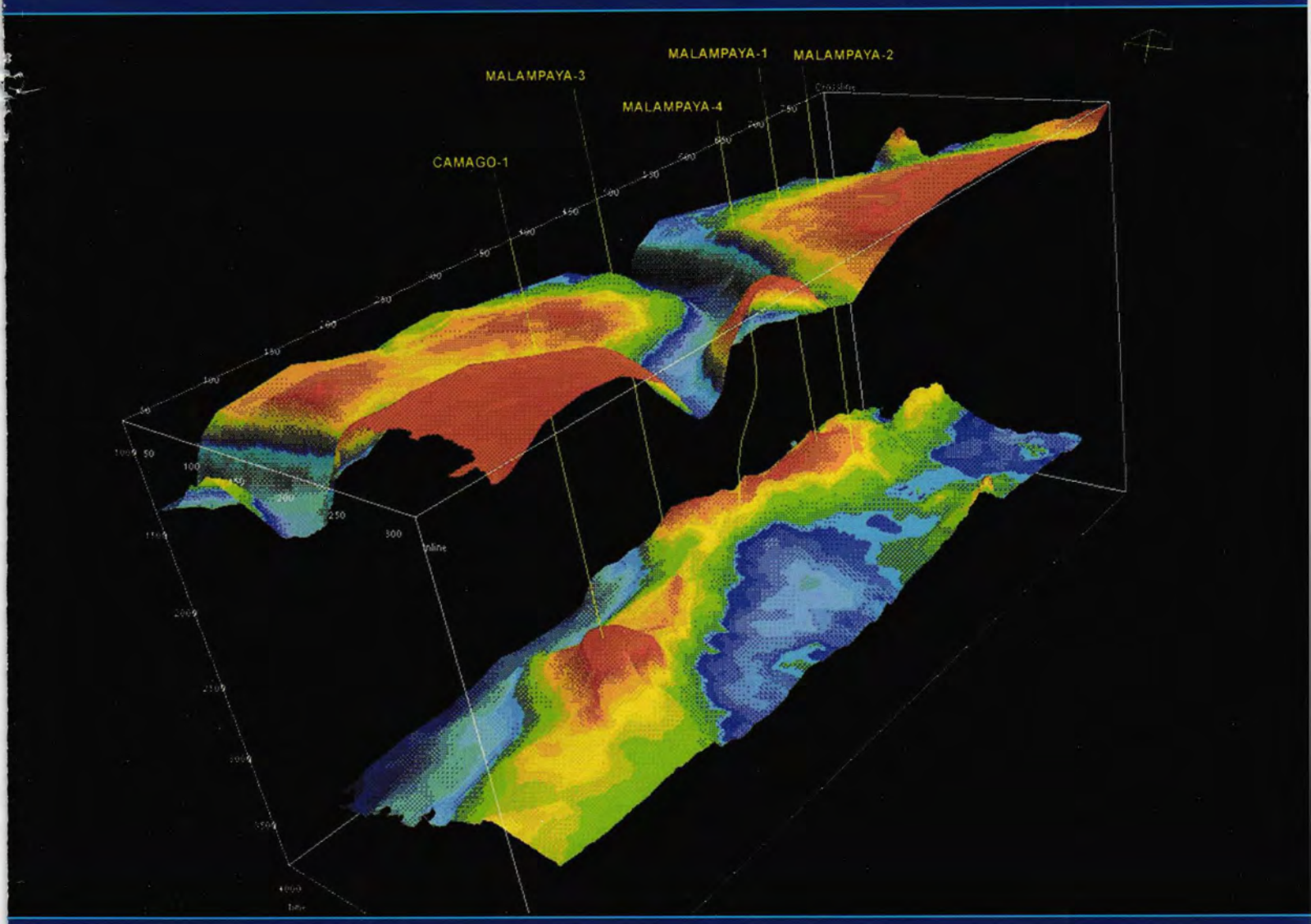
Petroleum review

MAY 2001



Alternative fuels

- Auto gases struggling for recognition

Africa

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Deepwater

- Malampaya – a world record float-over

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Petroleum review

MAY 2001 VOLUME 55 NUMBER 652
£14.00• SUBSCRIPTIONS (INLAND) £165.00 (OVERSEAS) £190.00

PUBLISHER

IP THE INSTITUTE OF PETROLEUM
A charitable company limited by guarantee
Director General: Jeff Pym
61 New Cavendish Street
London W1G 7AR, UK
General Enquiries:
Tel: +44 (0)20 7467 7100
Fax: +44 (0)20 7255 1472

EDITORIAL

Editor: Chris Skrebowski FInstPet
Associate Editor: Kim Jackson
Production Manager: Emma Parsons
Editorial Assistant: Cheryl Saponia
The Institute of Petroleum
61 New Cavendish Street, London W1G 7AR, UK
Editorial enquiries only:
Tel: +44 (0)20 7467 7118/7172
Fax: +44 (0)20 7637 0086
e: petrev@petroleum.co.uk
www.petroleum.co.uk

ADVERTISING

Advertising Manager: Jolanda Nowicka
Anne Marie Fox
Production: Jane Boyce
Landmark Publishing Services,
8 New Row, London WC2 4LH, UK
Tel: ***+44 (0)20 7240 4700***
Fax: ***+44 (0)20 7240 4771***

SUBSCRIPTIONS

Subscription Enquiries: Portland Press
Tel: +44 (0)1206 796351 Fax: +44 (0)1206 799331
Printed by The Thanet Press Ltd, Margate

US MAIL: *Petroleum Review* (ISSN 0020-3076 USPS 006997) is published monthly by the Institute of Petroleum and is available Periodical Postage Paid at Middlesex, New Jersey.

Postmaster: send address changes to *Petroleum Review*
c/o PO Box 177, Middlesex, New Jersey 08846, USA.

ABC AUDIT BUREAU OF CIRCULATIONS BUSINESS PRESS

ISSN 0020-3076

MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

ABBREVIATIONS

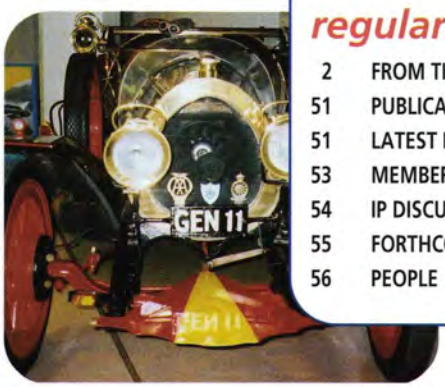
The following are used throughout *Petroleum Review*:

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

No single letter abbreviations are used. Abbreviations go together eg. 100mn cf/y = 100 million cubic feet per year.

Front cover: 3D visualisation of the Malampaya field offshore Palawan in the South China Sea

inside...



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Kyoto only mostly dead

In the film *The Princess Bride*, the lifeless corpse of the hero is carried to the home of the wise man, played by Billy Crystal, who solemnly pronounced that the corpse 'is not wholly dead, but only mostly dead.' He could have been describing the Kyoto Protocol on climate change following President Bush's announcement that the US did not intend to sign up. This produced howls of outrage from environmentalists and, to a lesser extent, European governments.

To the environmentalists Bush's rejection is craven pandering to the oil and coal interests who funded his election (or non-election according to some). To European governments it is a 'tragic lost opportunity,' and to President Bush and his advisors it is the rejection of an unreasonable protocol based on suspect science and against the US interest they were elected to defend.

Is there any reconciliation of such strongly divergent opinions and what are the underlying drivers? Even more important, how do the oil companies react given that they have to operate globally but within the predefined political frameworks in each country?

Uncertain science

Although many would like to maintain that the role of greenhouse gases in global warming is established fact, the evidence is mixed and ambiguous. To take a recent, fairly trivial, example – if you listened to the environmentalists the disappearance of the Arctic ice cap is imminent. In fact, recent monitoring established that there is little evidence for any thinning of the ice cap over the last 20 years, except for very local areas.

So far, science is unable to produce unambiguous results or even a plausible mechanism for climate change. Dire consequences are predicted by vast, complex computer models. So far this modelling has proved little better at forecasting than the much discredited economic models. It may be a cynical observation, but large numbers of people now have a direct personal economic interest in climate change.

Following the theme of interests, we find that European governments with a tradition of dirigisme, large bureaucracies and a chronic need for tax revenues are inclined to 'believe' in global warming (with its potential for morally acceptable, save-the-planet taxes). In contrast, the US Administration with a deep distrust of 'big government bureaucracies,' a passionate belief in market forces and little need for additional tax is low on 'belief.' Hence the current standoff.

Enthusiasm or otherwise for Kyoto is closely linked to a country's ability to reduce emissions. The UK, for example, has been an enthusiastic proponent – mainly because the effective closure of the UK coal industry and the substitution of coal by gas in the generating industry gave an easy win with little real cost to the economy.

In sharp contrast, the US was confronted with hard choices. A population which was brought up on cheap and abundant fuel takes some persuading to change its ways. The US is, in fact, not nearly as fuel inefficient as the environmentalists suggest. It may consume 25% of the world's energy for 6% of its population – which sounds terrible – but the US accounts for 25% of the world's GNP. This may be unfair, but it is not disproportionate energy use.

President Bush had other concerns, however. The Californian energy crisis may be the result of a particularly incompetent privatisation, but it has drawn attention to the fact that US gas supplies are tight and costly, and likely to remain so for some time (maybe until Alaskan and Mackenzie Delta gas are pipelined south at the end of the decade). Similarly, spare generating capacity is tight and tightening across the US, but virtually all planned new generation capacity is to be gas-fired. By rejecting Kyoto the US is opening up the option of coal-fired generation, economic at current high US gas prices. The only other option would be nuclear or renewables.

Already the US has indicated that it will develop market based systems for reducing greenhouse gases. A market-based Kyoto may be proposed. A Kyoto Mark 2 may be possible. Many governments will secretly be relieved that President Bush 'killed' Kyoto in March. This followed its earlier 'death' in the Hague in December. However, if precautionary cuts are not agreed and implemented, Kyoto's ghost will haunt governments, nations and individuals until either the seas rise up or we find that climate change doesn't exist.

The oil companies are now being left to decide for themselves if they want to be precautionary and minimise carbon dioxide emissions or risk being branded the assassins of the already mostly dead Kyoto Protocol.

Chris Skrebowski

ProXchange, the European marketplace for pre-owned capital assets has formed a new company targeting the oil and gas industry. ProX-oilfield will develop an international online trading platform for pre-owned exploration, drilling, development and production equipment. The company plans to build a global 24-hour marketplace for pre-owned oil equipment. ProXchange will retain a majority shareholding and provide the new company with a customised industry-specific version of its Internet service.

E-PageAds has turned on its latest portal site **www.E-PageAds.com/consigned** The initial focus of the site is geophysical, survey and underwater related equipment but other portals are due to follow soon such as one for oilfield equipment.

PDI has recently joined forces with **PetrolPlaza.com** to 'promote the possibilities of automation technology within the forecourt and convenience store sectors.' PDI specialises in providing business, application and management solutions to the fuel retailing sector.

Woodside Energy has signed up to use the Australian Competitive Energy (ACE) supplier vendor registration system – Supplybase VRS. The online database allows Australian companies to promote their goods and services to the oil and gas industry.

Metso Automation (formerly Neles Automation) has signed a membership agreement with the Trade-Ranger Internet marketplace launched by 14 leading energy and petrochemical companies. It is one of the first international control valve manufacturers to participate in the e-supply chain management initiative which aims to simplify the procurement process and lower transaction costs.

Chevron has discontinued its Silicon Valley Oil Company (SVOC) online marketplace. Launched last June, the portal was designed to facilitate spot-market sales of fuels to commercial and industrial customers via the Internet. The company reports that while customer feedback concerning the SVOC auction was positive, the number of customers did not increase at the rate needed to sustain long-term growth objectives.

Online technical help is now available for critical bolting applications to help eliminate hydrocarbon leaks with the launch of **www.boltup.com** from Hydratight Sweeney. The interactive site claims to provide all the information an engineer or technician needs.

Krohne has unveiled a new multi-language website – at **www.krohne.com** – dedicated to level and flow monitoring technology.

In Brief

UK

Chevron is understood to be planning *to develop the Parliament oil field in North Sea block 16/26 as a subsea tie-back to the Britannia or Alba oil fields. Recoverable reserves are 10mn barrels.*

SLP of Lowestoft is understood to have *secured the contract to fabricate the 550-tonne platform for BP's Hoton field in the North Sea. Heerema Marine Contractors will perform the platform installation. Coflexip Stena Offshore will undertake the pipelay and subsea work. The field is to be developed as a satellite tie-back to BP's West Sole pipeline system. First gas is slated for 4Q2001.*

The Ranger-operated Kyle oil and gas *field in the North Sea has come onstream with an initial production of 20,000 b/d of oil. Associated gas will be exported via the SEGAL pipeline.*

Northern Petroleum is reported to *have acquired a 4% stake in the Seven Heads oil and gas fields in the North Celtic Basin and a 6.4% interest in the nearby Galley Head gas field from Irish company Sunningdale Oils.*

ATP Oil and Gas has reportedly com- *pleted the purchase of block 47/10 and 50% of the Venture gas field in the UK North Sea from BP for an undisclosed sum. This is the US independent's first acreage in the UK.*

Amerada Hess has taken a 50% oper- *ator stake in Premier Oil's Chestnut field in block 22/2a in the North Sea.*

Shell's Shearwater platform is *expected to resume production in late spring this year. The platform was evacuated in November 2000 following a pressure build up in one of the production wells.*

Tullow Oil has announced a successful *natural gas well in the southern sector of the North Sea which, when developed, could yield more than 80bn cf of gas. Conoco, the operator, is currently evaluating the accumulation as part of the Caister Murdoch System III programme of development of five North Sea natural gas fields with first production in 4Q2002.*

Europe

TGS-Nopec and WesternGeco are to *cooperate on a non-exclusive 3D survey in the Norwegian Sea. The*

New North Sea search and rescue philosophy

In a radical departure from established offshore North Sea rescue philosophy, BP is to replace the area standby vessel with dedicated search and rescue (SAR) helicopters, writes *Brian Warshaw*. It is anticipated that the first helicopter will be ordered this month, and be used for an extensive six- to 12-month evaluation period, working parallel to the current procedures for rescuing personnel in the water.

For almost a year, BP has been in discussion with its workforce, the UK Health and Safety Executive (HSE), and the Emergency Response and Rescue Vessel Association (ERRVA). With platform safety representatives and the trade union group showing support for further studies, BP staged a two-day demonstration with the French Air Force, using one of their Super Puma Mark II SAR helicopters. It is reported that the manoeuvrability and speed of the helicopter was impressive – homing in to within five metres of a lighthouse.

The helicopter has auto-hover facilities and, it is claimed, can remain on station in wind speeds rising to 65 knots when wave height can reach up to 10 metres. The all-weather rescue capability of the Super Puma Mark II is enhanced by electro-optical sensors, radar, and a heat-seeking forward-looking infra-red (FLIR) camera. Using the latest personal locator beacons that BP is about to introduce for all offshore personnel, the helicopters can detect a person in the water at 16 km distance. Consideration is also being given to the helicopter carrying a diver delivery vehicle, which the winchman could drive underneath the platform to effect a rescue, before returning to the open sea to lift them onboard the helicopter.

To satisfy the requirements of the Prevention of Fire & Explosion, and Emergency Regulations (PFEER) , the performance standards for rescuing people from the water in the event of a platform emergency or helicopter accident is two hours. It is anticipated that the SAR helicopter could reach any location within 45 minutes and effect a rescue in seas of greater ferocity than could a standby vessel. The PFEER regulations also demand that in the event of a man-overboard accident to somebody working over the side of a platform, such as a scaffolder or painter, rescue should be accomplished in four minutes for the first person and within 20 minutes for the last person involved in the incident.

This will be achieved by use of a fast rescue craft (FRC) attached to each platform or group of platforms in a field.

BP says that its motive for reviewing a system that has operated for 25 years is generated by the 50% growth in field ownership following its acquisition of Amoco, with its geographical cluster of locations, and changes following Lord Cullen's report into the Piper Alpha platform disaster in 1988. The company denies that cost saving is behind the decision, claiming that operating costs for standby vessels and SAR helicopters are comparable at an annual £24mn, and the capital cost of the helicopters would be several million. The helicopters will displace 17 standby vessels, although BP may retain up to 11 of the present fleet for operations relating to drilling and floating production systems.

Should the HSE approve the change, the SAR helicopters will enter service in 2003, with full deployment in 2004. Four helicopters will probably be based on operating platforms available at ten-minutes response, with two located onshore ready to fly within an hour. A number of modified commercial helicopters will also be available for rescue work. It is intended that the standby vessel will remain for a period of time after the SAR helicopters have been introduced to validate the safety case for the platforms.

Concurrent with the BP decision, Statoil has announced that it will station a SAR helicopter on the Heidrun platform from July this year. Thor Haakon Helgesen, Vice President for the Halten/Nordland area, said that the decision had been taken, together with Shell and Norske Hydro, to strengthen the emergency response procedures. One standby vessel will be taken out of service, with others being progressively replaced by more modern vessels.

NEWS Upstream

Anadarko signs amended Algerian PSA

Anadarko (operator) and partners Lasmo, Maersk Olie and Algeriet have signed an amendment to their production sharing agreement with state oil company Sonatrach that will enable Anadarko to resume exploration of Algerian blocks 404, 208 and 211.

The exploration phase of the US company's original PSA ended in 1998. As part of that initial exploration programme, Anadarko drilled 20 exploratory wells, with a 70% success rate. This new agreement will enable the partners to resume exploration in the three blocks in areas outside of the exploitation licence boundaries that encompass the previous 12 discoveries made by the Anadarko/ Sonatrach alliance.

Under the terms of the three-phase exploration programme, Anadarko and partners will spend a minimum of $55mn. During the first five years, 400 sq km of 3D seismic and 1,100 km of 2D seismic will be shot and processed; the results of previous seismic surveys reprocessed; and six exploration wells drilled. Seismic acquisition is slated to begin this year, with exploration drilled due to commence in 2002. Should the sixth and seventh year options be exercised, an additional exploration well will be drilled in each year.

Production facilities are currently under construction that will allow the Anadarko/Sonatrach association to increase their gross daily production capacity from 75,000 b/d to 500,000 b/d by mid-2003.

In addition to the three blocks covered in the amendment to the PSA, Anadarko was selected as successful bidder for exploration block 406b in February 2001.

Elgin onstream

TotalFinaElf (operator) reports that the Elgin field in the central North Sea has commenced production, some four years after the official launching of the Elgin/Franklin gas condensate field development. Initial daily production of 13,500 barrels of condensate and 1.2mn cm of gas is expected to rapidly reach a plateau of 222,000 boe/d (140,000 barrels of condensate and 13mn cm of gas) following the start-up of production from the adjacent Franklin field this summer.

Both fields have their own wellhead platform with the production being processed through one central PUQ (production/utilities/quarters) facility located on the Elgin field. Liquid condensate from the fields is transported to shore via the existing Forties pipeline system and on to Kinneil for processing. Commercial quality gas for UK and Continental deliveries is transported via the new SEAL (Shearwater Elgin Area Line) pipeline to the terminal at Bacton, Norfolk.

The Elgin/Franklin project is reported to be the largest high pressure/high temperature development in the world – with pressure of 1,100 bars and a temperature of 200°C – and the deepest reservoirs (approximately 5,500 metres) put into production in the North Sea to date.

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CGG awarded onshore Yemeni seimic survey

Canadian Nexen has awarded CGG a 3D land seismic survey on Yemen's Masila block. The 315 sq km survey is slated to complete in mid-July.

Given the extremely hostile terrain, which is dominated by deep canyons of several hundred metres in depth, the crew will rely heavily on helicopters and intensive use of the new lightweight and portable Sercel SN 408UL recorder that is claimed to offer improved troubleshooting capability.

Approximately 4,000 traces will be managed in the field.

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survey will cover an area of 2,000 sq km, mainly over open acreage, and is based on TGS-Nopec's non-exclusive 2D data acquired in 1997.

***Production from the Esso Norway** Norwegian Sea Ringhorne development has reportedly been delayed until the end of 2002. The company is now in the process of drilling a second subsea well – the first well has been plugged and abandoned as the reservoir was lower than predicted. If the well is a success it will be tied back to the Balder production ship at the end of 2Q2001. Reserves are put at 190mn barrels of oil and 2bn cm of gas.*

***The Norwegian authorities are** reported to have given Norsk Hydro the go-ahead to develop the Fram Vest oil field in block 25/4 in the central North Sea. First oil is expected in October 2003, utilising the existing infrastructure on the Troll C floating production system. Production is forecast to plateau at 60,000 b/d.*

North America

***Appraisal drilling on the Gunnison** prospect on Garden Banks block 668 in the deepwater Gulf of Mexico is reported to have identified a 'significant' westerly extension making development a commercially viable option. Field reserves are put at between 150mn and 250mn boe.*

Middle East

***According to the Iraqi Oil Ministry** Undersecretary, Taha Hammud, Iraq has increased its proven oil reserves by 3bn barrels since 1990, despite the UN embargo imposed after the Gulf War. Reserves now reportedly stand at 115bn barrels.*

Russia & Central Asia

***Sakhaneftegaz, a small firm allied with** Yukos, has reportedly won the right to develop a field in eastern Siberia with proven gas reserves of 120mn tonnes of oil and 50bn cm of gas. The company won the tender for the rights to the Talakanskoye field in the Yakutia region with a payment of $501mn.*

***Gazprom reportedly plans to start up** the Zapolyarnoye natural gas field in West Siberia in 3Q2001. The field has estimated reserves of at least 2.8tn cm. Gazprom will invest approximately*

In Brief

$1.4bn in the field over five years and plans an alliance with Shell to tackle deeper areas of the field that contain large amounts of condensates.

***SeverTEK, the 50:50 joint venture** between Lukoil and Fortum of Finland, is reported by UFG to have launched the development of the 500mn barrel Yuzhno-Shapshinskoye oil field in Timan-Pechora. SeverTEK was acquired by Lukoil as part of the 1999 KomiTEK deal.*

***Rosneft has sold its 20% stake in the** stalled Sakhalin-1 project to ONGC of India for $90mn to cover its resultant loss and a $225mn entry fee in to the scheme, reports* Stella Zenkovich.

***Gazprom has signed a framework** agreement with the government of Sakha regarding the exploration and production of the Chayadinskoye field. This will be Gazprom's first major involvement in Eastern Siberia, writes UFG.*

Asia-Pacific

***Santos is proposing to take a 40%** interest in the Evans Shoal gas field in the Timor Sea. Recoverable field reserves are put at 6.6tn cf.*

***Lundin Oil of Sweden reports that** its recently completed production enhancement programme and a new exploration well on block PM-3 CAA offshore Malaysia and Vietnam have boosted production from the Kekwa field by 30% to 18,000 b/d of oil.*

***Gulf Indonesia Resources' Bukit Tua-1** discovery well in the Ketapang production sharing contract area offshore East Java has flowed at 2,800 b/d.*

***Chevron has reportedly confirmed the** discovery of a new oil field at Chaba in offshore block B8/32 in the Gulf of Thailand.*

Latin America

***Colombia's private and public sectors** will invest $160mn to explore 20 potential oil fields across the country in 2001 reports Ecopetrol, the Colombian state owned oil company.*

***Enterprise Oil has issued a Letter of** Intent to award a $270mn contract to FMC/Modec for the provision of the FPSO and subsea equipment for Brazil's Campos Basin Bijupira-Salema fields. The planned FPSO facility will have an*

NEWS Upstream

2000 – A good year for the Caucasus?

Following a year of slow, but steady, progress for the oil and gas industry in the Caucasus region, Edinburgh-based analyst Wood Mackenzie has ranked the international oil company portfolios in Azerbaijan and Georgia in its latest Caucasus report. The year 2000 saw a number of major oil companies enter the region, looking to expand their global business through exploration, while a number of smaller players, who were not prepared to endure the high cost and risk, decided to exit. In addition, there were a number of disappointments in the year, with poor results from Agip's first exploration well on the Kur Dashi block and Ramco's appraisal well at the onshore Muradkhanli field.

'Although no significant reserve additions were made in Azerbaijan during 2000, a number of corporate deals have changed the look of the reserve ranking,' states the analyst. 'BP remains top of the remaining reserve table in Azerbaijan with 1,670mn barrels of liquids and 4,660bn cf of gas from its 34.14% stake in the Azeri Chirag Guneshli (ACG) oil project and 25.5% stake in the Shah Deniz gas field. Lukoil strengthened its position during 2000 through the acquisition of the Govsany-Zykh fields, moving the company into second place in the liquid reserve ranking, although still some way behind BP.

Delta Hess, Devon Energy and Unocal were also able to book additional reserves following Ramco's sale of its 2.08% stake in the giant ACG development. In addition, Moncrief and Sooner Petroleum joined the reserve rankings for the first time with the acquisition of the onshore Kamaleddin and Mishovdag fields. Noticeable absentees from the ranking include Shell, Chevron and Conoco, who are currently only involved in offshore exploration projects.'

***For further information, contact Emma Brayshaw at Wood Mackenzie on +44 (0)20 131 243 4237; Fax: +44 (0)20 131 243 4435; e:* info@woodmac.com**

Otter development

TotalFinaElf reports that field partners have approved the development of the Otter field, pending consent from the UK Department of Trade and Industry. Otter is claimed to be one of the largest undeveloped discoveries in the UKCS.

Start-up is expected in 4Q2002 with a plateau production rate of 30,000 b/d of oil. The field subsea facilities will be located in UKCS block 210/15a in the northern North Sea.

Field approvals

The Norwegian Gas Supply Committee is understood to have given its approval for the Sigyn (ExxonMobil operator), Kristin (Statoil) and Øseberg Delta (Norsk Hydro) gas fields to supply gas to continental Europe under existing contracts. The three North Sea fields are reported to be capable of supplying up to 36bn cm of gas between 2002 and 2016, with Sigyn and Øseberg Delta due onstream in 2002 and Kristin in 2005.

Zamzama gas fields onstream

BHP reports that contractual gas sales have commenced from an extended well test on the Zamzama gas fields in southern Pakistan. The twin-well project initially came onstream on 8 March 2001, less than a year after gaining government approval. The development is reported to have completed on schedule and on budget.

Approximately 70mn cf/d of gas is being supplied to the Sui Southern Gas Company (SSGC) for an initial contract period of 21 months. The gas, which is lifted from the Zamzama-1 and Zamzama-2 wells, is exported 8 km via a minimum processing facility to the main SSGC Sui-Karachi gas pipeline.

Gross proven and probable reserves of more than 2tn cf remain uncontracted. Discussions are currently underway regarding longer-term commercial gas sales arrangements and full field development options.

The Zamzama fields lie within the Dadu licence in Sindh Province. BHP holds a 47.5% stake in the licence. Partners are Lasmo (23.75%), Premier Exploration Pakistan (23.75%) and Government Holdings (5%). Government Holdings has taken up an option to increase its working interest to 25% for the extended well test phase, and has the right to take a 25% interest in any future full field development phase.

CPC commences line fill

The Caspian Pipeline Consortium (CPC) has commenced 'line fill', sending the first Kazakh oil on its 1,500-km journey to CPC's marine terminal which lies north of Novorossiysk on the Black Sea. The export pipeline will carry oil from Kazakh and Russian fields, including the large Tengiz field which has recoverable reserves put at between 6bn and 9bn barrels.

By the end of 2001, the $2.6bn initial phase of the pipeline will have an export capacity of 28mn t/y of oil (approximately 600,000 b/d). With upgrades, the ultimate capacity of the pipeline is 67mn t/y (1.5mn b/d).

CPC partners are: Russian Federation (24%), Republic of Kazakhstan (19%), The Sultanate of Oman (7%), Chevron Caspian Pipeline Consortium Company (15%), Lukarco (12.5%), Rosneft-Shell Caspian Ventures (7.5%) and Mobil Caspian Pipeline Company (7.5%), together with Agip International (2%), BG Overseas Holdings (2%), Kazakhstan Pipeline Ventures (1.75%) and Oryx Caspian Pipeline (1.75%).

Search for deep natural gas in GoM

The heaviest bidding at the March 2001 US Minerals Management Service (MMS) auction for offshore leases in the central region of the Gulf of Mexico was for blocks in shallow waters, writes *Judith Gurney*. Although these waters have been exhaustively mined for oil, they are believed to contain undiscovered natural gas reserves at considerable depths. It was these that companies were seeking, encouraged by current high gas prices which, in the face of plans for extensive expansion of gas-fired electricity generation, are expected to continue. Some 64% of the bids were for blocks in water depths of less than 200 metres.

Overall, it was a bigger lease sale than in recent years. A total of 90 companies made 780 bids – considerably more than the 469 bids made by 63 companies last year and the 272 bids made by 41 companies in 1999. Independent oil and gas companies dominated the action, and 11 of these were first-time bidders. Seven independents, several unfamiliar outside of the Gulf region, ranked in the top ten companies with the majority of the winning bids: Magnum Hunter, Samedan, Remington, Kerr-McGee, Spinaker, Dominion (which recently acquired CNG) and Wiser.

Most of the more than $505mn offered in apparently successful high bids (the MMS will not issue its final acceptance for several weeks) involved deepwater blocks. Exxon, for instance, made 20 apparently successful bids for deepwater blocks for a total of $88mn; Magnum Hunter, by contrast, made 45 apparently successful bids for shallow-water blocks for a total of only $5.5mn.

All of the top ten highest bids were for deepwater blocks in Mississippi Canyon and Green Canyon, areas with most of the Gulf's current deepwater producing fields. Exxon was a major presence, offering more than $26mn for a Mississippi Canyon deepwater block. Shell, BP and Chevron were also active but Marathon, a substantial bidder in 2000, was not.

The reduced focus on deepwater acreage compared to that in previous auctions reflects the substantial portfolios of deepwater blocks already held by companies. They must drill these before the expiry of their leases or give them up. Deepwater exploration is restrained by a shortage of rigs able to work at great depths, as well as by risks and costs.

Canadian northwest set for gas boom

Canada's Northwest Territories is on the verge of a huge natural gas boom, exploiting reserves estimated at over 65tn cf in the Mackenzie Delta region in Inuvik, writes *Monica Dobie*. About a dozen oil companies, among whom are PetroCanada, Chevron and BP, are expected to pour C$750mn in exploration funding into the region over the next five years.

Other oil companies such as Esso, Shell and Gulf have identified 6tn cf of proven onshore resources and will begin drilling next winter with six rigs, compared with just one rig this winter season.

Doug Matthews, Director of the Northwest Territories' Mineral, Oil and Gas Department, told *Petroleum Review* that the project has only recently been given the green light following the settlement of land claims between the natives and governments. He said: 'This gas is "old gas". We've known it's been there since the 1970s. This project signifies how relations have changed and progressed with the native Canadian community.'

In Brief

oil processing capacity of 70,000 b/d of oil and a storage capacity of 1mn barrels. The subsea development will include 15 wells tied back via manifolds. First oil is expected in 2003.

Africa

***Triton Energy's development drilling** programme on the Ceiba field in block G offshore Equatorial Guinea has encountered a new, deeper pool of reserves, extending the field's limits to the northwest.*

***Apache has acquired Repsol YPF's** assets in Egypt's Western Desert for $410mn and Fletcher Challenge Energy subsidiaries with properties in Canada and Argentina for $627mn.*

***ExxonMobil is reported to have made** its tenth oil discovery with the Mbulumbumba-1 well on block 15 offshore Angola. The block is estimated to hold recoverable reserves in excess of 3.5bn boe, with first production due onstream in 2004.*

***US company Devon Energy's SWGEZ-2** well on the Southwest Gebel El-Zeit concession offshore Egypt is reported to have flowed at 6,700 b/d of oil and 2.4mn cf/d of gas. The company also reports that its North July field in the Gulf of Suez has come onstream and is producing at 5,500 b/d and 3mn cf/d.*

***A new oil field with 4,620 b/d proven** capacity has been discovered by OMV, Lundin, Petronas and Sudapet in southwest Sudan, reports the Sudanese Ministry of Energy & Mining.*

***ABB has won a $180mn order to** deliver the subsea production system for Shell's Bonga development in Nigeria, West Africa.*

***Smit Maritime Contractors has been** awarded a contract for subsea installation associated with development of the Isis field, offshore Tunisia. First oil is slated for 2Q2001.*

***Stolt Offshore has reportedly won a** $200mn turnkey contract from Shell Nigeria for subsea construction on the deepwater Bonga development. The contract covers design, engineering and installation as well as the commissioning of the gas export pipeline, production and water injection lines.*

In Brief

UK

BHP is set to merge with Billiton, the *UK mining company, in a deal worth a reported $28bn. BHP will own 58% of the new company. Billiton will hold the remainder.*

Europe

The partial privatisation of Gaz de *France is reported to have been postponed until after next year's parliamentary elections in France.*

ABB has launched a friendly bid to *acquire French company Entrelec, a supplier of industrial automation and control products.*

The European Commission has authorised *the purchase of Elf Antargaz by PAI – owned by BNP Paribas – and UGI. This fulfils a competition commitment made during the TotalFina/Elf merger to sell off Elf's LPG businesses, writes* Keith Nuthall.

Hungarian oil and gas company Mol *has increased its stake in TVK from 23.2% to 32.5%.*

It has been reported that between 15% *and 25% of Statoil equity is soon to be offered in an initial public offering. The partial sale is being made in the run up to the privatisation of Norway's state-run oil and gas company.*

North America

The Intercontinental Exchange is *reported to be planning a $65mn bid for the London-based International Petroleum Exchange (IPE)*

Ketch Energy of Canada is understood *to be acquiring fellow Canadian oil and gas company Post Energy in a cash and stock deal valued at C$200mn.*

Talisman Energy is reported to be *acquiring Petromet Resources for C$806mn, boosting the company's Canadian gas production to over 850mn cf/d. The deal also adds 291bn cf of proved gas reserves and 7mn barrels of oil and liquids to Talisman's portfolio.*

US oil company Vintage Petroleum has *agreed to buy Calgary-based Genesis Exploration for C$898mn in cash and accumulated debt. This latest acquisi-*

Lukoil details Caspian development plans

The Lukoil Board of Directors recently held a meeting in the Azerbaijani capital Baku to discuss the company's Caspian Sea development programme and prospects overseas.

The company initiated a comprehensive study of mineral resources in the Russian sector of the Caspian Sea at the end of 1995. Over the past five years a significant amount of work has been conducted to complete a geological survey and development of the northern part of the region. A prospecting infrastructure was created in Astrakhan and the Astra jack-up rig upgraded. Some 10 'promising' oil and gas structures were discovered in this period, five of which were prepared for deepwater drilling, including two oil and gas fields – Khvalynskoye and Yuri Korchagin.

Lukoil plans to drill at least four deep wells in the Russian sector of the Caspian in the near future, and to undertake 'significant geophysical works' at the Yalama-Samur and Tsentralnaya geological structures. In addition, the company will continue to survey the North Caspian contract area with partners Gazprom and Yukos under the Caspian Oil Company joint venture.

Targeting prospects in the international oil refining and oil product distribution sector, Lukoil recently created Lukoil Europe Holdings. It also embarked on a five-year programme of development of its overseas refineries in Romania, Bulgaria and Ukraine, where it plans to have expanded its retail chain network by 120–150 sites by the end of 2001.

Tech capital fund

Chevron Technology Ventures has launched CTV II, a $100mn capital fund to invest in early to mid-stage companies and in limited partnership funds. Investments from CTV II will 'centre on companies developing technologies that enable the interaction of physical devices and information networks, and focus on those companies whose technology has the potential to improve Chevron's core business performance or create opportunities for growth.'

CTV's first fund – $60mn, set up in June 1999 – focused investment in three primary areas: information technology, biotechnology and materials sciences. Some 75% of the CTV 1 fund capital has been committed in nine start-up companies and six venture capital funds.

Canadian royalties

Canada stands to lose royalties to France because of an ongoing legal boundary dispute between two of the country's east coast provinces Nova Scotia and Newfoundland, who both claim that the location of planned oil explorations are in their provincial waters and so should be paid resulting royalties, writes *Monica Dobie.*

France, which controls a slim strip of the ocean south of Newfoundland, because of its ownership of islands of St Pierre and Miquelon, has persuaded Gulf Canada Resources and Mobil Canada to explore in its waters.

A tribunal is currently underway and an interim report is due in two months time.

BP sells North Sea assets to Tullow

BP has completed the sale of certain UK southern North Sea gas assets to Tullow Oil, fulfilling undertakings that BP made to the European Commission at the time of the Arco acquisition, completed in April 2000.

The sale covered Arco's share in the Thames, Hewett and Welland producing fields and their associated pipelines and terminal interests. It follows the completion in February of the sale of Arco's share of the Murdoch and Boulton gas fields together with its stake in the Caister–Murdoch system to Tullow.

In addition, BP is also currently in the process of selling to Tullow the Orwell and Gawain fields, which are satellites to Thames, and some additional exploration licenses.

In the short term, Arco will continue to operate Thames, Welland, Gawain and Orwell on behalf of the coventurers. It is anticipated that ExxonMobil will assume operatorship of Thames, Welland and Gawain. Operatorship of Orwell is yet to be decided.

In total, Tullow is set to pay BP some £201mn for the package of assets. Net gas production from the assets amounts to 150mn cf/d.

Libya tops new ventures survey

Libya has been voted top of Robertson's *International New Ventures Survey* – which seeks to ascertain those countries most attractive to international oil companies for new ventures activity – for the second year running.

The top ten countries are: 1 – Libya; 2 – Iran; 3 – Algeria; 4 – Australia; 5 – Brazil; 6 – UK; 7 – Egypt; 8 – Iraq; 9 – Angola; and, 10 – Indonesia.

In a confidential questionnaire, 85 international oil companies rated their level of interest in new ventures in 146 countries outside North America, from which global and regional rankings were prepared. The most popular region was the Middle East, followed by the Far East/Australasia. Outside the top ten, the most impressive gains in ranking in 2000 were made by Mexico, Ecuador and Morocco, and the biggest falls by Eritrea, Thailand and Myanmar.

An overwhelming 72% of survey participants stated that they will increase their global E&P budgets in 2001, with 70% increasing spending on exploration. Independents appear the most aggressive in this regard. An average oil price of $23.8/b was used for 2001 planning purposes, up from $18.94 in last year's survey and $13.76 for 1999.

Some 51% of respondents stated that they are actively seeking new ventures in 2001, 56% indicating that they expected to invest in new projects in countries outside those in which they are presently involved. Interest in gas continues to rise, particularly among the majors, and 34% of participants expressed an intent to increase their deepwater ventures.

Elephant playtime with pipeline pigs

Some foam pipeline cleaning pigs have been donated to Whipsnade Wild Animal Park by Inpipe Products of Catterick Garrison in Yorkshire. Hard enough to hold, yet still gentle on the mouth, the pigs are giving the park's Asian elephants a taste of what it could have been like if they had been trained to carry logs in an Indian forest.

Natuna gas sales agreement signed

Indonesian state oil company Pertamina and Malaysian state oil company Petronas have signed final agreements for the long-term delivery of natural gas to Malaysia by pipeline from Conoco-operated South Natuna Sea Block B fields offshore Indonesia. Under the contract, Petronas will purchase 1.5tn cf of natural gas, valued at $4bn, over the next 20 years. In addition, more than $4bn in oil and natural gas liquids will be produced from Block B along with this gas.

This is the second gas sales agreement relating to Natuna Sea Block B and involves a $2.5bn direct investment by the partners in field facilities, wells and the installation of a 60-mile pipeline from the newly constructed Hang Tuah moveable offshore gas production unit (MOgPU) to Petronas' Duyong Complex offshore Malaysia. Recently inaugurated in Ulsan, Korea, the Hang Tuah MOgPU is due to come onstream in Indonesia's Block B by mid-2001.

In addition, an FPSO vessel and LPG facility are being constructed to support the production of more than 170mn barrels of oil and nearly 100mn barrels of LPG.

In Brief

tion follows Vintage's buyout of Comerta Energy in November 2000 giving the US company a stronger foothold in Canada's oil sector, writes Monica Dobie.

***Australian company Roc Oil is reported** to have launched a $17.9mn bid to obtain a controlling stake in Gulfstream Resources Canada.*

Russia & Central Asia

***The government of Uzbekistan is planning** to privatise national oil company Uzbekneftegaz and its subsidiaries.*

***The Russian Government body in** charge of regulating duty pricing has, according to UFG, proposed reducing the export duty on fuel oil from euro 31 per tonne to euro 20 per tonne.*

***Ruhrgas has announced that it may** 'gradually' increase its stake in Gazprom from 5% to between 8% and 10%, reports UFG.*

***Russian Energy Minister Viktor** Khristenko has announced that Russia has no plans to cut crude exports, despite the commitment made by the Energy Ministry at the last Opec conference, reports UFG.*

***GATX Rail Overseas Holding** Corporation has acquired DEC from Nafta Poland. DEC is responsible for moving 90% of petroleum products in Poland. The deal is worth a reported $90mn.*

Asia-Pacific

***Japan National Oil Company (JNOC)** is reportedly planning to liquidate the two exploration companies Japex Oman and Niigata Exploration and sell their concession, as part of a programme to dissolve unprofitable subsidiaries.*

Africa

***Nigerian President Olusegun Obasanjo** has reaffirmed that the deregulation of the country's oil industry is to go ahead to create a sustainable fuel supply, reports* Stella Zenkovich.

***Energy Africa has acquired an additional 12.5%** in Energy Africa Gabon, increasing its interest to 50%.*

In Brief

UK

An explosion and fire occurred in the *saturate gas plant at Conoco's 85mn b/y capacity Humber refinery in Lincolnshire on 16 April. No one was seriously hurt.*

German energy company E.On has *unveiled a 765 pence per share agreed takeover bid for Powergen, the UK-based electricity company, at £5.1bn. E.On will take on Powergen's £4.5bn debt.*

Europe

The EU Council of Ministers has *approved new emission levels for motorcycles and three-wheeled vehicles from 2003 – a reduction of 60% for hydrocarbons and carbon monoxide for four-stroke motorcycles, plus 70% for hydrocarbons and 30% for carbon monoxide regarding two-stroke motorcycles, reports* Keith Nuthall.

Texaco has reportedly acquired a 25% *equity stake in Bulgaria's largest motor oil producer Prista Oil, which will allow Texaco-branded lubricants to be sold in Bulgaria alongside Prista's own brand of lubricants.*

Shell is understood to be adding six *new service stations to its 125-strong Hungarian retail network this year, followed by 10 new sites a year over the next five years.*

European Union Commissioner Loyla *de Palacio has formally proposed complete EU gas liberalisation, across the EU, with all consumers being able to choose their suppliers by 2005, and non-domestic customers, by 2004 writes* Keith Nuthall.

Vopak has acquired two terminals in *Finland, which formed part of the Finnish Helvar Merca Group operating under the name Transkem. The terminals, with a total capacity of 164,500 cm, are capable of handling 1mn t/y .*

North America

Chevron is reviewing options for *importing LNG to serve the growing demands for clean energy in the west coast of the US. If the project is economically viable, the first supplies of LNG could begin arriving in 2005. Plans are to supply the LNG from Chevron's holdings in Australia.*

BP looking to secure partnership in Chinese first

BP has been selected to enter exclusive negotiations to secure the position as the foreign partner in the joint venture tasked to develop China's first LNG import terminal and associated pipeline. The Chinese sponsors and BP will jointly conduct a feasibility study which, once approved by the Chinese authorities, will lead to the formation of a joint venture company responsible for the construction and initial operating phase of the new plant.

The Guangdong project in southern China will consist of an LNG re-gassification terminal near the city of Shenzhen, with a capacity of 3mn t/y, together with 300 km of associated pipeline linking the terminal to the region in its first phase. It is due onstream in 2006.

A successful finalisation of the negotiations will lead to BP taking a 30% equity stake in the project, partnering with a coalition led by the China National Offshore Oil Corporation (CNOOC) (33%), local Guangdong companies (31%) and two Hong Kong energy companies (6%).

Phase 2 of the project – which will add a further 2mn t/y of LNG re-gassification capacity and 180 more kilometres of pipeline – is due onstream in 2008.

Gas currently meets just 2% of China's energy needs, but this number is projected to increase to between 7% and 8% by 2010.

Green London buses

BP, together with DaimlerChrysler, First Bus, Transport for London and the Energy Saving Trust, are to bring 'clean' public transport to London with the introduction of hydrogen fuel cell buses to major routes in the capital. The introduction of the buses is part of a European-wide EU-funded project to look at the viability of hydrogen as a fuel for vehicles.

Three of DaimlerChrysler's hydrogen-powered Citaro buses will begin taking passengers in 2003. These buses are the first of their kind to be commercially operated in the UK. The buses are said to be quiet and clean – the only emission is water vapour.

Under the terms of the deal, BP will build and manage the infrastructure to supply hydrogen to the buses. The hydrogen is stored in tanks on the roofs of the vehicles, and will use around 40 kg of hydrogen a day. They have a range of approximately 250 miles.

Call for greater biodiesel tax cut

The recent 20 p/l Budget tax cut on the price of biodiesel fuel is 'a sop to the environmental lobby' states Arval PHH Vehicle Solutions, said to be Europe's largest fleet and fuel management company. The company operates the AllStar fuel card that is accepted at over 12,000 petrol stations across the UK. However, it reports that not one of these sites sells biodiesel, which is manufactured from oilseed rape or vegetable oil and is a clean, biodegradable and non-polluting form of diesel. It is reported that the fuel can be used in regular diesel engines without any need for modifications.

Arval PHH argues that even with the tax cut, which was clearly intended to encourage the wider use of this alternative fuel, biodiesel 'remains uneconomical for motorists and oil companies alike.' Martin Hender, Director of Fuel, explains: 'The cost of refining biodiesel in a large, efficient plant would be about 30–40 p/l. Regular diesel costs less than half as much to refine, so the cut of 20 p/l only just brings biodiesel into line with its fossil-fuel cousin.'

'However, no such large biodiesel plants currently exist in the UK. When you add in the cost of building and operating such a facility, the potential pump price of biodiesel shoots right back up. What is needed is an even greater tax cut on biodiesel so that it will be economical for UK businesses to develop it.'

NEWS Downstream

New buyer for North West Shelf gas

The North West Shelf LNG Sellers have signed a Letter of Intent (LoI) with Kyushu Electric Power Company for the sale and purchase of 0.5mn t/y of LNG, beginning in April 2006. Kyushu Electric is Japan's fourth largest power utility and seventh largest consumer of LNG, currently using around 2.5mn t/y. The company is one of the North West Shelf LNG project's foundation customers, taking about 1.05mn t/y of LNG under an original 20-year agreement that commenced in 1989.

This latest agreement follows LoI's signed with other Japanese customers in recent months:

- Tokyo Gas and Toho Gas in September 2000 for the supply of 1mn t/y of LNG, starting in 2004.
- Osaka Gas in January 2001 for the supply of 1mn t/y, starting in 2004.
- Tohoku Electric in February 2001 for the supply of 0.4mn t/y, starting in 2005.

The agreement further underpins the recently approved North West Shelf Venture's (NWSV) $2.4bn expansion of its LNG operations. The expansion includes the construction of a 4.2mn t/y LNG processing facility, as well as a 42-inch trunkline that will connect the plant and the Venture's gas fields offshore Australia. Construction will commence in September 2001, with first production slated in mid-2004.

An additional LNG ship with a capacity of 135,000 cm has also been ordered from the Daewoo Shipbuilding and Marine Engineering Company to deliver volume associated with the expansion project. The vessel is scheduled for delivery in 2004.

Shell and RWE-DEA merge German ops

German utility RWE-DEA is to merge its dowstream oil business, encompassing refining, supply, distribution and marketing, with Deutsche Shell to create a joint venture to be known as Shell & DEA Oil, reports Wood MacKenzie. Both companies will initially hold a 50% stake in the new company, with Shell taking majority control from 2004 by acquiring an additional 1%. RWE-DEA will have the option to sell its remaining 49% stake to Shell.

The new joint venture – based in Hamburg – will be the largest refining and marketing company in Germany, holding 30% of domestic refining capacity and a similar share of the inland wholesale products market. The combination of 1,681 DEA branded service stations and 1,515 Shell stations will command a joint retail fuel market share of 24%, putting it ahead of current market leader Aral (with 19%). Both brands are to be retained for the time being.

Under the terms of the agreement, Shell is also to acquire RWE-DEA's 45-strong network of service stations in Poland. These will not form part of the German joint venture, but will be integrated into Shell's existing Polish operation, boosting its network to 161 outlets. This will place the company ahead of BP, with approximately 134 sites, as the largest foreign oil company network in Poland.

In addition, both companies have lubricants plants at Grasbrook, near Hamburg. Shell's 350,000 t/y lube oil plant is reported to be the Group's largest globally and is its only one that can run napthenic base oils. RWE-DEA's lubricants business is in the form of a joint venture with Fuchs Petrolub.

The merger is expected to create synergies in the region of at least $150mn. Approximately 10% of the combined workforce is expected to be made redundant.

Global LPG demand set to grow

Global demand for automotive LPG is set to grow by 5.9% per annum to 2009, according to Datamonitor's latest report entitled *The Global Automotive LPG Market 2001*. Europe and Asia-Pacific are expected to show the highest growth rates with demand rising by 7% and 7.8% per annum respectively. Latin American growth will not be far behind, reports the analyst, with a predicted growth rate of 5.7% per annum.

North America is predicted to be the only region to buck this trend, with automotive LPG sales expected to contract by just under 1% per annum for the next decade. This is due to a lack of government fiscal support which is relied upon to provide consumers with sufficient incentives to switch to LPG from more polluting fuels, states the report. North America's traditionally low gasoline and fuel prices, combined with an absence of preferential tax treatment for autogas, mean large scale switching is unlikely, says Datamonitor.

In Brief

Phillips Petroleum's proposed $9bn *takeover of US refiner Tosco is understood to have been approved by shareholders of both companies.*

Husky Energy of Canada has signed a *five-year deal to market Chevron lubricants through its 580-strong Husky- and Mohawk-branded network.*

Shell US Gas and Power is understood *to have sold its Acadian Gas subsidiary to Enterprise Products Partners for $226mn. Acadian Gas is a Louisiana intrastate natural gas pipeline company operating some 1,000 miles of pipeline and over 1bn cfld of capacity.*

Middle East

Snamprogetti of Italy has secured a *$140mn contract out of seven bidders to build a new gas oil separation plant (GOSP) for phase two of the Haradh light crude increment project in Saudi Arabia, reports* Stella Zenkovich.

Russia and Central Asia

Russian oil company Yukos and US *company UOP Services are reported to have signed an agreement under which UOP will advise Yukos on the installation of modern refining technology and improving existing processes.*

Visiting Kiev, Iranian Foreign Affairs *Minister Kamal Kharazi detailed a plan for a gas pipeline running from Tehran to the Ukraine via Azerbaijan, Georgia or Armenia, writes* Stella Zenkovich.

Lukoil and Uraltrasnefteproduct are to *build a Perm-Almetyevsk products pipeline across Russia's Muslim Bashkortostan enclave, with a terminal at Agidei, to supply the enclave's Ufa-Kambarka pipeline.*

Deliveries of Sakhalin LNG to South *Korea could start from 2005/2006, according to Sakhalin Regional Governor Igor Farkhutdinov.*

A new 800,000 t/y capacity refinery is *planned to be built at Kuibyshev, in Novosibirsk, to handle crude from the Verkh Tarskoye oil field. The plant is slated to be completed by 2004.*

Lukoil plans to start deliveries of low- *octane gasoline from its Black Sea refineries, Petrotel and Neftokim, to its US subsidiary Getty Petroleum, reports UFG.*

In Brief

Asia-Pacific

***Shell reports that the 5mn t/y LNG** terminal and port development at Hazira, India, has received environmental clearance from the Ministry of Environment & Forests.*

***Beijing's approval is expected this** month for two major forecourt investment projects, writes* David Egan *of Petrolworld. PetroChina and BP are set to build 1,000 service stations in a joint venture in Fujian and Guangdong Provinces in the southeast of China. Meanwhile Sinopec and Shell are planning to build over 500 outlets in Jiangsu Province by Shanghai.*

***International law firm Denton Wilde** Sapte reports that it has advised Malaysian state oil and gasPetronas on a $8.5bn project for the 20-year supply of Indonesian gas to Malaysia through a newbuild subsea pipeline linking the two countries.*

Africa

***South Africa and Mozambique are** reported to have signed a deal under which Sasol will be able to pipe gas from Mozambique to South Africa, beginning in 2003.*

***BP has signed an LNG agreement with** the Egyptian General Petroleum Corporation and Eni. The agreement provides for an LNG facility to be built at the Port of Damietta by BP and Eni, who have also agreed to be buyers of the LNG for sale in Mediterranean markets.*

NEWS Downstream

Mexico moving to gas self-sufficiency

PYPSA of Mexico City has secured a $5mn engineering, procurement and construction contract from Pemex to modernise 10 sour gas sweetening plants at the Cactus petrochemical complex in Chiapas, Mexico. The contract award comes on the heels of PYPSA's nearly completed rehabilitation of Pemex's compression no. 7 at Cempoala, Veracruz, Mexico (see above – installation of inlet and outlet valves).

The plant upgrades form part of Pemex's drive to optimise use of its national gas transmission system and to meet increasing demand for gas in the central and northern areas of Mexico. Mexican consumption of gas is forecast to reach 3.54tn cf/y over the next decade. According to PYPSA Director General Guillermo Barnetche, Mexico 'remains dependent on US imports for gas supply; however, this year's start-up of the Cempoala and Cactus facilities will help to lessen that dependency.'

Alliance searches for energy opportunities

BP and First Reserve are working together to identify and define investment opportunities in companies seeking to develop new technologies in the energy sector.

The deal will give BP access to a range of technologies for its upstream, midstream and downstream activities. It is likely that the two companies will initially focus on upstream technologies in small and medium-sized businesses.

Under the terms of the deal, BP will assess and provide advice on the technologies being pursued by the companies and identify those with the promise to solve its own technical challenges. First Reserve will take equity stakes in companies offering the best potential for investors.

UK Deliveries into Consumption (tonnes)

7Products	†Feb 2000	Feb 2001	†Jan–Feb 2000	Jan–Feb 2001	% Change
Naphtha/LDF	247,381	100,327	485,771	305,377	–37
ATF – Kerosene	689,458	735,609	1,425,975	1,494,790	5
Petrol	1,683,262	1,608,558	3,368,222	3,431,826	2
of which unleaded	1,530,810	1,529,803	3,072,312	2,822,067	–8
of which Super unleaded	29,771	31,636	70,938	67,795	94
of which Premium unleaded	1,501,039	1,056,701	3,001,374	2,242,921	–25
ULSP (ultra low sulfur petrol)	–	441,466	–	881,041	–
Lead Replacement Petrol (LRP)	152,452	78,755	295,910	170,184	–42
Burning Oil	436,080	422,543	841,702	916,364	9
Automotive Diesel	1,251,654	1,202,997	2,429,299	2,496,234	2.8
Gas/Diesel Oil	641,639	516,753	1,283,270	1,106,601	–14
Fuel Oil	157,004	192,572	323,361	401,450	24
Lubricating Oil	66,751	73,050	130,898	144,146	10
Other Products	706,532	647,514	1,317,576	1,301,182	–1
Total above	5,879,761	5,499,923	11,606,074	11,597,970	0
Refinery Consumption	449,520	346,062	910,284	748,058	–18
Total all products	6,329,281	5,845,985	12,516,358	12,346,028	–1

† Revised with adjustments

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

Clouds and silver linings

Expectations of lower oil prices are largely built into the current valuations of the upstream companies, so any improvement could revalue the sector, reports *Chris Chew*.

Enterprise Oil is now the giant of the sector, following the takeover of Lasmo last year. Its traditional emphasis on the UK and NW Europe is shifting towards Italy, the US Gulf of Mexico, Brazil, and Iran. There has also been a move into Western Siberia. This spread of activity, plus end-2000 reserves of 1,412mn boe, seems to be attracting the attention of predators, and companies such Eni, Repsol-YPF, Conoco, Talisman, Amerada Hess and Burlington have attracted press comment as possible suitors.

Enterprise itself has long been aware of the threat to its independence but believes that efficient and low-cost operation is one of its best defences against hostile attack. Nevertheless, the Board has approved a share buy-back of up to 10% of Enterprise's issued capital. This should help to support the share price – but at some cost to its balance sheet gearing.

Record Enterprise

Last year marked a record year for Enterprise's output and profits. Production rose by 31% to 280,563 boe/d – due mainly to the Pierce and Jotun fields in the North Sea – while the realised oil price improved by 66% to £19.05/b. This resulted in turnover more than doubling to £1,841mn, while operating profits jumped from £322mn to £1,096mn. Net profits also nearly doubled, from £177mn to £489mn. In the current year investors may be disappointed by Enterprise's forecast that oil production will fall to between 250,000 and 260,000 boe/d – although it has reaffirmed its commitment to a 5% annual growth across the cycle. Despite this longer term target, consensus brokers' estimates forecast a 25–30% contraction in net profits this year, followed by a further 15–20% reduction in 2002.

Premier production

Although the UK still accounts for over 60% of Premier Oil's production, this contribution is falling as Wytch Farm depletes. Premier's operational centre of gravity is moving steadily eastwards, and future growth will depend increasingly on its activities in Myanmar, Indonesia and Pakistan – all areas of high political risk. Premier's biggest asset by value is in Myanmar, where the $650mn Yetagun development came onstream in May 2000. The company has resisted efforts by the UK Government to withdraw from Myanmar, but a political settlement would clearly be of enormous benefit to Premier's share price. The principal Indonesian project is the West Natuna gas field, which will begin supplying natural gas to Singapore this year.

Last year, Amerada Hess and Petronas each acquired a 25% strategic stake in Premier, with the aim of combining their Asian gas activities. But Premier's share price has suffered, as it is effectively out of play as a bid target. It now appears that Asian gas development is no longer a strategic objective, so the relationship is now being re-assessed. Ironically, the most tangible result of the linkage was the negative impact of hedges taken out as a condition of the equity injection. This required Premier to hedge 70% of 2000 production at around $19.54/b, costing £28.7mn in reduced turnover.

The high level of debt – £445mn net of cash at the end of last year – concerns some investors. However, Premier points out that many of its large projects are near completion and net debt should peak in 2001. The fall in global interest rates will also help. Consensus forecasts are for earnings per share (EPS) to bounce back from a hedge-depressed 0.4p/share to 2.3p/share this year, followed by a modest 6% decline to 2.1p/share in 2002.

Cairn commitments

Cairn Energy remains committed to the Indian sub-continent, which now accounts for 84% of production. North Sea exposure is limited to small, non-operating, stakes and its contribution will continue to decline. Cairn's decision to concentrate on India and Bangladesh began in the mid-1990s and it remains committed to further development in this area. The attractions of the sub-continent are low operating costs and the availability of contractual protection against low oil and gas prices.

In India, production is mainly from the Ravva field in Eastern India, which Cairn operates, and where oil production has plateaued at around 49,000 b/d and 24.5mn cf/d of gas. There is still further exploration potential in the eastern basins, but Cairn is also exploring in the Cambay and the Rajasthan Basins of Western India.

Production in Bangladesh is mainly attributable to the Shell-operated Sangu gas field, which produced 123mn cf/d in 2000. The Sangu GSPA (gas sales production agreement) specifies a minimum take-or-pay amount of 128mn cf/d, so a significant increase in average off-take in 2001 is expected. There have been concerns over delays in payment for the gas from Petrobangla, but the GSPA includes a Government of Bangladesh Sovereign guarantee which can be invoked if the delays become excessive. Consensus estimates indicate a 12% fall in Cairn's EPS in 2001, followed by a similar contraction in 2002.

Share price drivers

Although non-oil factors are likely to be the biggest influence on company share prices, investors should not ignore the market impact of changing oil price expectations. According to a valuation by Merrill Lynch, the global oil sector is already discounting a Brent price of $17/b within the next two years.

If lower oil prices are indeed largely discounted by current share prices, investors should perhaps now be looking for silver linings, especially in the form of bid potential, rather than the black cloud of lower oil prices.

		Sales (£mn)	Operating (£mn)	Net (£mn)	EPS (pence)	PER (x)
Enterprise Oil (548p)	2000	1,841	1,096	489	97.6	5.6
	2001	–	–	–	68.1	8.0
	2002	–	–	–	56.9	9.6
Premier Oil (19p)	2000	1,15.7	28.9	6.1	0.4	47.5
	2001	–	–	–	2.25	8.4
	2002	–	–	–	2.11	9.0
Cairn Energy (257p)	2000	1,16.1	65.8	41.6	28.4	9.0
	2001	–	–	–	24.8	10.4
	2002	–	–	–	22	11.7

Source: Company statements, IBES consensus estimates Note: EPS – earnings per share; PER – price earnings ratio.

Table 1: Company Statistics, 2000–2002: Enterprise Oil, Premier Oil and Cairn Energy

Malampaya – a world record float-over

Pearl fishermen from the island of Palawan were consulted about the potential impact on their livelihoods of the Malampaya gas field project

An 11,000-tonne production deck was installed in the South China Sea during March 2001 in what was described as a 'world record' float-over operation. The gas platform will form part of the Malampaya deepwater gas-to-power project which aims to provide gas to fuel 2,700 MW of electric power to the Philippine Islands and to reduce the nation's dependence on imported fuel by 30%. The platform will receive gas from subsea wells in deeper water and is notable as the first of its type to use a new generation of 'fieldbus' automation, writes *Jeff Crook*.

The Malampaya and Camago gas/condensate fields are located in deepwater some 70 km northwest of Palawan Island in the South China Sea. The two linked subsurface structures have estimated reserves of 2.7tn cf of gas and 85mn barrels of condensate. Palawan is a pristine, undeveloped tropical island that extends like a long finger from the main island group, and is perhaps best known for its wildlife. The island has few paved roads, and the shores are surrounded by coral reefs. As Palawan has little demand for energy, the Malampaya natural gas is to be transported over 500 km by pipeline to the more industrial island of Luzon, where it will land at Batangas and provide fuel for newly built power stations.

The $2bn development presented operator Shell Philippines Exploration (SPEX), and its recently joined venture partners Texaco Philippines and the Philippine National Oil Exploration Corporation, with a major challenge due to the remote location and great water depth which precluded the use of a conventional production platform. Shell, therefore, drew on its deepwater experience to implement a subsea development. The subsea wells will be linked back to a shallow-water platform where the gas will be processed for its 500 km journey to Luzon. The offshore development is designed to produce

508mn cf/d of gas and 29,000 b/d of stabilised condensate. Gas is due to start flowing by 1 October 2001 to permit commissioning of the onshore power plant; first commercial gas sales are set to start from 1 January 2002.

The first phase of the upstream development consists of five subsea wells in 820 metres of water connected back 30 km, via a manifold and a pair of flowlines, to the shallow water platform. A second phase of development is planned for 2009, and will most likely consist of four more subsea wells drilled around a second manifold in the Camago area.

Condensate will be stabilised on the platform and stored in the caisson base, which consists of tanks within the concrete sub-structure before being exported by shuttle tanker from a catenary anchored leg mooring (CALM) buoy located 2.53 km away. The natural gas will be transported by a 504-km pipeline to the treatment plant at Tabangao, Batangas, on the island of Luzon.

Allseas Marine Contractors was awarded the contract for installing the offshore pipelines. The giant pipelaying vessel *Solitaire* started laying the 24-inch diameter pipeline from the Batangas landfall to the shallow-water platform last June, and is to install the subsea manifold and infield pipelines in early 2001. SPEX has placed another contract with Foster Wheeler to build the reception terminal at Batangas.

Shallow water platform

SPEX awarded contracts worth in the region of $450mn to Brown and Root Energy Services (BRES) during 1998 to design, procure, install and commission the shallow-water platform. These awards were made after BRES had completed the front-end engineering. Detailed engineering and procurement for the project is being performed by BRES in Singapore and Houston.

The platform stands in 43 metres of water, 50 km off the coast of Palawan Island and consists of a 961,000-tonne concrete gravity sub-structure (CGS) with topsides that will weigh around 13,000 tonnes when in operation. The topsides have three decks of processing equipment, together with living quarters for 44 workers, and an 80-metre flare boom. There is capacity to store 385,000 barrels of 'dry' condensate in inert gas filled tanks within the CGS.

BRES placed a sub-contract for the design, construction and installation of the base to the Malampaya CGS alliance which comprised John Holland, Arup Energy and Van Oord ACZ. This project was completed last summer, three months ahead of schedule. The CGS measures 112 metres long, 83 metres wide and has a caisson height of 16 metres. Four 11-metre diameter columns extend 40 metres above the caisson to support the integrated deck.

The CGS alliance was committed to a Philippine work content of some 60% and gave priority to the employment of local staff from the Subic Bay area. A purpose-built graving dock was built at Green Beech on a flat area of land that had once been used by the US Navy as a test range. After the site had been cleared of munitions, a self-contained residential site was built for 1,500 local workers and a small expatriate community.

The floor of the graving dock was 12 metres below sea level with a bund wall to prevent entry of water from the sea – construction of the graving dock involved the excavation of 320,000 cm of soil. A channel 150 metres wide and 12 metres deep was also dredged from the mouth of the graving dock to deeper water in Subic Bay. The graving dock was flooded before float-out of the CGS and the bund was dredged away to provide a clear passage into the open sea.

CGS installation

The CGS was installed on 1 June 2000 after being towed 209 km to the field site by three ocean going tugs with combined 30,000 brake horse power. A fourth tug was connected to the CGS on arrival at its field site, and the unit was manoeuvred into position by tugs linked in 'star formation,' one on each corner. Seabed transponders allowed the unit to be positioned within three metres of its target position.

The CGS settled gently on to mounds of crushed rock as ballast was pumped into internal tanks. The mounds were designed to flatten out under the weight of the CGS to smooth the contours of the seabed. Some 3,000 tonnes of rock were then deposited around the four corners of the base to prevent scouring by wave and tidal action, and 75,000 tonnes of additional ballast was deposited in open cells. This weight is designed to keep the CGS in its location even during a one in 10,000 year earthquake.

BRES also placed a sub-contract with Sembawang Marine Corporation for the fabrication of the integrated production deck. This work was carried out by the Sembawang yard located in the north of Singapore, with onshore commissioning testing completed during February 2001. The deck measures 90 metres long by 40 metres wide, and extends 25 metres from the base of the cellar deck to the helideck.

Heerema Marine Contractors Nederland was responsible for the transport and installation of the unit. The deck was loaded onto a barge and towed to the field site by three 9,000 brake horsepower tugs. The deck was weighed and placed on a 19-metre high transportation frame on 27 December 2000.

The transportation frame ensured that the deck cleared the top of the columns during the float-over operation – the four columns were placed far enough apart to allow the barge access. The barge was held into position by eight mooring lines during this operation. When the deck legs were precisely aligned with cone-shaped receptors mounted on top of on the CGS columns, the ballasting operations commenced.

The weight of the deck was progressively transferred to four leg mating units as the ballast operation progresses, with elastomeric pads incorporated in each of the mating units to reduce the initial impact. When the deck weight transfer had been completed the barge was towed from between the columns of the CGS and the final mating operation took place. The deck was lowered into its final position by sand jacks located on top of each column, and the contact points are now being welded together to form the one permanent structure.

Shell says that the principle advantage of selecting the float-over method was that it permitted the complete integrated deck to be installed as one unit. This allows greater freedom of equipment layout and also permitted testing and pre-commissioning to be completed onshore. This resulted in considerable cost saving through a shorter offshore commissioning phase, and elimination

Operational support

An unscheduled loss of gas supply would have serious consequences for an integrated gas-to-power project, so the reliability of subsea equipment has been the subject of special attention. SPEX says that a full integration test of the subsea system was undertaken on land prior to installation of the system offshore. This test verified that the system operates correctly and was used to train and familiarise personnel who will be involved in the installation and operation of the system.

SPEX has awarded the Fluor Daniel–Amec Strategic Alliance a major services contract to provide operational support for Malampaya. The services contract, placed in September 2000, has an initial term of six years. It covers the subsea wellheads, offshore platform, loading spar, subsea pipelines and onshore gas terminal.

of the need for heavy lift crane vessels. Installation was in fact completed two weeks ahead of schedule.

Fieldbus automation

The Malampaya shallow-water platform is claimed to be the first major offshore platform to employ a new generation of process automation based on Fisher Rosemount's PlantWeb architecture using Foundation fieldbus. The fieldbus technology has been a subject of great interest within the control system industry for over a decade, but implementation on major projects has been held up by the delay in agreement on standards for compatibility between different manufacturers.

Foundation fieldbus is described as an 'open', inter-operable fieldbus that is covered by European and international standards. These particular standards have been created by the Fieldbus Foundation, a not-for-profit corporation based in Austin, Texas, which is supported by 120 of the world's leading end users and manufacturers of automation products.

The basic fieldbus technology enables up to 32 intelligent field sensors, actuators and controllers to be linked by means of a digital two-way, multi-drop communication link. The multi-drop arrangement allows a considerable amount of field cabling, junction boxes and electronic hardware to be eliminated. The fieldbus system also allows application software to be downloaded through signal cables and permits more sophisticated functions, such as remote calibration and condition monitoring of field devices.

Major milestones

Following the spate of successful milestones achieved in 2000, SPEX says that it has already started 2001 with new achievements such as the successful installation of the first three Malampaya xmas trees on the sea floor and the catenary anchored leg mooring (CALM) buoy offshore Palawan.

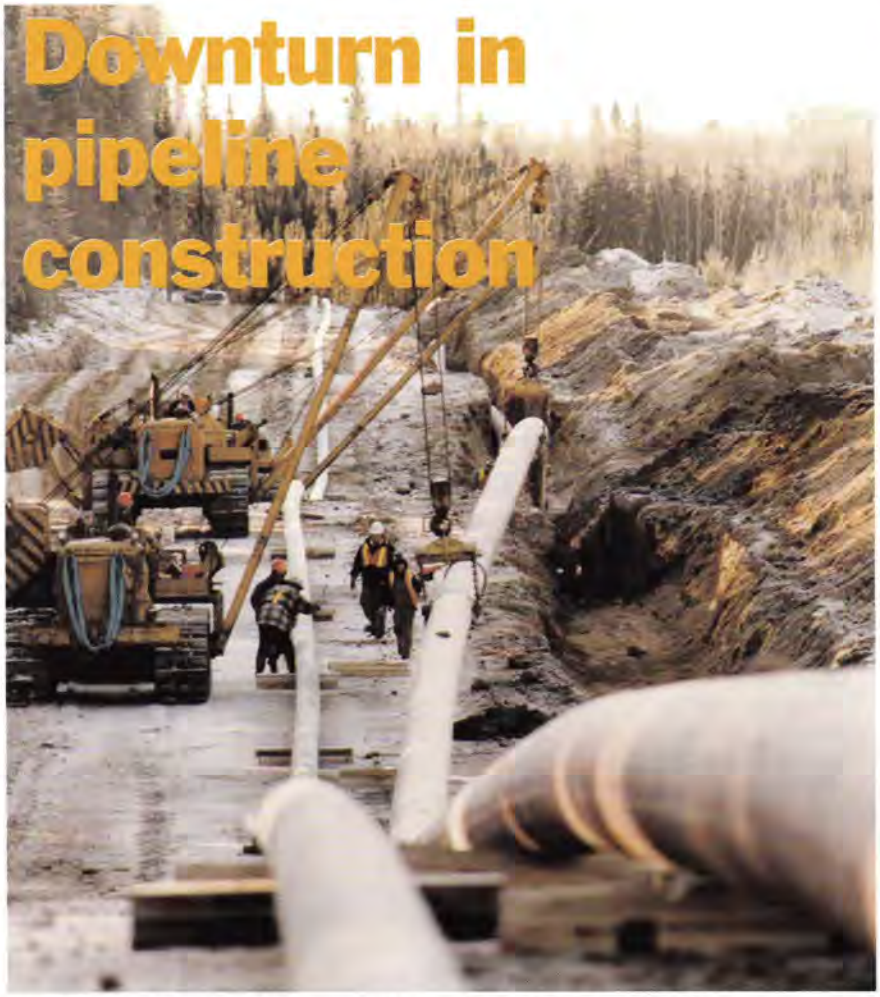
The *Atwood Falcon* drilling rig installed the first xmas tree on Malampaya well-9 at a depth of 832 metres below sea level on 22 January. Two more xmas trees were installed on Malampaya wells 5 and 6, successfully completing the third of them on 26 January. Using the rig anchors, the trees were carefully positioned over the well and lowered into place and locked. The trees were then extensively tested to make sure all functions were operating.

Just over 30 km away, the installation of the CALM buoy was completed. After being towed from its construction yard in Batangas last November and temporarily moored in Subic Bay, the CALM buoy was finally installed on 23 January.

David J Greer, Shell Philippines Exploration Managing Director, lauded these initial 2001 milestones: 'The successful attainment of our 2000 milestones and these early achievements in 2001 are a tribute to all the technical excellence, hard work and effort being expended by SPEX staff and contractors to ensure the successful accomplishment of this project by 1 October 2001 for the benefit of the nation. I am proud to be a member of this team and to be associated with the implementation of this landmark engineering project.'

Photo courtesy of Shell International

Downturn in pipeline construction



***Gordon Cope* reviews Canada's 2001 pipeline construction programme and assesses future pipeline prospects.**

A busy construction period in 2000 has been followed by a lull as Canada's pipeline sector takes a break. 'There's been lower pipeline growth this year than we've seen for the last five years or so,' says Bob Hill, President of the Canadian Energy Pipelines Association, whose members operate over 90,000 km of line in the country. 'There are no major projects ready-to-go at this point in time.'

Construction in 2000 was highlighted by the completion in November of the Alliance natural gas pipeline, a 2,988-km, 1.35bn cf/d system running from Fort St John in British Columbia, to Chicago, Illinois (see *Petroleum Review*, November 2000).

Construction downturn

Construction in 2001, however, is limited to a relatively modest series of shorter lines with specific tasks:

- TransCanada Pipe Line is building a 90-km, 24-inch diameter gas transmission line in northeast Alberta to deliver gas to oil sands plants near Fort McMurray. Due to be completed in March, the line runs from TransCanada's Peerless Lake lateral to its Liege lateral.
- Canadian Natural Resources, Alberta Energy and Koch Industries plan to construct a 250-km, 24-inch diameter pipeline from the Cold Lake heavy oil production area to the Hardisty hub in Alberta. Construction is scheduled for the summer of 2001 and will begin service in late 2001.
- Williams Gas, BC Hydro, Westcoast Energy and its subsidiary, Central Gas, are planning to build a 130-km, 16-inch natural gas pipeline to supply two cogeneration plants being built on Vancouver Island. The pipeline originates at Sumas, Washington, and terminates near Duncan, Vancouver Island. The pipeline is scheduled to begin operating in November 2002.
- Trans Mountain Pipe Lines is constructing a 493-km line to carry synthetic crude from the Athabasca oil sand's Muskeg River Mine, north of Fort McMurray, to an upgrader being built adjacent to the Scotford refinery near Edmonton. The pipeline is being built on behalf of Shell Canada, Chevron Canada and Western Oil Sands, and will be operated by Corridor Pipelines, a subsidiary of Trans Mountain Pipe Lines.
- Imperial Oil's Thicksilver pipeline project includes a 250-km, 36-inch line to transport blended bitumen from Cold Lake to Hardisty and a 250-km, 12-inch line to transport lighter hydrocarbon liquids from Hardisty to Cold Lake. (The project has been placed on hold pending further marketing studies).

The downturn in major construction is a direct result of transportation glut. For the last several years, gas production in the Western Canada sedimentary basin was been relatively static, at around 15bn cf/d. With the completion of the Alliance pipeline and other projects, however, there has been an excess of approximately 1bn cf takeaway capacity.

Falling oil output

On the oil side, light sweet crude production has been declining as the big fields discovered in the 1950s and 1960s inevitably deplete. Production of conventional crude – light, medium and heavy – stood at 1.26mn b/d, with the majority, 850,000 b/d, in the heavy category. (The rest, 790,000 b/d, is non-conventional – oil sands synthetic and blended bitumen).

The decline, however, has not been met by a corresponding increase in production of synthetic crude from oil sands and heavy oil fields. Overall production in the Western Canadian sedimentary basin dropped from the 1998 level of 2.1mn b/d to 1.9mn b/d in 1999, then rebounded to 2.05mn b/d in 2000.

All photos courtesy of Corridor Pipelines

'Right now, there is a surplus pipeline capacity of around 200,000 b/d,' says Onno DeVries, Manager of Crude Oil and Fiscal Policy for the Canadian Association of Petroleum Producers. 'But Enbridge [the operator of Canada's largest crude and refined products pipeline network] has less spare capacity on the heavy side, and that's where expansion is focused.'

A major expansion programme began in 1999, with the looping of the main heavy crude line between Saskatchewan and Minnesota that added 175,000 b/d capacity. 'A second phase [77 miles of 36-inch line being constructed this year], will add an additional 60,000 b/d from Saskatchewan to the heavy oil area in Alberta,' says DeVries.

Looking ahead

In the medium-term future, the East Coast of Canada may be the site of the next large construction project. 'There has been a recent announcement that PanCanadian will develop its Deep Panuke gas field and build a facility at Sable Island,' comments Hill. 'Increased capacity will be required for Sable Island to shore, and from shore to market.'

In the longer term, pipeline operators are eyeing the Arctic. In addition to the 6tn cf of discovered gas in the Mackenzie Delta and an estimated 35tn cf of gas in Prudhoe Bay, scientists reckon that the undiscovered reserve potential for the far North could exceed 150tn cf.

Various proposals to tie Arctic gas into the North American grid are slowly progressing through the feasibility phase. The C$6bn Alaska Natural Gas Transportation System (ANGTS) proposal, which routes its way through Alaska, the Yukon and the North West Territories, would deliver both Prudhoe Bay and Mackenzie Delta gas to north-east BC. Imperial Oil, Gulf Canada Resources, Shell Canada and Mobil Oil Canada are studying a less expensive proposal to run Mackenzie Delta gas down the Mackenzie Valley to connect with existing pipelines in Alberta.

On the East Coast, the North Atlantic Pipeline Partners, or NAPP, is conducting engineering and feasibility studies for a 1,500-mile, underwater North Atlantic natural gas pipeline. The 30-inch line, when completed, would extend from reserves in the Grand Banks of Newfoundland to the Island of Newfoundland, across the Laurentian Basin to the Scotian Shelf and on to New England, where it would connect up with existing grids. Spearheaded by Tatham Offshore Canada, of Houston, the $3bn project faces several hurdles, including environmental concerns over the fisheries in the region, iceberg scour and the difficulty of extracting natural gas from the faulted reservoirs.

Cloud on the horizon

The biggest cloud on the pipeline construction horizon is the sustained high price for natural gas. Increased fuel costs helped triple the price of electricity over the winter in markets on the west coast of North America, leading to concerns that plans for natural gas-fired generators – and the pipelines serving them – might be in jeopardy.

In a new study, Calgary-based Optimum Energy Management doubts that many of the 2,230 MW of gas-fired power projects proposed for the Alberta market in the next five years will be built. 'As the price of natural gas climbs, coal becomes more attractive,' explains Duane Reid Carlson, an analyst with Optimum.

East Africa's elusive elephants

Current industry trends in favour of deepwater exploration could renew hopes of finding oil in East Africa, reports *Maria Kielmas*.

The conventional wisdom about this least explored part of the African continental margin has usually regarded it, at best, as a gas play. The lack of a proven source rock has been a deterrent to explorers. But, as earlier East African gas discoveries are finally finding a market in power generation projects, industry has been taking a second look at the region, eyeing a potentially huge undeveloped electricity market. In addition, seismic over the deep offshore has identified huge structures – like elephants marching in line, the specialists say – which may provide the long-awaited breakthrough.

Most of the deep offshore interest in East Africa to date has focused on Mozambique, Tanzania and Kenya, while Sudan has been the focus of onshore interest.

Tanzania

The Tanzanian Government launched a bidding round for five deep offshore blocks in September 2000, based on a seismic survey shot by Western Geophysical (now WesternGeco). The deadline for presenting bids is May 2001.

Although the survey itself cost $10mn, according to the Tanzanian Government, companies will each be expected to pay between $3mn and $4mn for the data package in order to qualify to bid. Such bidding conditions are increasingly popular with governments, enabling them to collect substantial funds ahead of the round itself, assuming industry response is robust, and to demonstrate nationally that inviting international investors can bring immediate benefits. The companies regard this as equivalent to an upfront signature bonus prior to any contract being awarded and a barrier stopping small- and medium-sized firms from bidding.

However, the bidding condition may work against the Tanzanian Government's ambitions given the risk-averse attitudes of most large company managements who are more prepared to offer large upfront cash bonuses in West Africa where the geological risk is substantially lower.

Mozambique

The above proved to be the case in Mozambique last year when the government launched a licensing round for offshore blocks tied to the condition of buying seismic data shot by Western Geophysical. Companies unwilling to purchase the data were effectively blocked from pre-qualifying to bid. But the condition backfired on the government and there were no bids.

With the licensing round generally accepted as a failure, the Government of Mozambique has been approaching companies about the possibility of their bidding once more. State oil company Empresa Nacional de Hidrocarburetos de Moçambique (ENH) is in the process of evaluating new offshore seismic data shot by Western on the outer shelf and slope of the Mozambique Basin. The survey extends through most of the basin, from close to the South African border to north of the Zambezi Delta. Nevertheless, industry believes that the Mozambican Government may forego the licensing rounds and award the blocks on an individual basis.

Interest in offshore Mozambique has been encouraged by a long-delayed decision to develop the Pande and Temane onshore gas fields. Gas from the fields, which are believed to hold 2tn cf and 1tn cf of reserves respectively, will be exported mainly to South Africa – via a pipeline from Temane to Ressano Garcia on the South African border – with a minor amount transported to Maputo for use in the Maputo Iron and Steel Project (MISP). The gas fields will be developed as a single unit by South Africa's Sasol in a joint venture with ENH under which Sasol will hold 70% and ENH the remainder. Former partners in the Temane venture, BP and Dubai's Zarara Petroleum Resources, have relinquished their interests. Enron relinquished its interests in the Pande field.

Kenya

This year Kenya began the first ever licensing of its deep offshore acreage – although the blocks are not tied to any proprietary seismic survey or upfront cash bonuses. Last year, UK-based Star Petroleum was awarded three offshore blocks – L5, L7 and L10 – in the Lamu Basin and a further 10 offshore and onshore blocks are available. A number of majors are reportedly discussing exploration deals with the Kenyan Government.

To date three wells have been drilled in the offshore Lamu Basin. Of these, one registered oil shows and one registered gas and condensate shows. Geological interest in the Lamu Embayment is based on the notion that it was occupied by Madagascar prior to the break-up of Gondwanaland. The Bemalonga and Timirora tar sands on the northern and western coasts of Madagascar may have analogues offshore Kenya. The problem has been that no source rock has been proven to be associated with the tar sands, although the mainly Permo-Triassic, Sakhamena shales are a possibility. No such shales have been identified in Kenya, but then no wells drilled to date have been deep enough. The three offshore wells were drilled to either Upper Cretaceous or early Tertiary horizons.

Somalia

The elephantine deepwater structures offshore Tanzania and Kenya are believed to march further north into Somali waters. In early February this year TotalFinaElf was awarded a one-year exploration contract, believed to be a reconnaissance contract for two blocks, offshore Lower Shabelle and onshore Juba Valley.

Oil companies have been tentatively approaching the Interim Government of President Abdiqassim Salad Hassan after he was elected last year to head Somalia's first centralised administration in a decade. Salad Hassan was one of 20 candidates elected by a transitional National Assembly which met in Djibouti between May and August 2000 and gathering some 2,000 Somalis. He was elected in the third round of voting by 145 to 92 votes. But over 75% of the territory of Somalia, and breakaway Somaliland and Puntland in the north, was licensed out to oil com-

panies during the former Siad Barre Administration and has been under *force majeure* since the outbreak of the Somali conflict in 1991. Shell's Pecten division is the largest licence holder in Somalia proper, with four offshore licences along the Indian Ocean margin extending approximately from Bandar Beyle to south of Mogadishu. Other offshore blocks are held by Conoco and Phillips. Conoco and Agip are the largest licence holders in the north with the prospective Daban Basin blocks operated by Amoco (prior to its merger with BP) and Chevron.

News of Total's award triggered demonstrations in Somalia organised by warlords who oppose Salad Hassan's Administration, accusing it of being made up of remnants of the Siad Barre Government. The most vocal protester was warlord Osman Hasan Ali, known as 'Atto' who has previously worked for foreign oil companies before Siad Barre's fall. To date, TotalFinaElf has not disclosed the precise coordinates of its offshore permit, although industry specialists believe that these should be outside of the Pecten acreage.

TotalFinaElf has also been eager to do business with the breakaway Somaliland Administration. In May 1998, as Total, the company signed a Memorandum of Understanding for the lease of petroleum product storage and aircraft refuelling facilities in Berbera and Hargeisa. The MOU, which was acquired and published last year by the Somaliland media, stipulates an exclusive 50-year agreement with TotalFinaElf having a preferential right for lease renewal. In May 1998 Total paid a lump sum lease bonus of $200,000 and will pay $36,000 annually as rent for the duration of the lease. After signature of the MOU the company also paid the Somaliland Government part of the government's expected revenues deriving from the depot rental amounting to $450,000. The government has undertaken to repay this within two years of the contract's effective date.

In an unusual clause for environmentally conscious times the MOU states that: 'Under no circumstances shall the operator bear any cost, expense or liability for environmental, consequential or any other similar indirect damages or losses.' Company executives whose concessions in Somaliland and Puntland remain under *force majeure* reply that 'the Somaliland Government will give you any document you want.' There have also been unconfirmed reports that the Somaliland and Puntland Governments have signed oil deals with Far Eastern companies, while the Anglo-Arabian Oil and Gas Company, a firm of British and Arab investors, visited the Somaliland Government in December last year. But if mediation efforts to resolve the Somali conflict bear fruit, and the Total licence award does not, as some warlords claim, result in another spiral of violence, then Somalia, always the East African oil industry's sleeping giant, may be a magnet once more.

Sudan

Sudan may also become a magnet for investment once more, despite a recent highly successful campaign by organisations such as Christian Aid and Human Rights Watch alleging oil industry complicity in human rights abuses in the country. Sudan is producing around 210,000 b/d from the Unity field complex and has come under increasing fire from human rights groups since oil production first came onstream in 1999.

The only western member company of the Greater Nile Petroleum Operating Company (GNPOC) which operates blocks 1,2 and 4 around the Unity complex, Canada's Talisman Energy, has come under intense fire from the US Government and human rights for its involvement in Sudan. Talisman's CEO Jim Buckee admitted in March 2001 that the company had prepared 'an escape route' to sell its stake in Sudan, but now believes a Republican Government in Washington has changed the political climate.

Industry sources still expect Talisman to dispose of its Sudan interests, but this time at a much higher than expected price. The Washington Administration is studying the possibility of a special envoy or an ambassador representing its interests in Sudan as US policy towards the country is reviewed. For the moment US oil companies are barred from investing in Sudan – but US investor interest remains high given the country's significant petroleum potential. This has been further confirmed by the recent announcement of a discovery by Sweden's Lundin Oil on block 5A to the south of the Unity complex.

The Lundin Group has made no statement about the possible reserves of the find, although its development is expected to be slow as decisions by the Khartoum Government are not very rapid. But the Lundin Group has come under sharp fire in the Swedish media for its Sudan involvement, after nearly 15 years of low-profile presence in the country. The trigger has been the presence of Carl Bildt, a former Swedish Prime Minister and leader of the Moderate Party, on the company's Board of Directors. Bildt has been accused of double standards because of his other job as a UN Special Envoy to the Balkans where he is required to champion the cause of human rights. The pressure groups have alleged that the Sudanese armed forces have adopted a 'scorched earth' policy in depopulating villages around an access road that the company built in its block. Both Lundin and Bildt are standing their ground, claiming that there have been no signs of a scorched earth policy and that people were moving towards the road not away from it. 'People in the area want the oil companies in general, as well as Lundin, to stay,' Bildt reported on his website. Bildt has not answered media questions on whether he will resign from the Lundin Board.

Ethiopia

Sudan state oil company National Petroleum Company (NPC) has announced plans to construct a refined products pipeline to Ethiopia and Eritrea and to study the feasibility of a second crude export pipeline, also through Ethiopia. The situation of Ethiopia as a potential export route for Sudanese crude, and relative ease of pipeline access for any future oil production in prospective parts of the country, has prompted some further interests in exploration in Ethiopia.

In January this year, Calgary-based Pinewood Resources signed an exploration contract with the Ethiopian Government for the Gambela concession which borders Sudan. The concession contains the greater part of the Melut Basin and previous work mapped a large gravity low covering a significant part of the concession. But Pinewood has encountered difficulties in raising finance for the project. Under its agreement it was required to provide the Ethiopian Government with a $5mn irrevocable, unconditional bank guarantee by 25 March 2001. Pinewood difficulties might have been compounded by the fact that the company employs individuals previously connected with the now bankrupt Canadian firm Arakis Energy that held interests in Sudan but collapsed in the wake of a number of investor lawsuits. Its Sudanese assets were acquired by Talisman.

To date, Ethiopia has had a poor track record of attracting sizeable investors. The country's only proven hydrocarbon resource is the Calub gas field in the Ogaden. Independent industry estimates of Calub reserves have given a figure of about 1tn cf, although the Ethiopian Government has claimed that there could be between 2–4tn cf. Although originally considered too remote for commercial development, in December 1999 the government signed a $1.4bn contract to develop Calub, including a gas-to-liquids project, with Houston-based Sicor. Sicor, a privately held firm with no track record of financing such large investments, has yet to announce further progress on the contract or its financing.

Encouraging the next generation

The Institute of Petroleum awards prizes to outstanding students studying Masters' courses appropriate to the oil and gas industry. Last year, once again, produced a very high standard for which the IP was honoured to make the awards. *Gill Haben*, IP Education and Training Manager, reports on the 2000 IP Student Awards and other recent highlights in the IP Education Department.

The annual IP Student Prizes comprise of a cash sum, a three-year membership of the Institute of Petroleum and a framed certificate. Where possible we like to hold a ceremony to celebrate the achievement of the students and to introduce them to the Institute and our Branches. The calibre of entrants for the 2000 awards proved to be exceptionally high and, as a result, we extended the number of awards made to 11.

IP Student Prizes

The 2000 IP Student Prize winners were:

Celine Bacquet – Celine was awarded an IP prize jointly with Mohammed Piri, both gaining Masters in Petroleum Engineering at Imperial College. Celine's studies were sponsored by Mobil. Although the Department at Imperial has strong connections with the oil and gas sector, she believes that the industry should have a far 'greater presence in engineering schools' and talk to the engineers of the future about the various job opportunities. 'It is hard to erase the image that is often spread about the oil industry – old and polluting,' she says. 'But when you by-pass this first impression, you discover a very challenging industry that only wants to improve.'

Gareth John Funning – Gareth gained an MSc in Geophysics from the University of Durham.

Nicholas A Lorenz – Nicholas was awarded an IP prize for his MSc in Offshore Engineering at Robert Gordon University. Currently 'developing' his career in subsea engineering, a branch of engineering that he sees as having a 'bright future,' he reports that 'this is a truly exciting and rewarding time for those wishing to begin their career in the petroleum field.'

James Nileshwar – James gained an MSc in Petroleum Geoscience from Imperial College, funded by NERC (National Engineering Research Council). He recently joined Schlumberger as a Field Engineer and is looking forward to an 'interesting' career in an industry where the 'opportunity to continue learning and to develop is endless.'

James Robert Philip – James was awarded an IP prize for his MEng in Environmental and Earth Resources Engineering at Imperial College.

Damien Scott – Damien was awarded an IP prize for his MSc in Petroleum Geology at the University of Aberdeen. He is currently working as a Geophysicist with Enterprise Oil, embarking on a company-run two-year training programme in October 2000 which aims to 'expose new graduates to a wide range of exploration and production issues while working with a broad spectrum of international staff.' Looking to the future, Damien comments that 'it is vital that young people are attracted to the industry, but many talented graduates are put off by the "hire and fire" cycles that have plagued the industry in recent years. It was promising, therefore, to see companies at PETEX 2000 making some attempt to address this problem... Personally, I hope to be able to continue my career in the oil and gas industry through what will inevitably be exciting years ahead.'

Martin Towns – Martin was awarded an IP prize for his MEng in Petroleum Engineering at Heriot-Watt University, sponsored by BP. He is currently working in the oil company's West of Shetland Business Unit. 'From the start, BP was my first choice employer,' says Martin. 'It seemed to be leading the field not only in the application of advanced technology, but also in areas such as environmental protection, emissions reduction and alternative energy use and sources.' He recently embarked on an extensive company training programme, beginning with a three-week induction in Texas and New Mexico and soon to include courses in upstream process engineering; reservoir, well and flowline modelling; and uncertainty management.' Commenting on the future, Martin says: 'This is an industry that drives cutting edge technology to add the greatest value to our business. Innovation is key to continuing success. By carrying this message to schools and universities, the IP and the industry will continue to attract the best people for the job.'

Tony Fox Award

The Tony Fox Memorial Award – which commemorates the life of the late A F Fox MBE, ARSM, BSc, FGS, FinstPet for his great contribution to the Institute of Petroleum – was presented to *Gregg Pyke* who is studying for an MSc in Petroleum Geoscience at Imperial College. He plans to continue

IP Week highlight

A particular highlight at IP Week 2001 this past February was the award ceremony for some of our 2000 IP Student Award prize winners. The lunchtime buffet reception was held at the Institute of Civil Engineers and allowed colleagues with a personal or professional interest in careers and educational issues from across the industry and education sector to exchange ideas and information. The perfect opportunity for our award winners to network, the event also enabled one sixth-former to get herself a job for the school holidays! Indeed, the reception proved such a success, that we plan to hold another during IP Week 2002.

John Evans, Director, IP Membership Services and Gill Haben, IP Education and Training Manager (centre left and right, respectively) with IP 2000 Student Prize Winners Gregg Pyke, Damien Scott, Mohammed Piri and James Philip (left to right)

his education by gaining a PhD in a 'relevant' subject, with a view to subsequently 'developing a successful career within the industry.'

George Sell Prize

The George Sell Prize was established in recognition of the great contribution that George Sell made to Institute of Petroleum publications over many years. Active in the setting up of the Institute in 1913, he founded *Petroleum Review* in 1923 and went on to be involved with a range of IP publications by 1964 when he retired. Originally offered to the author from within the industry of the best technical paper published by the IP in a calendar year, the award was recently extended to cover MSc and PhD work.

The 2000 George Sell Prize was presented to *Young-Seog Kim* for his University of Southampton PhD on damage structures and fault evolution around strike-slip faults. As part of his studies he developed a 3D model illustrating the pattern of damage around a single strike-slip fault, which was extended to fault linkage. He believes the work has 'implications in many areas, notably the mechanics of fault zone evolution, the prediction of fracture distribution in fractured reservoirs, and the mechanics of active faults and an evaluation of earthquake risk.' His next goal is to pursue this research at postdoctoral level – he is particularly interested in investigating the relationship between damage development and the strain around large active fault systems.

ICT School Prize

ADT College in Putney, London, was awarded the 2000 IP School Prize for its imaginative use of information communication technology (ICT) in secondary school science teaching (see *Petroleum Review*, October 2000).

Today's young people are the first generation to know more about technology than their parents – Key Stage Three 11 to 14-year old students at ADT College, Putney.

Spreading the word

This year's Association for Science Education (ASE) Exhibition and Conference was held at the University of Surrey on 3–6 January 2001. Celebrating 100 years of science teaching the event once again proved an important forum for science teachers to gather information and swap notes. This was its busiest year yet, with more than 450 talks, workshops, lectures, demonstrations and visits on the programme.

The Institute of Petroleum had a stand at the show, fully stocked with our full selection of curriculum support and careers literature. Thousands of teachers attended the event and the material was snapped up rapidly. Our stand also played host to two partners – the Earth Science Teachers Association (ESTA), who had a number of earth science resources on display, and Industry Supports Education (ISE), who demonstrated their interactive science website at **www.schoolscience.co.uk**

As usual, the IP took the opportunity to talk to as many people as possible to find out what our prospective customers requirements are, and to establish what both teachers and students think about our industry and job prospects. It was interesting to note that many of the teachers were keen to have the opportunity to visit refineries.

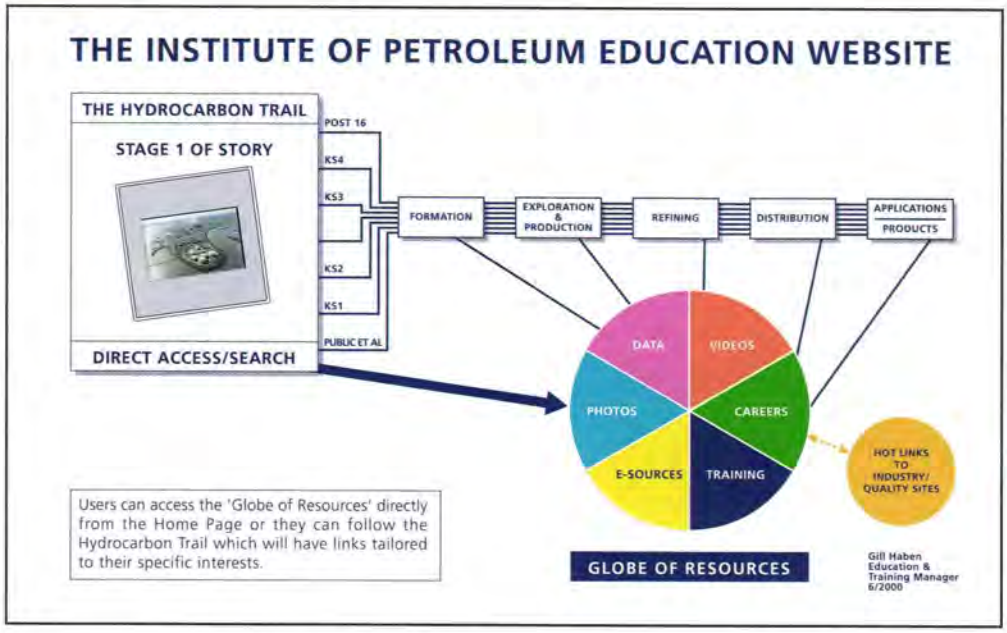
Website development

This coming autumn, the IP Education Department plans to unveil the first stage of its new interactive website with the launch of the 'Hydrocarbon Trail' (HCT). Once completed, the HCT site will cover all aspects of the oil and

gas industry, ranging from oil and gas formation, right the way through to the production of petroleum products and their applications in the real world. The new site will also include a wealth of information relating to education, careers, training and lifetime learning, taking into account all curricula appropriate to the industry (not just science). We plan to cover every age range – from junior school children to higher and further education and beyond.

The rapid advancement in ICT and young people's preference for using the Internet as an educational resource tool has helped drive this step change in the IP's education and careers strategy. Another key driver is the fact that many people have little idea of the full range of activities and jobs that make up the oil and gas business, having little or no opportunity to view first-hand job experience in refineries, on rigs etc. The new IP website will give us transparency, offering users a full and factual picture of the industry. We hope to give people the knowledge to make informed decisions. If you can't take the people to the industry, then the IP plans to use ICT to take the industry to the people.

If you would like to discuss any of these topics further, please feel free to telephone Gill Haben, IP Education and Training Manager, on +44 (0)20 467 7135.



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Struggling for recognition

Following UK Government initiatives to promote the use of autogases, such as the Powershift programme, the duty on LPG and CNG was once again reduced in the last UK Budget. But the motor manufacturers remain cool on LPG and the current fuelling infrastructure is holding back CNG sales. *Gibb Grace* reports.

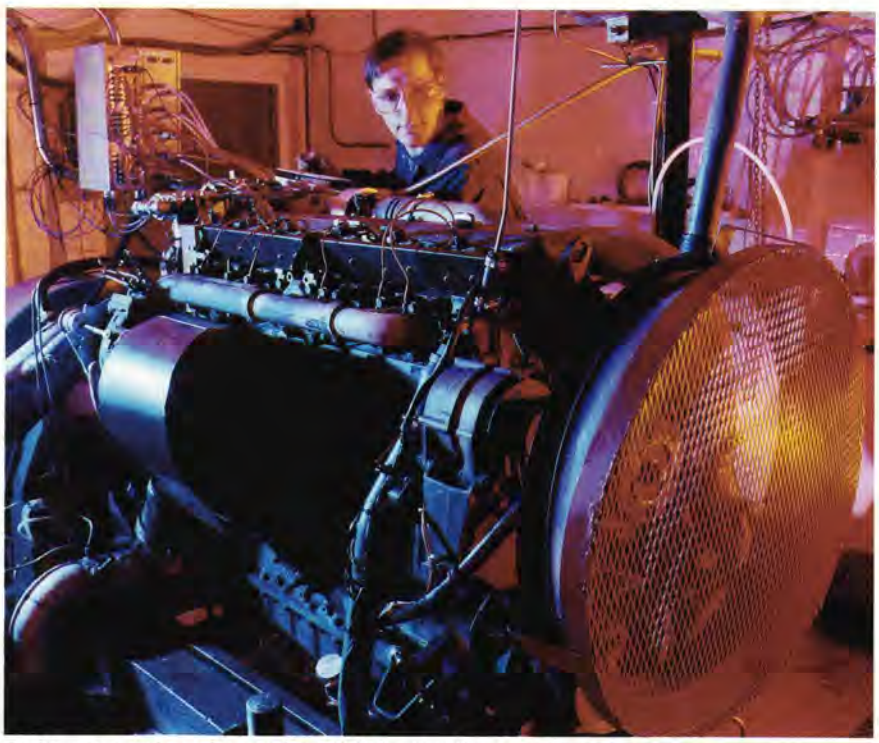
LPG is widely seen and promoted as a 'clean' fuel. It consists predominantly of propane, making it potentially cleaner in terms of emissions than either petrol or diesel. LPG also has some 7% more inherent energy per kilogramme than either petrol or diesel. Because of its nature, however, LPG can only be used in spark ignition engines, where the combustion process is less efficient than for a diesel. On a CO_2/km basis, LPG matches diesel and is better than petrol, but where LPG really scores is on NO_X. It produces half the NO_X of an equivalent petrol engine and less than one-fifth of an equivalent diesel engine. Given its green credentials, it is easy to see why government is so keen to promote LPG.

Reinforcing the message

That message was reinforced again in the UK March 2001 Budget, when the duty on LPG was reduced from 15 p/kg to 9 p/kg. This latest move means that since January 1995, the duty on LPG has come down by 73%, while that on unleaded petrol has risen by 50%. The message is pretty clear, and it will not have been lost on motorists.

Even before the Budget, there was a strong argument for switching to LPG. Now that the balance has tipped even further in favour of LPG, that argument is even stronger. Also, having fallen to around 36 p/l, LPG has fallen below the psychological 'half price' barrier – ie half the price of premium unleaded petrol. It is not really half price of course, as petrol engines running on LPG are less efficient than those running on petrol. Nevertheless, the payback time for the conversion has been reduced and this must add to the current impetus.

Despite these moves however, the car manufacturers have not got behind LPG, and this year only some 5,000–6,000 of the 2.5mn new cars and light vans sold in the UK are likely to be LPG powered. The picture is much the same across Western Europe where some 17mn new cars and vans are sold each year. Rather than backing LPG, Europe's car manufacturers are putting their huge R&D spending into direct injection petrol and diesel engines in the medium term and HEVs (hybrid electrical vehicles) in the longer term.



Endurance testing of an 11-litre 350bhp Scania gas-powered engine

Aftermarket business

LPG is and remains an aftermarket business as far as the motor manufacturers are concerned. Even those manufacturers that are involved, such as Ford and Vauxhall only offer relatively simple systems that are not much better from an emissions point of view than the latest Euro 3 petrol engines. Thanks to the supplier companies though, LPG technology is not standing still. Leading suppliers such as the Dutch company Vialle can offer every level of technology, including sequential injection of LPG and liquid propane injection. These techniques which are used mainly on city buses are used in dedicated engines that burn only LPG/propane.

There is a strong case for dedicated LPG engines cars, given the growing network here and the established networks on the Continent. Dedicated LPG engines would have higher compression ratios, be more fuel efficient, and emit up to 20% less CO_2. However, true to form, of the European manufacturers, only Fiat offers such an engine, and that is only available in one model – the Multipla.

As far as the motor manufacturers are concerned, LPG will remain an aftermarket business, and this, the trade admits, is exacerbated by the large number of small, diverse suppliers. Given the UK Government's belief in LPG, sales will continue to grow, but without the marketing muscle of the auto industry, LPG will never seriously challenge the dominance of petrol or diesel fuel.

Natural gas

Natural gas comprises mainly methane, and is therefore the cleanest fuel available apart from hydrogen itself. Being a gas it mixes well with air, making for good cold starting; it has zero evaporative emissions; is lower in sulfur than petrol; and its hydrocarbon (HC) emissions are non-toxic and non-reactive. Importantly too, natural gas, unlike LPG, is truly abundant, occurring along with crude oil and on its own.

On the face of it, given these properties and the reduced level of duty introduced in the March Budget, you might suppose natural gas was due for surge in popularity. Especially as, unlike the car manufacturers' apathy over LPG, the truck and engine manufacturers have produced some extremely clean engines. Iveco's 9.5 litre CNG engine for example, surpasses the EU's provisional standard for EEVs (environmentally enhanced vehicle). See **Table 1**.

However, in urban applications, where such clean engines are most useful, the payback times for vehicles costing around £20,000 more than their diesel equivalents, are uneconomically long. The situation regarding bus operations is particularly difficult to reconcile as in this case, diesel fuel is heavily subsidised.

Not surprisingly, for CNG, the emphasis has switched from clean engines for powering urban community vehicles, to engines that burn cheap fuel – an important consideration for high mileage trucks using highly taxed diesel fuel.

Scania initiative

For the last year, truck manufacturer Scania has been working in the UK with Mobil CNG and BG Group to re-engineer used 38-tonne tractors to run on CNG/LNG. Large numbers of these vehicles come onto the used vehicle market when their lease period is up, and Scania would clearly like to see them have a useful second life.

The group has demonstrated re-engineered tractors running on both CNG and LNG and is hoping they will appeal to environmentally-minded companies such as the supermarket chains. But, it is hard headed operating economics that will rule the day, and any emissions improvement will be seen as bonus.

In the March Budget, the duty on CNG was reduced from 15 p/kg to 9 p/kg, bringing the price of bulk CNG down to 55 p/kg. Running at 32-tonnes gross a tractor covers 2.3 miles on a kilo of CNG, so the fuel cost works out to 23.9 p/mile, or £23,900 for an annual mileage of 100,000 miles. The cost for same truck returning 9 miles per gallon, on diesel at 70 p/l, would be £35,388. The saving of £11,488 amounts to £2,300 a year more than the pre-budget figure, and this should help stimulate interest. An operator running a fleet of 40 trucks, could save close to £460,000 a year in fuel bills by switching to CNG and that is significant.

There is an environmental bonus too, as **Table 2** shows. The two most important pollutants NO_x and PM are both substantially reduced compared with the original diesel and are significantly below the 2008 Euro 5 emissions requirement. Compared with the original diesel, the CNG engine reduced NO_x by 86% and PM by 98%. The CNG tractor also produced about 10% less CO_2 than the original diesel.

	CO	NMHC	CH_4	NO_x	PM
EEV	3.0	0.40	0.65	2.0	0.02
Iveco EEV	1.4	0.05	0.17	0.69	0.01

Note: All pollutant amounts are given in g/kWh
CO – carbon monoxide; NMHC – Non-methane hydrocarbons; CH4 – methane; NOx – nitrous oxides; PM – particulate matter

Table 1: Provisional EEV standard and the certification results of Iveco's 8469 engine

Fuel tested	HC	CO	NO_x	CO_2	PM
Diesel	0.864	1.442	7.014	756.3	0.373
LNG	0.180	0.017	1.532	698.0	0.013
CNG	0.212	0.018	0.962	674.0	0.007
Euro	0.55	4.0	2.0	n/a	0.03

Note: All results are given in g/kWh

Table 2: Results of Millbrook's rolling dynamometer tests on a Scania 3-Series engine

Emissions testing was carried out at the Millbrook Proving Ground in Bedfordshire. The work was based on Millbrook's rolling road dynamometer test cycle, rather than the engine dynamometer tests used by the truck manufacturers to homologate engines to European standards. Nonetheless the tests are valid for comparison purposes and form the basis of any Energy Saving Trust grant (see *Petroleum Review, RMS Supplement*, March 2001). The Trust, has agreed to a grant of 75% of the cost of the re-engineering which is likely to be at least £20,000 per unit.

Unfortunately the grant only applies to vehicles operating mainly within three major conurbations – Greater London, the West Midlands and Leeds/Bradford, on the basis that these are known air quality black spots. Also, the grant is only available to fleets of thirty of more vehicles operating from the same depot, and furthermore, the vehicles have to each average 100,000 miles a year. This last requirement makes sense, as a fast fill CNG station costs in the region of £500,000 to build, and needs at least that level of throughput to make it viable.

Diesel/CNG dual-fuel system

Although CNG is a very clean fuel, in many ways it is not the ideal fuel for a heavy vehicle. It does not spontaneously ignite in a diesel, and the engine's compression ratio has to be reduced and the head modified to accept sparking plugs in place of injectors. And because of the lower compression ratio, the CNG engine is less efficient than the diesel, consuming up to 40% more fuel on an energy/km basis. Exhaust temperatures are normally lower than for a diesel, and the extra waste heat produced usually requires extra engine cooling. Also, in operation the CNG engine is characterised by below average, low speed torque, which is not desirable for heavy vehicles.

But it is possible to burn CNG in a diesel engine, and combine the efficiency of the diesel cycle and cleaner burning CNG. This seemingly impossible combination is achieved by using a small amount of diesel to start the combustion process and injecting the right amount of gas to produce the power required.

The American Caterpillar company has been selling dual-fuel engines in the US since 1996 and now offers a range of engines from four engine families, in ratings from 190 to 500 PS. In essence, the base engine with its diesel compression ratio is retained, and a multi-point, natural gas delivery system is added. Both the diesel and gas fuelling systems are electronically controlled to give the best fuel combination at all times. The engine starts on diesel fuel, but having warmed up progressively substitutes CNG for diesel. Diesel substitution can exceed 80%, resulting in appropriate reductions in both fuel costs and emissions.

As the compression ratio does not change, the engine retains its associated fuel economy; and as the total fuelling rate remains the same, there is no increase in heat rejection to the cooling and exhaust systems. Caterpillar says the engine cost of the engine compares well with an all-CNG system.

Dual-fuel engines of this type do not qualify for the normal Powershift grant, but that has not deterred some UK operators from trying them. Clearly, the annual saving which can be made by substituting even a proportion of diesel with CNG is proving attractive. No doubt more hard-pressed hauliers would jump at the chance if there were more CNG stations around the country.

Green gas for less cash?

Liquefied petroleum gas (LPG) is reported to be one of the most attractive alternative fuels on the market. The UK Government and oil companies are keen for motorists to convert their cars, with the Queen and Tony Blair acting as role models, each recently having a car converted to LPG. However, are there really benefits for the general public? *Cheryl Saponia* investigates.

Environmentally it is hard to fault LPG. It is clean burning, produces fewer pollutants than traditional road fuels and it contains virtually no sulfur, the main cause of acid rain. LPG rapidly evaporates, thus reducing potential damage to water and soil from accidental spills and, most importantly, it produces significantly reduced exhaust emissions compared with petrol and diesel (see P24).

LPG also has an excellent safety record. The gas is stored in low-pressure tanks that contain shut-off valves in the tank that prevent overfilling. Service valves in flow lines shut off supplies in the event of leaks and there are tight safety and environmental regulations.

In addition, it is apparently easy and quick to get a vehicle converted to LPG fuel use – it takes just two or three days. The conversion may be valid for funding by the UK Energy Saving Trust Powershift initiative, in which up to 75% of the cost can be refunded for vehicles up to one year old (see *Petroleum Review, Retail Marketing Survey 2001*). An autogas engine also has a proven longer service life and reduced running costs.

Site shortage

According to the LP Gas Association (LPGA) there are 5mn LPG vehicles on the road globally and, at the end of 2000, there were 39,000 LPG vehicles in the UK. By the end of 2004, according to the LPGA, there will be quarter of a million LPG cars in the UK but only 2,000 LPG filling sites. Currently the whole industry is installing one LPG pump at a site per day – a multi-million pound investment. But is this enough? That is still only 365 sites in one year. According to *Petroleum Review's 2001 Retail Marketing Survey*, there were 195 oil company sites retailing LPG at the end of 2000, up from 47 sites a year earlier.

It is also apparent that less than 40% of existing filling stations can actually support an LPG installation due to safety and legal requirements.

Currently, the situation looks quite dire, in central London – the City regarded as having the biggest pollution problem in the UK – there are only 20 sites according to Powershift's list of LPG sites in the UK. The main polluters – taxis and buses – need more encouragement to convert from diesel and on to 'green' fuel. However, this will never happen if they have no place locally to fill up.

Price promise

The current level of duty at 9p/kg will be frozen for the next three years. At the moment the price of LPG is 39p/l. This is half the price of petrol and diesel: surely an incentive to switch? *Petroleum Review* calculates for an average of 12,000 miles per year, and with conversion costs of £1,250, it would take three years to recoup the costs of the conversion and actually make cost savings. Of course, if you do more miles or get a conversion grant from Powershift, this time scale decreases; but if you drive less than 12,000 miles per year, and many people do, the time scale for saving money increases. So is this fuel really only economical for those doing high mileage? It appears so. The LPGA has also calculated that there is a 20–25% reduction in miles per litre compared with petrol or diesel.

Manufacturer madness?

A major obstacle to the promotion of LPG vehicles seems to be the lack of new cars and vans that are available with the tank and fuel delivery equipment already installed. This appears more favourable than a later retro-fitting, as the tank fits neatly in the space occupied by the spare tyre, rather than in the boot, where it significantly reduces carrying space. Are car manufacturers doing their bit? The industry seems firmly split on this issue. Vauxhall, Ford, Peugeot and Volvo, to name just four of a very small group, are producing cars with LPG tanks and fuelling as an option. However, Citroen, Renault, Mitsubishi, and Toyota are all part of a surprisingly large manufacturing group that are not offering LPG fuelling as an option.

Dave Sellors, Alternative Fuels Vehicle Consultant, Vauxhall UK, believes that the LPG market is tripling every year and will continue to do so for many more years. Vauxhall claims to be the market leader and offers the largest range of LPG vehicles, including the popular Astra and Vectra ranges. The company has sold around 2,400 LPG vehicles in the past year. In 1999 Vauxhall only sold 800.

Sellors believes that forecourt retailers who ignore the growing demand for LPG are going to miss out, not just on the sales of fuel, but also on sales of add-ons like newspapers and other goods sold in the forecourt shop. He is certain that the number of LPG pumps on sites is going to increase dramatically, and claims to be living proof that it is possible even now to only use LPG in your vehicle, as he did throughout the whole of last year.

The additional cost of the LPG option on a new Vauxhall is approximately £1,950 (Ford charges roughly the same).

An LPG tank in the spare wheel space

Map showing some UK LPG sites retailing from petrol stations and others outlets

This is more than the cost of a conversion, but retaining all your boot space and having all the controls neatly fitting with the car's interior is the attraction. On the plus side, insurance costs do seem to be equal regardless of whether an LPG tank is fitted or not.

According to a Datamonitor report *Global Auto LPG*, published in March 2001: 'The future of the industry lies to a greater extent in the hand of the manufacturers. The reasons for that relate to the growing sophistication of new vehicles and the resultant high costs of successfully converting them to another fuel.' If more motor manufacturers don't begin soon to offer LPG, they and the LPG market will suffer. The report adds: 'In the UK... the local LPG associations have been successful in securing the cooperation of the car manufacturers. However, the offering of factory-made LPG cars should be widened both in terms of product range... and geographically, before there is a critical mass of product which would make LPG a universally accepted automotive fuel.'

The report goes on to say that in the short to medium term car manufacturers must allow LPG conversions of their vehicles by specialists without invalidating the factory warranty. This is very important according to the report, because in most countries, governmental grants are only payable within the first year of registering a car, ie when it is still covered by the manufacturer warranty. Conversion is a strong disincentive to new vehicle owners if the warranty becomes invalidated because of it.

Cowboy crisis?

Currently there are approximately 100 companies that can do LPGA approved conversions in the UK. And, at the moment, the trade is totally unregulated. Naturally, there are excellent conversion companies on the market, but there is sure to be a rise in 'cowboys.' The LPGA is doing its best to help motorists thinking of converting and has a list of its approved LPG conversion companies on its website, go to **www.lpga.co.uk**

John Loakes, Managing Director, Key Autogas, the LPG conversion specialist and trainer, also sees the lack of guidelines as a serious issue. He believes that LPG installers need to be sufficiently trained or they simply will not have the technical ability to install the system and address problems should the situation arise.

The LPGA also cites the differences in quality of the conversion kits as a potential problem. The kits are mainly from continental Europe, and performance varies greatly. The LPGA believes the standardisation of these kits is an important government matter.

Currently there is a code of practice and the Construction and Use regulations overseeing LPG installations, but a mechanic once trained and with his own conversion site can still ignore all that he has learned. There are still 300 sites in the UK that have not had LPGA approval and mechanics that may not have had any approved training in LPG conversions. Once a conversion has been made there is no official body that can check the quality of the workmanship. In addition, the installation of tanks does not fall under MOT requirements.

Government gifts

Datamonitor's report *Global Auto LPG*, cites governmental support as the key factor in a developing LPG market. 'Most importantly it decides the legalisation and extent of autogas use, secondly it determines the level of taxation on autogas, the availability of subsidies and incentives, and the lobbying of distributors and manufacturers to distribute and provide the means of using the fuel.'

Is the UK Government doing enough? Currently taxis and buses are being encouraged to change fuels thanks to £1mn from the Energy Saving Trust's TransportAction CleanUp campaign. CleanUp was launched in December 2000 and is backed by the UK Government. It provides part-funding to encourage operators of the worst polluting vehicles in poor air quality 'hotspots' to fit emissions reducing equipment such oxidation catalysts or conversions to LPG fuelling.

There have been suggestions by some local governments to ban petrol and diesel vehicles from town centres by 2005. Only vehicles running on alternative fuels – aside from emergency service vehicles, buses and possibly taxis – will be allowed into these low-emission areas. Drivers who ignore the regulations would be caught on camera and face fines. London's Westminster Council has plans to reduce the amount of traffic and pollution, but at the moment no decisions have been finalised. However, what is being implemented in the near future are the Euro 3 specifications covering commercial and diesel vehicles which aim to reduce further emissions.

Future focus

There are upsides and downsides to the use of LPG. What we do know is that it greatly reduces emissions and is half the price of petrol. However, what is also clear is that there are not quite enough re-fuelling sites yet; that a conversion is expensive and may not be economical unless you are a heavy road user; that motor manufacturers are not offering the new car buyer enough of a range; and the government is not doing enough to encourage motorists to convert. More time, energy and publicity needs to go into the LPG campaign before it can become a fully competitive fuel of the future.

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e: *marta@petroleum.co.uk*

For Luncheon tickets please contact:

Christine Pullen, IP Conference Supervisor
Tel: +44 (0)207467 7106
Fax: +44 (0)20 7255 1472
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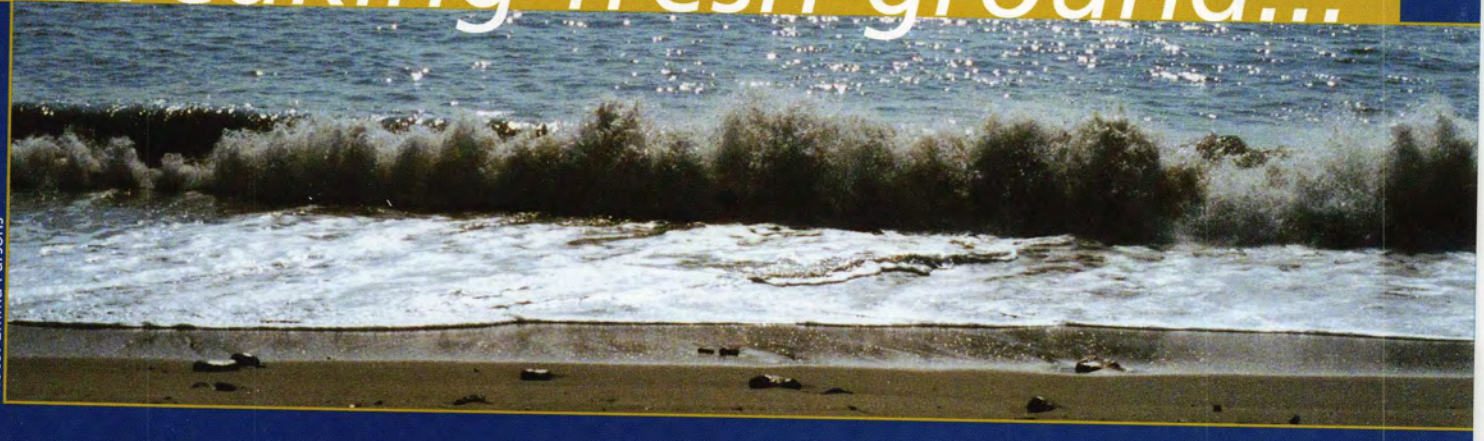

Photo: Emma Parsons

Yukos – a Russian giant emerges

The Russian currency devaluation and the recent high oil prices have given Russian oil companies the resources to invest. A new generation of Russian oilmen are keen to seize the opportunities their large reserve bases give them and become global players. *Chris Skrebowski* recently interviewed *Yuri Beylin*, President Exploration and Production for Yukos.

Asked about recent developments at Yukos, Yuri Beylin explained that the company's production expanded very rapidly in 2000, gaining 11.4% as a result of its investment programme which has focused on redeveloping underperforming wells and fields. A strategic partnership with Schlumberger has been a key element in this work, according to Beylin. As a result of the rapid expansion in 2000, Yukos has become Russia's second largest oil exporter with exports amounting to 45% of the company's production.

According to Beylin, fully built up costs of production (exploration, production, transport and capex) at $6/b were some of the lowest in Russia and fully competitive in global terms. Asked about a story circulating in financial circles that Yukos' reserves had been reassessed and were now 43% higher at 16.5bn barrels, Beylin pointed out that the new figures had not yet been consolidated, although the reappraisal work had been done by Miller & Lentz. He was therefore only prepared to confirm the audited figure of 11.4bn barrels, a figure which compares favourably with some of the largest oil companies in the world.

Asked whether the high export levels made Yukos vulnerable to government pressure to sell more into the Russian market, he indicated this was unlikely. He explained that internal Russian prices, currently at about 70% of the world prices, would only change slowly because of the need to restructure the gas industry and the generating industry. The need being to keep oil products competitive in these distorted markets while restructuring took place – a process he thought might take as long as 10 years.

Beylin explained that restraints on oil exports were unlikely because oil production was now growing at 6%/y and this was a sustainable level. In contrast, Russian oil products demand was only growing at around 2%/y, and this was unlikely to change significantly. This meant that additional oil exports were no threat to internal supply, but were necessary if Russian oil companies were to develop their large reserves.

In addition, he felt that the potential to expand production by Russian oil companies was probably rather greater than the 6% recently achieved – as his own company had demonstrated.

According to Beylin, Yukos expanded production by 5mn tonnes in 2000 and, of this, less than 1mn tonnes had come from its major new field – Priobskoye. This field was producing 1.9mn tonnes in 1999, reached 2.6mn tonnes in 2000, and is expected to achieve 6.1mn tonnes in 2001. He explained that the bulk of the production gains were the fruit of a programme of production enhancements started three years ago.

Yukos has 15,000 producing wells and a study done in conjunction with Geoquest established that 20% were significantly underproducing against their calculated output, while the remaining 80% were only moderately underproducing. Evaluation of the company's waterfloods produced a similar 80:20 split between the moderately underperforming and the drastically underperforming.

Working closely with Schlumberger, a programme was devised to tackle the best 20% of underproduced wells and waterfloods first. Modelling and evaluation of the reservoirs allowed the investment to produce the maximum reward.

According to Beylin, problems addressed were well completions, particularly the standard of completions, and location of perforation. Another area which had brought rewards was improved drilling mud formulations and handling systems.

He noted that producing horizons are typically around 2,700 metres, but traditionally Russian companies have set downhole pumps at 1,200 metres. Improvements in pump quality and design have allowed Yukos to set pumps down to the perforated zone with considerable gains to flow rates. Although pump quality remains a problem, Yukos was confident that setting the pumps just above the producing horizon was the key to increasing well flows.

Beylin indicated that the other Russian companies were now starting to realise the potential gains. This suggests there could be some quite substantial output increases over the next few years if they caught up with Yukos. Beylin unkindly suggested: 'I believe they don't know how to increase daily production by 20%, but it may be different in another two years.'

Yukos has made limited acquisitions in recent years, such as Eastern Siberian Oil Company with interests around Tomsk in Krasnoyansk, and it recently acquired the Russian assets of Eurogas, a Toronto-listed independent. However, Beylin suggested that Yukos had 'no need to buy companies,' although he went on to suggest that it might make acquisitions in Eastern Siberia to help

continued on p34...

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Gem of a project – on time and on budget

Phillips Petroleum's £189mn Jade field is on schedule to produce first oil on 1 October 2001. *Kim Jackson* reports on the project's progress.

Jade's twisted-base jacket under construction at Kvaerner's Methil yard

Jade's topsides and jacket were slated for installation on block 30/2c in the North Sea by Saipem's *S7000* as *Petroleum Review* went to press. With the 2,300-tonne (lift weight) topsides which were constructed by Heerema Hartlepool and the 2,600-tonne 'twisted base' jacket at Kvaerner's Methil yard, the project is reported to be on budget and on schedule for first production in October.

Some 380bn cf of gas and 30mn barrels of oil are forecast to be produced from the high temperature/high pressure (HT/HP) field. Production will be phased, rising to a peak flow rate of 200mn cf/d of gas and 15,000 b/d of oil. Gas will be fed into the CATS export line, and oil into Norpipe. Field life is put at 15 years.

Jade project partners are: Phillips (32.5%, operator), BG (35%), Texaco (19.93%), Agip (7%) and OMV (5.57%).

Platform design

The normally unattended Jade platform is to be tied-back to the nearby Judy facilities where processing will take

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place. Although designed with 12 well slots, Jade will in fact initially produce from four wells. The remaining slots will allow potential satellite production to be tied in in the future. Initial production will be from one well, with three further new wells to be spudded using the *Galaxy 1* drilling rig, the last slated to complete by 3Q2002. An earlier exploration well that has a damaged casing will be used for cuttings reinjection.

Two design changes have been incorporated in the platform design since the contract was awarded to Heerema Hartlepool in January 2000. The facilities have been upgraded from an original 10,000 psi pressure rating to 11,000 psi. Although this was done as a 'precautionary' measure, according to Project Manager Charlie Shepherd, the decision also provides the longer-term benefit of Jade being able to handle future potential development in the vicinity of the platform. Plans for development of the Jade Flank and Jade Deep prospects are expected in three years time, once Jade comes off plateau production. However, these plans have yet to be finalised.

The second design change increased the allowance for thermal expansion of the production casing – designed to handle a flowing wellhead temperature of 160°C – from six inches to 12 inches. Once again reported to be a 'precautionary' measure, the decision was taken in response to well expansion problems experienced by Shell on its Shearwater project, which subsequently led to the project's temporary shut-in.

Both of the design changes have been incorporated in Jade's originally agreed budget and neither have delayed the project's delivery schedule, states Shepherd.

Pipelay choice

A change was also made to the design for Jade's 19-km pipe-in-pipe export pipeline – the final design concept incorporating expansion loops. It was originally planned to use 'snake-lay' technology in order to accommodate the significant expansion and contraction that would result from heating during production and cooling during shut-down maintenance periods. This concept was used on Texaco's Erskine field – also a HT/HP project – where failure of some fillet welds in the export pipeline led to a pipe burst last year.

Shepherd stresses that although the original snake-lay concept echoed Erskine's, Phillips had already decided to incorporate a design change that avoided the use of fillet welds before the incident took place. 'The decision to change from the snake-lay concept had nothing to do with Erskine... Jade's timing necessitated the change, as it was not possible to have the snake-lay concept ready in time to achieve our onstream target date.' He continues to maintain that snake-lay is 'a neater and cheaper solution' and reports that Phillips is continuing to work on the concept which it is 'confident will work in the future.'

Phillips opted instead to add expansion loops at an extra cost of some $10mn (an expense that was 'factored out' out of the total budget following cost savings made elsewhere). This was welcome news to Kvaerner's Methil yard that picked up the contract to fabricate the eight loops.

Final furlong

Both Heerema and Kvaerner kept tight reigns on the construction schedule of the topsides and jacket. So much so that a two-week delay in installing the pipe-in-pipe riser on the jacket as a result of material failure of six thermal expansion bulkheads during routine testing, will not lead to a delay in the final October onstream date. It did, however, result in a rescheduling of the jacket sailaway from 29 April to 13 May.

Fabricating future

The completion of Jade's topsides and jacket marks an end to the major projects booked into Heerema Hartlepool and Kvaerner's Methil yard. The extra expansion loop pipeline work will tide Methil over until the end of July, but beyond that the yard faces the possibility of being put on a care and maintenance programme. Kvaerner Project Manager Jim Rutherford says that the yard will consider 'any work' to keep the 'core nucleus of the work force in business.'

Prospects for Heerema Hartlepool look marginally brighter. It recently secured a contract to build a 4,500-tonne module for Shell's offshore Nigeria Bonga 16,000-tonne topsides and is currently bidding for BP's 600-tonne Hoton platform and a number of Sullom Voe PAUs. It also plans to bid for Conoco's Caister Murdoch accommodation module and the second phase of BG's ECA development.

Looking further ahead, it is unlikely that any medium or large-size projects will be in the offing for at least the next six months, when BP's Atlantic Margin Clair project or Shell's North Sea Goldeneye development come forward for bidding.

...*continued from p30*

fill the projected pipeline to China. The company has been actively looking eastwards to China and other potential Asian markets, a strategy that directly contrasts with Lukoil's westward looking focus.

Yukos' next new field project is for the Yurubcheno–Takhomskoye field in the Krasnoyorsk region. It is due onstream in 2005 and comprises an extensive fractured carbonate reef producing oil with a high gas content. Its significant production potential will justify building an export pipeline to China according to Beylin.

Asked about the adoption of latest techniques by Yukos, Beylin explained that it was monitoring production in all wells in conjunction with Geoquest and the company now had a central control room in Moscow for day-to-day operations. He explained that visualisation rooms were to be added soon. His view was that now the Russian companies in general, and Yukos in particular, had the investment resources, they would aim to make use of the latest technology like any other international oil company.

Asked about the taxation of Russian oil companies and the prospects for PSAs, he explained that Russian tax was based on average industry performance – a system which rewarded efficient companies such as Yukos. His view was that PSA terms were favourable and it was unlikely that the government would improve them further or give the sort of additional guarantees many western oil companies appeared to want. His believed that international companies should look at involvement under non-PSA terms, which he described as being roughly 70% government, 30% oil companies income split. He noted that Russian companies were currently replacing their fixed assets quite rapidly, after a prolonged period of underinvestment. In the case of Yukos, in recent years the asset replacement rate had been around 12%, but this had now been stepped up to 30%. He went on to explain that Yukos now had a really independent board which he joked meant that he now had to be better prepared when making investment proposals.

Following the initial audit by PriceWaterhouseCoopers, the company had now had two years of GAPP accounts and had just registered a First Level ADR programme. The aim was to make Yukos a truly international company with around 15% of its income coming from international assets. The company didn't have to go it alone either at home or internationally, the clear implication being that it was looking for strategic international partners.

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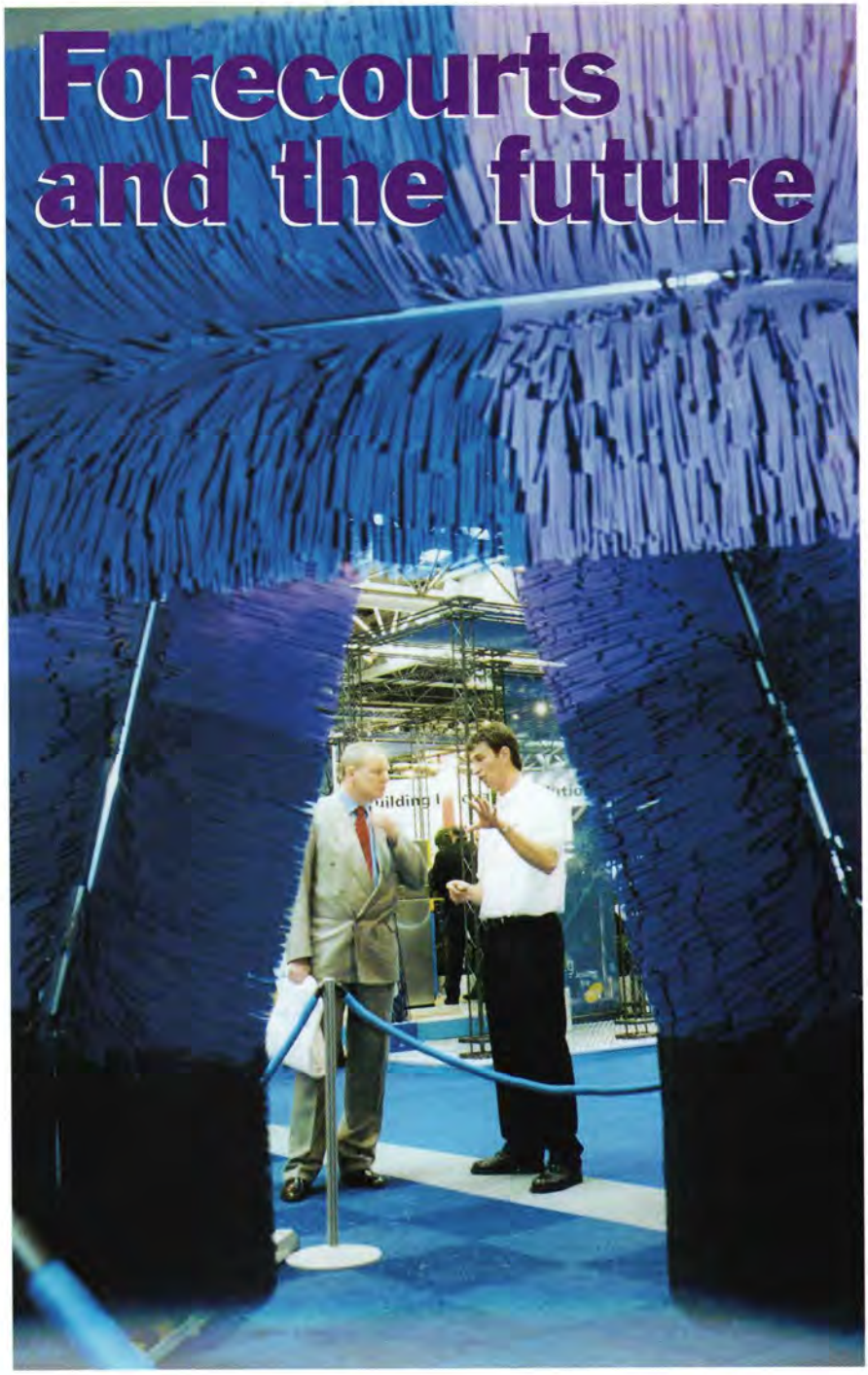
Forecourts and the future



The Institute of Petroleum (IP) held a one-day conference at the Forecourt & Fuel Equipment exhibition at Birmingham NEC in March, focusing on the need for the industry to enhance profitability in the fuels retailing sector. *Kim Jackson* reviews the papers presented and outlines some of the exhibition highlights.

Entitled 'Forecourt Profitability – A Challenge for the European Oil Industry,' the IP Conference opened with comments from the Chairman, Peter Ellis Jones, Director of Tawe Oil Management. He remarked that the past two years had been 'eventful' as operators strove to cope with external pressures – the oil price had soared from $11/b to $30, then levelling out to a new trading range between $24 and $28; the UK and other European countries had seen protest movements against fuel prices, especially against high taxes; the number of UK service stations had reduced once more; and there had been continued consolidation among the oil majors.

Unsustainable situation

The Keynote Address was presented by John Mumford, Director, BP Oil UK – also President of the UK Petrol Industry Association (UKPIA) and a Member of IP Council – who provided an overview of the UK refining and marketing sector. He stressed the importance of getting the right message about the industry across to the public. 'It would seem we are constantly subject to an attack,' he said, 'everything misinterpreted... and taken the wrong way. The issue isn't the press – it is public expectations. These are very high – they expect us to solve problems that are not of our making – and they don't trust us, suspecting us of making excessive profits.'

He went on to remind delegates that the UK, in fact, has the cheapest petrol at the pump in Europe. At 17 p/l, net of tax and duty, the UK price compares with between 20 p/l and 23 p/l in the rest of Europe. With the Rotterdam spot price market at about 14 p/l, this gives a margin at the UK refinery gate of just 3 p/l – an 'unsustainably low level' that has to be shared along the distribution and marketing chain, stated Mumford. He commented that the average profitability in the downstream sector was just 0.1 p/l over the past five years and that even in 1999, when profits reached their highest level, it was still just under 1 p/l. This had led to considerable consolidation of the network, with some 6,000 sites closing over the past decade (a rate of some two per day). 'Profit margins over the past six months indicate that this trend could accelerate this year,' warned Mumford.

Later readdressing the issue of public perception of the oil and gas sector, Mumford indicated that the industry was in need of better public relations. 'We have done a lot to be proud of,' he said 'and need to make the public see this.' As examples, he cited that:

- the refining industry had reduced emissions to the atmosphere by 50% since 1993;
- road tanker accidents had been significantly reduced in number;
- operator safety had significantly improved over the years; and
- the introduction of cleaner fuels has halved vehicle NO_x and particulate emissions over the last 10 years will halve them again over the the next 10 years; and
- through a combination of ingenuity and sheer hard work, the oil industry greatly reduced the impact of last year's oil crisis – the vast majority of stockouts were caused by panic buying, not by delivery problems, and recovery was achieved in a few days.

He also called for more fuel price transparency, to make the public aware of how much tax is being paid on fuel, and continued development of alternative fuels and the associated delivery infrastructure.

European market trends

Stephen Brooks, Principal Consultant at Wood MacKenzie, provided a comprehensive overview of retail development in Europe. He stated that today's consumer has more choice than ever before – choice that had grown hand in hand with economic and technological development. He pinpointed a number of key features of the market:

- Western Europe is a mature market, with little or no volume growth (<1% per year) and continued market consolidation. In contrast, Central and Eastern Europe, have 'huge potential' with a forecast growth rate of 4.4% per year.
- Gasoline and diesel still dominate the fuels sector, with some substitution of gasoline by diesel and LPG becoming more widely available in some markets. Already popular in the Netherlands and Italy, LPG is regarded as a 'strong growth market' in France and the UK and interest is now being seen in the Czech Republic, Poland and Hungary.
- The major oil company brands still dominate the market, with hypermarket retail groups increasing their presence in some markets. The independent sector continues to be squeezed.
- A number of major Central European players are emerging through consolidation and regional alliances.
- Retail outlets are still dominated by the fuels offer, with other products and services remaining subservient even though they provide more profitability.

The Forecourt Show attracted some of the industry's major service providers such as Veeder-Root

Looking to the future, Brooks stated that 'long-term sustainable profitability in fuels retailing is dependent upon how well you can anticipate, adapt to and manage change through the implementation of customer driven strategies.'

Tough times for independents

James Frost, former Chairman and Chief Executive of the Save Group proffered an independent's view of the UK fuels retailing market. Said to be the UK's largest independent fuels retailer, the company was put into administration earlier this year (see *Petroleum Review*, April 2001). He reported that the number of UK service station outlets had fallen from 16,971 in 1994 to 13,043 in 2000. During this time, the number of outlets in the private independent sector fell by nearly 38% and the number of supplier owned sites fell by 20.6%, while the supermarkets grew by 49.93%.

Frost also pointed to the 'devastating' reduction in the number of suppliers to the market, down from 11 in 1994 to just 6 in 2000, with one more in the process of being taken over in the proposed Chevron Texaco merger. Assessing the impact this may have on the future for branded independents, he pointed out that those suppliers who are left 'have no fear of losing volume to newcomers to the industry' and asked the question 'so why [should they] share the volume with independent sites when it can all be sold from company owned sites?'

He continued: 'Now, with the total reduction in the number of petrol filling stations, there is simply no opportunity for a new entrant – providing Save is safely out of the way. Save represents the very last opportunity for a new entrant to come in and improve the competitive position of the UK market.'

Frost also assessed the role of suppliers and banks as providers of finance, the latter heavily criticised by him for the role he believes they played in putting the Save Group into administration. He stated that most independent operators are cash negative in that they do not have enough

Chitty Chitty Bang Bang now runs on LPG

money to buy and operate their site without borrowing money – traditionally via advance rebate, write off loan, repayment loan, mortgage or supplier credit. He argued that the main advantage to a dealer obtaining a loan from a supplier is that there is a 'mutuality of interest' as the supplier has a 'vested interest in keeping the dealer in business.' The main disadvantage however, is that 'the dealer invariably has to sign up to a long-term agreement, which means that the margin allowed gradually becomes more and more out of date and the dealer finds that he cannot change supplier because he has to repay the money and a new supplier may not want to lend.'

In contrast, the advantage to borrowing from a bank is that it 'gives independence to purchase fuel from a wider variety of sources than if your supplier is also your banker,' commented Frost. 'However, unlike your supplier, your bank has no desire to supply your fuel so you have no mutuality of interest. If the going gets tough, your supplier has a motive in helping you, but your bank does not.'

Looking to the future, Frost said that the 'small independent rural site, which has no competition, can sell at higher prices than the cut-price urban sites – especially if it offers services other than petrol. Those independent sites in urban areas, up against superior oil company owned sites and reliant on pump price support to keep competitive, will find it harder to survive. Some, with large well-stocked shops serving the local community will fare better – but, for many, the cost of investment will prove to be too much.'

'Ultimately, the number of suppliers will become so reduced, and the number of independent sites so few, that prices will rise and good profits will be made. Then, of course, there will be a Monopoly Commission enquiry, which will find that there is a complex monopoly, just like the banks. We live, as they say, in interesting times.'

Environmental issues

Environmental issues are also of increasing importance to the retail fuel sector, and were covered by two presentations from Ian Davey of the Environment Agency and Paul Shone, Environmental Advisor at Texaco. Davey focused on the development of groundwater regulations and the importance of pollution prevention strategies. He also highlighted the Department of the Environment, Transport and the Regions (DETR) Approved Code of Practice (ACOP) for Underground Storage Tanks (USTs).

In a complementary presentation, Shone reiterated the great improvements in environmental performance at service stations over the years, which had been coupled with an ever increasing level of regulation. He also mentioned the Institute of Petroleum's own service station guidelines for the protection of groundwater and vapour emissions, which is scheduled for publication in June 2001, and will provide the engineering/operation guidance to underpin the DETR's ACOP for USTs.

Lube opportunities

After lunch, Mike Phillips, European Marketing Development Manager, Castrol Consumer Europe, provided delegates with a comprehensive overview of the European lubricants market. He stated that there are some 200mn cars and vans in Europe, about the same number as in the US, of which some 26mn are in the UK. However, although the car parc is rising in number, the vehicles are actually using less oil as engines become more

Product showcase

This year's International Forecourt & Fuel Equipment (IFFE) exhibition, took place alongside the Convenience Retailing Show at the Birmingham NEC from 13–15 March, and was packed with all that you would expect to find on a service station site – from car washes, petrol pumps and drainage systems to retail automation equipment, vapour recovery systems and BSI accredited manhole covers.

The IFFE exhibition, now under the management of *Forecourt Trader* publisher William Reed, saw a number of new introductions this year including a seminar programme, Car Wash Zone and a Virtual Store where visitors could spend 15 minutes being guided through a 3D virtual store, receiving advice on best practice and suggested improvements that could be made to improve profitability.

The seminar programme focused on the car wash, with presentations from Ryko, Atlantis International, Carebride, Wilcomatic and Branstons Service Stations, and LPG, with presentations from Shell, Tokheim and Key Autogas. There was also a Forecourt Trader Question Time, Chaired by Merril Boulton (Editor of *Forecourt Trader*), with Jonathon Turner of Bayford Thrust, Roy Roley of Conoco, Graham Kennedy of Inner Space Stations and Forecourt Trader of the Year winner 2000, and Ray Holloway, Director of the Petrol Retailers Association.

Two new car wash systems were being demonstrated by Wilcomatic at the Car Wash Zone. The Primus C150 from Otto Christ and the Mr Glow from Belanger. The C150 has a patented jointed side brush system said to ensure a perfect wrap around clean, plus an extensive range of pre-wash and high pressure options. Mr Glow is claimed to be the first rollover car wash to utilise a special soft cloth cleaning technology. A new tank design was exhibited by Rowafil that is claimed to provide high rates of water recovery.

It's a gas

The LPG sector was particularly well represented at this year's show, with several autogas specialists demonstrating the economic and environmental benefits of this fuel (see also p26). Conversion specialist Key Autogas announced a direct-injection system from Italy for LPG and CNG. Also on exhibition was a range of LPG pumps and fuel providers. A particular highlight was the presence of Chitty Chitty Bang Bang, the car star of the 1960s film of the same name, which has been converted to run on LPG and was there to promote Conoco's Jet-branded Autogas LPG fuel.

Technological advances in tanks and other fuel-related products were also heavily represented at the show. Claimed to be the UK's largest storage tank manufacturer, Cookson and Zinn exhibited a full size underground tank designed to alleviate the need for use of structural foundations. Also present were a number of companies dealing in fuel equipment installation, decommissioning and upgrading.

Among the wealth of new product and service launches, Veeder-Root introduced its new Fuel Management Service (FMS), claimed to be a flexible and cost effective route to loss reduction and environmental security (see p44).

On the oil company side, Jet returned to the show after a nine-year absence to demonstrate its 'commitment' to both its dealer network and potential dealers through a range of initiatives and support material designed to increase loyalty and drive sales. Q8 exhibited for the first time, showcasing its newly launched workshop support package and new dealer polling package. The independents were represented by Bayford Thrust, promoting its Gaytor loyalty scheme and franchising of the Thrust brand,

Nozzles coming under close scrutiny from visitors to the Forecourt Show

advanced. As a result, demand is falling by approximately 6%.

In addition, the type of product being demanded is changing, with an increasing call for ever more sophisticated and specialist oils. It is here that opportunities exist, argued Phillips, as these specialist oils can offer the supplier greater profit margins. He also pointed out that as service intervals get longer, there has been an associated increase in demand for top-up lubricants – another niche that could be 'better exploited' by the suppliers, according to Phillips.

Madan G Singh, CEO of KSS Group and Research Professor of UMIST's Computation Department, rounded off the day's presentations with a look at market adaptive pricing technologies for the modern petroleum forecourt. Singh stated that fuel 'price has a significantly greater impact on margin than cost cutting or efficiency gains' and said that tools now exist to base price decisions on demand on both a product-by-product and site-by-site basis.

He presented PriceStrat, a market adaptive pricing tool developed by the KSS Group. Competitor fuel and key item C-store product prices are fed into the model, together with the operator's own prices and various sales and price constraints and costs. The model then calculates the 'optimum price mix' for the operator. Achieved sales are subsequently input into the model, which then adapts the system to further optimise the price mix. According to Singh, trials have so far indicated that the model could produce annual profit improvements of up to 1.7% of annual sales revenue.

Challenges ahead

Peter Ellis Jones closed the conference by stating that the challenges facing the retail sector are 'as great, if not greater, than ever.' He said that while it was not necessarily the 'most attractive' part of the oil and gas industry, it was the 'most visible' and important shop window – 'our link with our consumers.'

'In the end,' he said, 'we all want to get from A to B. Despite the development of alternative fuels, petroleum will remain the main fuel and we need to concentrate on getting it's marketing right.'

Cetane number and cetane index relationship

It is a requirement of the European Specification for Automotive Diesel Fuel that both the Cetane Number (CN) and Cetane Index (CI) are determined and reported. This article outlines a review of the suitability of the current equation used in IP 380 (ASTM D 4737)/EN ISO 4264 for calculating Cetane Index, to predict Cetane Number as measured by IP 41/ASTM D 613.

The Institute of Petroleum (IP) runs a monthly diesel fuel engine correlation scheme under which approximately 20 laboratories worldwide determine CN. Most of these laboratories also determine density and distillation recovery temperatures, enabling CI to be calculated according to IP 380/EN ISO 4264.

The samples for the correlation scheme comprise commercially available fuels and special fuel blends to give a wide range of cetane numbers.

Data sets

As the occasional sample can have an undue effect on the trend between CN and CI, it is better to base any comparisons on larger data sets. This review looks at two ranges of data – the year 2000 and the five years covering 1996–2000. The former study period provides information on more recent fuels, while the latter provides smoother overall trends as it is less sensitive to individual samples. The five-year study also provides year-on-year information. For the sake of brevity the full monthly data for the five-year period are not given, but are available from the IP.

Outliers and unusual samples

The data was first checked for unusual individual results. Any outliers detected by Hawkins' test according to IP 367/EN ISO 4259 statistical methodology were removed from further analysis. Such outliers may be the result of laboratory bias or transcription errors.

The means of the 'good' data were used to provide estimates of the 'true' values of sample CN, density and distillation recovery temperatures. The last two parameters were then used to calculate CI values.

Samples that were well outside the scope of IP 380/EN ISO 4264 were excluded from the analysis. For example, the August 1996 sample contained ignition improver giving a CN boost of eight numbers. In addition to this, the February 1998 and December 1998 samples had unusual distillation and density

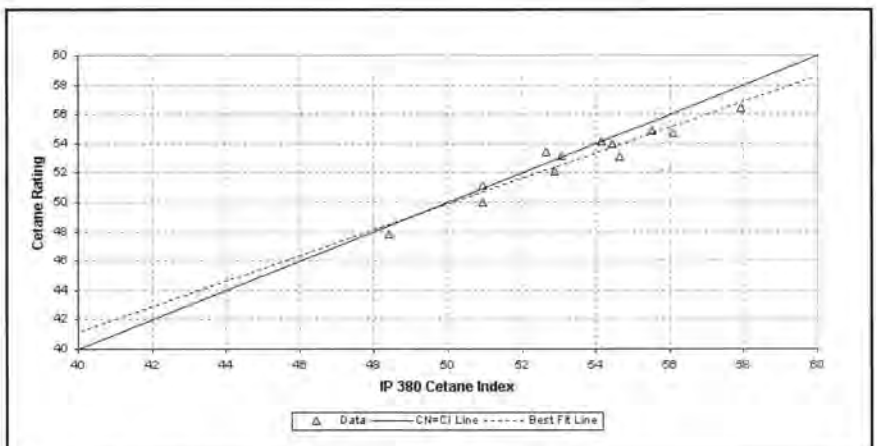


Figure 1: 'Best-fit' regression line through IP ST-B-1 2000 data

Year	Bias			CN/CI correlation	Bias slope	Trend line RMSEr	CN range	
	Mean	SD	RMSEb				min	max
1996	–0.0	0.7	0.7	0.97	0.93	0.7	48.1	58.4
1997	–0.3	1.6	1.6	0.86	0.82	1.6	45.7	54.7
1998	0.1	1.9	1.9	0.90	1.23	1.9	42.0	57.0
1999	0.1	1.2	1.2	0.84	0.78	1.1	49.7	55.7
2000	–0.6	0.7	0.9	0.96	0.88	0.7	47.8	56.4
1996–2000	–0.1	1.3	1.3	0.90	0.93	1.3	42.0	58.4

Table 1: Trends in CN and IP 380/EN ISO 4264

characteristics, respectively, that were outside the scope of the methodology. These two samples appear to have been special narrow fractions and, as such, are considered to be too different from typical samples.

Analysis

There are various ways to assess the appropriateness of IP 380/EN ISO 4264 to predict CN. They include:

- Overall bias between CN and CI, defined as mean (CN–CI).
- Bias standard deviation (SD) – a measure of scatter about the mean bias.
- A trade-off between mean bias and bias SD, as measured by the root mean square error (RMSEb), ie the square root of the sum of the squared bias and squared bias SD.
- Correlation between CN and CI, a measure of dependence between CN and CI.
- Bias trend in terms of the slope of the regression line.
- Data consistency, as measured by the root mean square error (RMSEr) about the best-fit regression line.

It is not enough to do well in just one of the above. For example, an overall bias of zero could hide either a bias slope very different to the ideal CN=CI slope or a large scatter of CI about CN. Furthermore, a small RMSEr could hide either a large bias or a far-from-ideal bias slope. The precisions of the test methods involved imply that some scatter of CI about CN is to be expected. As this scatter is dependent on the choice of samples, then bias SD and RMSEr will naturally vary over time. Therefore, IP 380/EN ISO 4264 can be considered appropriate when (i) bias is close to zero, (ii) bias SD is small, and (iii) RMSEr is consistent with test precisions. The bias slope will usually be close to ideal when both (i) and (ii) are attained, unless the range of CN and/or CI is relatively small, as in 1999.

Results

Trend information about CN and IP 380/EN ISO 4264 is given in **Table 1**. For all date ranges considered, this is (i) mean bias, bias standard deviation and a compromise between the two, (ii) correlation between CN and CI, (iii) bias slope, (iv) trend line RMSEr, and (v) the range of CN.

The CN/CI results are shown graphically in **Figures 1 and 2**. **Figure 1** shows the 'best-fit' regression line through the 2000 data, and **Figure 2** shows the 'best-fit' regression line through the 1996–2000 data.

Points to note are:

- IP 380/EN ISO 4264 is slightly biased over five years, more so in 2000. Because bias is generally small, the various measures on scatter (bias SD, bias RMSEb and RMSEr) tend to be very similar. The larger scatter of results in some years may be due to changes in fuel composition, or to the occasional unusual sample.
- IP 380/EN ISO 4264 bias slopes were worst in 1998 and 1999. This reflects the risk of using small data sets. Over five years, the bias slope is much closer to ideal.
- In contrast to previous years, the CN/CI correlation improved in 2000. This could reflect the chance of the occasional unusual sample in some years.

Conclusions

Three main conclusions can be drawn from this review:

- IP 380/EN ISO 4264 has a small bias overall for estimating CN. The unexpected small-sample bias in the 2000 samples may be reversed in future years.
- On average IP 380/EN ISO 4264 estimates CN very well. The scatter associated with individual CN estimation fluctuates year-on-year, suggesting a chance element.
- The equations used in IP 380/EN ISO 4264 for calculating CI are satisfactory and do not require revision at this time. The IP will continue to monitor the relationship.

If you would like further information about this article or the IP's Gasoline and Diesel Fuel Engine Correlation Scheme, please contact John Phipps, Technical Manager – Standards, at the IP. Tel: +44 (0)20 7467 7130, e: **jphipps@petroleum.co.uk**

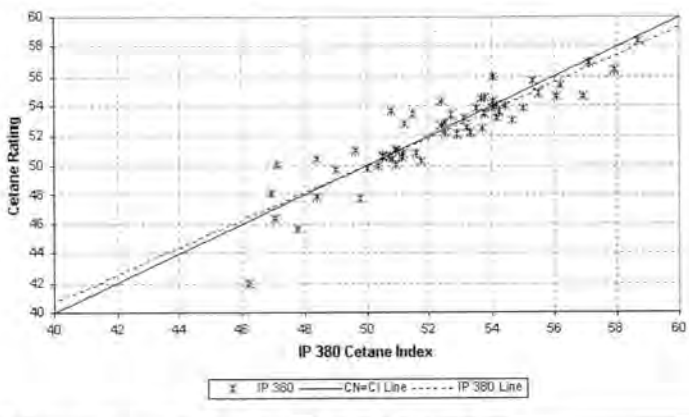


Figure 2: 'Best-fit' regression line through IP ST-B-1 1996–2000 data

Fast tracking for the future

Contractors are coming under increasing pressure to perform work on a 'fast track' schedule, which for most subsea tieback projects means award to completion in less than one year. Over the last five years, this approach has moved from being the exception to the norm, writes *M V Murray*, Marathon International Petroleum Ireland. What are the motivations for operators and what is the impact for contractors as experienced during perhaps the quickest ever project in the Northern Hemisphere – Marathon's Southwest Kinsale field?

Southwest Kinsale, located approximately 50 km off the south coast of Cork in Ireland was discovered in 1971 and 'rediscovered' in 1995. This second well was drilled to confirm a suspicion that this area of the Kinsale Head field was not being drained by the existing production wells on Kinsale Alpha and Bravo. Following a long period of commercial discussions, a gas sales agreement was finally achieved and the field was brought onstream on 1 October 1999, less than eight months after project sanction.

The single largest contract within the project was concerning the EPIC (engineering, procurement, installation and commissioning) contract that included all of the marine construction and tie-in works, including umbilical installation (and procurement of same, post-novation). This was awarded to Coflexip Stena Offshore Limited (CSOL) and, with the bidding cycle on contracts completed by 1 April 1999, CSOL had only six months to complete its part of the deal, from design to installation.

A key enabling element was Marathon's confidence in CSOL's ability to deliver in terms of safety, quality and schedule, which meant the company was free to select the subcontractors.

Development concept

The agreed development plan was for a single well tieback to facilitate gas sales on a depletion basis only. That is:

- recomplete existing well with a subsea tree;
- subsea flowline/umbilical to near-by processing facilities; and
- reuse existing subsea control system.

However, because planned reconfigurations of Kinsale Alpha and Bravo and the (still remaining) possibility of gas storage service, a number of design variations were possible:

- tie back to Alpha or Bravo;
- line size – depletion (8-inch) or storage (12-inch/14-inch);
- control system – depletion (one well) or storage (two to three wells).

The chosen scheme was implemented without compromising redevelopment plans for Alpha and Bravo and simultaneously maintaining the flexibility for future conversion to gas storage.

EPIC contract

The chosen solution was a 12-inch pipeline to the nearest platform (Bravo) – this was not the cheapest option, but one which optimised the early production profiles while maintaining the capacity for high gas deliverability if the field is ever converted for gas storage use.

Pipeline installation and the protection strategy were left to CSOL to propose, within the following constraints:

- installation vessel capacity;
- steel availability;
- soil conditions (extensive chalk outcrops);
- trenching capability;
- mechanical protection;
- fishing intensity.

It was recognised by all parties that the pipeline would have to be protected (trenched or rockdumped) because of the high level of fishing activity in the area.

Given the number of contractors in the market, Marathon was offered a number of different proposals that varied more in their approach to the protection issue than to pipeline installation (reeled pipe). The final selection was a single pass post-lay trench with provision for remedial rock dumping where the trench was below specification. This was the most pragmatic approach to protecting a line in difficult to trench ground conditions.

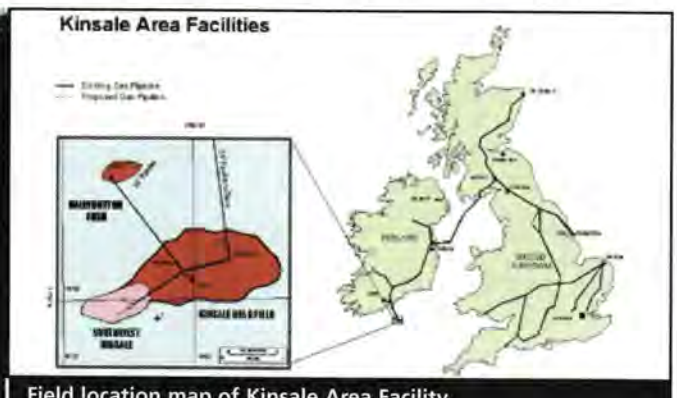
Traditionally, subsea trees and umbilicals have been perceived as 'long-lead' items and would determine the overall schedule of a subsea project. In this case, the items had to be available to meet a demanding schedule and, in addition, Marathon was seeking early delivery terms to give maximum offshore installation windows for the completion rig and CSOL.

The recorded delivery times speak for themselves:

Subsea Tree:	Delivered –	8 weeks
	Installed –	16 weeks
Umbilical:	Delivered –	20 weeks
	Installed –	26 weeks

The approach to the subsea control

Apache setting up to lay pipelines. Seawell on the South face of Bravo platform, Southwest Kinsale



Field location map of Kinsale Area Facility

Actual	Ballycotton (1991)	SWK Budget (1999)	SWK (1999)
Pipeline/riser	41%	(60%)	(59%)
Control system/umbilical	18%	(66%)	(57%)
Topsides	5%	(32%)	(19%)
Well/subsea tree	22%	(75%)	(57%)
Project management engineering	14%	(31%)	(30%)

Table 1: Cost breakdown between Ballycotton and Southwest Kinsale (in relative terms)

system was tailored to suit a number of constraints:

- small scope;
- existing SCM (subsea control module) available (ex-Ballycotton);
- existing control system (but parts non-Y2K compliant);
- possibility of expansion for gas storage service.

This approach of using available equipment or designs, without compromising quality or testing requirements, along with exceptional supplier cooperation, ensured that all parts of the subsea control system were available to meet all project deadlines, as required.

As part of the project workscope, Marathon successfully upgraded its existing subsea well to the new system, as well as including provisions for possible future wells.

Offshore installation

Given the short time window available a minimum number of constraints were placed on CSOL, primarily availability of equipment. A key schedule driver was delivery of the subsea tree by early June 1999, which allowed maximum flexibility in organising the well completion, ensuring that the potential for clashes with the pipelay/umbilical scope was avoided.

The *Glomar Arctic III*, following a similar completion operation for Marathon on West Brae in the North Sea, installed the downhole completion in 18 days. Few problems were experienced during the work and the well was successfully cleaned-up and flow-tested ahead of schedule. The rig was demobilised and the well remained isolated until the hook-up of the pipeline was completed.

The main installation workscope commenced in early September 1999; this included the pipeline, riser/J-tube, umbilical, valve protection structure, and xmas tree hook-ups.

The work was completed by end of the month, by the deadline for system commissioning – as originally planned. As predicted, trenching of the chalk strata proved difficult even using CSOL's multi-pass plough towed by the *Normand Pioneer*. The original design philosophy of only making one attempt at trenching was adhered to, as it was considered that a second pass would be of limited benefit and could in fact have destroyed the integrity of the existing trench. Areas of the trench that were out with specification (~40%) were rock-dumped to provide the necessary level of cover and protection.

Key offshore personnel from all parties were involved in review sessions, to ensure rapid exchange of views and experiences. The success of this approach is reflected in the fact there were no major 'surprises,' as often happens when offshore operations on older installations are undertaken.

Cost management

How does Southwest Kinsale compare with other Marathon projects on cost? The project was completed under budget and considerably cheaper than the closest analogue, the Ballycotton project, Marathon's first Irish subsea project which was completed in 1991. Commercial considerations preclude use of actual dollar costs. Nevertheless, it is instructive to compare the cost breakdown (in relative terms) between the two projects (see **Table 1**).

Significant reductions were targeted and achieved in all areas of the project, most notably in project management and topsides costs.

Project management costs were significantly reduced because:

- the electronic systems required less administration;
- the project was shorter;
- it had a flatter structure;
- there was a quicker decision making process;
- there was less 'shadow' engineering by Marathon; and
- off-the-shelf items were used.

Today, subsea projects do not need armies of people 'managing' the work, but a few highly trained and motivated individuals, who are willing to work together to get a job done efficiently.

There is no doubt that some of the cost savings are a result of market conditions at the time of tendering. Nevertheless, a significant and repeatable contribution was made by the combination of contracting strategy, 'fit-for-purpose' design philosophy and a streamlined decision making process within the management team.

What benchmarks have been established for future projects? Can we now routinely expect deliveries such as:

- 2-month xmas tree;
- 5-month umbilical; and
- 6-month pipeline?

If this can be maintained, and we see no reason why not subject to production capacity, then many subsea projects become 'commodity projects' where the schedule is driven only by availability of materials and installation equipment and not by design/engineering time. This may improve the economics of many projects due to:

- lower cycle times – faster payback;
- reduced uncertainty – less risk; and
- reduced cost – higher NPV (Net present value).

The challenge is for the industry to build on these successes and make subsea projects (shallow and deepwater) more and more routine – without sacrificing the quality and attention to detail that is essential for long-term reliability.

Marathon recognises the assistance provided to the project by Bord Gáis Éireann (BGE) and the European Union Trans-European Networks Scheme (TENS).

Umbilical installation from CSO Seawell, Southwest Kinsale

Flexible fuel management

Veeder-Root launched the latest addition to its range of tank gauging, wet stock management and leak detection products and services for the retail petroleum industry at the recent International Forecourt & Fuel Equipment (IFFE) exhibition (see p36), reports *Kim Jackson*.

Veeder-Root's new Fuel Management Service (FMS) is available to all petrol retailers, irrespective of the type of inventory monitoring used on their site – from dipsticks to electronic gauges (see **Figure 1**).

'It offers forecourt operators the best and most economic route to wet stock management, with flexible service levels to suit individual requirements,' Stephen Richards, Veeder-Root's UK Sales Manager, told *Petroleum Review*. 'From the most basic service level upwards, comprehensive reporting ensures a high level of management information is available. Reports are freely accessible to retailers using a customer specific, password protected feature on the Veeder-Root website [**www.veeder.com**] known as MyVeeder. This tool allows the retailer instant access to all their chosen reports from any Internet-enabled terminal anywhere in the world. In addition, reports can also be provided in a number of other ways, such as e-mail, fax or post.'

Should a problem be highlighted by the service, Veeder-Root's loss investigators are available on request to visit sites and help the operator to identify sources of leaks and losses, and to organise remedial action.

The company informs the operator if their sites have any leaks or if there are any suspected losses. Most importantly, it provides assurance that the operator's sites are environmentally secure, states Richards. The service provides guidance on the prime causes of variance which are costing the operator money – such as over dispensing pumps or delivery shortages.

'Every operator of a retail forecourt knows that stock losses can arise in many ways, leaks being the most costly and dangerous. But every day discrepancies through over dispensing, fraud, temperature changes and evaporation can accumulate to have a serious impact on slim operating margins,' states Veeder-Root.

Range of services

Services start with the Standard monthly service detecting leaks above 0.76 l/h. Inventory data is analysed on a monthly basis using an EPA-approved statistical inventory reconciliation (SIR) process. Any suspect tanks receive further investigation by an analyst, operating at Veeder-Root's new FMS data centre in the UK, to establish a pass status or identify the cause of failure. Data collection can be by fax, e-mail, post or automated polling – whatever suits the retailer's operation. Higher levels of security and enhanced reporting are offered through the Premium service, which also operates on a monthly basis, but to a more stringent leak detection rate of 0.38 l/h. When issues are highlighted, the operator is given timely recommendations as to the best corrective action to be taken.

For sites classified as high-risk (as determined by environmental, health and safety authorities) or where a high loss profile in monetary terms exists, a daily analysis service is offered with Premium Plus. This service facilitates immediate response to leak and loss events, over and above the features of the Premium monthly service.

Ongoing monitoring can be provided for any site through daily analysis of inventory data to detect loss patterns and catastrophic loss events. Differing site profiles can be accommodated without compromising safety or creating false alarms, states the company.

For sites equipped with a reconciling gauge, a further enhancement to the daily service is available. The sophisticated leak detection and reconciliation systems that function within these gauges can be programmed to automatically notify the FMS data centre of any alarm condition. From here, notification of alarms can be sent to nominated customer contacts by fax or e-mail. This real time alarm monitoring service operates 24 hours a day, seven days a week, 365 days a year. All alarms are archived and management reports are available on demand.

Distribution efficiency

Two further service packages to aid distribution efficiency are also available. These can operate in isolation or as a supplement to any other FMS option. Firstly, an Inventory Planning Service automatically collects data from all enrolled sites to provide daily inventory information for the entire network.

Secondly, a Delivery Scheduling Service forecasts effective delivery schedules which are automatically updated in response to the site trading characteristics, optimising deliveries to avoid costly overstocking and run outs. ●

Figure 1: Veeder-Root's new fuel management service provides solutions for all retail sites

For further information contact Tel: +44 (0)20 8392 1355; Fax: +44 (0)20 8878 6642; **e:sales@veeder.co.uk**

Sometimes the simplest ideas...

Essex-based Suckling Transport was recently awarded the Freight Transport Association's (FTA) Environmental Best Practice Award for its innovative TankShare programme. *Cheryl Saponia* spoke to Peter Larner, Managing Director of Suckling Transport, about the programme and other environmentally sound initiatives.

Q What was FTA award 'Best Practice' awarded for?

A – The award recognised two environmental initiatives, Stage Two of our Eco Guardian project and our TankShare service, which was launched last October.

In September 1998 we purchased two identical new tanker vehicles and we set about adapting one to a higher degree of environment acceptability. For example we used ultra low sulfur diesel (ULSD), fitted a continuously regenerating trap (CRT) and energy efficient tyres. In total there were 14 features that improved environmental acceptability. We then sent the tankers to the Millbrook Proving Ground, the only place in the UK that can check emissions, and they found that the Eco Guardian vehicle reduced emissions on all five main pollutants. The pollutant that gives most cause for concern, particulate matter, was reduced by 93%. A study at the time said if particulate matter could be reduced by this amount it could extend everyone in the UK's life by four and a half months.

Q: Did you implement the changes throughout your fleet after the Eco Guardian findings?

A – By the time the project ended only ULSD was available anyway – in the six months in which we were testing ULSD it became the accepted product. New UK Government legislation also meant a £1,000 reduction in vehicle excise duty where a CRT was fitted. These changes were not due to us alone, but our findings were used as an extension of bench testing exercises at Millbrook. They had tested ULSD and CRT and we simply put the test on the road. In that time the whole attitude to the environment changed, this was a coincidence, but the modifications that we recommended have become more or less standard in the industry.

Q: What does TankShare entail?

A – It works in three different ways. Firstly, oil companies and fuel distributors 'share' compartmentalised tankers for delivering product to the same area of the country. Secondly, by finding reloads, and finally by companies simply sharing a vehicle for full load deliveries, with different customers using the vehicle for different parts of the day, or on different days.

We realised that there wasn't a facility in this country for a groupage service in the tanker industry. I felt there was a requirement out there. I had the idea a couple of years ago: tanks are compartmentalised, five, six and seven compartments typically in a vehicle so different products can be used, and because of the nature of these products, tanks do not need to be cleaned between use. Petrol, kerosene, derv etc can all be used in the same compartment. And I just thought, "that should be possible, I wonder why no one else is doing it?" The simple ideas are sometimes the best ones.

In April 2000 a pilot scheme with four vehicles began and it proved so popular, so quickly, that we decided to launch the TankShare scheme in the October with new vehicles. We started out thinking we might find 10 customers if we were lucky. We now have 24 using the service. It was a great success for us (see **Table 1**). We found those wanting to use the service by using *Petroleum Reviews' Retail Marketing Survey* (see **Table 2**). At the moment we are limited to working around the Thames region.

Q: Has Suckling considered the use of alternative fuels?

A – LPG, CNG and ULSD all appear to have benefits, but some also have negative aspects to them. Natural gas, at one time the favourite of mine, contains sulfur compounds because of the added stenching agents, as well as mercury and other heavy metals. The gas is wet, picking up water from storage tanks and this causes corrosion in vehicle engines.

LPG actually causes more problems than ULSD and CRT with trucks. It is interesting that the UK Government's Powershift grants are currently only given for CNG, not LPG (see *Retail Marketing Survey 2001*).

Q: Why does Suckling care so much about environmental issues?

A – I genuinely feel that the environment is an issue we should all care about. If you look at Eco Guardian and TankShare you will see many similarities between them. They are both about UK companies working in partnership by sharing resources and ideas; they are about innovation and best practice; and perhaps most importantly, they are about sustainability. This is the natural extension of the environment debate and is about being more environmen-

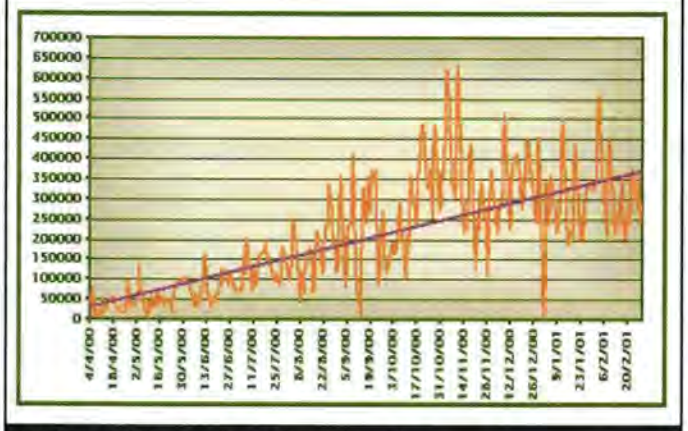


Table 1: TankShare – Litres delivered per day

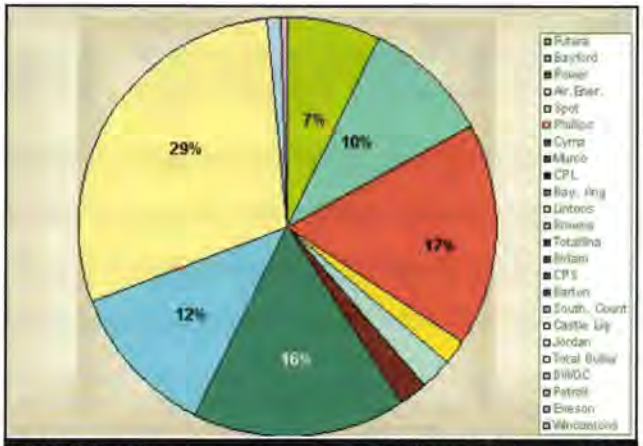


Table 2: TankShare revenue by customer – April 2000 to February 2001

tally and socially responsible.

I also felt at that time that we were being driven by government rules, and there has to come a time when you do something because you want to, not because you have to. Because of the influx of legislation over the last 30 years, we are forever on our back-foot, forever responding and being reactive to legislation, instead of proactive. The government's attitude is like a sign, the floggings will continue until morale improves, and that is their view of the environment. They will keep beating us until we do something about it or we will be taxed out of existence. There is EC legislation coming into London very soon, and again, the government's immediate reaction is to charge us to get into the City. They will price us out of the market, but it won't stop us going into London – all it means is we charge our clients more and they will charge their clients more.

Q: Do you feel you have an edge over your competitors?

A – I feel that the company is seen as innovative and different, and I enjoy going against the grain. I like doing what I'm told is impossible. I don't like treading in other people's footsteps and the staff here love a challenge. We care about what we do. A number of drivers and our office manager are away at the moment on a customer care course. We were the first company to register with the BS EN 12798 safety standard, which refers specifically to the carrying of dangerous goods in tanks. We felt it was a good idea. The government didn't tell us to do it and I still think we are probably the only tanker haulage company that has registered to it.

Q: So, are there more environmental initiatives in the pipeline?

A – There are no plans yet. Eco Guardian Two is running now. It began in October 2000. We bought nine new vehicles because one of the things that came out of Eco Guardian One was that the project vehicle had 10.4% better fuel consumption than the control vehicle. This is an enormous gain, so we thought about where that would have come from. By a process of elimination we decided that it must have been either the use of synthetic lubricants or energy efficient tyres. We used onboard management computers to eliminate differences in driver skills. My own gut feeling is it's the lubricants; the Michellin tyres do improve efficiency by about 6%, but this decreases the more urban your surroundings. In entirely motorway running areas then tyres do make a difference.

Stage Two is about finding out where the improved fuel consumption came from. Synthetic lubricants cost three times as much as the mineral kind, but if it saves on the cost of the fuel this is a benefit. You only need to save a small amount on fuel to make it worthwhile and of course, synthetics are better for the environment. Hopefully, Stage Two will convince people that there is no room any more for mineral lubricants. I'm confident of its cost-effectiveness.

Stage Three – I don't know yet. There are a number of issues, LPG as mentioned before, but I really do not think we are right for that. We have been approached by a customer who would like to run Eco Guardian Three with an LPG vehicle. Lots of road trials will be needed for this, but no manufacturer is even researching LPG in trucks as far as I know. A quantum leap needs to be made and we are not the people, but I hope someone else does.

Q: What are your expansion plans?

A – We have proved that TankShare works and it is our intention this year to roll it out across the country. We already have a programme in Hemel Hempstead, and from Grangemouth in Scotland from 1 May and we are also looking at Immingham and Ipswich.

Q: Has Suckling expanded due to its environmental initiatives?

A – In 1999 we were in a tricky situation, we lost a big contract with Shell who had been with us for 11 years, which was a big blow. We had grown because of Shell. When they changed their mind and wanted a single contractor throughout the whole of the country, we lost the contract as we were not seen as a national provider.

I think through TankShare we have solved two problems that came from the Shell incident. Firstly, we have become a national provider and we have widened our customer base to where we are now, with 24 customers (see **Table 2**).

Q: Finally, are there any further issues you would like to bring up concerning the industry?

A – Recruitment of drivers is a problem in the industry. A tanker driver, is at the top end of his profession and is well paid. A Class One LGV driver even with the ADR qualification in the right module, would still take three or four weeks to train – for loading and delivery mainly, as there are lots of equipment and safety issues that need to be taught. We are one of the few companies that provide this training. But generally, there are not enough drivers coming into the industry. Another problem we have is that drivers in the oil tanker sector need a City and Guilds qualification that covers petroleum spirit. But the driver takes his course and its six weeks before he gets his results. If I want to employ a new driver, I'm restricted as I can only employ someone who has taken the course themselves. Surely in this technological age, we can get a result the next day. Its just another one of those things that people have just accepted instead of saying 'Why?'.

Challenging market solutions?

Conferences fall into two broad groupings – those that address specific topics and basically impart facts, and those that dwell on concepts and impart ideas. *Chris Skrebowski* reflects on some recent 'ideas'.

One of the largest and most prestigious of the 'ideas' conferences is Accenture's annual utilities and energy conference, held this year in Phoenix, Arizona. As might have been expected, the Californian electricity crisis came to dominate much of the formal and informal discussions.

Although there are many detailed technical aspects to the crisis, there is also an important political and philosophical clash. The clash is the degree to which leaving electricity supply to the market is politically acceptable. This adds a whole new dimension to the Californian crisis and means that both participants and spectators fall into two camps – those who basically believe in market solutions and those who regard electricity supply as so important that some degree of political control is required.

The resolution or rapid amelioration of the Californian crisis is a direct challenge to those promoting market solutions. Much of Europe, Asia and South American remain to be convinced that electricity markets should be free of political control. Even in those countries that have accepted market solutions – Canada, UK, US, Australia, New Zealand, etc – there is increasing concern about how markets can be manipulated and a tendency to increase regulation.

As Daniel Yergin of CERA put it to the conference, the electricity industry is the last 'commanding height' of the economy still directly controlled and regulated by politicians. California is the battle ground that will decide whether more of the world opts for market solutions or whether the process has reached its high point with greater regulation now more likely than greater decontrol.

The conference also heard some of the contributory factors that produced the crisis. It is not generally known that California's enthusiasm for alternative generation has given it one of the highest proportions of non-hydrocarbon generation in the US. According to a recent paper by Global Change Associates – entitled 'Californian Energy Crisis' – generation capacity in California is 52% hydrocarbon based (gas 36%, coal 20%, oil and diesel under 1%) and 48% non-hydrocarbon (large hydroelectric 20%, nuclear 16%, renewables 12%).

This produces the irony that California's 34mn inhabitants, accounting for 12% of US GNP and on a standalone basis the sixth largest economy in the world, has one of the most fuel-diverse generating sectors. This fuel diversity, however, has proved very expensive, with virtually all the non-hydrocarbon generation more expensive to operate than the hydrocarbon based capacity.

Possibly the most spectacular example of this is the Pacific Gas and Electricity's Diablo Canyon nuclear plant which was estimated to cost $400mn, but actually cost $5,800mn. The State's other nuclear plant merely tripled its estimated cost. As a result, California entered the 1990s with a diverse but expensive generating industry and costs to the consumer that were roughly double other states.

From bad to worse

Then things really got worse. Demand grew by 11% between 1990 and 1999, while generation capacity actually decreased by 2%. Lack of snowpack in the Northwest restricted hydrocapacity and hydroelectricity imports.

Some 75% of power plants are now over 20 years old and 10% over 50 years old. Planning permissions are highly restrictive and little generating or transmission capacity is being added to an ageing and decrepid infrastructure. One speaker even described it as 'third world.'

Booming demand is, surprisingly, being driven by computers. As computer power has grown, so has their electricity consumption. For an individual user this may be the difference between a large light bulb and a small one – but, collectively, the impact is enormous. A large server farm can now use as much as 150 MW, so, just four server farms will take the total output of a large power station. The phenomena is being repeated across the entire developed world but, in the US, it means there is less spare capacity for California to import (it already imports 11,000 MW in addition to its own 53,000 MW of generating capacity).

Privatisation politics

Politically, the privatisation in the mid-1990s was seen as a way to reduce electricity prices to the consumer; but generators were highly successful at persuading the politicians that stranded costs should be remunerated. The result, as Global Change Associates pithily put it, was that 'California did not actually deregulate its electricity industry, choosing rather to restructure the industry's relationships in a politically expedient manner and calling it deregulation.'

California uses 40% more electricity in the summer, mainly for air conditioning, than in the winter. It had rolling brownouts this winter. An electricity short summer is inevitable. Gas supplies are expected to remain pricey and tight in the US for at least 18 months, according to Daniel Yergin. The challenge for the pro marketeers is to resolve the Californian crisis without discrediting the concept. Many eyes are watching how successful they will be.

Rich European utilities

A truly fascinating prospect raised at the conference was the sheer volume of money that European utilities will have to spend or invest as a result of privatisations. Accenture has calculated that European utilities could have as much as $175bn as all the various privatisations are completed. The Italian electric utility ENEL alone could have $40bn. As a result, Accenture is predicting that there could be large scale purchases of the relatively unconsolidated US electricity companies by the predominantly large European electric companies – a dramatic reversal of the last few years when US utilities were buying in Europe.

Only a year ago the oil companies were seen as likely buyers of electricity companies to give assured markets to their gas supplies. Now the exact reverse may be a realistic possibility – an electric company buying an oil and gas company for the assured gas supplies.

Just a year later

As recently as last year, combined cycle gas turbine (CCGT) generation was the unambiguous choice for new power supplies around the world. And the general expectation was that oil companies would increasingly move into power generation in a world of privatised and decontrolled power generation. Now all is uncertain.

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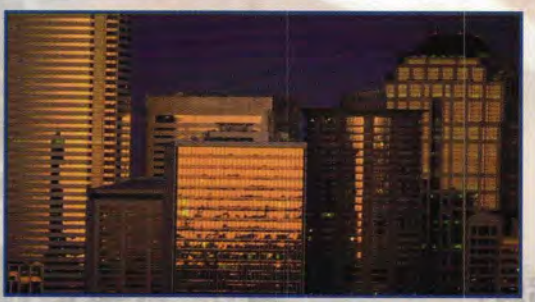

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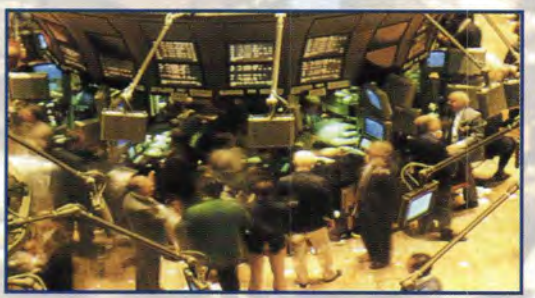

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A range of materials are available for the series, including hastelloy, zirconia, titanium, alloy 20 and tantalum, as well as plastic materials. Options available include heating and cooling jackets for the pump head.

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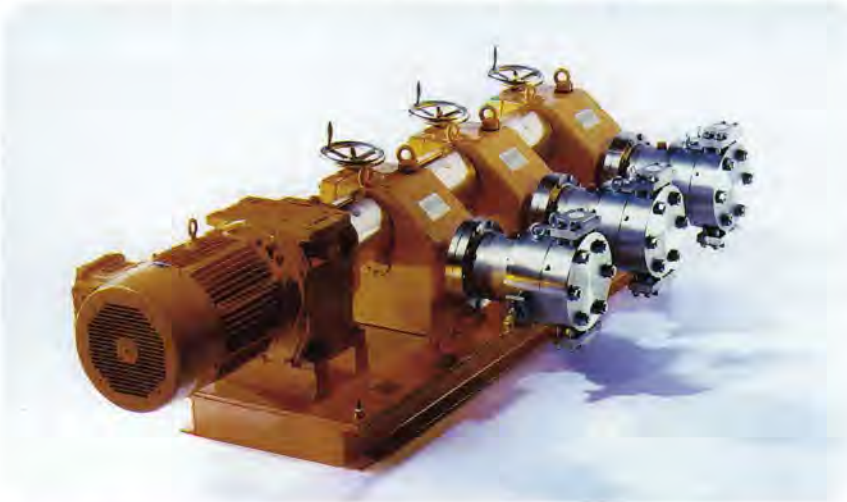
Fax: +44 (0)1530 560777



Easy thermal hydrocarbon removal

An on-site environmental remediation system, developed to address the growing problem in dealing with hydrocarbon contaminated soil and drill cuttings is now being offered by Furmanite as a result of its alliance with OnSite Technology.

The service uses indirect thermal desorption to recover and recycle hydrocarbon contaminated solids for safe on-site disposal. This is achieved by vapourising the hydrocarbons and recovering them for reuse, leaving the decontaminated dry soil ready to be returned to the ground as fill, all within a trailer-mounted mobile kiln and process plant unit.

The system, which was developed by OnSite Technology, operates at a processing rate of 2–10 t/h, with a claimed 99.9% removal efficiency for hydrocarbon contaminated materials. It has already been used to process over 600,000 tonnes and recovered over 53mn litres (333,333 barrels) of oil for re-use, states Furmanite. Soils and cuttings contaminated with all types of oil as well as oil-based drilling muds are reported to have been successfully treated.

The contaminated site is first evaluated to assess the quantity and characteristics of the waste, from which process flow rates and treatment efficiencies are established. Once the system is on site, contaminated materials are loaded and heat applied (at internal kiln temperatures of 93°C to 538°C) in a manner that isolates the flame from the material, raising the contents' temperature above the contaminant's vapour point for recondensing or thermal destruction.

The system is said to be easy to assemble and disassemble on-site, making a fast response and multi-site projects possible.

Tel: +44 (0)1539 729009
Fax: +44 (0)1539 729359

Valuable valves

A new range of Research Control® manually operated valves that combine the Cv and flow characteristics of automatically actuated valves, is the newest offering from Badger Meter, supplied in the UK from liquid handling company Pump Engineers.

The SMV series of globe two-way valves is available in sizes from 0.5 inches to 1 inch, in a choice of materials including stainless steel, alloy 20, monel, hastelloy and other more specialist materials. Cvs with linear, equal percentage or quick-opening characteristics are available as standard from 6 to 0.05, with smaller sizes from the factory.

The valves are designed with the stem threads above and out of the process fluid, thereby reducing the possibility of thread contamination and corrosion. They are designed to operate in temperatures ranging from –100°F to +400°F. However, a cooling fin option is available which extends the high temperature capability of the valves to +700°F.

SMV Series valves will operate to pressures up to 5,000 psig for the 0.5 inch version, while the 0.75 inch and 1 inch version handle pressure up to 1,500 psig. Standard packing is PTFE chevron rings with graphite and PEK available as options. Other options include extended bonnets for cryogenic or hot applications, angled bodies, heating jackets and TiN coating of inner valve, stem and seat.

Tel: +44 (0)1903 730900
Fax: +44 (0)1903 730234

NEW Publications

The New Economy of Oil – Impacts on Business, Geopolitics and Society*

John Mitchell (Earthscan Publications, 120 Pentonville Road, London N1 9JN, UK). ISBN 1 85383 745 8. 304 pages. Price: £40.

The main theme of this publication is that the acceptability of oil is becoming more important than its availability. The implications of this are large given the huge current dependence on oil of so much industry and government revenue. Mitchell successfully sets out the challenges and choices ahead. The book is of importance to all those involved in the oil industry, including industry professionals, commentators, investors, managers and regulators. Elements that may influence and determine the shape of the industry are also examined, along with the behaviour of the main players, the force of supply and demand and the price path. The book is anchored in the constants that have characterised developments in the industry in the past three decades but new elements are carefully placed in context. A host of issues are raised for debate and there is a great deal of thought provoking observation.

Human Rights and the Oil Industry*

Editors: Asbjørn Eide, Helge Ole Bergesen and Pia Rudulfson Goyer (Intersentia, Churchilllaan 108, B-2900 Schoten (Antwerp), Belgium. ISBN 9 05095 139 2. 208 pages. Price: BFr 1,250.

The accelerating globalisation process poses new challenges for the realisation of human rights worldwide. The process is largely driven by transnational corporations with resources and economic power, which by far outstrip those of many states. The petroleum industry is at the forefront of these corporations and many now recognise their responsibility and are seeking to develop new policies. This study is a description and analysis of the role and policies of these corporations with regard to human rights. Written by leading experts and practitioners in the field. The book explores the nature of the challenge major petroleum companies are facing, the demands set by the international community, and the responses from the corporations. The studies in this book are likely to play a role in the emerging debate on how the large corporates can meet their social responsibility for human rights in their countries of operation and how they can be held accountable to the international community.

Geology and Warfare: Examples of the Influence of Terrain and Geologists on Military Operations*

Editors: Edward PF Rose and C Paul Nathanail (The Geological Society, Geological Society Publishing House, Unit 7 Brassmill Enterprise Centre, Brassmill Lane, Bath BA1 3JN, UK). ISBN 1 86239 065 7. 480 pages. Price: £85.

This book records some of the lessons learned from the military experience in the two World Wars, and the subsequent 'peace' which ended the 20th Century. It also complements recent perspectives from the US which show how in warfare, military geologists irrespective of nationality have traditionally pursued five main categories of work: tactical and strategic terrain analysis, fortifications and tunnelling, resource acquisition, defence installations and field constructions and logistics. The book also illustrates how peace-time military geologists train for warfare operations and may be involved in peacekeeping and nation-building deployments. Chapters include how the influence of geology and geologists on military operations is more deeply rooted in history than commonly perceived; how military applications of geology were more quickly appreciated in Europe than in the US, and how modern expertise owes much to the work of British geologists during the two wars.

**Held by the IP Library*

Latest from the Library

YOUR OFFICE AWAY FROM HOME

Internet sources and issues relevant to the energy industries – 2001 update

IFEG is holding an afternoon seminar on 22 May 2001 to update members on finding energy information on the web, and the legal implications of using such information. There will also be a presentation from our sponsor, TDNet, about its One Stop E-Journal Management Tool. The seminar will be free to IFEG members.

Please contact Sally Ball to register for more information about the seminar or about joining IFEG.

Some New Editions to Library Stock

- *Gas Prices: Data 1990–2000: Detailed Tables.* European Commission, Eurostat, Luxembourg, 2000.
- *The Tank Register 2001.* Clarkson Research Studies, UK, 2000.
- *Trade Agreements, Petroleum and Energy Policies.* United Nations Conference on Trade and Development (UNCTAD), Switzerland, 2000.
- *Petroleum and Natural Gas Industries – Life Cycle Costing: Part One: Methodology.* British Standards Institution (BSI), UK, 2000.
- *Gas Prices: Price Systems 1999: Methods and Nomenclatures.* European Commission, Eurostat, Luxembourg, 2000.
- *The Chemical Tanker Register 2001.* Clarkson Research Studies, UK, 2001

Library & Information Service Hours

Open 9.30 am to 5 pm Monday to Friday (except Bank Holidays). Non-members are welcome on payment of an entrance fee of £20 for half a day or £30 for a full day. Student non-members may use the library for £2 per day if they bring a letter of introduction from their tutor and their student ID card.

Contact Details

- Information queries to:
  Chris Baker, Senior Information Officer, +44 (0)20 7467 7114
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- Website queries to:
  Perry Hackshaw, Webmaster, +44 (0)20 7467 7112
- LIS management queries to:
  Catherine Cosgrove, Head of LIS, +44 (0)20 7467 7111
- IFEG queries to:
  Sally Ball, IFEG Secretary, +44 (0)20 7467 7115

Fax any of the above on +44 (0)20 7255 1472 or e-mail: **lis@petroleum.co.uk** Visit our website at **www.petroleum.co.uk**

API/IP 1585 Guidance in the Cleaning of Airport Hydrant System

This new publication has been prepared jointly by the Institute of Petroleum Aviation Committee and the American Petroleum Institute Aviation Technical Services Sub-Committee.

It is intended to provide guidance in the cleaning of existing hydrant systems that are showing signs of having become contaminated with water, particulate material and/or microbiological activity.

It also gives guidance which, if followed, will help ensure that the construction and commissioning of a new system, or an extension to an existing system, does not cause subsequent adverse effects on fuel quality. The publication also contains some operational guidelines to ensure the supply, from a hydrant system, of jet fuel that is free from contaminant.

This publication will be of interest to hydrant system designers, engineering contractors, hydrant operating companies, aviation fuel suppliers, into-plane refuelling companies and airport authorities.

ISBN 0 85293 322 3 25% discount for IP Members £60.00

Workshop on Fatigue

In October 1999 the Institute held a workshop on the health and safety aspects of fatigue as they affect the up and downstream sectors of the oil and gas industry. The proceedings include:

- Summary and introduction by Dr L Wright, BP.
- Introduction to body rhythms, shiftwork and fatigue by Prof Simon Folkard, University of Wales, Swansea.
- Sleep, mood and performance in relation to offshore shift patterns, by Dr Katharine R. Parkes, University of Oxford.
- Adapting to night shift on oil-rigs and elsewhere: implications for health, by Dr Josephine Arendt, University of Surrey.
- Sleep-related vehicle accidents, by Dr Jim Horne, University of Loughborough.

ISBN 0 85293 314 2 25% discount for IP Members £20.00

Testing of Vapour Containment on Petroleum Road Tankers

This important new publication provides protocols to define a practical means of satisfying Clauses 31 and 34 of the UK HSE Approved Tank Requirements, which implement the design and testing of road tanker requirements to comply with European Directive 94/63/EC for the control of the emissions of volatile organic compounds.

The publication specifies a test procedure for determining the maximum number of tanker compartments that can be loaded simultaneously without causing any loss of vapour through the pressure and vacuum breather vents. The second section of the publication provides a test procedure to enable the vapour tightness (leakproofness) of a tank compartment to be determined.

Testing of vapour containment on petroleum road tankers will be of particular use to all those involved in the design, manufacture, operation, maintenance and inspection of petroleum road tankers.

It is understood that vapour tightness testing in accordance with the protocols in this publication is likely to be required by the Major Oil Companies Safe Loading Pass Scheme.

ISBN 0 85293 318 5 25% discount for IP Members £44.00

All publications available for sale from Portland Press Ltd at listed prices inc. postage in Europe (outside Europe add £5.00). Contact Portland Press Ltd, Commerce Way, Whitehall Industrial Estate, Colchester CO2 8HP, UK. Tel: +44 (0)1206 796 351. Fax: +44 (0)1206 799 331. e sales@portlandpress.com

For a complete and up-to-date listing of all IP Publications see our website: www.petroleum.co.uk

Membership News

NEW MEMBERS

Mr M J Adulphus, Kariela Oil & Gas Services Limited
Mr G Agugua, Shell Petroleum Development Company Limited
Dr R Ahilan, Noble Denton Europe
Mr B K Arora, J K White Cement Works
Mr B Ayres, Geospace Engineering Resources EAME
Mr M Azancot, Hurricane Hydrocarbons Limited
Mr R Baker, Sociéte Generale
Mr I Bonde Nielsen, Batumi Oil Terminal Limited
Mr E Bruyninckx, FPC NV
Wing Commander A E Buckingham, Defence Fuels Group
Mr A Butler, APCO UK
Mr B Caton, Lowestoft
Ms C Chart, Sevenoaks
Ms V Clure, Technical Outsourcing
Mr R Dakin, Lloyds TSB
Mr O Eik, Bloomberg
Mr F Fagbemro, Hydroserve Oil Services Nigeria Limited
Mr D Fitzsimons, Oakdene Hollins Limited
Mr S T Forsyth, Glasgow
Mr M G Freeman, Northants
Mr D Fulton, Ogilvy
Mr D G Garnon-Cox, Defence Fuels Group
Mr D R Godfrey, Wendale Oil & Gas Services Limited
Mr S Guy, Noble Denton Europe
Mr M C Henderson, Stockton-on-Tees
Mr A Huls, ING Bank NV
Mr R Humpreys, Geospace Engineering Resources EAME
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Mr I Johnson, DLA
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Mr C Moore, Quad Operations
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Ms B Perriman, Shell Capital
Mr C Phillips, Oil & Pipelines Agency
Mr G Prendercast, Australia
Dr M Reeder, Gaffney Cline & Associates
Mr S Remes, Fortum Oys
Mr D Roberts, Basildon
Mr G San Juan, Hailey Enterprises
Mr D S Savvides, Lloyds TSB
Ms L Scott, Camberley
Ms D Shashina, Chevron Munaigas
Ms L Shephard, Rank Communications International
Mr S Shlomo, Ministry of Infrastructures
Mr J D Southworth, Bourne End
Mr F Stalin, Bell Geospace Limited
Mr J Stephenson, Frogson Waste Oils Limited
Dr C Stewart, Department of Trade and Industry
Mr E Stibbe, NIR
Captain N Thomas, RBA Marine Services
Mr T J Tyler, US
Mr F Uwaibi, London
Mr V Ward, Skelmersdale
Mr A I Wiseman, Affinity Network Services

STUDENTS

Mr C Constantinou, University of Cambridge
Ms H M I Kuchi, Dundee
Ms M Kyrykbayeva, London
Ms I Papakirillou, London

STUDENT PRIZEWINNERS

Mr A Gholipour, London
Mr M J Towns, Doncaster
Mr D Scott, London

NEW CORPORATES

Faradays Limited, Unit B, 1 School Lane, Chandlers Ford, Eastleigh, Hants SO53 4DG, UK
Tel: +44 (0)23 8025 2258 Fax: +44 (0)23 8025 5997
e: faradays@compuserve.com
Representative: Mr D P Spratt, Managing Director
Faradays offers electrical design and installation in the downstream/retail industry.

KSS, St James Buildings, 7th Floor, 79 Oxford Street, Manchester M1 6SS, UK
Tel: +44 (0)161 228 0040 Fax: +44 (0)161 236 5740
e: HoldenJ@kssg.com
Representative: Ms Jacqueline Holden, Marketing
KSS is a world leader in the provision of intelligent pricing software tools. It was founded in 1993 to capitalise on 15 years' extensive research into price optimism techniques. PriceNet gives the fuel retailer the ability to take full control over pricing decisions at local, regional and national levels, and to drive increased profit through enhanced margins or improved volume performance.

Meridian Electrical (Eastern) Ltd, 775 Southchurch Road, Southend on Sea, Essex SS1 2PP, UK
Tel: +44 (0)1702 466604 Fax: +44 (0)1702 618325
e: meridian@meridianelec.demon.co.uk
Representative: Mr Stephen J Saunders
Meridian Electrical has carried out installations on petrol forecourts and depots throughout the UK since 1964, as well as a variety of other contracts of varying size in the industrial and commercial sectors. The company is active in the installation of LPG facilities on petrol forecourts, is a member of the LP Gas Association and undertakes staff training on a regular basis to support this specialist field of work.

Roplex Engineering Ltd, 71 St Margarets Lane, Titchfield, Fareham, Hants PO14 4BG, UK
Tel: +44 (0)1329 843344 Fax: +44 (0)1329 843360
e: jr@roplex.co.uk
Representative: Mr Tim Marshall
Roplex is involved in the installation, service, repair and monitoring of vapour recovery units, including project design and management emission compliance, HM Customs and Excise testing and VRU capacity testing, throughout Europe.

Baker Botts, 45 Ludgate Hill, London EC4M 7JU, UK
Tel: +44 (0)20 7778 1410 Fax: +44 (0)20 7778 1450
www.bakerbotts.com
Representative: Mr A Higginson
Baker Botts is a partnership practising law.

IP Discussion Groups & Events

Energy, Economics, Environment

'Postcard from the Edge... An Independent Retailer's View of the UK Market'

by **James Frost,** former Chairman and Chief Executive of Save Group

Tuesday 15 May 2001, 5 pm at the Institute of Petroleum, 61 New Cavendish Street, London W1G 7AR.

Contact: Jenny Sandrock or Laura Viscione
Tel: +44 (0)20 7467 7100

Energy, Economics, Environment

Programme of Events

18 June: **'LNG and CNG Vehicles and their Likely Future'** by *Mike Kesztenbaum*, BG Group

2 July: **'Trends in LNG Trading'** by *Morton Frisch*

11 October: **'West Africa – the Elephants' Graveyard'** by *Joseph Bryant*, President, Angola Business Unit, BP Exploration Operating Company

IP THE INSTITUTE OF PETROLEUM

Branch Activities

Humber
Contact: *Dave Hughes Tel: +44 (0)1469 555237*
10 May: Visit to Alstom Gas Turbines, Lincoln

North East
Contact: *John Sparke Tel: +44 (0)1642 546411*
22 May: Visit to BG Technology Spadeadam Test Site

IP Training Courses 2001 – Brochure

For details of how to obtain your copy please contact Nick Wilkinson at the IP

Tel: +44 (0)20 7467 7151
Fax: +44 (0)20 7580 2230
e: *nwilkinson@petroleum.co.uk*

IFEG

INFORMATION FOR ENERGY GROUP

Internet Sources and Issues Relevant to the Energy Industries – 2001 Update

Afternoon Seminar, 2 pm to 5 pm (1 pm buffet lunch), Tuesday, 7 September 2001
Institute of Petroleum, 61 New Cavendish Street, London W1G 7AR

Speakers will include: Keith Renwick, TDNet; Rev Graham P Cornish, British Library Document Supply Centre; Hazel Abbott, Electricity Association; and Catherine Cosgrove, Institute of Petroleum.

This event will be sponsored by Everetts/TDNet
www.tdnet.com

Further information from Sally Ball, IFEG Secretary
61 New Cavendish Street, London W1G 7AR, UK. Tel : +44 (0)20 7467 7115; Fax: +44 (0)20 7255 1472; e: **lis@petroleum.co.uk**

Oil in the Environment – Managing the Risk

The Stanlow Branch of the Institute of Petroleum, in partnership with the North West division of the Environment Agency (EA), organised a one-day seminar on *Oil in the Environment – Managing the Risk* and supporting exhibition, at the Merseyside Maritime Museum, Liverpool on 14 March (see picture). The event was attended by nearly 100 delegates and supported by 20 exhibitors.

This was the latest in a number of initiatives jointly undertaken by these two organisations. Jeff Pym, Director General of the IP set the scene for delegates, whilst Professor Donald Richie, Deputy Chairman of the Environmental Agency gave the keynote speech.

Whilst the pollution problems that hit the headlines tend to be the large scale ones – the reality is that enormous quantities of oil products are still allowed to drain into the ground and find their way into watercourses from a myriad of small daily incidents. The culprits are usually small businesses who store oil for energy purposes and commercial fleet operators who store fuel oils. The EA's Oil Care Campaign, which was featured at the seminar targets precisely this issue. Tougher legislation is on its way through Parliament to support their, and industry's, efforts.

Presentations were made in support of the EA by Shell UK, Arcadis, Geraghty and Miller, P&O Trans-European, Shell Global Solutions and Onyx, on their experiences and potential solutions.

EVENTS Forthcoming

MAY 2001

8–10 **Aberdeen**
Remote Intervention – An Awareness Course
Details: Society for Underwater Technology, UK
Tel: +44 (0)1224 823637
Fax: +44 (0)1224 820236
e: jeansut@sstg.demon.co.uk

8–10 **London**
Cruise and Ferry 2001
Details: Lloyd's List Events
Tel: +44 (0)1932 893861
Fax: +44 (0)1932 893893
e: cust.serv@ibcuk.co.uk
www.lloydslistevents.com

13–15 **Abu Dhabi**
Middle East Oil Strategy 2001
Details: IBC Gulf Conferences, UAE
Tel: +971 4 3369992
Fax: +971 4 3360116
e:ibcgulf@emirates.net.ae
www.ibcgulf.com

14–15 **Abu Dhabi**
Oil & Gas Pipelines in the Middle East
Details: The Energy Exchange, UK
Tel: +44 (0)1242 529090
Fax: +44 (0)1242 529060
e: s.church@theenergyexchange.co.uk
www.theenergyexchange.co.uk

14–15 **London**
Oil & Gas E-Business Summit
Details: IBC Global Conferences
Tel: +44 (0)1932 893857
Fax: +44 (0)1932 893894
e: cust.serv@informa.com
www.ibcenergy.com

15–17 **Aberdeen**
Subsea Pipeline Design Essentials for Engineers
Details: Trevor Jee Associates, UK
Tel: +44 (0)1892 544752
Fax: +44 (0)1892 544735
www.tja.co.uk

15–17 **East Kilbride**
Basic Principles and Practice of Flow Measurement
Details: National Engineering Laboratory, UK
Tel: +44 (0)1355 220222
Fax: +44 (0)1355 272431
e: mhughes@nel.uk

16–17 **Brussels**
Emissions Management Strategies
Details: Global Business Network, UK
Tel: +44 (0)20 7291 1030
Fax: +44 (0)20 7291 1001
e: info@gbnuk.com
www.gbnuk.com

16–17 **Cambridge**
New Advances in Welding Processes
Details: TWI, UK
Tel: +44 (0)1223 891162
Fax: +44 (0)1223 894363
e: meetings@twi.co.uk
www.twi.co.uk

17–18 **London**
Sell-Side and Supplier Adoption of E-Marketplaces in Oil, Gas and Chemicals
Details: IQPC, UK
Tel: +44 (0)20 7368 9300
Fax: +44 (0)20 7368 9301
e: sellside@iqpc.co.uk
www.iqpc.co.uk

21–22 **London**
Ship Agency Seminar
Details: Lloyd's List Events, UK
Tel: +44 (0)1932 893861
Fax: +44 (0)1932 893893
e: cust.serv@ibcuk.co.uk
www.lloydslistevents.com

21–22 **Nice**
Iraq Oil & Gas II
Details: Smi Global Conferences, UK
Tel: +44 (0)20 7252 2222
Fax: +44 (0)20 7252 2272
e: customer_services@smiconferences.co.uk
www.smi-online.co.uk

21–22 **London**
Angola Oil & Gas Summit
IBC Global Conferences, UK
Tel: +44 (0)1923 893857
Fax: +44 (0)1932 893893
e: cust.serv@informa.com
www.ibcenergy.com

21–22 **London**
Harnessing E-Business to Empower the 21st Century Energy Company
Details: IRM UK
Tel: +44 (0)20 8866 8366
Fax: +44 (0)20 8866 7966
e: customerservice@irmuk.co.uk
www.irmuk.co.uk

21–22 **London**
Ongoing Issues in the Decommissioning of Offshore Oil & Gas Installations
Details: IBC Global Conferences, UK
Tel: +44 (0)1923 893857
Fax: +44 (0)1932 893894
e: cust.serv@informa.com
www.ibcenergy.com

22–23 **London**
The 5th International Conference on Tanker Demurrage
Details: Asdem, UK
Tel: +44 (0)20 7493 0973
Fax: +44 (0)20 7499 5270
e: info@asdem.co.uk
www.asdem.co.uk

23–24 **Aberdeen**
Creativity and Co-operation to Build Confidence
Details: Logic, UK
Tel: +44 (0)1224 853420
Fax: +44 (0)1224 853429
e: events@agcc.co.uk

23–24 **Leatherhead**
Hazard and Risk Analysis of Electronic and Programmable Systems
Details: ERA Technology, UK
Tel: +44 (0)1372 367027
Fax: +44 (0)1372 377927
e: bev.dunham@era.co.uk
www.era.co.uk

24 **London**
Flow Assurance: Current State of the Art
Details: Society for Underwater Technology, UK
Tel: +44 (0)1224 823637
Fax: +44 (0)1224 820236
e: joycesut@sstg.demon.co.uk
www.sstg.co.uk

28–31 **Malaysia**
ASPEC 2001
Details: Petrolworld Consultants, UK
Tel: +44 (0)20 8993 7913
Fax: +44 (0)20 8752 1439
e: fiona@petrolworld.com
www.petrolworld.com

29–31 **Netherlands**
MariChem 2001
Details: Turret RAI, UK
Tel: +44 (0)1895 454545
Fax: +44 (0)1895 454647
e: c.reynolds@turret-rai.co.uk
www.marichem.co.uk

30–31 **Oslo**
Nor-Shipping 2001
Details: Seatrade Organisation, UK
Tel: +44 (0)1206 545121
Fax: +44 (0)1206 545190
e: dhurlock@seatrade-global.com
www.seatrade-global.com

31–1 June **Prague**
East–West Road Transport Conference
Details: International Road Transport Union, Switzerland
Tel: +41 22 918 27 00
Fax: +41 22 918 27 41
e: iru@iru.org
www.iru.org

31–3 June **Istanbul**
Petroleum Istanbul
Details: Hannover-Messe International, Istanbul
Tel: +90 212 2496779
Fax: +90 212 2453603
e: hmist2@hmist.com.tr

MOVES People

Helen Jones has become the first ever female Chairman of the IP Essex Branch. She has worked for SGS for 13 years. Here, she has specialised in Account Management for UK-based global customers for the downstream oil division. She has played a key role in the development of the company's International Commercial Centre based in Purfleet, Essex.

Robert Archibald has been appointed Chair of Common Data Access Limited (CDA) Council.

The Board of Noble Denton Holdings has appointed **Capt David Wells** to the Operations Board.

Dave Skuse has been appointed as Technical Support for Able Instruments & Control's range of flow products.

Avril Banks has joined UK consultancy Gibb as Business Development Manger for the company's Waste Group.

Scott Glatley is the new Managing Director of Offshore Crane Engineering (OCE), taking over from his father, Bob, who becomes Chairman.

GlobalView Software has named **Mark Powell** Managing Director Europe, Middle East and Africa.

BP has recruited **Jose Patricio**, Angola's Ambassador to the United Nations, Executive of Operations in Angola.

John Belcher is the final appointment to the new UK Gas and Electricity Markets Authority Board.

Oil services company UWA Group has named **John Hogan** Chairman and **Iain Patrick** Non-Executive Director.

Cadcentre, the UK engineering IT solutions company, has appointed **Jørgen Piene** General Manager of Cadcentre Nordic.

Greg Robinson has been named BHP Petroleum's Chief Financial Officer.

Apache has made a number of appointments relating to its pending Repsol Egypt acquisition. **James House** moves to General Manger and Managing Director of Khalda Petroleum Company; **David Gilbronson**, General Manager of Apache Poland; **David Talbot**, Operations General Manager (Oil); **Warren Ford**, Operations General Manager (Gas) at Khalda; **C Brian Boutte**, Deputy Exploration General Manager; **John Youle**, Deputy Development General Manager and **James Page**, Deputy Finance General Manager at Khalda.

Vincent Viola has been elected Chairman of Nymex. Other appointments to the Board of Directors include: **Gordon Rutledge**, **Madeline Boyd**, **Gary Rizzi**, **J Robert Collins**, **Kenneth Garland**, **Robert Steele** and **Harley Lippman**.

Gibb Environmental has appointed **Stefan Waldek** as Technical Director of the Remediation Assessment & Engineering Division.

EDF Trading, the energy trading subsidiary of Electricité de France and the Lois Dreyfus Group, has named **Douglas Lawrence** Manager of Gas Trading and **Louis Pensivy** Freight Trader to expand EDF's vessel trading business.

Orlita, the high-end precision metering pump producer, has named **Graham Cooper** as Manager.

Steve Lower has been promoted to the role of Sales Director at Sira Test and Certification, a UK provider of conformity assessment solutions.

International Pipeline Products has appointed **John Hallgren** as Sales Manager for Scotland and Norway.

Sasol has announced a new management team after its acquisition of Condea. **Mike Biesheuvel**, from Sasol, Vice President – Monomers Business Unit; **Thomas O'Brien**, from Condea, Vice President – Fatty Alchohols Business Unit; **Erik Rietkerk**, from Condea – Vice President, LAB, Parafins, Internal Olefins & Poly Internal Olefins; **Klaus Diblitz**, from Condea, Vice President – Inorganic Speciality Business; **Arno Stegk**, from Condea – Vice President Surfactants Business Unit; **Mark Lawrence**, from Sasol, Vice President – Technology, Information Technology, Safety, Health and Environmental Matters; **Johan Nel**, from Sasol, Vice President – Finance; **Marlene Hubbard**, formerly of Union Carbide, Vice President – Purchasing, Supply Chain Management and Administration. In addition, **Guido Safran** is the new President of Sasol Italy; **Chuck Putnik**, President of Sasol North America; **Reiner Groh**, Managing Director Sasol Germany and **Bernard Klingenberg**, Managing Director of Sasol Olefins & Surfactants South Africa.

Charles Phillips has been named Legal Director and Company Secretary of Wincanton Logistics.

Ofgem, the UK gas and electricity watchdog, has made three new appointments. **John Scott** is the new Technical Director and **Nick Simpson** Director of Industry Code Development. **Richard Ramsay** has been named Managing Director in charge of Regulation and Financial Affairs.

Ennio Sganzerla and **Roberto Lorato** have joined the Board of Lasmo from Eni Sganzerla as Chief Executive.

AremisSoft Corporation has appointed *Stan Patey* to its Board of Directors. He will also act as Chairman of the Audit Committee following recent organisational and management changes.

Anthony Hichens (Chairman), **Joe Darby** (new Deputy Chairman) and **Paul Murray** (Finance Director), will remain on the Board. Thierry de Rudder, Roy Reynolds, Tim Brennand and Nigel Turnbull have resigned from the Board.

Lisa Rodriguez has been appointed Vice President, Finance and Accounting, and **Burt Martin** Vice President, Law for Weatherford International.

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- The Americas
- North Sea Basin

The Oil Markets

- Crude Oil Markets
- Product Markets
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For more information please contact: Nick Wilkinson at The Institute of Petroleum
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Fax +1 (732) 494 1832
sgsredwood_houston@sgsgroup.com
Asia, Far East
Tel. +65 778 1550
Fax +65 779 5805
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