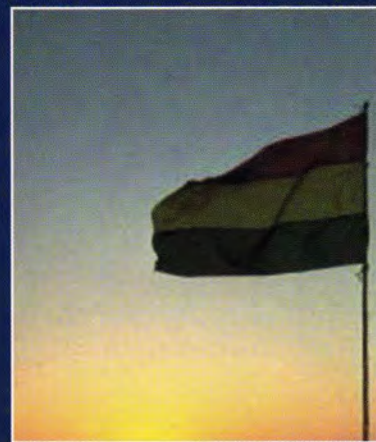


# Petroleum review

OCTOBER 2004



## North Sea

- Decommissioning boom to come

## China

- Offsetting oil demand on world supplies

## Brazil

- Cutting E&P spend, but investing in gas

## EI – Technical

- Environmental sensitivity of UK service stations

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**Jeroen van der Veer (right)**

Chairman of the Committee of Managing Directors (CMD) of the Royal Dutch/Shell Group of Companies and President of Royal Dutch Petroleum Company

**Wednesday 20 October 2004**  
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Jeroen van der Veer's career has included manufacturing operations in Curaçao and Pernis in the Netherlands as well as postings in Corporate Planning for Shell Nederland, and in marketing with Shell UK's liquefied petroleum gas business, extending and restructuring it to achieve profitability.

Jeroen was appointed Chairman of the Committee of Managing Directors (CMD) in March 2004. He joined the CMD from the Shell Chemical Company in the USA, where he was President and Chief Executive. In the USA he was involved in the transformation of Shell Chemical (a part of Shell Oil Company) and he sponsored the reward and recognition initiative. This reflects his strongly held view: it is important to allow people to contribute to Shell in their own way while the leadership helps them to focus their energy on what matters. Jeroen has been appointed an Advisory Director of Unilever and serves as a member of the Nomination and Remuneration Committees.

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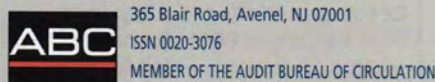
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## ABBREVIATIONS

The following are used throughout *Petroleum Review*:

mn = million (10 <sup>6</sup> )	kW = kilowatts (10 <sup>3</sup> )
bn = billion (10 <sup>9</sup> )	MW = megawatts (10 <sup>6</sup> )
tn = trillion (10 <sup>12</sup> )	GW = gigawatts (10 <sup>9</sup> )
cf = cubic feet	kWh = kilowatt hour
cm = cubic metres	km = kilometre
boe = barrels of oil	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.

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INSIDE BACK COVER: IP WEEK 2005 ANNUAL  
DINNER BOOKING FORM





### Eyeing the bear as the blame game starts

For the last three years Russia has provided the largest incremental non-Opec crude volumes (520,000 b/d in 2001, 642,000 b/d in 2002 and 845,000 b/d in 2003). It is likely to do so again this year, probably adding 700,000 b/d.

At the moment the signals coming out of Russia are mixed and ambiguous, with a slightly sinister tone starting to creep in. The destruction of Yukos at the hands of the Russian taxman appears to be proceeding apace. *Petroleum Review* learns from Russian industry insiders that the destruction of Yukos is now seen as inevitable. The latest report is that the licences for Yagansk – Yukos' primary production asset – may be revoked. If this were to happen, the company would be reduced to the secondhand value of the pumps and pipelines in the oil fields. UFG/Deutsche Bank analysts now value Yagansk at \$1bn–\$2bn if stripped of its licences (less than its immediate tax liability) but at \$15bn with them.

Could this happen? We don't know, but the signs are not encouraging. Both President Bush and ex-Russian President Boris Yeltsin have warned President Putin that he is risking democratic reforms in Russia with his recent decisions on increased powers for the security services and with the Kremlin appointment of regional governors. However, Putin's strong-man approach to both internal security and the oil oligarchs appears to be highly popular with the Russian people.

Russia's latest move has been to merge the state-owned oil company Rosneft with the partially privatised gas monopoly Gazprom. As a result, the state will have majority control of this new energy behemoth.

Putin has always indicated that he wants to rebuild the power and prestige of Russia as quickly as possible. As it has been reported that his higher degree was in the economics of natural resources, a reasonable guess would be that resource exports are seen, by him, as the key to rebuilding Russia in general and Kremlin power in particular. In this context, higher energy taxes; control of oil exports via the state-owned pipeline monopoly Transneft; recreation of a state-controlled energy major in Gazprom-Rosneft; the destruction of Yukos (the most western of all the Russian oil companies); and the aggressive use of nit-picking rules about licences and production permits as ways to control company activity

would all seem to add up to a deeply statist, central control model.

Following the same logic, the central appointment of regional governors blocks the route used by several oligarchs, whereby they got themselves elected as governors of obscure provinces and then used their wealth to bring in investment in exchange for (often self awarded) tax and permitting privileges.

To western commentators hoping that after a rough start Russia would become progressively more democratic, capitalist and protective of private ownership, this all looks rather negative. To the average Russian – who has no useful experience of democracy, capitalism or even legally-defensible personal ownership rights – this looks like a strong leader bringing back order and stability. For the oil industry, it brings the challenge of how to do business with the new autocracy.

To date, only BP has really taken up the direct investment challenge. For some time Gazprom has cast covetous eyes on BP's Kovytko gas field in eastern Siberia. Now there are rumours of possible rescinding of BP's licence for the field. Is this a particularly brutal form of negotiation to cut Gazprom in? Or is it the first move by the new state-controlled oil and gas behemoth? What happens to Kovytko could be the touchstone for what happens in Russia. It may also determine for how long Russia remains the main source of non-Opec growth.

### The blame game

Most agree that recent oil discovery has been disappointing, that there is a lack of new capacity and a dangerously small margin of spare capacity. Candidates for blame include – lack of investment by Opec, lack of investment by the oil companies, lack of exploration by oil companies, synchronous economic recovery, rapid demand growth in China and the US and financial markets requiring unreasonably high and quick returns inhibiting investment.

There is some truth in all these, but the real question is if we are in a lack of spare capacity hole, how do we get out?

Chris Skrebowski

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

Red tape is to be cut for new entrants into the UK gas supply market under new proposals announced by the government in a move designed to help increase competition and benefit the security of UK energy supplies. The proposals ask for views on exempting persons conveying gas from an LNG import facility to a pipeline system operated by a licensed gas transporter from the requirement for a gas transporter licence. The proposals document can be found at [www.dti.gov.uk/energy](http://www.dti.gov.uk/energy)

The 2004 *Digest of United Kingdom Energy Statistics* has been published by the UK DTI. With many detailed tables, supported by charts and commentary, the Digest provides a comprehensive account of energy supply and demand in the UK. Visit [www.dti.gov.uk/energy/inform/dukes/](http://www.dti.gov.uk/energy/inform/dukes/). In addition, data for 2003 in *Energy Consumption in the United Kingdom* has also been published at [www.dti.gov.uk/energy/inform/energy\\_consumption/](http://www.dti.gov.uk/energy/inform/energy_consumption/). This publication brings together statistics from a variety of sources, providing a comprehensive review of energy consumption in the UK since the 1970s.

The UK Government's Energy Bill has received Royal Assent, paving the way for nuclear clean up and enhanced renewable energy generation. Copies of the Energy Act are available from [www.uk-legislation.hms.gov.uk](http://www.uk-legislation.hms.gov.uk) while information on the Energy Bill can be obtained at [www.dti.gov.uk/energy/sepn/energy\\_bill.shtml](http://www.dti.gov.uk/energy/sepn/energy_bill.shtml)

The Office for National Statistics (ONS) has published its latest UK Input-Output Analyses report. A copy can be viewed at [www.statistics.gov.uk/inputoutput](http://www.statistics.gov.uk/inputoutput). Among other things, the report looks at the contribution of the oil and gas sector to the UK economy.

An interim report analysing the National Allocation Plans (NAPs) for the EU Emissions Trading Scheme (EU ETS) submitted by other Member States to the European Commission (EC) was published in August. The research, funded by the UK DTI and Defra, and carried out by independent consultant ECOFYS, contains two levels of evaluation – high level evaluation focuses on progress towards meeting Kyoto targets and an assessment of the development of emissions detailed evaluation against all the criteria in the Emissions Trading Directive. A copy of the report is available online at [www.ecofys.co.uk](http://www.ecofys.co.uk)

EPG Companies, a leading manufacturer of landfill equipment, has published a 285-page landfill design catalogue, available in a three-ring binder or CD format. An order form can be found at [www.epgco.com](http://www.epgco.com)



Michael O'Brien has replaced Stephen Timms as UK Energy Minister.

Shell has been awarded two licences in the deepwater Atlantic area West of Shetland, comprising a total of eight blocks. One is a new 'Frontier' licence with BP as partner and the other a traditional licence with BP, ChevronTexaco and Faroe Petroleum as partners. Shell will be operator in both cases. Meanwhile, for the first time since the entry in the UK in 1987 OMV is to become operator for North Sea two licences – in block 30/30 in the Central Graben and block 204/13 in the West of Shetland region. Four additional non-operated licences in the West of Shetland region have also been awarded to OMV – block 204/4, 5 (15%), and blocks 205/1213/22, 23 and 28 (20%).

Total (50%) has announced the positive appraisal of the Laggan gas field in the Atlantic Margin, testing some 37.8mn cfd. It has also been awarded three adjacent licences in blocks 214/23, 24, 28, 29, 205/15 and 214/25.

Statoil has secured three licences covering a total of five blocks in the North Sea. The acreage lies west of Shetland and on trend with licence P1026, where Statoil acquired a 30% interest earlier in the year. The new licences include one covering blocks 213/22, 23 and 28, with the other two covering blocks 205/1 and 213/21 respectively. Statoil has 30% of the first and second of these awards, with operator ChevronTexaco receiving 40%, OMV 20% and Dong 10%. ChevronTexaco is also operator for block 213/21 with a 45% interest, while Statoil has received 35% in this licence and Dong 20%.

Tullow Oil has been awarded nine operated exploration blocks in the UK's 22nd offshore licensing round. The seven SNS blocks comprise two traditional awards (25% in block 44/21c and 44/26b) located to the south of Tullow's Boulton field, and five Promote awards in under-

### Addendum

Should readers of the article entitled 'Overcoming the innovation barriers' in the September issue of *Petroleum Review* wish to contact the co-author Graham Freeth, he can be reached via e: [freethg@uk.bp.com](mailto:freethg@uk.bp.com)

## Deep gas attracts bids in Gulf of Mexico auction

Oil and gas companies bidding for leases on offshore blocks in the western Gulf of Mexico in a mid-August 'vibrant' US Minerals Management Service (MMS) auction were more successful than those in 2003 auction in this region, writes *Judith Gurney*. This year, some 54 companies placed bids totalling \$197.4mn, resulting in \$171.4mn in apparently successful high bids. Last year, of the total \$258.7mn that bidders offered, only \$148.7mn resulted in successful high bids. In addition, there were more bids made on a larger number of blocks this auction than in all western Gulf licensing rounds for the last six years.

Well over one-third of the bids received were for blocks in water depths of less than 200 metres. Substantial reserves of natural gas are believed to exist at great depths in these shallow waters and the MMS is offering royalty relief on output from discoveries here.

For the second year in a row, many bidders honed in on the shallow-water High Island area. Houston Exploration made the highest high bid of the auction, for \$6.8mn, topping three other bidders, for a High Island block. Several additional top ten highest bids were for blocks in High Island, an area which borders on West Cameron in the central Gulf, a focus of bidders in that region.

Although most of the interest in deepwaters was concentrated on blocks with water depths between 800 and 1,600 metres in Garden Banks and East Breaks, there were multiple bids for several blocks in ultra-deep Keathley Canyon, one for a block in 2,824 metres of water. Much of the competition in Keathley was between BP and Shell.

Although independents dominated the auction, as in previous recent years, the majors, especially BP but also Shell, Petrobras and ConocoPhillips, were more prominent this year. Total, on the other hand, had a much smaller presence than usual and ExxonMobil didn't present a single bid. Among independents, Kerr-McGee and Amerada-Hess maintained their positions as traditionally the most active bidders in the western Gulf. Others with more than \$10mn in total high bids included Devon, Woodside, Pioneer, Spinnaker, Anadarko and BHP Billiton.

## Subsea is the solution of choice

London-based energy analyst Infield Systems' *Global Perspectives Subsea Market Update 2004/08* report forecasts the future market value for subsea development to be \$55bn for the period 2004 through to 2008.

According to Infield's Subsea Analyst Howard Wright: 'The past five years have seen the most prolific use of subsea systems as the development solution of choice, whilst at the same time providing some of the key technological advancements that have and continue to enable many of the most important offshore projects to be developed cost effectively.'

Meanwhile, Dr Roger Knight, Infield's Data Manager and co-author of the report, says: 'The importance of the subsea option has never been greater for two reasons – first, subsea provides the major way forward in the frontier deepwater areas off Brazil, West Africa and the Gulf of Mexico, where production has now exceeded water depths of 2,300 metres, and, second, as operators struggle to add value to ageing assets

in mature areas such as the North Sea, they can best do this by tying back as many subsea developments to their fixed platforms as possible.'

Through the ten-year actual and forecast period 1999–2008, Infield Systems sees the value of the subsea sector more than doubling. It is a testament to the efficiency of the contracting and supply industry that it has yet to see any evidence of bottlenecks or supply constraints containing the market.

Wright commented: 'Of the \$55bn of expenditure forecast over the next five years drilling and completion accounts for 56% and the balance relates to the supply and installation of subsea equipment, pipelines, and control lines.'

There are therefore a considerable number of business opportunities. This expanded market, however, masks the difficulties that some contractors and suppliers may face as a considerable proportion of the global market is divided into a number of distinct niches, both geographically and technically and also by water-depth.



## Apache acquires Anadarko GoM assets

Apache has signed a definitive agreement to acquire all of Anadarko Petroleum's Gulf of Mexico Shelf properties for \$537mn. The acquisition includes 78 fields on 241 offshore blocks (approximately 693,000 net acres), including 93 undeveloped blocks and 112 platforms.

Apache will operate 53 of the fields, with 80% of the production and 85% of the net reserves, and will book proved reserves of approximately 61mn boe, of which 51% is natural gas. Apache estimates the properties' probable reserves at an additional 23mn boe.

Prior to the Apache transaction, Morgan Stanley Capital Group is to

pay Anadarko \$775mn to acquire an overriding royalty interest in 24mn boe of lower-risk reserves estimated to be produced over the next four years.

Upon completion of the announced sales, Anadarko will operate only one offshore platform – the recently commissioned Marco Polo facility at deepwater Green Canyon block 608.

Commenting on the sale, Jim Hackett, Anadarko President and CEO, said: 'By exiting the shelf, we can focus our Gulf programme on the deepwater, which is expected to be the single-largest contributor to Anadarko's targetted 5–9% annual growth rate through 2009.'

## Underbalanced drilling first on NCS

Underbalanced drilling technology has been used for the first time on the Norwegian Continental Shelf to implement a Statoil well on the Gullfaks field in the North Sea. The job was performed by Halliburton, in cooperation with drilling contractor Prosafe. A second underbalanced well is due to be drilled from Gullfaks C later this autumn.

'Oil worth about Nkr1.2bn is unrecoverable from Gullfaks with conven-

tional drilling methods,' explains Johan Eck-Olsen, Project Manager for underbalanced operations in Statoil. 'Now that we've succeeded in applying this technology, the accessibility of these reserves could help to extend the producing life of the field.'

He added that Statoil is looking at international opportunities for using the technique to optimise recovery and producing life on fields it operates in such countries as Algeria and Iran.

## Further growth in Venture's Trees portfolio

Venture Production is to acquire four interests in five UKCS blocks from Marubeni Oil and Gas. These include the remaining equity interests in the Venture-operated Birch (35.4%), Larch (43.1%) and Sycamore (35.4%) oil producing fields (the 'Trees' fields) that it does not already own, as well as a portfolio of undeveloped discoveries and exploration opportunities in the central and northern North Sea.

In addition to the proven producing fields in Birch, Larch and central Sycamore, Venture is also acquiring the remaining interest in the development of the southern part of the Sycamore field and several other discoveries and prospects within block 16/12a. In the other four acquired blocks, Venture is gaining interests in several non-operated discoveries and a number of exploration opportunities. Work is currently underway to establish how best to realise the potential value of these new assets, which are outwith Venture's existing business hubs.

The total consideration for the acquisition will be \$50mn (approximately £28mn). In addition, Venture will pay Marubeni an overriding royalty on two undrilled exploration prospects, Ash and Cedar, located in block 16/12a, in the event of successful commercial development of either of the prospects.

## Shell to increase European E&P spend

Shell has announced a \$150mn increase in capital investment to \$1.8bn throughout 2004 in E&P in Europe. The additional \$150 funds will 'extend offshore asset life, enhance integrity and bring new projects forward', states the company, and 'will also play an important role in developing European energy for the future'. Projects in which the monies will be invested

include Goldeneye in the UK, the large Groningen gas field and Dutch small fields, and the Ormen Lange development in Norway, as well as the Statfjord agreement that will bring Norwegian wet gas to the UK, Danish gas via the Tyra pipeline to the Netherlands and the planned Balgezand-Bacton pipeline between the Netherlands and the UK.

## In Brief

explored acreage to the west of Boulton (25% in 43/22b, 23, 43/27b, 28 and 43/29). A further two Promote awards are located in the North Viking Graben to the east of the Tern Field (100% in 210/25 and 211/21b).

**Kerr-McGee has acquired from BP interests in four exploration licenses covering five blocks in the central North Sea. It has acquired (and operates) a 66% stake in block 22/25a (excluding the Mirren and Merganser fields), 50% in block 23/26a (excluding the Machar and Erskine fields), 50% in block 30/1a and 50% in block 30/1e. Kerr-McGee also acquired an approximate 65% non-operating interest in block 22/15.**

**Talisman Energy has announced the £320mn development of the Tweedsmuir and Tweedsmuir South oil fields in the UK North Sea block 21/1aN. The fields will be developed using a four-well subsea tieback to the Talisman-operated Piper B facility. Production is scheduled to commence during 4Q2006 at an initial rate of 40,000 b/d. Probable field reserves are put at 71mn boe (87% liquids, 13% natural gas).**

### Europe

**Stratic Energy and its partners Toreador Resources and TPAO, the Turkish national oil company, have discovered gas in the shallow waters of the Black Sea offshore Turkey. The Ayazli-1 exploration well flowed approximately 15mn cfd of gas. Ayazli-1 is the first well to be drilled in the Turkish Black Sea in five years.**

**Petroleum Geo-Services has rejected a proposal from Compagnie Générale de Géophysique (CGG) for the \$900mn acquisition of PGS' geophysical business.**

### North America

**ChevronTexaco (50%) has announced a new deepwater oil discovery at the Jack prospect in Walker Ridge block 759 in the Gulf of Mexico. Partners are Encana (25%) and Devon (25%).**

**EnCana has sold conventional oil and natural gas assets producing approximately 16,800 boe/d, after royalties, to Harvest Energy Trust for approximately \$395mn.**

**Pogo Producing Company is to acquire gas properties in the San Juan Basin**



region for \$189mn in two separate deals that will add some 100bn cf of gas equivalent proven reserves and current production of 15mn cfd to its portfolio.

**Anadarko Petroleum has signed a purchase and sale agreement for the divestiture of its Phase 1 Canadian properties to Advantage Oil & Gas for \$142mn (C\$186mn).**

## Middle East

**Total has announced the production start-up of the third phase of development of the Al Khalij oil field in Qatar. Field production will increase by 20,000 b/d to 50,000 b/d following the finalisation of the drilling phase in January 2005.**

## Russia & Central Asia

**Shell (55%) is reportedly set to inform the Russian government that spending on the Sakhalin 2 oil and gas project has run over the original estimate by \$10bn, significantly lowering the profits that will be received by the Russian government.**

**Gazprom, Rosneft and Statoil have signed a memorandum of understanding covering cooperation in R&D work on a number of projects, including the first stage of the development of the Shtokman gas condensate field. The memorandum also stipulates Russia's participation in the construction of a natural gas liquefaction plant on the shore of the Barents Sea.**

## Asia-Pacific

**Shell's Jintan gas field has come onstream. It is the second gas field brought into production under the SK8 production sharing contract offshore Sarawak, following Serai which came onstream in June 2004.**

**An additional 52.63bn cm of proven gas reserves have been announced for the Tainan gas field, boosting total proven field reserves to 95.16bn cm. Total proven gas reserves for China's Qaidam Basin are now put at 303.9bn cm.**

## Latin America

**ExxonMobil (40%), together with Ecopetrol (20%) and Petrobras (40%), have signed an exploration and pro-**

## Fall in UK oil production continues trend

UK oil production in June fell by 8.9%, to reach 1,768,099 b/d, against June of last year – the 19th consecutive month where UK oil output fell on a year-on-year basis – according to the latest (September) Royal Bank of Scotland Oil & Gas Index. Oil production has declined by 9.6% in 1H2004 on a year-on-year basis.

Meanwhile, gas production of 10,427mn cf/d increased by 14.6% on the month and by 12.7% compared to June 2003.

Combined oil and gas production increased by 0.9% on the year.

'UK oil and gas revenues continue to look positive because of higher oil prices, albeit that the relative strength of sterling is lessening their impact. However, higher prices are not having the positive impact on production that would be expected,' according to Tony Wood, Senior Economist with the Royal Bank of Scotland Group.

Year Month	Oil production (av. b/d)	Gas production (av. mn cf/d)	Av. oil price (\$/b)
Jun 2003	1,940,265	9,264	27.31
Jul	1,957,888	9,517	28.43
Aug	1,858,409	9,447	29.51
Sep	1,966,800	9,546	26.81
Oct	2,018,972	10,075	28.93
Nov	2,036,012	12,641	28.76
Dec	2,056,469	12,642	29.84
Jan 2004	2,014,906	12,689	31.12
Feb	1,972,891	11,220	30.89
Mar	2,006,160	11,787	33.72
Apr	1,964,905	12,181	33.36
May	1,778,979	9,095	37.72
Jun	1,768,099	10,427	35.21

Source: The Royal Bank of Scotland Oil and Gas Index

## North Sea oil and gas production

## Anadarko sells certain onshore US assets

Anadarko Petroleum has agreed to divest certain US onshore properties to undisclosed parties for \$850mn in cash and interests in two oil and gas fields in Wyoming. The deal will include an estimated 108mn boe in proved reserves as of year-end 2003, and current daily net production of about 38,000 boe, located in approximately 180 fields across Texas, Oklahoma, Kansas, Wyoming, Utah, Louisiana and Alabama. The properties to be divested include about 30% of Anadarko's fields worldwide, but only 4% of year-end 2003 reserves and 7% of

current production.

As part of the sale, Anadarko will receive cash, as well as the buyers' interests in the Brown Cow and Hartzog Draw fields in Wyoming, representing 2mn boe of proved reserves and an estimated 7mn boe of probable reserves.

Other US onshore assets targeted for divestiture, but not part of this sale, include a separate package in south-east Colorado, the West Panhandle and Slaughter fields in Texas, and exploration acreage in the Deep Hugoton Basin in Kansas and Oklahoma.

## Reserves reduction for Mary gas field

The Yam Thetis consortium is reported to have stated that Israel's Mary gas field reserves in the southern Mediterranean are less than previously estimated. According to Netherl, Sewell & Associates, proven reserves are some 25.6bn cm, about 12% less than originally announced.

The Mary field began supplying the Israel Electric Corporation with gas in February 2004. Yam Thetis has an 11-year agreement with the state-owned utility to supply 1.8bn cm/y of gas. The lower reserves estimates are expected to put greater pressure on the IEC to sign additional gas supply contracts. Indeed, the company has already approved a framework agreement with the East Mediterranean Gas Company for the supply of 1.7bn cm/y for 15 years.



## Latest UK licensing rounds

In one of his first announcements as new UK Energy Minister Mike O'Brien has offered 97 offshore licences under the 22nd Offshore Licensing Round. Of the 58 companies offered licences, 15 are potential newcomers to the North Sea.

The Round awards consisted of 32 'traditional' offshore production licences, seven 'Frontier' licences and 58 'Promote' licences – covering 163 blocks in all.

The traditional seaward production licence has an initial term of four years (for exploration), four more years (to draw up and submit a field development plan), and a production period of 18 years, which can be extended. After the first term the licensee will be required to relinquish at least 50% of the licensed area with a further relinquishment of all acreage not covered by a field development plan at the end of the second term.

The new Frontier licence allows companies to apply for relatively large amounts of acreage and then relinquish three-quarters of that acreage after an initial screening phase during which the normal rental fees will be discounted by 90%. Additionally, the exploration and development periods will be extended by two years over and above those stipulated for the traditional licence. This new licence is solely for the acreage west of the Shetland Isles, comprising the areas 1 and 4 of the DTI's Strategic Environmental Assessment process.

The Promote licence offers the licensee the opportunity to assess and promote the prospectivity of the licensed acreage for an initial two-year period without the stringent entry checks required as part of a traditional licence. For the period of this assessment, to a maximum of two years, the licence rental fee will be 10% of the rental fee for the traditional licence (ie it will be £15/sq km). In order to continue beyond the first two years of the initial term, the licensee will be required to submit a report to the Department during the first two years. This report will outline the research and analysis undertaken and include a request to retain the licence into the third and fourth year with a commitment that will include the drilling of at least one well, or the conduct of an equivalent agreed substantive activity, by the end of the initial term (ie by the end of year four). To be allowed to enter the third and fourth year the deferred financial and environmental checks will need to be satisfied.

A further 26 onshore petroleum exploration and development licences have also been awarded, more than three times the amount awarded in the 11th round.

Additionally, in a move designed to further reduce the bureaucracy on companies operating under an oil and gas licence, the DTI has announced that it is shortly to write to operators relieving them of the need to submit an Annual Licence Return and to introduce the principles of e-government to expedite the process of licence relinquishments.

The full list of licence offers can be found at [www.og.dti.gov.uk/upstream/licensing/22\\_12\\_rnds/index/htm](http://www.og.dti.gov.uk/upstream/licensing/22_12_rnds/index/htm)

## Sole gas field deal

OMV is to increase its share in the Sole gas field in the offshore Victoria Basin, Australia, which it operates through its wholly owned subsidiary Basin Oil. Basin Oil has agreed to obtain from Trinity Gas Resources Pty Ltd (TGR) an additional 5% interest in the Sole gas field, raising its share to 40%. As a result of a parallel arrangement between TGR and Santos, TGR's equity in both Sole and Patricia Baleen will decrease to 10% and Santos will increase its interests in both fields to 50%. The joint venture participants will then hold the same interests in both Patricia Baleen and Sole, aligning their interests for future development and ongoing operations.

The Sole gas field is located in block Vic/RL3, 45 km off the Victorian coast; the Patricia Baleen gas field is located in block Vic/L21, 20 km off the Victorian coast in the Gippsland Basin.

## Egyptian gas finds

Two of Apache's recent discoveries in Egypt's Western Desert tested at a combined rate of 70mn cf/d of natural gas and 2,330 b/d of condensate. The Mihos-1X discovery is located on the Matruh concession and proves up a 1,500-acre trap in the Lower Safa reservoir. Apache plans to tie the well into the Matruh manifold, running directly to its nearby Tarek gas plant. It was expected to commence production in September, bringing the Tarek plant up to its full capacity of 100mn cf/d.

The Imhotep-1X discovery on the Khalda offset concession, tested at a rate of 28.4mn cf/d of gas and 911 b/d of condensate following hydraulic-fracture stimulation. Imhotep is on production, flowing through the Tarek gas plant at a daily rate of 31.8mn cf of gas and 1,789 barrels of condensate.

## In Brief

duction contract with Colombia's National Hydrocarbon Agency (ANH). The agreement covers the 11mn-acre Tayrona block offshore Colombia's northern coast in the Caribbean Sea.

### Africa

**Libya is reported to be moving ahead with plans to modernise its oil sector. The country is currently offering exploration rights on 15 blocks, six offshore and nine onshore, with bids to be submitted by 10 January 2005.**

**BG Group has finalised an agreement for the \$235mn acquisition of Shell's interest in the Rosetta concession offshore Egypt. The deal will increase BG's equity interest in Rosetta from 40% to 80% and pre-empts an earlier agreement to sell to the Kuwait Foreign Petroleum Exploration Company.**

**Mustang Engineering has been selected by Amerada Hess to perform detailed engineering design and procurement assistance for its Northern Block G (NBG) development project offshore Equatorial Guinea. Mustang will design four fixed platforms in the Elon reservoir area, including the central processing facility, where total NBG field production will be gathered, plus three additional well protector platforms. The platforms will be located in approximately 200 ft of water.**

**Apache has reported that the Qasr-6 appraisal well on Egypt's Khalda concession flowed 28.8mn cf/d of gas and 1,037 b/d of condensate, while the Qasr-9 development well flowed 4,826 b/d of oil and 0.75mn cf/d. The company now estimates Qasr's ultimate recoverable gas reserves to be in excess of 2tn cf, with condensate recoveries in the range of 40mn to 50mn barrels.**

**Statoil is planning to take an 18.85% interest in a unitised development of the Agbami oil field offshore Nigeria. The project is due onstream in 1Q2008.**

### World

**Opec lifted oil supply quotas by 1mn b/d in mid-September, a rise of 4%, in a renewed bid to force down high world crude prices. Critics have said that the move will have little or no effect on the cost of oil as Opec members are already pumping 2mn b/d over the existing production ceiling.**



## UK

**IHS Energy has acquired Cambridge Energy Research Associates (CERA) for an undisclosed sum.**

## Eastern Europe

**BP has sold its BP Czech Republic LPG business to a subsidiary of the UGI Corporation, Flaga Plyn. The sale includes the LPG filling plant and storage depot in Dysina, together with several bottle distribution centres and assets at customer sites.**

**The Romanian government has awarded Germany's Ruhrgas a 30% stake in Distrigaz Nord and Gaz de France a 30% interest in Distrigaz Sud. These interests are to be subsequently raised to 51% via new share issues.**

## North America

**Petro-Canada and TransCanada have put forward plans to build an LNG receiving terminal at Gros Cacouna, 450-km north-east of Montreal on the mouth of the St Lawrence. The plant, due for completion in 2009, will have a sendout capacity of 500mn cfd.**

**Anadarko has acquired Access Northeast Energy Inc, a private Canadian company whose sole project is a proposed 1bn cfd LNG receiving terminal on the coast of Nova Scotia, at Bear Head, Point Tupper on Cape Breton Island.**

## Russia & Central Asia

**Russian President Vladimir Putin has approved plans to merge Rosneft with the gas monopoly Gazprom.**

**The annual carrying capacity of Russia's Baltic Pipeline System (BPS) will reach 62mn tonnes in 2005 if the government adopts an appropriate resolution before the end of this year, Oleg Gordeyev, Deputy Head of the Federal Agency for Energy Industries, recently told a Moscow press conference.**

**Lukoil has boosted its reserves by 440mn boe in 1H2004 from new deposits in the Far North and the Caspian Sea. The company says that it has added the equivalent of 60mn barrels of oil to its reserves in Russia and 340mn tonnes internationally, without**

## UK gas prices set to rise

In response to record levels of wholesale gas prices, British Gas was to raise UK residential prices by 12.4% for gas and 9.4% for electricity last month. At the time of the announcement, the average wholesale price for gas in 2004 was up by 28% on 2003, with forward prices showing a further rise of 25% for 2005. With regard to electricity, average wholesale prices for 2004 were 22% higher than 2003, with 2005 up by a further 28%. The new prices will mean an extra 7 pence per day (p/d) on electricity bills and 13 p/d on gas bills for the average domestic customer.

Mark Clare, British Gas Managing Director said: 'Depletion of the North and Irish Sea gas reserves, the UK's consequent need to import larger volumes of gas and high oil prices are pushing up wholesale prices. The era of cheap UK energy is over, but we have confidence that the investments we are now making in future energy supplies will, in the long term, put downward pressure on commodity costs for the benefit of all our customers.'

He added: 'We are clearly very sensitive to the impact these changes will have on customers. British Gas has pledged £10mn to set up an independent fund to assist those customers who need help paying bills. In partnership with Help the Aged, we have also developed a package to cap energy bills for vulnerable older customers. This will give them peace of mind that their electricity and gas bills will not increase over the next three years.'

Centrica, the parent company of British Gas, has already announced its intention to spend £4bn on securing new sources of gas and electricity for its British Gas customers as the UK moves to a position where approximately 75% of its gas requirements will need to be imported by 2015. In addition, Centrica has agreed long-term supply deals worth almost £12bn with Gasunie, Statoil and, most recently, a 15-year LNG deal with Petronas.

## New Commissioners in place at EC

The energy portfolio at the European Commission (EC) is being downgraded this November with the departure of Spain's Loyola de Palacio, a Vice President as well as an Energy Commissioner, writes Keith Nuthall.

Hungary's Foreign Minister László Kovacs – who will be a standard Commissioner without the transport portfolio also commanded by De Palacio – is replacing her. Meanwhile, a conservative Greek, Stavros Dimas – whose appointment has been taken to signal a possible weakening in Commission environmental activism – is replacing Swedish social democrat Margot Wallström as Environment Commissioner.

At the same time, the European Investment Bank (EIB) has revealed a string of oil and gas-related plans. These include two LNG projects in Egypt, aimed at enabling the country

to exploit its proven gas reserves. The EIB wants to lend up to \$300mn to the Spanish Egyptian Gas Company to build an 4.9mn t/y LNG plant west of Port Saïd, with storage plus export equipment. It also plans to lend \$350mn for a second LNG terminal at Idku, east of Alexandria, with a capacity of 3.6mn t/y, that will be run by the Idku Natural Gas Liquefaction Company.

The EIB is also:

- lending Brazil's Refinaria Alberto Pasqualini (REFAP) \$150mn to boost the efficiency and environmental performance of a refinery in Rio Grande do Sul state;
- investing 200mn in building a combined cycle gas turbine power plant near Damascus, Syria; and
- funding the construction of a new diesel power plant in St Vincent & the Grenadines, with up to \$10mn.

## Shell agrees final settlements with FSA and SEC

The United Kingdom Financial Services Authority (FSA) and the United States Securities and Exchange Commission (SEC) have announced the final settlements that they have reached respectively with Shell. These settlements resolve the FSA's and SEC's investigations into the reserves recategorisation issues for the Shell companies. Consistent with the terms of the previously-announced agreements in principle, Shell settled without admitting or denying the findings and conclusions in the FSA's Final Notice and the SEC's Cease and Desist Order. Shell also agreed to pay penalties of £17mn and \$120mn in the FSA and SEC settlements, respectively, and committed in the SEC settlement to spend an additional \$5mn for the development and implementation of a comprehensive internal compliance programme.



## Tangguh gas sales deal

BP and its partners in the Tangguh LNG project in Indonesia have signed a sales and purchase agreement with K Power of South Korea for the supply of up to 800,000 t/y of LNG for 20 years, starting in 2006. The LNG will be used to power K Power's new 1,074-MW power station being built at Gwangyang in south-western South Korea, due to commence operations in 2006. K Power, formerly known as SK Power, is a joint venture between SK Corporation (65%) and BP (35%).

The signing follows an earlier agreement, signed in July, for the supply of 550,000 t/y of LNG to Posco, Korea's largest steelmaker, and completes the process outlined in the heads of agreement signed between SK Corporation and the Tangguh partners in July 2003.

In addition to the K Power contract, the Tangguh project has sales and purchase agreements in place for the supply of 0.5mn t/y of LNG to Posco and 2.6mn t/y of LNG to China's Fujian LNG import terminal. The project is also in the process of finalising a further agreement to supply up to 3.7mn t/y of LNG to Sempra Energy's proposed LNG import terminal at Costa Azul in Mexico.

## Commercialising new CNG transport concept

A new concept for transporting CNG is being developed and commercialised by Statoil, Canadian-owned Teekay Shipping and Norway's Leif Høegh & Co. Allowing natural gas to be shipped from an offshore field to terminals, this solution has been pursued together with Det Norske Veritas in a preliminary project since 2002. A new company – Compressed Energy Technology (CETech) – owned equally by the three partners, is responsible for marketing the technology and has already sought patents for several solutions.

The planned vessels will be equipped with large horizontal pipes capable of carrying gas under high pressure, with the largest able to load up to 20,000 tonnes of CNG.

'We initially envisage using the technology in the storage system on production and storage ships,' says Project Manager Per Henning Hanssen, who chairs CETech. He believes that the

most relevant application in the short term will be on oil fields with small quantities of associated gas, which could be stored with the aid of the CNG technology.

Natural gas is transported today either under pressure in pipelines or liquefied for shipment in special carriers. Both these methods have their constraints. Pipelines can be used over relatively short distances, while LNG is primarily attractive for high gas production and long shipping routes.

CNG vessels will be particularly useful where traditional gas field developments are uneconomic because of size and geographical location. Compression also loses less energy than liquefaction. According to Statoil, CNG technology could be a relevant choice for distances from 300 to 2,000 nautical miles and production volumes from 500,000 cm to 3bn cm/y.

## Seeking cost-effective LNG solutions

A three-year collaboration has been established by Statoil, Germany's Linde and Aker Kvaerner of Norway to develop cost-effective technology and solutions for LNG.

Covering ship-based production, storage and discharging of LNG in remote areas, the agreement extends the existing LNG technology alliance established by Statoil and Linde to develop and qualify the components of a new generation of spiral-wound heat exchangers (SWHEs).

Through its alliance with Statoil, Linde has become qualified as a manufacturer of SWHEs for gas liquefaction. This in turn has created a new process licensor

in the international market. The SWHEs have already been delivered to Shell's LNG development in north-western Australia and Brunei, and will be used at Russia's Sakhalin project. In addition, the technology is being applied in Statoil's Snøhvit gas development in the Barents Sea off northern Norway.

Statoil and Linde have also developed a mixed fluid cascade (MFC) process that was patented in 1997 and forms the basis for the Snøhvit project. 'This represents the world's most efficient condensing process, and is the first solution to incorporate electrical motors for driving the compressors,' claims Statoil.

## In Brief

specifying whether the reserves are proven or probable. Lukoil's audited proven reserves were 20bn boe at the beginning of the year. Lukoil's crude oil output rose 8.9% in the first half to 42.31mn tonnes, the equivalent of 1.7mn b/d, the company said, revising a July report in which it said production rose to 42.15mn tonnes. It refined 21.1mn tonnes of oil, a 2.9% increase from the year-earlier period.

**Yukos is to ship 6.4mn tonnes of oil via the Russian rail network to China in 2004, 8.5mn tonnes in 2005, and 15mn tonnes in 2006.**

**The Russian government's 7.59% stake in Lukoil was to be put up for auction on 29 September, with a starting price of \$1.928bn.**

**It has been reported that a new tax demand of up to \$3bn is being considered by the Russian tax authorities, this time against Yuganskneftegaz rather than Yukos.**

**Yukos has announced that, as a result of certain accounts being inaccessible which denies the company access to half of its monthly revenues, 'stringent cash conservation measures' have been taken in order to allow it to extend the time it can continue normal operations.**

### Asia-Pacific

**BHP Billiton has announced plans to develop an LNG liquefaction plant to help exploit the Scarborough gas field offshore Western Australia. BHP owns 50% of Scarborough alongside ExxonMobil. The pre-feasibility study is looking at setting up a 6mn t/y liquefaction plant at Pilbara, not far from the North West Shelf LNG project.**

### Latin America

**Peru's first LNG project has taken a step closer to fruition with the award of an exploration licence covering the Pagoreni and Mapaya onshore gas fields to the Peru LNG consortium led by Hunt Oil. The partners intend to feed the gas into a liquefaction facility to be built south of Lima, with LNG likely to be exported to Mexico and the US. Start-up is unlikely before 2008.**

**ENAP of Chile is understood to be planning to develop a LNG import facility to come onstream by 2007 at a cost of up to \$500mn.**



## UK

The IPE (International Petroleum Exchange) enjoyed its best ever August trading month in 2004 with a total traded volume of 2,956,419 lots. This represents a 19% growth over the previous August high of 2,401,511 contracts, which was reached in 2003.

Kuwait Petroleum International (KPI) has sold the UK service station network and fuel distribution operations of its subsidiary Kuwait Petroleum (GB) (KPGGB) to Refined Holdings, a newly formed joint venture between Malthurst, Winston Group and The William Pears Group. When combined with the 100-strong network of Malthurst, the new venture will be the largest independent fuel distributor and retailer in the UK. The sale does not include KPI's aviation fuels, lubricants or International Diesel Service (IDS) businesses.

Q8Oils has announced the development of a new high-performance diesel engine oil specifically designed to meet the challenges faced by Euro 4 diesel truck engines. Q8 T 900 is a synthetic, high performance, heavy-duty diesel engine oil with low sulphated ash, phosphorous and sulphur (SAPS) content.

Centrica has exercised its option to acquire a subsidiary of Carlton Power, which owns land and consents for developing a gas-fired power station of up to 1,000 MW at Langage, Devon. The Langage project is one of only three large-scale power station developments in the UK which are consented.

## Europe

The European Union has approved the acquisition by Spain's Repsol YPF of Shell's Portuguese operations, including over 303 Shell-branded service stations. The deal will make Repsol YPF the third largest operator in Portugal, with 417 service stations and a 21% share of the fuel retail market. The EU Commission said the deal didn't raise competition concerns as other large players were competing in the market, including Galpenergia, BP, ExxonMobil and Cepsa.

Shell has agreed to the sale of its 16.67% interest in both Distrigas, the Belgian gas wholesale company, and

## National Grid Transco asset sale

National Grid Transco is to sell half its gas distribution assets for £5.8bn in order to raise a £2bn windfall for shareholders and monies to invest in growing US markets. The deal was welcomed by industry regulator Ofgem, which hopes that increased competition will drive down prices for customers.

The company has sold four of its networks – its Scotland and South of England network going to Scottish & Southern Energy and United Utilities, its Wales and West network going to Australia's Macquarie Bank, and Cheung Kong Infrastructure Holdings of Hong Kong taking over its North of England operations.

Despite the sale, National Grid Transco will remain the UK's biggest gas distributor – retaining control of four other regional networks, including its London and England's Northwest network – with 11mn business and domestic customers.

## First gas flows through second phase of China's West-East pipeline

PetroChina was due to begin filling the second development phase of its 4,000-km cross-country pipeline with natural gas in September. The pipeline, starting from the Lunnan field in the Tarim Basin of north-west China's Xinjiang Province, spans eight provinces and autonomous regions to reach eastern China's commercial hub of Shanghai.

The first phase of the pipeline, which links Jingbian to Shanghai, began commercial operation in January this year.

The gas handling capacity of the pipeline can be expanded to 18bn cm/yr by adding a compressor along the route.

The Tarim Basin gas fields are the main source of gas for the pipeline. Proven gas reserves are put at 658bn cm. By the end of 2003 a total of 14 gas fields had been found in the basin. Among the first to supply gas are the Yaha, Kela 2, Sangnan, Jilake and Ji'nian 4 field. The Kela 2 field alone is reported to have proven reserves of 284bn cm.

## Fujian refinery expansion plans

Fujian Petrochemical (a company owned 50% by Sinopec and 50% by the Fujian government), ExxonMobil and Saudi Aramco are to jointly fund the front-end loading (FEL) design activity for a more than \$3.5bn project involving expansion of the existing refinery at Quangan, Quanzhou City, Fujian Province, and the addition of a chemical complex. The project will expand capacity at the existing refinery from 80,000 b/d to 240,000 b/d, with significant product upgrading capability. The upgraded facility will be designed to refine and process sour Arabian crude. In addition, the project involves construction of a new 800,000 t/y ethylene steam cracker, polyethylene and polypropylene units, and a new 700,000 t/y paraxylene unit. Currently, completion is expected in 1H2008.

Meanwhile, ExxonMobil, Sinopec and Saudi Aramco have also agreed to submit a joint feasibility study (JFS) for a fuels marketing joint venture in Fujian Province to the Chinese government. The joint venture plans to manage and operate more than 600 service stations and a network of terminals.

## Japan looks to cut pipeline construction costs

Japan is reported to be interested in combining the route of an oil pipeline from Taishet to the Sea of Japan and a gas pipeline from the Kovykta gas condensate field to China and South Korea in a bid to cut construction costs by nearly 50%.

The building of the pipeline to transport some 80mn t/y of Russian oil to the Asia-Pacific through a terminal on the Sea of Japan coast has been estimated at \$16.22bn. The pipeline is to pump 24mn tonnes of oil from Western Siberia and another 56mn tonnes from

fields in Eastern Siberia and the Russian internal republic of Sakha (Yakutia), most of which have yet to come onstream.

A pre-feasibility study signed by TNK-BP, China's CNPC and South Korea's Kogas states that the first Kovykta field gas will be supplied to north-east China and South Korea in 2008. China will initially receive 12bn cm/y of gas and South Korea 10bn cm/y. China will buy another 8bn cm annually for Beijing and its hinterland from 2013.



### UK petrol pump labelling 'inadequate'

UKPIA, the trade association representing the main oil refining and marketing companies in the UK, has requested the UK government to withdraw legislation (Statutory Instrument 2003 No 2110) on labelling of petrol pumps as it refers to an out of date British Standard. As a result it offers inadequate protection for the motorist and is a recipe for confusion, states the association.

The BSI standards for petrol (BS EN 228) and diesel (BS EN 590) have recently been updated to cover a number of changes to protect consumers, including the upper limit for blending of biodiesel with conventional diesel, the quality of the biodiesel that can be blended into diesel without invalidating vehicle warranties, standardisation of nozzle colours for petrol and diesel to reduce misfuelling, as well as more informative labelling. The Statutory Instrument is inconsistent with this new British Standard, states UKPIA.

### Step closer to single UK electricity market

The UK has taken a step closer to having single electricity market after National Grid Company's appointment as the GB System Operator under the British Electricity Trading and Transmission Arrangements (BETTA). UK-wide electricity trading under the new arrangements – intended to create greater competition and greater choice for Scottish customers and also give all elec-

tricity generators access to a wider British market with a single set of rules – are scheduled to 'go-live' in April 2005.

The market in Scotland currently operates under different arrangements from those in England and Wales. Under BETTA, the England and Wales trading arrangements will be extended to Scotland, creating a single UK wholesale electricity market.

### IPE launches new electricity futures contracts

The International Petroleum Exchange (IPE) launched baseload and peakload electricity futures contracts last month. The new contracts are physically deliverable and are based on the electricity forward agreement (EFA) calendar, with month, quarter and season contracts being available to trade concurrently. At launch, the first traded month was November 2004; the first quarter, 1Q2005; and the first season, summer 2005.

The contracts, which are available for trade on WebICE via the Exchange's

electronic trading platform, the Interchange®, are deliverable and cleared through LCH.Clearnet, with a minimum trading size of 10 MW. In addition, the normal EFP, EFS and block trade facilities provided by the IPE is available, and margin offset arrangements are granted against other IPE contracts, including IPE natural gas futures.

The trading, registration and clearing of the contracts will have a simple and very competitive fee structure of 0.225 p/MWh inclusive.

### Shell unveils Shangahi GTL fuel trail

Shell Shanghai and Pudong Bus Transportation Company have jointly launched a road trial of Shell's gas-to-liquids (GTL) fuel in Shanghai. Buses from Pudong Bus will be fuelled by a blend of GTL fuel and standard diesel over a two-month period on a route through the Pudong New District, Shanghai.

The trial will involve 12 buses with standard Euro 1 engines. Eight of these buses will use a mixture of 30% GTL fuel and standard diesel. The remaining will use standard diesel as a comparison. During the trial the reduction in emissions and improvement in fuel efficiency and noise levels of the GTL-fuelled buses will be measured and compared.

Shanghai is the latest in a number of major cities around the world to launch a road trial of Shell's GTL fuel. Trials have already been completed, or are underway in Los Angeles, Berlin, London and Tokyo.

Jack Jacometti, VP Global GTL Development, Shell Gas & Power, explained: 'Shell GTL fuel is a clean, colourless synthetic fuel, derived from natural gas. It can be used in existing diesel engines without modification – either as a blend with standard diesel fuel or in neat form. It is the most cost effective of alternative fuels, and its unique properties – excellent combustion characteristics and virtually free of sulphur – deliver significant emission benefits. GTL fuel has a key role to play in the long-term transition to renewable fuels and in the development of advanced engines.'

Fluxys, the Belgian gas transmission company, to Suez-Tractebel.

**Tynagh Energy Limited (TEL), together with RWE, has signed business contracts for electricity tolling, gas supply, and the operation and maintenance of the 400-MW power plant to be built at Tynagh, Co. Galway, Ireland. The combined cycle gas turbine (CCGT) facility will be completed and ready for full operation in early 2006. It will produce power equivalent to around 10% of Ireland's installed power capacity.**

**Global law firm Clifford Chance has advised Shell on the divestment of a number of its downstream assets in Spain. Shell and Disa Corporación Petrolifera (Disa) have signed a sale and purchase agreement relating to the divestment of Shell Oil Products' businesses in Spain, excluding its LPG, lubricants, aviation and marine businesses. The divestment includes a network of 338 service stations, a 5% stake in Compañía Logística de Hidrocarburos and distribution assets geographically spread across Spain. Disa will continue to use the Shell brand under a trademark licence agreement.**

#### North America

**Enron is reported to have agreed to sell its US gas pipelines for more than \$2bn to CCE Holdings, a joint venture of Southern Union and GE Commercial Finance Energy Financial Services. The venture will also assume about \$430mn in CrossCountry Energy's debt.**

#### Russia & Central Asia

**Karachaganak Petroleum Operating (KPO) has commenced construction of a 26.9-MW gas turbine power station under a joint project involving the government of Japan, WKO Akimat and KPO. Building work is scheduled to complete end-2005.**

**Lukoil-Permnefteorgsintez has commissioned a complex for deep refining of crude oil – claimed to be Russia's first such facility and the world's seventh. With a design capacity of some 3.5mn t/yr of feedstock, the new complex will hydrofine and hydrocrack vacuum distillate mixtures and secondary components for the production of highly refined catalytic-cracking feedstock, low-sulphur and low-aromatics diesel fuel, as well as the naphtha needed for anti-knock gasoline production.**



## Asia-Pacific

**International law firm Reed Smith LLP** has secured the legal work on a major oil refinery and a co-generation power project being developed by Regional Cooperative Petroleum Refinery (RCPRI) in Sri Lanka. The project is one of the largest infrastructure/commercial projects in the Indian-Sub Continent with a capacity to refine 200,000 b/d. The project is forecast to contribute as much as 11% of the total GDP of Sri Lanka.

**The labour union at state-owned Korea Gas** is reported to have issued a statement rejecting sweeping government reforms that would allow the entrance of private players into the domestic gas sector. The announcement comes hot on the heels of a recent failed attempt to privatise the six generating companies of the government-run Korea Electric Power Corporation. According to the union, the entrance of more players would lead to fragmentation of the market.

## Latin America

**ChevronTexaco (30%)** has announced the completion of construction of the Hamaca project's crude upgrading facility at the Jose industrial complex located on the north-eastern coast of Venezuela, allowing the start of a production ramp-up from the current level of 120,000 b/d of oil. The Hamaca upgrader has the capacity to process 190,000 b/d of extra-heavy crude from the Hamaca region of the Orinoco Belt and transform it into 180,000 b/d of high-quality synthetic crude.

## European cogeneration market set for recovery

Supported by economic revival, renewed industrial investment and changing power policies of governments, the struggling European cogeneration equipment market is on course for strong recovery, according to industry analyst Frost & Sullivan. Emerging from its recent downturn, this mature \$1,481.7mn market is forecast to experience annual average growth rates of above 3% between 2005 and 2010.

'The current decline in the market has been mainly due to the global economic recession, excess generation capacity and low demand for power due to low industrial growth,' notes the analyst. 'High gas prices, low electricity prices, absence of price incentives, interconnection issues with national grids and a historic lack of framework have also served to dampen the market.'

However, there are now signs that the cogeneration market is on the rebound. The ability to effectively utilise waste heat is giving cogeneration a distinct advantage over conventional thermal power generation processes where levels of heat energy wasted are considerably higher. The waste heat recovered through cogeneration can be channelled towards additional power generation, generating process steam, district heating and cooling applications. The subsequent saving in energy costs is likely to appeal to end users who would otherwise need to invest money in these applications.

From a policy perspective, the new EU Cogeneration Directive is likely to boost the prospects of the cogeneration sector over the next two to five years, comments the analyst. 'While unlikely to offer an immediate or all-encompassing solution to existing problems, this pioneering legislative initiative is geared to break down market and institutional barriers and advance the use of this energy-efficient power generating option.' At the same time, existing government incentives in terms of electricity tariff, lower interconnection charges and emission credits have played a key part in promoting the installation of cogeneration plants in several European countries.

Forecast to grow steadily from 2006 to 2009, annual cogeneration capacity addition is estimated to reach 4,000 MW by 2010, up from 3,345.9 MW in 2002. One factor in this spurt is expected to be escalating fuel costs, with customers increasingly adopting energy-efficient equipment so as to reduce operational expenditure and maintain profitability.

Positive signs notwithstanding, a series of challenges await market participants. In some countries, for instance, cheaper power from old and depreciated power plants is posing a serious threat to the viability of cogeneration plants. Another critical challenge has come from intensifying competition and excess manufacturing capacity, which has led to price erosion and low profitability.

### UK Deliveries into Consumption (tonnes)

Products	†Jul 2003	†Jul 2004	†Jan-Jul 2003	†Jan-Jul 2004	% Change
Naphtha/LDF	145,642	201,816	1,332,513	1,359,789	2
ATF - Kerosene	925,889	942,275	5,760,335	6,006,957	4
Petrol	-	-	-	-	-
of which unleaded	1,445,747	1,608,261	10,904,891	11,141,403	2
of which Super unleaded	69,600	75,592	472,689	503,076	6
ULSP (ultra low sulphur petrol)	1,376,147	1,532,669	10,432,202	10,638,327	2
Lead Replacement Petrol (LRP)	16,782	4,011	133,209	44,800	-66
Burning Oil	153,326	162,012	2,575,735	2,543,591	-1
Automotive Diesel	1,497,322	1,647,759	9,846,301	10,957,696	11
Gas/Diesel Oil	513,976	502,857	3,628,797	3,680,041	1
Fuel Oil	179,926	128,186	1,389,661	1,350,789	-3
Lubricating Oil	69,963	53,888	490,132	446,698	-9
Other Products	703,276	873,035	4,727,426	5,932,300	25
Total above	5,858,746	6,124,100	41,015,867	43,464,064	6
Refinery Consumption	382,509	488,830	2,767,097	3,081,367	11
Total all products	6,241,255	6,612,930	43,782,964	46,068,358	5

† Revised with adjustments

All figures provided by the UK Department of Trade and Industry (DTI), as supplied by reporting companies



## Decommissioning boom

Abandonment activity in the North Sea is set to rise to unprecedented levels in the next three to four years as a raft of new projects in the UK sector hits the market. Large-scale decommissioning operations are also looming in the Norwegian sectors as ConocoPhillips and Total respectively review bids for the Frigg and Ekofisk I platform removals. *Nick Terdre reports.*

The coming boom in the UK was revealed at a conference earlier this year by Keith Mayo, head of the DTI's Decommissioning Unit. The unit was speaking to the operators of 27 structures on 19 fields which had ceased production or were due to do so in the coming months, and was aware of another nine installations on fields expected to cease production by end 2005, Mayo said. These 36 candidates for decommissioning over the next few years are in addition to a further three projects for which plans were already in the approval process, he added.

The latter three projects concern BP's North-West Hutton field and facilities, a number of redundant structures on Shell's Brent field, and Total's MCP-01 concrete platform. North-West Hutton is the first steel platform in the North Sea for which the licensees are allowed to seek derogation – exemption from the general rule that all installations must be removed – on the grounds that the jacket weighs in excess of 10,000 tonnes. Whether this option will be pursued will be revealed in the draft decommissioning plan, which was due to be submitted late in the third quarter.

In mid-year the North-West Hutton platform became unmanned, following the completion of well plugging and abandonment, and cleaning of the topsides and pipelines. BP expects to remove the 20,000-tonne topsides by a process of reverse installation, with operations tentatively scheduled for 2006–2008.

### Brent plan approved

Shell's Brent plan, which was approved by the DTI in May, involves the removal of a remote flare tower weighing 1,025 tonnes and standing 194 metres high, together with the six concrete blocks which once held the Brent Spar in place. Each of these weighs 990 tonnes in air. The structures will be lifted by Saipem's S7000 crane-barge in summer 2005 and transported to the Aker Stord yard in Norway for disposal. Shell plans to

recycle the steel and, if possible, reuse the concrete blocks as hardcore.

Total's MCP-01 platform, located halfway along the route of the two Frigg gas pipelines which run to St Fergus, no longer has a role to play in boosting the gas flow, and the company has decided to coordinate its abandonment with that of the Frigg platforms. All options are under study for the 373,000-tonne concrete base, but company sources say that it will apply for derogation from removal.

It would indeed be remarkable if Total arrived at any other conclusion. MCP-01 is built to the same C G Doris design as CDP1, for which Total has all the necessary approvals to leave in place. Abandonment of the other two Frigg concrete bases, TCP2 and TP1, has also been fully approved on both sides of the median line. In Norway's case such decisions are ultimately endorsed by the government or Storting, while in the UK the deciding authority is the DTI.

Meanwhile, the vexed question of the cost of abandonment has been revived by Mayo's reference to an overall bill for the UKCS of £15–£19bn. He pointed out that there was little sign so far of the cost of individual projects falling as experience mounted, but that owners, on the contrary, not uncommonly found costs rising as they ran into unexpected surprises during project implementation.

The DTI's estimate is a very high one compared with other current figures. In its *Economic Report* for 2004, UKOOA (the United Kingdom Offshore Operators Association) gives a figure of £9.1bn, while the estimate of the *North Sea Abandonment Handbook* is \$13.8bn, equivalent to £8.3bn.

The calculations are not a mere academic exercise. In the DTI's case they serve as a basis for establishing whether field owners – and in the case of asset trades, proposed new owners – have sufficient financial strength to meet their decommissioning liabilities. The higher the estimate of that liability, the more expensive it is for the owners to

arrange the necessary financial security. Obviously smaller companies with little or no offshore track record will be hardest hit, yet they are the ones the government wants to encourage to take on mature producing fields and smaller undeveloped fields. Achieving a realistic estimate of the cost of abandonment is important for this reason.

In his presentation Mayo recognised that there were problems in this area, and said that they would be addressed by new guidance. This was expected to come out to consultation in the spring, but in September had still not been issued. It is doubtful whether the new guidelines will introduce any fundamental changes given the DTI's duty of protecting the interest of UK taxpayers, who are anyway liable to pay half the overall abandonment bill as decommissioning expenses are tax-deductible. For this reason too the department has a strong incentive not to under-estimate costs.

### Ekofisk tank work begins

After many years of planning the first steps have been taken offshore to abandon the platforms made redundant when the second phase of Ekofisk development came onstream in 1998. The centre of attention at present is the giant Ekofisk tank, the base of which is to be left in place. The topsides are to be removed – but, before this can happen, the nine storage cells had to be made safe. The job, which has been contracted to Aker Kvaerner Offshore Partner (AKOP), first involved treating the water in the cells with sodium chloride to remove the high content of dangerous hydrogen sulphide (H<sub>2</sub>S) gas.

In the next phase, which was due to start in September and continue into 1Q2005, a layer of oily wax half a metre thick will be skimmed from the surface of the water, after which a layer of contaminated sediments up to one metre thick at the base of each cell will be sucked out. Special skimming and sedi-



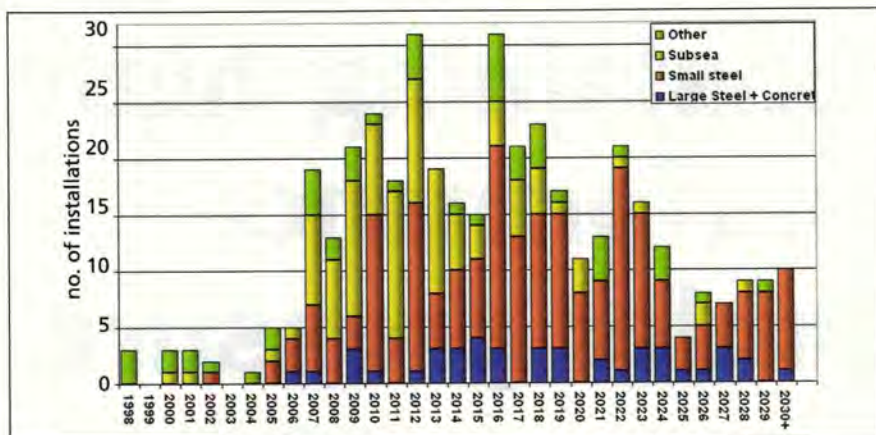


Figure 1: The DTI's forecast of removal dates shows the UK decommissioning market taking off in 2007

ment removal tools have been developed for these tasks, as well as a process plant for treating the removed materials. Both wax and sediments will be pumped down a disposal well on the Ekofisk 2/4 X platform.

Removal of the topsides can then proceed. This task will be performed by AF Decom, an experienced onshore disposal contractor, which will use hydraulic scissors to cut up the modules and steel structures. The pieces will be loaded into containers and shipped to shore for recycling. Offshore work begins in mid-2005 and is expected to take a couple of years to complete.

Removal of the steel platforms will take place in three phases, for which prequalification has been carried out this summer. In 1H2005 a contract will be awarded for the removal of light structures such as bridges, flares and tripods, followed a year later by a contract for the removal of five to six platforms. An option will be attached to this contract for the removal of a further four platforms plus the 2/4 Q topsides. The deadline for completing these operations is 2013.

Preparations for decommissioning the Frigg platforms are proceeding in parallel with the Ekofisk operations. After performing a phase of front-end engineering design (FEED) work, five consortia led by Aker Kvaerner, Amec, Heerema, Subsea 7 and Technip, submitted bids for the removal work in July, and an award is scheduled for the autumn. Total's aim is to award a single contract for the full scope of work.

## New concepts lose out

As Ekofisk and Frigg prepare to award their respective removal contracts, the losers are clearly the contractors which since the late 1990s have been developing new single-lift concepts to provide a cost-effective alternative to the existing heavy-lift crane-barges for the removal

of decks and jackets. Seven new concepts – *Offshore Shuttle*, *Pieter Schelte*, *Versatruss*, *GM-Lifter*, *MPU Heavy Lifter*, *SeaFork One* and *Twin Marine Lifter* – have been developed by these contractors, which were last year invited to bid exclusively for the removal of two Ekofisk booster platforms, 36/22 A and 37/4 A. When it saw the bids, however, ConocoPhillips cancelled the tender on the grounds that none of the bidders had been able to secure satisfactory financial support to build their lift-vessels.

The contractors have not necessarily desisted. Master Marine, owner of *SeaFork One*, is now working on a jackup concept, while Excalibur has decided that the *Pieter Schelte* catamaran vessel should use newbuild hulls rather than second-hand ones – it also plans a speculative build. It is impossible to say, however, when, or if, any of these new concepts might break onto the market.

A modest level of reuse has taken place in recent months, mostly limited to small gas platforms in the Dutch sector. Here Gaz de France plans to use redundant jackets from the K11-B and K12-E platforms as part of the new G14-A and G16-A platforms respectively. It will also reuse the subsea tree from the redundant K12-S1 well on a field in G17.

One of the offshore decommissioning topics currently under discussion at Ospar – the Oslo-Paris commission for the protection of the marine environment of the north-west Atlantic – is drill cuttings. Here, a new phase of research into drill cuttings piles has been launched by UKOOA, which originally carried out an extensive research project over the turn of the century. The new phase involves taking samples from half a dozen representative piles on the UKCS with the aim of determining the lifespan of each pile, mapping the area of contamination and changes over time, determining the total hydrocarbon leaching rates and modelling them over time.

The Norwegian Oil Industry



Decommissioning planning is underway for Total's MCP-01 concrete-base platform

Association, OLF, will contribute an analysis of the historical data on THC contamination. In the Netherlands a working group will carry out an assessment focusing on locations where oil-based mud (OBM) cuttings were discharged, and draw up recommendations on the appropriate responses according to the different sedimentation, transition and erosion zones.

No abandonment projects are imminently expected on the Danish Continental Shelf, but provident preparations are being made for the time when this occurs. With the backing of an oil company, an initial project has been carried out on identifying and assessing the economic, technical, safety and environmental aspects of different decommissioning options. A second phase of more detailed studies is now under way, by the end of which a firmer grip on the best way of proceeding when an actual case comes up should be available.

The oil company sponsor has not been identified, but there is only one with a large decommissioning liability on the DCS, which of course is Maersk. The operator's only field which appears to running out of reserves is the small Regnar oil field, which produces through a single subsea well. However, it seems that with virtually no operational costs, Regnar can be kept in production for some time yet.



## Lifetime learning in the oil and gas industry – personal effectiveness

**T**he EI is constantly looking at new ways to assist the oil and gas industry with making the most effective use of its human resources. As well as pointing out useful sources of training at all levels, the EI's own training service is planning new courses to add to its established programme.

One area that will feature within some of the EI's future course provision is individual performance and personal effectiveness. As an introduction to the subject I am pleased to announce a proposed partnership with Lane4 Management Group that will help you source the oil and gas specific training your staff need combined with the leadership skills that makes their training effective.

This article – written by *Professor Graham Jones and Adrian Moorhouse, MBE, of Lane4 Management Group* – sets the scene for future training opportunities open to members and the wider oil and gas community.

*Sarah Beacock,*  
EI Professional Affairs  
Director

# Sustaining high performance under pressure

**W**e come from a world where high performance and pressure are inseparable. The recent Athens Olympic Games bears ample witness to the inevitable and accepted part of the process of becoming the best in your sport on the world's most visible stage: the anticipation of the elation of achieving a dream conflicting with the fear that you might fail, and what that might bring; the seesaw of emotions and behaviours that will be experienced in the quest for that dream; digging deep within in search of meaning and resources that will help when things get tough; and, of course, the pressure that crushes, if you let it.

Those of you who followed the Games closely will have vivid images, beamed into the homes of millions of people across the world, of the personal anguish of those who literally froze in front of you, and also of those who positively flourished and achieved sometimes more than they thought possible. Pressure does remarkably things to people – it can induce remarkably high performance or it can crush performance in phenomenal and unexplainable ways.

Sport does not have exclusivity on pressure, of course. We have witnessed levels of pressure in some business organisations that would rival the most extreme levels in elite sport. And it's getting worse. We live in turbulent economic times, in which big companies are failing more frequently and performance slumps are proliferating. There is a subtle difference, though, between sport and business in this respect. In sport, dealing with pressure is part of the 'test' that performers *choose* to participate in; however, in the business context, this type of pressure is not something that most people would actually choose to subject themselves to. Instead, it is often an unwanted distracter – and sometimes detractor – from individual, team and organisational performance. And the consequences of failure are potentially more catastrophic at the personal level, with redundancy, demotion, severance,

burnout and ill health lurking around the corner.

Looking in on the oil and gas business at the present time there are four issues that stand out as being particularly significant sources of pressure:

**Skills shortage** – The industry has an ageing workforce which impacts at two levels. First, it is difficult to see where the next senior level leaders will come from. Second, the 'hire and fire' reputation currently associated with the industry, together with the environmental issues, mean that it will be difficult to attract new people with the skills required.

**Security of supply** – Dwindling oil and gas supplies means that the UK is about to become a net importer for the first time in many years, thus imposing pressure on the long-term stability of energy prices. Potential disruptions to supplies from other countries with unfriendly regimes or civil unrest will result in an increased uncertainty and lack of control that can only exacerbate the problem.

**Oil price** – Oil prices have risen to unprecedented levels, with every dollar increase in a barrel of oil putting the downstream segment of the market under further tremendous pressure. Some commentators are already talking about the threat of recession in some global economies.

**Environment** – New environmental legislation adds further pressure on two fronts. Firstly, the need to introduce new technologies for cleaner fuels and to reduce emissions from refineries and power stations, and, secondly, from a potential increase in costs to the consumer.

These are tough circumstances in which two key predictors of stress, that negative and debilitating consequence of pressure, are particularly evident – uncertainty and lack of control. This situation is further exacerbated by the incessant demand and expectations from key stakeholders, that include clients, shareholders and a very interested media, to deliver high performance. Leaders and managers are particularly visible in this process and



the close scrutiny they are continually subjected to makes for a potentially stressful job with a significant risk of burnout. They must not only be able to cope with this pressure, they must also positively thrive on it. This is a defining personal quality that forms the foundation for high performance.

## High performance

High performers, by the nature of their success, are people who thrive on pressure. They possess the crucial ability to frame and respond to challenges they experience in a positive way. The absence of this ability makes them vulnerable to the debilitating effects of stress. When this happens, performance becomes more constrained as individuals focus on 'fire-fighting' and coping with what they perceive to be the hardships of their job, rather than addressing specific performance demands and allowing their full talent to surface and flourish.

How leaders and managers respond to the visibility and exposure they encounter is a marker of the consequent vulnerability and negative stress they may endure. Prolonged feelings of vulnerability can lead to a vicious downward spiral whereby, in response to feelings of self-doubt and isolation, leaders may retreat within themselves, distancing themselves more and more from their teams and employees. The resultant breakdowns in relationships, communication, teamwork and, ultimately, business performance, become the inevitable symptoms upon which



Matthew Pinsent CBE knows all about the drive and ambition required to achieve one's best under pressure, having won four Olympic Gold Medals for rowing – the most recent at the Athens 2004 Olympic Games. Matthew will be sharing his experiences with the EI when he will be Speaker and Presenter at the EI Awards at the Savoy Hotel in November 2004. For more information visit [www.eiawards.com](http://www.eiawards.com)

consultants are then asked to act.

High-performing leaders and managers are high performing because they develop resilience to the vulnerability they encounter. Like others, they may still experience self-doubts and negative thoughts but they have the ability to turn them around. In short, they have the performance mindset that stops the vicious downward spiral from occurring in the first place. This is not to say that high-performing leaders achieve their status because they have had it easy. On the contrary, they become what they are because of their

experiences. Successful leaders face up to the visibility, vulnerability and pressure they encounter, extract meaning and learn important lessons, including new skills that allow them to move on to new levels of achievement and development. This openness to challenge is what develops a leader's 'mental toughness' and ability to thrive on pressure.

## Mental toughness

Mental toughness is most commonly associated with sport and has been exhibited by Adrian Moorhouse during

Attribute	Development interventions
Actively manage your own motivation	Motivation is key to personal performance. Managing motivation is about the 'what' and 'why' of achieving a vision. Supporting leaders in actively self-managing their motivation involves helping them to extract meaning from their experiences, clarify purpose, direction and values, and develop specific goal-setting skills.
Believe in yourself	Leaders are often in situations where they stand alone, having to convince and influence an array of stakeholders. Unshakeable self-belief is a key quality in this regard. Supporting the development of self-belief involves helping people see clearly the qualities that have contributed to their successes, identifying negative confidence triggers and developing personal strategies for managing confidence while going forward.
Focus on the controllables	Dealing with multiple demands can result in a loss of perspective and focus. Understanding what is within direct control, managing distractions, bouncing back from major setbacks and dealing with unexpected events are all aspects of the ability to retain performance focus and achieve results.
Thrive on pressure	The stress and pressure leaders experience come from many sources. Supporting leaders in keeping stress positive involves interventions such as developing personal coping strategies, minimising uncertainty, creative problem solving and recognising and seizing opportunities.

Table 1: The attributes of mental toughness



## Shortlisted candidates for this year's EI Awards

The Energy Institute is pleased to announce its short-listed entries for this year's prestigious EI Awards ceremony.



### Communication Award

- IT Power for 'Enthuse'
- ISE for 'Inside Distillation and Cracking at Fawley (web and CD)'
- ISE for their 'Virtual Visit to The Captain Oil Platform'
- Hocol S.A for the 'Disclosure of Hocol's public stance as a public commitment with its partners in growth, wealth and corporate governance and programmes for conservation and productive management of water in Huila, Colombia'

### Community Initiative Award

- ExxonMobil for the 'BTCV Green Gym'
- Occidental de Colombis (OXY) for 'A Crecer: or Life'
- Npower for their 'Health through Warmth programme'

### Environment Award

- Rother District Council for their 'Environmental education resource for the communities of Rother and surrounding areas in order to raise awareness of environmental issues, in particular engaging those who presently do not participate in sustainable activities'
- Ravensrodd for the 'Severn Barrage Tidal Power project'
- Walsh-Ecuador for 'Reducing the footprint of 3D Seismic in the tropical rainforest of Ecuador'

### Innovation Award

- Windsave for their 'Supply of affordable supplementary electricity by micro-power wind turbine'
- Total E&P UK for 'Nuggets Longest Subsea Tieback'
- Clariant Oil Services for 'Field Application of Reltreat Water Management System'
- Halliburton Energy Services for their 'DepthStar™ Tubing-Retrieveable Subsurface Safety Valve'

### Safety Award

- BG Group for 'BG Exploration and Production India Ltd - Investing for Safer future'
- ExxonMobil for the 'Green and Red reporting system'
- Shell/BP Integrated Services for 'Advanced Safety Leadership - a people centred approach to enhanced safety performance'

### Technology Award

- Indian Oil Corporation Limited for 'INDMAX: The Bottom of the Barrel Upgrader'
- Shell UK for 'Deployment of high horse power ESPs to extend Brent Field life'
- Camcon for the 'Camcon rolling swing valve for the unfiltered fluids and management of flooded wells'

### Outstanding Individual Achievement Award

- Lord Derek Ezra for his 'Contribution to energy policy'
- Dr Jeremy Leggett for his 'Passion for sustainability'
- Dr Wolfgang E Schollnberger for his 'Leadership within the oil industry'

The International Platinum Award nominees will be announced at a later date.

For information about table bookings, please contact:

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the six consecutive years that he was World Number One in the 100 metres breaststroke, and also studied at length by Graham Jones. The results of this scientific research have pinpointed mental toughness as being the psychological edge that enables people to remain motivated, focused, confident and in control when faced with the pressure of high performance expectations and demands.

In simple language, mental toughness is the quality that distinguishes those who snap from those who are able to continually bounce back and sustain high levels of performance.

**Table 1** summarises the four key learnable personal attributes that underpin mental toughness – actively managing your motivation, believing in yourself, focusing on the controllables and ultimately thriving on pressure.

Mental toughness is pivotal to personal leadership. It is a multifaceted concept and, unsurprisingly, each leader has a unique blend of development needs. One-to-one coaching is a particularly beneficial medium for delivering tailored support. This said, mental toughness is an attribute from which performers at all levels in an organisation can benefit. It is a quality that distinguishes high performers from their more 'average' counterparts. Hence, it can form an integral part of talent development initiatives as well as more general interventions aimed at raising the performance capability of an organisation.

Leaders and managers also have a very important role in helping their followers deal with pressure. In the same way that mental toughness involves a high degree of self-awareness and developing your own ability to thrive on pressure, leading and managing others requires a high degree of awareness of the pressures on different people and how it is affecting them.

## Model of leadership

We employ a very simple model of leadership which comprises three key components – vision, challenge and support.

*Vision* is a central element of leadership as it is the link between strategy and people. It is the vehicle by which leaders are able to engage people's motivation and provide purpose, direction and cohesion. This may not be an easy task given the uncertainty in the oil and gas business at the moment but should never be forgotten. Even in the most uncertain circumstances it is possible to establish some level of direction by identifying and concentrating on the controllables.

*Challenge* involves translating this

motivation into high performance, by moving people out of their comfort zone and opening them to new experiences that will test and develop their capabilities. Through appropriate challenge, leaders communicate performance excellence and foster innovation and adaptability – it provides people with a specific focus, one of those key elements of mental toughness which is so vital to performers under pressure.

Although challenge is a core element of high performance, on its own it presents a 'sink or swim' scenario. To ensure that performance is sustainable over the longer term, leaders also need to *support* people. Through appropriate support provided in a variety of ways to suit specific needs and circumstances, leaders promote learning and build trust and belief (another key element of mental toughness).

Leaders can be instrumental in increasing already severe pressures on people. Those who focus on vision and challenge without facilitating or providing the necessary support, as can often be the case, may induce short-term performance improvement but at the cost of high, eventually debilitating stress levels in their teams. When vision, challenge and support exist and are appropriately balanced, people can actually thrive on pressure and deliver performance gains that are sustainable.

We are not suggesting that the pressures you are facing in your industry are easy to deal with – far from it. But you do have a choice as regards how you approach and deal with them. Developing your own resilience and mental toughness and supporting others in developing theirs is one way of dealing very positively with a difficult set of circumstances, and which will also serve you well throughout your careers. Converting pressure into competitive advantage ultimately rests on developing a high-performance leadership ethos at personal, team and organisational levels. Transforming pressure into competitive advantage is the ultimate hallmark of a high performance organisation.

If the article above has been of interest why not come along to our introductory EI Discussion Group session on Tuesday, 2 November 2004 to find out more? It will be held at 61 New Cavendish Street, London W1G 7AR, to start at 5pm for 5.30pm. Admission is free, but places need to be booked in advance. For further information e: [events@energyinst.org.uk](mailto:events@energyinst.org.uk)

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# Petrobras cuts E&P spend, but invests in gas

Petrobras recently unveiled its latest strategic plan, under which it is to spend less on E&P than ever before, while increasing investment on gas and energy. *Patrick Knight* reports from Brazil.

Natural gas is the star of Petrobras' latest strategic plan, which, although entitled 'Plan 2015' actually covers the period 2004–2010. Some 60% of the total \$53.6bn that the company anticipates spending in the next five years will be devoted to E&P, with production getting \$22.8bn of the total \$32.1bn E&P budget. Although large, this share compares with 80% of the total spend that E&P has been allocated in recent years. Meanwhile, gas and energy are to get an 11% share, more than twice as much as under previous plans.

A further 21% of the total will be spent on downstream activities, with some 14% allocated to overseas projects.

## Growth in gas

While demand for liquid products is expected to grow by an annual average of 2.4% in the next six years – slightly less than in recent years – demand for gas is expected to shoot from the 30.7cm/d level of 2003 to 77.6cm/d by 2010, an annual increase of 14.2%.

First gas from the 'very substantial' reserves discovered last year in the Santos field is not expected to come ashore until 2008 or 2009, almost certainly at new facilities to be built adjacent to Petrobras' important marine terminal at Sao Sebastiao. The increase in spending under Plan 2015 is partly to allow this extra gas to be accommodated.

Most of the \$3bn allocated to gas and energy projects will be spent on expanding Petrobras' gas grid – particularly in the north-east region which is to be linked with the central-south system, currently supplied by both the associated gas produced mainly from the fields in the Campos Basin and gas imports from Bolivia.

The north-east region is the only part of Brazil that has had to import energy. Situated at the end of long transmission

lines means that gas-fired power stations are particularly appropriate in an area that has been growing faster than the national average in recent years. Petrobras plans to pave the way for linking its gas grid with those in neighbouring countries such as Peru and Venezuela, as well as Bolivia and Argentina.

The amount of gas required to generate electricity is expected to increase from 6.5mn cm/d in 2003, to more than 27mn cm/d by 2010 – by which time gas-fired stations, which have incurred heavy losses for Petrobras in the past few years, will have the capacity to generate more than 5,000 MW of electricity. Gas consumption by industry is predicted to grow at an even faster rate, almost doubling from slightly less than 20mn cm/d last year to almost 37mn cm/d by 2010.

Meanwhile, gas demand for 'other' purposes, mainly as fuel for motor vehicles and for co-generation, is forecast to jump from 4.6mn to 13.8mn cm/d by 2010.

## New production planned

Petrobras reports that 13 completely new production systems, most of them offshore, will come onstream between now and 2010, with a further 13 scheduled to be operating by 2015. The company anticipates that crude production will increase by an average of 5.9%/y between now and 2010, rising from the 1.54mn b/d average of 2003 to 2.3mn b/d by 2010, with the so far elusive self-sufficiency in output to be finally achieved in 2006.

The company also expects Brazil's proven reserves of oil equivalent to increase from 12.6bn barrels at the end of 2003 to 17.3bn by 2010. It is assumed that a total of about 6bn barrels will be produced between now and 2010, which implies that for the reserves

to have increased by the amount envisaged by Petrobras, close to 2bn boe will have to be found in each of the next six years. This would be about twice as much as has been found annually in Brazil over the past decade – which seems rather a tall order unless Petrobras knows things the rest of us do not!

Gas production is expected to increase from 42mn cm/d in 2003 to about 80mn by 2010, while the actual cost of extracting each barrel is forecast to fall from the current \$3.41/b to \$3/b in the period. It had originally been hoped that the cost of extraction would have fallen to about \$2.7/b by 2010, but the increased cost of equipment is helping prevent this. Exchange factors are also playing a part, as has the fall in the parity of the US dollar against other currencies.

All of Petrobras' calculations assume a US dollar being worth just over three Reais (the Brazilian currency) and are based on the assumption that the price of crude will shortly fall to average \$25/b, which seems overly optimistic in light of the recent record breaking oil prices amidst fears of supply disruptions. The Plan 2015 also assumes that the Brazilian economy will grow at an average 4%/y.

## Refining costs

Because of the relatively high cost of processing the increasing proportion of very heavy crudes which are to be refined from now on, refining costs are expected to increase from the present average of \$1.14/b to \$1.58/b by 2010 – rather than falling to about \$90 cents per barrel as had been hoped under previous plans.

Petrobras anticipates refining close to 300,000 b/d more domestic crude by 2010 than in 2003, with the total processed at its 12 refineries increasing from 1.31mn b/d to 1.75mn b/d by 2010. Domestic crudes should form more than 93% of the total processed by then. Modifications both to enable refineries to handle heavier crude and to reduce sulphur levels in products are under way at eight of the 12 refineries.

Meanwhile, as domestic consumption has been growing rather less in recent months than previously anticipated, it is now felt that a new refinery will not be  
*continued on p21...*



# Environmental sensitivity of UK service stations

The Soil, Waste and Groundwater Working Group of the Energy Institute (EI) commissioned the consultant Arcadis Geraghty & Miller (Arcadis GMI) to conduct a GIS-based assessment of the environmental sensitivity of service stations across the UK. The aim was to set the potential environmental risk in context and help the fuel retail industry promote a more proactive approach to the portfolio management of environmental issues.

**T**he UK operates a risk-based regulatory framework for contaminated land. Under this regime legislation requires local authorities, the Environment Agencies and companies to identify and assess contaminated sites, or sites at potential risk, on the basis of their location. This approach allows owners and operators of service stations to focus attention and resources on preventing pollution at the most environmentally sensitive sites – whether this be by engineering integrity, changing oper-

ational practices, monitoring or training.

Most oil companies operating in the UK have their own geographic information systems (GIS) or other databases that enable them to take a risk-based approach to their portfolio management. However, this information is company specific and there is a lack of consolidated data for the industry as a whole. As a result, there is insufficient understanding of the overall environmental risks posed by service stations within the UK.

- Objective of project to develop a comprehensive database of UK PFS.
- Major PFS operators all supported this initiative, and they provided details on site locations and grid references.
- Data for smaller companies and dealer-owned sites obtained from industry databases.
- Where no grid references supplied, derived from postcodes. Locations accurate to +/-100m.
- Final list of 13,141 PFS compiled.



Figure 1: Some 13,141 sites are covered by the UK service station database

In a bid to inform this issue, in 2002 the Energy Institute commissioned Arcadis GMI – through the EI's Soil Waste and Groundwater Workgroup – to conduct a study with the principal objective of developing an industry-wide view of the groundwater and environmental sensitivity at all service stations in the UK.

## Location, location, location

The first step was to collate data on the locations of these outlets in the UK. The major operators – all of which actively support the EI's Technical Programme – were very supportive of the initiative and provided details on site locations, including OS (Ordnance Survey) grid references.

The information provided differentiated between company-owned/company-operated sites (COCOs), company-owned/dealer-operated sites (CODOs) and dealer-owned/dealer-operated sites (DODOs). Listings for the smaller oil companies and independent dealer-operated sites were obtained from proprietary databases (eg Catalyst). Additional information was obtained from the Institute of Petroleum's (now the EI) 2002 UK Retail Marketing Survey, as well as databases held by the consultant Arcadis GMI. Once compiled, this data was validated, corrected and sorted until a final list of around 13,000 sites was produced, each with its own geo-reference. (See Figure 1.)

## Environmental data

The next step was to develop a comprehensive environmental database across the UK by sourcing information from a number of organisations, including British Geological Survey, the Environment Agencies, Ordnance Survey, English Nature, Scottish Natural Heritage, Countryside Council for Wales and water companies. Information was collated on aspects such as the groundwater usage, aquifer type and vulnerability, geology and the soil leaching potential. Data were also collated on the location and purpose of some 78,000 individual water abstraction points and whether they were sourced by ground or surface water, as well as the location of source protection zones (SPZs) – land-use planning tools used to protect important water supply sources.

In addition, information was collated on the location of a number of ecological features, such as Sites of Special Scientific Interest (SSSIs), special protected areas, areas of outstanding natural beauty, nature reserves and ancient woodlands. (See Figure 2.)

This environmental information was



collected for England and Wales, Scotland and Northern Ireland. Although there are some differences in how data is stored and classified between each region, efforts were made to align the various datasets and present the information in a consistent format.

## Data analysis

The GIS data collected on service station locations was combined with the environmental data and an analysis of sensitivity was carried out. The outcome from this analysis was subjected to two separate and distinct data checking exercises. A verification exercise was carried out on 25 random sites to ensure that the digital data from the GIS analysis matched the original digital and paper-derived data, thus confirming that the information had been correctly transferred to the database.

A validation exercise was also undertaken in two stages. The first stage involved a comparison of data derived by the GIS analysis at 25 randomly selected sites, with information contained on existing paper maps. The second stage was a comparison of data derived from the GIS analysis with actual historic data obtained by Arcadis GMI at a further 25 sites. This historic site data had been collated by Arcadis GMI during previous desk and on-site investigations. The validation exercise concluded that the GIS analysis had successfully identified sensitive sites.

## Overall picture

By overlaying and combining the two sets of data in this way it was possible to build a comprehensive view of the environmental sensitivities at each service station location in the UK, as well as gaining an overall picture of the total number of sites at high risk locations.

In order to establish the environmental risk posed by a service station it is important to consider the accepted risk paradigm, which requires the presence of a potential source of pollution, the presence of an environmental receptor, and the presence of a pathway linking the two for there to be a risk.

The data derived from the GIS analysis shows that 25% of sites across the UK are located on a major aquifer. It should be noted that location on a major aquifer does not in itself indicate that the environmental risk is high. The risk is determined by the vulnerability of the aquifer to contamination from above (ie the permeability of the overlying soil). If a further analysis is carried out of the data it can be shown that the percentage of sites on a major aquifer combined with soil of high

Data sets used include:

Groundwater:

- Aquifer type and geology
- Soil leaching potential
- Groundwater abstractions
- Source Protection Zones (SPZ)

Ecological:

- SSSI
- Special Protection Areas
- Ancient Woodlands
- etc

Example of SPZ Mapping

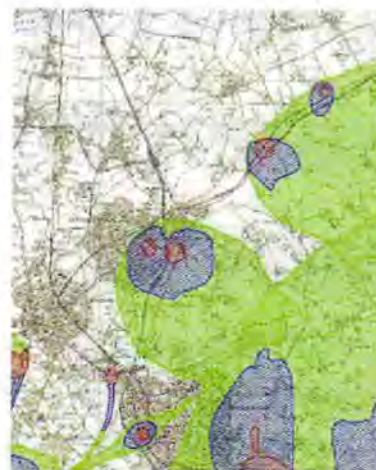


Figure 2: An example of SPZ mapping

leaching potential falls to 19%.

The analysis also demonstrates that 2.7% of the service stations lie close to sensitive abstraction points or within a SPZ1 (50-day travel time to water supply). Additional analysis shows that if proximity to abstraction points and SPZ1 is combined with a high soil leaching potential, the percentage of service stations in the UK in such high-risk locations falls to just 1.1%.

The analysis of location and ecological data shows that just 1.6% of service stations in the UK are located within 100 metres of a SSSI, with less than 0.5% being within 100 metres of any other designated ecological receptors, such as nature reserves, Ramsar sites or ancient woodlands. (See Table 1 and Figure 3.)

It should be recognised that this

analysis provides the potential environmental sensitivity of the service station location. Estimation of the real risks should include an assessment of the particular fuel retail station integrity measures. The analysis enables better management of pollution mitigation and prevention measures by providing a relative risk ranking tool.

## Regional variation

An interesting feature to emerge from this exercise is the variation within the UK from region to region. Table 2 represents the regions of the Environment Agency, the Scottish Environmental Protection Agency and Environmental Heritage Services Northern Ireland. It shows the total number of service stations in each

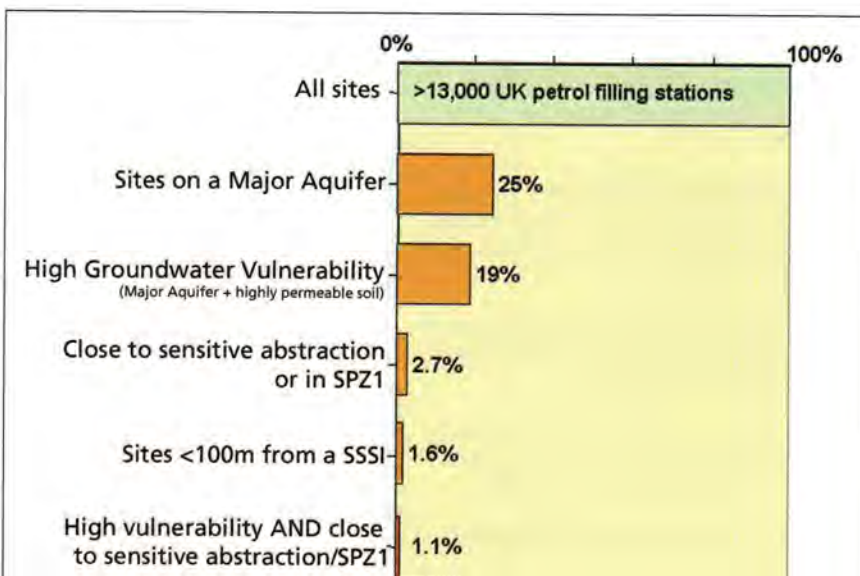


Table 1: Overall sensitivity at UK service stations



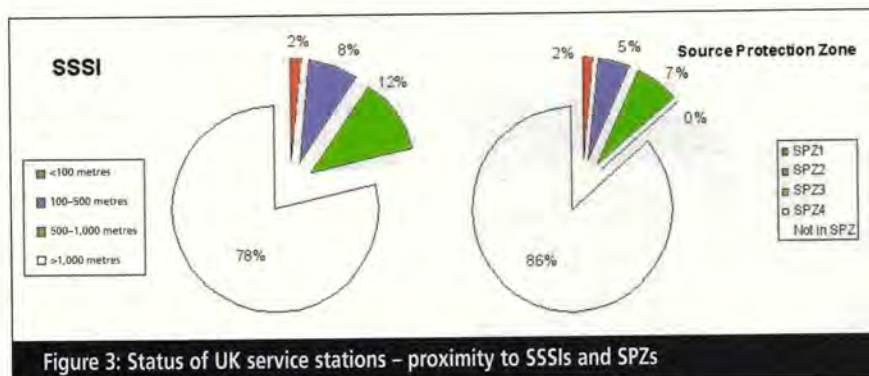


Figure 3: Status of UK service stations – proximity to SSSIs and SPZs

region and the percentage of these that are located on major aquifers, permeable ground, close to abstractions or SPZ1, or within 100 metres of an SSSI.

It can be clearly seen that different regions will have different groundwater sensitivity to contamination from service stations depending on aquifer type and soil leaching potential. Both Anglia and Southern EA regions have 40% of sites on major aquifers, with Wales having just 8%. In addition, location within SPZ1s varies regionally, with 6.4% of sites in both Thames and Southern regions, and less than 1% of sites in Wales, Scotland and Northern Ireland.

## Conclusions

The EI-commissioned study has produced a comprehensive view of the environmental sensitivity of service stations in the UK. It has shown that of the 13,141 sites listed, a very small percentage are located in what could be described as high-risk locations where, in addition to the intrinsic potential source of pollution, there also exists a potential for a well defined pathway to a vulnerable receptor.

Despite the large number of service stations in the UK, the number located on environmentally sensitive sites is relatively very low. This study, under the risk-

based legislative philosophy, allows the owners and operators of such sites to prioritise their activities at those outlets posing the greatest risk, thus ensuring the maximum environmental benefit for investments within a portfolio of sites.

Whilst the majority of major oil companies have their own similar internal risk ranking tools, these are all company specific. This project has enabled the overall risk from the industry to be put into context. The information has been shared with UKPIA and included in its 'Risk Manager' tool for service stations. This increases the availability and practical benefit of the work.

The project was conducted as part of the EI's annual technical programme and was funded on a collaborative basis by EI Technical Partners. The objective of the technical programme is to provide industry with cost-effective, value-added scientific and technical knowledge on key current and future issues. It is divided into a number of key themes, covering Health, Safety, Environment, Marketing and Distribution, Aviation, Hydrocarbon Management and Test Method development. This particular project was steered by the EI's Soil Waste and Groundwater Workgroup and was conducted in close cooperation with the Environment Agency for England and Wales.

...continued from p18

needed until about 2010 or 2011. This means that a start need not be made on building new facilities until about 2007. The project is expected to cost about \$2bn, half of which will be funded by Petrobras. Overall, Petrobras anticipates that 70% of the investments to be made in this sector over the next five years will come from its own resources, the rest to be raised abroad, most involving the securitisation of some of its oil and gas reserves.

Although construction of a new refinery – which the governments of at least half of Brazil's 26 states are hoping will be located in their state – is to be delayed, there is a sop for the nationalists. After a very long gap during which Brazil's shipyards have received few orders, Petrobras is to order a total of 53 vessels in the next few years. The newbuilds will include 17 crude carriers, 19 product ships, six LPG carriers and 10 supply boats, in a programme estimated to cost \$1.2bn.

## Petrochemicals plans

Meanwhile, and contrary to expectations, Petrobras plans to allocate only 2% of its total spend under Plan 2015 in the petrochemicals sector. Nor does the company envisage increasing its participation in the three large existing complexes, which it dominated until these assets were privatised in the early 1990s. However, it does plan to build a large new polypropylene plant, and anticipates work starting on a new complex on the border with Bolivia.

All in all, Petrobras' plans for the petrochemicals sector are relatively modest. Petrobras Chief Executive Jose Dutra has said that there are no plans for petrochemicals to be re-nationalised. The \$1.1bn that Petrobras plans to spend in the next five years is about one-fifth of the total planned by the rest of the petrochemical companies during the same period.

## Overseas spending

Contrary to what was indicated when the new, left-orientated government led by the Workers Party – the PT – took power in early 2003, Petrobras does not now plan to spend less monies overseas. Some \$7.5bn is to be spent abroad in the next five years, 80% of it on E&P projects and half in Latin America, where Petrobras aims to become the industry leader.

Overseas oil and gas production is forecast to increase from 246,000 boe in 2003 to 613,000 boe by 2010. Petrobras anticipates that it will be getting a return of about 9% on its investments by this date, compared with the 12% anticipated under earlier plans.

Environmental Region	Total nr of Filling Stations	Sites on Major Aquifer	High Groundwater Vulnerability	Abst. <=100m OR in SPZ1	High Vulnerability AND close to Abstraction	Sites <=100m from SSSI
Anglia (EA)	1472	40%	27%	3.7%	1.4%	1.0%
Midlands (EA)	1904	22%	20%	1.5%	0.5%	0.9%
North East (EA)	1494	15%	12%	1.7%	0.3%	0.9%
North West (EA)	1498	34%	29%	1.3%	0.3%	1.4%
South West (EA)	1384	16%	11%	3.2%	1.0%	2.4%
Southern (EA)	900	40%	29%	6.4%	4.0%	3.9%
Thames (EA)	1867	30%	24%	6.4%	2.7%	1.1%
Wales (EA)	781	8%	4%	0.1%	0.0%	4.2%
SEPA (Scotland)	1144	16%	8%	0.1%	0.1%	1.5%
EHS (NI)	653	18%	12%	0.3%	0.0%	1.7%

Table 2: Regional variations of sensitivity





Photo: David Hayes

## Reducing oil reliance and switching to gas

Japan's Ministry of Energy Trade and Industry (METI) is preparing a new long-term energy plan intended to further reduce reliance on imported oil and increase the share of natural gas in the country's primary energy mix. Efforts to reduce oil consumption and increase gas use have important energy security implications as Japan relies on the Middle East for about 88% of its oil supplies. *David Hayes reports.*

**D**ue to concerns about potential disruption to energy supplies from the Middle East, the Japanese Government is seeking to increase the share of oil and gas imported from nearby sources in the Asian region, particularly the Russian Far East. Developing trade relations with Russia is expected to increase bilateral cooperation, which Tokyo hopes will lead to the eventual settlement of the Kurile Islands problem as Japan continues to seek the return of the islands that were occupied by the Red Army at the end of the Second World War.

'Total energy consumption in Japan will increase gradually, but Japan's pop-

ulation size will start decreasing in the next decade,' commented a METI official. 'Our previous forecast was for a 15% increase in energy demand from 1990 to 2000. But by 2010 the level of energy demand growth will be single digit, maybe just 1% or 2%, as the population peaks and we develop energy conservation.'

'The general tendency is to reduce oil use and promote gas. We are drafting a plan for oil supply and demand in 2030. Even in 25 years' time oil will still be an important energy source; but there is room to decrease oil dependency. We are making an effort to promote gas but it will never substitute perfectly for oil.'

### Key Russian role

Although Japan relies on Indonesia, Malaysia and Brunei for two-thirds of its LNG imports and the Middle East for oil and LPG supplies, the Russian Far East could become an important source of gas and oil in the future. Japanese power companies have already contracted to buy LNG from Shell's Sakhalin 2 project, while planning is underway to import gas by subsea pipeline from the Sakhalin 1 oil and gas project.

Sakhalin 1 is a \$12bn, four-phase project planned to develop three offshore oil and gas fields that lie off the east coast of Sakhalin Island. Potential recoverable reserves are put at 2.3bn barrels of oil and 17.1tn cf of gas. Oil production at the Chayvo field is due to begin in late 2005 following the inauguration of Sakhalin 1 Phase I by project partners Exxon Neftegas (operator, 30%), Sakhalin Oil and Gas Development (30%), ONGC Videsh (20%) and two Russian companies – Sakhalinmorneftegas (11.5%) and RB-Astra (8.5%).

Initially, some gas will be sold to customers in the Russian Far East. However, most associated gas production will be reinjected for Phase II of the project, which is planned to begin in 2008 when construction of a subsea pipeline to Japan is completed.

Studies by the Sakhalin project partners and a group of Japanese companies have already shown the project to be technically and commercially feasible. The consortium is marketing gas in Japan. Gas purchase commitments of between 40% and 60% of the maximum supply capacity – equivalent to 6mn t/y of LNG – are believed to be needed for the project to begin.

Under the current proposal, the Sakhalin 1 project partners will construct and operate the 900-km Russian segment of the pipeline. The Sakhalin 1 partners could also build and operate the connecting pipeline section that will run from the south of Sakhalin Island to landfall on Japan's main Honshu Island. Other potential gas markets, including China and South Korea, are also being studied and could be supplied through connecting pipeline routes. The route of the pipeline in Japan has still to be finalized as does the route of the final subsea section. The total pipeline length from Korsakov to Chiba, adjacent to Tokyo, is 1,600 km.

### Developing gas customer base

While Japan's gas and electricity utilities are obvious customers for Sakhalin gas, it is possible that new customers will



emerge in Japan as ongoing deregulation of both the electricity and gas industries is interlinked.

Japanese city gas companies yet to convert to natural gas could be one market for Sakhalin gas. During the past decade the share of imported LNG as a proportion of total city gas feedstock rose from 72% in the early 1990s to 86% by the close of the decade. Almost all city gas companies using other feedstocks are expected to convert to natural gas eventually, when affordable supplies become available.

New gas uses will also create new gas markets in Japan. For example, in a bid to reduce vehicle emissions of nitrogen dioxide pollution the Japan Gas Association is overseeing a government-sponsored research programme that is developing a new engine for natural gas-fuelled vehicles. The target is to get one million natural gas-fuelled vehicles on to Japan's roads by 2010.

While other new uses also could expand the market for Sakhalin gas, the Sakhalin developers are looking for large gas customers to provide the initial baseload demand to ensure the pipeline is commercially viable. A number of Japanese companies and foreign investors are planning to build private power stations in Japan and could favour gas as the preferred fuel – if the price is right.

A consortium is expected to be formed to build Japan's first national gas transmission grid to carry the Sakhalin gas from landfall on Honshu Island to major consuming areas. One possibility is that an offshore pipeline could be built along the Japanese coastline, supplying major cities and markets through various off-take points.

'We are promoting a shift to natural gas as there is less carbon dioxide emission than with oil and other petroleum energy. Also, there is less dependency on the Middle East,' the METI official commented. 'The share of natural gas in primary energy is less in Japan than in Europe and the US, so gas has big potential here. The Sakhalin 2 LNG project has made more progress than Sakhalin 1 piped gas, as LNG is more popular than piped gas in Japan. That's the difference between Japan and Europe, where more gas is supplied by pipeline.'

## Siberian oil

Japan also hopes to import Russian oil and is competing with China to buy oil from East Siberia. Transneft, Russia's state monopoly pipeline operator, has announced plans to build a \$10bn oil pipeline from Taishet in East Siberia, running 4,200 km to the Japanese port

of Nakhodka. Analysts believe that Russia will prefer this project to the original plan of building a pipeline to Daqing in northeast China to supply a single customer, as the Taishet to Nakhodka scheme would allow oil to be sold on the international market as well as to Japan.

'We are promoting the East Siberian oil pipeline to Japan project for the same reasons as Sakhalin 1 and 2, which is to pursue less dependency on the Middle East,' the METI source noted. 'This pipeline could provide 1mn b/d, so it could reduce our Middle East oil dependency and promote economic friendship with Russia. The project is under consideration by the Russian Government to see which route – to Japan or China – is more beneficial. We are lobbying for this.'

'Japanese companies are interested in this oil pipeline project, but it is too early to say who will participate and invest as there is a possibility that Russia may choose China rather than Japan. If we could import all of the East Siberia oil it would be about 25% of our 4mn b/d oil requirement.'

Oil remains Japan's most important energy source, accounting for 49% of the nation's primary energy supply compared with 35% to 39% for most leading European countries and North America. Coal is Japan's second major source of primary energy, followed by nuclear power and natural gas.

## Stockpiling supplies

As part of its energy security programme Japan keeps a stockpile of oil exceeding 160 days supply at 10 national oil stockpiling bases across the country. At the end of 2003 the government's stockpile totalled 87 days, while the private sector stockpile was 78 days.

In 2002 the government decided to begin stockpiling LPG as well, recognising the importance of bottled LPG as domestic fuel in provincial areas and the growing use of LPG by public transport vehicles, particularly taxis. Five national LPG stockpiling bases are under construction for completion by 2009, when the national LPG stockpile will total 40 days. 'The government has decided on LPG storage as a national gas pipeline grid has not been developed. About 60% to 70% of households use LPG, so we need a stable LPG supply for daily life,' the METI official said.

## Five-year forecast

According to METI's annual five-year rolling forecast for petroleum product demand for the period 2004–2008,

overall demand for petroleum products will decline very slightly by about 0.1% annually. The exceptions are gasoline and jet fuel, both of which are expected to show a small increase in demand each year. Gasoline is sold through about 52,500 service stations in Japan. In spite of rising gasoline sales the number of service stations continues to fall compared with the peak of 60,420 outlets in 1964. In spite of individual yearly fluctuations, METI is forecasting that consumption of kerosene and fuel oil A will remain stable. The use of naphtha, gas oil, fuel oil B and C, and fuel oil for power generation will decrease – in particular fuel oil for power generation.

METI predicts that overall demand for petroleum products will decrease by 5.7% from an estimated 241.4mn kilolitres (kl) in 2003 to 228.1mn kl in 2008. However, during this period consumption of gasoline is forecast to rise by 2.3%, from an estimated 60.3mn kl in 2003 to 61.7mn kl in 2008. Gasoline will increase from 25% of total petroleum demand to 27.1% during the five-year period.

Naphtha consumption is the second largest item after gasoline and more than half of all naphtha supplies are imported. According to METI, demand for naphtha will decrease by 2.8% from an estimated 48.5mn kl in 2003 to 47.4mn kl in 2008. However, in spite of reduced demand, naphtha's share of total petroleum consumption will increase from 20.1% to 20.8% over the five-year period.

Fuel oil use for power generation is expected to experience the largest decline. According to METI, demand for fuel oil to fire power stations will decrease by 86%, from an estimated 12.9mn kl in 2003 to 5.7mn kl in 2008. The share of fuel oil for power plant use as a proportion of total petroleum consumption will drop from 5.4% to 2.5% over the five-year period. In fact, oil use posted some growth in 2003 due to Tokyo Electric Power Co's nuclear power generation problems. As a result, oil use will decrease in 2004 as normal nuclear power generation resumes.

Among other forecasts, demand for kerosene will increase very slightly by 0.6%, from an estimated 29.1mn kl in 2003 to 29.3mn kl in 2008. The kerosene share of total petroleum consumption will increase marginally from 12.1% to 12.8% over the five-year period. Consumption of jet fuel is forecast to grow by 3.3%, from an estimated 4.54mn kl in 2003 to 4.68mn kl in 2008. The aviation fuel share of total petroleum demand will increase from 1.9% to 2.1% during the five-year period.

Meanwhile, pressure is growing on Japan's refining industry to cut costs and become internationally competi-



tive. In the financial year ending 31 March 2004 (financial year 2003) about 37mn kl of petroleum products were imported, accounting for about 14% of total Japanese demand.

Naphtha is Japan's largest petroleum import, with about 28mn kl imported last year, accounting for almost 60% of naphtha supplies. Some 52% of naphtha imports were from Asia and Australia, and 43% from the Middle East. All 1.15mn kl of Japan's gasoline imports are supplied by South Korea and Singapore. In addition, most of Japan's 2.8mn kl kerosene imports are from northeast Asia, including 70% from South Korea, which also supplies all of Japan's gas oil imports.

### Cutting carbon emissions

Japan's Kyoto protocol commitment requires a reduction in total average greenhouse gas emissions by 6% from 2008 to 2012 in comparison with levels recorded in 1990. Because almost 80% of total greenhouse gas emissions come from carbon dioxide (CO<sub>2</sub>) emissions from the energy sector, the Japanese Government has set a target of stabilising CO<sub>2</sub> emissions at the 1990 level.

According to METI's current energy outlook, the base case forecast is that energy consumption will reach 409mn kl of crude oil equivalent in 2010, up slightly on the previous target of 400mn kl. Energy demand for residential and passenger transport use is expected to grow rapidly, while on the energy supply side the share of non-fossil fuel such as nuclear and renewables will be lower than previously forecast. Meanwhile, the share of coal will increase rapidly due to its low price. As a result, CO<sub>2</sub> emissions from energy sources will reach 307mn tonnes of carbon (t-C). This is 20mn t-C, or 6.9%, higher than the 1990 level of 287mn t-C – which now is Japan's target for 2010.

In 2000, industry's share accounted for 206mn kl, or 49.3%, of crude oil equivalent of Japan's total 406mn kl energy consumption – a drop in the ocean compared with a 52.5% share of 349mn kl total consumption in 1990.

According to METI, industry will use 187mn kl, or 45.8%, of the forecast 409mn kl energy consumption in 2010. Residential and commercial energy use is forecast to rise, however, from 108mn kl, or 26.5%, of total energy use in 2000 to 126mn kl, or 30.8%, of the projected base case use in 2010. Passenger together with vehicle transport energy use is expected to dip by 4% in 2010, from 98mn kl in 2000

(accounting for 24.1% of energy supplies) to 96mn kl (accounting for 23.4% of energy supply) in 2010.

### Continuing role for oil

Oil is Japan's main source of primary energy. While oil use is not expected to increase, total energy demand is expected to grow in Japan and oil will continue to occupy a significant proportion of energy supply. According to METI, Japan consumes 25% of the Asia-Pacific region's total oil demand and accounts for one-third of the region's total oil imports.

In terms of Japan's total forecast primary energy supply, the share of oil is planned to drop from 313mn kl (accounting for 51.8mn of the total 604mn kl oil equivalent energy supply) in 2000, to 280mn kl (accounting for 45% of the total forecast 622mn kl energy supply) in 2010.

Meanwhile, government efforts to support the development of overseas energy resources will change in the future with the recent winding up of JNOC and the transfer of the company's functions to a new organisation. In July 2002 the Japanese Diet (Parliament) approved plans to abolish JNOC in 2005 and merge its functions with Japan Metal Resources Organisation, which supports the metal mining industry. Financial support for overseas oil and gas exploration and development will be up to 50% of the project cost in the future.

### Importance of coal and LNG

Coal is Japan's second largest energy source, with total demand in financial year (FY) 2002 reaching a record 162.2mn tonnes, of which almost all was imported. Steam coal represents 55% of coal demand. About 68% of steam coal is used by the electricity industry. Coking coal accounts for 43% of total coal demand. About 92% of coking coal demand is used by the iron and steel industry.

Japan is the world's largest coal importer. Coal use is expected to rise from 108mn kl of crude oil equivalent (accounting for 17.9% of Japan's total 593mn kl energy supply) in 2000 to 136mn kl (accounting for 21.9% of the total forecast 622mn kl energy supply) in 2010. The forecast increase in coal use is due to the expected growth in coal-fired power generation. Steaming coal imports are expected to reach 134mn tonnes in 2010, an increase of 61.4% compared with 83mn tons in 2000.

Natural gas, after nuclear energy and

coal, is expected to play an important role in the future as a clean-burning fuel which will help reduce Japan's dependency on oil. In the financial year 2002 Japan imported 55mn tonnes of LNG, representing a 1% increase compared with 2000. Some 38mn tonnes of LNG were used for power generation, accounting for 69% of Japan's total LNG imports. In addition, 16.2mn tonnes of LNG were used as feedstock to produce city gas for piped distribution by city gas companies. The remaining 800,000 tonnes of LNG were imported by large industrial consumers for their own use.

Imported LNG accounts for 97% of all natural gas consumed in Japan. Just 3% of natural gas supplies are produced from indigenous reserves. Japan has been diversifying its LNG import sources to ensure security of supply. Indonesia, Malaysia and Australia account for about 67% of Japan's LNG supplies. Other sources are Alaska, Brunei, Abu Dhabi, Qatar and Oman.

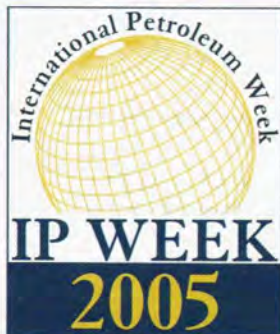
Gas use is forecast to rise from 79mn kl (accounting for 13% of the total 604mn kl crude oil equivalent energy supply) in 2000 to 82mn kl (accounting for 13.2% of the forecast 622mn kl energy supply) in 2010. By then, government plans call for one million natural gas fuelled vehicles to be on Japan's roads.

METI has identified gas-to-liquids (GTL) and dimethyl-ether (DME) as two future important uses of gas as part of its plans to encourage a gradual transition from oil to gas use. METI is supporting research into methane hydrate energy development as Japan has sufficient estimated offshore supplies to last more than 100 years.

Nuclear power will also remain important if Japan is to achieve its Kyoto emission reduction targets. Nuclear energy use is expected to grow from 75mn kl (accounting for 12.4% of the total 604mn kl energy supply) in 2000 to 93mn kl (accounting for 15% of the total forecast 622mn kl energy supply) in 2010.

Renewable energy is another energy source that Japan is looking to develop. However, in spite of being the world's largest producer of solar power, Japan does not have sufficient natural resources to produce large amounts of renewable energy. 'Renewables are important, but they cannot be a substitute for oil, gas, nuclear energy or coal,' the source said. 'Renewables' current share of primary energy is 5.6%, including 4.2% hydropower. We can double or triple renewable energy production, but its overall share still will not be that important compared to oil, gas and other conventional energy.'





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# Offsetting demand on world supplies

**Feng Xue,\* Regional Manager, Far East III (North East Asia), IHS Energy, considers how developments in China's domestic oil and gas sector may reduce the impact of the country's increased demands on the global energy marketplace.**

China became a net importer of crude oil in 1993 in order to meet commercial and manufacturing demands as well as those of a significant domestic consumer market. The country soon joined the US as one of the two major demands on global supplies, importing (net) some 1.66mn b/d in 2003 – a figure forecast to grow to 4mn b/d by 2010 and 8mn b/d by 2020. (See Figure 1.)

For a nation that had always valued self-reliance, this loss of oil self-sufficiency was alarming. Therefore, in order to counter this fast-growing energy demand, China embarked on a major programme that is just starting to show promise. Its national oil companies (NOCs) are bringing a number of new projects onstream as part of an ambitious schedule and doors have been opened to allow serious foreign investment.

The programme has a strategic, three-pronged approach that addresses oil production, reserves replacement and natural gas.

## Oil production

Except for a slight dip in 1999, crude production in China had been on a steady upwards trend over 20 years (see Figure 2). Although onshore oil production seems to have plateaued, offshore crude output has steadily increased. Production of natural gas has also seen a strong momentum of growth since 1995 and is expected to continue this trend in the decades to come (see Figure 3).

China produced 1,458mn boe domestically in 2003, up 0.55% from 1,449mn boe in 2002. Total hydrocarbon production comprised 1,244mn barrels of oil and 1,212bn cf of gas. Daily crude production averaged 3.41mn barrels, in line with plateau production levels in 2001 and 2002. Daily gas production averaged 3,321mn cf, a rise of 4.57% compared with that of 2002. Onshore basins contributed 85.7% and 87.7% of domestic oil and gas production, respectively, while offshore basins accounted for 14.3% and 12.3%.

Recent new offshore developments include CNOOC's Qikou 18-2 field in Bohai Bay, the second of its six targeted

offshore projects for 2004 – the company's most ambitious field development timetable to date. Qikou is reported to be currently producing more than 2,800 b/d of oil from five wells to a 3,000-tonne wellhead platform. The oil is carried via 6 km of interfield pipelines to an existing platform within the three-field Boxi complex. Meanwhile, Weizhou 12-1N – the first of the six planned projects for 2004 – is producing 7,500 boe/d.

Each of the remaining four fields yet to come onstream are expected to produce more than Weizhou 12-1N. The first phase of the Bonan oil and gas development is the next project to be commissioned, while the Bozhong 25-1S and the Caofeidian 11-1/11-2 oil fields, both newbuild FPSO developments, are due onstream in 3Q2004.

## Reserves replacement

As of end-2003, the remaining developed and undeveloped proved recoverable reserves in China totalled 24,949mn boe, of which oil accounted for 20bn barrels, with some 27tn cf of gas. (These figures do not include recoverable probable and possible reserves.) Of these reserves, PetroChina holds 14,404mn barrels of oil and 19tn cf of gas, Sinopec 3,302mn barrels and 3.52tn cf and CNOOC 1,333mn barrels and 3.954 tn cf, while international companies account for some 1,100mn barrels and 880bn cf.

The 2003 recoverable reserve additions in China amounted to over 1,741mn boe, resulting in a total hydrocarbon reserve replacement ratio of 119%. PetroChina added 1,160.9mn boe of recoverable proven oil equivalent, at a reserve replacement ratio of 130%. Sinopec added 253mn barrels and 378.7bn cf, replacing 93% of oil and 202% of gas production respectively. CNOOC added 144mn barrels and 690bn cf, replacing 148% of oil and 1,000% of gas production.

## Natural gas

Production of natural gas has shown strong growth in recent years. However, an even greater acceleration of gas pro-

duction will have to await completion of several major gas infrastructure projects. Indeed, the Chinese natural gas industry is still very much in its infancy.

Natural gas exploration, the most exciting front in the onshore upstream campaign, has marched on at a terrific pace – and with great success. The 1998 discovery of the 7.5tn cf (recoverable) Kela 2 field revealed a new petroleum system, which triggered a chain of finds in the Kuqa foreland fold-and-thrust belt in the Tarim Basin, including Dabei 1, Yinan 2, Dina 2 and Dina 1. The reserves record set by Kela 2 was soon broken by the Sulige find in the Ordos Basin, which contains 11.8tn cf of recoverable gas in the extensive Permian fluvial sandstones. Meanwhile, exploration of the Lower Triassic oolitic limestone play in the north-eastern Sichuan Basin has led to a series of major gas discoveries, including Dukouhe, Tieshanpo, Luojianghai, Maobachang and Puguangsi.

Along the northern slope of the Baiyun Sag, PRMB (Pearl River Mouth Basin), CNOOC drilled a total of eight wildcats in 2002 and 2003, of which three have been declared as gas discoveries to date – Panyu 19-3 1, Panyu 30-1 1 and Panyu 34-1 1. CNOOC estimates that Panyu 30-1 and 34-1 combined hold 1.5tn cf of gas reserves. This success has helped boost interest in the deepwater bid blocks in the area.

The majority of China's natural gas reserves are stranded in the western basins, far from the main markets on the east coast. Relatively inexpensive and abundant alternative energy, coal in particular, remains the principal source of power supply. A sizable natural gas market is yet to emerge on the horizon. Furthermore, the lack of a favourable natural gas pricing regime and consistent national master gas plan only add uncertainty for the future of the natural gas sector.

## Concession issues

International companies seem to have maintained a fairly high level of interest in China. Indeed, China is placed fourth on IHS Energy's PEPS (Petroleum Economics Policy Solutions) overall country ranking – following Kazakhstan, Iran and Norway – due to its active upstream sector, favourable fiscal terms and political stability.

During 2003 there were 16 international companies producing in China, of which Shell, ChevronTexaco and BP were the top three foreign producers in terms of total hydrocarbon output. ConocoPhillips, Shell, ChevronTexaco, Agip and JHN are the five largest foreign oil producers, whilst BP and Kufpec are by far the largest foreign gas producers.

CNOOC continues to promote offshore



acreage to the international players, whilst conducting its own independent E&P activities. In September 2002 the company offered 12 deepwater bid blocks in the northern South China Sea for high-risk exploration. The round has led to the signing of one block so far – PSCA 40/30 by Husky. The recent discovery of Panyu 30-1 and Panyu 34-1 may trigger new interest in these deepwater blocks.

CNOOC also announced in June 2003 a new round of offerings, including four blocks in the East China Sea, three blocks in the western PRMB, three blocks in the Beibu Gulf, and two open areas – one each in the South Yellow Sea and PRMB. In August 2003 CNOOC, Sinopec, Shell and Unocal signed five blocks in the Xihu Trough in the East China Sea. This rekindled interest in exploration and development of this gas-prone basin, as evidenced by Husky's November 2003 signing of PSCA 04/35.

It is worth noting that CNOOC implemented in 2002 the so-called 'cluster exploration' method, drilling a record 46 exploration wells. The underlining rationale is that more wells drilled may lead to more discoveries, which may further ignite international companies' interests in offshore China. However, any such success arising from this approach may also raise the entry threshold for foreign players. It will be interesting to see CNOOC's change of attitude towards concessions over the next few years.

A commonly held opinion is that it is difficult to enter onshore China, especially for medium-sized independents. However, in recent years, international independents have begun to gain an onshore foothold. For example, Sunwing Energy was able to sign PSCA Zitong in the Sichuan Basin for natural gas exploration and development.

The onshore state companies have been promoting the following areas to international companies: (1) tight gas development; (2) deep gas exploration; (3) coalbed-methane (CBM) exploitation; and (4) enhanced oil recovery (EOR). A joint study was conducted by several companies on the development of the tight gas reservoirs in PetroChina's Sulige project in the Ordos Basin. Meanwhile, Sinopec presented two deep gas exploration projects in the onshore Bohai Gulf Basin, but reactions were at best lukewarm, even though deep gas is probably a legitimate play in this region.

## A partial solution

It seems that China's efforts to increase domestic energy production, coupled with a slight slowdown in economic growth, will combine to offer a partial answer to concerns over China's influence upon world demand.

The problems of the massive invest-

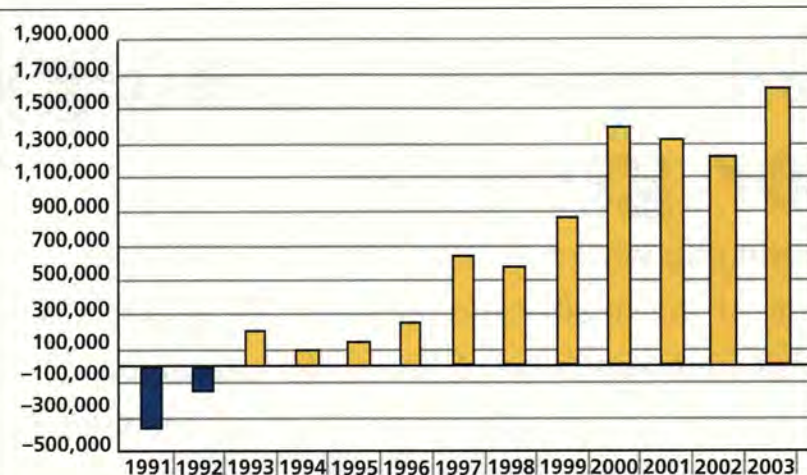


Figure 1: China's net oil imports (in b/d), 1991-2003

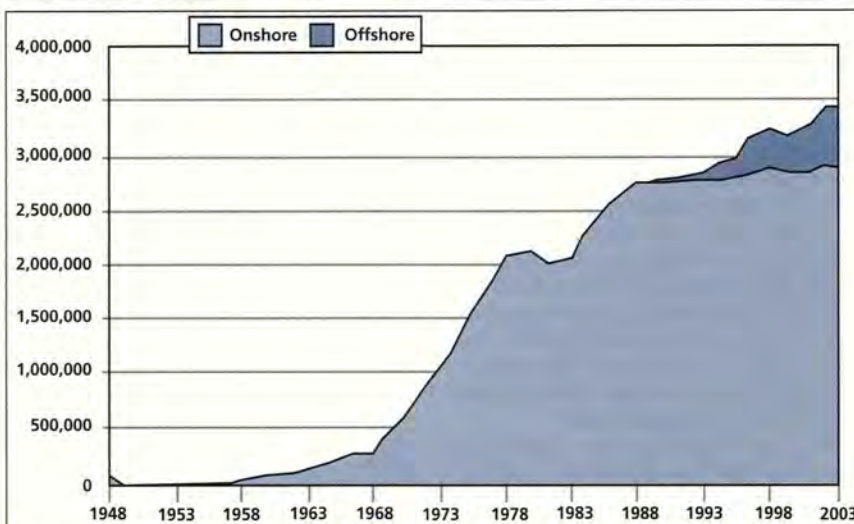


Figure 2: Chinese oil production (in b/d), 1948-2003

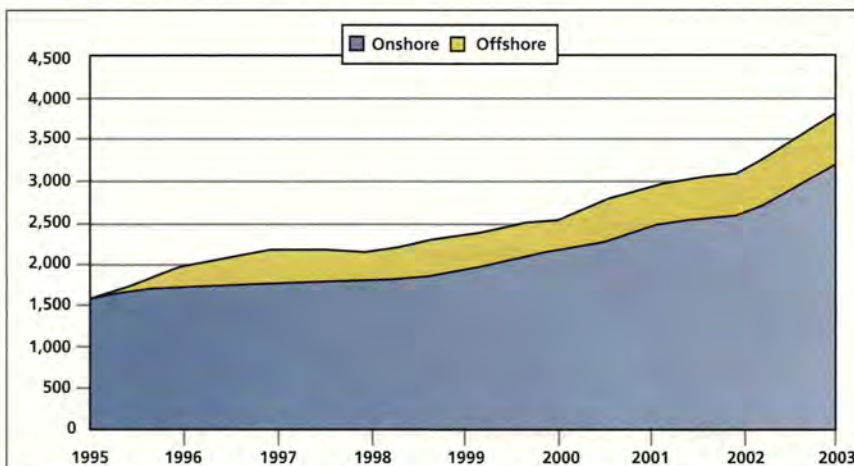


Figure 3: Chinese gas production (in mn cf/d), 1995-2003

ment required to improve activity are being solved via foreign investment, coupled with an intensive NOC programme of development.

For a nation often quoted as the first region to start drilling for oil, it seems

that China has a lot deeper to go before its reserves are fully exploited.

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# Balanced strategy for growth

Continuing with our series of articles analysing some of the smaller and intermediate oil and gas companies from around the world – based on information supplied by *Oilvoice.com* – we take a closer look at the activities of *Dana Petroleum*.

**D**ana Petroleum is an independent oil and gas company focused on growth through international exploration and the development of low-risk production from the UK North Sea. The company has seen eight years of continuous growth in oil and gas reserves, along with rising production and earnings. Last year proved to be particularly successful, with significant increases in production, reserves and bottom-line financial performance. Dana also drove forward its exploration programme and made a new gas discovery with its first well offshore Mauritania. Early indications are that the Pelican field contains around 1tn cf of gas in-place.

This year should see the sanction of four new field developments and further exploration and appraisal drilling in the North Sea, Mauritania, Indonesia and Australia.

## Europe: core production area

The UK sector of the North Sea currently delivers around 90% of Dana's

production, from eight fields. Its principal assets are its interests in the Hudson (19.5%) and Otter (19%) oil fields. This was the company's most important producing region in 2003, yielding some 2.64mn barrels of oil, approximately 42% of Dana's overall output.

Development drilling at the Otter field was completed in May 2003. A total of three subsea production wells are now onstream, producing via the Shell-operated Eider platform. The Hudson field is a subsea development of five production wells and two water injection wells tied back to the Shell-operated Tern platform. The field produced above expectations in 2003, averaging 14,284 b/d (2,785 b/d net to Dana).

A number of upgrades to the processing facilities on the Tern platform are planned during 2004 in order to provide a more stable flow regime in the production offtake system. This should enhance the production capacity available for Hudson. In parallel, the Hudson co-venturers are finalising plans to drill the nearby Melville oil prospect,

which was deferred from 2003.

Dana holds interests in five producing fields in the central North Sea, alongside a portfolio of near-term field developments and exploration prospects. This is an important growth area for the company and delivered approximately 40% of overall production in 2003, comprising 2.21mn barrels of oil and 1.73bn cf of gas.

Production from the Banff field (Dana 12.4%) benefited from the successful B5 infill well. This well, completed at the end of 2002, increased field production rates in the early part of 2003 to over 20,000 b/d of oil. A detailed analysis of future investment opportunities in the Banff area has resulted in a number of new initiatives, including the decision to reconfigure the existing Banff wells and production facilities to allow the reinjection of produced gas into the reservoir. Gas injection could extend the life of Banff by several years, with a corresponding increase in reserves extracted. Furthermore, with the floating production facilities expected to be on station for longer at Banff, studies are planned to examine the remaining exploration targets in the area. In particular, the MacDuff and Deep Banff prospects are being considered for drilling in 2005. A possible tie-back of the nearby Kyle field to the Banff facilities and development options for the 29/2a-2 gas condensate discovery are also being reviewed. Both these latter steps could add value to the gas reinjection project by providing additional gas to enhance oil recovery.

The Caledonia oil field (Dana 25.8%) was developed as a single horizontal production well tied back to the Britannia platform and was brought onstream in February 2003. Meanwhile, the Claymore oil field (Dana 7.5%) continues to be a valuable long-life

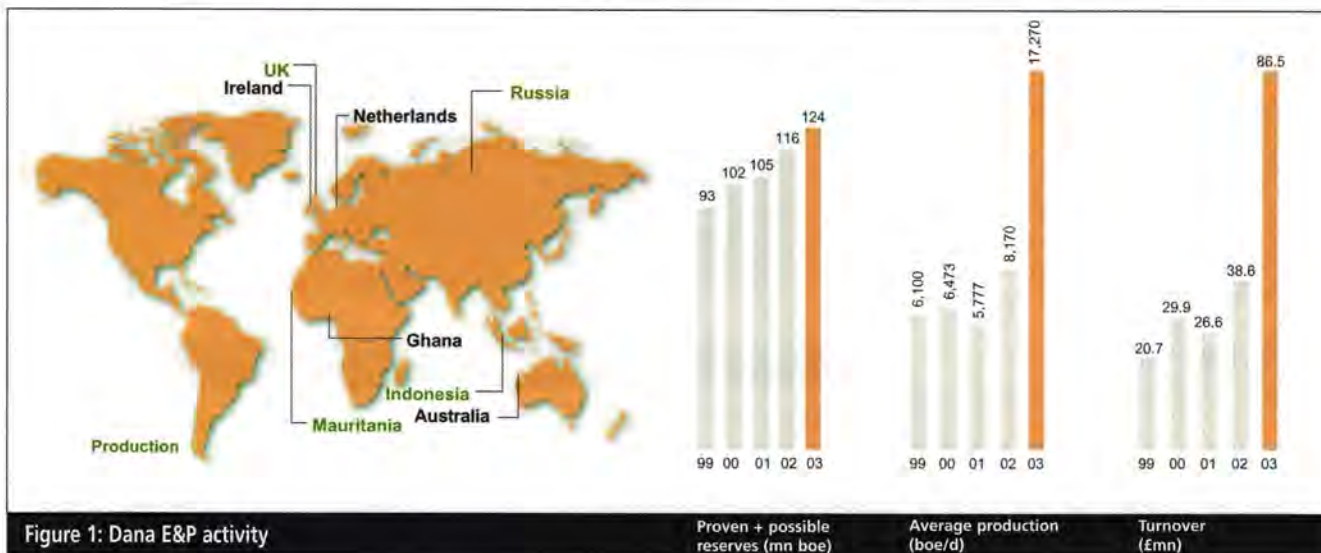


Figure 1: Dana E&P activity



producing asset for Dana, averaging 26,592 b/d (2,000 b/d net to Dana) in 2003 from a total of 27 producing wells. This stable production performance, matching that in 2002, is a result of successful well workovers and infill wells offsetting the natural decline in production that would otherwise occur. In particular, the C77 infill well that was brought onstream in September at approximately 3,600 b/d, achieved its objective of identifying an area of oil-bearing reservoir which had been by-passed by water injection. This positive result should pave the way for similar areas of by-passed oil to be drilled in the future.

## 50:50 with Venture

Dana's interests in the Greater Kittiwake Area ('GKA') were boosted during 2003 with the award in July of licences for four new blocks in the area and the completion in November of a series of transactions with Shell, ExxonMobil and Venture Production. This resulted in Dana building its interest across the entire area to 50%, creating a commercially aligned 50:50 participation with Venture. The GKA encompasses two oil fields already in production but with remaining potential, Kittiwake and Mallard, and two near-term development opportunities, Gadwall and Goosander. The area also holds other small oil accumulations with development upside, such as Grouse and the previously abandoned Durward and Dauntless fields. In addition, the acreage contains a number of interesting exploration prospects.

Combined production from Kittiwake and Mallard averaged approximately 4,400 b/d (2,200 b/d net to Dana) in the period between completion and end-2003. However, these fields contributed only 211 b/d to Dana's net average production over the year because the transaction with Shell and ExxonMobil completed so close to year-end.

A GKA technical and commercial review is currently underway to prioritise investment options in the area. Development of the Gadwall field and workovers at Kittiwake have been high-graded as projects which could make a positive impact in 2004. It is anticipated that these activities will be followed by redevelopment of Mallard and development of the Goosander field. Future possibilities include infill drilling at Kittiwake and one or two wells to test undrilled prospects such as Lightning, which has reserves potential of around 25mn barrels (12.5mn barrels net to Dana).

Elsewhere in the central North Sea, a number of discoveries continue to be advanced towards development, most notably the Barbara gas condensate

field (Dana 27%) where the opportunity to combine appraisal drilling with other drilling activity in neighbouring blocks is being examined, and the Enoch oil field (Dana 11%), where a recent change of operator is expected to catalyse development activity.

Meanwhile, in the southern North Sea, Dana holds a portfolio of production and development interests across the UK and Dutch sectors with some limited remaining exploration potential. This region delivered approximately 5% of overall group production in 2003 – a total of 1.99bn cf of gas and 5,840 barrels of associated liquids.

The Victor gas field (Dana 10%) continues to be a reliable performer. Production averaged 54.5mn cf/d of gas (5.4mn cf/d net to Dana) in 2003, an increase of 10% over 2002. This increase is driven largely by demand from the gas buyer, British Gas Trading.

Dana also has two near-term field developments in the southern North Sea. In the Dutch sector, sanction of the 450bn cf F16-E gas development (Dana 1.2%) is expected shortly. In the UK sector, the development plan for the 200bn cf Cavendish gas field (Dana 25%) should be finalised in 2004, with formal sanction expected before year-end. Both these developments will feature a minimum facilities platform with gas export via nearby established infrastructure. First gas from both fields is expected around the end of 2005.

In July 2003 Dana was awarded new licences that cover five UK blocks surrounding the Cavendish field. Reprocessing of existing 3D seismic data is now underway with a view to identifying exploration targets for drilling in 2005. Elsewhere in the Dutch sector further exploration drilling is expected in 2004/2005 in blocks E18a (Dana 5%) and A15 (Dana 9%) to test two gas prospects, each with reserves potential in the range of 200bn cf. The existing gas discoveries at A15-3 (Dana 9%) and B17a-6 (Dana 8.8%) are being considered for a possible joint development with other similar gas accumulations in the area.

## Atlantic Margin

The area west of the Shetland Islands contains very large prospects with inherently higher risk than others in Dana's portfolio. The company has positioned itself to benefit from upside in the Atlantic Margin through its 13.8% shareholding in Faroe Petroleum (FP), without the responsibility of funding future drilling. FP holds 25% interests in licence 002 and licence 005 in the Faroe Islands and, following its flotation on the Alternative Investment Market of the London Stock Exchange in 2003, is now financed to carry out its exploration

programme and grow in the region.

FP's first well, drilled with Eni Agip in licence 002, was disappointing in that it found only traces of hydrocarbons. Nevertheless, other prospects have been identified and the next drilling is expected in licence 005 in 2005, following wells scheduled this year by neighbouring operators in UK waters.

## Growing international portfolio

Offshore Africa, Dana has built extensive licence interests offshore Ghana, Mauritania and Kenya – three potentially high impact regions with a range of exploration prospects emerging. Following two discovery wells in shallow water offshore Ghana, Dana announced a major discovery offshore Mauritania in March 2004.

In the Far East, Indonesia and Australia continue to offer material opportunities to Dana, with further exploration and appraisal drilling expected during the next year. The planned development of the Ujung Pangkah field, following earlier exploration success, should turn the region into a cash generator by 2006. Dana expects first gas from Ujung Pangkah to herald a new phase of activity in the Far East. With the prospect of this area becoming a cash source in the next three years, the company also anticipates building upon its Pangkah and Sidayu exploration successes with further drilling in the region.

Meanwhile, in Russia, Dana's early entry into the West Siberian Basin has left it well positioned to exploit the recent resurgence of industry activity in the region. The development of the vast Salym group of fields offers organic growth, building on the success of the South Vat-Yoganskoye field that continues as a baseline source of oil production. The start of production from the Upper Salym field is catalysing activity in the wider group of Salym fields, the development of which should add significant value to Dana's existing oil production business at the South Vat-Yoganskoye field. The South Vat-Yoganskoye oil field is operated by the Yoganol joint venture company, in which Dana holds an 80% interest. Consideration is being given to a third phase of development drilling, featuring new wells in the western area of the field.

\*Visit [www.oilvoice.com](http://www.oilvoice.com) to view a worldwide selection of continually updated oil company profiles, or contact Chris Pettit on e: [chris@oilvoice.com](mailto:chris@oilvoice.com)



# World oil demand development in 2005

Looking at the events that have created an exceptional oil and tanker market so far for 2004 – featuring record oil prices, surging demand and VLCC rates averaging close to \$70,000/d – it is a difficult task to make projections for 2005, comments *Intertanko* in its 9 August newsletter

caution. The IEA predicts world oil demand will grow by 1.8mn b/d in 2005, or 2.2% over 2004, a slowdown on the 2004 growth but higher than the 2003 growth. Despite the current high oil prices, oil consumption is still being forecast to continue to grow. Other forecasts also predict growth ranging

from 1.4mn to 2.4mn b/d, with an average amongst these of about 1.8mn b/d. In its assumptions, the IEA expects that the world economy will continue to expand at about 4%. Uncertainties regarding the pace of this development exist, in particular with regard to the sustainability of Chinese and US growth. ●

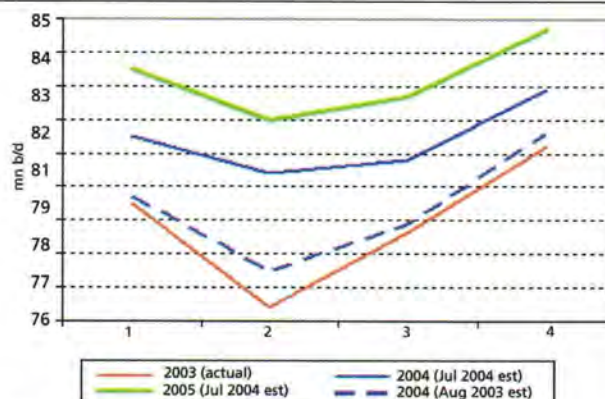


Figure 1: Quarterly world oil demand development 2003-2005 (est.)

Source: IEA

Going back one year, in its August 2003 *Oil Market Report* the International Energy Agency (IEA) predicted that 2004 world oil demand would grow by a modest 1.1mn bd (or 1.3% over 2003) – about the same growth pattern as in 2003. Growth in oil demand was predicted to be met by a corresponding growth in non-Opec oil production, leaving no room for Opec growth.

However, it turns out that 2004 world oil demand is likely to grow by more than twice that forecast, or 2.5mn b/d (a rise of 3.2% compared to 2003). Demand growth in North America, China, other Asia and Europe is more than twice as high as the August 2003 predictions for 2004. China's oil imports rose by almost 40% to 61mn tonnes in the first six months of this year, official figures revealed.

Figure 1 shows quarterly world oil demand development, comparing the 2003 actual with the August 2003 and July 2004 estimates for 2004, and the July 2004 prediction for 2005.

Figure 2 shows the world oil demand growth in mn b/d according to region for 2003-2005, while Figure 3 shows Brent blend spot oil prices from July 1999 to July 2004.

It goes without saying that the 2005 oil market must be viewed with

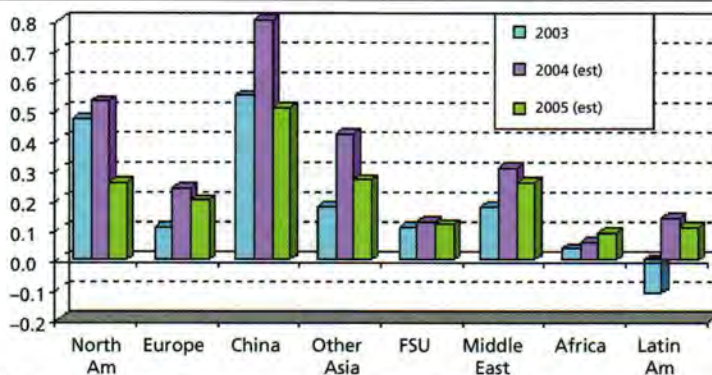


Figure 2: World oil demand growth by region, in mn b/d

Source: IEA, July 2004

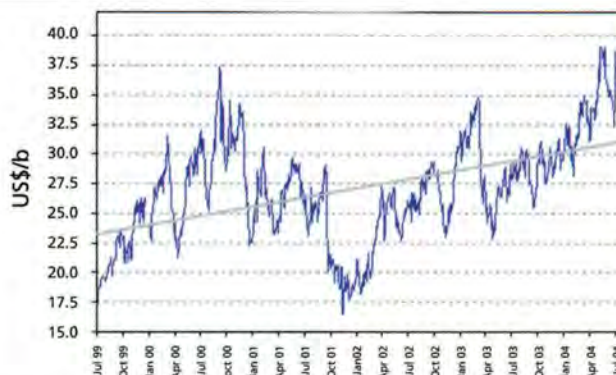


Figure 3: Crude oil price – Brent blend spot development, 1999-2004

Source: Intertanko



# Oil Depletion – No Problem, Concern or Crisis?

**Wednesday 10 November 2004**  
**Energy Institute, London**



There is mounting concern that oil supplies may peak in the relatively near future. A rash of recent books and articles have concluded that the cheap oil era is over and that fairly soon supplies will fall short of demand with almost incalculable impacts on our oil-addicted societies. Recent high oil prices and Middle East instability have heightened supply concerns. As if this was not enough, doubts have recently been raised about Saudi Arabia's ability to supply future requirements and about the real size of Middle East reserves.

So has oil depletion reached the point where it will restrict supply? Is the fundamental driver of future oil supplies geology? Or is there little or no supply problem because economics — prices and investment — are the real keys to future supplies?

The conference will tackle all aspects affecting future oil supplies — geological, financial, economic and political. Speakers from a range of backgrounds and interests will discuss all aspects of oil depletion and attempt to answer the question as to how concerned we should be about future oil supplies.

An extended panel discussion among the speakers and guests will take the debate forward with particular emphasis on economic factors, technology and the future of alternative fuels.

## Speakers include:

- Martin Fry, Director, Martin Fry and Associates
- Chris Skrebowski, Editor, *Petroleum Review*
- Roger Bentley, Senior Research Fellow, Department of Cybernetics, The University of Reading
- Francis Harper, BP
- Professor Peter Odell, Professor Emeritus of International Energy Studies, Erasmus University
- Dr Mike Smith, Technical Director, Energy Files
- Dr Robert Arnott, Senior Research Fellow, Oxford Institute of Energy Studies
- Dr Ken Chew, Vice President — Industry Performance and Strategy, IHS Energy

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Photo: ONS

# Oil and gas – at work and at play

Debating the geopolitics of oil and gas and dancing the samba were both on the agenda at Offshore Northern Seas in Norway this year. Young people and foreign delegations were also to the fore as ONS celebrated its 30th anniversary. **Nick Terdre reports from Stavanger.**

**T**he samba was part of the ONS festival, the show's fun side. However, for those who prefer their oil and gas shows traditional, there was plenty of serious fare to chew on. It began with the geopolitics of oil and energy, the topic of the keynote speech from Jeroen van der Veer, Chairman of the Royal Dutch/Shell group's Committee of Managing Directors, at the opening session of the conference.

The relationship between energy companies and governments was becoming increasingly important as the world confronted the twin challenges of providing secure and economic energy supplies to meet expanding needs and responding to climate change, van der Veer said.

Governments had an important role to play, especially in deciding who could access energy resources and markets, providing the regulatory framework, and agreeing how to respond to shared challenges such as climate change. In the past decade new markets had opened up, he said, but how this opening would develop was a vital question – it should not be taken for granted that foreign capital and participation would always be welcome. In the case of Iraq, for example, there was clearly great scope for foreign participation in rebuilding capacity – but van

der Veer said he doubted that there would be significant investment before an established government was able to provide a long-term framework.

## Ministerial message

As usual the Norwegian and UK Energy Ministers addressed the conference and gave a press briefing. Both have changed since the last ONS and since this year's show the UK Minister, Stephen Timms, has been replaced by Mike O'Brien – The Norwegian Minister, Thorhild Widvey made one of her first public appearances at ONS, having replaced Einar Steensnæs only in June.

The big announcement would have been that the cross-border treaty, whose coming was announced at the last ONS in 2002, was ready. Unfortunately, even though the principles were agreed last year, it seems that lawyers are still poring over the details. This intrigued some journalists who wanted to know if problems had arisen. Timms assured them that, in fact, it was just a time-consuming process, which he hoped would be completed before year-end.

The major thrust of the treaty will be to open the way for fresh imports of Norwegian gas into the UK. As this new era dawns, an old one ends, as Total revealed that Frigg, which has supplied

the UK with gas since 1977, was expected to cease production by October. The company dedicated its stand to reassuring the public that it still has a long future in Norway.

As Timms pointed out, the agreement on principles has opened the way for the Langeled pipeline, which will carry exports from the giant Ormen Lange field, to proceed. Langeled includes a new link to the UK. Provision will be made in the treaty for a further gas pipeline, the Minister said.

## Newcomers to Norway

Hopes are high that the treaty will also facilitate development activity in the corridor either side of the median line. Paladin Resources, which operates the Blane and Enoch fields that straddle the median line, was one of five exhibitors sharing a 'new companies' stand. In its view, the two fields have been stranded precisely because of cross-border issues, and it looks to the new treaty to resolve these problems, an official said.

The other companies on the stand were Dong, Revus Energy, Talisman and Marathon. Marathon is not a newcomer to Norway, but is enjoying a new lease of life as it gears up for Alvheim, its first operated development in the sector.

The new companies' stand shows that there has been a positive response to the government's policy of bringing fresh blood into the sector. The process continues – the Ministry held a special session at the show to apprise other prospective entrants of the benefits the sector, with its mix of maturity and frontier challenges, has to offer.

## Statoil looks north

ONS also provided the first proper opportunity to meet Statoil's new Chief Executive – Helge Lund, formerly the head of Norway's largest offshore contractor, Aker Kvaerner. Among his priorities Lund promised to make Statoil more competitive internationally and to increase the commitment to northern areas. The latter are becoming more prominent in several ways. Statoil's Snøhvit development will make it a supplier of LNG to the US market, but has run into cost overruns and delays which could threaten the start-up schedule in 2006. Lund promised a personal involvement in getting Snøhvit back on the rails.

Statoil also wants to get involved in the development of Russia's oil and gas reserves in the Barents Sea and further east. Its first target is Shtokman, the world's largest offshore gas field. Since ONS it has reached agreement with the field's owners, Gazprom and Rosneft, to carry out joint studies on Statoil's participation in Shtokman and the Russian



companies' participation in Snøhvit and its LNG marketing operations in the US.

Although Lund would not be drawn on the matter, it is possible that he, like his predecessor Olav Fjell, will want to explore a possible merger with Norsk Hydro, which is seen as the route to giving the two companies an international clout that neither can achieve on its own. Such a move would probably be rejected by the government, which is the 76% owner of the partly privatised Statoil and has a minority stake in Hydro.

But in Norway directors of state companies sometimes get their way against government opposition, as journalist Alf Ole Ask demonstrates in a recent book on state companies in Norway and who controls them. The book was the subject of a debate held in the press centre during the show. Ask says he is not trying to put forward a particular point of view but is concerned that the government appears to have no thought-out policy on its relationship with state companies.

## Focus on youth

At the last show the organiser latched onto the idea that ONS should have a special focus on youth, with a session of the conference given over to allowing groups of young professionals from a number of companies to have their say. These are the people who in a few years' time will be running the industry, the thinking goes.

The move was considered a success, so much so that the accent on youth was much expanded at this year's show. The teams of young professionals were back, this time providing 'reflective links' in the middle of each conference session.

The young only represent the industry's future to the extent that they decide to make a career in it, and at the moment the industry is struggling to persuade them that it represents a worthwhile and challenging choice. So an all-out effort to promote the industry was launched this year with invitations to different groups. One day saw the visit of young politicians, including members from the youth groups of all seven parties represented in the Parliament – who knows if there are not future Energy Ministers in their ranks?

Another day a group of third-year science students from universities and technology colleges was present, and on a third day a group of science teachers and career advisers.

Inviting youth and youth-related groups to ONS may become a regular feature. It has certainly become a fixture to invite delegations from other oil and gas producing countries with which the Norwegian industry wants to build relationships. The arrangements for these



Photo: ONS

The Norwegian/UK cross-border treaty should be ready by year-end, according to former UK Energy Minister Stephen Timms and Norwegian Energy Minister Thorhild Widvey. Samba dancers (left) enlivened ONS' 30th anniversary celebrations.

visits are made by Intsok, the Norwegian Oil and Gas Partners, in collaboration with ONS. This year there were delegations from 10 countries, including for the first time China and Mexico.

## Foreign delegations

Some of the foreign delegations included high-ranking government members, such as Energy Ministers and Deputy Ministers from Kazakhstan, the Russian Federation, Iran and Venezuela. Delegations were also present from Angola, Azerbaijan, Brazil and Nigeria. India was also officially represented for the first time, with its own seminar arranged at the initiative of the ChemTech Foundation.

In the conference technology spot the focus was on e-operations, an approach to optimising drilling and production operations which, as Tor Skjærpe, Vice President of Technology at Petoro, put it, involves integrating technology, people and work processes. 'The premise for success is a flexible and highly multi-skilled organisation,' he stressed. 'Success with technology is all about people.'

The final conference session was largely given over to workshops looking at four examples of the implementation of e-operations – on ConocoPhillips' Ekofisk, on Statoil and Hydro's Norne, Giltne and Fram West fields, on Total's Canyon Express in the Gulf of Mexico and on Hydro's upcoming Ormen Lange project.

Halliburton also paid tribute to the significance of e-operations by taking the whole of one of the smaller halls and turning it into a theatre, with its own employees forming the cast. Groups of visitors were taken around a series of stations in an imaginary asset management centre to see how the different functions interact to solve a production problem and work towards an

optimised process.

## Innovation rewarded

Among several companies which have implemented this type of process is BP. An important fundament of its developing e-operations on Valhall is the wealth of data provided by the life-of-field seismic project it has implemented on the field, for which it received the ONS Innovation Award. A second innovation award, for smaller and medium size companies, was introduced this year, the inaugural distinction being won by Total Catcher for its tubing disappearing plug.

Since it began in 1974, ONS has established itself as one of the leading offshore industry forums. The inaugural show was opened by Crown Prince Harald; this year, as King Harald, he again opened the show, as he has done on many occasions. Prime Minister Kjell Magne Bondevik was also present at the opening.

Norway is small enough, and its oil industry big enough, to warrant the presence of the heads of state, both actual and nominal. Another unique characteristic is the festival, the industry's gift to the people of Stavanger, the country's oil capital.

Hence the samba, as demonstrated with élan by the Vila Isobel School of Samba from Rio de Janeiro. They were there as part of six delegations invited from oil towns across the world, including Ravenna in Italy and Bilbao in Spain, to give a taste of their culture.

The festival also included a lot of music, a competition to build a giant oil platform in spaghetti, a mass run, a chess tournament, a rugby match and other activities. ONS clearly takes the view that all work and no play makes Jack a dull boy. And despite the frequent rain, that seemed to be the con-



# Safety net for foreign investments in Bolivia

A new draft hydrocarbons law introduced by Bolivian President Carlos Mesa has been put before Congress. It raises important questions about the stability of foreign investments in Bolivia's burgeoning hydrocarbons sector and could open the way to major state intervention, writes *Stephen Jagusch*, a partner specialising in arbitration at the international legal practice *Allen & Overy LLP*.

The new law – details of which can be found at [www.comunica.gov.bo/documentos\\_oficiales/ley%20referendum30\\_8pm.html](http://www.comunica.gov.bo/documentos_oficiales/ley%20referendum30_8pm.html) – contains provisions to raise taxes on oil companies and renegotiate contracts. Its unveiling follows a recent referendum, the result of which empowers the government to take greater control over the export and sale of Bolivia's vast oil and gas reserves. Indeed, some pro-nationalisation campaigners are already claiming that the results of the referendum oblige the government to end foreign ownership of oil and gas assets.

## Far reaching consequences

The President has called for the new law to be approved by Congress as soon as possible. If passed, the outcome is likely to have far reaching consequences in terms of the contractual relationship between concession holders and the state, as well as the economic returns that existing investors will receive from their interests in Bolivia.

The new tax would be applied on a sliding scale, rising in relation to the size of the gas fields, output and volume of investment. Brazil's Petrobras, Spanish company Repsol-YPF and BP – which own the largest field – could see their level of taxation increasing to 50%, according to some financial analysts.

The new law also envisages restoring the state's role in energy development by reviving the state energy company Yacimientos Petrolíferos Fiscales de Bolivia (YPFB). Over 70 shared-risk contracts will be re-negotiated to make room for YPFB.

## Legal rights

With the second largest reserves of natural gas in Latin America, Bolivia is

expected to play a significant part in satisfying the demand for gas in the continent over the next 20 years. While the Bolivian Parliament considers President Carlos Mesa's new hydrocarbon law, foreign oil and gas companies will also be considering what legal protection they have for their investments.

In negotiations with Bolivian officials that are likely to follow, foreign oil and gas companies must be fully aware of their legal rights. In addition to the protection offered in their existing contracts, investors cannot neglect the very effective protection that investment protection treaties can provide.

Bolivia has signed at least 19 bilateral investment protection treaties with other States – Argentina, Belgium, Chile, China, Cuba, Ecuador, France, Germany, Italy, the Netherlands, Peru, Korea, Spain, Sweden, Switzerland, the UK, the US, Uruguay, and Venezuela – which contain promises of fair treatment and protection for each other's investors. Many of the foreign oil and gas companies with interests in Bolivia, including a number of Latin American investors, are nationals of States to which Bolivia has a treaty and therefore these investors may enjoy the legal protections these treaties provide. These include Bidas, Repsol-YPF, Shell, Total, Enron, British Gas, El Paso and Petrobras.

A foreign oil company seeking a remedy against Bolivia may institute investment arbitration proceedings relying on the provisions of a bilateral treaty between Bolivia and its national State. The wording of these treaties can vary, but most provide, at a minimum, that investors in Bolivia and their investments are entitled to fair and equitable treatment in accordance with international law.

Investors must also not be treated arbitrarily or be discriminated against,

or receive treatment that is less favourable than the treatment of Bolivian companies ('national treatment') or companies from other countries with which Bolivia also has a treaty ('most favoured nation treatment').

It is possible that any contractual arrangements between investors and Bolivia that aim to preserve the financial equilibrium of a long-term state contract can also be protected to some extent by the provisions found in some treaties that oblige Bolivia to observe the obligations it has entered into with foreign investors. They could be entitled to compensation for their losses if Bolivia took actions that are in effect tantamount to an expropriation of their investments, such as through confiscatory increases in the tax or royalty regime for oil and gas companies.

Furthermore, any outright re-nationalisation of the gas industry may violate Bolivia's international obligations, regardless of the popular support expressed in the referendum, unless it pays investors prompt, adequate and effective compensation.

## Going to arbitration

Bolivia has ratified the 1965 ICSID Convention so that certain treaty claims may be brought before ICSID, the arbitration body affiliated to the World Bank. Indeed, Bolivia is currently defending a case at ICSID which has been brought by a foreign investor who operates a water concession in that country and who alleges that the government took various steps which adversely affected its investment.

In certain situations, these treaty remedies may be capable of being pursued in addition to any direct contractual arrangement an investor may have with Bolivia for settling disputes. ●



# El aviation fuel filter conditioning facility goes live

It was reported in the April edition of *Petroleum Review* that an El contract was awarded to Air BP for the design, construction and installation of an aviation fuel filtration conditioning facility at O'Hare International Airport, Chicago. The facility is now operational.

Following completion of the detailed design in early spring, work began on the fabrication in late April, which was sub-contracted by Air BP to Fuel Tech and Velcon Filters. United Airlines also kindly donated a clay vessel to the El for use during the project. The fabrication stages were completed by the end of June, when the conditioning facility was transported to O'Hare. The connection to the tank farm pipework took place in July, shortly after the conditioning facility had been visited by project participants to confirm that it met the detailed specification. Successful commissioning took place in early August.

Project participants agreed the programme for the first filter monitor element test back in May, and the conditioning facility was appropriately configured for the test to begin on 16 August. Monitor elements are to be removed for testing and analysis at vessel throughputs of 5mn, 10mn, 15mn and 20mn gallons. The first 5mn gallon throughput was reached on 2 September, at which point elements were removed and sent for laboratory performance testing. Such testing will continue throughout the autumn, and

during the second test programme which is scheduled for completion by year-end.

In addition to the contract for the design, construction and installation activity that occurred over the summer, three further contracts have also been placed for this project by the El following a competitive tender process. The first of these is with Velcon Filters of Colorado Springs, to provide the El with laboratory testing facilities for filter monitor elements. Such tests will be used to gauge the laboratory performance of filter elements taken from the conditioning facility at O'Hare. Velcon is able to provide such information on a quick turn round basis.

The second contract has been placed with ExxonMobil Research & Engineering, Fuel Products Division, to provide a Test & Results Co-ordinator until year-end. Robert Becker, Advanced Chemist, will be ensuring that conditioning, testing and subsequent filter analysis runs smoothly. The third contract has been placed, again with ExxonMobil Research & Engineering, Fuel Products Division, to provide the El with a portfolio of analytical services that can be called upon to investigate specific aspects of any filter elements

removed from the conditioning facility.

Finally, a fourth contract will be placed with Airport Group International, to take on the responsibility for the operation of the facility at O'Hare at the completion of the Air BP contract (end of Test 1).

The El has continued to seek additional project participants for the O'Hare filter monitor conditioning activity and has recently been successful in obtaining the support of the Co-ordinating Research Council (CRC), a non-profit organisation that directs engineering and environmental studies on the interaction between automotive equipment and petroleum products, based in Alpharetta, Georgia, US. CRC is well known to many involved in aviation and automotive fuel handling industries.

Further participants are still welcome. If your company has an involvement with aviation fuel and you would like further information on the project, please contact Martin Hunnybun, Technical Manager – Distribution and Aviation, at the El on t: +44 (0)20 7467 7133, e: [mh@petroleum.co.uk](mailto:mh@petroleum.co.uk)





# Why is travel health important to you and your contractors?



**The world is still plagued by many diseases that have been successfully eradicated in the UK. Employers have a duty of care to their employees and decent travel health advice can significantly reduce the risks to contractors sent to work in some of the more remote parts of the globe, reports Dr Charlie Easmon, Medical Director, The Number One Health Group.\***

**T**he UK has successfully rid itself of many diseases that still plague the poorer parts of the world. Such diseases include hepatitis, which can damage the liver, cause tiredness and in some cases lead to cancer; tetanus, which can cause spasm of the jaw and death; typhoid, which can cause a hole in the gut and death; polio, which can cause paralysis; and rabies, which, once it reaches the brain, is fatal. Indeed, most of us know someone who was severely ill, or has even died, from malaria.

However, decent travel health advice can significantly reduce these risks.

### **The legal reason**

Employers owe a duty of care to their employees. An engineering firm recently had to settle out of court with a widow whose husband died of malaria after being sent to work in a foreign country. Her lawyers successfully argued that he should have received up-to-date malaria prevention advice. However, the unfortunate man had only been told about the risk of yellow fever. In another case, a lawyer successfully won a six-figure sum from her own law firm after it failed to warn her of the risk of amoebic gut diseases in West Africa.

Properly documented, accurate travel health advice can reduce the risk of such payouts.

### **The financial reason**

Reducing the risk of having to make court, or out-of-court, payments are an obvious cost saving to the employer, but who audits the cost of illness? How many people have returned from abroad and been wrongly diagnosed by their GP? For example, some people are told they have irritable bowel syndrome (IBS), which is a life-time diagnosis for what may be a parasitic illness and could be treated in a week. How many people with malaria end up in intensive care or are too ill to work? Even hepatitis can put you out of action for several months.

You and your work force deserve the best and most up-to-date advice available. Good travel health advice is not an area in which to falsely try to save costs. Many employers show no interest at all in where, or even whether, their employees receive travel health advice. If 20 contractors go to see 20 different general practitioners (GPs), it is almost a certainty that they will receive 20 different opinions ranging from the well-informed to the truly appalling. You, as employer, should want to be certain that all 20 of your employees have had the best advice possible and that this is consistent. With this knowledge you can feel reassured that your duty of care has been met.

### **The logistical reason**

You are pulling a team together from different locations. You may even disperse them overseas. Why not make sure they all have the same written travel health brief? See if a provider can go to them, if you cannot bring them all to one place to see the provider. In addition, why not make sure one provider keeps all the health records for you and ensures completeness? How many times has someone said: 'I don't remember what I had and when I had it?' This is costing you, and them, time and money.

A simple example – if you have two hepatitis A vaccinations within one year of each other, then booster jabs are not required for a further 10 years. However, people usually forget to book their second vaccination and



have to start again – each time at a cost of more than £40. Why not choose a provider who can ensure a recall is made as and when the next vaccinations are due?

Another example – you have sent your engineer to a malarious area. The initial contract was supposed to be three months, however it has been extended. Who do you ask to provide more malaria tablets? The NHS GP is not allowed to prescribe for more than three months to someone going abroad. You need a provider who can source and deliver the medication to your engineer in the field.

## Good travel health policy

As an employer, what should you think about in order to provide comprehensive travel health duty of care?

First, you should ask yourself if your company even has a travel health policy. If not, think about what should it contain or who you can ask to provide you with this information.

A good travel health policy should consider the following:

- What are the likely risks to your travellers?
- Who advises your employees or contractors on travel health risk?
- What resources do the service providers currently use to give your employees or contractors the most up-to-date advice?
- Does each person have a record of what vaccinations/medication they have had and is it regularly updated?
- Do you give them written travel health information or an oral health brief, or both?
- Have you checked their insurance?
- Have you checked that they know their blood group and that they are at most risk of road accidents?
- Can you reduce the risk of road accidents? (ie advise no self-driving in the first 24 hours after a long-haul flight?)
- Have you assessed the risk of deep vein thrombosis (DVT)?
- Have you assessed the fitness of the individual to travel?
- Will you supply any sort of medical kit, including anti-diarrhoea medicine?
- Have you talked about sexual health risks?
- What do you know about the quality of local medical facilities?
- What system do you have in place for assessing post-travel illness?
- How will you cope with next SARS-like illness overseas?

The above list is not exhaustive, but it does give an idea as to why clients use services such as those provided by The Number One Health Group\* to ensure that their employees get the best travel health advice and services before, after and during their time abroad.

*\*The Number One Health Group (incorporating Travel Screening Services Ltd) is based at One Harley Street, London W1G 9QD. t: +44 (0)20 7307 8756, www.numberonehealth.co.uk The author of this article, Dr Charlie Easmon, can be contacted at e: Charlie@travelscreening.co.uk*



INFORMATION FOR ENERGY GROUP

## Copyright – One Year On

Tuesday 16 November 2004  
14.00-17.00 with free buffet lunch  
held at the Energy Institute, W1G 7AR

Attendance FREE for IFEG members; £10 for ASLIB Members  
£25 to non-members of IFEG or ASLIB or £20 to join IFEG

Just a year ago the new Copyright Act came into force. Come to this seminar to hear the CLA's plans for licences in the future; how the British Library is coping with the new regulations, and Paul Pedley's advice on staying legal. A forum at the end will allow the speakers to be questioned further, and the exchange of views amongst the audience.

Graham Coult, Editor of *Managing Information*, will chair the seminar.

To attend contact IFEG Secretary  
t: +44 (0) 20 7467 7115 e: ifeg@energyinst.org.uk or  
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All details are correct at time of going to press, but IFEG reserves the right to make alterations if necessary



## EI Membership Challenge

The EI is committed to growing its membership in order to increase access to its services and strengthen its position within the industry. To help us achieve this, we need the help of the EI's most successful ambassadors – each of you!

**We are offering two return flights up to the value of £3,500\* to the EI Member who recruits the most new Affiliate members between 1 September 2004 and 31 December 2004. This membership challenge is open to all members across the world regardless of your grade of membership. New members must be accepted for Affiliate membership, the EI's most flexible grade of membership.**

Copies of membership application forms can be downloaded by visiting [www.energyinst.org.uk](http://www.energyinst.org.uk) or by contacting the Membership team on t: +44(0)20 7467 7100.

\*Terms and conditions apply



# Marine crude oil transport – 2003 analysis

This article by *Paul S Harrison* – Consultant to the HMC-4A

Marine Oil Transportation Database Committee – presents findings from analysis of the 2003 data, updating the 2002 analysis which was reported in the October 2003 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](http://www.oil-transport.info) or via the EI website at [www.energyinst.org.uk](http://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 2003:

- BP Oil
- CEPSA
- ChevronTexaco
- Chinese Petroleum Corporation
- ConocoPhillips
- Eni
- ErgMed
- ExxonMobil
- Marathon Ashland Petroleum
- Petrobras
- Petrogal (GALP Energia)

- PMI Pemex
- Repsol-YPF
- Saras
- Scanraff (PREEM)
- Shell
- Statoil
- Sunoco
- Total

Membership of the Committee 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 its sister committee, HMC-4B – The Oil Transportation Measurement Committee. The next meetings will be held in Mexico on 9–11 November 2004 and will be hosted by PMI Pemex. 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 continues to increase, due partly to the growth in membership but also as a result of existing members gathering more data from affiliates. The total number of voyages reported rose in 2003 to almost 9,800 and included 6.54bn barrels of crude at bill of lading (BOL). As shown in Figure 1, total volume for voyages with complete load and discharge data was 5.62bn barrels, an increase of 9% over the 2002 volume.

The latest *BP Statistical Review of World Energy* gives global crude trade for 2003 as 12.97bn barrels. The database therefore includes over 50% of the global volume at bill of lading for the first time and has load and discharge data for over 43% of global volume. The database is considered sufficiently large to represent the global situation.

## Global mean loss

The mean net standard volume (NSV) loss from the database from 1989 to 2003 is plotted in Figure 1. An overall improvement from 1989 to 1995 is readily

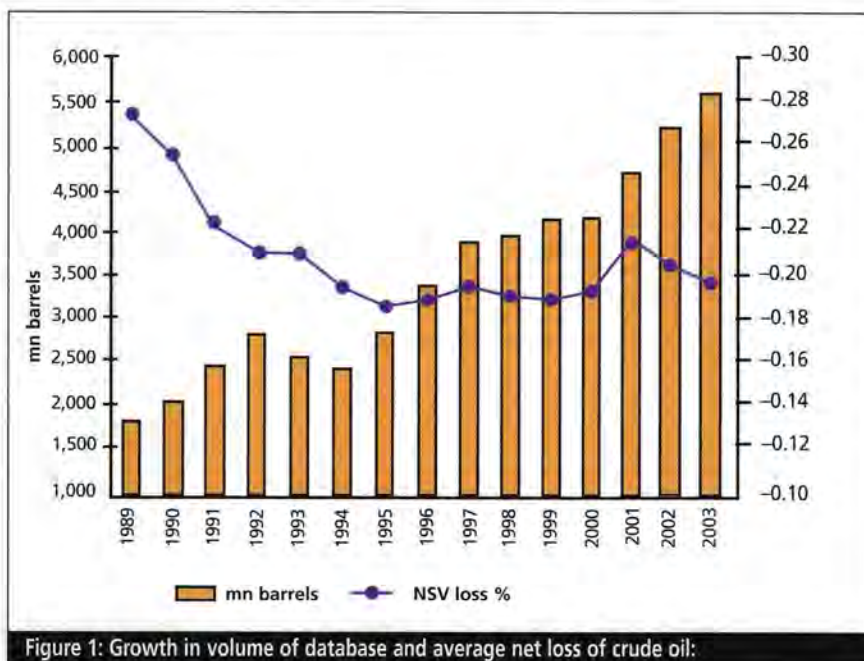


Figure 1: Growth in volume of database and average net loss of crude oil:



apparent, and it can be seen that global loss then showed no major change between 1995 and 2000. A significant increase in mean NSV loss occurred between 2000 and 2001. However, this has been reversed during 2002 and 2003 and mean NSV loss now stands at -0.195%, the same as in 2000 (by convention losses are given as negative).

## 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 2003 and 2002. Please note that Russian Export Blend has been divided into two grades – Urals (Black Sea) and Urals (Baltic) – in order to distinguish between grades loaded in the south and north.

Crude type	API gravity	Overall volumes (NSV)			Calculation by voyage					
		Total barrels	Barrels loss	Barrels loss %	2003			2002		
					NSV loss %	Mean	Std dev	NSV loss %	Mean	Std dev
							No.			No.
Abu Safah	28.9	13,491,269	-23,044	-0.17	-0.15	0.69	31	-	-	-
Al Shaheen	27.9	41,625,476	-80,685	-0.19	-0.18	0.37	54	-0.34	0.29	34
Alaskan North Slope	32.0	314,287,194	-182,425	-0.06	-0.05	0.21	419	0.00	0.24	478
Amna	37.9	46,994,774	-141,269	-0.30	-0.30	0.20	77	-0.28	0.31	61
Arabian Extra Light	39.1	131,296,307	-345,422	-0.26	-0.25	0.41	177	-0.26	0.34	180
Arabian Heavy	27.7	140,416,244	-342,437	-0.24	-0.22	0.46	188	-0.13	0.60	124
Arabian Light	33.2	408,337,195	-1,137,392	-0.28	-0.26	0.36	420	-0.19	0.53	353
Arabian Medium	30.7	126,526,018	-231,319	-0.18	-0.18	0.51	178	-0.28	0.56	159
Asgard	44.7	40,669,276	-126,924	-0.31	-0.31	0.14	51	-0.41	0.25	55
Azeri Light	34.7	30,334,683	-32,603	-0.11	-0.10	0.13	32	-0.08	0.20	32
Bach Ho	40.3	50,212,167	-238,920	-0.48	0.42	0.50	104	-0.39	0.49	107
Basra Light	31.1	80,286,629	-184,541	-0.23	-0.25	0.30	59	-0.25	0.21	33
Beryl	38.9	14,489,105	-36,910	-0.25	-0.25	0.42	25	-	-	-
Bonny Light	33.7	62,674,064	25,345	0.04	0.06	0.32	59	-0.38	0.79	31
Bouri	25.9	21,130,210	-41,768	-0.20	-0.26	0.44	41	-0.03	0.42	36
Brent Blend	38.4	52,170,171	-33,403	-0.06	-0.07	0.20	73	-0.24	0.24	33
Cabinda	32.7	44,059,195	187	0.00	0.00	0.27	47	0.06	0.21	46
Canadon Seco	24.7	29,957,958	-13,700	-0.05	-0.05	0.17	85	-0.03	0.35	72
Cerro Negro SCO	15.6	26,969,537	11,780	0.04	0.05	0.28	51	0.07	0.33	54
Champion	28.4	7,415,883	-12,270	-0.17	-0.12	0.38	24	-0.17	0.64	21
CPC Blend	46.1	85,959,533	-281,207	-0.33	-0.34	0.30	95	-0.19	0.29	38
Danish	33.7	57,794,119	-100,920	-0.17	-0.17	0.19	93	-0.16	0.20	93
Draugen	40.4	30,667,028	-90,200	-0.29	-0.30	0.14	37	-0.34	0.16	63
Ekofisk	37.6	122,380,074	-101,308	-0.08	-0.08	0.15	185	-0.09	0.15	176
Eocene	18.3	10,236,838	-19,654	-0.19	-0.20	0.49	23	-	-	-
Es Sider	36.9	29,393,406	-108,938	-0.37	-0.36	0.18	46	-0.32	0.18	21
Escalante	23.4	22,213,668	15,832	0.07	0.07	0.30	33	0.13	0.35	37
Escravos	34.1	52,736,936	6,759	0.01	0.01	0.31	54	-	-	-
Flotta Mix	35.4	33,274,525	-99,780	-0.30	-0.30	0.14	50	-0.33	0.23	57
Foinaven	28.4	20,216,203	-16,284	-0.08	-0.12	0.30	28	-0.03	0.19	31
Forcados Blend	30.8	52,683,960	-18,202	-0.03	0.02	0.49	46	0.04	0.25	38
Forozan	30.2	26,146,285	-68,099	-0.26	-0.16	0.41	25	-0.21	0.28	48
Forties Blend	44.7	128,113,935	-288,633	-0.23	-0.22	0.19	194	-0.20	0.18	190
Girassol	31.4	41,650,028	-42,209	-0.10	-0.10	0.21	43	-0.08	0.17	44
Glitne	32.9	9,742,723	-23,598	-0.24	-0.24	0.26	38	-0.20	0.22	48
Gulfaks A	36.2	60,017,968	-189,244	-0.32	-0.32	0.21	70	-0.42	0.18	75
Gulfaks C	36.5	39,129,108	-136,658	-0.35	-0.35	0.23	46	-0.39	0.20	54
Harding	20.5	14,717,651	11,177	0.08	0.07	0.40	25	-0.11	0.20	31
Hibernia	35.1	44,360,183	-14,663	-0.03	-0.04	0.34	67	-0.08	0.27	50
Iranian Heavy	30.1	78,211,586	-201,110	-0.26	-0.26	0.26	118	-0.30	0.42	114
Iranian Light	33.4	62,953,074	-169,644	-0.27	-0.29	0.26	79	-0.24	0.43	72
Kirkuk	33.2	27,003,765	-131,352	-0.49	-0.45	0.35	29	-0.32	0.28	57
Kuwait Export	30.4	96,016,318	-246,145	-0.26	-0.27	0.41	68	-0.29	0.39	64
Lower Zakum	39.7	22,503,395	-45,210	-0.20	-0.23	0.24	34	-0.28	0.24	32
Masila	31.8	34,565,330	-15,452	-0.04	-0.05	0.16	22	-0.18	0.21	27
Maya	21.8	352,814,043	-1,152,756	-0.33	-0.34	0.24	636	-0.39	0.24	582
Mersey 16	16.0	39,689,879	105,093	0.26	0.27	0.20	74	0.23	0.27	103
Mesa 30	30.6	32,434,430	-38,015	-0.12	-0.12	0.28	54	0.02	0.24	60
Murban	39.5	79,293,937	-229,644	-0.29	-0.24	0.37	105	-0.33	0.42	66
Nemba	40.7	20,430,394	-52,680	-0.26	-0.22	0.53	24	-0.27	0.24	36
Norne	32.6	31,696,979	-58,437	-0.18	-0.20	0.30	40	-0.28	0.29	37
NWS Condensate	60.6	14,192,626	-14,950	-0.11	-0.08	0.26	23	-0.10	0.27	22
Olmeca	39.0	65,697,883	-181,674	-0.28	-0.27	0.27	122	-0.23	0.22	167
Oman Export	32.5	57,761,002	-100,726	-0.17	-0.18	0.17	67	-0.18	0.41	64
Oriente	24.3	23,731,443	63,674	0.27	0.25	0.38	63	0.17	0.48	48
Oseberg	38.7	66,720,931	-176,865	-0.27	-0.26	0.15	101	-0.30	0.14	67
Palanca	37.0	22,879,969	-23,010	-0.10	-0.10	0.47	24	-0.15	0.24	37
Qatar Land	41.3	21,125,832	-189,902	-0.90	-0.89	0.45	26	-0.96	0.30	33
Qatar Marine	34.2	32,559,840	-83,599	-0.26	-0.24	0.29	39	-0.13	0.54	51
Qua Iboe	36.7	70,310,344	-45,787	-0.07	-0.08	0.31	74	0.01	0.32	82
Rabi Light	36.5	31,146,352	-69,668	-0.22	-0.23	0.20	33	-0.01	0.18	22
Ratawi	24.2	20,885,450	-76,815	-0.37	-0.34	0.38	34	-	-	-
Saharan Blend	45.6	86,415,062	-101,898	-0.12	-0.09	0.29	122	-0.12	0.23	91
Santa Barbara	39.7	14,187,557	-22,413	-0.16	-0.15	0.18	26	-0.15	0.29	33
Sarir	37.8	19,309,934	-23,065	-0.12	-0.14	0.31	30	-	-	-
Schiehallion	26.0	27,755,899	10,428	0.04	0.02	0.29	31	0.01	0.29	29
Seria Light	37.2	9,185,330	16,363	0.18	0.19	0.57	29	-0.01	0.37	25
Siberian Light	35.7	22,819,046	-46,494	-0.20	-0.17	0.36	46	-0.21	0.18	32
Sirtica Blend	40.0	21,593,619	-34,493	-0.16	-0.16	0.18	35	-0.14	0.21	31
Souedie	24.5	24,336,414	-42,006	-0.17	-0.19	0.30	54	-0.19	0.36	72
Statfjord	39.4	134,248,158	-377,162	-0.28	-0.28	0.16	169	-0.28	0.22	161
Syrian Light	38.0	43,908,681	-128,018	-0.29	-0.29	0.28	81	-0.33	0.33	105
Tapis Blend	46.3	13,082,112	-47,432	-0.36	-0.28	0.66	34	-0.32	0.55	32
Tengiz	46.4	20,187,340	-82,106	-0.41	-0.41	0.32	23	-0.27	0.32	53
Terra Nova	33.2	21,198,113	8,367	0.04	0.04	0.21	34	-0.04	0.14	35
Triton	39.0	14,592,390	-94,517	-0.65	-0.64	0.28	29	-0.47	0.32	36
Troll	27.4	44,894,467	-14,808	-0.03	0.00	0.33	71	-0.07	0.27	81
Umm Shaif	36.9	9,851,898	-19,965	-0.20	-0.13	0.44	26	-	-	-
Urals (Baltic)	32.0	198,936,483	-261,838	-0.13	-0.13	0.20	323	-	-	-
Urals (Black Sea)	32.2	191,631,777	-593,604	-0.31	-0.32	0.26	298	-	-	-
Yoho	39.1	25,993,815	-151,594	-0.58	-0.60	0.47	30	-	-	-
Zafiro	31.8	27,041,780	-86,216	-0.32	-0.31	0.24	27	-0.42	0.34	24
Zarzaitine	43.2	24,156,597	-81,772	-0.34	-0.34	0.15	33	-0.35	0.17	27

Table 1: Analysis by crude oil type 2003



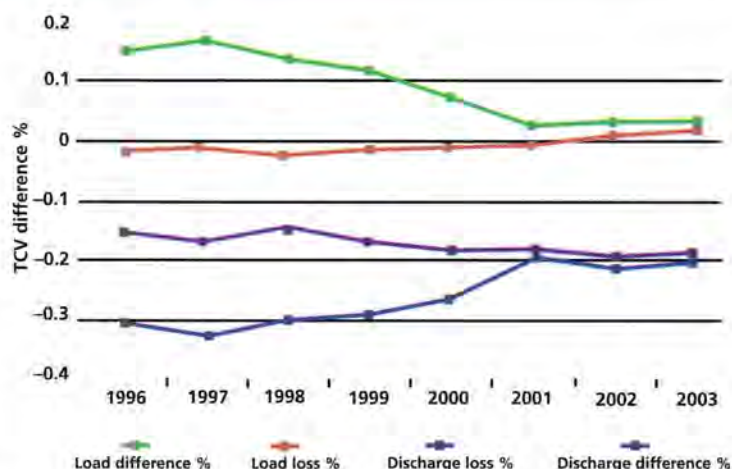


Figure 2: Comparison of load and discharge figures

The data in Table 1 is not 'table corrected' but based on original bill of lading 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 will therefore 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 2003 with those for 2002. Following an increase in the standard deviations (spread) of all the main losses figures in 2002, this variability has reduced in 2003 to levels in line with those seen in previous years.

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 quantities (free and dissolved) deducted. TCV is the NSV plus sediment and free and dissolved water.
- Load difference is the TCV difference between the ship after loading and the shore delivered volume.
- Discharge difference is the TCV difference between the ship before discharge and the shore received volume. Note that load and discharge differences are not corrected for VEF (vessel experience factor). However, load loss and discharge loss figures are also calculated making allowance for OBQ (preload onboard quantity) and ROB (remaining onboard) and taking into account load VEF.
- 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).

Between 1997 and 2000 there was a trend of reducing load differences balanced by a similar increase in discharge differences. However, this now seems to have levelled off – as is seen in Figure 2. This shows these 'differences' compared with the load and discharge loss figures which are adjusted for VEF and OBQ and ROB.

It can be seen that the gap between the uncorrected 'difference' figures and the corrected 'loss' figures has reduced again in 2003 to 0.016%. The closing of this gap over recent years is due to a general reduction in VEF's and a reduction in OBQ and ROB volumes as shown in Figures 3 and 4.

Load loss in 2003 was 0.014%, higher than in 2002 but still 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.

Figure 3 shows a fall in load VEF values over the past nine years. This fall is apparent from the average value by voyage and also from the average value by vessel. The 2003 average by voyage is below 1.0000

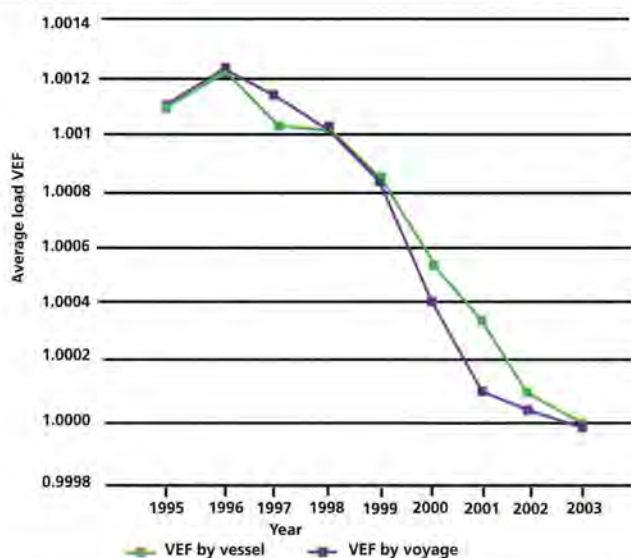


Figure 3: Vessel experience factor figures



Crude type	Mean NSV Loss %		Table Difference
	Original	Corrected	
Abu Safah	-0.15	-0.04	0.11
Arabian Extra Light	-0.26	-0.10	0.17
Arabian Heavy	-0.33	-0.27	0.07
Arabian Light	-0.29	-0.13	0.16
Arabian Medium	-0.20	-0.10	0.10
Arun Condensate	0.00	0.02	0.02
Belida	-0.63	-0.54	0.09
Dubai Export	-0.15	-0.06	0.10
Dulang	-0.01	0.12	0.13
Eocene	-0.12	-0.12	0.00
Labuan	-0.19	-0.09	0.11
Lower Zakum	-0.22	-0.09	0.12
Murban	-0.28	-0.14	0.14
Oman Export	-0.19	-0.07	0.12
Oman Residue	-0.31	-0.18	0.12
Qatar Land	-0.89	-0.81	0.08
Qatar Marine	-0.24	-0.18	0.06
Ratawi	-0.35	-0.30	0.05
Saharan Blend	-0.09	-0.03	0.06
Senipah Condensate	-0.28	-0.21	0.07
Souedie	-0.18	-0.17	0.01
Sumatran Light	0.21	0.32	0.11
Syrian Light	-0.29	-0.25	0.04
Tapis Blend	-0.28	-0.15	0.13
Umm Shaif	-0.08	0.00	0.09
Upper Zakum	-0.16	-0.07	0.09
Zarzaitine	-0.30	-0.26	0.05

Mean difference % 0.088

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

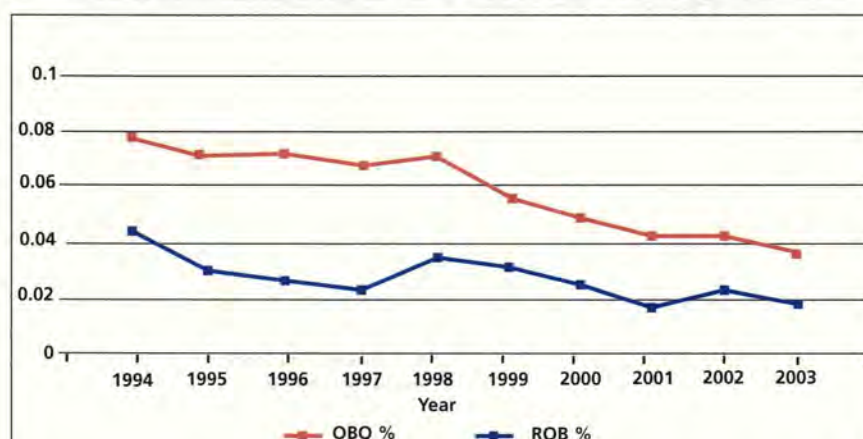


Figure 4: OBQ and ROB figures

	2003		2002	
	Mean	St Dev	Mean	St Dev
NSV loss %	-0.20 (-0.195)	0.36	-0.20 (-0.203)	0.39
TCV loss %	-0.15	0.34	-0.16	0.35
Load difference %	0.03	0.35	0.04	0.38
Ship loss %	0.02	0.20	0.02	0.21
Discharge difference %	-0.20	0.38	-0.22	0.41
Water loss %	-0.04	0.16	-0.05	0.18
OBQ-ROB difference %	0.02	0.11	0.02	0.12

Table 3: Global loss analysis

for the first time. 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.

OBQ and ROB (expressed as percentages of BOL and outturn TCV's respectively) have also both fallen over recent years as shown by Figure 4. This fall seemed to have levelled out in 2002 – but figures are lower again for 2003. The difference between OBQ and ROB has also steadily reduced, indicating that ROB clingage volume has reduced. Another small reduction brings this value to 0.018% for 2003. This improvement is related to improved tank design and more effective heating and crude oil washing.

## Conclusion

The 2003 data indicates that the small, but significant, increase in average NSV loss for 2001 over 2000 has now been reversed, with mean global NSV loss for 2003 back at the 2000 figure of -0.195%.

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 0.018% – only marginally less than in 2002. Load VEF's continue to fall, with the average load VEF by voyage for 2003 below 1.0000 for the first time.

The database continues to increase in size in terms of volume and voyage numbers. The Committee has now passed an important milestone with load data for over 50% of seaborne crude trade. The next target is to collect full load and discharge data for 50% of global volume, currently standing at 43%.

## Product data collection

The Committee is extending its activities to products movements in 2004 and it is hoped that general information on measurement differences for marine product movements will be published in 2005 or 2006. This is a new project for the Committee and should produce some interesting and useful information.

### 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.*



## New conductor torquing system



BJ Tubular Services has introduced a new conductor (pile) torquing system that is claimed to offer 'dramatically improved safety and operational efficiency' when making up or breaking out conductor-threaded connections.

With a spinner system that delivers 7,000 lbs/ft, the new unit is also said to be the first of its kind to deliver torques of 150,000 lbs/ft. As a result, conductor connection make-up and breakout, and driving operations, are carried out more efficiently, states the company.

The new conductor torquing system – which has a patent pending – is designed to be operated remotely by just one technician. This not only improves safety as personnel are not

required to work in close proximity to the rotary table, it also reduces running costs as fewer personnel are required.

To ensure that the pipe and its protective coating are never damaged, the conductor torquing system and spinner are non-marking systems designed to handle pipe with special care. In addition, the make-up system is consolidated into one simple unit, so there is no need to invest in time and manpower to assemble the unit before carrying out a make-up or breakout operations.

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e: ngordon@bjservices.co.uk  
www.bjservices.co.uk

## Avoiding leak troubles



Elfab has designed a pressure-relief assembly to prevent environmental contamination in severe process conditions. The Double-Disc Opti-Gard comprises primary and secondary bursting discs, plus a pressure gauge or switch to monitor the space between the discs. In the event of chemical attack causing pinholing of the primary disc, the back-up prevents pollution of the environment, while the intermediate pressure sensor warns process managers and maintenance teams of the need to repair the compromised primary disc. The Opti-Gard disc comes with a  $\pm 5\%$  tolerance as standard.

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www.elfab.com

## Easy-fit water sensor meets new SOLAS regs

Solartron Mobrey's new intrinsically safe and marine-certified Squing water level sensor has been developed to enable bulk carrier operators meet the new SOLAS regulation XIII/12, recently passed by the International Maritime Organisation. This requires all bulk carrier vessels to fit water ingress detection systems on or before the vessel's first service after 1 July 2004.

The regulation requires water level detectors to be installed in each cargo hold, giving audible and visual alarms – one when the water level above the inner bottom in any hold reaches a height of 0.5 metres, and another at a height not less than 15% of the depth of the cargo hold

but not more than 2 metres.

A compact instrument of 316SS construction, the Marine Squing can be simply mounted, without causing obstruction, into a T-piece offset on the sounding tube found in all bulk cargo holds. An integral magnetically operated test point on each sensor facilitates the mandatory testing between loads. It can operate in temperatures between  $-40^{\circ}\text{C}$  and  $150^{\circ}\text{C}$  and provides IP68 protection for 20 days submersion at 30 metres.

t: +44 (0)1753 756600  
f: +44 (0)1753 787109  
e: enquiries@solartron.com  
www.solartronmobrey.com





## Supercritical fluid chromatography



High temperature liquid chromatography (HTLC) specialist Selerity Technologies has unveiled its Selerity Series 4000 supercritical fluid chromatograph (SFC) – a completely automated system that uses supercritical fluid carbon dioxide as a mobile phase for analytical separations.

The company originally developed the Series 3100 SFC to overcome the limitations of gas and liquid chro-

matography to separate compounds prone to thermal instability, and subject to other causes of ineffective separations, including a lack of chromophores. The new Series 4000 is claimed to take 'productivity and efficiency to new levels'.

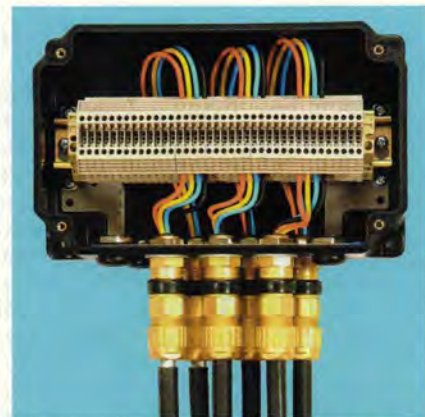
The Series 4000 consists of a high capacity force air oven with a flame ionisation detector for rapid heating and cooling; a 10-ml syringe pump for pulse-free mobile phase delivery and minimal usage of carbon dioxide; an autosampler, and an integrated data acquisition software package.

The instrument is designed to accommodate capillary columns and 1-mm packed columns manufactured for SFC use. The Series 4000 also eliminates pressure fluctuation created from the surrounding environment by the use of a temperature-controlled pressure transducer, a syringe pump for continuous mobile phase delivery, and split/splitless injection for high volume capillary column injections.

The unit is fully compliant with ASTM methods in the use of supercritical fluid chromatography – ASTM D5186 and ASTM D6550.

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[www.selerity.com](http://www.selerity.com)

## ATEX-certified junction box



The ATEX-certified PL range of EExe junction boxes from Hawke International has a new model – the PL626. The box has a removeable/underwireable terminal rail, from the company's stainless steel EZE enclosure product, to assist the wiring process and reduce installation time.

Manufactured from high strength, anti-static, glass-reinforced polyester (GRP), the PL range of junction boxes are reported to be tough enough to survive impacts of up to 20 Nm – three times the force of similar EExe-approved enclosures, states the company.

t: +44 (0)161 308 3611  
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[www.ehawke.com](http://www.ehawke.com)

## Hoses face up to demanding environments

Parker Hannifin has launched a range of convoluted hoses in stainless steel and PTFE variants that are optimised for demanding environments. Developed for medium- and high-pressure duties, the range includes corrugated parallel flexible metal hoses covered with one or two stainless steel braids; corrugated spiral parallel stainless steel covered with two stainless steel braids, for high pressure applications; convoluted PTFE hoses; and extruded PTFE hoses.

The hydroformed hose convolutions are parallel, the result being a hose that is extremely flexible compared to other variants on the market, states the com-

pany. Another important structural feature is the hose ends – which are welded in one go to create a much stronger joint than those subject to multiple-weld operations.

The two steel variants offer working pressures up to 120 bar, meet or exceed ISO 10380 standard, and can accept JIC, BSPP, bite type or flange type couplings – depending on the pressure they will be working with.

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## **Code of practice for a product identification system for petroleum products**

5th edition. Essential reading for all those responsible for, and involved in, the storage and handling of petroleum products downstream from refinery process plants, the product identification system provides a common industry approach to help avoid confusion between grades, which could result in cross-over and consequent contamination of product. The Code meets the substance labelling and marking requirements of the Health and Safety (Safety Signs and Signals) Regulations 1996 and the Dangerous Substances and Explosive Atmospheres Regulations 2002. This is the fifth edition of the Code, which was last published in November 2002. Changes have been made to the fourth edition to account for new product grades required by EC Directive 2003/17/EC and fiscal incentives in the United Kingdom to introduce those grades with a reduced sulfur content of 10 ppm. Specifically, the changes are to introduce new identifiers for: sulfur free premium unleaded petrol (95 octane) meeting the requirements of BS EN 228, i.e. with a maximum of 35 % aromatics, but with a maximum of 10 ppm sulfur; sulfur free super unleaded petrol (97 octane) meeting the requirements of BS 7800, i.e. with a maximum of 35 % aromatics, but with a maximum of 10 ppm sulfur; sulfur free diesel meeting the requirements of BS EN 590, i.e. with a maximum density of 845 kgm<sup>-3</sup>, but with a maximum of 10 ppm sulfur. It is recommended that all personnel who handle products should be competent in use of this product identification system.

August 2004

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## Seminar on Respiratory Protective Equipment – the facts about fit testing

Friday 8 October 2004

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

The Energy Institute's (EI) Occupational Hygiene Committee will be hosting a one-day seminar on Respiratory Protective Equipment (RPE). The seminar – which will be chaired by Sarah Leeson of ExxonMobil, includes presentations from a number of key groups and two discussion sessions. Refreshments will be provided.

- *Introduction to the day's events/EI*  
Sarah Leeson, Chairman, EI Occupational Health Sub Committee  
Martin Maeso, Energy Institute
- *HSE View – Requirements and Expectations*  
Bob Rajan, HSE
- *Good Fit by Design*  
Jo Partridge, 3M
- *Practical Aspects of RPE Fit Testing*  
Andrew Kennedy, Babcock
- *Medical View on RPE*  
John Ross, Aberdeen University
- *Fit Testing for the Emergency Services*  
Philip Osler, BP

The seminar will be of interest to anyone involved with the use of RPE as a means of controlling exposure to airborne hazards, including policy makers, managers, operational and emergency response team members.

[www.energyinst.org.uk](http://www.energyinst.org.uk)



For further details on the technical aspects of this event please contact:

Martin Maeso, Technical Team  
Manager at the EI.

t: +44 (0)20 7467 7128

f: +44 (0)20 7467 7156

e: [mmaeso@energyinst.org.uk](mailto:mmaeso@energyinst.org.uk)

Tickets:

Member: £40+VAT

Non member: £60+VAT

If you would like any further information on the programme or booking your place, please contact:

Marta Kozłowska

t: +44 (0)20 7467 7105

f: +44 (0)20 7580 2230

e: [marta@energyinst.org.uk](mailto:marta@energyinst.org.uk)





## COURSE DATES:

4 - 8 October, 2004

## COURSE VENUE:

The Møller Centre,  
Cambridge, UK

£2550.00  
(£2996.25 inc VAT)

## PRICE RISK MANAGEMENT IN TRADED GAS AND ELECTRICITY MARKETS

On this **five-day course**, delegates will identify the areas of price risk in different areas of operation; trade futures, forward, swaps and options markets; hedge and then manage a corporate position; analyse price charts; separate price and supply through the use of exchange and OTC instruments

### WHO SHOULD ATTEND?

Those affected by changes in international gas and electricity prices, including those in companies affected by traded markets in the gas and electricity industries; the supply, marketing, finance and planning departments of gas, electricity and integrated energy companies; energy related government departments and regulatory authority staff; purchasing, planning and finance in major energy consumers; energy publications; banks, accountants, auditors and others associated with gas and electricity companies; advisors and policy makers.



## COURSE DATES:

12 - 15 October, 2004

## COURSE VENUE:

London, UK

## EI MEMBER:

£1900.00  
(£2232.50 inc VAT)

## NON-MEMBER:

£2100.00  
(£2467.50 inc VAT)

## PLANNING AND ECONOMICS OF REFINERY OPERATIONS

This intensive, **four-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
- Analysts and planners
- Trading and commercial specialists
- Independent consultants
- Catalyst manufacturers and refining subcontractors



## COURSE DATES:

18 - 20 October, 2004

## COURSE VENUE:

London, UK

## EI MEMBER:

£1400.00  
(£1645.00 inc VAT)

## NON-MEMBER:

£1600.00  
(£1880.00 inc VAT)

## INTRODUCTION TO PETROLEUM ECONOMICS: PROJECT ECONOMIC ANALYSIS AND EVALUATION

This intensive, **three-day course** concentrates on economic evaluation techniques applied in upstream and downstream oil and gas projects. It will discuss the fundamental variables and issues associated with petroleum project valuations and provide an appreciation of how to assess the key uncertainties involved. The course will incorporate a number of short exercises to reinforce the key techniques discussed.

### WHO SHOULD ATTEND?

The course is pitched to appeal to professionals with a large range of technical and commercial backgrounds and varying levels of experience seeking insight to the broad range of economic valuation techniques required across the industry. In addition, for those employed by financial, commercial, legal, insurance, governmental, service, supply and advisory organisations, the course will also provide a valuable overview of the micro-economic issues facing oil and gas project operators.



## COURSE DATES:

18 - 22 October, 2004

## COURSE VENUE:

The Møller Centre,  
Cambridge, UK

£2150.00  
(£2526.25 inc VAT)

## ECONOMICS OF THE OIL SUPPLY CHAIN

On this **five-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.



For more information, see enclosed inserts or contact Nick Wilkinson

t: + 44 (0) 20 7467 7151 f: + 44 (0) 20 7255 1472

or visit: [www.energyinst.org.uk](http://www.energyinst.org.uk) e: [nwilkinson@energyinst.org.uk](mailto:nwilkinson@energyinst.org.uk)



**COURSE DATES:**

25 - 29 October, 2004

**COURSE VENUE:**

The Møller Centre,  
Cambridge, UK

£2800.00

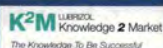
(£3290.00 inc VAT)

## TRADING OIL ON INTERNATIONAL MARKETS

During this **five-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 live the 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.

**COURSE DATES:**

4 - 5 November, 2004

**COURSE VENUE:**

London, UK

**EI MEMBER:**

£1000.00

(£1175.00 inc VAT)

**NON-MEMBER:**

£1200.00

(£1410.00 inc VAT)

## INTRODUCTION TO LUBRICANTS

This **two-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.*

**COURSE DATES:**

17 - 17 November, 2004

**COURSE VENUE:**

London, UK

**EI MEMBER:**

£1400.00

(£1645.00 inc VAT)

**NON-MEMBER:**

£1600.00

(£1880.00 inc VAT)

## LNG - LIQUEFIED NATURAL GAS INDUSTRY

This **three-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?**

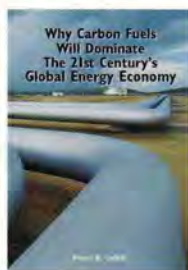
*Those working in the LNG industry in production, liquefaction, transportation and receiving, including those reliant upon LNG supply or the financing of LNG projects; analysts, planners and commercial staff; personnel operating in the gas, electricity and related energy industries and markets, regulators,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



For more information, see enclosed inserts or contact Nick Wilkinson  
t: + 44 (0) 20 7467 7151 f: + 44 (0) 20 7255 1472  
or visit: [www.energyinst.org.uk](http://www.energyinst.org.uk) e: [nwilkinson@energyinst.org.uk](mailto:nwilkinson@energyinst.org.uk)



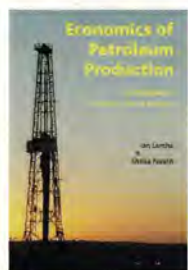
# essential books for **energy** experts



## Why Carbon Fuels Will Dominate The 21st Century's Global Energy Economy Prof. Peter R. Odell

One of the most eminent commentators on the vexed issue of oil and gas reserves makes his case that the supply position is secure for the medium term, and in doing so rebuts the doomsters who claim that imminent world oil and gas supply shortages presage a major world crisis; in fact, he cogently argues that the oil industry will be bigger in 2100 than 2000! Coal, oil and gas will continue to dominate the 21st century energy market, although there will be significant shifts in their respective market shares, a development with significant geopolitical implications.

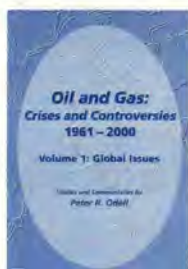
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## Economics of Petroleum Production (2 volumes) Ian Lerche & Sheila Noeth

Concerned with hydrocarbon production economics, these two volumes dissect the old adage in the oil industry that exploration for hydrocarbons loses money while production of hydrocarbons makes money. Issues explored include how risk should be managed and how a given situation can be analyzed so that the chances of obtaining the desired level of profit can be maximized. A significant contribution to the understanding of economic risk management in the context of hydrocarbon production, these texts will be of value to both graduate students studying hydrocarbon production and oil industry professionals involved in economic risk analysis.

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**£55.80**  
(each)



## Oil & Gas: Crises and Controversies 1961 - 2000 Prof. Peter R. Odell

Oil and gas are the drivers of modern economies, and issues relating to them impinge importantly on national and international politics. The first of the two volumes of Odell's collected papers and essays charts the sequence of significant global developments, over the final 40 years of the 20th century, of this most international of industries. The second volume deals with Europe's entanglement with the issues of international oil and gas, looking at the astonishing story of a succession of fundamental changes in the European energy economy during the last 40 or 50 years.

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## Man-Made Global Warming: Unravelling a Dogma H. Labohm, S. Rozendaal, D. Thoenes

These three Dutchmen - respectively an international relations expert, a scientific journalist, and a chemical engineer (past chairman of the Royal Netherlands Chemical Society) - form part of that growing body of reasonable and qualified people who feel unease at the claims of 'scientific consensus' on climate change, and wonder at the policies flowing from those claims. If the science is flawed, plainly the policies are too. Worldwide, billions of public money will be mis-spent, unnecessary costs placed on existing industry, new industrial development hampered. Could it really be the case that the 'global warming crisis' is really as much about careers and power as anything else?

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## Climate Change, a Natural Hazard William Kininmonth

William Kininmonth, of Australasian Climate Research, is not impressed by the IPCC models of climate, and climate change. For him, they are simplifications which do not do justice to the complexity of the system we call 'climate'. In this valuable contribution to the climate change debate, he draws attention to those elements of this natural system which can themselves affect the 'climate' we experience, and also to those elements which are buffers to climate variability. A model is necessarily a simplification; what level of compression and/or omission is required to render it simplistic, a tool of no utility? And is the IPCC model at that level, despite the claims made for it by its proponents?

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# IP Week 2005 Annual Dinner

Wednesday 16 February 2005

Grosvenor House Hotel, Park Lane, London, UK



*'The EI dinner is one of very few 'must attend' events put straight in our diary. It is almost guaranteed to not only be a great networking opportunity but also an enjoyable evening!' Phil Kirk, CH4 Energy*

For further information please contact Lynda Thwaite,  
EI Events Organiser on: t: + 44 (0) 20 7467 7106  
e: lthwaite@energyinst.org.uk

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

## TICKET APPLICATION FORM



Please photocopy this page and send completed form to the Events Department, Energy Institute, 61 New Cavendish Street, London W1G 7AR, UK f: +44 (0) 20 7580 2230

I wish to order \_\_\_\_\_ ticket(s) @ £193.00 + 17.5% VAT (£33.78) each = Total £ \_\_\_\_\_

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Please note: This year, for your convenience, there will be no additional surcharges for credit card payments.

I will pay the total amount by: ☐ Sterling Cheque or Draft on a bank in the UK, and I enclose my remittance, made payable to the Energy Institute, for £ \_\_\_\_\_

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### DATA PROTECTION ACT

The EI will hold your personal data on its computer database. This information may be accessed, retrieved and used by the EI and its associates for normal administrative purposes. If you are based outside the European Economic Area (the 'EEA'), information about you may be transferred outside the EEA. The EI may also periodically send you information on membership, training courses, events, conferences and publications in which you may be interested. If you do not wish to receive such information, please tick this box ☐

The EI would also like to share your personal information with carefully selected third parties in order to provide you with information on other events and benefits that may be of interest to you. Your data may be managed by a third party in the capacity of a list processor only and the data owner will at all times be the EI. If you are happy for your details to be used in this way, please tick this box ☐

a) All tables seat 10. Purchasers of less than 10 tickets will be seated with other guests.

b) Ticket purchasers wishing to share tables with named individuals or companies must state this when completing the application form, as changes cannot be made after tickets have been allocated.

c) Applications should be made by completing this form and sending it to Energy Institute, with the full remittance including VAT. (Extra charges may apply - see item 'g'). Orders received by Friday 29 October 2004 will be included in the primary table allocation. Applications received after this date will then be considered on a first-come first-served basis.

d) The cost of one ticket is £193 plus VAT at £33.78. VAT is payable by all UK and overseas purchasers. No additional charges will be incurred for credit card payments. Full payment must be received before tickets can be guaranteed. All tickets are the same price, whether or not your guests are EI Members.

e) For bookings requiring additional administration (eg: incorrect payments, requests for invoices, etc), or if payment is not received before 10 January 2005, an extra charge of £20 per ticket will be made.

f) Upon EI receiving your booking form (by fax, post or e-mail) you become liable for full payment of the fee and you undertake to adhere to the terms and conditions as specified.

g) Tickets for tables in the primary allocation will be mailed during the week of 29 November 2004. Please note that the EI may be unable to meet requirements in full, and we suggest therefore that you do not invite guests until you have received your tickets. In the event that the Dinner is oversubscribed, allocation of tickets will depend on the degree of the applicant's involvement in EI affairs, and a waiting list will operate. Full refunds will be made as appropriate.

h) If you cancel your order after it has been processed, a refund less a 20% administration charge of the total monies paid will be made provided that notice of cancellation is received in writing by 10 January 2005. No refunds will be paid or invoices cancelled after this date.

i) Successful applicants should submit their guests' names, in writing, to the EI by Wednesday 26 January 2005 at the latest. Name changes or additions submitted after this date cannot be included in the printed guest list. Further information regarding the guest list will be provided with the tickets.

j) Please notify the EI in writing of any special dietary requirements by 7 February 2005. An additional charge may be incurred.

k) Dress is black tie with decorations.



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