumes significant increases of discoveries in the future, "discoveries" meaning not only new fields but also additional recoveries of existing fields.'

According to Jungels, similar considerations apply to gas. However, the data for gas is even softer than for oil, but a tentative King Hubbert peak would be in the 2020-2030 range. He then noted that: 'In the near term, there is no shortage of oil and gas although the rate of discovery world-

wide has been declining since 1982 and more recently a majority of oil companies has had to revise downward their expectation of oil and gas production growth, citing technical, people and weather issues. The reality is that the production targets were unrealistic and based on flawed statistics.

'In summary, short-term past, near-term future and long-range forecasts of oil and gas supplies are so uncertain that they should not be used for planning purposes except in a scenario process. What this means is that the industry faces huge challenges to find and produce the hydrocarbons required over a 20 years horizon.'

## Current sources

The opening address was given by Rex Tillerson, Senior Vice President, ExxonMobil. Speaking to a title of 'Current Sources - A Global View' he explained that ExxonMobil had analysed demand and discovery data and concluded that around 80mn boe/d of new supply would need to be added by 2010 to meet the projected demand at that date. The company's calculation was that it could involve an investment of \$1tn over the decade, or a rate of \$100bn/y. This level of investment was somewhat ahead of recent investment levels and, as such, represented a huge challenge to the industry.

He indicated that he was confident that the challenge could be met, but noted that the principal threats to its attainment were lack of fiscal stability or denial of access to resources.

## An economist's viewpoint

Taking a totally different approach Dr Robert Arnott of the Oxford Institute for Energy Studies analysed the potential resource problem from an economist's viewpoint. He started by reminding people that security of supply concerns were not new and that 'any discussion on current energy sources must include the issue of potential supply disruptions and their likelihood of occurrence'.

He continued: 'Security is therefore a mother of probability, the greater the chance of these events occurring the weaker the security.' He then went on to explain that the impact and economic damage was closely related to

the speed of the disruption and the ability of the system to adapt, for example by switching supply sources, switching fuels and developing new energy sources. He concluded by noting that most commentaries are inclined to minimise significance of crises, arguing that adjustment is inevitable. This, he felt, minimised the impact of the immediate costs and the variable time of adjustment depending on the nature of the crisis.

## US perspective

Colin Welsh, Managing Director of Simmonds & Company, gave a US perspective on some of the wider challenges facing the energy industry. He started by noting the steady rise in the world population and the way it was being driven by increasing life expectancy as rising incomes extended healthcare provision. There was, however, a massive gap between the world's rich and poor in terms of both GDP and energy consumption. In addition, much of the world's poorer countries had rapid population growth and a high proportion of their population under the age of 15.

He then went on to explain that more people and more GDP necessarily meant the need for more energy. According to him 2bn people in the world still have no access to electricity and half the world has a GDP of under \$2,000. As the rich use 25 times the energy of the poor, and energy consumption starts to rise rapidly once GNP/per capita reaches \$5,000, the scale of the problem becomes clear.

He noted that the US saw the rich/poor gap as a threat to global stability – as would any denial of economic advancement in terms of energy supply. He stated that renewables are dominated by hydro power and the contribution of wind is small. Germany is the leading wind power generator but it still only contributes 1.8% of total energy in the country. Nuclear remains unpopular and has very limited growth potential, while coal, although abundant, has environmental challenges.

The rest of the presentation looked at US energy challenges and its vulnerability to disruptions, noting current Venezuelan crude shortfalls and the consequent move to minimum stocks. In a similar vein he drew attention to possible shortfalls in US gas supply and the lack of production gain from the recent gas drilling boom. He summed up the challenges as there being a huge requirement for additional energy, which was becoming hard to meet from conventional sources. Alternative energy was seen as a marginal contributor while price volatility had inhibited energy



investment. The US, as the world's largest consumer, was most at risk because of its dependence on imports.

## Developing demand

Robert Priddle, Executive Director of the International Energy Agency (IEA) echoed many of the themes of the previous speaker as he showed the way in which developing countries would account for 62% of the increase in world demand between 2000 and 2030.

He also showed that, although gas demand grows fastest to 2030 in absolute terms and non-hydro renewables fastest in percentage terms, oil remains the dominant fuel in 2030. Demand for oil in 2030 is seen to be running at 120mn b/d with non-conventional oil making a significant contribution. Oil import dependence increases in all areas over the period, with OECD Europe, OECD Pacific, South Asia and China all between 80% and 90% import dependent. Chinese net imports are expected to rise from 1.7mn b/d in 2001 to 9.89mn b/d in 2030. One of the conclusions drawn was that the Middle East will become the dominant oil exporting region and, towards 2030, the world's largest gas-exporting region.

Other features addressed were the progressive increase in carbon dioxide

emissions as energy consumption expands and the possibility of this being mitigated, and the massive investment demands to meet global power generation requirements.

## Profitable niches

In contrast to the somewhat sober tone of some of the early speakers, Bruce Stover, Senior Vice President–Worldwide Business Development for Anadarko Petroleum, was very positive about future prospects for his company. After showing the way in which mergers of the late 1990s rearranged the oil industry food-chain, he noted that independents can effectively utilise their core competences on projects of a size and scope that match their scale of operations. Where there are projects too small to interest the mega-majors there is a considerable and profitable niche for the independents.

He then went on to describe Anadarko's success in Algeria where it had made 12 discoveries with over 2.8bn barrels of reserves and where production has just come onstream. He went on to describe the company's joint venture with BP for South Auger and a large number of deepwater blocks in the Gulf of Mexico, as well as a series of niche acquisitions in Canada, the





Middle East and the US Rocky Mountains. His summary was that companies like his would be most successful by sticking to what they did best and to focus on, and establish, a niche.

## New potential

Ian Vann, Group Vice President and Technical Director for BP, entitled his paper 'New Oil Provinces – The Opportunities and Constraints'. He started by showing the relative levels of the depletion of the global distribution of conventional oil, noting that while North America's initial 330bn barrels was over 80% depleted, the FSU's 300bn barrels was under half depleted and the Middle East's 770bn barrels was only a bit over one-quarter depleted. While confirming the progressive decline in discovery rates, Vann noted the significant discovery upturn in the late 1990s during which five major oil provinces were developed. Collectively West Africa, Brazil and the deepwater Gulf of Mexico have had discoveries totalling over 30bn barrels. In the same period access was gained to the Caspian and Sakhalin, both of which had considerable, but not yet fully defined, potential for new reserves.

In addition, improving technology was opening up potential to find oil and to recover it more efficiently. He explained that BP was currently using the largest commercially available parallel processing to image under salt. As the largest Gulf of Mexico field – Thunder Horse – is a sub-salt discovery he felt there was immense potential for further sub-salt discoveries in the region (both US and Mexican offshore) and in the South Atlantic, both offshore Brazil and in the Gulf of Guinea. He assessed the potential in the Gulf of Mexico to be up to 25bn boe, with a further 40bn boe in the South Atlantic Margins. In the Middle East, he saw

potential of up to 100bn barrels in play extensions provided the companies with the technology could get access on favourable fiscal terms.

As a final long-shot possibility he noted that the Russian Arctic Basin was an extension of the structures that had produced the Alaskan North Slope, although the extreme environments offered real challenges to exploration.

He concluded that provinces open up when the technological barriers are overcome and when political constraints on access are removed. He was very optimistic that this process would continue.

## Alternative energies

A series of speakers then examined alternative energies. Jeremy Leggett, CEO of Solar Century looked at the role of gas and micropower in future energy supply. His view was that global warming caused by rising carbon dioxide levels was such a threat that: 'We have perhaps a quarter of a century or less to achieve the transition from fossil fuels to renewables.' He believed that this could be achieved once the will and determination were there to make the investments for the changeover.

Stéphane Grit, Head of the Nuclear Department in the French Ministry of Economy, Finance and Industry, examined the potential of nuclear industry and the influences determining the length of life of nuclear power stations with particular reference to the French experience. He ended with a strong plea to keep the nuclear option open for the future.

Corin Millais, CEO of the European Wind Energy Association, was a persuasive advocate of the potential of wind power and the way that improving technology is revolutionising the sector.

Daniel Carr, Vice President, International Affairs, Nymex, examined

the potential for coal, noting the way that modern trading systems could facilitate a wider use of coal.

Jan Lundberg, the founder of the Sustainable Energy Institute, ended the first day's presentations with the provocative suggestion that the world needs to focus on using less energy, as well as using energy more efficiently. He particularly noted the way in which our city- and town-based society is wholly dependent on flows of food from the countryside and the way that this is wholly dependent on uninterrupted flows of oil products. He ended with a strong plea for better understanding from the public of the challenges ahead.

## Rosy future for gas

IP Week's Tuesday morning seminar hosted in association with the Institution of Gas Engineers and Managers (IGEM) opened with some bold statements from Chairman Maurice Tallantyre. With economic, social and environmental drivers in place, demand in Europe set to grow by 75% and as the technology required is readily available, the gas industry's future was almost assured.

Commentary from BP's David Weaver acknowledged these sentiments, but on a more cautionary note he reminded delegates that on entering the 'golden age of gas' there were issues to address with government and regulators in order to ensure that they recognised gas as the bridging fuel towards a low carbon economy. First and foremost market liberalisation needed to move forward at a measured pace.

## Shakespearean parallels

Ken McKellar of Deloitte & Touche Petroleum Services drew parallels with Shakespearean plays to provide delegates with two possible futures focused around gas contracts – 'as you like it' or 'a comedy of errors'. The essence of his message was that the industry should take the initiative in developing contracts rather than leaving it to regulators or government. His advice centred on ensuring that we understood the constraints and opportunities of the industry's infrastructure before drawing up future contracts.

Jonathan Stern from the Royal Institute of International Affairs challenged common thinking – gas was plentiful; it was unlikely that demand would grow as forecast; there was no security of supply issue, and we should not be concerned about dependence on imports. Arguably his view flew in the face of previous commentaries, but the logic and empirical evidence he

supplied made most in the room think again.

The seminar concluded with Lattice's Nick Curtis describing LNG as a solution in part to supply security, offering further diversity, and using the Isle of Grain facility as an example in practice.

## Future North Sea prospects

Chairing the 'UK Upstream Industry: Exploring the Future' seminar organised in association with UKOOA, UKOOA Director General James May told delegates that the UK oil and gas industry was at the half-way stage of development, with 'at least as much oil and gas to produce as has already been produced'. On a less positive note, he stated that exploration in 2002 was at an all-time low, with just 19 wells drilled on the UKCS (more expected in 2003) and with industry spending more – over £6bn since 2000 – to produce less. Unit opex is currently predicted to rise 20% to reach \$4.9/boe by 2010.

He noted: 'The North Sea still offers a range of opportunities for the independent and new entrants such as Apache and Perenco – increasingly so as materiality of assets is becoming a key issue for the oil majors. However, a new culture was required, focusing on new commercial attitudes and using new technology to better interpret the geology and reserves, if the North Sea was to remain competitive. It would also require the support of the UK Government and initiatives focused on restoring capital and operating/commercial efficiency.

He also pointed to the opportunities that may result from ongoing discussions between the UK and Norwegian Governments to address median line developments and better utilisation of the North Sea infrastructure. The latter would prove to be increasingly important as the UK becomes a net gas importer by 2005.

Gerald Kenny, Head of Natural Resources, Bank of Scotland, echoed many of May's comments. He pointed out that although production was falling and the number of wells drilled had fallen in recent years, the industry had a relatively successful discovery rate of some 10mn boe/well drilled. He also reminded delegates that although most new production was expected from mature fields and smaller discoveries, there could still be some major finds out there – as evidenced by the Buzzard field.

He forecast that the asset transfer market would remain active in forthcoming years, with the oil majors increasingly transferring their less profitable assets to the smaller indepen-



dents. As examples, he stated that the 50,000 b/d Forties field represented 1.5% of BP production but 15% for Apache; and that the 39.5mn boe purchased from BP/Amerada Hess represents a 38% increase in reserves for Paladin. 'The map of the North Sea is changing,' he said. 'Investor profiles are changing and independents are likely to be the main investors.'

One of these independents is Venture. Bruce Dingwall, Venture Chief Executive, stressed the important role that independents had to play in the future of the UKCS. He pointed out that new operators such as his company 'bring energy to market as they have got to make it work'. He stated that every change of operator had resulted in 'increase in investment, increase in production, increase in cash flow and a deferment of abandonment' as the result of using different operating practices and different business models.

## Importance of integrated technology

Douglas Meikle, Operations Vice President EFSU at Landmark Graphics, a subsidiary of Halliburton, outlined how Halliburton's 'Now Field' concept, a real time asset management paradigm, could help realise the remaining potential of the North Sea by making efficient use of integrated technology. He cited work by Cambridge Energy Research (CERA) that had defined five key technologies that had the potential to increase recovery rates by 2–7%, reduce lifting costs by 10–25% and increase production rates by 2–4%.

The five technologies are:

- Data integration – providing a low-cost platform for better workflow and improved performance. It can shorten the time to build a dynamic subsurface model from months to days.
- Visualisation – a forum for real time decision making. Such technologies are being used in development scenario modeling to comprehend risk and economic uncertainty.
- Intelligent well completions – surface controlled reservoir analysis

and measurement.

- Remote sensing – that allows the optimal placement of wells for recovery and productivity.

The seminar was closed by Dr James Milne, Chairman and Managing Director of Balmoral Group. He stated that in order to meet the challenge of remaining competitive the UK oil and gas industry would require a commitment to innovation, diversification, internationalisation and finally, and most fundamentally, a commitment to people. 'New skill sets will now need to be developed by the UK energy sector, from operators through to major contractors, sub-contractors and suppliers. Opportunities must be grasped to help the independent companies benefit from their considerable risks and investments and to bring the North Sea to its full potential.'

He went on to say: 'If we seriously want the UK to remain a key player, we, as an industry, with legislative support, must get round the table to discuss the best way forward for all concerned. The current environment does nothing for investment in the future. It does not allow for investment in people. It does not allow for investment in research and development. It does not allow for growth... Investment in the future of our industry is required immediately. That investment can only come from within the industry if key players, across the board, are rewarded for their contributions. Equally important is an understanding from government that this industry needs to be supported from the highest level and not milked as a cash cow when other tax raising strategies fail.'

\* Owing to space constraints we are unable to review the all-day session on 'Oil and Gas in the FSU' on Tuesday, 18 February, and the all-day 'Perspectives on the Upstream Business of Oil and Gas' on Thursday, 20 February. The Thursday conference was organised in association with the AAPG and sponsored by IHS Energy. These two conferences will be reviewed in the next issue.

# Shaping a new future

As February's issue of *Petroleum Review* went to press and I shared my views with you after three months in post as Director General, voting on the proposal to create a single Energy Institute was drawing to a close. Members visiting the website or taking part in IP Week will now know the outcome. For those of you who don't, the following provides an update.

Against an acknowledgement within the world of professional institutions that response rates from memberships to such calls for opinion can be as high as 15%, the resounding response from over 41% of the IP's membership was, by any recent standard, impressive. Certainly this was the view of our regulating bodies when we informed them. Some 2,995 Members returned their voting forms and, of these, 2,801 were in favour – equating to 93.5% of the voting membership supporting the proposal to create a single Energy Institute. Our merger partner, the Institute of Energy, recorded a similar return, with more than 2,000 of their members voting to demonstrate that 94.9% were similarly in favour of the proposal to merge. The detail of the results was posted on the IP website [www.petroleum.co.uk](http://www.petroleum.co.uk) on 10 February.

In his Presidential Address to 1,100 industry professionals at the 2003 IP Annual Dinner, Pierre Jungels said, combining the results of both institutes: 'With over 94% of votes cast in favour of the merger, you, our members, have given us a clear mandate for change and a solid base from which to build the Energy Institute. Both the IP and the InstE were created by men of vision and have served their memberships over many decades. But with the advent of an integrated global energy sector, I and my fellow trustees firmly believe that the new Institute is needed, not only to mirror developments in our market, but also to lay the foundations for the foreseeable future. We are convinced that this merger will create such an Institute – one that will have the strength and reach to cover energy and fuels in all their forms, giving it both authority and influence.'

He went on to say: 'The Energy Institute will form a focus for professionals and companies in energy the world over. Some may consider this to be a bold claim. Time will tell. If, however, we harness just some of the tremendous support that we have received over the past few months from government, industry and members

alike, I am certain that the new Energy Institute will succeed.'

## Next steps

As you read this we are approaching the EGM on 5 March 2003, notice of which was given in last month's *Petroleum Review* and published on the website. In addition to noting the result of the membership vote, the principal business to transact will be to consider and vote on a resolution to submit a joint petition with the Institute of Energy to the Privy Council for a Royal Charter. If agreed, this will commence the legal process outlined in the merger prospectus to create the new Institute. In parallel, trustees of both organisations have begun to work with members and the CEOs to identify the practical issues of merger integration in readiness for forthcoming Council meetings. This trustee group, formally the joint merger steering group, met on 5 February to discuss and agree the approach to tackling integration.

The Councils of both organisations intend to appoint eight members each, including their respective Presidents, to an Interim Council (IC) to act with their authority as a 'shadow board' to oversee and monitor agreed integration activities.

By drawing on the expertise of not only IC members, but also of the respective Councils, branches, members and staff, working groups will be established, reporting to the IC, to ensure momentum, direction and accountability in the key work streams, including:

- Governance
- Strategy and performance
- Communications
- Operations and HR
- IT
- Technical affairs
- Finance
- Legal
- Membership services
- Branches

External advisers will be appointed in accordance with specific briefs as appro-

priate, but each work stream will have an executive owner and an IC member as liaison and be directly accountable for performance and progress. Effective management and coordination of these work streams are essential if we are to meet the short-term deadlines and objectives, and ensure that the foundations are laid to deliver the promises made in the prospectus.

The branch network and membership services work streams are key to encouraging the wider practical involvement of branch members in the merger process and the opportunity for them to be instrumental in shaping their future aspirations.

## Open communication

One of the most important of the work streams will be Communications as we seek to ensure that members, customers, stakeholders and staff are kept as fully up to date and informed of progress as possible. Through websites, publications, events, newsletters and media releases you will be kept aware of developments as the process of merger integration unfolds. However, we must not forget that both the IP and InstE have a very full and active programme to run and it is very much 'business as usual' with the attendant obligations over the coming weeks and months. We must not, and will not, take our eye off the ball in meeting and managing these obligations as we seek to preserve continuity of services and business operations as well as the relationships and reputations of both organisations through this transitional period.

In the last issue of *Petroleum Review* I said that my work would just be beginning as members' determined one of two clear paths for me to pursue. Members took the first and significant step by providing me with a clear mandate. Collectively we are now embarking on a new and exciting chapter in our proud histories. It is a journey not without risks but, given the will to succeed and the spirit of cooperation already demonstrated by both Institutes, there will be no complacency. I am confident that we have the expertise and ability to manage not only the process of merger but also the expectation to achieve the promises made. ●

Louise Kingham, DG, IP

## Oilmen in need of slick recruitment

Monster.co.uk, the UK's leading online recruitment site and its parent company, TMP Worldwide, recently completed a survey of oil industry personnel to find out more about them, their attitudes to the industry and their perceptions of how others view the market. Its findings debunk several industry myths and provide a number of surprises. *Chris Skrebowski reports.*

The survey was conducted by e-mailing 25,000 people working in the oil industry. Industry personnel were contacted via TMP Worldwide's own database and the Institute of Petroleum's members database. People who had expressed an interest in the industry via Monster.co.uk were also encouraged to participate. In addition, a further 5,000 personnel were approached through the house magazines of the Petroleum Exploration Society of Great Britain (PESGB) and the Institute of Energy. A total of around 30,000 people were approached and 869 completed questionnaires were received. The results are therefore broadly based and provide a good snapshot of the industry and its attitudes.

The first myth exploded by the survey is the idea that greybeards dominate the industry. Among the respondents the age splits are reasonably even – 7% under 25, 29% aged between 26 and 35, 30% 36–45, 22% 46–55 and just 7% over 55 (see Figure 1). While only 3% of the sample were reluctant to reveal their age, when it came to their job titles most were reluctant to tell, the exception being those with the grander sounding titles. However, 97% of respondents were prepared to give a more general job title and we learn that 15% were Executives/Senior Management, that 59% were Technical/Operations and 24% were General Management/Administration.

The data revealed that 75% described themselves as working in the upstream, with only 12% in the downstream sector. Curiously, a further 12% didn't know or

weren't telling if their activities were in the upstream or the downstream arenas. Downstream respondents were reluctant to offer any detail, but for those in the upstream nearly a two-thirds were prepared to provide specifics. We learn that 24% of them work for Government, 15% for E&P Companies; with 9% in Consultancy, 6% in Major Oil Companies and a further 6% in Oilfield Service Companies. Independent Oil Companies and Supply Chain Companies accounted for just 2% each.

Some 87% of the respondents are currently working in the oil and gas industry so we are entitled to conclude that when they say they are well paid, the oil and gas industry pays well. The survey results are from 92% of the respondents, indicating no shyness about their remuneration. The results are: under £25,000: 12%, £26,000–£35,000: 16%, £36,000–£45,000: 15%, £46,000–£60,000: 21%, £61,000–£75,000: 14%, £76,000–£100,000: 9%, £101,000–£120,000: 3%, and over £121,000: 3% (see Figure 2).

### Jobs for life?

Respondents were very reluctant to indicate how long they intended to stay in the oil and gas industry but, among the few that answered, the favourite period was between five and 10 years. Career aspirations in terms of role in 10 years' time produced the possibly unsurprising result that 45% of them wanted to be Executives/Senior Management while 31% aspired to Technical/Operations. General Management/Administration

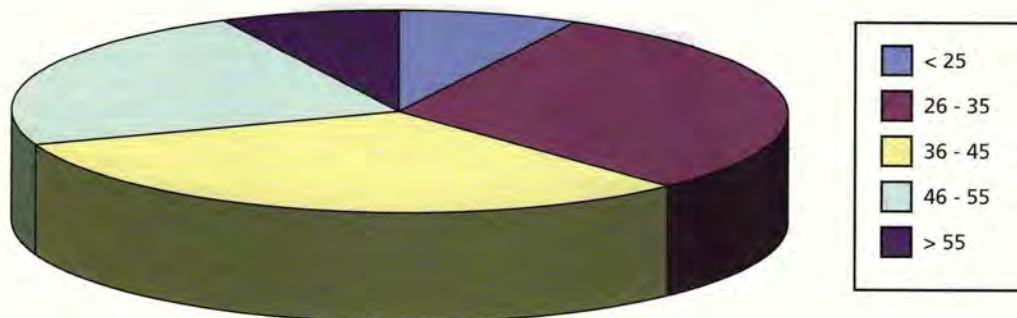


Figure 1: Age ranges

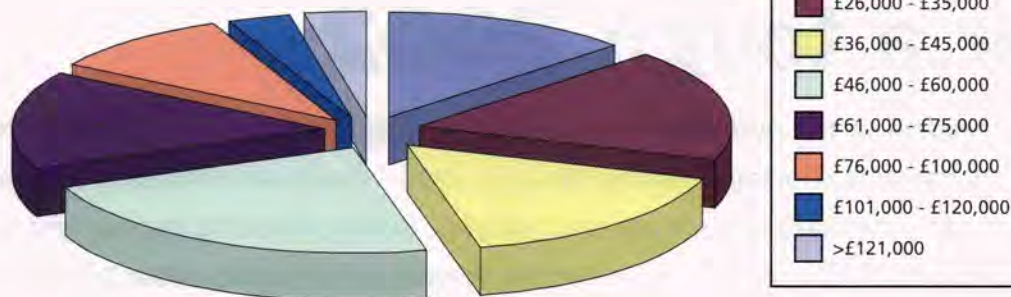


Figure 2: Salary ranges

was the aim of 13%, leaving 10% who either didn't know or weren't telling.

The answers to the question 'At what stage did you become interested in working in the oil and gas industry' were particularly revealing. No less than 17% began working in the industry purely by chance. In contrast 10% had become interested at school, 28% at university and 5% on post-university courses. A further 11% became interested at the time of their first job and another 11% in mid-career. The final 17% either couldn't remember or weren't telling.

The survey clearly shows the oil and gas industry to be a place where people stay for a long time. Some 25% of respondents (79% answered) had been in the industry for over 20 years. A further 25% had been in it for 16-20 years. Among the newer entrants 7% had been in for less than 2 years, 8% for 3-5 years and 13% for 5-10 years. The implication of these figures is clear - if as many of its critics charge it as a hire-and-fire industry then most are being rehired and are staying with the industry.

This positive conclusion is borne out by the responses to the 'How long do you intend to stay in the industry?' question. The view that people commit to the industry for long periods is confirmed by the answers, with an impressive 30% of respondents offering to stay for the rest of their careers, 17% for 5-10 years, 15% for 11-15 years and 8% 16-20 years. As just over 80% of those contacted responded we can safely conclude this is an industry that people want to stay in - a view confirmed by the fact that just 6% of the sample expected to stay for 3-5 years and just 3% for less than two years.

### Qualifications and incentives

In terms of the area of qualifications 84% responded. Of the sample 10%

had PhDs, 9% MBAs and 32% had Masters degrees. Oil-related degrees were possessed by 20% of the sample, with 33% having other degrees. A-levels or High School equivalents were held by 29%, with a further 15% having an HND. Asked how they would fund further qualifications 31% would look to their employer, 19% would pay themselves, while 12% planned to work for an organisation that would pay. However 26% didn't answer and 13% answered but were unsure about who would pay.

Of particular interest in an industry that is truly global was the question asking which incentives would entice the respondents to relocate. Predictably money won for 62% of respondents, followed by location 58% and responsibility for 46%. Company image was the decider for 23%, while other factors enticed 8% and 19% didn't answer.

### Benefits of membership

Of the sample 61% had professional affiliations, with the largest group being members of the Society of Petroleum Engineers (SPE) with 29% of the positive respondents, followed by the PESGB with 16%, and then by the Institute of Petroleum 6%, Institute of Mechanical Engineers 5% and the American Association of Petroleum Geologists (AAPG) 4%. Another 14 different bodies and institutes had up to 3% of respondents as members.

Asked about the benefits of membership the chief attractions were - industry information cited by 54% of respondents, professional journals 53%, networking and training opportunities 46% each, conference programmes 31%, technical standards 25%, social events 24% and professional qualifications 23%. Having initials after their names was mentioned by only 15% of respondents.

### Industry perception

The most dramatic findings of all came when the respondents were asked for their perceptions of the oil and gas industry and their perceptions of how people outside the industry saw it. Roughly three-quarters of respondents answered the questions. In terms of the perception of their industry 53% saw it as a dynamic and challenging industry that offered a diverse range of career opportunities. However, 39% saw it as an industry with a boom-bust mentality and a hire-and-fire policy. More positively 34% saw it as an industry at the forefront of technology, 23% as one that was environmentally conscious and 22% as an industry that embraces change and drives diversification. Just 4% described it as just a place to work and 6% as an industry with no long-term future.

Slightly more respondents replied about how others see the industry and this makes very gloomy reading for those trying to improve perceptions of this sector. According to 45% of the respondents the oil and gas industry was seen as one that irresponsibly exploits natural resources, 38% noted it as an industry with a boom-bust mentality and a hire-and-fire policy, 34% an industry with no long-term future and 31% as an unfriendly and dangerous industry to work in.

### Good news... and bad news

The results of the survey provide many positive points about people in the oil and gas industry and their views about it. They also show a somewhat beleaguered attitude among the respondents who appear to believe that those outside the industry don't understand it and are hostile to it.

# Refining margins to improve after a tough 2002

With the exception of the odd windfall year due to exceptional events – such as the Gulf War in 1991 or US gasoline shortages during the year 2000 – European refining margins have generally provided inadequate returns for most players. In fact, over the last ten years the average margin for a complex refinery running Brent crude in North West Europe (NWE) has been only \$1.89/b, write Wood Mackenzie Consultants *Sat Roopra* and *Lindsay Docherty*.

Last year, 2002, saw the worst refining margins that most commentators can recall – surpassing even the disastrous levels of 1999 (see Figure 1). Indeed, the start of the year saw negative complex margins in both February and March – an almost unprecedented situation. Although margins firmed somewhat as the year progressed, the tentative recovery which started in October was stifled by rapidly rising crude oil prices in December.

So what occurred during 2002 to make this a year that most refiners would prefer to forget? Oil product demand fell by around 0.6 % versus 2001 as economic growth in Europe slowed. Of the light products only diesel grew (although at a lower rate than previous years). Demand for jet fuel (the fastest growing product of the last five years) also fell following the terrorist attacks in the US on 11 September. Demand for gasoline continued to fall and US shortages did not prop up the gasoline price in Europe as they have done in the previous two years. The only saving grace came in the unlikely form of fuel oil, where demand across Europe was up by around 7% on the previous year.

Figure 2 shows the crack spreads of gasoline, gas oil and fuel oil against Brent crude. The weakness in gasoline prices is evident and is accentuated by the absence of the gasoline spikes of the last two years (gasoline stock management in the US was much improved this year versus recent years). Gas oil too showed significant weakness, dropping to levels not seen since 1998/1999. Furthermore, the weakness in gas oil was accompanied by lower premia for both diesel and jet prices against gas oil than we have seen in recent years, due largely to weaker demand. Despite the high crude price (\$24.97/b) the fuel oil crack spread was particularly strong during 2002 due to the robust demand picture.

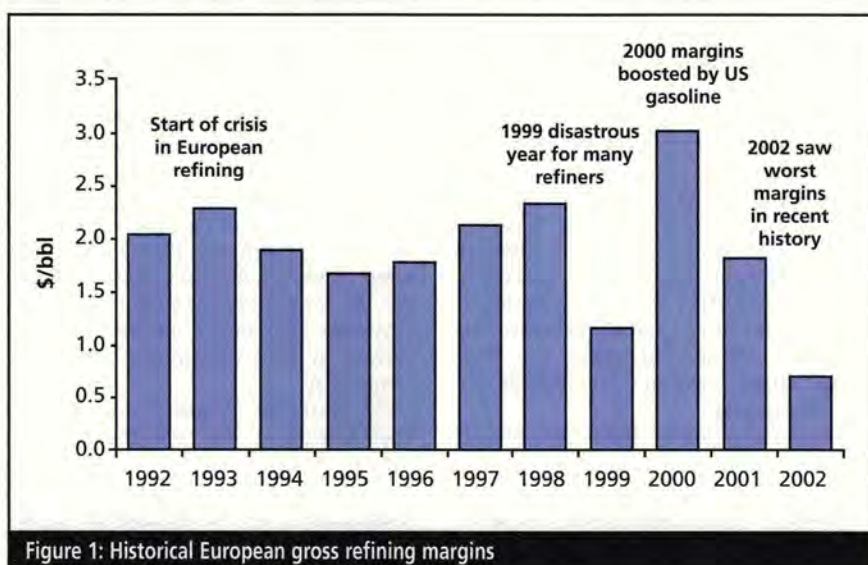


Figure 1: Historical European gross refining margins

Wood Mackenzie estimates that the weakness in light distillates (LPG, gasoline and naphtha) accounted for a \$0.85/b reduction versus 2001 margins, while weakness in middle distillates (jet

fuel, diesel and gas oil) accounted for \$0.51/b reduction. Paradoxically, for a product that is consistently written off, buoyant fuel oil prices strengthened margins by \$0.29/b versus 2001.

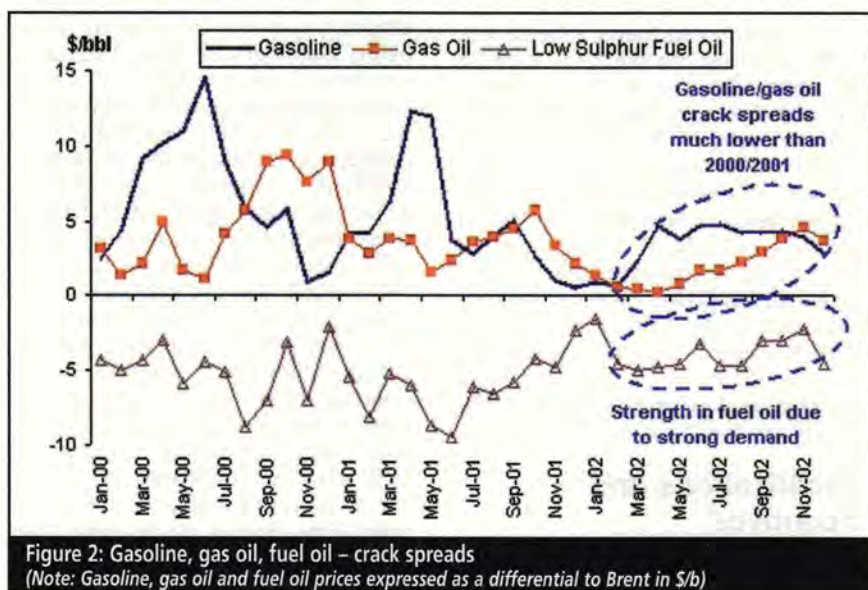


Figure 2: Gasoline, gas oil, fuel oil – crack spreads

(Note: Gasoline, gas oil and fuel oil prices expressed as a differential to Brent in \$/b)

## European margins well down

The year 2002 was a grim one – not just in comparison to 2001 but also in comparison to a typical mid-cycle year. We estimate that around 40% of refineries in Europe would have lost money on a cash cost basis during 2002, and around 55% would have failed to make an operating profit.

As Figure 3 shows, with the exception of fuel oil all product prices were weaker than they would have been under typical mid-cycle conditions. Oil product prices are driven by a number of fundamental factors such as supply/demand, stock levels or product quality and in the case of fuel oil the absolute level of crude price as well. Oil products usually exhibit different price dynamics in different years and this is reflected in the refining margin. However, during 2002 virtually all products showed weakness at the same time and it is this confluence of events that resulted in the very depressed levels of margin during 2002.

## Global margins

With the exception of the US, refining margins on a global basis were weak during 2002, although Europe showed more weakness than the other regions. Figure 4 shows the average 2002 margin and the average margin over the last five years for each of three main refining centres – US Gulf Coast (USGC), North West Europe and Singapore – along with our indicator global margin.

In the US, despite a rapid slowdown in the economy, oil demand still grew by around 0.3%. The weakness in jet fuel demand (caused by the terrorist events on 11 September) was countered by people electing to drive greater distances and so gasoline demand remained buoyant. USGC refiners who are strongly geared towards gasoline production benefited from the strength in gasoline prices. Unfortunately, from a European perspective US refiners managed gasoline supply better this year than the previous two years and the US supply disruptions of 2000/2001, which lent significant support to European gasoline margins, did not occur.

In the Asia-Pacific region the demand picture was, if anything, more sluggish. Falling demand in OECD Pacific (notably South Korea and Japan) was offset by strong growth in the emerging economies of China and India. Singapore margins remain at depressed levels as the region continues to suffer from the legacy of over investment in refining capacity during

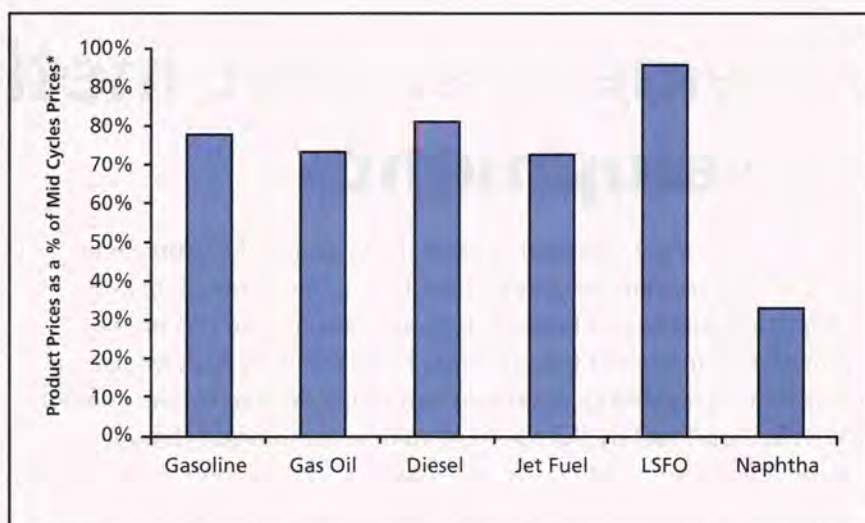


Figure 3: Product prices as percentage of mid-cycle prices

*\*(Note: Average 2002 product price differentials to Brent crude expressed as a percentage of mid-cycle differentials)*

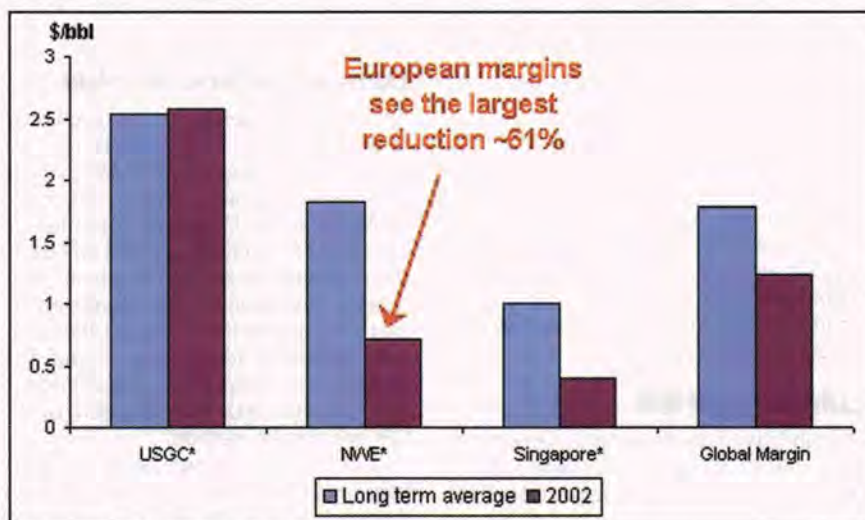


Figure 4: Global gross refining margins

*\* USGC – WTI, NWE – Brent, Singapore – Minas*

the late 1980s and early 1990s – this is further exacerbated by the fact that the refining centre in Singapore acts as the swing producer in the region.

## Outlook for refining margins

Overall, Wood Mackenzie is bullish about the prospects for refining margins in 2003. In Europe margins should recover strongly as the underlying fundamentals reassert themselves. Furthermore, we believe that European gasoline prices in particular will see support from the US as the refining industry in the US tries to replenish stock levels which have been run down as a result of the general strike in Venezuela. Moving forward, tightening fuel specifications in 2005 should offer additional support to

margins, but the margin environment in overall terms will remain challenging.

The US is also likely to see higher margins in 2003 than last year. This is driven both by likely supply shortages due to the recent strike in Venezuela and a more robust demand picture as economic growth picks up.

In Singapore we believe that 2002 represented the nadir and that margins should now begin to improve. This region has the most positive demand side story of the three regions, although the extent of the overcapacity issue is such that recovery will be a slow process. In fact, Wood Mackenzie does not believe that the current overhang of refining capacity will be cleared until nearer the end of the decade.

# Driving fuel test method developments

On the 25, 26 and 27 November 2002 the Institute of Petroleum (IP) ran a series of workshops on three of the test methods called up in the European Gasoline and Diesel Fuel Specifications. The test methods were: determination of the lubricity of diesel fuel by high frequency reciprocating rig (HFRR), determination of the derived cetane number (DCN) of diesel fuel by the constant volume combustion chamber method and the determination of low level sulphur content of gasolines and diesel fuel. *John Phipps, IP Technical Manager-Standards, reports.*

All three workshops were well attended by representatives from engine and vehicle manufacturers, oil companies, diesel engine equipment manufacturers, test houses, test equipment manufacturers and standards development organisations, from the UK, mainland Europe and the US.

Presentations were given on the latest developments in test method equipment and test method development both within Europe and the US. In addition, the application of the methods in online applications was also addressed. The presentations were followed by lively and informed discussions and a number of action items agreed.

## Lubricity HFRR

The lubricity of diesel fuel is an important characteristic as some of the diesel engine fuel delivery components rely on the fuel for their lubrication.

A number of actions were agreed at the workshop:

- Link the test method equipment manufacturers' website to the IP website – [www.petroleum.co.uk](http://www.petroleum.co.uk) – in order to allow users easy access to their 'help line'.
- Change the scope of the test method to allow fuels with less than 350 µm wear scars to be tested.
- Recommend to the Coordinating European Council for the Development of Performance Tests for Fuels, Lubricants and Other Fluids (CEC) that its revised method be published as soon as possible.
- Request that CEC release data from its testing programme to the IP.
- Revise the IP 450 (ISO) test method to bring it in line with the revised CEC test method.
- Test diesel engine fuel samples used in the IP's Diesel Fuel Engine Correlation Scheme for lubricity by the IP 450 HFRR test method and

publish the results on a monthly basis.

- Encourage the CEC Working Group SF 006 to hold a meeting during 2003 at the IP.

## Derived cetane number

The CFR engine test currently called up in the European Specification for Automotive Diesel Fuel EN 590 is both time-consuming and costly to set up. In addition, some European countries do not have CFR engines and this will cause them problems as the European Fuel Quality Monitoring Scheme will require that all countries in the EU test the diesel fuel marketed for quality – and this quality check includes the requirement to determine the cetane number (CN) by the CFR engine test method.

In order to overcome all these problems the IP, together with the ASTM, have developed a standard test method for DCN and is proposing to CEN that it be adopted as an alternative technique for determining the ignition quality of diesel fuel.

Actions agreed:

- Link the test method equipment manufacturers' website to the IP's website in order to allow users easy access to their 'help line'.
- Manufacturers of test equipment to inform users and organisations producing test methods of any changes in software.
- IP, together with ASTM, to look into producing a 'code of practice' for manufacturers, users and test method writers to determine when changes in software of automatic test equipment are significant and could affect test results and or precision.
- Set up a monthly DCN testing scheme in conjunction with the IP's Diesel Fuel Engine Correlation Scheme in order to check for any bias between

the DCN values and the cetane number of the fuels.

- Obtain data to improve the precision of the IP 498 test method.
- Test method instrument manufacturers to develop online equipment.
- Fuel Tech AS to obtain more data for its instrument, using both reference diesel engine fuels and samples used in the IP Diesel Fuel Engine Correlation Scheme.
- IP to consider the development of a Proposed Test Method for the determination of the ignition characteristics of marine fuels using the Fuel Tech apparatus.

## Sulphur content

In order to meet the specification limits for fuels to be marketed within Europe in 2005 and 2010 existing test methods have had to be revised and new standard test methods written. In addition, analysing automotive fuels for sulphur content below 10 mg/kg presents problems with cross-contamination of test portions, apparatus verification and apparatus performance.

Actions agreed at the workshop:

- At the earliest opportunity revise the European/international standard test methods so that they have a consistent storage time requirement for calibration/reference materials.
- Revise the EDXRF methods to have a tighter procedure for test cup filling and tighter requirements for checking film compliance.
- Include more guidance on sampling and sample handling in test methods that are to be used to determine 'low' levels of sulphur.
- Encourage the manufacture of CRMs that can be used in test methods that measure sulphur contents in the 10 mg/kg region.
- IP's Sulphur Panel to look at writing a protocol for the determination of 'very low', less than 10 mg/kg, sulphur contents of petroleum products.

The number of attendees, their active participation and the agreed action items demonstrate that the IP Workshops had fulfilled one of the Institute's objectives of providing a forum for the dissemination of technical information and the identification of technical work items. ●

# Copyright explained

Copyright law is changing to harmonise copyright across Europe and will affect anyone making copies of any published material for a commercial purpose. The changes should have come into force in December 2002 but, due to the number of detailed responses generated following the consultation period, implementation has been delayed until March 2003. *Catherine Cosgrove*, Head of IP Library and Information Service, answers some of the questions that have arisen in light of the change.

**Q. What happens if I need to copy a document for a commercial purpose?**

A. You will have to obtain a licence from The Copyright Licensing Agency (CLA), get permission direct from the publisher, or obtain your copy from a library. The library will have obtained a licence from the CLA and you should expect to pay an additional charge, on top of the usual photocopy fees, for a copyright cleared copy.

Some publishers, however, have forbidden copying of their material. In this case libraries, including the IP Library, will be unable to make a copy for you. If you are an IP Member the IP Library will endeavour to lend the item to you

instead, assuming it is held, but this will not always be possible or practical.

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A. If you need to copy a document for a non-commercial purpose (and only you can decide if the purpose is non-commercial) then the existing fair-dealing copyright provisions will still apply. The IP Library will supply copies at the existing rates without any additional fees.

The important thing to remember is that it is the purpose for which the copy is being used that determines whether or not the copying is commer-

cial – not who is doing the copying or where it is being done.

**Q. How can I find out more?**

A. Further information can be obtained from the following websites:

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[www.managinginformation.com/copyrightspecial.htm](http://www.managinginformation.com/copyrightspecial.htm)
- British Library  
[www.bl.uk/copyright](http://www.bl.uk/copyright)
- Patents Office  
[www.patent.gov.uk/copy/](http://www.patent.gov.uk/copy/)
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## Automotive Fuels 2003

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Automotive Fuels 2003 is a meeting point for managers of producers, distributors and laboratories, and regulatory bodies in the automotive fuels field. The symposium is aimed at strategic considerations and future developments in the combination of fuels and engines. Standardisation and regulation are the main themes.

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# Work in the pipeline

**John Brown Hydrocarbons Limited is the engineering and procurement contractor for the South Caucasus Gas Pipeline (SCP) from Azerbaijan to Turkey. John Brown is also responsible for corridor engineering on the Azeri and Georgian sections of the Baku–Tbilisi–Ceyhan (BTC) pipeline and for construction engineering of the BTC pump stations in Turkey. Roberto Pirani, Vice President–Pipelines, provides a brief company history and reviews John Brown’s involvement in these key Caspian pipeline export routes.**

John Brown\* is internationally recognised as a market leader in its areas of expertise and has been responsible for many innovative changes throughout its history. The award of the SCP and BTC pipeline contracts followed the successful execution of the Baku–Supsa (Western Route) Export Pipeline (WREP) which was completed in 1999. Today the company concentrates on oil and gas production and treatment facilities, offshore and onshore, as well as hydrocarbons transportation – which is the focus of this article.

## UK first

As Constructors John Brown\* (CJB) was the first British company to undertake cross-country pipelining. Its first contract was awarded by BP in Scotland in 1948, followed by a long list of pipeline projects in the UK, Austria, Holland, Germany, Algeria, Turkey and Iran, executed over three decades when CJB owned five full pipeline spreads.

In the late 1970s CJB moved out of the direct construction of pipelines and, under the name of John Brown, became a world leader in the engineering, procurement, management and construction supervision of pipelines, and onshore/offshore oil and gas production facilities, undertaking numerous successful projects in Europe, North and Southern Africa, the Middle East, the Asia-Pacific region and the Former Soviet Union (FSU). Current work includes projects for offshore

Canada, the North Sea, North Africa, Iran, Russia and Turkey as well as major pipelines in the Caspian region.

## Key Caspian export routes

John Brown has a long tradition of working with Russia, going back to the nineteenth century and involving the railway, tunnelling, gas turbine, engineering and construction sectors, as well as oil and gas. For the last 40 years John Brown has provided design, construction and engineering services to more than 30 plants and pipelines in Russia and the countries of the FSU.

In 1996 a consortium of major international oil companies – led by BP and known as the Azerbaijan International Operating Company (AIOC) – awarded a major contract to John Brown for the engineering, procurement and construction management of the Western Route Export Pipeline (WREP) from Sangachal on the Caspian Sea to Supsa on the Black Sea. The project consisted of the installation of a 20-inch diameter, 830-km buried pipeline following the same Azeri–Georgian corridor used by the Nobels and Rothschilds more than 100 years before. The project also included pump and pressure reducing stations, storage tanks, communications and control systems, and an onshore loading facility at Supsa.

The WREP project was successfully completed on schedule in April 1999, and

was the first major pipeline implemented in the former Soviet Union by an international consortium of oil companies.

The success of the WREP project led to further major contracts for oil and gas export pipelines from the Caspian region. The first of these was for the front-end engineering of the South Caucasus Pipeline (SCP) that will transport gas produced by the Caspian offshore Shakh Deniz field to Turkey. This contract was followed by the detailed engineering and project management assistance to the client’s team.

The SCP will have a diameter of 42 inches and an overall length of 970 km, running from Sangachal on the Caspian Sea to Erzurum in Turkey. Initial capacity will be 7.3bn cm<sup>3</sup>/y of gas, with a possible expansion to 22bn cm<sup>3</sup> when sufficient gas becomes available from the Caspian Continental Shelf.

During the execution of the design of the SCP pipeline, John Brown was also awarded a contract by the BP-led BTC Consortium for the corridor engineering and pipeline engineering on the project, as well as the preparation of the invitation to tender for construction, procurement and project management assistance, including logistics, for the Azeri and Georgian sections of the BTC pipeline.

The Azeri section of the two pipelines will be 442 km in length and have a nominal diameter of 42 inches. The pipelines will largely parallel the Western Route Export Pipeline, apart from deviations at the beginning on exiting the Sangachal terminal and to avoid known sensitive sites. Two new pump stations will also be installed on the Azerbaijan section of the BTC pipeline.

The Georgian section of the pipelines will be 248 km in length. The pipeline diameter will be 42 inches for the gas pipeline and 46 inches for the oil pipeline. This section will initially be routed parallel to the existing Western Route Export Pipeline for a short distance at the Azerbaijan/Georgian border, before diverting south towards the Turkish border at approximately KP 19. Two new pump stations will be installed in Georgia.

The overall length of the BTC pipeline, including the Turkish section from the Georgian border to Ceyhan, will be approximately 1,760 km. It will have a capacity of 1mn b/d, which is expected to be reached towards the end of the decade.

Once sanctioned the SCP will be constructed alongside the BTC pipeline through Azerbaijan and Georgia, and the SCP pipeline will supply fuel to the BTC pump stations.

On the basis of the current schedule the BTC pipeline will be completed by 2005 and the SCP by 2006, with some overlap between the completion of BTC construction and the commencement of SCP construction. Whilst there is some overlap in the construction schedules, construction of the two pipelines will not occur at the same place at the same time.

### State-of-the-art GIS

John Brown has developed a project specific Geographical Information System (GIS) based on ERSI products, which was used during the design phase alongside more established design software packages such as AutoCad and PDMS.

The GIS was used to manage, interrogate and interpret an extensive range of available data, to develop detailed routing and constraints maps to avoid known sensitive or densely populated areas, cultural monuments and archaeological sites, and known geohazards (wherever practical). It is also used to maximise the safe, uninterrupted construction and operation of the pipelines and the potential for reinstatement, and to minimise the risk of oil spill and the amount of land required for pipeline construction.

The GIS has proved to be an essential tool, not only during the design stage, but also during the process of consultation with governments and non-government organisations (NGOs), as well as potentially affected communities and interest groups at local, regional and international level.

As a result of the meticulous selection process for the route, not a single person will be required to move from their home because of the BTC and SCP pipelines, nor will there be any permanent disruption to the livelihood of the local communities.

During construction and operation, GIS will allow rapid and effective management of data, such as:

- *Health and safety* – Incident tracking by locating emergency response, location of emergency facilities, content details, access, security areas, etc.
- *Land information* – Land use, owners details, and agreement details.
- *Construction management* – The progress of construction, storage yards, camp locations, reinstatement and as-builts.
- *Logistics* – infrastructure.
- *Engineering* – pipeline technical information and crossings.

It will also provide an active link to the pipeline tracking system, enabling continuous monitoring of materials movement and the progress of pipeline installation and its testing. During

\*The origin of the company name goes back to Sir John Brown who founded the company in 1837. Over the last century the company has merged and formed new links so that, in turn, its name changed to John Brown & Company Ltd, Costain John Brown, Constructors John Brown (CJB), John Brown Engineers & Constructors Limited, Kvaerner John Brown, Kvaerner Process and Kvaerner Hydrocarbons. But it is simply as 'John Brown' that the company is famously known in the industry and remembered for the last 165 years by clients, partners and the public. Today the employees of John Brown are extremely pleased that the company is able to trade proudly under its original name once again.

pipeline operation GIS will be an essential tool for pipeline surveillance, maintenance and repair. ●

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## Can mobile phone communications ignite petroleum vapour?

The Institute of Physics, London, 76 Portland Place, London W1B 1NT, UK

The Institute of Petroleum will be holding a free technical seminar to review whether mobile phone technology can ignite petroleum vapour.

The seminar will include presentations by leading experts in the fields of: telecommunications, fire safety/investigation, electrostatic and electromagnetic compatibility

Presentations will include research from:

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Note: Due to the limited number of places available it will not be possible to register for this event on the day. To encourage a range of attendees please also consider sending only a limited number of representatives from your company.

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# Briefing the petroleum industry on human factors

**Bill Gall\*** of Kingsley Management Services describes a new initiative by the IP Working Group on Human Factors to bring practical guidance to the industry.

**H**uman factors is a subject that seems to be poorly understood and treated with scepticism by many people in industry. However, in fact, it is a subject that most of us are already familiar with, providing powerful and practical tools for improving human performance in all businesses, not just the oil and gas arena.

How is it that we are already familiar with this subject? Take, for example, any newspaper report of a major accident – it will almost certainly mention 'human error' as a factor in the accident and may even describe this as the 'cause'. As further details emerge, however, it is obvious to us why the event happened – somebody was overloaded with work; they were given monotonous unstimulating jobs to do; they were not fully trained; their instructions were badly written; the equipment provided was not suitable for the job; or there was no clear team leadership. These are the more immediate causes – the 'human factors' that prompted the error. Why these factors were not better controlled is a question that ultimately only management can answer. So, we know the subject. We also know that the result of not controlling industrial tasks properly can be literally disastrous.

There are numerous definitions and frameworks describing human factors. Notable examples are from the UK Health and Safety Executive (HSE), The International Association of Oil and Gas Producers and the Ergonomics Society (the terms 'ergonomics' and 'human factors' are used interchangeably). Whilst the various definitions differ, they all include the same basic elements – people, jobs, the workplace, equipment and organisation/management systems – all of which have a strong influence on human performance.

## Industry brief

Following an IP Workshop on Human Factors held in November 2001, and as a first step in increasing the industry's understanding of the subject, the Institute of Petroleum commissioned Kingsley

### Briefing Note topics

- **Alarm Handling** – understanding and rectifying badly-designed alarm systems
- **Organisational Change** – issues that can arise from restructuring, especially downsizing
- **Maintenance Error** – human errors specifically during routine or emergency servicing and repair
- **Fatigue** – recognising and dealing with excessive physical or mental workload
- **Safety Critical Procedures** – issues concerning written instructions for performing critical tasks
- **Training and Competence** – ensuring a suitably qualified and experienced workforce
- **Ergonomics** – physical aspects of work such as lifting and carrying, and also design of equipment
- **Safety Culture** – securing the appropriate attitudes and values towards safety among the workforce
- **Communications** – transfer of information between key personnel, for example, at shift hand-over
- **Task Analysis** – formal methods for examining industrial tasks
- **Human Reliability Analysis** – systematic techniques for determining the likelihood of human error
- **Violations** – how to prevent deliberate breaking of rules or failing to follow procedures
- **Behaviour Observation and Modification** – key methods for improving safety behaviours at work

**HUMAN factors no2**  
briefing notes  
series 1 - introduction

**alarm handling**

**Case Studies**  
1. On 12th September 1998, explosions at an Australian oil refinery killed 11 people and injured 40 others. The refinery was producing for two weeks. Indicators for gas leaks were not working. That caused major changes in the plant control system. An untested alarm system was installed. In the first 12 hours, 12 alarms were triggered. The operator had to respond to every alarm. The operator had to respond to every alarm. The operator had to respond to every alarm.

**Why Alarm Handling?**  
Partly-designed alarm systems under load often fail. The operator and any other who has to identify a fault or respond to an alarm in an effective manner need to act, or have a clear and effective course of action, available to them. This is often a matter of life or death. The operator must be able to identify a fault or respond to an alarm in an effective manner. The operator must be able to identify a fault or respond to an alarm in an effective manner.

**When Should My Company Do About It?**  
It is reasonable to expect that the alarm system needs to be able to do the following:  
• Be able to see and hear the alarm under all conditions  
• Quickly understand what caused the alarm and how serious it is  
• Know from training or instructions what to do next  
• Have enough time to take action  
• Realise when the situation has returned to normal

**What Should My Company Do About It?**  
Your company should make sure that alarm systems are designed to meet guidelines such as the CCMA, Guide Reference 23.

**United Kingdom Health & Safety Executive (HSE)**  
1. Better Alarm Handling, Chemical Industry (Issue 6) C000, HSE Books, ISBN: 0 7176 1000 0  
2. Alarm Systems, HSE Books, ISBN: 0 7176 1000 0  
3. Safety, HSE and Industry, The Management of Alarm Systems (HSE Contract Research Report 980), HSE Books, ISBN: 0 7176 1000 0  
4. The Operation and Use of the Process Industry Alarm System (HSE Contract Research Report 980), HSE Books, ISBN: 0 7176 1000 0

## The way forward

'Historically, improvements in safety, health and environmental (SHE) performance have been achieved by improvements in engineering and enhanced SHE management systems. However, in the future progress will only be achieved by taking more account of the way people interact with every aspect of the workplace; that is through the integration of human factors principles into the organisation and its existing risk assessment methodologies. This will also lead to better utilisation of technology, enhanced reliability and product quality, improved productivity and reduced costs. The "best practice" material prepared by the IP's Human Factors Working Group provides line managers with practical advice on how human factors can be addressed in the workplace.'

*Graham Reeves of BP and Chairman of the IP Human Factors Working Group*

Management Services to develop a series of 'Briefing Notes'. This work was funded using Oil Industry Liaison Committee (OILC) member company contributions.

The Briefing Notes aim to quickly familiarise the industry with the subject of human factors and provide some practical guidance on its techniques. Each is a short (two- to three-page) leaflet that:

- introduces a topic with a definition;
- illustrates problems and success stories relating to that topic using case studies;
- provides a checklist of questions for the reader to gauge whether his or her company has a problem;
- proposes what the individual and higher management can do to address the problem; and
- provides a list of references/useful sources of information.

Briefing Notes will not make the reader an expert, but they will raise awareness of the issues and guide them towards more information if they wish to explore specific topics further.

## Coverage and use

Most of the topic areas described in the Briefing Notes were suggested by delegates at the IP Workshop. HSE inspectors from the Hazardous Installations Directorate also proposed their 'Top Ten' issues – persistent and widespread problems encountered in the major hazards sector – as a good starting point. Given these drivers the IP's Human Factors Working Group agreed to develop Briefing Notes covering the topics outlined in the tinted box, as well as an introductory note.

The Briefing Notes are aimed primarily at supervisors and managers, but anyone who works in the petroleum industry should find them of interest.

If supervisors or managers become aware that their workforce is experiencing any of the problems described, they should take practical steps to help solve them by gathering information and drawing this to the attention of higher management, perhaps via safety committees.

It is important to stress that controlling

human factors is part of management's health and safety responsibilities. Every major hazard organisation should have systems that take into account the human operator in all tasks, especially safety-critical ones, and managers should welcome any information that will help improve reliability.

## Call to industry

Use these resources. Pin them up in the workplace. Link your intranet to the IP site at [www.petroleum.co.uk/humanfactors](http://www.petroleum.co.uk/humanfactors). Spread the word. Above all, send your comments to Mark Scanlon at the IP, e: [mscanlon@petroleum.co.uk](mailto:mscanlon@petroleum.co.uk) – in particular any suggestions for improvement or further case studies.

Not interested? You should be – it's all about you! ●

*The Briefing Notes can be found on the Members Only area of the Institute of Petroleum website at [www.petroleum.co.uk/humanfactors](http://www.petroleum.co.uk/humanfactors)*

*Printed resource packs containing a complete set of Briefing Notes will soon be available from Portland Customer Services, T: +44 (0)1206 796351; F: +44 (0)1206 796331; e: [sales@portland-services.com](mailto:sales@portland-services.com)*

*If you would like to order a bulk quantity of these packs, please contact Sarah Frost Mellor, Publications Manager for further details. e: [sfm@petroleum.co.uk](mailto:sfm@petroleum.co.uk)*

*\*Bill Gall is a human factors consultant and can be contacted at e: [kingsley.management@btopenworld.com](mailto:kingsley.management@btopenworld.com)*

# Institute of Petroleum Report of Workshop on Human Factors in the Petroleum Industry

The issue of 'human factors' is attracting increasing interest, as it offers the possibility of further improving the safety of petroleum industry operations. This new Report is a record of the IP's workshop held on 28 November 2001 which was convened to share experts' knowledge of human factors and to help businesses to start to apply human factors to their operations.

It includes speakers' presentations from the upstream and downstream petroleum sectors, regulators and leading industries, and key points presented by them, as well as the main issues arising from a working session. A way forward is proposed to enable better understanding and application of human factors in the petroleum industry.

Essential reading for employers and employees, legal advisers, regulators and consultants. A colour version of the same information is available on the IP's website at [www.petroleum.co.uk/humanfactors](http://www.petroleum.co.uk/humanfactors)

ISBN 08529 374 6

Full Price £40.00

25 % discount for IP members

Available for sale from Portland Customer Services, inc. postage in Europe (outside Europe, add £6.00 per order). Contact Portland Customer Services, Commerce Way, Whitehall Industrial Estate, Colchester CO2 8HP, UK. Tel: +44 (0)1206 796351. Fax: (0)1206 799331. e: [sales@portland-services.com](mailto:sales@portland-services.com)

# Membership News

## NEW MEMBERS

Mr J P Bowles, Warwickshire County Council  
Mr M J Chorley, Bank Of America  
Mr M K Chung, Hong Kong  
Ms S Crow, Dover  
Dr C Devine, Commercial Microbiology  
Mr D J C Emmerson, Thames Ditton  
Mr K Gennadis, Olympic Fuel Company SA  
Mr K Klein, PriceWaterhouseCoopers  
Mr D I Lerer, D J Freeman  
Mr J Liddell, ASP Shipping Services  
Mr D Longbotham, Grangemouth  
Mr J Meyer, ODAC  
Dr C Onosode, London  
Mr S D Petitt, Marlborough  
Mr A Pillai, GreenScience Technologies (Singapore) Pte  
Mr E Price, ExxonMobil  
Mr C Roberts, University of Dundee  
Mr F Rotimi, London  
Mr K B Stewart, Defence Fuels Group  
Ms L J S Sutherland, London  
Mr C D Taylor, BSI Inspectorate  
Mr R I Trigle, London  
Mr N Williams, Simmons & Simmons  
Mr A Zucco, Belgium

## STUDENTS

Mr D S Ahmed, Aberdeen  
Mr P A Banfield, Essex  
Mr W J Bowers, Essex  
Mr J A Fisher, Cardiff  
Mr Y Heima, Robert Gordons University  
Ms J Tuorila, London  
Mr J A Vazquez, University of Newcastle

## DEATHS

We have been notified, over the past few months, of the deaths of the following members:

Mr R N Beer	Born 1909
Mr R J Berryman	1939
Mr C D Brewer	1909
Mr B W Divall	1945
Mr R P Langston	1921
Mr L J McGill	1934
Mr P J Odell	1950
Mr P Saunders	1930
Mr A A J White	1953

## Branch Activities

### LONDON

Contact: *Ian K Robinson, T: +44 (0)1932 783774*

22 Apr: 18.00: *Biosensors – Threat or Friend*, by Crown Bio Systems and Card Geotechnics

## GOLDEN ANNIVERSARY

The IP is proud to announce that the following Members have all been awarded a special commemorative tie, as a result of achieving 50 years of IP Membership.

Mr P Addiscott	FlInstPet
Mr D R Clarke	FlInstPet
Mr E S Ewart	FlInstPet
Mr J A Hayward	FlInstPet
Mr G H Hutchinson	FlInstPet
Mr R E Jackson	FlInstPet
Mr A Kaye	FlInstPet
Mr G Loble	FlInstPet
Mr C H Mitchell CBE	FlInstPet
Mr D K L Morgan	FlInstPet
Mr G E Pryke	FlInstPet
Mr T Pytel	FlInstPet
Dr A Sagarra	FlInstPet
Mr J D Sandrock	FlInstPet
Mr J E Sharpley	FlInstPet
Mr R A Vere	FlInstPet
Mr J G R White	FlInstPet
Mr I R Williams	FlInstPet

## CORPORATE MEMBERS

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e: john.hinde@vernolab.co.uk

Representative: *John Hinde*

Testing of lubricating oils, especially for machinery condition monitoring and fuels. Testing of feedstocks and oils for manufacturing quality control.

CH4 Energy, 1 Grosvenor Crescent, London SW1X 7EF

T: +44 (0)20 7152 6050 F: +44 (0)20 7152 6051

e: info@ch4energy.com www.ch4energy.com

Representative: *Phil Kirk*

CH4 Energy is backed by 3i, and is intent on building a material UK gas portfolio. CH4 Energy will focus on gas production and the exploitation of marginal or dormant gas discoveries and will be seeking to acquire assets from the major industry players and other independents.

## NEXT MONTH'S FEATURES...

The April 2003 issue of *Petroleum Review* will feature a review of the Middle East oil and gas market from Wood Mackenzie, considering planned production capacity growth in other parts of Opec and non-Opec and its potential affect on oil prices. Other articles will include a look at the problems besetting oil sands and heavy oil projects worldwide; an update from Wincanton, who recently took over the logistics operations of P&O Trans European; and Deloitte & Touche will examine value creation through active portfolio management. There will also be a write up of the oil depletion debate organised by the Institute of Energy and an update on the proposed merger between the Institute of Petroleum and Institute of Energy, including the results of the Extraordinary General Meeting (EGM) to be held on 5 March 2003.



**Course Dates:**  
3 - 7 March, 2003

**Course Venue:**  
London, UK

**IP Member:**  
£1900.00 (£2232.50 inc VAT)

**Non-Member:**  
£2100.00 (£2467.50 inc VAT)

**International Upstream Fiscal Terms and Contract Negotiations**

This **five-day course** focuses on the economic, negotiation and operational management issues associated with licence agreements encountered in the upstream oil and gas industry. Detailed explanations are provided of key components. Global comparisons are made, identifying strengths and weaknesses in specific contracts. The many issues, going beyond just the fiscal terms, that must be considered when negotiating licence agreements are identified and reinforced through team exercises.

*The course is suitable for: E&P technical professionals, asset managers, negotiators, economists, analysts, financial controllers, planners, company regulators, contract administrators, advisors, policy makers, professionals supporting E&P operations.*



**Aviation Jet Fuel**

This **three-day course** is designed to provide a technical overview and to introduce delegates to the many facets of the Aviation Jet Fuel business – a business which operates at a truly global level.

It will not only examine the workings of the modern jet engine, but will build the picture as to why, unlike some fuels, jet fuel specification, production and handling is critical to the continuing success of the aviation industry. It explores components of the business from several key perspectives, including oil company fuel suppliers and civilian and military users.



**Course Dates:**  
19 - 21 March, 2003

**Course Venue:**  
London, UK

**IP Member:**  
£1400.00 (£1645.00 inc VAT)

**Non-Member:**  
£1600.00 (£1880.00 inc VAT)



**Course Dates:**  
8 - 11 April, 2003

**Course Venue:**  
London, UK

**IP Member:**  
£1900.00 (£2232.50 inc VAT)

**Non-Member:**  
£2100.00 (£2467.50 inc VAT)

**Overview of the Natural Gas Industry**

This **four-day course** will provide participants with an overview of the economic and contractual aspects of the natural gas industry.

The peculiar features of natural gas will be highlighted in order to explain the economic differences between a crude oil chain and a natural gas chain. Gas chains can become very complex, rigid networks which penetrate deep into energy markets and the associated, broad range of crucial economic, marketing, and legal issues of the gas industry will be examined. Discussions will cover a number of questions, including problems of gas projects' structuring, upstream sales' contracts, take-or-pay issues, and gas markets' liberalisation.



**Custody Transfer of Crude Oil - Trading and Loss Control Issues**

This **two-day course** covers the principles of custody transfer, the units of measurement and the terminology used.

Participants will become aware of the need to minimise the uncertainties during the various measurements that are crucial in performing a custody transfer.

They will also learn the acceptable limits within which measurements may differ and what can cause excessive differences and their effect on the final outcome.



**Course Dates:**  
28 - 29 April, 2003

**Course Venue:**  
London, UK

**IP Member:**  
£1000.00 (£1175.00 inc VAT)

**Non-Member:**  
£1200.00 (£1410.00 inc VAT)



**Course Dates:**  
6 - 9 May, 2003

**Course Venue:**  
London, UK

**IP Member:**  
£1995.00 (£2344.13 inc VAT)

**Non-Member:**  
£2195.00 (£2579.13 inc VAT)

**Price Risk Management in Energy Trading**

This **four-day course** provides delegates with a thorough understanding of how markets operate and the range of contracts, tools and techniques available to manage and take advantage of price and margin volatility in the oil, gas and electricity markets.

Practical skills are developed and reinforced through world-class business trading simulations and syndicate exercises of increasing difficulty and intensity.



For more information, see enclosed inserts or contact Nick Wilkinson at IP Training or visit: [www.petroleum.co.uk/training](http://www.petroleum.co.uk/training)

Tel: + 44 (0) 20 7467 7151 Fax: + 44 (0) 20 7255 1472 E-mail: [nwilkinson@petroleum.co.uk](mailto:nwilkinson@petroleum.co.uk)

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