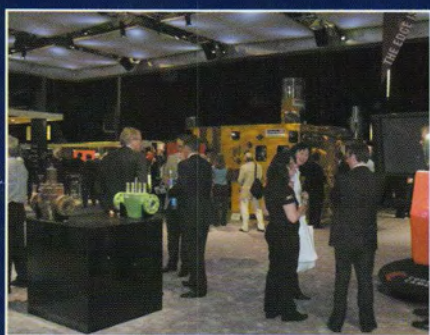


Petroleum *review*



AVIATION


- Aviation fuel prices – up, up and away

DECOMMISSIONING

- Heading for uncharted waters

RESERVES

- Putting paid to unrealistic demand predictions
- Production struggling to meet demand



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ABBREVIATIONS

The following are used throughout *Petroleum Review*:

mn = million (10 ⁶)	kW = kilowatts (10 ³)
bn = billion (10 ⁹)	MW = megawatts (10 ⁶)
tn = trillion (10 ¹²)	GW = gigawatts (10 ⁹)
cf = cubic feet	kWh = kilowatt hour
cm = cubic metres	km = kilometre
boe = barrels of oil	sq km = square kilometres equivalent

b/d = barrels/day
t/y = tonnes/year

t/d = tonnes/day

No single letter abbreviations are used.

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

Front cover picture: The aviation industry is just one sector reeling from rising oil prices (see p18).
Photo courtesy: SolArc Inc



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REGULARS

2 FROM THE EDITOR/E-DATA

An elegant double bluff

Readers will have been amused to note the elegant double bluff being played out between western politicians and Opec over the last few days. Western politicians eager to placate their electorates' anger about high oil prices, but equally eager to hang onto their oil tax receipts, have once again chosen to blame Opec for not producing enough oil. Leaving aside the question of quite why Opec producers should solve the West's problems, the hypocrisy is that the current bottleneck is refining capacity not crude supply.

Opec, in return, has quite wittily announced that it will make available an additional 2mn b/d of oil supply for three months. In other words, all the spare capacity it claims to have. It can be confident that its bluff will not be called as, until refining capacity is restored and expanded, few, if any, companies could make use of additional, poor quality, high sulphur crude – even if Opec could produce such volumes.

Two for one

Readers of the 19 September issue of *Time* magazine were able to read in detail of the devastation wrought by Hurricane Katrina on New Orleans. They were probably rather more surprised to read the following in an advertisement from Chevron.

'The fact is, the world has been finding less oil than it's been using for 20 years now. Not only has demand been soaring, but the oil we've been finding is coming from places that are tough to reach. At the same time, more of this newly discovered oil is of the type that requires a greater investment to refine. And because demand for this precious resource will grow, according to some, by over 40% by 2025, fuelling the world's growing economic prosperity will take a lot more energy from every possible source.'

'The energy industry needs to get more from existing fields while continuing to search for new reserves. Automakers must continue to improve fuel efficiency and perfect hybrid vehicles. Technological improvements are needed so that wind, solar and hydrogen can be more viable parts of the energy equation. Governments need to create energy policies that promote economically and environmentally sound development. Consumers must demand, and be willing to pay for, some of these solutions, while practising conservation efforts of their own.'

'Inaction is not an option. But if everyone works together, we can balance

this equation. We're taking some of the steps needed to get started, but we need your help to get the rest of the way.'

As part of a drive to encourage such help, Chevron has launched a website – www.willyoujoinus.com

So, is this hype from a major oil company that is having some difficulty in maintaining its oil and gas production levels? Or is it a level-headed statement of the challenges facing both the industry and its customers? Readers must decide for themselves, but in this issue we have three articles that collectively suggest Chevron is not exaggerating and that the world faces a considerable energy supply challenge.

On p32, Dr Michael R Smith of Energyfiles explains the future supply challenges. On p24, using quarterly production data from Evaluate Energy, we show that BP has now become the world's largest oil producer, but that virtually all the publicly quoted oil companies are having difficulty maintaining crude production flows and are in fact losing market share in global production.

Readers will, perhaps, be surprised to learn that in the 1H2005 the five largest publicly quoted oil companies collectively produced 1.72% less crude and natural gas liquids (NGLs) than they did in 2004. The ten largest produced 1.14% less and the top 22 some 0.92% less. The comparable figures for gas are better, but not vastly. For the top five, gas production in 1H2005 was 0.48% below 2004. For the top ten and top 22, however, gains of 1.68% and 1.61% were recorded.

On p34, *Petroleum Review* has updated its megaprojects analysis. The megaprojects database is drawn from publicly available data and lists all oil projects with peak flows of over 75,000 b/d. (A few smaller projects are listed because they have the potential as hubs to reach the 75,000 b/d level.) Where data is incomplete or uncertain, but there is a significant potential, the project is listed under 'potential projects'. Once more information becomes available, these projects are then added to the listing by years. In order to accurately reflect the way in which production builds up, production increments are made depending when in the year a project starts up and whether it is an onshore project where flows build up slowly or an offshore project where predrilling and rapid production build-up are the norm. For example, if an offshore project will add 200,000 b/d of new capacity and is due onstream in June 2007, a 100,000 b/d

PennWell has launched a new online employment service – PennEnergyJOBS – which is dedicated to serving the recruitment needs of both energy-industry employers and professionals. It can be accessed at www.PennEnergyJobs.com. The site currently lists over 1,600 job postings from more than 40 energy-industry employers, including Chesapeake Energy, Chevron, FMC Technologies, First Energy, GlobalSantaFe, Halliburton, Occidental Petroleum, Pioneer Resources, Range Resources, SGF Global, Southwestern Energy and Williams.

The latest (30th) quarterly update of the CD-ROM publication *Oil and Gas on the Internet – Upstream* is now available in PDF format for use with Adobe Acrobat Reader®. The next update is scheduled for 1 December 2005. It contains 888 pages, with 6,064 upstream resources on the Internet, listed in 16 different categories. The publication is available at a cost of \$89.95 per issue, or \$324 for a 4-quarter subscription. Multi-user levels are available for corporate Intranets starting at \$1.25/user/month. For more information, visit www.catsites.com

In addition, following a request from the American Association of Professional Geologists (AAPG), an online, interactive training course has been developed, based on *Oil and Gas on the Internet*. The 9-module course is designed for those wishing to improve their researching skills in finding upstream oil and gas information.

increment will be attributed to 2007 and 100,000 b/d to 2008. If the project is an onshore field with an extended slow build up, this also will be reflected.

The latest version of the database now tabulates 16.6mn b/d of gross new capacity coming onstream by 2010. This is virtually the same total that the consultant CERA came to in its recent analysis. Unlike CERA, however, *Petroleum Review's* analysis shows the way that project slippage and depletion will erode the net increments to the point where high prices and tight supply are virtually guaranteed.

The extended time periods for major field developments is, at around six years, such that the only real uncertainty is in the later years. The only real changes likely in the period up to 2010 are likely to be reductions due to project delays.

Chris Skrebowski

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

UK

Rig utilisation in the North Sea fell back marginally to 90.4% in August, down from the record 91.8% seen in June and July, but remains 13.9% up on a year earlier, according to recent Platts North Sea Letter data. Utilisation six month's forward rose to 93.4%, a new high, reflecting almost zero availability to year's end, if cold-stacked rigs are discounted. Underlying the strength of the market, utilisation 12-month's forward has also climbed steadily for the last 14 months, to reach a record 90.7%.

RWE Dea UK (35.1%) has reported first gas from the Saturn field in North Sea blocks 48/10a and 10b, at an initial rate of 75mn cfd from the first well.

Venture Production (69.875%) has signed a deal with Sevan Marine for the use of its SSP 300 FPSO (floating, production, storage and offloading vessel) on the Chestnut field in the central North Sea. Field reserves are put at between 7mn and 15mn barrels. The FPSO will be installed in mid-2007.

Tullow Oil (15%) has reported first gas from the Munro field development, at an initial average rate of 55mn cfd. The field is expected to produce at a peak rate of 80mn cfd.

EUROPE

Ireland has become the latest country to ask the United Nations to extend its economic control over the continental shelf bordering its coastline beyond the usual 200 nautical miles, reports Keith Nuthall. It has asked the

Complete news update

The 'In Brief' news items in *Petroleum Review* represent just a fraction of the news we regularly publish on the EI website www.energyinst.org.uk via the 'News in Brief Service' link from the 'Petroleum Review' drop-down menu. Covering all sectors of the international oil and gas industry, the News in Brief Service is a fully searchable news database for EI Members.

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

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Record high for UK licensing round

A record 152 oil and gas production licences have been offered to 99 companies under the UK's 23rd oil and gas licensing round – the highest number since licensing began in 1964. The licences, covering 264 blocks, comprise 70 traditional licence offers (38 more than in 2004), six Frontier licence offers (one less than in 2004) and 76 Promote licence offers (18 more than 2004). If all the offers are accepted, 24 of the 99 companies will be new entrants in the North Sea.

Speaking at the Offshore Europe 2005 exhibition and conference in Aberdeen (see p44) UK Energy Minister Malcolm Wicks said: 'Our licensing innovations are producing results in our effort to maximise the production of the North Sea's remaining resources. Industry is delivering a vote of confidence in its future. I'm determined that we maximise the exploitation of the remaining reserves, which could be between 22bn and 28bn boe.'

A number of drilling commitments have been promised by the successful companies in the awards, with a total of 17 wells already firmly committed to so far – more than any amount promised for a decade.

Among the offers are 20 contiguous blocks in underexplored quadrants 36, 37 and 38, made under a single licence to ExxonMobil (75%) and Shell (25%). BP picked up acreage close to its Bruce field in the northern sector of the North Sea, as well as close to its Foinaven and Schiehallion fields in the Atlantic Margin. Chevron secured a licence near its Rosebank/Lochnagar discovery, as well as three other Frontier licences and a block near the Captain field. A full list of licence offers can be found at www.og.dti.gov.uk

Go-ahead for Moho-Bilondo field

Total (operator, 53.5%) has received the green light from the Congolese authorities to begin developing the Moho-Bilondo offshore project. Phase 1 development comprises 12 subsea wells – seven producers and five water injectors – tied into a floating production unit (FPU) housing the processing facilities. Expected to peak at 90,000 b/d, production will be exported to the Djéno terminal, which already handles nearly all of the country's crude oil output. The development is scheduled to come onstream in 2008.

Total E&P Congo's (53.5%) partners in the Moho-Bilondo permit are Chevron Congo Overseas (31.5%) and the Société Nationale des Pétroles du Congo (15%).

High bidding in GoM auction

Oil and gas companies bid enthusiastically at the US Minerals Management Service's (US MMS) mid-August auction for offshore blocks in the western Gulf of Mexico, writes *Judith Gurney*. They offered higher dollar amounts in their total bids and in their successful high bids than companies have done in similar auctions over the past seven years. Bids totalling \$335.6mn offered by 56 companies resulted in \$285.2mn of successful high bids. Last year, 54 companies offered \$197.4mn, resulting in \$171.4mn high bids.

A lot of the substantial bids were for deepwater blocks with water depths greater than 1,600 metres. A large proportion of these offers, including four of the top ten highest bids, went for frontier blocks with water depths greater than 2,000 metres. The recently enacted Energy Policy Act of 2005 gives companies significant royalty relief on production from these depths. Interest in ultra-deep areas has been stimulated by wildcat discoveries in the seldom-explored, ultra-deep Lower Tertiary-Wilcox Trend in the Alaminos and Keathley Canyons and other frontier areas. The deepest block receiving a bid in this auction was for a prospect in the Sigsbee Escarpment, with a water depth of 3,278 metres.

There was also strong bidding, including five of the top ten highest bids, for shallow-water blocks with water depths of less than 200 metres. Natural gas reserves are believed to exist in these waters at great depths. The two highest bids in this auction, each more than \$21mn, were made by LLOG Exploration Offshore, a privately-held company, for shallow-water blocks in the High Island area adjacent to the West Cameron area in the central Gulf of Mexico, which is believed to contain substantial reserves of deep gas. This was the third year of active bidding for High Island blocks.

Although independents, including Anadarko, Spinnaker and Newfield, were active bidders as in recent years, majors dominated this auction. Petrobras, with 57 bids, submitted the most bids, followed by BP with 48 bids, Shell with 31, and Chevron with 27. Petrobras also had the most successful high bids, followed once again by BP and Shell.

Commission on the Limits of the Continental Shelf for oil, gas and other rights over the Atlantic seabed abutting the Porcupine Abyssal Plain.

Norsk Hydro is to acquire US company Spinnaker Exploration for \$2.45bn.

What is claimed to be the world's first sidetrack drilled by a mobile rig through the production string in a subsea-completed well has been successfully finished on Statoil's Norne field in the Norwegian Sea. Sidetracks have previously been drilled from existing wells only after pulling the production liner and other downhole equipment. Once the work is finished, the liner and equipment have to be run back into the well. The new method is reported to reduce drilling costs as work can be carried out much more quickly than before. A recovery factor exceeding 60% is expected on Norne.

Red Spider Technology's TTRD (through tubing rotary drilling) protection sleeve is reported to have successfully completed its first run on Norsk Hydro's Njord A platform, in what is claimed to be the world's first TTRD well to be drilled from a floating installation. Targeting new pockets of oil in the Njord field, the challenge was to provide a simple and reliable tubing retrievable safety valve (TRSV) protection system.

EASTERN EUROPE

Oracle Energy is reportedly planning to acquire from Carpathian Energy up to a 20% interest in six Romanian oil and gas fields – Bordei Verde Vest, Nadlac, Catrunesti, Cozieni, East Ciuneghiu and North Ciuneghiu – for \$500,000.

NORTH AMERICA

Technip has secured an engineering, procurement and construction contract from Chevron (58%) for the delivery of a spar hull and mooring system for the deepwater Tahiti field in Gulf of Mexico Green Canyon blocks 596, 597, 640 and 641. Technip is also to fabricate the topsides. The Tahiti facility will have the capacity to produce 125,000 b/d of oil and 70mn cf/d of gas, and to treat 120,000 b/d of produced water. Tahiti partners are Statoil (25%) and Shell (17%).

Petro-Canada has entered into an agreement with Teck Cominco that will see the Vancouver-based mining company acquire a working interest in the

Green light for Cavendish gas field

Dana Petroleum has been given the green light by the UK government for the development of the Cavendish gas field located in UK North Sea block 43/19a. Total gas-in-place reserves are estimated to be approximately 400bn cf. Cavendish will be developed at a total cost of some £120mn by three production wells drilled from a minimum facilities platform and tied back to the ConocoPhillips-operated Murdoch platform, located some 44 km to the south-east. Gas will then be exported from Murdoch through the Caister Murdoch System (CMS) trunk pipeline to the Theddlethorpe gas terminal in Lincolnshire where it will be sold into the UK gas market.

Production is planned to start in October 2006 at rates of around 100mn

cf/d. The field is expected to continue to produce until 2016.

Project partners are Dana Petroleum (25%), RWE Dea UK (50%, operator) and GDF Britain (25%).

Commenting on the news, Tom Cross, Dana's Chief Executive, said: 'Dana set itself the target of gaining approval for the development of three new UK oil and gas fields in 2005. Cavendish represents the second of these, having achieved sanction of the Enoch oil field in July. In addition, we are on track to begin the Goosander oil field development before year-end. All three of these fields are expected to come onstream during 2006, giving Dana a total of 15 producing fields and a significant boost to production next year.'

Saudi Aramco outlines redevelopment work

Saudi Aramco is moving ahead with redevelopment work on its Marjan, Zuluf and Safaniya oil fields. By the end 1Q2006, the company anticipates installation of the first jacket in the Zuluf field. The final major milestones are scheduled for completion in October 2006, with the installation of the remaining structures, pipelines and cables.

The second project involves the installation of 42 electric submersible pumps (ESP) on seven existing platforms in the North Safaniya field. In addition, mezzanine decks will be added to the existing platforms to accommodate the ESP service equipment. Subsea power cables will be installed along with new flanklines and a 42-inch, 50-km trunkline from a new tie-platform to the onshore Safaniya gas-oil separation plant No 1 (GOSP-1).

GoM deal for Anadarko and Chevron

Anadarko Petroleum has signed an agreement with Chevron to participate in the drilling of four deepwater Gulf of Mexico prospects. Under the agreement, Anadarko will pay a disproportionate share of the drilling costs to earn a 20% to 25% working interest in two appraisal wells and two exploration wells that are scheduled to be completed by mid-year 2006. Anadarko will also gain rights in 29 deepwater Gulf of Mexico blocks.

The two appraisal wells – Tonga (Green Canyon block 727) and Sturgis (Atwater Valley block 138) – will evaluate the com-

merciality of existing discoveries, as well as additional exploration potential identified in these areas. The two planned exploration wells are Turtle Lake (Green Canyon block 847) and Caterpillar (Mississippi Canyon block 782), which is in close proximity to Chevron's Blind Faith discovery. Chevron will operate all four wells utilising drilling rigs already under contract.

In a separate transaction with another company, Anadarko has gained a 15% working interest in Chevron's Big Foot prospect currently drilling on Walker Ridge block 29.

Boosting production from Åsgard

Recovery from the Smørbukk South part of Statoil's Åsgard field in the Norwegian Sea is to be boosted by about 18mn barrels with the coming onstream on 26 August 2005 of the new Q template. The subsea installation is the third unit of its kind on Smørbukk South, and will increase recovery from the Garn reservoir in the first phase. One production well has so far been completed through the template. A second is also scheduled to be drilled, again to tap the Garn formation.

Statoil is also planning to utilise the Q template for a second development stage, which could include three production wells and a gas injector. This phase would aim to drain reserves from Smørbukk South's Ile and Tilje formations.

'These parts of the reservoir have not been produced so far,' explains Olav Skotheim, Operations Vice President for Åsgard. 'Bringing them into production would improve recovery by 40mn to 50mn barrels of oil and roughly 7bn cm of gas.'

Fort Hills oil sands project in Alberta, Canada. Under the terms of the agreement with Petro-Canada and partner UTS Energy Corporation (UTS), Teck Cominco will assume a 15% interest in Fort Hills. Petro-Canada will remain project operator with a 55% interest, with UTS holding a 30% stake.

Woodside Energy has acquired Houston-based Gryphon Exploration for \$282.7mn. Gryphon has interests in 118 leases in the Gulf of Mexico.

Eni has acquired the Alaskan assets of US independent Armstrong Oil & Gas, comprising 104 exploration leases along Barrow Arch, in the North Slope, Northern Alaska. Total net reserves of the exploration blocks are anticipated in excess of 170mn barrels of oil.

MIDDLE EAST

Circle Oil has signed a six-year deal to undertake geophysical, seismic and exploration programmes over Oman's offshore block 52. Meanwhile, Sweden's GotOil Resources and Danish company Odin Energi have secured an exploration agreement that cover onshore block 15.

OMV is reported to have signed a sales agreement with Marubeni of Japan for its 7.5% interests in block 12 and 13 in Qatar.

The release of the main report of the Volcker inquiry into the United Nations' oil-for-food scandal could strengthen reformers within the global body seeking tougher auditing controls and greater independence for its secretariat, writes Keith Nuthall. It blamed administrative complexity involving shared powers over the Oil for Food Programme by the UN Security Council and its secretariat for creating a power vacuum, readily filled by Iraq's former Saddam Hussein regime.

Syria is reported to have signed a \$14.4mn, 25-year contract with Canadian company Stratic Energy and Foreign Oil Exploration of Kuwait to explore for oil and gas in the central region of Palmyra.

RUSSIA/CENTRAL ASIA

Uzbekneftegas, Lukoil Overseas, Petronas Carigali of Malaysia, Korea National Oil Corporation and CNPC International of China have signed an agreement establishing a joint venture

UK oil output continues decline

Summer outages in the North Sea as a number of operators undertook maintenance work meant that UK oil production resumed its downward trend in June, according to the latest (September 2005) Royal Bank of

Scotland Oil and Gas Index.

Oil production saw a decrease of 6.8% on the month to 1,606,794 b/d, down 9.5% on the year. Gas production also fell, by 7.8% to 8,800mn cf/d compared to May, down 13.6% on the year.

Year Month	Oil production (av. b/d)	Gas production (av. mn cf/d)	Av. oil price (\$/b)
Jun 2004	1,776,246	10,192	35.21
Jul	1,758,312	10,292	38.15
Aug	1,621,582	8,585	42.99
Sep	1,526,692	8,716	42.92
Oct	1,630,230	9,677	49.66
Nov	1,748,744	10,385	42.88
Dec	1,800,309	10,823	39.55
Jan 2005	1,725,929	10,444	44.24
Feb	1,742,295	9,759	45.40
Mar	1,703,744	10,514	52.95
Apr	1,749,773	10,261	51.83
May	1,723,598	9,549	52.95
June 2004	1,606,794	8,800	54.45

Source: The Royal Bank of Scotland Oil and Gas Index, September 2005

North Sea oil and gas production

Foreign winners in Yemen licensing round

The Yemen Oil and Minerals Ministry reports that four foreign companies have won concessions in seven oil blocks. Australia's Oil Search was the successful bidder for block seven in Shabwah and block 74 in Hadhramout, while Korea's KN Aus Company won block 39 in Mahra. A United Arab Emirates company secured rights to blocks 37 and 34 in Mahra, and 55 in Hajjah, while Occidental of the US secured block 75 in Shabwah.

A third international tender is to be announced soon. It is expected to cover 13 open blocks – blocks 11, 79, 80, 82, 83 and 84 in Hadhramout, blocks 30 and 29 in Mahra, block 17 in Aden and Abyan, block 19 in Al-Jawf, block 23 in Al-Hodeidah and blocks 28 and 57 in Shabwah.

Reservoir modelling R&D venture

Roxar, a leading reservoir management solutions provider to the upstream oil and gas industry, reports that its FieldWatch™ project on right-time integration of production data in reservoir characterisation and fluid flow simulations has been approved by the Norwegian Research Council for funding from its PETROMAKS Research & Development (R&D) programme. Roxar's initial partner on this joint industry project is Statoil and the project is funded one third each by Statoil, Roxar and PETROMAKS.

Through R&D in collaboration with the NCC and Statoil's R&D centre in Trondheim, Norway, Roxar will develop tools and methods that foster co-visualisation and monitoring and co-analysis of

reservoir and production data; enable more realistic reservoir models; improve the accuracy of production forecasts; provide faster history matching; and speed up reservoir management decision loops.

The end result of this three-year project will be a set of software modules integrated with Roxar's flagship 3D reservoir modelling software, IRAP RMS™.

Roxar CEO, Sandy Esslemon, noted: 'Norway's oil and gas sector has a clear goal – to maximise reservoir performance. And the potential benefits are staggering – a mere 1% in increased recovery from the Norwegian Continental Shelf would have a value of approximately Nkr500bn (\$79bn).'

under which the companies will undertake E&P operations in the Uzbek part of the Aral Sea.

LATIN AMERICA

Chevron has been awarded the exploration licence for the Cardon III exploration block, located offshore western Venezuela.

Mærsk Oil & Gas is reported to be planning to acquire a 40% interest in the Tierra Negra exploration licence in Colombia from Petrobras.

PdVSA has assigned Repsol YPF the Junin 7 block in the Orinoco area, south-east Venezuela. An early production stage is anticipated in 2009 and an eventual start-up in 2011.

A total of 1,134 blocks are reported to be on offer under Brazil's seventh licensing round. The blocks (509 onshore and 625 offshore) are located in 14 sedimentary basins – Pelotas, Santos, Campos, Espíedito Santo, Jequitinhonha, Camamu-Almada, Recôncavo, Sergipe-Alagoas, Potiguar, Barreirinhas, Pará'e1-Maranhão, Foz do Amazonas, Solimões and São Francisco – divided into 34 sectors. In addition, marginal fields with small discoveries, are being offered in four basins – Recôncavo, Tucano Sul, Camamu and Sergipe-Alagoas.

AFRICA

Gaz de France is reported to have signed a production-sharing agreement with the Egyptian Ministry of Petroleum and the state-owned Egyptian Natural Gas Holding Company (EGAS) for the entire West El Burullus exploration block in the Mediterranean Sea, off the coast of Alexandria.

Roc Oil has begun shooting seismic in what is claimed to be the first exploration to take place onshore Angola for 30 years. The 2D and 3D seismic programme will cover the Cabinda South block. First drilling is expected in 2006 or 2007.

Hunt Oil Company, through its wholly owned subsidiary Namibia Hunt Oil, is understood to have signed a petroleum agreement with the government of Namibia, giving Hunt the right to carry out E&P operations in the offshore Lüderitz basin in partnership with Namcor, the state oil company.

TNK-BP to fund Verkhnechonskoye

TNK-BP is to fund up to \$270mn for pilot development of the Verkhnechonskoye oil and gas condensate field in the Katangsky region of the Irkutsk Oblast. The current stage of the pilot development is intended to prove field reservoir potential and to determine the most efficient method for a full-scale development of the field using advanced technologies. The project is expected to complete by the end of 2008.

The pilot production system will include oil and gas processing and water injection facilities that are expected to be completed by the end of 2006. It is planned to drill 20 new wells, 13 of which will be production wells, and seven new water injection wells.

Part of the allocated funds will be invested to build a 600-km pipeline to connect the Verkhnechonskoye field with Ust-Kut, a railway station on the Baikal-Amur Magistral. A railway terminal will be constructed, which will accept and re-handle the Verkhnechonskoye crude.

The Verkhnechonskoye field is claimed to be the largest oil and gas condensate field yet discovered in Eastern Siberia. Development had been hampered for many years by an absence of transportation infrastructure. However, it has now become possible following last year's decision by the Russian government to undertake the construction of the Eastern Siberia-Pacific Coast pipeline system.

Record depth well test in the GoM

Halliburton's Energy Services Group recently used its DeepQuest service to help Chevron successfully complete the test on its Tahiti field discovery well in the Gulf of Mexico. Early analysis of the test results are reported to indicate that the well's capability exceeds the pre-test expectation of 25,000 b/d.

'The well test was completed in 4,100 ft of water and at 25,812 ft subsea, making it the deepest successful well test in the history of the Gulf of Mexico,' states Halliburton. 'Even more significant is the fact that it was completed in a high-pressure environment.'

The DeepQuest service includes a new weighted fluid system that allows for frackpack and fracturing treatments on deep wells where the necessary surface treating pressure would otherwise exceed the pressure limitations of surface equipment. The technology is specifically aimed at deep shelf and deepwater field development, but it is also suited to land applications.

Using a weighted fluid makes it possible to achieve required treating pressure at the formation face by taking advantage of the hydrostatic pressure of the fluid column. For example, a 25,000-ft well may require 22,500 pounds per square inch (psi) at the formation in order to fracture it. Using a conventional fracturing fluid requires a surface treating pressure of 16,675 psi (pounds per square inch), which exceeds the capability of the vast majority of surface equipment currently available, explains the company. In this example, using DeepQuest service fluid would reduce the surface treating pressure to only 13,610 psi, making the treatment possible.

'This is especially important for offshore operations,' said Jim Prestidge, a Vice President in Halliburton's Production Optimization Division, 'because flexible treatment lines rated at over 15,000 psi simply are not available at this time in the industry.'

Central Asian first for Santos

Australian company Santos is reported to have embarked on what is claimed to be its first exploration venture in central Asia, entering into a conditional agreement with Caspian Oil and Gas covering a phased farm-in under which Santos will earn an 80% operated working interest in 10 exploration licences in the Kyrgyz Republic.

The 10 licences are mainly located in the Fergana basin, which extends across parts of Kyrgyzstan and into Uzbekistan and Tajikistan. The basin is, in part, analogous to the prolific hydrocarbon province of the Tarim and Junggar basins in western China, which contain many large fields. Total discovered reserves from 58 fields in the Fergana basin are estimated to be in excess of 1.2bn barrels of oil and 5.5tn cf of gas, with cumulative production to date of more than 600mn barrels.

Santos is also seeking to take a 15% stake in Caspian Oil and Gas for a total cost of A\$3mn, with an option to acquire a further 4.9% of Caspian's issued share capital.

Visit the Energy Institute website at
www.energyinst.org.uk

UK

British Energy is reported to be planning to extend the life of its Dungeness B, Kent, nuclear power station by 10 years to 2018.

EUROPE

Greece and Italy are reportedly planning to sign an agreement covering the construction of a subsea natural gas pipeline between the two countries. The pipeline – which will be built by Depa, Greece's natural gas supplier, and Italy's Edison – will eventually be linked via another pipeline across northern Greece to a third that is being built between Greece and Turkey. Together, the three pipelines will enable Caspian and Central Asian gas to be transported to Europe. All three pipelines are part of the Southern Europe Gas Ring Project.

Lloyd's Register recently acquired Ødegaard & Danneskiold-Samsøe (ODS), a Danish consultancy specialising in noise, vibration and machinery dynamics, for an undisclosed sum.

NORTH AMERICA

TransMontaigne is reported to have agreed to buy the combined LPG assets and refined products tankage of Rio Vista Energy Partners and Penn Octane for \$27.5mn. The deal includes the Brownsville LPG/petroleum product terminal in Texas, the Matamoros terminal in Mexico, various pipeline assets and existing sales contracts.

Total E&P Canada has acquired some 78% of the issued and outstanding common shares of Deer Creek Energy.

MIDDLE EAST

Dolphin Energy is understood to have signed a gas sales agreement to deliver some 200mn cfd of gas to Oman Oil Company (OOC) from early 2008, for a period of 25 years.

Ali Saeedlou is understood to have been appointed to run Iran's Oil Ministry, despite having no experience in the industry.

Kuwait and Lebanon are reported to have signed a deal under which Kuwait will supply Lebanon with 500,000 tpy of gas oil for three years.

Impact of Hurricane Katrina

As *Petroleum Review* went to press, Hurricane Katrina was reported to have led to the shut in of 58% of Gulf of Mexico oil production and 34% of gas production, with refineries operating at 87% capacity.

In a bid to help alleviate the crisis, some 2mn b/d of oil was released into the market in early September in order to ease supply constraints. The 30-day release of oil marked the first time the International Energy Agency (IEA) had taken steps to open up its strategic reserve since 1991. Meanwhile, Opec began producing 1mn b/d beyond quotas to help keep supplies running.

The price of oil rose to a record \$70.85 in the US in the immediate aftermath of Katrina, which wreaked havoc, flooding New Orleans and flattening much of the Gulf Coast.

The hurricane knocked out a number of US refineries, damaged oil platforms and sent petrol prices soaring. Among the worst-hit refineries were Chevron's Pascagoula facility in Mississippi, and ConocoPhillips' plant in Belle Chasse, Louisiana, which normally produce nearly 600,000 b/d between them. At least 20 rigs and platforms were initially reported damaged, sunk or missing.

Just over a week later, Shell reported that production was flowing and ramping up from all its operated assets in the western Gulf of Mexico that were shut in because of Katrina. Production had resumed at Auger, Brutus, Bullwinkle, Cougar, Enchilada, North Padre Island and West Cameron 565. In the eastern Gulf of Mexico, the company's Fairway asset and Yellowhammer gas processing plant near Mobile Bay were operating normally.

Shell's net Gulf of Mexico production from Shell-operated and outside-operated fields for the first half of 2005 averaged around 450,000 boe/d. At the time of writing, net production from the region had returned to approximately 160,000 boe/d, while the company continued to make a comprehensive assessment of its hurricane-hit assets – Mars, Ursa, Cognac, and West Delta 143 – as well as pipelines and other related onshore processing/handling facilities that transport and receive production. Pending full assessment and evaluation of infrastructure and assets, it is expected that about 60% of total production will be restored to pre-hurricane levels within 4Q2005.

Looking downstream, Shell and Motiva operate seven refineries in the US, with overall crude throughput of approximately 1mn b/d. Two Motiva refineries – Motiva Convent (235,000 b/d crude throughput capacity) and Motiva

Norco (220,000 b/d) – representing about 27% of Shell's US refining capacity (net), were impacted by Hurricane Katrina. However, the refineries, which normally supply retail and other customers mainly in the PADD III Gulf Coast area, were expected to be back in full production as *Petroleum Review* went to press.

Meanwhile, BP has returned the deepwater Holstein spar facility to production. The BP-operated Caesar and Cleopatra pipelines, which serve the Holstein field, have also been returned to service, as has a further 55,000 boe/d of production from the western Gulf of Mexico and onshore Louisiana.

BP reports that efforts are continuing to inspect and return its remaining Gulf of Mexico oil and gas fields to production and pipelines to service. Inspections thus far have revealed no major damage to BP-operated deepwater facilities. Restoration of remaining deepwater production is largely dependent on the resumption of downstream infrastructure, however. Surveys of near shore facilities indicate damage to several small platforms with relatively small production volumes in the West Delta and Grand Isle areas of the Gulf.

Power has also been restored to the BP-operated Pascagoula gas processing plant although it is unable to resume operations until offshore pipelines are able to deliver gas to the plant.

Anadarko Petroleum earlier announced that the Marco Polo platform at Green Canyon block 608 had resumed output, producing approximately 20,000 boe/d – its normal production rate before being shut down on 27 August prior to the passage of Hurricane Katrina. Apache had restored 76% of its gross operated natural gas production and 60% of operated oil production within a week of Katrina.

Kerr-McGee's operated deepwater facilities – Nansen, Boomvang, Gunnison and Red Hawk – and shelf facilities operated by the company in the central and western gulf are also now producing at pre-hurricane levels. The company is continuing to repair minor damage to its eastern gulf shelf operations that remain shut in, including Main Pass 102, Main Pass 108 and Breton Sound. The Neptune facility has been fully inspected and is ready to restart production.

● As *Petroleum Review* went to press, Opec announced that it planned to release an extra 2mn b/d of production in a bid to ease crude oil price pressures. The extra supplies will be available for three months from 1 October 2005.

RUSSIA/CENTRAL ASIA

The Russian government has raised export duties on oil products following a decree signed by Prime Minister Mikhail Fradkov, reports Stella Zenkovich. Russia currently produces about 470mn t/y of oil, of which it exports 230mn tonnes.

Lukoil is to restrict exports via its terminal at Vysotsk to middle distillates and plans to switch crude oil exports to the Baltic pipeline and the terminal at Primorsk. A number of analysts suggest this could save up to \$2lb in transport costs. Some of the released capacity at Vysotsk is to be used by TNK-BP or other companies. Current capacity at Vysotsk is some 7mn t/y – this is to be expanded to 12mn t/y in spring 2006.

Moldova's debt to Russian gas giant Gazprom had risen to \$662.8mn by 1 July 2005, writes Stella Zenkovich. Gennady Abash-kin, Chairman of Russian-Moldovan joint venture Moldova-Gaz, stated that the company owes a further \$631mn in interest and fines for past deliveries. Current supplies are being paid for in full. However, Moldova's debt to Gazprom may rise further as the Russian company plans to raise its gas prices for Moldova starting from 1 January 2006, in order to cover higher production and transportation costs, growing tax pressures and the rising price of gas imports from Central Asian countries such as Turkmenistan, Kazakhstan and Uzbekistan.

China's CNPC is reportedly planning to buy PetroKazakhstan for \$4.2bn. The deal still requires the approval of PetroKazakhstan's shareholders. If successful, it would be the largest acquisition yet in a number of Chinese corporate takeovers overseas. However, it is also reported that a joint venture of India's ONGC Videsh and London-based steel billionaire Lakshmi Mittal may place a counter-bid for PetroKazakhstan.

Baltafta, a Tatneft subsidiary, is understood to have received approval to proceed with the construction of an oil terminal in Russia's Kaliningrad region, at Svetlovsky. Throughput capacity will be around 800,000 t/y of oil products and fuel oil.

ASIA-PACIFIC

Technip and Subsea 7 have signed a memorandum of understanding under

Green light for Yeman LNG

The government of Yemen recently approved the development plan for the Yemen LNG project. The shareholders in Yemen LNG, for which Total is the leader (42.9%), will build a liquefaction plant in the port of Balhaf on the southern coast of Yemen. The plant will have two trains with a combined capacity of 6.7mn t/y and will be supplied with gas from block 18 located in the central Marib region.

Yemen LNG has signed three long-term (20-year) sale and purchase agreements for the plant's output – one with Suez

LNG Trading for 2.5mn t/y, one with Kogas for 2mn t/y and one with Total Gas & Power for 2mn t/y. The plant is scheduled for commissioning in late 2008.

Project shareholders are the Yemeni government, represented by Yemen Gas Company (23.10%), Total (42.90%), Hunt Oil Company (18%) and South Korea's SK Corporation (10%) and Hyundai Corporation (6%). Under the agreements with Kogas, the utility will acquire a 6% interest in Yemen LNG in the near future.

Work starts on WAPC pipeline

Chevron reports that the West African Gas Pipeline Company (WAPCo) has commenced installation of the 353-mile (569-km) main offshore segment of the West African Gas Pipeline (WAGP). When complete, the estimated \$590mn, 475mn cf/d capacity pipeline will be the first regional natural gas transmission system to have been developed in sub-Saharan Africa. First gas is scheduled for December 2006.

According to expert analysis, it is estimated that when fully operational, the pipeline could reduce greenhouse gas emissions by as much as 86mn tonnes over the next 20 years through flare reduction and changing to a cleaner-burning fuel.

Shareholders of WAPCo, the pipeline owner and operator, include Chevron (38%), Nigerian National Petroleum Corporation (25%), Shell (17%), Takoradi Power Company (16%), Societe Togolaise de Gaz (2%) and Societe Bengaz (2%).

North European Gas Pipeline deal

Gazprom, BASF and E.ON have signed a basic agreement on the construction of the North European Gas Pipeline (NEGP) through the Baltic Sea. The parties intend to set up the North European Gas Pipeline Company as a joint German-Russian venture, with Gazprom holding 51% and BASF and E.ON 24.5% each.

The NEGP will provide Germany with a direct link to Russia's huge gas reserves, helping meet rising demand for imports in both Germany and other European countries, and reinforcing security of supply. The pipeline systems of Wingas and E.ON Ruhrgas in Germany will be linked to the NEGP, which will run from Vyborg on Russia's Baltic coast to Germany's Baltic coast, the Greifswald region being provisionally earmarked as landfall. The 1,200-plus km pipeline is planned to be commissioned in 2010, initially consisting of a single pipeline with an annual transmission capacity of 27.5bn cm. The project envisages laying a second pipeline and doubling the transmission capacity to 55bn cm/y.

LNG processing plant order for Hamworthy

Hamworthy has won an order for an unmanned land-based LNG processing plant at Kollsnes in the western coastal area of Norway. The contract, worth in excess of £25mn, was awarded by Gasnor. The plant at Kollsnes will use the same technology as employed on LNG carriers for which Hamworthy has already won orders, but will be approximately twice the capacity – producing up to 84,000 t/y of LNG. However, the plant, which will be delivered in February 2007, will be small-scale compared to other land-based distribution plants that liquefy natural gas directly from gas fields.

The plant will receive natural gas from the neighbouring Statoil North Sea gas receiving terminal. Once the gas has been liquefied, it will be distributed as LNG by road and via small coastal LNG carriers for industrial customers based in Norway. In addition, the liquefied LNG will provide fuel for five new Norwegian gas engine ferries.

Hamworthy supplied its first fully functioning land-based liquefaction system in 2003 for Gasnor at Snurrevarden, Norway. This unmanned plant was Northern Europe's first free-standing mini-LNG production facility and is able to process up to 21,000 t/y of LNG.

which they plan to form a joint venture that will undertake subsea activities in the Asia-Pacific region (excluding India and the Middle East). The new joint venture's head office will be located in Perth, Australia.

South Africa and Indonesia are reported to have signed a memorandum of understanding (MoU) under which the development of alternative sources of energy will be a key focus of attention. The MoU also proposes scientific collaboration in biotechnology, the aerospace industry and in nuclear power development.

Apache has signed a new contract to supply gas to a major West Australian power station to be built at Kwinana, south of Perth. The gas will be supplied from the John Brookes field, jointly owned by Apache (55%) and Santos (45%), located offshore north-west Australia in the Carnarvon basin. The 15-year term of the contract with the plant's developers, Wambo Power Ventures, calls for the delivery of approximately 215bn cf of natural gas (118bn cf net to Apache) at a daily rate of 39mn cf (21mn cf net). The term can be extended an additional 10 years by mutual agreement. First gas delivery is expected by 2H2008.

LATIN AMERICA

EnCana is planning to sell its oil and pipeline business in Ecuador to Andes Petroleum – a joint venture of Chinese oil companies – for \$1.42bn in cash as part of its plan to concentrate on natural gas and oil sands in Canada and the US. The company also reported that it is continuing with plans to divest its natural gas liquids business and gas storage assets in North America.

AFRICA

BG Group and its partners Petronas, the Egyptian General Petroleum Corporation (EGPC) and the Egyptian Natural Gas Holding Company (EGAS) recently announced the start-up of Egyptian LNG Train 2, some nine months ahead of schedule. Early cargoes from the new facility will be lifted later this year by BG Group and Asean LNG Trading Company (ALTCO), a subsidiary of Petronas. The entire 3.6mn t/y output of the second train has been sold to BG Gas Marketing under a 20-year sales and purchase agreement.

Latest European Union developments

The oil price rises wrought by Hurricane Katrina and endemic strong global demand have encouraged European Union (EU) Energy Commissioner Andris Piebalgs to press ahead with his plans to promote energy conservation in the EU, writes *Keith Nuthall*.

He has released a paper stressing the need to accelerate the European Action Plan on energy efficiency and also to promote more effective international action on the topic bilaterally and through the International Energy Agency (IEA).

Piebalgs said he would also publish as soon as possible, twice-monthly consolidated statistics on oil security stocks in the EU; create a Commission Oil and Gas Market Observatory Unit, to improve statistics and transparency; and form a Fossil Fuels Forum on improving the stability and predictability of oil and gas markets – it will first meet on 20 October 2005, in Berlin.

In other news:

- The EDRD (European Bank for Reconstruction and Development) is planning to lend \$25mn to Ukraine fuel retailer Galnaftogaz, helping it build and acquire new outlets, expanding its LPG market and creating an in-house trading unit to diversify supplies.
- The EBRD is planning to lend Azerbaijan state-owned power utility JSC Azerenerji \$100mn to

rehabilitate eight 300-MW dual fuel (heavy fuel oil/natural gas) generators at the AzDRES power plant, Mingechaur, 300-km west of Baku.

- The European Commission has asked EU Ministers to approve special 'balancing' charges on imports of certain industrial gases, including ethylene, propene (propylene), benzene and others, where exporting countries are using raw materials subsidised by dual-pricing policies. These allow low prices in domestic markets, whilst exported products are sold more expensively. Such systems are usually found in non-World Trade Organisation (WTO) countries, such as Russia.
- The acquisition by gas groups Gaz de France International and Britain's Centrica of Belgian gas companies ALG Negoce and Luminus, has been approved without conditions by the European Commission.
- China and the EU have agreed at a summit in Beijing to cooperate technically regarding energy efficiency and conservation, methane recovery and usage, carbon capture and storage, hydrogen and fuel cells, and other energy-related matters.
- The European Commission has cleared without conditions the purchase of Germany's Ruhrgas Industries by Luxembourg-based investment group CVC Capital

Cutting pipeline costs by up to 50%

It has been claimed that a recently launched R&D programme by the Intermediary Technology Institute (ITI) for Energy in Aberdeen could cut onshore and offshore pipeline costs by up to half. Current annual global expenditure on oil and gas pipelines is between \$15bn and \$20bn.

ITI Energy is behind a £3mn project to develop a low-cost, lightweight, high strength pipeline technology capable of being manufactured on-site in a continuous process. The resulting technology is expected to have a range of key energy applications, including onshore and offshore pipelines for the oil and gas industry. The R&D project and the associated commercial development, which will be based in Scotland, involve collaboration between ITI Energy and Helical Pipelines.

Discussions are ongoing with a number of Scottish based businesses who will be contributing research and development expertise to the project.

Traditionally, the oil and gas industry has specified steel or steel alloys for its pipelines. However, engineering improvements in metallurgy, design and construction of pipelines has led to the introduction of high cost alloys to meet the ever-increasing challenges facing this industry. Novel pipeline technology such as that being developed by ITI Energy is key to overcoming these issues. The ability to significantly reduce pipe wall thickness, and therefore weight and material costs, while maintaining strength, allows wide application of the technology. Furthermore, easy integration of liners that protect the pipeline makes the solution particularly relevant in aggressive environments such as sour gas gathering lines, states ITI.

The ability to manufacture on-site allows for cost reduction when installing pipelines in remote locations. It is claimed that the benefits of the new technology could lead to potential cost savings of 40% to 50% compared with current types of oil and gas pipelines.

UK

US electricity company Constellation Energy is reported to have made a £1.9bn bid for the UK's largest power station – the 4,000 MW, coal-fired Drax plant in Yorkshire – which is capable of producing 7% of the country's electricity needs.

Total has sold its 40% stake in the 1,260-MW South Humber Bank combined cycle power plant to Centrica, the current operator (60%).

Many UK household energy bills are expected to rise by 14.2% after Centrica announced that the soaring wholesale cost of gas, driven by the high oil price and declining North Sea gas reserves, had forced its hand. The price hike follows the recent decision by Powergen, owned by German utility E.ON, to increase gas and electricity bills by 11.9% and 7.2% respectively.

EUROPE

Total is planning to invest €2.8bn in refining in France from now to 2010, three times as much as in the first half of the decade. The main investment will be €500mn to increase diesel production at four refineries by some 4mn tonnes, €400mn to improve energy efficiency and further reduce the environmental impact of its refineries, and €800mn to build an upgrader at the end of the period to convert surplus heavy fuel oil into automotive fuel.

Eni has sold its 100% shareholding in IP (Italiana Petroli) to api (anonima petroli italiana) for €190mn. The sale is in line with Eni's strategy to rationalise its presence in the Italian market and develop further its refining and marketing activities in Europe. Eni's marketing activities in Italy are now solely represented by the Agip brand, through a network of 4,300 service stations – representing a 30% market share.

A sales contract covering the supply of some 300mn cmly of gas for a new Norwegian power station has been awarded to Statoil by electricity generator Statkraft. Deliveries to the planned Naturkraft installation at Kårstø, north of Stavanger, are scheduled to start on 1 October 2007.

French utilities group Suez has made a €11.2bn (\$13.8bn, £7.7bn) bid to buy out minorities in Belgian power company Electrabel. The offer is for 49.9% of Electrabel's stock.

UK fuel price protests

Fuel price protests expected outside UK refineries – including Stanlow oil refinery in Cheshire, the focus of the largest national fuel price protests five years ago – failed to materialise on 14 September, with fuel supplies continuing to move freely. However, a number of forecourts across the country were reported to have run dry following panic buying by motorists in anticipation of demonstrations.

More activity was seen on 16 September, when some 100 or so tankers reportedly took to the Welsh section of the M4 motorway, driving slowly and blocking as many carriages as they were able.

In the run-up to the protests, UK Chancellor Gordon Brown called for a number of urgent measures to tackle soaring oil prices during his speech to the TUC Congress in Brighton. Brown stated that the government understood the problems being faced by hauliers, farmers and motorists at a time when oil prices were doubling and stressed that the first action to take must be to tackle the cause of the problem, ensuring concerted global action is taken to bring down world oil prices and stabilise the market for the long term. He said that because demand for oil was outstripping supply, Opec should decide at its September meeting to raise production.

African lubes and oil products ops sold

Total has signed sale and purchase agreements to acquire the shares in ExxonMobil companies operating fuel and lubricants businesses in 14 African countries. The agreement includes ExxonMobil's subsidiaries marketing motor fuels, lubricants, aviation and marine petroleum products in Chad, Djibouti, Ethiopia, Eritrea, Ghana, Guinea, Liberia, Malawi, Mauritius, Mozambique, Sierra Leone, Togo, Zambia and Zimbabwe. The acquisition represents a network of around 500 service stations as well as 29 terminals and depots.

The transaction is subject to the necessary approvals of the relevant authorities in each country.

Total's downstream activities in Africa prior to this deal include an interest in

seven refineries and a network of some 3,300 service stations, as well as petroleum products, such as lubricants, aviation fuel and LPG.

Meanwhile, Shell has signed a sale and purchase agreement, and trade mark licence agreement, with Rubis Group relating to the divestment of Shell's oil products businesses in the French Antilles (Guadeloupe, Martinique) and French Guyana. The agreements relate to Shell's 24% interest in the SARA refinery in Martinique, a wholly-owned network of 54 retail service stations, distribution assets and facilities, commercial fuels, bitumen, aviation, lubricants, LPG and marine businesses geographically spread across the region. No financial details have been disclosed.

Venezuelan oil trading initiative

Nine Caribbean countries are understood to have signed the 'Petrocaribe' oil trading initiative proposed by Venezuelan President Hugo Chavez as an alternative to free trade deals backed by the US amid rising world fuel prices. Those signing the accords included the Dominican Republic, which has already proposed a series of national measures aimed at curbing fuel consumption, along with smaller countries such as Antigua, Suriname and St Kitts and Nevis. Cuba and Jamaica had previously signed up to the initiative.

Under the plan, Caribbean governments will pay market price for Venezuelan oil, but will only be required to pay a portion of the cost up front. The rest can be financed over 25 years at 1% interest. Governments will also be able to pay for part of the cost with services or goods such as rice, bananas or sugar, while oil-rich Venezuela will provide assistance in expanding shipping and refining facilities. The accords are reported to come 'without any political strings' – however, some critics of Chavez say it will allow the socialist leader to expand his influence in the region.

Chavez is also reported to have recently stated that PdVSA plans to build three new oil refineries – two with a 50,000 b/d capacity, the third with a 400,000 b/d capacity – and to expand capacity at the existing Puerto La Cruz and El Palito refineries.

EASTERN EUROPE

Poland's second-largest fuel group, Lotos, is reportedly planning to buy ExxonMobil's Polish fuel retailing network for \$85mn. The sale covers 39 Esso-branded stations and 14 sites on which stations can be built. If approved by competition regulators, the deal would increase Lotos's retail network to 127 stations from 74, bringing its market share to 7.5% up from 1.5%. Poland's main fuel retailer, PKN Orlen, holds a 30% market share.

OMV is seeking a 51% stake in the Turkish refining company Türkiye Petrol Rafinerileri Anonim Şirketi (Tupras), which has an annual refining capacity of 27.6mn tonnes.

MIDDLE EAST

In Iraq, tenders have been issued to build new refineries to help cope with fuel shortages, writes Stella Zenkovich. Oil Minister Ibrahim Bahr Al-Uloom stated that the country is currently spending \$300mn on refined oil product imports.

RUSSIA/CENTRAL ASIA

Gazprom and Shell have recently announced the first shipment of Gazprom-owned LNG into the US market, via the Cove Point LNG import terminal where Shell owns one-third of the regasification capacity.

LATIN AMERICA

The International Finance Corporation (IFC) of the World Bank is lending \$150mn to Brazil petrochemical company Ipiranga Petroquímica, one of Latin America's leading producers of polyolefins, reports Keith Nuthall. The loan will support initiatives including 'process improvements and debottlenecking of operations'.

AFRICA

Foster Wheeler has been awarded a project management consultancy contract by Societe Anonyme Marocaine de l'Industrie de Raffinage (SAMIR) for a \$650mn upgrade and expansion of its Mohammedia refinery, located near Casablanca, Morocco. The total refinery throughput will be 6.25mn t/y, equivalent to about 121,000 b/d.

European biomass-to-liquids deal

Shell Deutschland Oil has acquired a minority equity stake in CHOREN Industries of Freiberg, Saxony, setting the stage for construction of what is claimed will be the world's first commercial facility to convert biomass into high-quality synthetic biofuel, already marketed by CHOREN as SunFuel. A 15,000 t/y plant is planned at Freiberg for the production of SunFuel. The fuel is supported by car manufacturers such as Volkswagen and DaimlerChrysler as it can be used without modification in any diesel engine, without compromising performance and with a substantial reduction in harmful emissions.

CHOREN Industries has developed its patented Carbo-V biomass-gasification process to become a leader in the field of converting biomass – such as wood-chips – into ultra clean, tar-free synthetic gas. This 'syngas' can then be converted into synthetic biofuels using the same Shell middle distillate synthesis (SMDS) technology that Shell has developed for gas-to-liquids production (conversion of natural gas into synthetic oil products).

The synthetic fuels made from biomass have identical composition to synthetic products derived from natural gas – yet they have the advantage of being sustainable and environmentally

friendly because they are based on renewable feedstocks. Biomass-to-liquids (BTL) fuel is as clear as water and virtually free of sulphur and aromatic substances. Its ignition qualities (as measured by a very high cetane number) are reported to be excellent, thereby reducing noise and resulting in cleaner combustion than with conventional diesel. Greenhouse gas emissions from BTL fuel are claimed to be less than 10% of those from fossil fuels. Moreover, BTL fuel can either be used as a pure product or in a blend with conventional diesel fuel.

Traditional biofuels such as RME (rapeseed oil methyl ester) and ethanol are first generation biofuels. They are made using the same parts of plants (rapeseed, grain or sugar cane crops) that are also used in food production. Competition between fuel and food for these crops has the potential to impact upon both availability and price. In contrast, biomass-based BTL fuel, or ethanol produced from ligno-cellulose, are second generation biofuels, made by converting those parts of plants not used in food production. Hence farmers are able to satisfy the needs of both the food and fuels industry from the same land, thus significantly increasing yields per hectare whilst securing an additional source of revenue.

Neste and Bapco sign lube joint venture

Neste Oil and the Bahrain Petroleum Company (Bapco) are proceeding with their plans for a joint venture to produce high-quality lubricant base oil, having recently signed an agreement covering the commercial terms for a project to design, build, and operate a base oil production facility at Bapco's Bahrain oil refinery. The facility will be capable of producing 400,000 t/y of sulphur-free, very high viscosity index (VHVI) base oil, used for blending top-tier lubricants. The plant is due to come onstream in 1H2008.

Feedstock for the new base oil facility will be provided by Bapco's low-sulphur diesel hydrocracker unit, which is due to come onstream in mid-2007. Neste Oil will be responsible for sales and marketing the output of the joint venture plant.

Petronas enters Sudan refining sector

Petronas has further strengthened its presence in Sudan by taking a 50% interest in the new Port Sudan refinery project, expanding its entry into the Sudanese downstream sector following its acquisition of the entire retail assets of Mobil Oil Sudan in March 2003.

The refinery project – located at Port Sudan, the only entry port in the country – has a total capacity of 100,000 b/d. It is an export refinery designed to process high acid crude that will add value to the Dar Blend from Sudan Melut basin blocks 3 and 7 where Petronas has a

40% equity interest. Production will meet the growing demand for petroleum products in Sudan and neighbouring countries under the Common Market of East and South Africa (COMESA) once it is fully operational by early 2009. The refinery will produce high quality petroleum products meeting Euro 4 specifications.

The Sudanese Ministry of Energy and Mining holds the remaining stake in the Port Sudan refining project.

Petronas also has upstream interests in blocks 1, 2, 3, 4, 5A, 5B, 7 and 8.

Heading for uncharted waters

One forthcoming North Sea project is set to see reuse of a previously decommissioned gas platform setting a precedent for the UK, while three other operators are grappling with issues surrounding decommissioning and disposal of some of the industry's largest offshore installations.

John Bradbury reports.



Photo: BP

BP is currently conducting consultations prior to gaining approval for decommissioning and removal of its northern North Sea North West (NW) Hutton installation, while Total and ConocoPhillips in Norway are moving on removal of redundant Frigg and Ekofisk 1 field facilities.

Meanwhile, Houston-based Newfield Exploration will set a UK North Sea precedent by redeploying ExxonMobil's former Camelot CB gas platform as an integral part of its 230bn cf Grove field gas development in UK block 49/10 under plans which were recently revealed.

Camelot's 682-tonnes steel jacket and 475-tonnes topsides were put in place in UK block 53/2 as a normally unmanned installation in 1992. The field came onstream December the same year. It ceased production in 1998 and the platform's four-leg jacket and topsides were removed by Hereema's crane barge *Thialf* in November 2004 and transported to Able UK's Teesside reclama-

Footings on the North West Hutton jacket will be severed above the mudline, primarily for safety and technical reasons. Essentially, BP is unsure that cutting the footings any lower will be successful; secondly, it could entail an unacceptable level of safety risk

tion and recycling centre (TERRC). Earlier this year Newfield bought the platform, now re-designated Grove A. An industry source told *Petroleum Review*: 'The new owner has carried out some work on stripping out unwanted equipment on the topsides and they are currently working with a consultant to put together a scope of work for refurbishment before reinstallation.'

Camelot's topsides include processing equipment, a wellhead, and metering for a single well, plus a utilities building, emergency shelter and helideck. They are now being refurbished prior to redeployment at Grove in 2Q2006. Earlier this year, Able UK also sought to buy the ex-BARMAC (Brown and Root and McDermott) offshore construction yard at Nigg (see *Petroleum Review*, April 2005), which it plans to turn into a

multi-user facility, including recycling redundant offshore structures.

Peter Stephenson, Chairman and Chief Executive of Able UK, confirmed the Nigg yard bid in June. Potential Nigg users in future '... may be involved in the marine recycling industry, primarily for redundant marine structures from the North Sea similar to those that were constructed at Nigg during the last 30 years,' he commented. Stephenson said he is currently awaiting the outcome of negotiations to buy the entire Nigg site.

Norwegian plans

Meanwhile, Total and ConocoPhillips Ekofisk are squaring up to two multi-component decommissioning tasks on the Frigg and Ekofisk fields.



Contingency planning for pandemic flu

Monday 17 October 2005

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Pandemics of influenza have swept the world throughout history, causing widespread illness, deaths and societal disruption. It is not known when the next influenza pandemic will occur, but when it does the consequences are expected to be serious, with around a quarter of the population affected, and with over 50,000 deaths in the UK alone. The energy industry is part of the UK's critical national infrastructure, and as such is planning for such an event. The purpose of this conference is to discuss issues and potential problems that industry will face in the event of a pandemic.

Topics covered will include:

- Overview and historical perspective
- UK National Contingency Plans
- Vaccine development and antiviral development and supply and distribution
- Impact on business and business continuity
- Specific issues relating to the energy industry
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- The International perspective

Confirmed speakers:

- Dr Charles Easmon, Medical Director, Number One Health Group
- Paul Werbiski, Director, Health, Safety and Environment, Centrica North America
- Geir Suerre Braut, Deputy Director General, MD, Norwegian Board of Health
- Dr Doug Quarry, International SOS
- Dr R Lambkin, General Manager, Retroscreen
- Philip Atkinson, Tamiflu Business Leader, Roche, Switzerland
- Dr David Salisbury CB, Principal Medical Officer, UK Department of Health
- Helen Howie, Consultant in Public Health Medicine and Head of Health Protection, NHS Grampian

This conference should be attended by health professionals, contingency planners, government and local authorities, health agencies and all those working in industry and responsible for contingency planning and business continuity.



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UK

- Concrete drilling platform (CDP1) – 41,861-tonnes plus 4,840-tonnes topsides, installed September 1975. Disposal: in situ.
- Treatment platform (TP1) – concrete, 163,179-tonnes plus 7,840-tonnes topsides, installed June 1976. Disposal: in situ.
- Quarters platform (QP) – steel jacket, 4,757-tonnes plus 3,639-tonnes topsides. Disposal: removal to shore.
- Template for flare tower (FP) – steel foundations, 950-tonnes, installed October 1975. Disposal: removal to shore.

Norway

- Treatment and compression platform No 2 (TCP2) – concrete, 231,200-tonnes, installed June 1977, plus 22,882-tonnes topsides. Disposal: in situ.
- Drilling platform No 2 (DP2) – steel jacket, 9,800-tonnes, installed May 1976, plus 5,479-tonnes topsides. Disposal: removal to shore.
- Drilling platform wreck (DP1) – steel, 7,300 tonnes, severely damaged during installation in 1974. Disposal: removal to shore.

Table 1: Frigg field structures due for removal

Total has already obtained clearance to leave three concrete-based platforms – CDP1, TP1, and TCP2 – in place, after getting special dispensation from international Oslo and Paris Commission (OSPAR) rules covering offshore abandonment in North West Europe.

Frigg decommissioning – costed at \$417mn in 2000 – was approved in part by Norway's Petroleum Safety Authority in June 2004. That permission applied to Frigg's treatment and compression platform (TCP2), drilling platform (DP2) and treatment platform (TP1) in the Norwegian sector of the North Sea, and the quarters platform (QP) and concrete drilling platform (CDP1) in the UK sector (see Table 1).

Frigg ceased production October 2004. AKOP was selected as the decommissioning contract winner after five consortia conducted front end engineering and design studies for the Frigg programme.

Each consortium had been given a draft of the Frigg decommissioning contract. The customer, Total E&P Norge, explained why: 'The advance information gave them an opportunity to get acquainted with Total E&P Norge requirements on a complex and lengthy scope of work as well as clarifying any contractual issues before the formal tendering process.'

AKOP's successful bid for the Frigg work, worth Nkr3bn (\$459bn) in October 2004 comprised AKOP, the Aker Stord dismantling yard in Norway, Saipem UK (which is contributing the 57000 crane vessel) and the Shetland Decommissioning Company (which is due to receive 20,000 tonnes of Frigg steel for dismantling).

Since offshore operations commenced, they have not been without incident. Total and AKOP fell foul of Norway's Petroleum Safety Authority (PSA) which issued an order to Total

concerning breaches in safety regulations during the offshore work phase. The order followed an audit of working practices and an offshore inspection in June. According to the PSA: 'The audit revealed several weaknesses in Total's and AKOP's management systems for following up the working environment in the removal project. Eight nonconformities and two aspects with potential for improvement were noted. The PSA is of the opinion that deficient involvement of working environment competence is a contributory cause to many of these nonconformities.'

Overall, the PSA said: 'These nonconformities indicate deficient management of the working environment in the removal project on the part of both Total and AKOP, for their respective areas of authority.'

After the successful re-floatation of the UK North Sea Maureen platform in 2001, ConocoPhillips faces a bigger challenge with 15 offshore platforms in the Ekofisk 1 Cessation project. Under the plan developed by Phillips, later ConocoPhillips, major structures are to be removed in two

stages. In 1998, the total cost was put at Nkr8bn – now equivalent to at least \$1.25bn. Today, the price is likely to be much higher. Bids were invited for removal of lighter – sub 1,000 tonnes – structures such as bridges, flare stacks and tripods, with the original aim of awarding first contracts in early 2005. Simultaneously, a bid round was launched for removal of the first six platforms, with an option to include the remaining five, with awards due in 2006 and work completed by 2013.

The largest structure, the 290,000-tonnes concrete Ekofisk storage tank and its surrounding protective barrier wall of 900,000-tonnes are due to be left in place. In total, the Ekofisk Cessation project entails removing 14 jackets, comprising 64,000 tonnes of steel, 15 topsides (107,000 tonnes) and 150 miles (235 km) of buried pipelines (see Table 2).

The project reached a critical stage in summer 2005, as the operator evaluated contract bids for onshore disposal of smaller structures.

Norwegian engineering group A F Decom was selected earlier to remove and dispose of the 24,000 tonnes of Ekofisk tank topsides – the first major deal for the Ekofisk Cessation project. Sections were being cut up and removed to containers for shipping ashore during the summer.

ConocoPhillips abandoned an earlier bid round within the Ekofisk scope, for removing the Norpipe booster platforms, 37/4A and 36/22A, in the Norwegian sector – a process that sought to elicit proposals for cost-effective single lift removal and other decommissioning technologies from contractors. ConocoPhillips said that because the decommissioning workscope was limited to just two platforms, bidders were unable to obtain financing to prove and develop the concepts on offer. Effectively, the competition is still open for removal of the two booster platforms, along with the other nine in the Ekofisk Cessation scope.

Stage one: first six facilities due for decommissioning:

Albuskjell 1/6a
Albuskjell 2/4F
Vest Ekofisk 2/4D
Ekofisk 2/4R
Norpipe booster platforms – Norpipe 36/33A and Norpipe 37/4A

Stage two: five remaining facilities (may be added as an option to the stage one contract):

Cod 7/11A
Edda 3/7C
Ekofisk 2/4 P
Ekofisk 2/4 H
Ekofisk 2/4 Q topsides

Table 2: Ekofisk Cessation structures



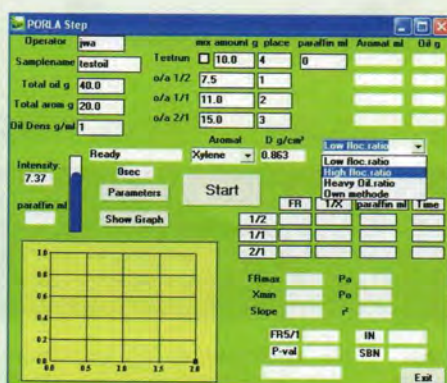
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Model Code of Safe Practice Part 2: Design, construction and operation of petroleum distribution installations (3rd edition)



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This new publication replaces the second edition of IP2, published in 1998. Its purpose is to provide a general guide to safe practice in the layout, design, construction and operation of distribution installations and their equipment. The Code aims to recommend basic standards and practice in this regard.

The new edition covers the receipt, storage and handling of petroleum products at all locations, and should be read in conjunction with the UK Health and Safety Executive's publications HS(G)51 *The storage of flammable liquids in containers*, HS(G)176 *The storage of flammable liquids in tanks* and HS(G) 186 *The bulk transfer of dangerous liquids and gases between ship and shore*, or their local equivalent in other countries.

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An information meeting for potential Ekofisk decommissioning bidders – many of whom have been developing single lift methodologies – in December 2004 indicated a new project schedule with a new workscope: six platforms in a first phase, with the option of including the remaining five, all for disposal by 2013.

Stig Kvendseth, one of the Ekofisk Cessation project team members, indicated bid evaluation for removal of the smaller – sub 1,000 tonnes – structures, including bridges, flare stacks and tripods is ongoing, with awards planned for 3Q2005.

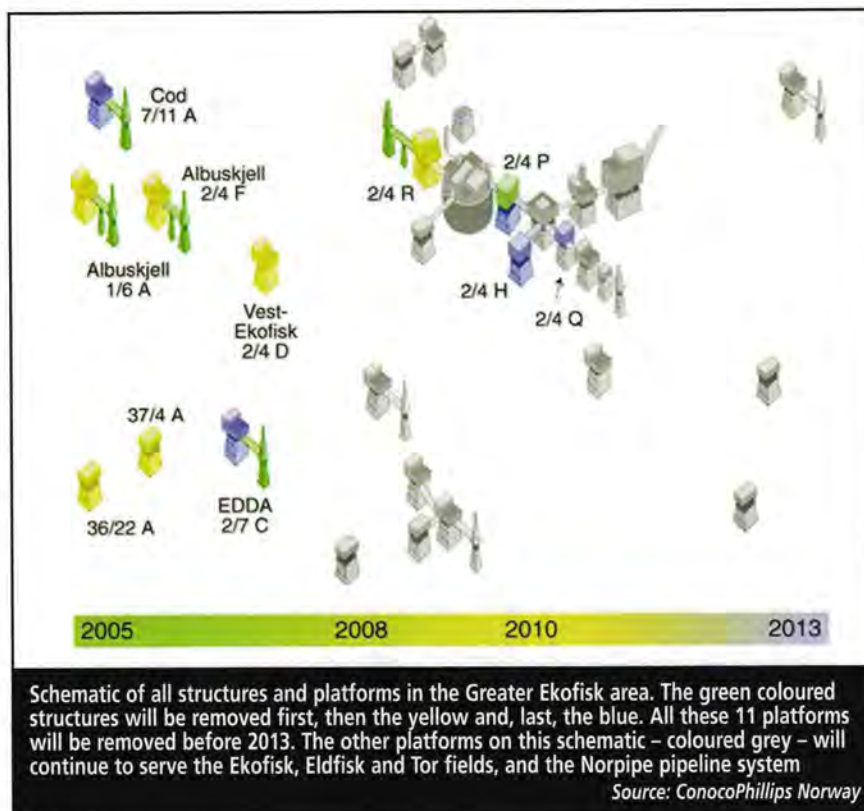
Prequalification is underway for decommissioning the larger structures, with a bid invitation also due in the third quarter. Contract awards are expected by 2Q2006.

UK proposals

Earlier this summer the Saipem 57000 was on station on Shell's Brent field, to remove six 990-tonnes anchor blocks for the notorious Brent Spar oil storage facility and a 1,094-tonnes flare stack, which were removed successfully without incident.

Meanwhile, BP's programme for decommissioning its NW Hutton platform in block 211/27a in the UK's northern North Sea has moved forward with the submission of a decommissioning plan to the UK's Department of Trade and Industry (DTI). Public consultations closed in March. This year, BP is evaluating yards capable of onshore disposal. Front end engineering and design work for the removal phase was also due to begin, along with a tendering process, so that removal can take place between 2006 and 2009. Contract bids are expected in the second half of this year, with awards envisaged for 2Q2006.

However, BP wants to leave the jacket footings at the base of the platform in place. A BP external affairs spokesman



said that had triggered a further European-wide consultation process among OSPAR signatories. 'That process is just about beginning,' he said, and it is expected to take about four months to complete. 'At the end of that, the UK government is in a position to approve [the decommissioning plan] or not.'

NW Hutton was installed in 1981. One of the jacket legs was damaged during installation due to a severe storm which necessitated more grout being used to cement the leg into piles. This was a major safety consideration, which, in part, led BP to recommend leaving jacket footings partially in place. It has calculated that there is a one in seven chance of a fatality during

the necessary diving operations that total or partial removal of footings would entail. Accordingly, BP has recommended that the jacket should be removed down to the footings only, and that the footings themselves are left in situ.

NW Hutton comprises an 8-leg, 17,500-tonnes steel jacket including piles, which was built for the field's water depth of 459 ft (140 metres), and 20,000 tonnes of topsides comprising integrated oil and gas drilling, production and processing facilities. Topsides were installed with a total of 22 heavy lifts and BP envisages reverse installation for topsides and a cut and lift technique for the jacket.

Both the steel jacket and topsides – a total of 30,000 tonnes – will come ashore under the decommissioning plan for dismantling and disposal. 'Achieving this outcome represents a major engineering challenge,' BP notes in its executive summary of the project. All of the platform's 40 wells have been plugged and abandoned and the facility has been a normally unmanned installation since July 2004, with navigation lights to warn shipping.

Yet, as BP's spokesman points out, there is a huge amount of technical uncertainty surrounding NW Hutton. 'Fixed jackets like this have never been removed before,' he said. 'When we do North West Hutton we will learn a lot about how it has all worked in practice and move the industry up the learning curve.'



Total's Frigg TCP2 platform

Photo: Total

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The EI will present awards to the winners of nominated projects in the categories of Communication, Community Initiative, Environment, Innovation, International Platinum, Outstanding Individual Achievement, Safety and Technology. The evening begins with a welcome drinks reception in the Savoy's River Room. The Awards presentation ceremony follows a gala dinner and proves to be a truly international industry event.

Guest speaker and presenter 2005 Sir Ranulph Fiennes Bt OBE

Ranulph Fiennes was born in 1944, spent his early years in South Africa and was educated at Eton. He followed his late father's footsteps and served with the Royal Scots Greys before joining the SAS. In 1968 he joined the Army of the Sultan of Oman and in 1970 he was awarded the Sultan's Bravery Medal. Since 1969, when he led the British Expedition on the White Nile, Sir Ranulph has been at the forefront of many exploratory expeditions. Dubbed the 'World's Greatest Living Explorer' by the *Guinness Book of Records*, his expeditions around the world include Transglobe, the first surface journey made around the world's polar axis, which took three years to complete, several unsupported North Polar expeditions and the discovery in 1991 of the lost city of Ubar. In 1993 Sir Ranulph and Dr Mike Stroud entered the history books when they completed the first unsupported crossing of the Antarctic continent. For 97 days the pair fought through pain, starvation and snowblindness to achieve this, the longest unsupported polar journey in history. Later that year they were both awarded an OBE (Order of the British Empire) for 'human endeavour and charitable services'.

Despite suffering a heart by-pass operation just 4 months previously, Sir Ranulph's pioneering spirit led him to complete a punishing schedule of seven marathons, in seven days on seven continents in 2003, again with Dr Stroud. First stop was Patagonia at the southern tip of Chile, then the Falkland Islands, Sydney, Australia, on to Singapore, before returning back to this side of the continent for a 26-mile run in London, Cairo and finally, New York. Sir Ranulph Fiennes - who has certainly lived by his family's motto 'Look for a Brave Spirit' - lives on Exmoor.



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Up, up and away



Photo courtesy: SolArc Inc

It may never equal the four-fold rise in the price of a barrel of crude oil that took place between 1973 and 1974, but this year's hike to more than \$60/lb has given all those industries dependent on the stability of fuel prices a severe shock – and the aviation industry is one of those reeling from the increases, writes Deirdre Mason.

US refiners are under huge pressure to produce more diesel and heating oil so as to lower the current high oil price. The main effect of trying to squeeze more gasoline, diesel and heating oil from the crude oil barrel is to leave less for the production of jet fuel. As a result, world airlines are already feeling the effects of sharply rising jet fuel costs. Remember, this is an industry only just emerging from a slump in demand caused by the 9/11 terrorist attacks in 2001 and increased costs because of the consequent tightening in security.

The impact of the soaring price of jet fuel is being felt globally. For example, it has led British Airways to suspend freight services in Zambia, causing *The Times of Zambia* to call for the country's government to press its fuel suppliers

for a better deal. Meanwhile, DHL, which supplies aviation fuel to the Republic of Ireland, has been imposing fuel surcharges since November 2002. These surcharges are now substantial. 'Since January 2002, the price of aviation fuel has increased by 50%. Previously, we absorbed the full impact of these increases,' a company spokesman said. DHL's surcharge for August 2005 was 11%, compared with 10% for July.

No let-up

The world's bankers see no let-up in the immediate future. At a recent meeting in Basel, Switzerland, where international bankers discussed the trend of future oil prices, Martin Redrado, Governor of Argentina's central bank,

said: 'There is a general consensus that we will have high oil prices for at least the next two or three years.'

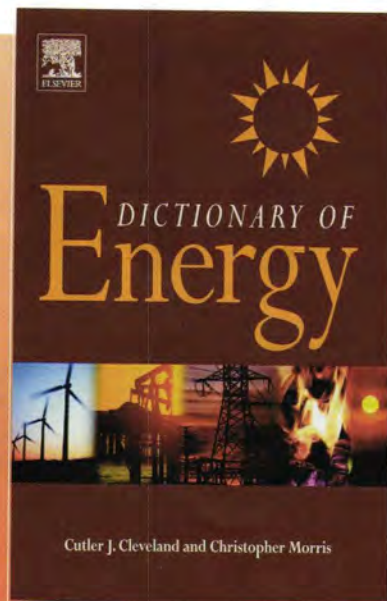
Meanwhile, on 30 July 2005, the US Senate passed a mammoth energy bill – but only after Vice President Dick Cheney's key goal of opening up an Arctic wildlife reserve in Alaska for oil drilling was stripped from it. Democrat Senator Barack Obama, although voting for the bill, saw it as a missed opportunity: 'I would insist that, in the next year or two, we immediately address the issue of how we can wean ourselves off Middle Eastern oil,' he said.

So, no new supplies of aviation fuel can be expected from this US frontier state. This is bad news because the aviation fuel sector is not only under pressure from basic supply and price problems – it has also to contend with toughening environmental legislation and the possibility of environmental taxes.

This is particularly the case in the European Union (EU), which has bound itself to the Kyoto agreement to cut greenhouse gas emissions. The latest move from the European Commission (EC) is to suggest strongly that airlines will be included in a reformed EU greenhouse gas emissions trading scheme (ETS) when it finally announces its strategy for tackling aviation's contribution to climate change. If, as seems very likely, the trading scheme will

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The Bitumen safety code provides good health, safety and environmental protection practice, rather than a set of rigid rules, for the whole product life cycle of manufacture, blending, storage, distribution, handling, use and sampling.

The 4th edition follows a comprehensive review of all sections, and accounts for the introduction of new bitumen specifications. It provides improved guidance on health management, in particular hazards, exposure mechanisms, generic inhalation exposure data, control measures and recovery strategies. It also takes account of the implications of the Dangerous Substances and Explosive Atmospheres Regulations, in particular, the control of flammable atmospheres, sources of ignition and foreseeable fire scenarios. One notable addition is a new chapter on environmental protection, given its greater prominence.

For the user sector of the bitumen industry, the updated Code provides enhanced guidance on the requirements for the safe delivery of bitumen products to customer sites and improved guidance on product handling and use such as with mobile heating kettle operations, roofing applications, and asphalt manufacture and use.

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apply to airlines, it would come into effect in 2012.

For environmentalists, of course, this is a good thing. Take the UK's influential Commons Environment, Food and Rural Affairs Select Committee – in a recent report on tackling climate change, the committee applauded the proposal to include aviation within the emissions trading scheme but wondered why it would take so long to come into effect. The British government, it said, should use 'whatever means necessary to ensure inclusion within the scheme by the start of the second phase of the ETS in 2008,' when the system will receive its first administrative tweak.

Along with the ETS comes the possibility of an airline fuel tax, as arguments that tax-free fuel for air traffic is a privilege that makes no environmental sense gain ground. Early this year, the EC suggested once more that a tax on jet fuel should be implemented, but the Commission's views were vehemently rejected by the southern European countries and the Republic of Ireland, which depend strongly on tourism brought in by air.

However, the German government put forward its own proposal to impose a tax on airline fuel to boost overseas development funding, which angered the Association of European Airlines (AEA). Its Secretary-General Ulrich Schulte-Strathaus, whose association represents airlines such as British Airways, Air France, Virgin Atlantic and SN Brussels, said: 'Of course we applaud humanitarian initiatives, but why target the airlines? Our industry is going through a fundamental crisis.'

A more measured, but nevertheless critical, response came from the German Deutsche Bank. Eric Heymann, an Economist in the bank's research arm, DB Research, said: 'For Germany to go it alone on taxation on aviation fuel would be a mistake in our view. The two large German airports, Frankfurt and Munich, and to a lesser extent Düsseldorf, are competing heavily with other European hubs.' A tax on low-frequency domestic routes would be likely to restrict the growth of domestic aviation and would have a positive effect on the environment, he thought. However, he warned: 'The two hub airports of Frankfurt and Munich, which serve roughly 50% of passengers at German airports, would lose market share to foreign airports as gateways to Germany if a national tax on aviation fuel were levied.'

Heymann stressed that countries must be able to afford such environmental protection: 'With a national tax

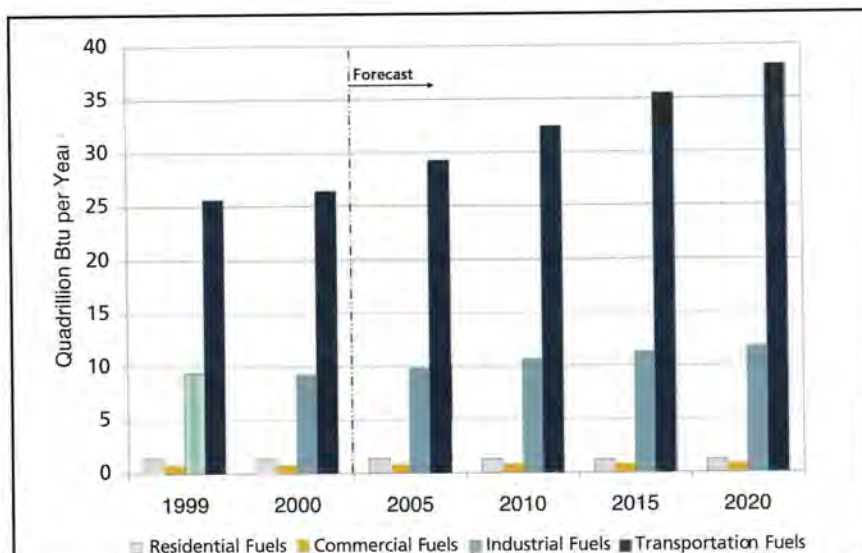


Figure 1: Trends in petroleum fuels consumption: 1999-2020

Source: Annual Energy Outlook 2002 with Projections to 2020, US Department of Energy and National Energy Information Centre, SOE/EIA-0383 (2002) December 2001

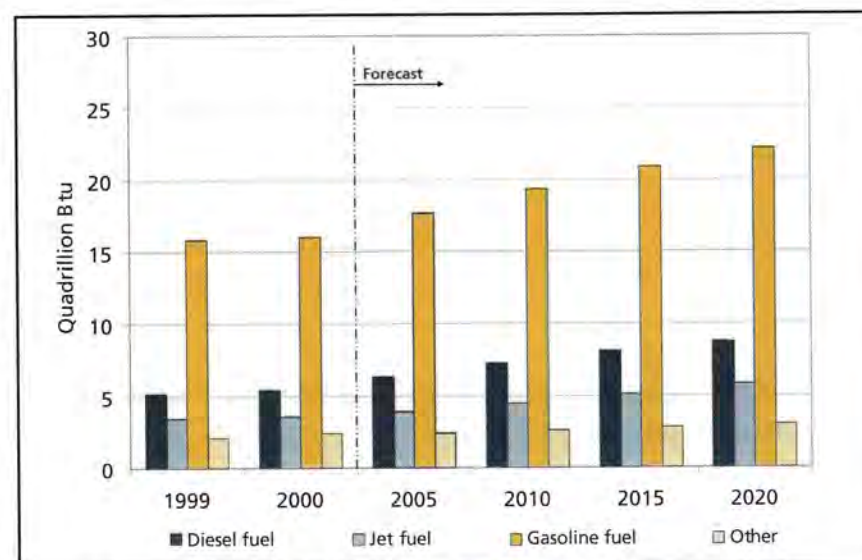


Figure 2: Trends in transportation fuels consumption: 1999-2020

Source: Annual Energy Outlook 2002 with Projections to 2020, US Department of Energy and National Energy Information Centre, SOE/EIA-0383 (2002) December 2001

on aviation fuel, however, aviation as well would start to stutter as a job-creation motor in Germany. Thus, a high price would have to be paid for the limited ecological effects.' Instead, he wants to see increased efficiency in Europe's air traffic control system and the elimination of bottlenecks in airport infrastructure. Flight delays and holding patterns, still the order of the day in European air traffic and the cause of wasted fuel, could thus be reduced significantly, he argued.

However, airport attempts to build their way out of fuel-wasting congestion and bottlenecks have always generated strong local protests. For

example, in the UK, the South East Regional Assembly (SERA) recently warned the government that plans to build a second runway and third terminal at Gatwick Airport are unsustainable. Commissioning Roger Tym & Partners, SERA produced research into a more sustainable aviation policy. Government should, says the Tym report, move on from the 'predict and provide' approach. Landing charges at congested airports should, it says, reflect demand. Airport expansion, it warns, runs the risk of undermining progress on climate change, with a major increase in carbon dioxide (CO₂) pollution from aviation.

EI Autumn Lunch 2005

Guest of Honour and Speaker:

Joan MacNaughton, Director-General, Energy Department, DTI
Monday 17 October 2005, The Berkeley, Wilton Place,
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The EI Autumn Lunch is a prestigious and established date in the energy events calendar, providing a unique opportunity to hear a respected figure speak on contemporary global issues affecting our industry.

Joan MacNaughton, Director General, Energy, Department of Trade & Industry (DTI), joined the Home Office in 1972 with a degree in Physics from Warwick University. She has had a wide range of policy and managerial jobs in her Civil Service career – managing large-scale organisational change in several different sectors. She has been Principal Private Secretary to three Cabinet Ministers, and has also spent time in the private sector. Since January 2002 she has been DG, Energy, DTI, responsible for Oil & Gas, Nuclear Industries, Coal Policy, and the Engineering Inspectorate. In early 2003, she oversaw the publication of the Government's Energy White Paper, which defines a long-term strategic vision for energy policy combining the UK's environmental, security of supply, competitiveness and social goals. Overall aims of the Group include working with others to promote competitive energy markets, while achieving safe, secure and sustainable energy supplies.

In Spring 2004 she was elected as Chair of the International Energy Agency Governing Board. The IEA, based in Paris, is an autonomous agency linked with the Organisation for Economic Co-operation and Development (OECD). It was formed in the wake of the 1973/74 oil crises with energy security as its core activity and includes key consuming countries such as the US and Japan.

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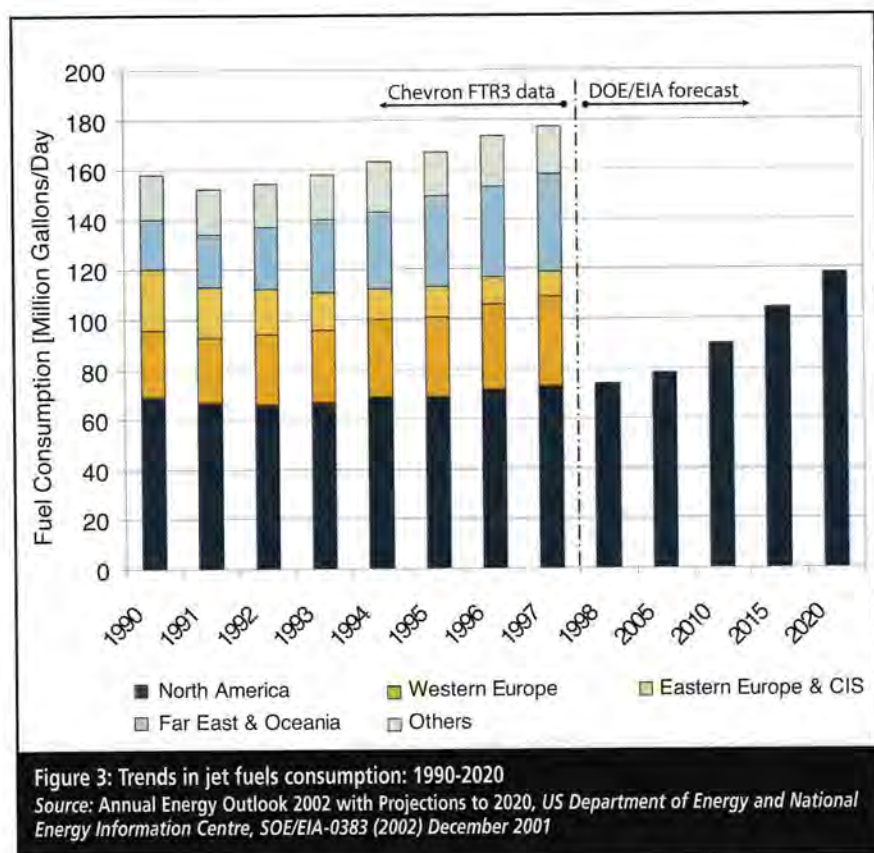
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Cutting fuel waste

For those favouring an expansion of the air industry, technology could be of assistance. Fuel efficiency is built in to the International Air Traffic Association's (IATA) guidance on maintaining aircraft so as to save fuel waste. Maintaining aircraft to reduce drag in all its forms is the essential component to a fuel-efficient maintenance policy, IATA says. For more specific wastage control, engineers need to inspect pneumatic manifolds and valves for leaks, it advises. Even though the individual leaks may be too low to register on the warnings panel, over an entire aircraft these leaks can add up to a significant loss, requiring additional throttle to sustain performance. Tired air cycle machines can place a demand for additional pneumatic muscle to drive them, and this adds to the need for additional fuel, it notes.

More generally, IATA is working with industry partners to cut down on fuel use, and with individual airlines to ensure that they have a robust internal fuel conservation programme in place.

On average, says IATA, airlines spend around \$100 per flight minute in total operating costs. After labour, fuel is the largest cost component in airline operations. IATA is working with air navigation service providers, air traffic controllers and airlines to

save one minute per flight through better airspace design, procedures and management. If successful, IATA says, this initiative could reduce total industry operating costs by over \$1bn/y and significantly reduce environmental emissions.

Another IATA strategy is route optimisation. Opening new, more direct flight routes and realigning others to reduce fuel requirements could, it says, save the industry a further \$1bn/y and cut environmental emissions. Said Project Leader Ravin Appadoo: 'Work to date this year has already produced over \$500mn in savings.' A 1% improvement in fuel efficiency across the industry can lower fuel costs by \$700mn/y, IATA claims. 'We are compiling industry best practices, publishing guidance material and establishing training programmes for member airlines to improve existing fuel conservation measures,' the trade association added. It has already sent a comprehensive checklist on fuel efficiency best practice to its members.

Looking at the alternatives

However, reducing fuel usage still may not be enough for the industry. As environmental laws bite ever harder and fuel costs put increasing pressure on fuel efficiency, fuel quality becomes increasingly important. Fuel composition and specifications will have to

change to meet these requirements and fuel refiners will have to deal with restrictions on certain components such as sulphur and aromatics. They will also have to deal more rigorously with contaminants such as water, particulates, peroxides and even microbial contamination, all of which affect performance as well as the environment.

Thus there is increasing pressure to produce safe, alternative fuels for air traffic. However, there are still enormous obstacles to overcome. Colin Beesley, Head of Environmental Strategy for Rolls-Royce, raised the key ones at a climate technology conference organised by the Royal Institute of International Affairs in London. 'Safety is the number one issue with alternative fuels,' he said. 'Biodiesel goes a bit solid at cruising altitudes, so we're not quite sure how we get around that.'

Another problem is worldwide availability of these alternatives. Airlines cannot risk converting to an alternative fuel unless its availability becomes standard at all airports. Unless scientists make some rapid breakthroughs on technical barriers and individual countries find the means for rapid and sustained production of alternatives such as biofuels, a move away from traditional fossil fuels for air traffic will take decades.

However, there is still scope for redesigning aircraft engines to use fuel more efficiently and more cleanly. One of the European Union's current international research projects concerns the VITAL environmentally friendly auto-engine, which aims to significantly reduce fuel use, polluting emissions and noise from aircraft. This would fit in with the Advisory Council for Aeronautics Research in Europe's (ACARE) goal of cutting CO₂ emissions by 50% by 2020. Says Valérie Guénou, Head of Research and Technology for Snecma Motors, one of the partners in the VITAL project: 'In conjunction with similar European research programmes like EEFAE (efficient, environmentally friendly aero-engine), this will bring us within reach of our goal.'

The EC is pumping euro 50mn into the four-year VITAL project. The partners believe that, combined with other EU projects, VITAL should be able to validate technology that will cut CO₂ emissions by 18% by 2008.

Snecma Motors' Research and Technology Programme Manager, Jean-Jacques Korsia, said: 'The aim is to achieve a very high bypass ratio engine that can meet the noise and specific fuel consumption goals set by ACARE without the penalties of drag and weight normally associated with low specific thrust engines.'

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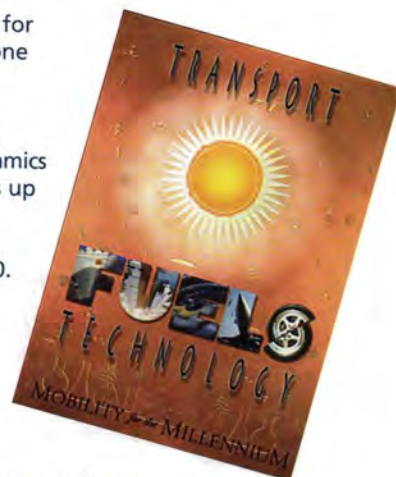
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BP is now the world's largest oil producer

Over the last three quarters, boosted by the TNK acquisition, BP has out-produced ExxonMobil to become the world's largest publicly quoted producer of crude and natural gas liquids (NGLs) as such companies generally struggle to maintain production. BP's output has now taken it to within sight of its 1972 production peak, which it is believed it may regain by 2008. Petroleum Review is indebted to Evaluate Energy for the oil and gas company production data presented in **Table 1**, and for checking Petroleum Review's calculations in the preparation of this article.

Quite remarkably, in the first half of 2005 the top five, the top ten and the top 22 publicly quoted oil companies all produced less crude and NGLs than they did in 2004 and only slightly more than they did in 2003 and 2002. Given the global increase in production and demand over the last three years (see **Table 2**) it is clear that, in aggregate, the largest private oil companies are losing market

Oil/NGL Company (000 b/d)	Output by 2002 Average	2003 Average	2004 1st qtr	2004 2nd qtr	2004 3rd qtr	2004 4th qtr	2004 Average	2005 1st qtr	2005 2nd qtr
BP (IFRS)	2,018.3	2,120.5	2,533.0	2,518.0	2,479.0	2,593.0	2,530.8	2,593.0	2,619.0
ExxonMobil	2,496.5	2,515.3	2,635.0	2,581.0	2,506.0	2,565.0	2,571.8	2,543.0	2,466.0
Royal Dutch Shell (IFRS)	2,371.3	2,378.8	2,332.0	2,238.0	2,279.0	2,163.0	2,253.0	2,144.0	2,168.0
Chevron	1,896.8	1,807.8	1,756.0	1,749.0	1,678.0	1,656.0	1,709.8	1,647.0	1,649.0
Total (IFRS)	1,588.8	1,661.0	1,723.0	1,698.0	1,674.0	1,684.0	1,694.8	1,657.0	1,630.0
ENI (IFRS)	921.0	980.8	1,016.0	1,026.0	1,003.0	1,090.0	1,033.8	1,100.0	1,107.0
ConocoPhillips	735.0	1,022.5	1,040.0	1,012.0	953.0	1,036.0	1,010.3	1,050.0	1,004.0
Statoil (USGAAP)	750.0	747.3	771.0	730.0	671.0	728.0	725.0	708.0	687.0
Repsol-YPF (IFRS)	584.2	594.3	579.7	575.6	564.9	549.5	567.4	542.1	541.0
Occidental	387.5	419.0	441.0	440.0	431.0	427.0	434.8	427.0	416.0
Devon Energy Corp.	167.5	228.6	295.9	274.7	276.4	269.3	279.1	264.5	257.1
Amerada Hess	324.8	259.3	246.0	251.0	237.0	250.0	246.0	258.0	258.0
Apache Corp.	161.5	214.3	228.3	234.8	252.8	253.4	242.3	252.1	253.5
EnCana	0.0	226.9	260.3	269.8	261.1	235.7	256.7	232.9	230.8
Anadarko Petroleum	246.5	232.0	251.0	214.0	238.0	223.0	231.5	213.0	189.0
Marathon	207.1	193.8	183.9	178.0	156.6	162.3	170.2	163.1	219.1
Kerr-McGee	196.7	151.6	143.2	140.5	155.2	184.7	155.9	187.7	175.0
Unocal	166.8	160.5	157.7	151.1	154.7	170.5	158.5	169.0	176.9
Burlington Resources Inc.	109.3	111.2	149.3	143.2	151.6	157.6	150.4	158.3	161.7
BHP Billiton	231.7	198.1	187.4	180.6	178.4	168.6	178.8	156.2	152.9
BG (IFRS)	114.8	117.5	123.1	120.9	121.7	147.8	128.4	137.8	141.8
EOG Resources	26.9	25.9	30.6	32.3	33.0	29.9	31.5	36.3	37.6
Total Top Five	10,538.3	10,643.8	11,136.7	10,935.1	10,770.7	10,831.5	10,918.5	10,753.0	10,708.9
Total Top Ten	14,448.3	14,407.6	14,984.4	14,718.7	14,393.6	14,662.0	14,689.7	14,580.1	14,463.9
Total Top 22	16,401.8	16,527.4	17,241.1	16,909.6	16,610.1	16,914.8	16,918.9	16,808.9	16,717.3

Natural gas output by company (mn cf/d)	2002 Average	2003 Average	2004 1st qtr	2004 2nd qtr	2004 3rd qtr	2004 4th qtr	2004 Average	2005 1st qtr	2005 2nd qtr
ExxonMobil	10,455.3	10,127.5	11,488.0	9,061.0	8,428.0	10,430.0	9,851.8	10,753.0	8,686.0
Royal Dutch Shell (IFRS)	9,426.0	8,856.0	10,045.0	7,773.0	7,706.0	9,710.0	8,808.5	9,875.0	7,875.0
BP (IFRS)	8,707.8	8,614.3	8,600.0	8,425.0	8,275.0	8,714.0	8,503.5	8,745.0	8,661.0
Total (IFRS)	4,528.0	4,786.0	4,951.0	4,915.0	4,386.0	5,323.0	4,893.8	4,945.0	4,797.0
Chevron	4,377.3	4,293.0	4,257.0	4,125.0	3,727.0	3,725.0	3,958.5	3,755.0	3,772.0
Repsol-YPF (IFRS)	2,495.4	3,225.2	3,271.2	3,621.6	3,875.4	3,591.6	3,590.0	3,537.6	3,828.0
ENI (IFRS)	3,304.5	3,486.0	3,672.0	3,570.0	3,252.0	3,684.0	3,544.5	3,618.0	3,708.0
ConocoPhillips	2,040.8	3,522.5	3,424.0	3,303.0	3,183.0	3,360.0	3,317.5	3,300.0	3,198.0
EnCana	2,888.0	2,566.3	2,712.0	3,037.0	3,128.0	3,113.0	2,997.5	3,119.0	3,212.0
Statoil (USGAAP)	1,947.0	1,999.5	2,472.0	2,052.0	1,758.0	2,844.0	2,281.5	2,886.0	2,646.0
Devon Energy Corp.	2,103.7	2,364.7	2,441.4	2,454.9	2,414.1	2,420.7	2,432.8	2,375.1	2,295.6
BG (IFRS)	1,548.2	1,858.7	1,958.2	1,991.2	1,858.7	2,047.8	1,964.0	2,086.7	2,090.1
Burlington Resources Inc.	1,917.0	1,899.3	1,953.0	1,899.0	1,906.0	1,900.0	1,914.5	1,896.0	1,909.0
Unocal	1,819.0	1,728.3	1,507.5	1,514.1	1,511.2	1,543.7	1,519.1	1,559.7	1,690.4
Anadarko Petroleum	1,760.5	1,761.5	1,723.0	1,786.0	1,813.0	1,641.0	1,740.8	1,454.0	1,434.0
Apache Corp.	1,080.5	1,216.6	1,212.8	1,250.9	1,233.7	1,243.1	1,235.1	1,259.3	1,296.6
EOG Resources	963.0	955.0	975.0	978.0	1,045.0	1,143.0	1,035.3	1,163.0	1,182.0
Kerr-McGee	760.0	724.8	763.0	740.0	1,051.0	1,125.0	919.8	1,104.0	1,118.0
Marathon	1,230.7	1,170.8	1,136.3	964.9	901.2	996.4	999.7	1,025.5	892.6
BHP Billiton	776.4	770.3	926.0	843.2	840.3	935.3	886.2	839.0	949.5
Occidental	627.0	605.8	613.0	642.0	649.0	644.0	637.0	662.0	681.0
Amerada Hess	754.8	682.8	602.0	601.0	516.0	576.0	573.8	604.0	575.0
Total Top Five	41,515.0	40,940.7	43,735.4	38,652.9	36,842.1	42,222.7	40,363.3	42,344.1	37,995.6
Total Top Ten	59,590.3	60,924.7	64,281.4	59,075.5	57,195.9	64,267.4	61,205.1	64,318.9	60,151.6
Total Top 22	76,760.8	76,663.1	80,092.6	74,740.7	72,935.1	80,483.4	77,062.9	80,347.1	76,265.4

Table 1: Annual and quarterly production of oil and gas by publicly quoted oil companies
Source: Evaluate Energy, calculations by Petroleum Review

share. For ten of the top 22 companies, and for four out of the five largest private companies, the first half of 2005 saw lower crude and NGLs production than in 2004. Ten companies also produced less in first half 2005 than they did in 2003, while nine companies produced less than in 2002.

Clearly, it is no exaggeration to say that the world's largest publicly quoted oil companies are now really struggling to hold production levels, with only a few managing to maintain their market share of global production (see Table 2).

In terms of gas production, the picture

is somewhat better, but hardly very positive. In terms of first half 2005 versus the 2004, 2003 and 2002, collectively only the five largest companies have experienced production declines, with the ten and 22 largest companies registering small collective increases – although less than required to hold market share.

In terms of 1H2005 gas production versus 2004, eight companies also recorded declines, with six registering declines in both periods. Versus 2002, the first half of 2005 saw nine companies registering declines. ExxonMobil, Chevron,

Anadarko and Marathon recorded declines in all three periods. Notably, large falls were recorded by Anadarko, Marathon and, to a lesser extent, Chevron. Notable gains were recorded by Kerr-McGee, EOG Resources, Statoil and BG, with somewhat smaller gains from EnCana, Repsol YPF, Occidental, Apache and BHP Billiton. It is notable, however, that output gains appear to be slowing – even among those companies recording production gains.

While less clear than for gas, the tendency for production growth to be slowing or for production loss to be accelerating is seen for crude and NGLs production. Over the period under consideration (2002–2005), notable oil company crude and NGLs production loss was seen by BHP Billiton, Repsol YPF, Statoil, Shell and Chevron. Consistent production gains over the period were seen from EOG Resources, BG, Burlington, Unocal, Apache and Eni, while for BP and ConocoPhillips, gains have slowed notably over the last year or so. (See Table 1.)

Future challenge

Perhaps the most important question to attempt to answer is the likely underlying decline rate of oil companies' production. Quite limited numbers of projects come onstream between the fourth quarter and the first quarter – winter being a difficult time to start up offshore projects and most new production is coming from offshore. This means that production changes in this period give some indication of underlying decline rates (although there are always special circumstances to be taken into consideration). Looking at the percentage change between 4Q2004 and 1Q2005, as shown in the final column of Table 1, some of these are extremely high. Equally, there are spectacular gains for some companies. The movements for gas are notably larger (in both directions) than for crude and NGLs.

Given that a 2% decline a quarter, if sustained, represents an annual decline

continued on p41...

Oil/NGL Output by Company (000 b/d)	1H2005 Average	% chnge 1H2005 v 2004	% chnge 1H2005 v 2003	% chnge 1H2005 v 2002	% chnge 1Q2005 v 4Q2004
BP (IFRS)	2,606.0	2.97	22.90	29.12	2.46
ExxonMobil	2,504.5	-2.61	-0.43	0.32	-1.12
Royal Dutch Shell (IFRS)	2,156.0	-4.31	-9.36	-9.08	-4.84
Chevron	1,648.0	-3.61	-8.84	-13.11	-3.67
Total (IFRS)	1,643.5	-3.02	-1.05	3.45	-2.23
ENI (IFRS)	1,103.5	6.75	12.52	19.82	6.41
ConocoPhillips	1,027.0	1.66	0.44	39.73	3.93
Statoil (USGAAP)	697.5	-3.79	-6.66	-7.00	-2.34
Repsol-YPF (IFRS)	541.6	-4.56	-8.88	-7.30	-4.46
Occidental	421.5	-3.05	0.60	8.77	-1.78
Devon Energy Corp.	260.8	-6.54	14.08	55.67	-5.22
Amerada Hess	258.0	4.88	-0.48	-20.55	4.88
Apache Corp.	252.8	4.32	17.96	56.57	4.02
EnCana	231.8	-9.70	2.15	-	-9.29
Anadarko Petroleum	201.0	-13.17	-13.36	-18.46	-7.99
Marathon	191.1	12.28	-1.38	-7.73	-4.17
Kerr-McGee	181.4	16.32	19.60	-7.78	20.40
Unocal	173.0	9.12	7.74	3.69	6.62
Burlington Resources Inc.	160.0	6.37	43.88	46.39	5.24
BHP Billiton	154.5	-13.54	-21.99	-33.31	-12.61
BG (IFRS)	139.8	8.87	18.92	21.77	7.32
EOG Resources	37.0	17.49	42.66	37.23	15.42
Total Top Five	10,731.0	-1.72	0.82	1.83	-1.52
Total Top Ten	14,522.0	-1.14	0.79	0.51	-0.75
Total Top 22	16,763.1	-0.92	1.43	2.20	-0.65

Natural gas output by company (mn cf/d)	1H2005 Average	% chnge 1H2005 v 2004	% chnge 1H2005 v 2003	% chnge 1H2005 v 2002	% chnge 1Q2005 v 4Q2004
ExxonMobil	9,719.5	-1.34	-4.03	-7.04	9.15
Royal Dutch Shell (IFRS)	8,875.0	0.75	0.21	-5.85	12.11
BP (IFRS)	8,703.0	2.35	1.03	-0.05	2.84
Total (IFRS)	4,871.0	-0.46	1.78	7.58	1.05
Chevron	3,763.5	-4.93	-12.33	-14.02	-5.14
Repsol-YPF (IFRS)	3,682.8	2.59	14.19	47.58	-1.46
ENI (IFRS)	3,663.0	3.34	5.08	10.85	2.07
ConocoPhillips	3,249.0	-2.06	-7.76	59.21	-0.53
EnCana	3,165.5	5.60	23.35	9.61	4.05
Statoil (USGAAP)	2,766.0	21.24	38.33	42.06	26.50
Devon Energy Corp.	2,335.4	-4.01	-1.24	11.01	-2.37
BG (IFRS)	2,088.4	6.33	12.35	34.89	6.25
Burlington Resources Inc.	1,902.5	-0.63	0.17	-0.76	-0.97
Unocal	1,625.1	6.97	-5.97	-10.66	2.67
Anadarko Petroleum	1,444.0	-17.05	-18.02	-17.98	-16.47
Apache Corp.	1,278.0	3.47	5.05	18.27	1.96
EOG Resources	1,172.5	13.26	22.77	21.75	12.34
Kerr-McGee	1,111.0	20.79	53.29	46.18	20.03
Marathon	959.1	-4.07	-18.09	-22.07	2.58
BHP Billiton	894.2	0.91	16.09	15.17	-5.32
Occidental	671.5	5.42	10.85	7.10	3.92
Amerada Hess	589.5	2.75	-13.66	-21.89	5.27
Total Top Five	40,169.9	-0.48	-1.88	-3.24	4.91
Total Top Ten	62,235.3	1.68	2.15	4.44	5.09
Total Top 22	78,306.3	1.61	2.14	2.01	4.26

Table 1 cont'd

	2002	2003	2004
Global oil production gain	-0.7%	3.8%	4.5%
Global oil demand gain	0.1%	2.1%	3.4%
Global gas production gain	1.4%	3.4%	2.8%
Global gas demand gain	2.8%	2.0%	3.3%

Source: BP Statistical Review, June 2005, June 2004 and June 2003

Table 2: Global oil and gas production and demand gains

Holding back the talent tide or riding the wave?

Oil and gas industry managers are facing a real challenge to recruit new talent as the workforce is rapidly reaching the age of retirement, with insufficient new blood entering the market, report Peter Parry, (left) Vice President, and Varya Davidson, (right) Principal, at Booz Allen Hamilton.*



The past five years have seen upstream oil and gas companies working harder than ever before to meet shareholders' expectations of growth, resource renewal, technology leadership, improved reporting and new levels of operational efficiency. The historic and continuing high levels of oil and gas prices have provided 'windfall' financial improvements and much needed respite for stretched management teams (see **Figure 1**).

However, has the oil price yet again distracted the industry? For years industry observers have warned of the likely consequences of 'the big crew change', the term given to the expected mass erosion of technical skill resulting from retirement of a rapidly ageing workforce. What perhaps was not realised was the compounding effect of a rapidly tightening recruitment market for the best and brightest.

Emerging labour crunch

According to Booz Allen Hamilton research, about 50% of professional

exploration and production (E&P) staff are aged between 40–50, whereas barely 15% are junior recruits in their early twenties to mid-thirties (see **Figure 2**). Up to half of the current workforce is likely to retire within the next 10 years – consequently, pressure to replace skills will most likely be felt on the technical side of the business where shortages are acute and business demands most intense. Planned capacity increases for step-outs into new environments will further exacerbate the situation.

The maturity of Western economies means lower birth rates and fewer college graduates. In the US and Europe, disproportionately fewer engineers are graduating, and many of the strongest players are being attracted to careers in banking, consulting and 'high tech' industries.

The big crew change has been spoken about and is a recognised phenomenon, but it is not yet taken seriously enough. For companies who do nothing this could lead to the permanent loss of differentiating technical capabilities. Potential damaging effects include a slow down in new project delivery, 'capacity shut-in', increases in operating costs within the next five to 10 years and, ultimately, a further tightening of production supply contributing to oil price volatility.

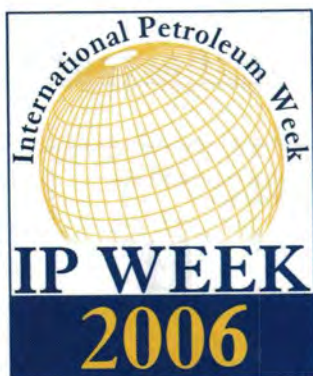
Moving into action

The impact of this emerging capability gap is starting to be felt and has

prompted swift action from companies such as Shell, who is returning to active university recruiting and has announced a target of 1,100 engineers (400 graduates and 700 mature recruits) this year alone. BP is also looking to fill 400 technical positions (300 for its growing North American operations) by the end of the year and has hired 13 search firms to help. Companies are actively starting to poach top talent and traditional direct marketing tactics for university graduates have been stepped up. As the *Financial Times* observed early this year: 'Companies such as Shell, BP and ExxonMobil have stepped up their traditional hard-sell tactics such as milk rounds and prize raffles of mountain bikes. They are also paying attention to the need to build their brand with marketing-savvy students by using ambassadorial teams and personal support for potential recruits, including the occasional curry.'¹

Response options?

From 2006 onward, the provision of human resource must become a critical element in upstream strategic planning and effort must be directed across the industry to attracting, resourcing², developing and retaining top talent. The challenge is to ensure that the right skills and capabilities are available both when and where needed. Companies across the sector have a real opportunity to gain a competitive advantage by riding the wave, creating strategies to



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IP Week 2006

13–16 February 2006

Energy Institute's 92nd International Petroleum (IP) Week 2006 will be held from Monday 13 February 2006 – Thursday 16 February 2006, in London. In 2006, the theme for the week will be the changing role of the international oil company and national oil company with presentations by some of the industry's most illuminating figures who will give us their unique perspective on this.

They include:

- *Malcolm Wicks* MP, Energy Minister
- *Jeroen van der Veer*, Shell
- *David O'Reilly*, ChevronTexaco
- *Tony Considine*, TNK-BP
- *John Martin*, ABN Amro
- *Claudio Castejon*, Petrobras
- *James Ball*, Gas Strategies

Key topics include:

- The changing role of the international and national oil company
- Sustaining production in Russia and the CIS
- 19th energy price seminar – the energy mix
- LNG
- Reserves

IP Week Dinner 2006

Wednesday 15 February 2006, Grosvenor House Hotel, London

This year we are pleased to welcome **Lord John Browne**, CEO, BP as our guest of honour and speaker. He will be followed by John Sergeant, former BBC Political Correspondent.

IP Week Lunch 2006 – sponsored by Platts

Tuesday 14 February 2006, The Dorchester Hotel, London

The guest of honour and speaker at the IP Week Lunch will be the newly appointed **Mr Paolo Scaroni**, CEO, Eni

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address the challenge as opposed to instituting temporary 'holding' measures (for example, contracting back retired staff or expecting even more from existing employees).

ExxonMobil President, Rex Tillerson, recently suggested in a presentation to leaders in the engineering and construction industry: 'We all need to help think of ways to keep the pipeline full... but we also need to ensure that once a person is attracted to a working career in engineering, we develop them intelligently. The workforce is ever changing, and our work practices and approaches must adapt to the changing expectations of the new generation of employees entering the workforce.'

Resourcing is a topic of interest for line managers at all levels, as it frequently addresses immediate business needs. However, HR's (human resources) role in many companies must shift, from simply responding to line requests and providing relevant services to taking a strategic role in partnering with business to define, shape and meet technical talent sourcing and development needs.

It is clear that there is no single solution for closing the emerging competence gap. However, action in targeted areas can have a tangible short-term impact. A good starting point is to obtain a clear understanding of current and upcoming business needs rather than to focus too early on tactical solutions. Many examples exist of good money thrown after bad, best illustrated by the implementation and wholesale rollout of inappropriate HR systems.

The industry should tackle three key areas – attracting talented individuals, resourcing them and developing them.

Talent pipeline moving east?

With traditional western talent markets tightening, clear opportunities exist to source highly skilled graduates from India, China and Russia. Several of the majors are beginning to explore these 'new sources', in part by joining up recruitment efforts across upstream and downstream businesses.

Local workforces in other developing areas also present opportunities. As Adam Lomas, Director of Learning and Development for Shell E&P, explains: 'Resource rich countries, particularly in the Middle East where 50% of the world's remaining reserves are located, increasingly expect IOCs [international oil companies] to guarantee the development of their local workforce. Companies that recognise this as a major source of future talent will gain a competitive advantage; companies that do not will not be welcome in the future.'

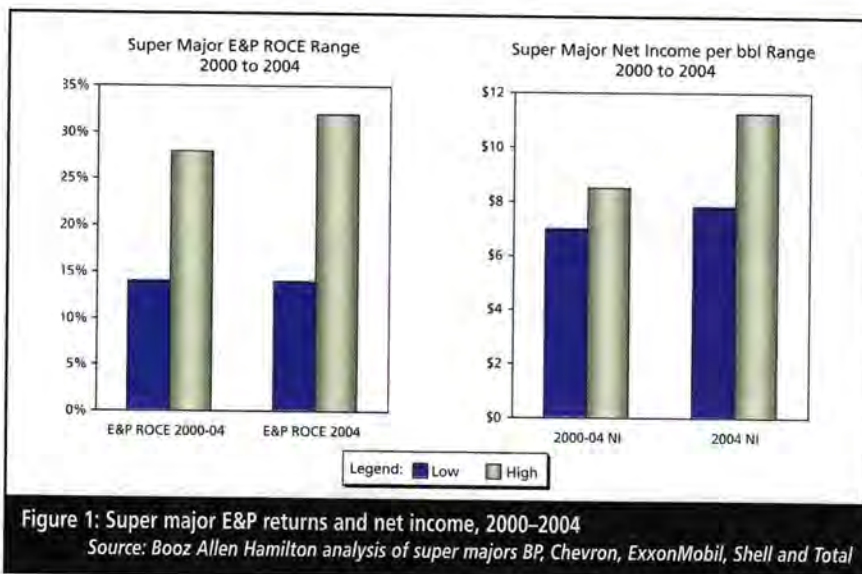


Figure 1: Super major E&P returns and net income, 2000-2004

Source: Booz Allen Hamilton analysis of super majors BP, Chevron, ExxonMobil, Shell and Total

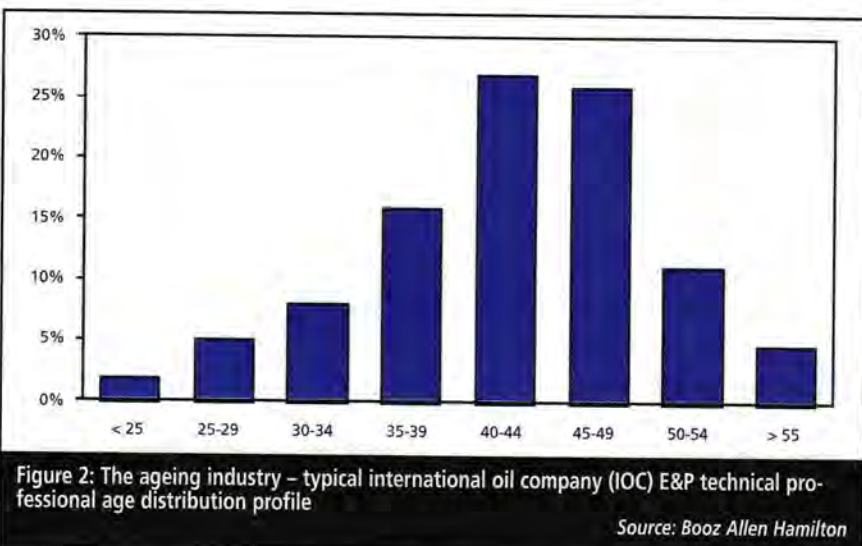


Figure 2: The ageing industry – typical international oil company (IOC) E&P technical professional age distribution profile

Source: Booz Allen Hamilton

Resourcing reframed

'Where skills gaps do emerge we would argue that stronger functional elements in an organisation are better able to support standards and provide assurance than pure asset-based models,' states Otto Waterlander, Vice President at Booz Allen. In a functional organisation, technical disciplines drive staff deployment, resulting in access to necessary expertise.

Nevertheless, solutions are not necessarily simple, as, increasingly, E&P work entails operating in diverse cultural environments (for example, Middle East, West Africa, Caspian region). In these environments, employees with local knowledge are also of crucial importance when building business sustainability and working with local subcontractors, unions and community stakeholders.

Global resourcing frameworks consist of two basic elements. The first element is to establish clearly the rationale or

objective for deployment. In a green-field development situation in Venezuela, for example, the governance needed is different from that in London or Azerbaijan. This governance criterion forms part of a framework that enables HR to establish the reason that people are being deployed. The second element is to define targets (in numbers and duration) for various types of positions (for example, specific skill sets, expatriates, contract staff) and hold line management accountable for these targets. The use of such frameworks has enabled companies to improve deployment of scarce resources and simultaneously reduce costs.

Developing talent

In talent development, best practice companies such as Shell are implementing exciting new approaches to learning that focus on the workplace

continued on p41...

Oiling the wheels of logistics in Oman



PDO oil terminal

This summer saw the official launch in Oman of what is claimed to be the largest ever logistics outsourcing initiative the nation has ever seen. The \$300mn-plus 'fourth-party logistics' (4PL) contract was awarded by Petroleum Development Oman (PDO) to a new joint venture between Exel and Bahwan Cybertek – known as Bahwan Exel (formerly BTB). Doug Taylor, General Manager, Bahwan Exel, reports.*

PDO** – Oman's leading E&P company, accounting for over 90% of the country's oil production and nearly all of its gas supply – set out four years ago to create a 4PL partnership with a leading international supply chain management business. Its aim was to improve service levels to its interior drilling and engineering operations, and maximise fleet use, while cutting kilometres driven by at least 20% – thereby helping to reduce risk and improve road safety. Some 120 companies expressed interest in participating in the venture at the outset.

The ground-breaking contract was awarded to BTB (now Bahwan Exel) last year. As well as covering PDO's primary cargo haulage, the contract was also designed to create the framework necessary for incorporating secondary logistics activities previously undertaken by PDO's oil services contractors. Approximately 60% of total expenditure relates to rig transport, and there is

an average of more than one rig move every day. Other cargo being transported includes pipes, equipment, water and diesel fuel, and there are typically around 50,000 such movements a year.

Within the joint venture, Exel – a global leader in supply chain management – is responsible for general management, the implementation of software, provision of logistics management services, health and safety, and environmental operations. Bahwan Cybertek (BCT) – a global system integration, software products and services company – will provide IT infrastructure, accounting and treasury services.

As a 4PL, Bahwan Exel has the IT, organisational and management skills and expertise needed to co-ordinate end-to-end logistics services without necessarily owning or operating the underlying assets or resources. The role contrasts with that of a third-party logistics provider, or '3PL', which supplies logistics services using primarily its own trucks and warehouses, etc but has visibility across only a

limited area of the enterprise.

Originally, PDO owned and operated its own vehicles. It later passed this responsibility on to 3PL contractors. Now it has embraced the concept of 4PL logistics management (see Figure 1).

PDO needed a strong logistics partner that could assume management of its supply chain and quickly improve levels of quality, efficiency and integration. A partner that was capable of raising materials visibility and effectively co-



Tapping into the accumulated expertise of its 3PL partners, Bahwan Exel can plan and execute up to five rig moves simultaneously every working day

ordinating third-party resources. A partner that could share international best practice techniques and cross-fertilise supply chain innovations from other geographies and industry sectors.

Pioneering innovation

So, how does PDO expect Bahwan Exel to achieve the benefits outlined above?

The short answer is through optimisation and synergies. By establishing a single organisation with vision and ownership across its entire supply chain, PDO has set itself on a path of achieving significant year-on-year cost savings and service improvements. These benefits will be gained by using state-of-the-art logistics technologies to consolidate cargoes more efficiently, and through leveraging Bahwan Exel's global supply chain and systems know-how. The key technology is the transport management system (TMS) – which combines sophisticated load and cost optimisation tools with web-based consignment tracking.

The contract also incorporates a framework for extending services to other parties on a shared-user or payer-per-consignment basis. This offers the prospect of PDO paying only for the consignment carried, rather than for a complete vehicle or container. The scale of the opportunity can be gauged from the fact that, until recently, average utilisation of vehicles with a 25-tonne carrying capacity was less than 50%.

Bahwan Exel's logistics processes and systems will provide high levels of visibility across PDO's supply chain. The joint venture is offering field-proven solutions for optimising transportation and tracking inventory at every stage. It will receive no management fee unless it achieves annual cost saving targets each year.

Warith Kharusi, PDO's Logistics Manager, sums up: 'This is a pioneering innovation for PDO, which is providing an enabling framework to improve road safety and efficiency in the very complex oil exploration and production industry in Oman. Through this fourth-party logistics contract we hope to further develop the country's already proven third-party logistics service providers and, in accordance with the Omani government's aspirations, enhance the skills of future generations of Omanis. This is a very positive development.'

*Doug Taylor may be contacted at doug.taylor@btblogistics.com

For further information, visit www.bawan.com, www.cybertek.com and www.exel.com

**PDO is jointly owned by the Omani government (60%), Shell (34%), Total (4%) and Partex (2%).



A heavy oilfield flatbed truck picking up a portable office unit as part of a rig move

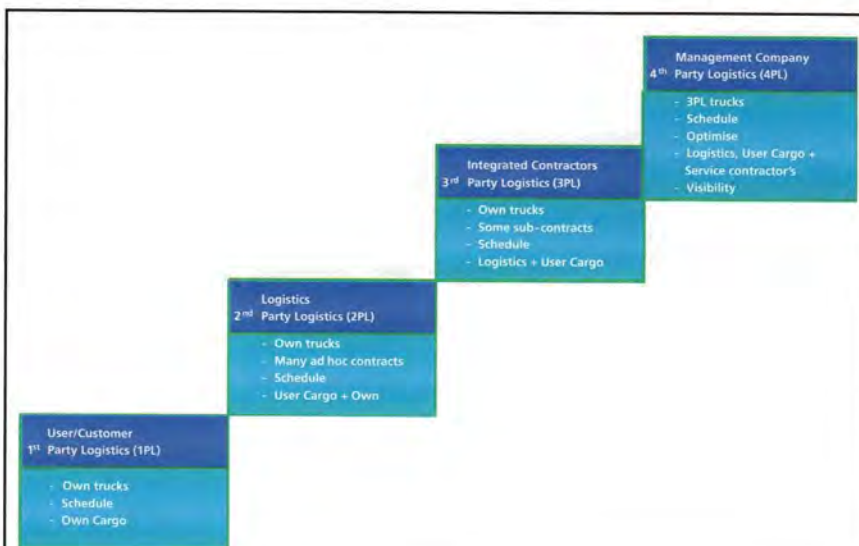


Figure 1: 4PL overview

El Evening Lectures



Russian oil: price discovery in the internal and international markets

Peter Stewart, European Oil Director, Platts
Monday 10 October 2005

platts

Renewables

Dan Rigden, Managing Director and Editor, ReNews
Wednesday 23 November 2005

All of these lectures are free to attend and are held at the Energy Institute, 61 New Cavendish Street, London W1G 7AR. Registration starts at 16.30 with the lecture commencing at 17.00, lectures usually end at 18.30.

If you wish to attend please contact Catherine Spence at the address below with your name, job title, company and email address. If you wish to register any guests we will also require their details.

For more information please contact: Catherine Spence

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e: cspence@energyinst.org.uk www.energyinst.org.uk/evening_lectures

Jointly organised by



Crisis – avoiding and managing crises

Wednesday 23 November 2005

15.45 – 19.30, Ashurst, Broadwalk House, 5 Appold Street, London EC2A 2HA

This seminar is directed at executives concerned with the management of companies and public authorities facing crises. It will look at how to plan to avoid or minimise the physical effects of crisis, how to ensure that any legal consequences of an event can be minimised and how best to react so as to ensure that the effect of any event on share price is minimised.

Speakers include:

Jeremy Larken – Jeremy is managing director of OCTO, one of Europe's foremost authorities on the leadership and management of crisis and emergency situations. Jeremy served previously in the Royal Navy for 33 years to the rank of Rear Admiral as deputy head of the Ministry of Defence's crisis management organisation dealing with military operational contingencies worldwide. He held six major commands through the height of Cold War operations, including *HMS Fearless* during the Falklands Campaign.

Ian Johnson – Ian is a Director and Company Secretary of the Wood Group, a company specialising in the supply of equipment to the offshore oil industry. Ian is a lawyer who has held senior positions both in private practice and in industry and has played an active part in the preparation of crisis management plans.

Tim Reid – Tim is a partner in the Global Energy Team at Ashurst, a leading international law firm specialising in the energy sector. Tim has advised many organisations in relation to high profile disputes and how to avoid or minimise their effect on share price. Tim also has experience of advising on the preservation and protection of evidence following major public disasters.

Programme

15.45: Registration and refreshments

16.00: Welcome and introduction

16.05: **Tim Reid** – Legal aspects of crisis

- obtaining legal advice
- preserving evidence
- corporate manslaughter
- keeping information confidential
- working with the company's PR advisers
- working with the company's insurers

16.35: **Deborah Pretty** – How to minimise the effect of a crisis on your share price

17.05: **Ian Johnson** – The private sector perspective

17.35: **Jeremy Larkin** – Crisis management

- Avoiding crisis in the first place
- Managing crisis

Q&A

18.15: Drinks

This event is free to attend. To book your place, please complete this form in BLOCK CAPITALS and return it to the address below:

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Putting paid to unrealistic demand predictions

Predictions that oil demand will increase to up to 120mn b/d by 2020, allied to automobile and airline traffic growing at extraordinary rates, are futile and damaging to policy makers. Only a mix of geoscientific and engineering principles combined with economic judgement can now properly define future oil consumption levels. A recent data report from Energyfiles demonstrates that oil demand of over 95mn b/d, and probably less, will be impossible to meet, writes Dr Michael R Smith at Energyfiles.*

Having predicted and witnessed the first pre-peak oil price surge, Energyfiles recently published its 10-year dataset, projecting onshore/offshore oil and gas production, consumption and trade in every producing country of the world. It is claimed that these data should force an immediate revision of the long-term demand forecasts of the EIA (US Energy Information Administration) and others, and also the oil price forecasts advocated by the CEOs of Shell and BP.

Of course, there is nothing new about a geologist's forecast of an imminent global oil supply peak – indeed, **Figure 1** has been published in various forms since 2001. Comprehensive data analysis shows that the world is near its peak and the influence of limited offshore and onshore opportunities seem immutable. What is new is that some economists are beginning to accept early signals of irreversible change, despite comforting pronouncements from oil companies and Opec.

Oil remains vital

Together, oil and gas still account for around 65% of the world's energy mix. Oil is valuable because it is versatile and easy to find, existing commercially in over 100 countries. It is easy to transport, through pipelines and in tankers, and can be readily transformed into useful work in simple engines. The high energy density of oil makes it the fuel of choice for automobiles and its jet fuel fraction is the only viable energy source for the airline industry.

And oil has been abundant for over a century. Many of the technologies to find and produce it from onshore reservoirs were developed early in the 20th century and, since then, with the appearance of offshore operations in the 1950s, there have been lots of new places to look. Increases in demand have easily been met by supply, whilst exporters – collaborating to restrict output – have artificially created upward pressure on price, allowing exploitation of expensive development options.

Ambiguous and biased data

There are still many ways of measuring oil and gas reserves, production and

consumption. Different countries and companies use different units and splits, and there are various rules defining how numbers should be publicly recorded. The treatment of proven reserves varies, as does the inclusion of unconventional sources such as natural gas liquids. Meanwhile, analysts misunderstand the time element, using reserves divided by yearly production (R/P ratio) to define years of supply remaining – a meaningless number in practical terms.

Geologists are optimistic, when the truth is that realism will give a different result, whilst engineers have to be pessimistic to avoid costly mistakes. Some parts of the oil industry under-report for regulatory reasons, other parts over-report to maximise value. Governments also over-report for promotional reasons. Countries seldom update reserve estimates and the many public and private data sources give different numbers so that individuals pick the one that suits their argument.

Broadly speaking, the Energyfiles data resource at least tries to be internally consistent. Produced oil volumes are those at the surface, not in the reservoir where dissolved gas means oil occupies up to 30% more space. Any production that exists as a liquid at the surface is allocated to the oil domain. Thus, natural gas liquids are oil – even though they may be recovered from gas – whilst liquefied natural gases are not, since they are created from gas.

Gas production is marketed gas, including that from tight reservoirs and coal seams, sold either as pipeline gas or after conversion to LNG. Production of vented, flared and re-injected gas is not production, although re-injected gas will usually return to market if one has been created or an oil field is exhausted and so requires no more pressure support. Gas volumes increase substantially at the surface but shrink after processing as the liquids are removed, and this often leads to uncertainty in published figures.

Peak is still argued about

Production peaks in fields, basins, countries and regions. Theoretically, peak occurs when 50% of recoverable oil reserves have been produced – but

empirical analysis of the many basins that have already peaked show that the timing is much more variable, heavily controlled by fiscal terms and infrastructure.

Offshore oil peaks are easier to define because of the rapid and consistent way in which full field developments proceed. Studies show that output from offshore wells declines by an average of 15%/y. Individual fields made up of a collection of wells decline less rapidly, at around 10%/y, because the best wells are worked-over and enhanced recovery projects briefly stem decline. By the same token, unless containing very few fields, sedimentary basins decline by around 5%/y as new, progressively smaller, fields are added.

Countries and regions may decline by less still if they contain many basins. Decline rates are averages and can be affected by the discovery of new provinces or plays and by technological breakthroughs that lead to a one-off jump in output. They are also affected by commercial and political circumstances, such as output restriction by Opec. Figure 2 is the model profile that sedimentary basins will adopt if unmodified by these effects.

Geologically constrained oil supply

Exceptional demand growth in Asia, coupled with flagging levels of oil output from non-Opec countries, has created a capacity-constrained environment in which permanent geological supply limitations are truly beginning to control price. Since 2003, and until 2010, global oil supplies will be struggling to keep up with demand – leading to intermittent upward pressure on prices as the supply/demand ratio swings in and out of balance.

However, after 2010 declining oil supply, matched by permanently rising prices, will begin to have a negative effect on oil consumption throughout the world. The effect of a capacity-constrained environment on the economies of countries will differ depending on their level of development, location, dependence on imported oil and availability of other raw energy materials and/or infrastructure to produce fuel alternatives from coal, nuclear power, hydroelectricity, solar power, wind farms, biomass etc, and especially from gas.

Viable alternative

Gas, too, is a versatile fuel, and is even more widespread. It has an advantage over oil in that it is ready to burn

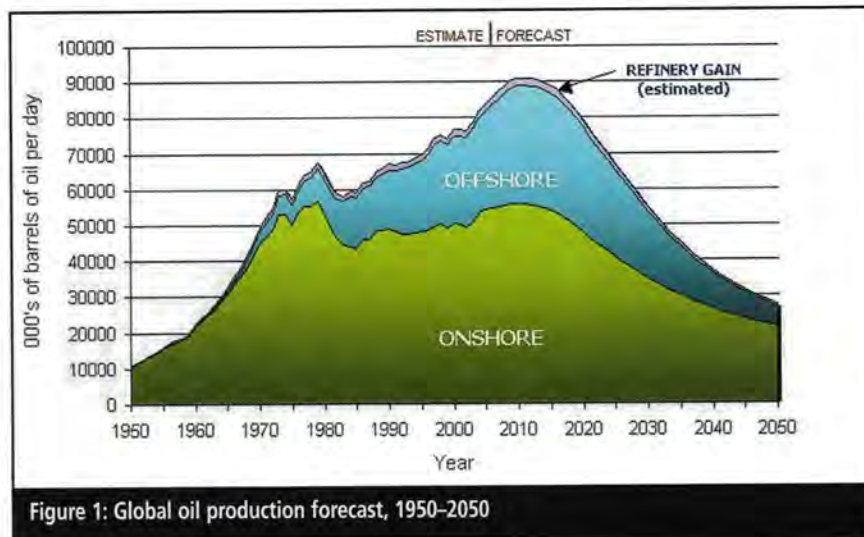


Figure 1: Global oil production forecast, 1950–2050

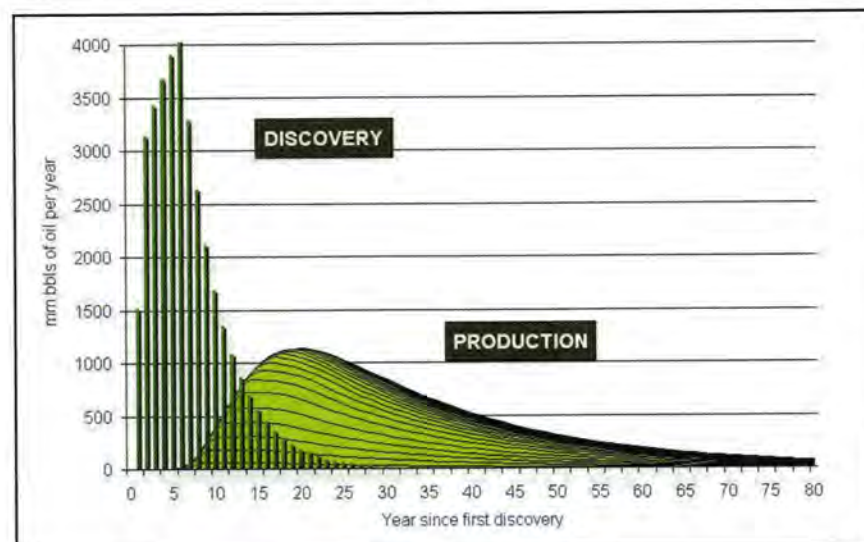


Figure 2: Model of oil production forecast

without refining, although processing is necessary if the valuable liquids are to be recovered. Furthermore, gas burns relatively cleanly so that environmental regulations favour its use for heat and power in populated regions.

However, gas is less dense and bulkier to move and to store and has been used only in regions accessible by pipeline. It is unsuitable for use in automobiles except when expensively converted into a liquid or fuel substitute such as electricity or hydrogen. As a result, large quantities of gas located in remote oil fields have had to be wasted through flaring and venting. With the advent of an LNG industry, a global gas market is now developing, which is kick-starting new local and regional gas markets, allowing the commercialisation of undeveloped or wasted gas accumulations. Gas is substituting for oil wherever it can.

For example, Europe has become

dependent on gas to fuel its electricity and domestic markets. But gas as a substitute for oil in transport will be used only after massive investment in infrastructure, which takes time to install and may not immediately be cost-effective. Moreover, northern Europe will rely on Russian gas to top up indigenous output and sufficient supplies are unlikely to be developed in time.

Projections in Table 1 show that Russia will actually have less gas to export westwards over the next decade, especially as China enters the gas import market. Output will only pick up after 2015 as new volumes appear in the Arctic, so it is hardly surprising that the UK is anxiously looking for new gas sources to fill its supply gap, as shown in Figure 3 (eg LNG from Qatar).

US Federal Reserve Chairman, Alan Greenspan, has said that oil markets might stay turbulent 'for some time to come', but has predicted that 'high

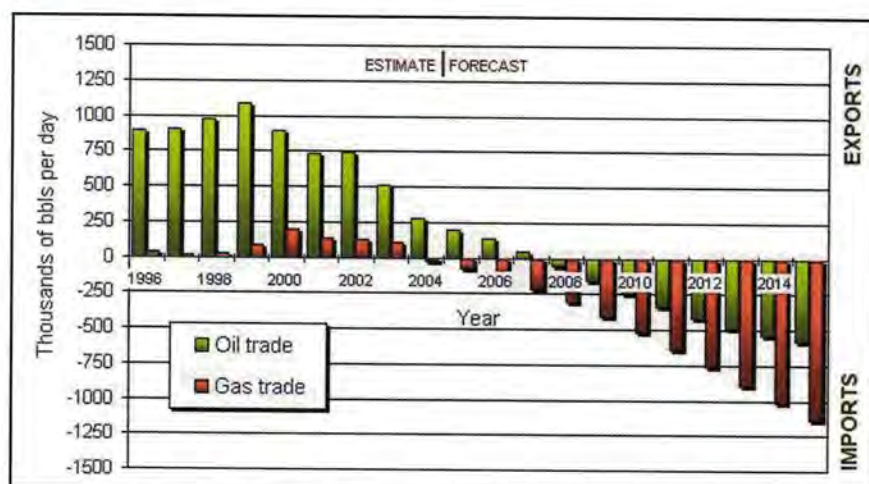


Figure 3: UK oil and gas trade balance

prices will spur the use of cheaper alternatives well before the world's oil reserves are depleted'. Full projections show that gas is an alternative, but not without a recognition that the transport industry must change direction. Increasing investment in public electrified systems is essential, whilst reduction in aircraft and automobile numbers is inevitable over the longer term.

Surging oil prices

At such a critical time, with oil and gas uniquely important to the health of the global economy, it is important to take an integrated look at production, consumption and price using facts not assertions. Lord Browne of BP has said that oil prices are likely to remain above \$40/b – but only until new supplies come onstream in a few years.

Albert Bressand, a Vice President of Shell, proposes a long-term price in the \$30/b to \$40/b range, whilst the CEO of Shell said in June that energy demand in the next 30 years will grow faster than in the past three decades. Meanwhile, the head of commodity research at Goldman Sachs recently said: 'The real problem is a lack of

refining capacity.'

Careful forecasts of oil supply data do not support such speculations. True projections are consistent with rapidly rising prices after 2010 accompanied by painful conservation. Sufficient new supplies will not come onstream to replace the depletion of existing fields, especially those old giants responsible for around 65% of global supply.

Of course, not everyone is sanguine. My own *World Oil Supply Report* – now in its 3rd edition and published by Douglas-Westwood – has long forecast oil price surges. Its 0% to 3% demand scenario has recently been reproduced by the Economics, Industry & Finance Ministry of the French government. The Ministry comments on the likelihood of a production plateau – a subject seldom brought up by government ministries and never by financial departments.

Untenable demand forecasts

In developed countries oil consumption has already been driven lower by high taxes and environmental regulations. Growth in private automobile use and air travel, albeit with better fuel

economy, has had the opposite effect, so that overall oil consumption has been near flat. However, in developing countries a wealthier population who covet a Western standard of living has driven consumption much higher.

Projections demonstrate that it is no longer appropriate to accept glib demand forecasts from oil companies, financial institutions and governments that predict, with wishful thinking, ever-growing demand levels. Such forecasts, divorced from reality, fail to take account of tight supply conditions and rising prices. We will be unable to produce oil at these rates without unbelievable step changes in technology. Consumption will only grow as much as supply will let it. Policy makers who believe unfettered demand forecasts will make bad decisions.

Permanent price pressure

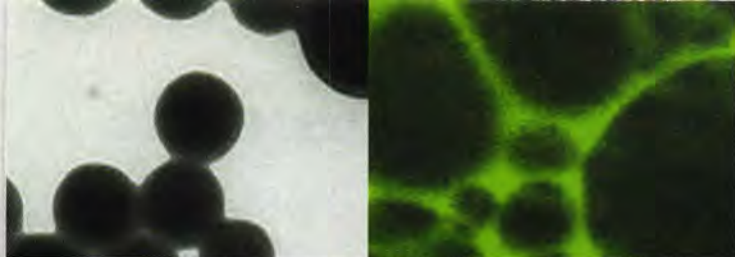
After 2010 upward pressure on price will be permanent, with oil supply limitations seriously subduing demand. When the price of oil is significantly higher, people will know oil to be a more valuable commodity and their behaviour will adjust to a restructured fuel economy. They will be looking at alternatives, but primarily they will be looking at painful conservation and global competition for resources. ●

**Oil and Gas 2006: Global 10-year projection – is a quantitative survey of production, consumption and trade. Each dataset is a 10-year historic and 10-year projected production, consumption and trading series for every country and region in the world, split into oil/gas and onshore/offshore where appropriate. Charts graphically demonstrate trends, along with brief descriptions. The report contains over 275 pages, 500 figures and 250 tables and covers 129 countries and regions.*

For more information, e: admin@energyfiles.com or visit www.energyfiles.com

RUSSIA Consumption	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Oil mm bbl/day	2.46	2.48	2.50	2.57	2.63	3.15	3.19	3.22	3.25	3.28	3.30	3.32	3.33	3.34	3.34
Gas bcm/year	373	389	393	402	412	422	433	444	455	466	476	483	490	497	505
Gas mm bbl/day	6.42	6.70	6.77	6.93	7.10	7.28	7.46	7.65	7.84	8.04	8.20	8.32	8.44	8.57	8.70
SUM mm bbl/day	8.88	9.18	9.27	9.50	9.73	10.43	10.65	10.87	11.09	11.31	11.49	11.64	11.78	11.91	12.04
Oil trade mm bbl/day	4.60	5.22	6.04	6.71	6.78	6.44	6.65	6.92	7.05	6.95	6.79	6.49	6.13	5.79	5.48
Gas trade bcm/year	170	167	186	187	180	176	178	172	171	168	163	162	164	167	168
Gas trade mm bbl/day	2.92	2.87	3.20	3.22	3.10	3.03	3.07	2.97	2.94	2.90	2.81	2.79	2.82	2.87	2.90
SUM mm bbl/day	7.52	8.09	9.24	9.93	9.88	9.47	9.72	9.89	9.99	9.85	9.60	9.28	8.95	8.66	8.38

Table 1: Russian consumption and trade data



Petroleum Microbiology

Thursday – Friday 17–18 November 2005
Energy Institute, 61 New Cavendish Street,
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The Microbiology Committee of the Energy Institute and the Reservoir Microbiology Forum present a 2-day seminar on the topical developments in produced water reinjection and oilfield microbiology.

Sessions will include:

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- Mitigation of reservoir souring • Biotechnology and oil production

This seminar would be of interest to professionals' industry-wide, and including:

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or from the following areas where controlling bacteria is imperative:

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To apply for tickets, please complete this form in BLOCK CAPITALS and return it to the address below, together with payment in full.

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Prices set firm, despite massive new capacity

Over the last two years Petroleum Review has regularly updated its listing of the upcoming so-called 'megaprojects'. The aim of the listing is to attempt to answer the question as to whether sufficient oil is being developed to meet likely requirements going forward, writes Chris Skrebowski.

This latest update – based on public sources of information – identifies a total of 16.65mn b/d of new capacity due onstream by 2010. This, in turn, is made up of 6.34mn b/d of incremental Opec capacity and 10.31mn b/d of non-Opec capacity additions (see p2 for basis of tabulation). This is directly comparable with the 16.5mn b/d identified by the consultant CERA in its recent report. However, CERA's happy conclusion that potentially price depressing excess supply was about to emerge does not appear to take project slippage and depletion fully into account and, therefore, appears highly optimistic.

Experience shows that between 10%

and 20% of projects slip from one year to the next. As no company intends this to happen and there is no way it can be anticipated, the only way to deal with it is to continuously update the database. A recent example of this phenomenon is the BP-operated Thunder Horse project, where, following storm damage to the platform, start-up has moved from late 2005 to 1H2006. Project slippage does not mean that the capacity is lost, but merely postponed. This, however, will reduce the actual capacity increments each year going forward. The exact magnitude cannot be determined in advance – although 10% to 20% would be a reasonable rule of thumb.

Depletion modelling

Depletion is relatively difficult to model, but must be taken into account when determining future capacity additions. It is possible, and useful, to identify three sub-categories, or types, of depletion.

Type 1 depletion – is the normal loss of capacity in an oil field as production from wells in one field run down and are offset by new wells or increased production from other existing wells in the field. There is only limited public data available, apart from the North Sea, where decline rates of between 5% and 15% are reported and are typical of the main decline phase. The North Sea also shows that a proportion of the region's fields are able to finally stabilise production at about 10% of peak flows. There have also been reports (not fully corroborated) of 7% declines in Iranian fields and 6% declines in Saudi fields. Offshore fields, which, because of their economics require high flow rates and much more rapid and intensive development, tend to have the most rapid decline rates – often as much

continued on p40...

Project	Location	Operator	Oil peak flows (kb/d)	Gas peak flows (mn cf/d)	Reserves (mn b)	Partners and shareholdings
Onstream 2005						
<i>Opec countries</i>						
Bab North East	Abu Dhabi onshore	ADCO	+90 (2005)			ADCO 100%
Bonga	Nigeria OML 118	Shell	225	170	600	Shell 55%, ExxonMobil 20%, Total 12.5%, Agip 12.5%
Darkhovin Ph1	Iran	Eni/Naftiran	55			Eni 60% (on behalf of NIOC), Naftiran Intertrade (NICO) 40%
Northern fields incr.	Kuwait	KOC	+300			
Nowruz expansion	Iran expansion	Shell	+90			Shell buy-back from NIOC
Soroush expansion	Iran expansion	Shell	+100			Shell buy-back from NIOC
<i>Non-Opec countries</i>						
ACG magasturcture Ph1	Azerbaijan	BP	+300 (2006)		6,000+	BP 34.14%, Unocal 10.28%, Socar 10%, Inpex 10%, Statoil 8.56%, ExxonMobil 8%
(Azeri-Chirag-Guneshli)	(Central Azeri)					TPAO 6.75%, Devon 5.62%, Itochu 3.92%, Delta Hess 2.72%
Adar Yale fields	Sudan	CNPC	250 (2006)		300	BHP Billiton 45%, Total 30%, Talisman Energy 25%
Angostura Ph1	Trinidad	BHP Billiton	60 (2005)		770	Petrobras 100%
Barracuda (25° API)	Brazil (Campos)	Petrobras	150 (2005)	25		CNR 57.61%, Svenska Petroleum 27.39%, Petroci Overseas 10%, Petroci Holdings 5%
Baobab	Ivory Coast	CNR	65 (2006)			Petrobras 100%
Caratinga (24° API)	Brazil (Campos)	Petrobras	150 (2005)		330	BP 28.6%, ConocoPhillips 24%, Chevron 19.4%, Shell 18.7%, Amerada 9.3%
Clair South	West of Shetland	BP	60 (2006)	15	250	ExxonMobil 40%, BP 26.66%, Eni 20%, Statoil 13.33%
Kizomba B	Angola	ExxonMobil	250 (2005)		1,000	ExxonMobil 11%?
Kristin	Norway	Statoil	126 (cond)	530	220 (cond)	BP 60.5%, BHP Billiton 23.9%, Unocal 15.6%
Mad Dog	Gulf of Mexico	BP	80	40	250 boe	Santos 33.3977%, Kufpec 33.4023%, Nippon Oil 25.0%, Woodside 8.20%
Mutineer-Exeter (Civir Basin)	NW Australia	Santos	85 (2006)	3	61	Gazprom 7, Rosneft?
Prirazlomnoye	Russia Siberia	Gazprom/Statoil	155 (2010)		610	Exxon NG 30%, Sakhalin O&G 30%, ONGC Videsh 20%, Sakhmng 11.5%, RB-Astra 8.5%
Sakhalin I (Chayvo field)	Russian Far East	ExxonMobil	250 (2006)	1,000	2,300	Salym Petroleum Development NV (SPD): Shell 50%, OAO Evikhon 50%
Salym fields	Khanty-Mansiisk	Shell/Evikhon	120 (2009)		800	
Sanha(cond),						

Future oil field projects with a peak production capacity of over 75,000 b/d

Project	Location	Operator	Oil peak flows (kb/d)	Gas peak flows (mn cf/d)	Reserves (mn b)	Partners and shareholdings
Bomboco(crude)	Angola	Chevron	100 boe (2007)			
White Rose	Eastern Canada	Husky Oil	90 (2006)		230	Sonangol 41%, Chevron 39.2%, Total 10%, Eni 9.8% Husky Oil 72.5%, Petro-Canada 27.5%
Onstream 2006						
<i>Opec countries</i>						
Bu Hasa development	Abu Dhabi	ADCO	180			ADCO 100%
Darkhovin Ph2	Iran	Eni/Naftiran	+160			Eni 60% (on behalf of NIOC), Naftiran Intertrade (NICO) 40%
Erha	Nigeria (OPL 209)	ExxonMobil	165		500	ExxonMobil 56.25%, Shell 43.75%
Ghawar Haradh Ph3	Saudi onshore	Saudi Aramco	+300			Saudi Aramco 100%
NEAD project****	NE Abu Dhabi	ADNOC	+110			ADNOC 100%?
<i>Non-Opec countries</i>						
ACG megastructure Ph2	Azerbaijan	BP	+500 (2008)		6,000+	See under Ph1 in 2005
Albacora Leste	Brazil	Petrobras	180 (2006)		700mn boe	Petrobras 90%, Repsol 10%
Atlantis	Gulf of Mexico	BP	150		675 boe	BP 56%, BHP 44%
Benguela-Belize (BBLT1)	Angola	Chevron	100 (2007)		400	Chevron 31%, Agip 20%, Total 20%, Sonangol 20%, Galp 9%
Buzzard	UKCS	Nexen	200 (2007/20/08)		550	Encana 43%, Intrepid Energy 30%, BG Group 22%, Edinburgh Oil & Gas 5%
Cachalote	Brazil	Petrobras			800	
Chinguetti Ph1	Mauritania offshore	Woodside	75		123	Woodside 53.85%, Hardman Res 21.6%, Roc Oil 3.69%, Premier 9.23%, BG 11.63%
Dalia	Angola	Total	240		1,600	Total 40%, BP 16.67%, Statoil 13.33%, ExxonMobil 20%
Enfield (+Laverda/Vincent)	Australia NW Shelf	Woodside	100	363		Woodside Petroleum 60%, Mitsui 40%
Golfinho Module I	Brazil (Espírito Santo)	Petrobras	100 (2007)	450		Petrobras 100%
Jubarte 1	Brazil (B60 Santos)	Petrobras	60 (2005)		540	Petrobras 100%?
Roncador II	Brazil	Petrobras	145 (2008)		2,700 (tot)	Petrobras 100%
Surmont (heavy oil by SAGD)	Canada, N Alberta	ConocoPhillips	100 (2012)		?	ConocoPhillips 50%, Total 50%
Syncrude Ph3	Canada, Athabasca	Canadian Oil Sands	100			Canadian Oil Sands 32%, Imperial Oil 25%, Petro-Canada 12%, Nexen 7%, others 7%
Tengiz/Kololev expansion*	Kazakhstan	Chevron	298 to 450+	100	7,000	Chevron 50%, ExxonMobil 25%, KazMunaiGaz 20%, LukArco 5%
Thunder Horse (Inc North)	Gulf of Mexico	BP	250 (2008)	200	1,500 boe	BP 75%, ExxonMobil 25%
Onstream 2007						
<i>Opec countries</i>						
Abu Hadriya/Khursaniyah/Fadhili	Saudi onshore	Saudi Aramco	+500	250	4,500; 500; 950	Saudi Aramco 100%
Azadegan (south part)***	onshore Iran	Inspex	260 (2012)		2,500-3,000	Pedco 25%, Japanese interests 75% (Inspex, Japex, JNOC, Tomen)
Bonga South + Aparo	Nigeria (OML 118)	Shell and Chevron	250		1,000	Shell 55%, ExxonMobil 20%, Total 12.5%, Eni 12.5%
Corocoro Ph1	Venezuela offshore	ConocoPhillips	75		450	ConocoPhillips 32.5%, PdVSA 35%, Eni 26%, Opic 6.5%
<i>Non-Opec countries</i>						
Golfinho Module II (28-40/20P)	Brazil (Espírito Santo)	Petrobras	100 (2007/2008)		450	Petrobras 100%
Greater Plutonio (6 fields)	Angola block 18	BP	240		800	BP 50%, Shell 50%
Kikeh	Malaysia, off Sabah	Murphy Oil	120 (2009)		530	Murphy 80%, Petronas Carigali 20%
Lobito-Tombuco (BBLT 2)	Angola	Chevron	+100 (2008)		400+	Chevron 31%, Agip 20%, Total 20%, Sonangol 20%, Galp 9%
Long Lake (tar sands)	Canada, N Alberta	Nexen	70		1,900	Nexen 50%, OPTI Canada 50%
Greater Aishwariya	India, onshore Rajasthan	Cairn Energy	80-100		600	Cairn Energy 70%, ONGC 30%
Peng Lai Ph2	China, Bohai Bay PL19-3	ConocoPhillips	190 (2009)		800	CNOOC 51%, ConocoPhillips 49%
Polvo (BM-C-8)	Brazil (Campos)	Devon Energy	50		50mn b+	Devon Energy 60%, SK Corporation 40%
Roncador III	Brazil	Petrobras	145 (2008)		2,700 (tot)	Petrobras 100%
Rosa (4 back to Girassol)	Angola block 17	Total	250, net+40		300	Total 40%, Esso 20%, BP 16.67%, Statoil 13.33%, Norsk Hydro 10%
Sakhalin 2	Russian Far East	Shell	+120			
Vankorskoye 2 fields	Russia Siberia	Shell/TFE PSA	216		900	
Onstream 2008						
<i>Opec countries</i>						
Agbami	Nigeria OPL 216, 217	Chevron	250 (2008)		800	Chevron 68.15%, Petrobras 13%, Statoil 18.85%
Akpo	Nigeria OML 130	Elf Nigeria (Total)	225 boe		590	Total 24%, NNPC %, Petrobras %, Sapetro %
Banyu Urip (Cepu block)	Indonesia offshore	ExxonMobil	170	20	700 in block	Under negotiation
Block 208 El Merk fields	Algeria	Anadarko	100			
Shaybah and Central fields expn	Saudi onshore	Saudi Aramco	+300			
<i>Non-Opec countries</i>						
ACG megastructure Ph3??	Azerbaijan	BP	+400 (2009)		5,400	See under Ph1 in 2005
Frade	Brazil	Chevron	110 (2007)		300	Chevron 42.5%, Petrobras, Nissho Iwai
Horizon Ph1 (tar sand)	Canada	CNR	110		3,300	CNR ???
Kashagan Ph1	Kazakh Caspian	Agip (Eni)	450 (2009)	1,500	10,000 (tot)	Eni/Total/ ExxonMobil/Shell 18.52% each, ConocoPhillips 9.26%, Inspex 8.33%, KMG 8.33%
Kizomba C (Mondo, Savi, Batuq)	Angola	ExxonMobil	125		1,000	ExxonMobil 40%, BP 26.66%, Eni 20%, Statoil 13.33%
Marlim Leste	Brazil (Campos)	Petrobras	180 (2008)	6mn cm/d	150	Petrobras 100%
Marlim Sul III	Brazil	Petrobras	100		2,679 boe (tot)	Petrobras 100%
Moho-Bilondo	Congo (Haute Mer)	Total	90			Total 53.5%, Chevron 31.5%, Societe Nationale de Petroles du Congo (SNPC) 15%
Su Tu Trang (White Lion)15-1	Vietnam, Cuu Long	ConocoPhillips	100?		220	Petrovietnam 50%, ConocoPhillips 23.25%, KNOG 14.25%, SK Corp 9%, Geopetrol 3.5%
Shenzi	Gulf of Mexico	BHP Billiton	100			BHP Billiton 7%, BP 7%
Tahiti	Gulf of Mexico	Chevron	125	70	500mn boe	Chevron 58%, Statoil 25%, Shell 17%
Onstream 2009						
<i>Opec countries</i>						
Al Shaheen expansion	Qatar offshore	Maersk Oil	+210			
Corocoro Ph2	Venezuela offshore	ConocoPhillips	+45		450	ConocoPhillips 50%, PdVSA 24%, Eni 26%
Khurais	Saudi onshore	Saudi Aramco	1,200		3,000	Saudi Aramco 100%
Qatar GTL (Ph1)	Qatar	Qatar Shell Gas	70 (cond)	800		Qatar Petroleum 7%, Shell 7%

Future oil field projects with a peak production capacity of over 75,000 b/d

Project	Location	Operator	Oil peak flows (kb/d)	Gas peak flows (mn cf/d)	Reserves (mn b)	Partners and shareholdings
Non-Opec countries						
Karachaganak Ph3 & 4 Marlim Sul III (FPSO P56)	Kazakhstan	Eni and BG Brazil	+200? Petrobras	100		Eni 32.5%, British Gas 32.5%, Chevron 20%, Lukoil 15%
Marlim Sul IV (Semi tba) New Canadian tar pit	Canada,, Athabasca	Brazil Imperial Oil	Petrobras 100	100		Imperial Oil 7%, ExxonMobil 7%
Onstream 2010						
<i>Opec countries</i>						
Usan/Ukot/Tongo	Nigeria (OPL 222)	Elf Nigeria (Total)	150		480+	Elf Nigeria 20%, Chevron 30%, ExxonMobil 30%, Nexen 20%
<i>Non-Opec countries</i>						
Jubarte 2 Kashagan Ph2	Brazil B60 Santos Kazakh Caspian	Petrobras Agip (Eni)	60 (2005) +450 (2012)	1,500	540 10,000 (tot)	Petrobras 100%? Eni/Total/ ExxonMobil/Shell 18.52% each, ConocoPhillips 9.26%, Inspec 8.33%, KMG 8.33%
Roncador IV (FPSO P54) Uvatskoye	Brazil Russia Siberia	Petrobras TNK-BP	150 200			
Onstream 2011						
<i>Opec countries</i>						
Qatar GTL (Ph2)	Qatar	Qatar Shell Gas	70 (cond)			Qatar Petroleum 7%, Shell 7%
Onstream 2012						
<i>Non-Opec countries</i>						
Horizon Ph2 (tar sands) Kashagan Ph3	Canada Kazakh Caspian	CNR Agip (Eni)	+122 +300 (2015)	1,500	3,300 10,000 (tot)	CNR ??? Agip/Total/ ExxonMobil/Shell 20.37%, ConocoPhillips 10.19%, Inspec 8.33%
Potential Projects						
<i>Opec countries</i>						
Ahwaz Bangestan devs	onshore Iran	Pedco?	+150			
Arash	Iran, in Gulf	NIOC			683 boe	
Azadegan (Northern part)****	onshore Iran	NIOC?	400		2,500-3,000	
Hamrin	Iraq onshore (South)	SOC				
Manifa (Arab Heavy)	Saudi offshore	Saudi Aramco	300			Saudi Aramco 100%
Majnoon	Iraq onshore	SOC	360		12,100	
Minagish EOR project	Kuwait onshore	KOC	100			
Nuayyim (Arab Super Light)	Saudi onshore	Saudi Aramco	75		250	Saudi Aramco 100%
Northern Fields	Kuwait onshore	KOC?	+450			
Ramin	Iran, near Ahwaz	NIOC			1,500	
Sincor II	Venezuela	Total	180			
Subbah-Luhais	Iraq onshore (South)	SOC				
Su Tu Nau (Brown Lion)	Vietnam block 15-1	ConocoPhillips				PetroVietnam 50%, ConocoPhillips 23.3%, KNOG 14.2%, SK Corp 9%, Geopetrol 3.5%
Tomoporo (23° API)	Venezuela	PdVSA	250?		1,000	PdVSA, but private investors to 49%
Upper Zakum redevelopment	Abu Dhabi	ExxonMobil	+650?			ExxonMobil to 28%
Yadavaran (Khuihik, Hossaini)	Iran onshore	NIOC/Sinopec	300	1,500+		Nioc 80%, ONGC 20%
West Qurna Ph2	Iraq onshore	SOC	650		11,300	
<i>Non-Opec countries</i>						
BC-2	Brazil (Campos)	Total				
BS-4	Brazil offshore	Shell				
Block 09-03	Vietnam, Cuu Long	Petrovietnam	100+?		300-400	
Block 18 West (3 fields)	Angola block 18	BP			250-300	
Block 31 Nth E Plutao+3 dev	Angola block 31	BP			500 in block 31	BP 26.67%, ExxonMobil 25%, Sonangol 20%, Statoil 13.33%, Marathon 10%, Total 5%
Block 31 S-Ceres/Palas/Juno	Angola block 31	BP			500 in block 31	BP 26.67%, ExxonMobil 25%, Sonangol 20%, Statoil 13.33%, Marathon 10%, Total 5%
Block 32 Perpetua et al	Angola block 32	Total			4 discoveries	Total 30%, Marathon 30%, Sonangol 20%, ExxonMobil 15% and Petrogal 5%
Fort Hills oil sands	Canada, N Alberta	PetroCanada	190		2,800	Petro-Canada 55%, UTS Energy Corp 30%, Teck Cominco 15%
Great White	Gulf of Mexico	Shell			500-1000 boe	Shell ??
Jeruk	Indonesia, offshore Java	Santos			170 boe	Sampang PSC: Santos 45%, Singapore Petroleum Co (SPC) 40%, Cue Energy 15%
Kebabangan	Malaysia, off Sabah	ConocoPhillips			200-300	Block J: Petronas Carigali 20%, ConocoPhillips 40%, Shell 40%
Kharyaga	Russia Siberia	Total PSA			5,200	
Khvalynskoye	Russian Caspian	Lukoil/KazMgaz			627 boe	
Kirkuk Khurmala Dome	Iraq onshore	NOC	100			
Kizomba D	Angola block 15	ExxonMobil				
Kurmangazy	N Caspian (Russ/Kaz)	Rosneft/KMG	600?		7,000	Rosneft 25%, other Russian 25%, KazMunaiGaz 25%, Total 25% (tbc)
Lungu	China Tarim basin	Petrochina			500	
Marimba Leste (FPS-Semi)	Brazil (Campos)	Petrobras				
Marimba Leste (FSO)	Brazil (Campos)	Petrobras				
Northern Lights oil sands	Canada, N Alberta	Synenco	100			Synenco 60%, Sinopec 40%
Northern Territories 4fids	Russia Timan-Pechora	Lukoil, ConPhillips			990	
Stybarrow	Australia Exmouth basin	BHP Billiton	100		90	BHP Billiton 50%, Woodside Petroleum 50%
Su Tu Vang (Golden Lion) 15-1	Vietnam, Cuu Long	ConocoPhillips	100?		400?	Petrovietnam 50%, ConocoPhillips 23.25%, KNOG 14.25%, SK Corp 9%, Geopetrol 3.5%
<i>Non-Opec countries</i>						
Suncor (tar sands)	Canada		100			
Talanskoye	Russia Siberia	Surgutneftegas			832	
Tiof	Mauretania	Woodside			298	
Tsentrlnoye block	Russia/Kazakh Caspian	Lukoil/Kazakhioil			3,800	TsentrKasneftegaz JV : Kazakhioil 50%, Lukoil and Gazprom 50%
Val Gamburtsev	Russia Siberia	Yukos/Sibneft			600	
Verkhnechonsknoye	Eastern Siberia	TNK-BP?			1,500	
Yalamo-Samur	Russia/Azeri Caspian	Lukoil			3,750 boe	
Yuri Korchagin	Russian Caspian	Lukoil			879 boe	
Yuzhno-Shapinskoye	Russia Siberia	SeverTek			500	Lukoil Fortum

*limited production from 12/2004, Vadelyp 2006; ** 250,000 b/d 2007-2009; *** 5,000mn barrels for field; **** Al Dhabiya, Rumaitha, Shanaget

Future oil field projects with a peak production capacity of over 75,000 b/d

Facing the future

It is well documented that people's career choices often reflect those of a parent, so that doctors are often the sons or daughters of doctors and those who sell insurance similarly persuade their offspring to go into the insurance business. The same is at least partly the case in energy, particularly amongst engineers – both George and Robert Stephenson (father and son) had distinguished careers in the profession, for example. Although it may not seem so at the time, we all, as parents, have an unduly large influence on our children's career paths. But how many of us are fortunate enough to influence the future careers of others? asks Sarah Beacock, EI Professional Affairs Director.

I speak to so many Energy Institute (EI) Members and Fellows who tell me of the enjoyable and rewarding careers they have had in the oil and gas industry and it amazes me that this is an industry that believes it can't sell itself to young people. We need now to build on the awareness raising that has already begun through our schools programmes and use the skills and knowledge of our members to spread this influence effectively. In particular, we need to influence those career choices, whether at 16, 18 or 21, in understanding that a career in energy offers good training prospects for development and promotion, opportunities to travel and the chance to have responsibility for important high value projects and training in a wide range of transferable skills that make energy careers a long-term prospect.

Science, engineering and technology (SET) based industries are suffering a worldwide shortage of skilled new recruits and the energy sector is no different. Petroleum engineers, geologists and geophysicists are always highly sought after and, as a result, attract increasing salaries and careers that offer variety, early advancement and opportunities worldwide.

Through our connections with universities offering degrees in these subjects, the EI is establishing a fast-growing pool of Student and Graduate members looking for a career in oil and gas, as well as the wider energy sector. When we accredit degree programmes we try to take along a young member who works in the industry to meet the students and explain how they got where they are in their career. Students appreciate

meeting someone who can tell them what the world of work is like and with whom they can identify as possibly being them in four or five years' time. It's a useful learning experience for the young member too.

Make a contribution

So, what does this have to do with your own professional development (PD)? Lifelong learning is a habit that we need to acquire at a young age. Once gained, however, it is something that should never stop and these days often

continues into retirement.

The PD challenge that I am putting to you, therefore, is to make a contribution to the future of the industry and, most importantly, to the future of a young person.

As part of our ongoing educational programme for the energy industry, the EI has identified a number of ways in which members can assist with this objective and is devising resources and support materials to help.

The suggestions include:

- Getting involved with local schools to go in to speak about the career options in the industry – schools particularly welcome young professionals from diverse backgrounds who can communicate well with youngsters.
- Offering to assist schools with technical demonstrations, science fairs, careers exhibitions or visits to workplaces.
- Nominating a young colleague to provide a Career Profile or even provide one about yourself – we use these on the EI's website (www.energyinst.org.uk) or submit them to careers publications that regularly request this type of information from us. It's important to show the diversity of career options in the industry and the various levels that can be achieved. We never have enough of these profiles.
- Mentoring a young colleague or Graduate member of the EI – most new recruits benefit from access to someone

Skills strategy

As part of the UK government's strategy to ensure the skills business needs now and in the future are the skills it gets, Cogent Sector Skills Council (SSC) for the chemicals, nuclear, oil and gas, petroleum and polymers industries has launched its critical Sector Skills Agreement (SSA) process.

The SSA process will drive the future education and training provided by schools, colleges and universities, as well as private training providers. It represents a strategic plan designed to ensure the UK's education and training infrastructure is demand-led.

Cogent CEO, Joanna Woolf said: 'Very often the providers of learning have been the very same bodies or institutions to determine the actual provision. The SSA process will put employer skills needs first and provide them with

the opportunity to have a full say in what is designed and offered.'

To make getting involved at the first stage convenient, Cogent has launched an online questionnaire. This supplements over 200 face-to-face interviews with individuals within companies. Woolf said: 'The questionnaire is part of a market information gathering exercise which will contribute to a joined-up skills strategy that will involve all the key stakeholders – including the all-important funders of education and training.'

The questionnaire takes around 30 minutes to complete and the data inputted remains confidential. It will ultimately ensure that the Cogent sectors have the necessary range and level of skills to enable them to compete in an aggressive global market place.

The questionnaire can be accessed at www.cogent-ssc.com/home_SSA_Questionnaire.php

with experience who isn't a direct line manager, either to gain an early grasp of various aspects of the business or towards professional membership of the EI or registration as an engineer. We also frequently need mentors with subject expertise to advise young engineers who are putting together a Technical Report for their registration as a Chartered Engineer.

- Sponsoring a colleague into professional membership. Although joining the EI as an Affiliate has no sponsorship requirements, gaining professional recognition as a Fellow, Member, Associate Member or Technician Member does and recommendation by your peers is a critical element of the application. We still receive many applications from those who are sponsored by the professional members of other institutions so let's get into the habit of recognising our own talent rather than relying on other professionals to do it for us!

This is not an exhaustive list and you may well have other ideas to put forward. Some of our members are already involved with this type of activity and we would like to gauge an idea of how much work members already do in this regard. Do you have resources that you could share with others? Those working on the Branch Committees are already having a good influence over the younger members and future professionals. From their time as Student members we are now seeing more involvement in branch activities, not just in attending events but running them as well. This can only be good for the industry and, of course, for the early professional development of our younger members.

Development goals

The EI's professional code of conduct requires members to 'encourage the education and training towards the appro-

priate level of membership' of those over whom they have a level of authority – but not all actively put this into practice. However, sustaining a profession requires the members of that profession to have regard for their own professional capabilities as well as developing the professional capabilities of their colleagues, particularly those in their teams.

Make investing in the future one of your own development goals for this year. The benefits to the industry will be enormous, but the benefit to the individuals you influence could be life-changing – and you might just learn a thing or two yourself!

Finally, don't forget to tell us about it once you've done it. We'd like to publicise the success stories and to spread the impact of good practices to other areas. I look forward to hearing from you. ●

To contact Sarah Beacock, EI Professional Affairs Director, t: +44 (0)20 7467 7170 or e: sbeacock@energyinst.org.uk

...continued from p38

as 15%/y. Companies really only suffer the impact of Type 1 depletion when a field is fully drilled up and there is no possibility of offsetting the declines.

However, with the consultant IHS Energy now reporting to various conferences that 90% of known reserves are in production, more and more fields around the world are moving into their decline phase. One estimate is that as much as 70% of the world's producing oil fields are now in decline.

Type II depletion – is when a company, or country, can offset field declines in one part of the country with expansion in another part. Because public data is collected on a national basis, there is only limited data available on Type II depletion – although its magnitude is likely to be the same as for Type I.

Type III depletion – is when a country produces less oil in a year than it did in the previous year. This can be identified quite readily from public production databases (see *Petroleum Review*, August 2004 and August 2005). Type III depletion will increase as additional countries move into decline, but will reduce as the volumes produced by the countries in decline decreases. In 2003, Type III depletion was running at around 1.1mn b/d, but in 2004 it fell back to around 900,000 b/d (significant revisions to production data tend to confuse the picture). Over the next few years a number of countries are likely to move into decline – Denmark, China, Malaysia, Mexico, Brunei and India are the obvious candidates and account for over 12% of global production – so a reasonable working

assumption is that Type III depletion will increase, although with something of a saw-tooth profile.

Recent statements by oil companies (*Petroleum Review*, August 2005) have tended to indicate that overall depletion (Types I, II and III) is running at between 4% and 6%. Analysis of recent company production (see p24) tends to confirm that using a 5% figure is a reasonable approximation. Demand growth is subject to quite rapid swings, but appears to average around 2%/y. By combining these various pieces of information, it is possible to determine whether the market will tighten or weaken and whether 'peak oil' is a likely outcome in the period to 2010 (see Table 2).

In 2004, effectively all the world's spare capacity was used up in meeting

unexpectedly rapid demand growth. It is not at all clear if the world's oil companies can provide an incremental 3mn-plus b/d from all the small, untubulated projects and infill drilling going forward year after year. The world has now reached the point where the volumes lost to depletion are much larger than the levels of likely new demand. This means total increments required (new demand plus depletion) are running at around 7%/y, while the largest supply increments in 2006 and 2007 are contributing 3.6% and 3.5%.

It would seem most unlikely that small projects and infill drilling could account for the remaining required 3.5%. The inescapable conclusion is that oil prices will have to remain high enough to destroy demand, bringing supply and demand back into balance. ●

	2004	2005	2006	2007	2008	2009	2010
Oil demand	82.1*	83.5*	85.3*	87.0*	88.8*	90.5*	92.3*
Demand increase	2.9	1.4	1.8	1.7	1.8	1.7	1.8
Supply increase**	1.1	2.4	3.1	3.1	2.8	2.8	1.5
Opec	0.3	0.9	0.9	0.9	1.0	1.4	0.9
Non-Opec	0.8	1.5	2.1	2.1	1.8	1.4	0.6
5% depletion	4.1	4.2	4.3	4.4	4.4	4.5	4.6
Extra volume required**	2.3	3.2	3.0	3.0	3.4	3.4	4.9

Source: *International Energy Agency (IEA) Oil Market Report, September 2005; **from Petroleum Review megaprojects database; *calculated on 2% growth; **volume required from infill drilling and the small projects not tabulated in the megaprojects database

Table 2: Oil demand, supply and depletion to 2010 (mn b/d)

...continued from p25

of 8%, and that nine of the top 22 companies are showing declines of over 2% in 4Q2004/1Q2005 the challenge is easily apparent.

Clearly, maintaining production flows is becoming a struggle for many companies. New large projects are tabulated on pXX. This shows that in the period to 2010 gross production flows of 16.6mn b/d will be added by megaprojects. All new projects with peaks of over 60,000 b/d are tabulated. The net addition, however, will be much lower as more and more of the new flows are pre-empted to offset underlying production declines (see p36).

By matching the start-up of new projects in late 2004/early 2005, it can be seen that new start-ups boosted production for BP (Holstein, Clair South, Mad Dog), Eni (Elephant build up) and Total (Hamaca). The BP experience is, however, sobering – despite bringing onstream Holstein (100,000 b/d peak) and Mad Dog (80,000 b/d peak), and getting smaller additions from Clair South, BP's production only managed to grow by 2.46% between the quarters.

The fact that BP was the only one of the top five mega-majors to grow production at all in the period vividly illustrates the production problem the world now faces. In fact, in the 4Q2004/1Q2005 period, only three – Eni, ConocoPhillips and BP – out of the top 11 publicly quoted oil companies grew production. In terms of volumes produced, an overall decline in the period was seen by the top five (-1.52%), top ten (-0.75%) and top 22 (-0.65%). This contrasts sharply with the solid gains in gas output over the same period – top five (+4.91%), top ten (+5.09%) and top 22 (+4.26%).

For the moment, the larger problem and challenge appears to be crude and liquids production rather than gas production. ●

Notes

The period covered from 1Q2002 to date is used because virtually all companies are broadly the same over the period. BP, EnCana, Kerr McGee and Anadarko data all modified by Acquisitions/Rationalisations.

Oil and NGLs

- Shell – numbers include Canadian oil sands production from 2003.
- ConocoPhillips – in 2002, Phillips numbers only; 2003 onwards includes syn-crude data.
- EnCana – compiled under US protocols (different to annual reports).

Gas

- Shell – 2002 and 1H2003 restated.
- Repsol YPF, Eni and Statoil – all report gas in boe, these figures converted to gas at 6,000cf to 1 boe ratio.
- EnCana – compiled under US protocols.

...continued from p28

and specific business needs (for example, tertiary recovery). Staff development is being delivered in a structured manner with formal support – but on the job, eliminating generic, hypothetical case studies and a 'sheep-dip' format. BP has launched its Projects Academy, in collaboration with the Massachusetts Institute of Technology, and several successful projects have been kicked-off in the business as a result. Shell has announced plans for its own Shell Project Academy and a Commercial Academy as well.

Yet, while training is one tool that can be employed to address the skills shortage issue, ironically, the dazzle of leadership development courses, widespread throughout the oil industry, has put many already available skills in the shade. For some time now, technical and business skills have not been equally weighted, with senior technical professionals systematically siphoned off into management, resulting in depleted technical application and know-how.

To redress the balance and free up the best talent, companies such as Shell and BP have both explored creating parallel career tracks, where talented staff can advance in their technical fields (for example, chief technology officers).

Riding the wave

Opportunities exist for companies to use the capability challenge facing the industry as a catalyst for changing and updating out-dated talent management approaches.

Such opportunities to ride the talent wave are already being pursued by some, others face the risk of being left behind. In the future, returns to individuals and companies can, and should, go hand in hand. Exploring and defining innovative methods to do so will provide a fresh source of competitive differentiation in the industry. ●

Footnotes

1. 'Depleted talent reserves threaten oil companies: The industry aims to attract young graduates to replace an ageing workforce,' Doug Cameron, James Boxell and Liam Denning, *Financial Times*, 29 March 2005.
2. 'Resourcing refers' to matching people to business needs.

**For more information about management consultant Booz Allen Hamilton visit www.boozallen.com. To learn more about the best ideas in business, visit www.strategy-business.com – a website for strategy+business, a quarterly journal sponsored by the consultant.*

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Setting up shop

Pandita Louram,
Datamonitor's Forecourt Analyst, looks at how operators in Central and Eastern Europe are prioritising network rationalisation over expansion in the region's fuel retailing sector.

The Czech Republic, Hungary, Poland and Romania are the largest consumers of motor fuel in Central and Eastern Europe (CEE)*. Together, these markets account for 81% of fuel volumes and 83% of fuel value in the region. Fuel consumption levels in these CEE markets are on the increase and, although the growth in the value of the fuel retailing market is starting to slow in Poland and Hungary, the former alone accounts for more than a third of the regional total. These forecourt retailing markets are dynamic and it is essential that both new entrants and existing players are familiar with the changing face of the fuel and non-fuel markets within the competitor landscape.

In response to wider demographic, social and political developments, the forecourt too is undergoing a dramatic

make-over. Ancillary services on the forecourt are becoming increasingly commonplace given that – as Western European markets have demonstrated – non-fuel components, such as the forecourt shop and carwash, are a means of supplementing wafer-thin fuel profit margins. Investment in the sites with the greatest potential, rather than network expansion, is the key for both new entrants and existing players to gain a firm foothold in what is one of Europe's fastest developing regions.

Fuel volumes and value

Not only are fuel consumption levels high in Poland (see Figure 1), the Czech Republic, Hungary and Romania, but they are also on the increase. Motor fuel consumption grew in these markets by a compound annual growth rate (CAGR) of 3.4% year-on-year between 2000 and 2004, compared with a CEE CAGR of 2.8% over the same period. The fastest growing market is the Czech Republic, where fuel consumption grew at a CAGR of 5.5% between 2000 and 2004. This significant increase can largely be attributed to 'fuel tourism' – motorists crossing the border into the Czech Republic to fill up from the likes of Austria or Germany, where petrol prices are considerably higher.

Motor fuel value growth year-on-year is beginning to slow in Hungary and, to a lesser extent, Poland. This fall in retail sales can be attributed in part to high petrol prices suppressing demand. Furthermore, Hungary's economy is not

boosted by fuel tourism as prices at the pump are significantly higher in this market than in neighbouring ones due to hefty government taxes.

By contrast, in Romania, for example, the total value of the fuel retailing market grew at a CAGR of 12.2% due to the fact that currently pump prices after tax are lower than international prices – a means of compensation by the government for the lower purchasing power of consumers (see Figure 2). Despite the small decline in the CAGR of the total fuel value in the Polish market between 2000 and 2004, Poland still accounts for 38% of the fuel value in the CEE region totalling 8.4bn compared with the CEE country average of 2.8bn.

Expansion vs rationalisation

The Czech Republic and Romania offer the greatest opportunity for network expansion, given that both the volume and value of the fuel retailing market continue to increase. However, whilst in the Czech market the focus is network rationalisation, in Romania network expansion is the current priority. At the start of 2005, some 77% of stations in the Czech and Hungarian markets had a forecourt store compared with only 51% in Poland and 54% in Romania. Furthermore, 35% of Czech sites have a carwash on the forecourt compared with only 11% in Poland.

Forecourt analysis indicates that, although in the Czech Republic network expansion and improvement go hand in hand, in Poland improvements to existing sites in terms of efficiency and additional forecourt services are being abandoned in favour of new builds. The number of sites in the Polish market is increasing – between the start of 2001 and 2005, the number of Polish stations increased by a CAGR of 0.7%.

However the average throughput per station in Poland is 4.6mn litres per year (l/y) compared with 4.8mn l/y in the Czech Republic. The Polish market has many sites, but not all of them are fulfilling their maximum potential. In contrast, in January 2005 the Hungarian fuel retailing network totalled 1,447 sites compared with 1,568 in 2001 – a fall of nearly 8%. This decline can be attributed to the fact that whilst many previously state-owned stations have been refurbished or modified to meet stricter environmental legislation, many have been shut down due to their irreparable inefficiency. So, whilst the

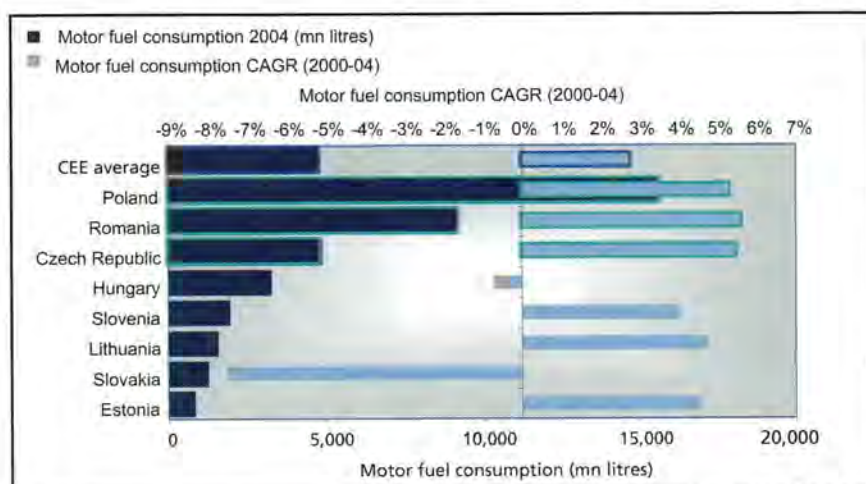


Figure 1: Poland is the market demonstrating the greatest amount of fuel consumption growth between 2000–2004

Source: Datamonitor

number of sites is falling, efficiency is increasing as older sites are replaced by more state-of-the-art stations.

Talking shop

Czech and Hungarian players are raising the stakes in terms of ancillary services. Older sites are being revamped to include shop and carwash facilities, whilst the new build formats are now much more ambitious in scope. So, despite the fact that the number of sites in Hungary is falling, the number of forecourt stores and carwashes – and the standard of these ancillary services – is rising. At the start of 2005, in Hungary, 77% of filling stations had a shop and 40% had a carwash – a higher degree of non-fuel development than any of the other key CEE markets. Similarly, in the Czech Republic, 35% of forecourts had a carwash at the start of 2005 and 77% had a forecourt shop.

Romania and Poland are lagging behind in terms of non-fuel services on the forecourt. In both markets, the proportion of filling stations with a forecourt shop is 54% and 51% respectively. Investment in existing sites has often been neglected in favour of new builds or acquisitions. Although some major fuel retailers, such as PKN Orlen, already have a strong presence in the convenience sector, many other players – particularly in the Romanian and Polish markets – still have a long way to go in terms of non-fuel development.

Not only should players in the CEE be prepared to invest in forecourt stores, but also the quality of such services must be at a high enough standard to compete with new entrants into the region – namely supermarkets. The rising popularity of supermarkets such as the UK's Tesco in Hungary and Poland, and Germany's Kaufland in the Czech Republic – where supermarkets currently account for 6% of fuel volumes sold – is an element of the market that fuel retailers cannot afford to ignore.

With a wealth of expertise and experience in the convenience sector and the ability to subsidise pump prices with grocery profits, supermarkets are able to squeeze fuel margins even further and pose a real threat to oil majors' forecourt retailers. Given the development of key Western European markets such as the UK, France and Germany, fuel retailers, particularly those in the more developed Czech and Hungarian markets, should not discount the possibility of negotiating partnerships with supermarkets on the forecourt – a synergy from which both parties can expect to benefit.

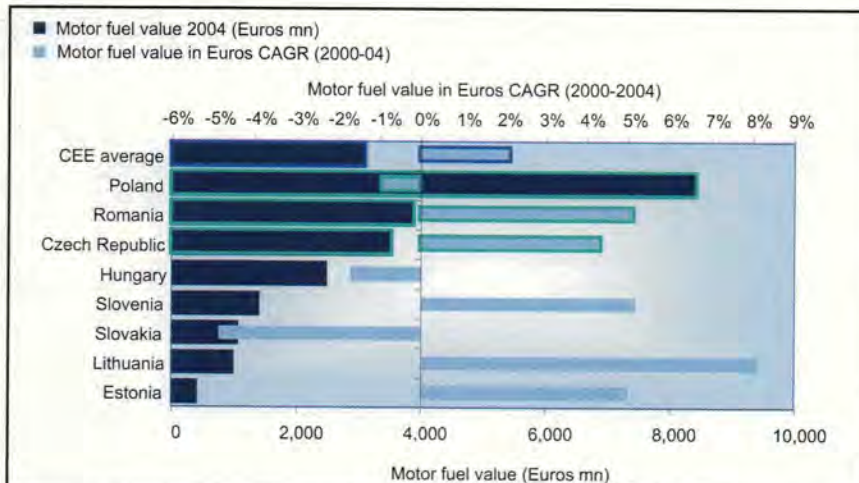


Figure 2: Romania is the market demonstrating the greatest amount of fuel value growth between 2000–2004

Source: Datamonitor

Pump up the volume

Market liberalisation in fuel retailing is fully-fledged in the Czech Republic and Poland, with many foreign and new entrants operating in the market. At the start of 2005, the principal oil majors in the Czech market were Shell, Benzina and OMV, with volume shares of 16%, 15% and 10%, respectively. The presence of foreign players raises the stakes in terms of efficiency as well as the standard of services on the forecourt. For example, whilst Petrom (Romania's former state-owned monopoly) has an average throughput of 4.7mn l/y, the Austrian player OMV has an average throughput of 7.9mn l/y.

However, Hungary and, to a lesser degree, Romania, still have a long way to go until liberalisation is achieved. In these less mature markets, the lion's share of fuel volumes continues to go to former state monopolies characterised

by their well-established national presence and extensive, albeit comparatively inefficient, network. In Hungary, for example, Mol dominates the market – accounting for 44% of fuel volumes sold at the start of 2005. Once again, however, foreign players are the ones with the most efficient sites. So, whilst players such as Petrom and Mol are long-standing, competitors are in a position to exploit the flaws entrenched in the 'quantity rather than quality' approach to network planning characteristic of the former state-owned monopoly.

However, by prioritising site efficiency and ancillary services, new entrants and existing players alike will be in a position to consolidate and reinforce their position in a region that the rest of Europe is watching with bated breath.

*CEE refers to Bulgaria, the Czech Republic, Estonia, Hungary, Lithuania, Poland, Slovakia and Slovenia.

Seminar

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Bigger and better



Offshore Europe 2005 (OE05) reportedly broke all the records in the book for the Eastern Hemisphere's largest oil industry event, with well over 30,000 visitors passing through the doors between 6–9 September, writes Kim Jackson.

The biennial show's industry standing was reflected by the number of important announcements made there, including the UK's largest licensing round for years, when UK Minister for Energy Malcolm Wicks used it as the platform from which to announce details of the 23rd Licensing Round. This saw 152 licences issued to around 100 companies – the highest number awarded since UK offshore licensing began in 1964 (see p3).

The year also saw a record number of exhibitors – 1,661, compared to 1,392 in 2003 – including 16 major oil companies such as Shell, BP, Total, ConocoPhillips, Chornomornaftogaz of the Ukraine, Gazprom of Russia, Venezuela's PdVSA and the Colombian National Hydrocarbons Agency. A total of 107 countries were represented at the show, either as exhibitors or visitors.

Much of OE05's vitality came from its agenda-setting conference, under the theme 'Managing Mature Production: A Global Challenge', and the attendance of many highly influential industry figures. Chairman Andrew Gould, who is also Chairman and CEO of oilfield services group Schlumberger, commented: 'The outstanding delegate participation and strong international presence at OE05 are clear expressions of the industry's commitment to developing current and future sources of oil and gas supply to meet global demand. OE05 has seen a wide range of new technologies and innovative approaches focused on

mature field recovery, as well as on non-conventional hydrocarbon development.'

Industry barometer

Throughout the four-day show there was a vibrant atmosphere, reflecting the oil industry's current upsurge in activity, driven partly by the dramatic climb in the price of oil in recent months to record highs of up to \$70/b. The high oil price is enabling many oil companies to kick-start new projects internationally as overall economics improve, providing new business opportunities for the contracting and oil services sector both within the UK and around the world.

A stream of high-profile visitors attended the show, including the UK Minister for Energy Malcolm Wicks MP and a host of international delegations and ambassadors. Heavyweight speakers at the conference included Mahmoud Abdul-Baqi, Vice President-Exploration, Saudi Aramco; Luis F Vierma, Vice President-E&P, PdVSA; Michel Bènezit, Vice President-Northern Europe, Total; Mike Bowyer, UK Managing Director of Halliburton; Robert Olsen, Chairman and Production Director, ExxonMobil International; and Sir Ian Wood, Chairman and Chief Executive, Wood Group.

Also speaking at OE05 was Tom Botts, Executive Vice President-Europe, Shell International E&P, who outlined the role of technology in maximizing production. He commented: 'We are doing things today that were unheard of five years

ago. Technologies that allow our industry to work smarter are the name of the game when it comes to making the most of today's oil and gas fields.' He explained that expandable tubulars for example, have increased recovery in some cases by up to 70%. Intelligent wells with down-hole real-time monitoring and separation, and remote operation, can revitalise an ageing field – often without upgraded treatment facilities. The North Sea has benefitted from advances enabling the development of increasingly smaller hydrocarbon accumulations. In July, for example, Shell installed newly designed monotoner platforms at Cutter in the UK and K17 in Holland, which are powered by renewable energy sources.

Botts continued: 'Shell remains fully committed to the North Sea. Our industry has a good track record of outperforming expectations in the region. We continue to explore high-value, near-field opportunities, while at the same time increasing our efforts in the hunt for material opportunities in the Atlantic Margin and elsewhere. This renewed focus on exploration has been rewarded with a number of discoveries in the UK and Dutch North Sea, as well as the Shell-operated Onyx SW gas discovery.'

He concluded: 'Clearly there are still many challenges and unknowns in the North Sea's future. But we know there is a heck of a lot still to play for. And we also know this industry has some of the best people in the world, a tradition of finding solutions together, developing new technology, and doing things that were not imaginable just a few years ago.'

DEZ and networking

The show also featured a Digital Energy Zone (DEZ), which showcased the technologies leading the industry towards the next generation, web-enabled oil



Oil Depletion – Facing the challenges

Wednesday 2 November 2005

Energy Institute, 61 New Cavendish Street, London W1G 7AR

There is mounting concern that global oil supplies may peak in the near future. How realistic is this and where will incremental supplies come from? What are the implications for the transportation sector especially for cars and other road transport?

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Confirmed speakers:

- **Martin Fry**, Director, Martin Fry and Associates
- **Chris Skrebowski**, Editor, *Petroleum Review*
- **Roger Bentley**, Senior Research Fellow, Department of Cybernetics, The University of Reading
- **Claire Durkin**, Head of Energy Markets Unit, DTI
- **Jason Nunn**, Director, Upstream Services, PFC Energy
- **Robert Skinner**, Director, OIES
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field. In conjunction with the overall event theme of managing mature production, the DEZ specifically addressed 'smart' technologies that will be instrumental in increasing the life of mature basins around the world and optimising their production.

Mike Bowyer, UK Managing Director of one of the main DEZ exhibitors – Halliburton Energy Services Group (www.halliburton.com) – said: 'We are all aware that the key objectives of the digital oilfield include increased recovery, increased production and reduced operating costs, but developing cornerstone enabling technologies such as 4D seismic, intelligent completions, real-time operations and integrated modelling and simulation are only the first steps on the solution journey. To optimise and sustain the value of these technologies, we must be prepared to challenge the critical concepts of asset awareness, optimised decisions, effective execution and reinvent the work place and our existing work force to harvest the investment.'

Another popular feature was the OILCAREERFAIR, which offered recruitment opportunities for employers and employees alike, be they experienced or new, to the industry. Both home-grown business and overseas companies were recruiting, including Petronas of Malaysia (www.petronas.com.my). The OILCAREERFAIR is a key element in ongoing efforts to help the global industry deal with one of its most pressing challenges – bridging the skills gap that now exists and attracting fresh young talent. (See p26 and p29 for more on this topic.)

Health and safety

Meanwhile, the UK Health and Safety Executive (HSE) urged the offshore oil and gas industry to increase its efforts to meet the 2010 target of safest sector in the world, as set by the industry's own Step Change in Safety initiative.

Speaking at OE05, Taf Powell, head of HSE's Offshore Division, said: 'I am taking this opportunity to re-emphasise the link between good health and safety and good business in the offshore industry, and the extension of good business to the sustainability, in the long term, of the industry itself.' He continued: 'Action is needed now by all players to tackle the fundamental issues offshore. This year's safety statistics are frustratingly flat and, while I'm confident the industry is heading in the right direction, the pace of change is not fast enough and action is needed now.'

The HSE has identified a number of key challenges:

- Increased partnership working – which



UK Oil Minister Malcolm Wicks (left) was on hand to congratulate Phil Head, Technical Director of Artificial Lift Company (ALC; www.alc.uk.com) for winning an innovation technology award. The award was for its Through Tubing Downhole Electrical Submersible Pumping System (TTESP). The electrical submersible pump can be deployed through a well's existing tubing (currently 3.8-inch diameter, with plans to build a smaller diameter system) with slight modification only required to the christmas tree. As such, it can be installed and recovered without a rig, reducing costs and downtime. The 300-kW TTESP is used to pump large volumes of fluids from reservoir depth to the surface, helping to boost ultimate recovery from a well and extending a field's production plateau.

means the active involvement of all who operate and work offshore, not just those in harm's way, but those that let contracts, allocate resources, perform technical authority 'on the beach' and set budgets in the boardroom.

- Investment in ageing infrastructure and the working environment, including worker accommodation.
- Investment in people to sustain the skills and experience vital for safe operation, such as treating issues like workforce welfare and consultation as core corporate values.
- Improved management of the supply chain to create increased capacity in human resources and technical innovation.

Powell stated: 'These are not easy issues to tackle, there are no quick fixes to achieve a solution'. However, he explained that partnership working must be extended 'to encompass everyone in the organisation to engender ownership'.

Meanwhile, at the joint HSE/Step Change in Safety stand, Lord Hunt of Kings Heath, Parliamentary Under Secretary responsible for health and safety, presented certificates to representatives of the winners of this year's Step Change in Safety Awards for Outstanding Manual Handling Initiatives – Gordon Smith, Offshore Installation Manager on Marathon Oil UK's Brae field; Kjell-Erik Ostdahl, Schlumberger North Sea GeoMarket Manager; and John Gray, a Safety Advisor on the Britannia gas platform.

New products and announcements

A number of new products were showcased during the four-day event, including Parker Instrumentation's (www.parker.com/ipd) one-piece clamp for instrumentation tubing, Snap-Trap, which can be 'fitted in seconds, reducing installation time by up to 80% compared with some alternative systems which require the assembly of up to 12 parts', according to the company. The company also highlighted its new innovative turnkey solution for venting samples from process analysers into a plant's flare disposal or return system. The Vent Master system is claimed to 'eliminate the need to vent directly to the atmosphere', while 'resolving analyser accuracy issues associated with alternative disposal techniques'. In addition, Parker provided selected customers at a champagne reception with a sneak preview of its 'revolutionary' manifold and tube fitting products, due to be launched on the market in 1H2006.

AMEC (www.amec.com) unveiled what it called a 'groundbreaking design tool', developed with three leading technology companies (Aveva, Hi-Cad and Z+F) that it claims 'will dramatically improve the speed and efficiency of offshore plant design, leading to enormous benefits in future brownfield developments'. Point cloud data (PCD) is used by engineers to gather information from existing offshore facilities, or under-construction modules, for use in



the proprietary design system called Project Design Management System (PDMS). 'The combination of this data avoids the long and costly process of modelling of plant drawings or manually taken measurements,' commented the company, 'and produces geometrically accurate digital models of existing structures. This new computerised system also has the added advantage of an automatic check capability to ensure



that clashes between the existing and new parts of the plant are avoided.'

The technology has been trialled on North Sea projects and a number of clients are reported to 'have shown a keen interest'. The system also has potential uses beyond the design phase. For example, during construction, engineers will be able to monitor fabrication progress in offsite locations to ensure that prefabricated units will fit exactly as planned.



C&M Group (www.c-m-group.com) launched its new range of security and control products. The Haz-Tek range of marine CCTV systems for harsh environments is based on the latest digital technology, providing reliable monitoring underwater, on board a vessel or in hazardous areas onshore and offshore. The advanced software has recording and playback functions, as well as the ability to jump to incidents caused by movement in the field of view. Recordings can be stored on CD or DVD or e-mailed. Anyone with the correct authorisation and connected to the web can access the video. There is an extensive memory for storing recordings, which can be increased to suit requirements.

Among the announcements during OE05, international oilfield service provider Expro International (www.exprogroup.com) officially opened its new Expro Technology Centre in Aberdeen. The 10,000 sq ft (929 sq metre) building is the first to be occupied in the new Aberdeen Business Park. The Expro team has doubled in size over the past six months and is expected to rise further by the end of 2005. The company currently employs some 750 of its 2,400 global workforce in Aberdeen.

Meanwhile, integrated services consultancy egis (www.egis.co.uk) – a subsidiary of the Expro Group) launched its Integrity Manager web-enabled management tool designed to enable a systematic approach to integrity management. The 'built for purpose' software package was designed by egis well engineers and contains both current and historic well data. The system provides a live 'well integrity health check' and well maintenance archive in a single data source available to nominated personnel regardless of location. Maintenance schedules are planned



Also present at OE05 was the Energy Institute (www.energyinst.org.uk), whose stand was busy throughout the show, with visitors including existing members plus many prospective members and others interested in EI services. Commenting on the event, Sarah Beacock, EI Professional Affairs Director, said: 'It was gratifying to meet many young new recruits to the industry, together with employers keen to have professional recognition for their staff. We offered one-to-one sessions to Affiliates and Graduates wanting to upgrade to full professional membership, which proved a successful activity likely to result in a number of applications to the next meeting of the Membership Panel in October. Many thanks to the Aberdeen branch members who helped to man the EI stand, introducing new and prospective local members to the varied Aberdeen branch programme for 2005/2006, as well as reminding them of the many benefits of membership of the EI.'



New North Sea player Oilexco (www.oilexco.com) has awarded Framo Engineering (www.framoeng.no) of Norway a contract to supply the UK North Sea Brenda field with a multimanifold. The system comprises an eight-port multipoint selector manifold, a multiphase booster pump, multiphase flow meter and a control system. Framo is also to supply 8.5 km of umbilical to Brenda's host platform, the CNR-operated Balmoral, where the topside power and control are located. Oilexco plans to tie in six wells (including the single well satellite Nicol) to the system, which has room for a further two wells. The multimanifold is claimed to keep the costs of intervention work to a minimum as each of the modules can be removed separately to the surface using a light intervention vessel. The pump module, for example, is an 18-tonne total lift. Brenda is due onstream in September 2006, producing some 35,000 b/d of fluids (although the multimanifold has the capacity to handle 51,000 b/d). Field reserves are put at between 20mn and 22mn barrels, with significant upside potential reported.

onshore, while offshore personnel have a clearly defined work programme. As pressure and function tests on the well-head are completed, results are entered in the system onsite. Any test failures are highlighted graphically, and key individuals are notified immediately with further details on the failure. A suite of reports is available to help analyse historical data, enabling effective planning of future operations, while providing an auditable trail of all maintenance and testing activities.

Oilflow Solutions (www.oilflow.solutions.com) also used the show to mark the official opening of its new Aberdeen office at Greenhole Park, Bridge of Don. Oilflow was recently formed by joint venture partners Vienco Oil & Gas and AGT Energy to market a portfolio of new product systems that are targetted at flow optimisation of heavy and waxy crudes. The company's Proflux 200 system, which is claimed to reduce the viscosity of low API heavy oil from a thick and slow flowing liquid to a free flowing state, was recently trialled in the field in Columbia with 'excellent results', reported the company. Further trials on Proflux 200 and Proflux 300 –

which stabilises waxy crudes, allowing them to be pumped well below their original pour point temperature – are due to commence shortly in Albania and India. The company plans to commercialise the Proflux product systems by the end of 1Q2005.

The Craig Group (www.craig-group.com) also announced the conclusion of a deal for a joint venture in Kazakhstan as part of its drive to become a market leader in the Caspian region. The Group's international arm, Craig Energy Services, has signed a deal with MAK Atyrau, a Kazakh supplier, based in Atyrau, to form Craig Energy Services. The new company will not only target the Caspian market, but also plans to export its oilfield procurement, catering supplies, mooring service sale/rental, and chain inspection and repair services to South and West Africa. This is the second joint venture for Craig Energy Services – multinational Craig Energy Services in Lagos, Nigeria, was set up in May 2004 between Craig Energy Services and Multinational Oilfield Services.

The Craig Group also officially christened the *Grampian Commander* – the first newbuild vessel in a series of seven

planned by the company – at Aberdeen Harbour during OE05, shortly after the vessel's delivery from Spain. The *Grampian Commander* will now go on charter to Shell Exploration & Production. The Craig Group's shipping division, North Star, currently operates a fleet of 27 stand-by, emergency response and rescue and multi-function ROV survey vessels.

Among the oil majors exhibiting was Shell Global Solutions International (www.shellglobalsolutions.com), who released its FieldWare Production Universe software application. FieldWare allows continuous monitoring, control and optimisation capabilities of oil and gas flows across the production system, from the wells through to export meters, in real time, enabling staff to detect low flow rates and instabilities as they happen and to deal with them quickly.

Exhibiting for the first time at Offshore Europe was Ukrainian state-owned oil and gas company Chornomornaftogaz. Company President, Igor Franchuk, took the opportunity to outline the company's plans to develop a key deepwater swathe of the Black Sea, having recently signed a deal with Hunt Oil of the US to carry out a 20 to 25-well drilling campaign in the By-Kerch zone from autumn 2006. According to Franchuk, five prospects located in 1,000 metres of water near the Pallas structure are estimated to hold in excess of 1bn boe. Western Geco is reported to have been selected to shoot seismic over the area in March 2006, if the Ukrainian company successfully secures the upcoming tender for the acreage. It is understood that US independent Hunt Oil will fund the \$100mn cost for drilling, while Chornomornaftogaz will cover the \$20mn bill for seismic.

Ukraine's deepwater acreage covers some 140,000 sq km and reserves are put at some 1.5tn cm of gas. Franchuk explained that the country was keen to secure foreign interest and noted that terms for production sharing agreements with international oil companies had now been adopted by Ukraine and that legislative changes were improving the attractiveness of the region for inward investment. OMV is among oil companies reported to have already expressed an interest.

Some 14 medium-sized and small gas and condensate fields have so far been discovered in the Ukrainian sector of the Black Sea and Sea of Azov, with a further 109 structures identified through earlier seismic programmes. Franchuk explained that 31 of these prospects, located on the country's continental shelf, are estimated to hold some 20bn cm of gas each. At present, only 4% of Ukraine's total oil and gas reserves have been developed. ●



Offshore oil projects: finance to first oil

Monday 7 November 2005

The Energy Institute (EI) and the Consilience Energy Advisory Group (CEAG) are pleased to invite you to a 1-day conference at the Energy Institute, 61 New Cavendish Street, London, W1G 7AR.

The conference examines both fundamental aspects of offshore oil project profitability and current industry and market developments. The conference considers four key aspects of offshore oil projects from finance to first oil:

- the rising cost of reserves and development
- financing the project
- project execution risk issues-managing the physical project
- managing investor expectations

The context for the examination is:

The positive factors

- high oil prices
- new technologies
- hard-won discipline in project management

The negative factors:

- escalating reserve acquisition and development costs,
- a scarcity of service company resources
- instability in the planning variables of price, costs and timing

The conference investigates the fundamentals of profitable project management. It also reviews the extent to which the benefits of the current high oil price environment, which has re-valued existing reserves, is inhibiting the development of new reserves.

All speakers have senior current experience in their subjects. For full biographies please visit this link.
<http://www.energyinst.org.uk/content/files/spkbio.pdf>

Programme

09.00–09.30: Coffee and Registration

09.30–09.40: *John Walmsley*, CEAG – Introductory remarks

09.40–10.20: *Mike Bridden*, Harrison Lovegrove – Exploration/acquisition/development: comparative costs

10.20–11.00: *Professor Alex Kemp*, Economic/Fiscal analysis of international contractual structures

11.00–11.30: Coffee

11.30–12.10: *Jason Fox*, Herbert Smith – Financing and negotiation of oil based lending

12.10–12.45: *Liz Bossley*, CEAG – Managing price risk using forward curve financing

12.45–14.00: Lunch

14.00–15.00: *Ron Bryans*, International Project Director – Project execution risk – managing the project

15.00–15.30: Tea

15.30–16.10: Contractor, TBA – Current contractor perspectives

16.10–16.40: *Patrick d'Ancona*, M:Communications – Communicating your performance – managing investor expectations

16.40–17.00: *John Walmsley*, CEAG – Q&A

The course fee is £450.00 (£528.75 inc VAT) for the first delegate from each company. In the event that more than one delegate from a company wishes to attend the event, the fee for each delegate from that company will be reduced to £400.00 (£470.00 inc VAT).

For further information and to book attendance at this event, please contact **Jacqueline Warner**, Energy Institute, 61 New Cavendish Street, London W1G 7AR, UK. t: + 44 (0) 20 7467 7116, f: + 44 (0) 20 7580 2230, e: jwarner@energyinst.org.uk

Marine crude oil transport – 2004 analysis

This article by Paul S Harrison – Consultant to the Energy

Institute's HMC-4(A) Marine Oil Transportation Database

Committee – presents findings from analysis of the 2004 data,

updating the 2003 analysis which was reported in the

October 2004 issue of Petroleum Review.

The Marine Oil Transportation Database Committee (formerly the PM-L-4A panel) was formed in 1986 and is now the Energy Institute HMC-4A (Hydrocarbon Management Committee 4A). The Committee collects and analyses worldwide crude oil shipping data with the general aim of improving loss control through a better understanding of loss patterns and trends. The losses include apparent as well as physical losses. Apparent losses result from the combination of fixed and random errors in the measurement systems used at load and discharge.

The Committee has established a website for the publication of the information presented here, together with additional data concerning crude oil marine transportation. The site can be accessed at www.oil-transport.info or via the EI website at www.energyinst.org.uk

Committee members submit their company data for analysis and an annual report is issued individually to all members. This report includes a confidential analysis of the individual company data together with a general global analysis of the entire annual data set. Reports are issued in hard copy and in electronic format.

The following companies submitted data for 2004:

• BP Oil • CEPESA • Chevron • Chinese Petroleum Corporation • ConocoPhillips • Eni • ErgMed • ExxonMobil Company • Marathon Ashland Petroleum • Petrobras • Petrogal (GALP Energia) • PMI Pemex • Repsol-YPF • Saras • Scanraff (PREEM) • Shell • Statoil • Sunoco • Total.

The Committee welcomes new members and membership is open to all oil companies with data to contribute. The Committee meets twice a year and meetings are held in conjunction with those of the sister committee, HMC-4B

– The Oil Transportation Measurement Committee. The next meetings will be held in San Francisco on 5–6 October 2005 and will be hosted by Chevron. Prospective new members are encouraged to contact the EI for further details – t: +44 (0)207 467 7100.

Database growth

The size of the database increased again in 2004 as a result of existing members gathering more data. The total number of voyages reported rose to almost 10,800 and included 6.82bn barrels of crude at bill of lading (BOL). As shown in **Figure 1**, total volume for voyages with complete load and discharge data was 5.82bn barrels – an increase of 3.5% over the 2003 volume. The increase in data was not as great as in previous years and the Committee is working to attract new members so that the database will continue to grow at least as fast as the

increase in global shipped volumes. The *BP Statistical Review of World Energy* gives global crude trade for 2004 as 13.6bn barrels. The database therefore includes just over 50% of the global volume at BOL and contains complete load and discharge data for almost 43% of global volume. The database is therefore considered sufficiently large to represent the global situation.

Global mean loss

The mean net standard volume (NSV) loss from the database from 1990 to 2004 is plotted in **Figure 1**. An overall improvement from 1989 to 1995 is readily apparent, global loss then showed no major change between 1995 and 2000. A significant increase in mean NSV loss then occurred between 2000 and 2001. However, this has now been reversed and mean NSV loss stands at –0.190% for 2004 (by convention losses are given as negative).

The reduction in NSV losses in earlier years was related almost entirely to water measurement as shown in **Figure 2**. Gross or TCV (total calculated volume) loss also fell between 1990 and 1994, but has risen again in recent years as water losses have continued to fall. It is clear that with TCV loss now the cause of almost 80% of the NSV loss, it is this –0.15% figure which must be improved

continued on p54...

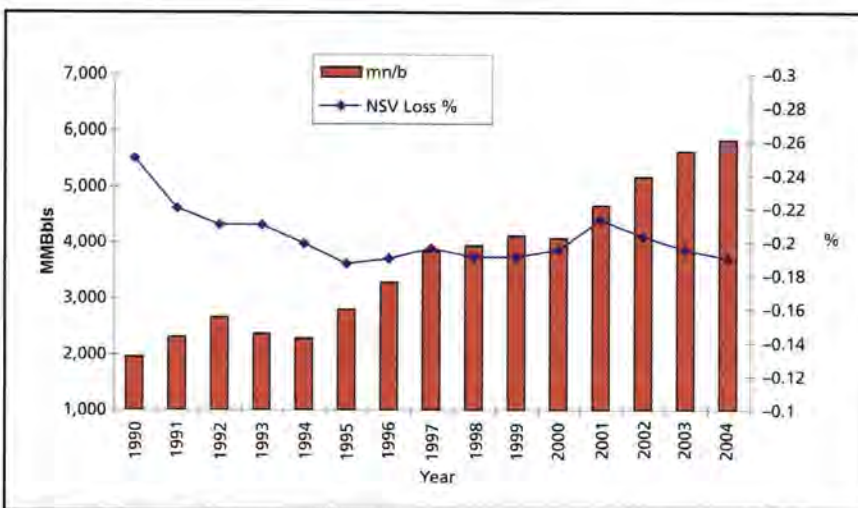


Figure 1: Growth in volume of database and average net loss of crude oil

Crude type	API gravity	Overall volumes (NSV)			Calculation by voyage					
		Total barrels	Barrels loss	Barrels loss %	2004 NSV loss %			2003 NSV loss %		
					Mean	Std dev	No.	Mean	Std dev	No.
Abu Safah	28.9	15,748,932	-32,441	-0.21	-0.17	0.37	38	-0.15	0.69	31
Al Shaheen	26.7	44,446,589	-240,904	-0.54	-0.47	0.69	51	-0.18	0.37	54
Alaskan North Slope	32.2	262,608,023	-196,099	-0.07	-0.08	0.21	338	-0.05	0.21	419
Amenam Blend	38.4	31,701,732	-69,102	-0.22	-0.21	0.23	34	-	-	-
Amna	37.7	44,528,552	-133,259	-0.30	-0.31	0.22	91	-0.30	0.20	77
Arabian Extra Light	38.6	109,557,929	-274,635	-0.25	-0.23	0.43	177	-0.25	0.41	177
Arabian Heavy	27.8	154,453,342	-427,155	-0.28	-0.27	0.44	220	-0.22	0.46	188
Arabian Light	33.0	402,980,368	-1,133,334	-0.28	-0.23	0.34	412	-0.26	0.36	420
Arabian Medium	30.7	102,744,808	-298,488	-0.29	-0.25	0.38	137	-0.18	0.51	178
Asgard	46.7	35,603,568	-105,006	-0.29	-0.29	0.14	44	-0.31	0.14	51
Azeri Light	34.7	27,572,036	-38,039	-0.14	-0.15	0.24	30	-0.10	0.13	32
Bach Ho	40.3	41,229,976	-168,662	-0.41	-0.36	0.50	92	-0.42	0.50	104
Basrah Light	30.8	211,498,017	-188,080	-0.09	-0.09	0.33	164	-0.25	0.30	59
Belayim	26.3	10,618,936	-18,948	-0.18	-0.17	0.15	24	-	-	-
Beryl	38.9	14,229,494	-46,684	-0.33	-0.32	0.62	24	-0.25	0.42	25
Bijupira	29.0	14,859,713	-129,474	-0.87	-0.85	0.41	23	-	-	-
Bonny Light	33.7	51,788,246	-23,222	-0.04	-0.05	0.32	56	0.06	0.32	59
Bouri	25.9	22,741,754	-57,208	-0.25	-0.27	0.28	40	-0.26	0.44	41
Brass	36.7	26,966,665	-38,673	-0.14	-0.15	0.44	28	-	-	-
Brent Blend	38.4	50,012,876	-81,028	-0.16	-0.16	0.13	67	-0.07	0.20	73
Cabinda	33.0	34,440,701	20,125	0.06	0.06	0.22	37	0.00	0.27	47
Cañadon Seco	24.8	27,431,663	-34,833	-0.13	-0.13	0.22	78	-0.05	0.17	85
Captain	20.1	12,074,069	-10,956	-0.09	-0.09	0.25	24	-	-	-
Cerro Negro SCO	15.7	31,219,303	6,466	0.02	0.02	0.25	54	0.05	0.28	51
Cossack	47.6	12,462,518	-2,896	-0.02	-0.08	0.40	24	-	-	-
CPC Blend	44.8	146,242,154	-426,743	-0.29	-0.28	0.27	180	-0.34	0.30	95
Danish	33.7	64,837,500	-110,487	-0.17	-0.17	0.24	107	-0.17	0.19	93
Doba Blend	21.9	22,492,086	22,488	0.10	0.00	0.68	29	-	-	-
Draugen	40.6	27,358,577	-73,653	-0.27	-0.26	0.15	33	-0.30	0.14	37
Dulang	37.8	6,812,508	-23,862	-0.35	-0.32	0.75	23	-	-	-
Ekofisk	37.4	123,790,812	-74,632	-0.06	-0.06	0.14	188	-0.08	0.15	185
El Sharara	42.8	12,389,457	-10,374	-0.08	-0.10	0.40	22	-	-	-
Eocene	18.1	17,610,066	-20,770	-0.12	-0.15	0.21	38	-0.20	0.49	23
Es Sider	36.9	32,606,944	-103,034	-0.32	-0.31	0.18	53	-0.36	0.18	46
Escalante	23.5	12,667,725	11,504	0.09	0.05	0.25	24	0.07	0.30	33
Escravos	34.2	63,729,718	-34,869	-0.05	-0.06	0.28	64	0.01	0.31	54
Flotta Mix	35.0	25,237,767	-68,217	-0.27	-0.26	0.16	37	-0.30	0.14	50
Foinaven	27.3	16,422,409	-7,976	-0.05	-0.07	0.21	25	-0.12	0.30	28
Forcados Blend	30.7	52,419,359	4,953	0.01	0.01	0.52	52	0.02	0.49	46
Forties Blend	44.9	117,575,360	-264,484	-0.22	-0.23	0.16	186	-0.22	0.19	194
Gippsland	50.3	12,253,999	26,625	0.22	0.21	0.57	23	-	-	-
Girassol	30.9	32,632,349	-33,800	-0.10	-0.10	0.38	35	-0.10	0.21	43
Gullfaks A	36.1	54,484,416	-143,741	-0.26	-0.26	0.23	65	-0.32	0.21	70
Gullfaks C	37.2	24,665,913	-70,097	-0.28	-0.28	0.15	30	-0.35	0.23	46
Harding	20.7	12,564,693	4,691	0.04	0.03	0.21	21	0.07	0.40	25
Hibernia	34.9	57,602,700	-32,420	-0.06	-0.06	0.14	86	-0.04	0.34	67
Iranian Heavy	29.9	74,533,761	-163,098	-0.22	-0.21	0.29	119	-0.26	0.26	118
Iranian Light	33.3	65,671,099	-108,990	-0.17	-0.23	0.28	86	-0.29	0.26	79
Kirkuk	33.7	19,806,354	-34,681	-0.18	-0.15	0.27	23	-0.45	0.35	29
Kumkol	39.9	8,442,455	-42,901	-0.51	-0.50	0.47	21	-	-	-
Kuwait Export	30.6	88,512,281	-214,809	-0.24	-0.24	0.17	60	-0.27	0.41	68
Masila	31.4	35,869,908	-25,786	-0.07	-0.08	0.15	27	-0.05	0.16	22
Maya	21.9	360,341,881	-1,145,944	-0.32	-0.32	0.29	653	-0.34	0.24	636
Mersey 16	15.9	53,634,409	127,242	0.24	0.23	0.20	101	0.27	0.20	74
Mesa 30	30.5	54,189,029	2,244	0.00	-0.02	0.21	89	-0.12	0.28	54
Murban	39.6	38,226,438	-105,820	-0.28	-0.30	0.32	50	-0.24	0.37	105
Napo	19.3	14,603,740	2,855	0.02	0.04	0.26	39	-	-	-
Norne	32.7	24,827,651	-37,696	-0.15	-0.15	0.16	29	-0.20	0.30	40
Olmea	38.4	74,411,002	-211,154	-0.28	-0.28	0.25	136	-0.27	0.27	122
Oman Export	32.3	38,679,179	-53,867	-0.14	-0.15	0.26	53	-0.18	0.17	67
Oriente	24.2	21,305,658	36,289	0.17	0.17	0.28	57	0.25	0.38	63
Oseberg	38.1	62,518,554	-139,564	-0.22	-0.22	0.13	98	-0.26	0.15	101
Oso Condensate	48.0	17,873,497	-91,424	-0.51	-0.52	0.40	21	-	-	-
Palanca	37.2	22,751,313	-59,397	-0.26	-0.26	0.20	23	-0.10	0.47	24
Qatar Marine	33.9	17,136,749	-40,441	-0.24	-0.27	0.54	25	-0.24	0.29	39
Qua Iboe	36.7	70,645,872	-86,154	-0.12	-0.12	0.25	71	-0.08	0.31	74
Rabi Light	36.4	25,445,027	-75,283	-0.30	-0.29	0.20	28	-0.23	0.20	33
Ratawi	24.8	19,403,699	-28,943	-0.15	-0.15	0.27	37	-0.34	0.38	34
Saharan Blend	45.6	108,297,092	-172,967	-0.16	-0.12	0.30	150	-0.09	0.29	122
Santa Barbara	39.9	13,977,911	-16,220	-0.12	-0.10	0.22	27	-0.15	0.18	26
Sarir	37.7	15,777,015	-26,221	-0.17	-0.18	0.27	24	-0.14	0.31	30
Schiehallion	26.2	24,359,812	-7,602	-0.03	-0.04	0.23	30	0.02	0.29	31
Seria Light	37.6	10,687,647	10,185	0.10	0.08	0.49	31	0.19	0.57	29
Siberian Light	35.5	18,522,603	-52,080	-0.28	-0.29	0.25	38	-0.17	0.36	46
Siri	37.8	5,460,270	-16,145	-0.30	-0.29	0.28	21	-	-	-
Sirtica	40.0	29,071,399	-47,071	-0.16	-0.16	0.23	46	-0.16	0.18	35
Souedie	25.0	19,553,631	-44,847	-0.23	-0.24	0.27	41	-0.19	0.30	54
Stafford	39.5	104,404,560	-264,857	-0.25	-0.26	0.19	134	-0.28	0.16	169
Syrian Light	37.9	33,172,237	-110,897	-0.33	-0.33	0.36	65	-0.29	0.28	81
Tapis Blend	45.6	16,123,724	-29,163	-0.18	-0.18	0.34	30	-0.28	0.66	34
Terra Nova	33.2	17,814,247	-17,007	-0.10	-0.08	0.51	30	0.04	0.21	34
Troll	28.7	45,522,984	-11,989	-0.03	-0.01	0.29	74	0.00	0.33	71
Upper Zakum	34.2	21,191,006	-33,879	-0.16	-0.16	0.17	22	-	-	-
Urals (Baltic)	32.0	323,379,528	-422,827	-0.13	-0.14	0.22	503	-0.13	0.20	323
Urals (Black Sea)	32.0	171,446,120	-546,988	-0.32	-0.31	0.22	263	-0.32	0.26	298
Yoho	39.0	32,326,182	-56,377	-0.17	-0.18	0.41	35	-0.60	0.47	30
Zafiro	31.2	28,365,676	-87,227	-0.31	-0.32	0.22	29	-0.31	0.24	27
Zarzaitine	42.6	29,811,405	-73,281	-0.25	-0.25	0.34	49	-0.34	0.15	33

Table 1: Analysis by crude oil type 2004

Oil and Gas Training 2005



Economics of the oil supply chain

10–14 October 2005

£2,150.00 (£2,526.25 inc VAT)

On this 5-day course, delegates will examine the various activities of the fictional Invincible Energy Company to explore the economic forces which drive the oil supply chain. They will concentrate on the main areas of risk and opportunity from the crude oil supply terminal, through transportation, refining and trading to the refined product distribution terminal.

During their time in Invincible's refinery, delegates will learn about the quality aspects of product supply.

They will study refinery process economics and the effects of upgrading.

Who should attend?

This course is the essential foundation for people entering the oil industry or for those with single-function experience looking to broaden their knowledge. It also forms the basic building block for the other trading-related courses.



Gas-to-liquids in the context of the global gas industry

11 October 2005

El member £550.00 (£646.25 inc VAT) Non-member £650.00 (£763.75 inc VAT)*

*Includes complimentary Affiliate membership to the Energy Institute

Topics covered will include:

- Developments, trends and forecasts • Overview of the gas-to-liquids (GTL) processes • Intermediate step of synthesis gas (syngas) production
- Fischer-Tropsch (F-T) synthesis • Syn crude fractionation and product options • Economic viability of GTL • Cost, breakeven points and economies of scale
- GTL versus LNG: economics, market and strategic considerations • Environmental advantages of GTL products • Emerging markets for GTL • Market leaders in commercial GTL developments • Projects in development and some regional perspectives • Case studies: Malaysia, Qatar, Nigeria

LNG – Liquefied natural gas industry

12–14 October 2005

El member £1,400.00 (£1,645 inc VAT) Non-member £1,600.00 (£1,880 inc VAT)*

*Includes complimentary Affiliate membership to the Energy Institute

This intensive 3-day course covers technical and commercial perspectives of all segments of the LNG gas supply chain from gas field development, liquefaction processes, shipping, re-gasification, storage, supply into a gas distribution network, embedded opportunities for LNG within existing gas markets, supply and construction contracts, project finance and economic valuation. This differs from other LNG courses in providing an integrated insight to the technologies, the markets, the economics and the finance of the industry.

Who should attend?

Those working in the LNG industry in production, liquefaction, transportation and receiving, including those reliant upon LNG supply or the financing of LNG projects; analysts, planners and commercial staff, personnel operating in the gas, electricity and related energy industries and markets, regulators, advisors and policy makers, financiers, legal advisors and risk managers.

Trading oil on international markets

17–21 October 2005

£2,800.00 (£3,290.00 inc VAT)

During this 5-day course, delegates will become part of Invincible's fictional trading team, taking decisions about the company's activities to maximise profits through an understanding of the economics of trading and the management of inherent price risks.

Delegates will trade the live, crude oil and refined product markets worldwide, under the guidance of an expert team of lecturers, reacting to events as they happen and using real-time information from Reuters and Telerate screens and daily price information from Platts and Petroleum Argus.

Exercises are performed in syndicates, with comprehensive debriefs studying the consequences of the decisions made. The course expects a high degree of participation from delegates.



Planning and economics of refinery operations

18–21 October 2005

El member £1,900.00 (£2,232.50 inc VAT) Non-member £2,100.00 (£2,467.50 inc VAT)*

This intensive, 4-day course will enable delegates to understand the essential elements of refinery operations and investment economics, to review the various parameters which affect refinery profitability and to develop a working knowledge of the management tools used in the refining industry.

Who should attend?

- Technical, operating and engineering personnel working in the refining industry • Catalyst manufacturers and refining subcontractors
- Analysts and planners • Trading and commercial specialists • Independent consultants



Introduction to lubricants

3–4 November 2005

El Member £1,000.00 (£1,175.00 inc VAT) Non-member £1,200.00 (£1,410.00 inc VAT)*

*Includes complimentary Affiliate membership to the Energy Institute

This 2-day course is designed to provide an overview of the lubricants business for those personnel needing a working knowledge of it, but in a limited amount of technical detail. The broad scope of the course will allow those new to the industry, or those with some experience of it, to draw immediate benefits from their increased knowledge to the advantage of themselves and their organisations. The environmental aspects of lubricants will be explored during the programme, together with their impact on the business itself.

Who should attend?

The course is pitched to appeal to lubricant buyers, analysts, planners, new personnel to the oil industry, lubricant sales personnel, fleet operators, oil company sales and marketing personnel, environmental issues personnel, oil company strategy and planning staff, additive manufacturers and suppliers.

El Oil and Gas Training 2005



NEW COURSE

Financial management of international petroleum contracts

9–11 November 2005

El Member £1,400.00 (£1,645.00 inc VAT) Non-member £1,600.00 (£1,880.00 inc VAT)*

*Includes complimentary Affiliate membership to the Energy Institute

Who should attend?

This course is designed for a multi-disciplined audience with diverse commercial, financial, corporate, operations, planning, legal and risk management backgrounds from the oil and gas sector. Course content addresses issues and skills relevant to professionals working on wide-ranging financial management issues associated with oil and gas contracts, including: analysts, accountants, asset managers, bankers, contractors, economists, government regulators and representatives, financial controllers, insurers, investors, lawyers, national oil company and ministry personnel, negotiators, planners, portfolio managers, project managers, risk analysts, strategists and taxation administrators and advisors.

Oil and gas industry fundamentals

28–30 November 2005

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*Includes complimentary Affiliate membership to the Energy Institute

This 3-day course comprehensively covers the oil and gas supply chains from exploration through field development, valuation and risk, production, transportation, processing and refining, marketing, contracts, trading, retailing, logistics, emerging markets and competition with alternative energies. As such, it provides understanding and insight to the processes, drivers, threats and opportunities associated with the core, industry activities.

Who should attend?

Personnel from a range of technical, non-technical and commercial backgrounds, new industry entrants and those with expertise in one area wishing to gain a broader perspective of all industry sectors. It also provides an industry overview for those employed by financial, commercial, legal, insurance, governmental, service, supply and advisory organisations who require an informed introduction to the economic and commercial background and general trends within the oil and gas industry.

Price risk management in the oil industry

28 November – 2 December 2005

£2,800.00 (£3,290.00 inc VAT)

During this 5-day course, delegates become part of Invincible's fictional trading team, identifying and then managing the exposure to price risk. They trade the full range of derivative markets, including the live futures markets which are received on-line through Telerate and Reuters. Options are traded using a simulation programme. Delegates compare the performance of different instruments over time and in changing market conditions and learn how to choose the appropriate instrument to match their objectives.

The course explains the workings of futures, forwards, swaps and options markets and how they can be used for hedging and price management purposes. The costs and relative benefits of the instruments and the implementation of risk management strategies are explored as well as technical analysis and the principles of management control. Exercises are performed in syndicates, with comprehensive debriefs to study the consequences of the decisions made. The course expects a high degree of participation from delegates.



NEW COURSE

Overview of the international upstream oil and gas industry

5 December 2005

El Member £550.00 (£646.25 inc VAT) Non-member £650.00 (£763.75 inc VAT)*

*Includes complimentary Affiliate membership to the Energy Institute

The upstream oil and gas sector involves the interaction of wide-ranging engineering and geological techniques and technologies with complex fiscal, financial and risk management issues. In one day, this course provides an overview of the upstream sector in non-technical terms from technical, commercial and financial perspectives. It is designed for a multi-disciplined audience with varying levels of previous experience in the upstream sector wishing to gain an integrated overview of the key issues and drivers.

Who should attend?

This course is designed for a multi-disciplined audience with diverse commercial, technical, corporate, operations, planning and trading backgrounds from various sectors of the oil and gas industry. Course content addresses the basic issues and skills relevant to professionals working within companies involved in upstream activities, including: analysts, asset and portfolio planners, bankers, economists, financial administrators, traders, trainee geologists and engineers, insurers, lawyers, and risk managers.

Geopolitics and risk in the oil and gas industry

6–9 December 2005

El member £1,900.00 (£2,232.50 inc VAT) Non-member £2,100.00 (£2,467.50 inc VAT)*

*Includes complimentary Affiliate membership to the Energy Institute

This course outlines systematic, holistic and quantifiable approaches to risk management and integrates this with an overview of the regional and global geopolitical issues that now confront the oil and gas industry. It addresses risks from upstream, downstream, strategic, portfolio and corporate perspectives, and how they influence the valuation of assets. It addresses community, contractual, environmental, financial, fiscal, political, public relations, safety, security and technical risks, and the techniques used to assess, quantify and mitigate them in various risk valuation procedures.

Who should attend?

The course is structured for a multi-disciplined audience with diverse technical and professional backgrounds and experience levels from within oil and gas companies. Professionals from the industry support and service sectors, including government ministries and departments, will also benefit from participation in this course.

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...continued from p51

in order to achieve further significant reductions in NSV loss.

TCV loss comprises any real losses due to evaporation plus any apparent losses due to systematic measurement differences.

Loss comparison

Table 1 gives mean NSV loss and standard deviation for shipments of the most popular crudes in the database (20 or more voyages with full data). The mean of the reported API gravity is also given, together with the overall percentage loss based on reported total barrels shipped.

For comparison, figures for NSV loss calculated by voyage are given for 2004 and 2003.

Note that the data in Table 1 is not 'table corrected' but based on original bill of lading (BOL) figures. Where possible, for load ports using 'old' (1956) Table 6 or Table 54, corrected BOL figures are calculated using 'new' (1980) tables for comparison with outturns at discharge ports, which also use the 'new' tables. The effect of using table-corrected BOL data for specific crudes is shown in Table 2.

It should be noted that as the information in Table 2 is derived from a smaller set of voyages than those used for Table 1 (ie those with both corrected and uncorrected BOL figures), the actual mean losses may differ. Table 1 should be used as a guide for typical measurement differences, while Table 2 gives an indication as to likely table difference. The figures are based on a minimum of five voyages per grade.

Detailed loss analysis

In addition to NSV loss figures, the database contains details of all measurements made through each voyage. This enables more detailed analysis to determine where losses are occurring and sets realistic performance limits for each stage in the measurement process.

Overall results for each of the main measurement differences are shown in Table 3, comparing figures for 2004 with those for 2003.

Following an increase in 2002, the standard deviations (or spread) of the key loss figures are now at historically low levels, indicating better overall control of measurement systems.

Key comparisons used in the analysis are as follows:

- NSV (net standard volume) and TCV (total calculated volume) losses are simple comparisons between bill of lading (BOL) and outturn figures.
- NSV is the volume of crude corrected to 60°F with sediment and water

Crude type	Mean NSV Loss %		Table Difference
	Original	Corrected	
Abu Safah	-0.17	-0.05	0.12
Arabian Extra Light	-0.27	-0.11	0.16
Arabian Heavy	-0.43	-0.35	0.08
Arabian Light	-0.33	-0.16	0.17
Arabian Medium	-0.33	-0.23	0.10
Arun Condensate	-0.21	-0.19	0.02
Belida	-0.65	-0.52	0.13
Bunga Kekwa	-0.17	0.07	0.23
Dubai	-0.13	-0.06	0.07
Dulang	-0.50	-0.28	0.22
Eocene	-0.14	-0.11	0.02
Kidurong	0.10	0.22	0.12
Marib	-0.19	-0.10	0.09
Minas	0.01	0.12	0.11
Murban	-0.32	-0.15	0.17
Oman Export	-0.15	-0.01	0.13
Oman Residue	-0.48	-0.33	0.15
Qatar Land	-0.36	-0.26	0.10
Qatar Marine	-0.20	-0.14	0.05
Ratawi	-0.13	-0.09	0.04
Saharan Blend	-0.17	-0.11	0.06
Senipah Condensate	-0.24	-0.15	0.09
Souedie	-0.18	-0.17	0.01
Syrian Light	-0.32	-0.29	0.04
Tapis Blend	-0.24	-0.10	0.13
Upper Zakum	-0.14	-0.04	0.10
Zarzaitine	-0.27	-0.22	0.05

Mean difference % 0.10

Table 2: Effect of table corrections on net standard volume loss figures for individual crude oils

	2004		2003	
	Mean	Std Dev	Mean	Std Dev
NSV Loss %	-0.19 (-0.190)	0.34	-0.19 (-0.195)	0.36
TCV Loss %	-0.15	0.33	-0.15	0.34
Load Loss %	0.00	0.25	0.01	0.26
Ship Loss %	0.03	0.21	0.02	0.20
Discharge Loss %	-0.18	0.31	-0.19	0.32
Water Loss %	-0.04	0.17	-0.04	0.16
OBQ-ROB Difference %	0.01	0.11	0.02	0.11

Table 3: Global loss analysis

- quantities (free and dissolved) deducted. TCV is the NSV plus sediment and free and dissolved water.
- Load loss (load difference) is the TCV difference between the received volume measured on the ship (corrected for OBQ (preload onboard quantity) and VEF (vessel experience factor)) and the shore delivered volume.
- Discharge loss (discharge difference) is the TCV difference between the discharged volume measured on the ship (corrected for ROB (remaining onboard) and VEF (vessel effect factor)) and the shore received volume.
- Ship loss or 'transit difference' is the difference between ship TCV measurements at the load port before sailing and at the discharge port on arrival.
- Water loss is the difference between BOL and outturn water and sediment.
- OBQ-ROB difference is the difference between the TCV measured on the ship prior to loading (OBQ) and that remaining after discharge (ROB).

Load loss in 2004 was -0.004%, very close to zero. This should be the case as application of the load VEF will generally take account of ship/shore differences, including calibration differences and vapour losses.

Ship loss shows a small gain, which is unexpected but has been consistent over many years. A recent study by the Committee has been unable to identify any specific grades, routes or vessels showing large or regular gains. Previous estimates have put 'real' losses as high as -0.05%. However, an extensive study of

venting for over 250 voyages carried out by Venturie AS indicates that, while venting losses on specific voyages may approach this figure, average losses are much lower – probably in the region of -0.004% . Clearly, if the actual figure is this small then a very small systematic difference in measurements at load and discharge (eg ship trim differences) can lead to the small apparent gain which the data shows.

Load VEF values have fallen fairly consistently over the past nine years. This fall is apparent from the average by voyage values and also from the average by vessel values (although there was a slight increase in VEF by vessel in 2004). The 2004 average by voyage is again below 1.0000, at 0.99990. With increasing use of modern, more accurately calibrated vessels, this figure will begin to represent the real loss at loading. A value of 0.9998 would be equivalent to a -0.02% evaporative loss. A similar loss at discharge will give a discharge VEF of 1.0002. (See Figure 3.)

OBQ and ROB (expressed as percentages of BOL and outturn TCVs respectively) have also both fallen over recent years, as shown by Figure 4. This fall seemed to have levelled out in 2002, but figures were lower again for 2003 and 2004. The difference between OBQ and ROB has also steadily reduced, indicating that ROB clingage volume has reduced. Another small reduction brings this value to 0.014% for 2004. This improvement is related to improved tank design and more effective heating and crude oil washing.

Conclusion

Mean NSV loss for 2004 was -0.190% , the lowest level since 1995. However, with over twice the number of voyages now included in the database this figure has a much lower level of uncertainty. Unlike in 1995, the majority of this -0.190% difference is now related to TCV loss and not water loss, and it seems clear that the -0.15% TCV loss figure must be addressed in order to achieve further significant reductions in NSV loss.

The changes in global loss patterns seen over recent years in relation to ship/shore comparisons at load and at discharge have now slowed, with OBQ-ROB difference at 0.013%. Load VEFs continue to fall, with the average load VEF by voyage for 2004 standing at 0.9999.

The database continues to increase in size in terms of volume and voyage numbers. However, the Committee is committed to its next target to collect full load and discharge data for 50% of global volume and, in addition to improving data gathering by existing members, is keen to increase the membership. ●

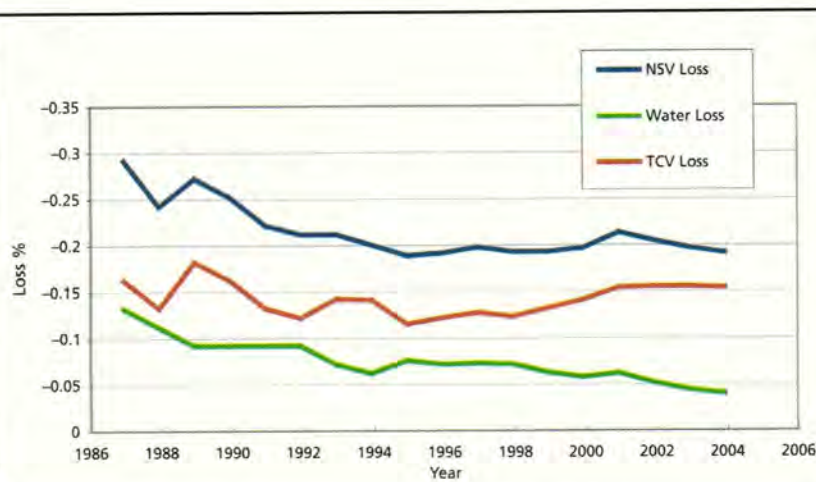


Figure 2: Overall loss trend

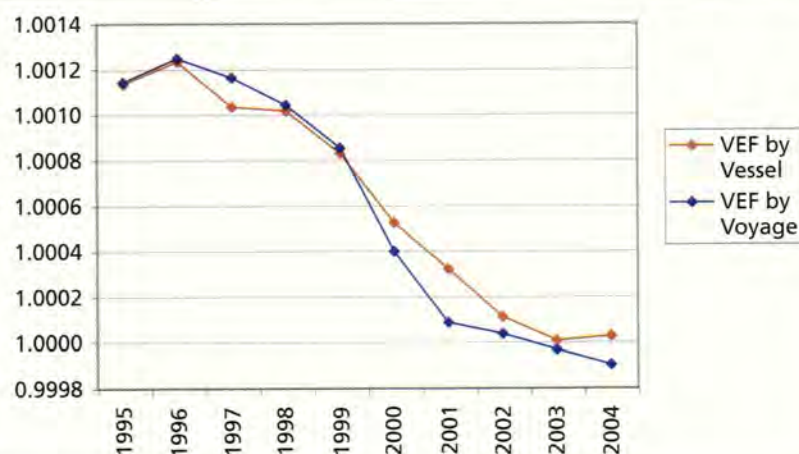


Figure 3: VEF trend

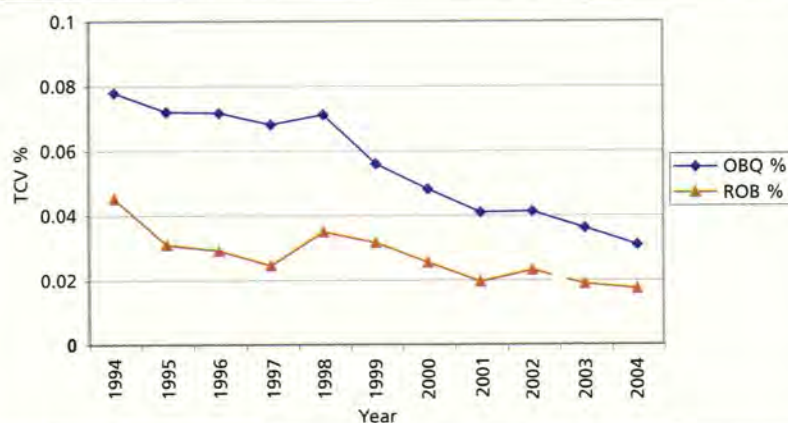


Figure 4: OBQ and ROB trend

Acknowledgements

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Disclaimer

The EI as a body is neither responsible for the statements or opinions presented in this article nor does it necessarily endorse the technical views expressed.

Corporate killing – new laws apply offshore

The UK government's proposals for a new offence of corporate manslaughter in England and Wales will also extend to all offshore installations in the UK sector of the Continental Shelf, including those in the Scottish sector, writes Rona Jamieson, Health & Safety Partner, Paull & Williamsons.

Legislation extending criminal jurisdiction offshore does not differentiate between Scottish and English law. Any conduct that constitutes a criminal offence in either jurisdiction is deemed an offence offshore. Historically this has not been an issue, since the criminal law in both jurisdictions is broadly the same. However, the new Bill, if it becomes law, will make an important difference since it will mean that companies operating in the Scottish sector of UKCS will now be exposed to the risk of criminal liability for corporate manslaughter – even if that is not an offence under Scots law.

What is proposed?

The new offence of corporate manslaughter does not focus on individual failures, but rather on the way an organisation's activities are managed as a whole. The arrangements and practices put in place enable an organisation to carry out its work, and management failings by the organisation's senior decision makers are the key factors. The Bill contains a statutory framework for assessing an organisation's conduct, including a clear link with standards imposed by health and safety legislation and guidance publications. Documents such as the Health & Safety Executive's *Guidance on Directors' Responsibilities for Health and Safety* will now be directly applicable and organisations that have not appointed a Health and Safety Director are likely to be in difficulty.

All companies, including foreign registered companies, would be subject to the offence if the injury causing the death occurs in any place where the English courts have jurisdiction. The offence applies to incorporated bodies, not individuals, and the only sanction available is a financial penalty. Since corporate manslaughter is outside the Health & Safety at Work Act regime it will require to be investigated by the police and prosecutions will be brought

by the Crown Prosecution Service not the Health and Safety Executive.

What is the cost?

The government's view is that the new Bill will create no additional regulatory burdens and, since it is linked to existing health and safety duties, it claims that the additional costs of compliance ought to be modest. It admits, however, that it has been unable to put a specific figure on this. The general view from business is that it will have a negative impact, increasing bureaucracy and cost, and making companies more risk averse.

There appears to be particular cynicism in the energy/utilities sector where it has been reported that 71% of directors/senior managers interviewed believed the government's primary motivation to be a political manoeuvre to satisfy public outcry and media demands in the wake of several rail and other transport disasters. On the other hand, the Bill has the backing of the Trades Union Congress (TUC), which insists that health and safety standards can only be improved through greater corporate accountability. Indeed, the TUC wants matters to be taken further, with individual liability for directors and sanctions such as imprisonment.

Will we be safer?

Analysis of trends over the last five years suggests that an increased use of the criminal law and enforcement measures has made no difference to the country's safety performance. In 2004, workplace fatalities increased from 227 to 235. The total number of reported injuries increased by 9%. The Health & Safety Executive's own assessment of progress towards the targets set at the start of the 'Revitalising Campaign' of 2000 (a 10% reduction in fatalities and major injuries by 2010) is that there is 'no clear evidence of any change in the incident rate' of fatalities, major injuries or work related ill-health since 1999/2000.

There is no doubt that the tragic loss

of life in disasters such as Piper Alpha and the spate of terrible railway accidents has raised important issues. We should, however, move beyond a culture of blame where for every accident we demand that someone be punished. Introducing a new criminal offence will not of itself improve safety. If there are to be real advances in safety in the workplace, businesses, particularly small and medium-sized companies, need greater help with compliance.

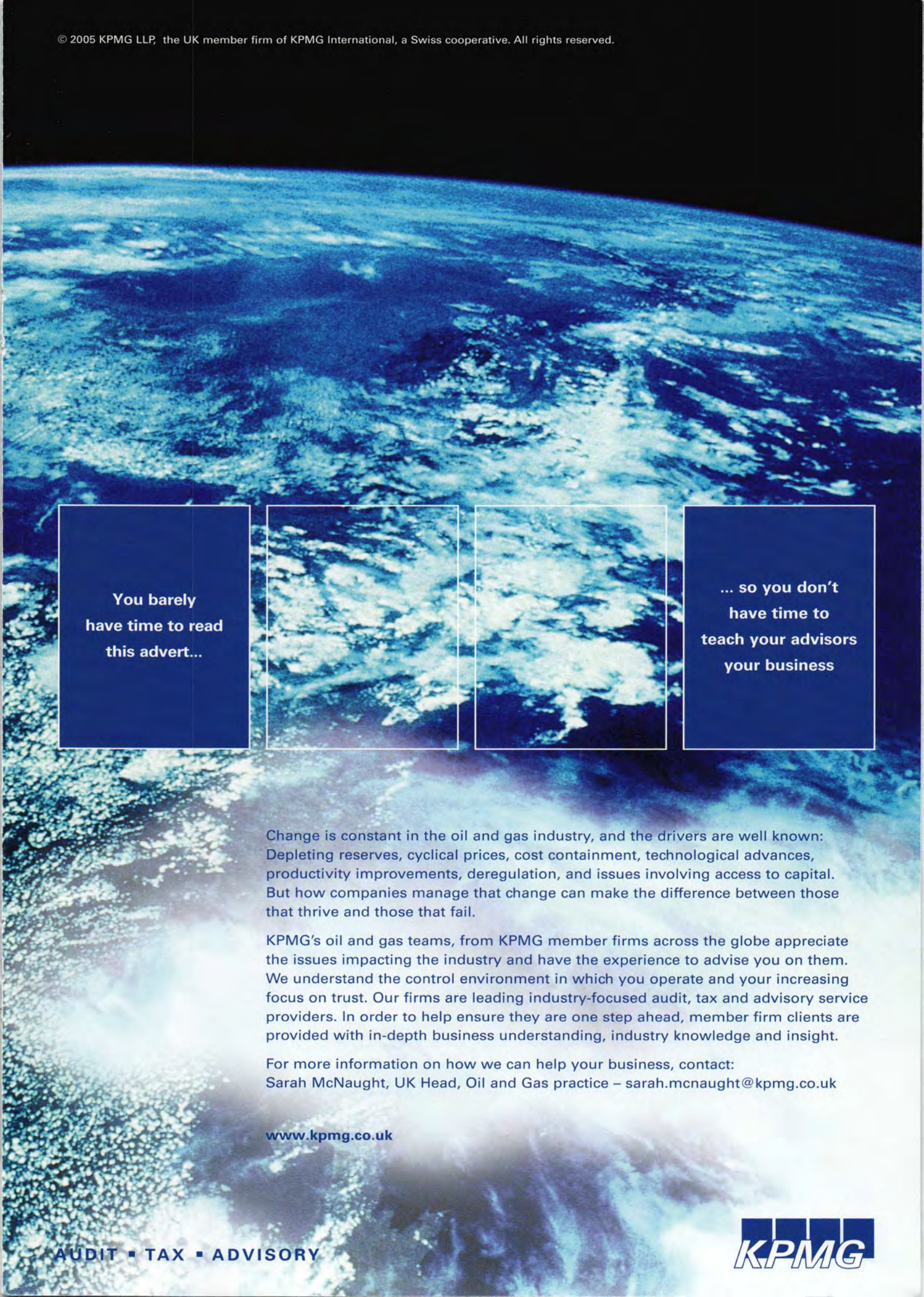
Glimmer of hope

There is a glimmer of hope. In the spring the UK Chancellor, Gordon Brown, announced that the government would be adopting a new 'light touch' in relation to health and safety regulation. He stated that he believed that UK businesses generally act responsibly and that they understand the commercial benefits of effective safety management. Accordingly, routine health and safety inspections would be reduced and targeted more where they were needed.

The Health & Safety Executive has also announced that it intends to develop its advisory role and the Executive has appointed a number of Health and Safety Awareness Officers who will visit employers and raise awareness of safety issues. Unlike inspectors they will not have direct enforcing powers; the aim is that this will facilitate an open discussion of safety issues.

If there is a requirement for punishment the mechanics are already available and, if used appropriately, are quite sufficient to deal with even the most serious safety breaches. The Health & Safety at Work Act 1974 seeks to balance the need for flexibility and guidance with punitive sanctions as a last resort. These can be applied with force in the, relatively rare, situations where true culpability arises. The sanctions imposed by the 1974 Act apply not only against corporate bodies, but also against individual directors where failures are directly attributable to their neglect. In that sense, the penal element of the 1974 Act already exceeds the current proposals on corporate manslaughter.

'The real need is for a constructive means of ensuring that practical improvements are made and preventative measures adopted. Whatever the value of the threat of prosecution, the actual process of prosecution makes little direct contribution towards this end.' These words are lifted from the report of the Robens Committee, whose lengthy inquiry into workplace safety led to the creation of the Health & Safety Executive and the 1974 Act. They are as apt today as they were then and, 30 years on, it seems we still have lessons to learn.



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