Petroleum review

NOVEMBER 2000

Asia-Pacific survey (Part 1)

- Oil supply pressure as gas use soars

Transport and logistics

- Truck manufacturers take telematics onboard

Gas

- Future prospects for world LPG
- Alliance in the pipeline

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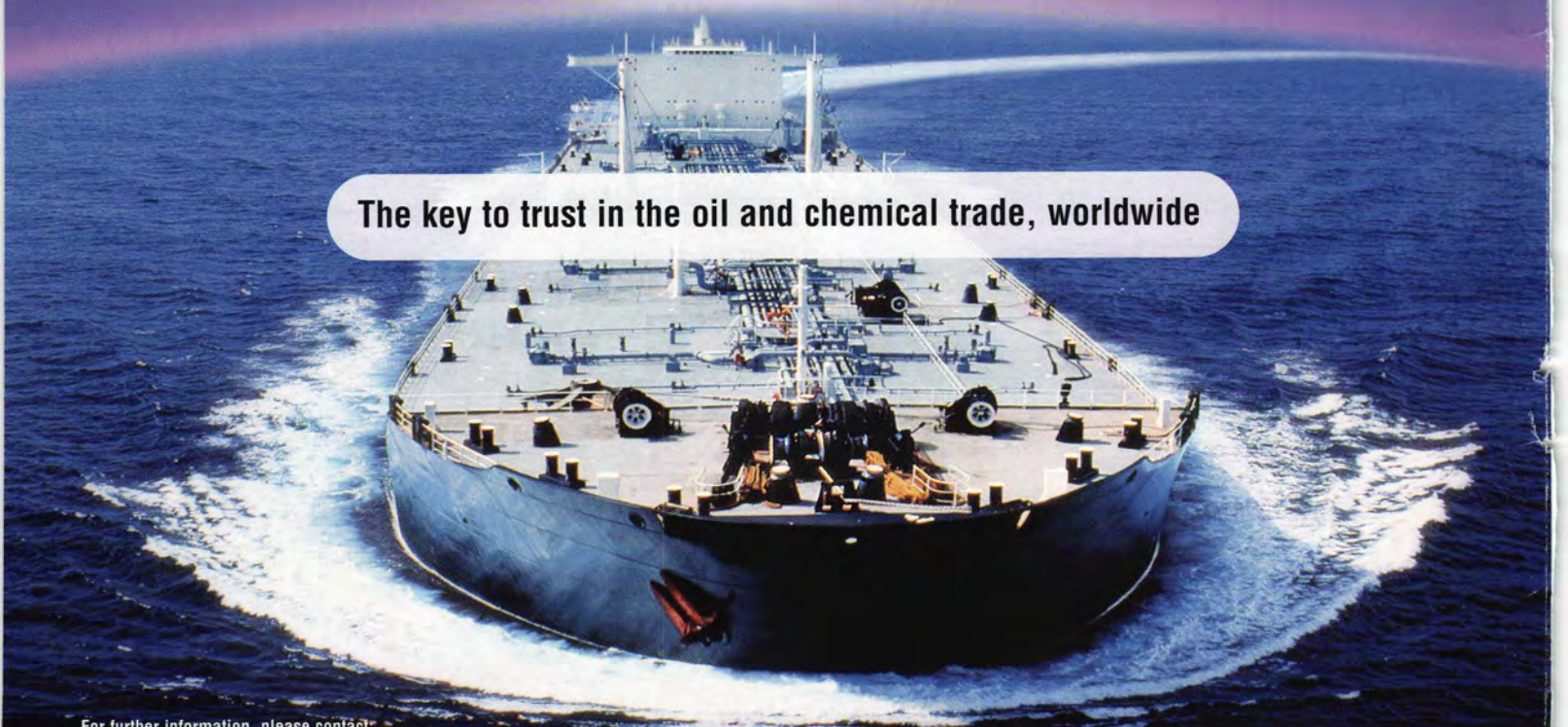

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ABBREVIATIONS

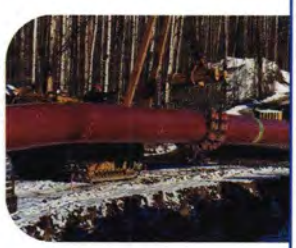
The following are used throughout *Petroleum Review*:

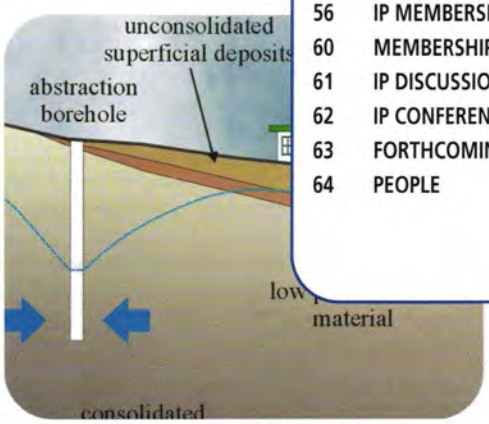
mn	= million (10^6)	kW	= kilowatts (10^3)
bn	= billion (10^9)	MW	= megawatts (10^6)
tn	= trillion (10^{12})	GW	= gigawatts (10^9)
cf	= cubic feet	kWh	= kilowatt hour
cm	= cubic metres	km	= kilometre
boe	= barrels of oil equivalent	sq km	= square kilometres
		b/d	= barrels/day
t/y	= tonnes/year	t/d	=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

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

Front cover: Much of Asia-Pacific's prospective acreage is in waters shallow enough to be accessed by jack-up rigs.
Photo: courtesy of Wapet Ltd.

inside...





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Opec production at all-time high

For the last few weeks the international price of oil has been more of a barometer of Middle East tensions than an indicator of the oil supply/demand balance. As tension mounts the price moves to the high $30s; as it eases the price drops back to the low $30s. Reports of vessel loadings appear to confirm a continuing expansion of Mideast Opec production. Meanwhile, the International Energy Agency (IEA) continues to assess demand as unchanged from earlier projections while noting that provisional August figures indicate a rebound to 2% growth in the seven key OECD markets, with the uplift virtually all for middle distillates.

The IEA's estimate of Opec production in September is that it reached 31.84mn b/d of liquids (28.98mn b/d of oil, 2.86mn b/d of NGLs). Dedicated readers of the *BP Statistical Review* will note that this means that Opec is now producing at an all-time record high, exceeding the previous record of 31.69mn b/d in 1977. Opec liquids production has exceeded 31mn b/d in only five years – 1973, 1974, 1976, 1977 and 1979. It is therefore unsurprising that Sheik Saud Nasser al-Sabah of Kuwait has publicly stated that Kuwait and most of Opec are now flat out.

Refiners are scrambling to maximise runs and rebuild stocks ahead of the winter. The key question is have customers stocked up ahead of time – which would not show up in the stock statistics? Even more importantly, will high oil prices rein in demand, causing supply to overshoot and oil prices to fall back? For the moment Mideast tensions and low primary stocks are underpinning demand. The events of late 1997 and early 1998, however, remind us that oil statistics are not timely enough or accurate enough to identify when the market first starts to turn.

If the oil markets are tight with the possibility of becoming easier, gas markets are just the reverse. That gas resources are plentiful is not really in doubt – the problem is that they are not close to where the gas is being consumed.

In the US, spot gas prices which were $2/mn BTU just a year ago, are now well over $5/mn BTU. The reason being robust demand growth (+4.3%) and slow (1%) production growth. The number of rigs drilling for gas is up 50% on the year to around 800 in the lower 48. Canada is seen as the incremental supply source and the commissioning of the new Alliance pipeline (see p14) should ease the situation. Long term the vast gas resources of Alaska and the Mackenzie delta will provide the required supply, but even a crash programme could not bring gas from the Far North to US markets in under four to five years. Other sources could be LNG imports (already rising fast), discoveries in the Gulf of Mexico or the government relenting on the environmental restraints on developing the proven gas resources of the Destin Dome offshore Florida. Meanwhile, more and more US customers recognise the environmental benefits of gas. Similarly, power companies order ever-larger volumes of gas-fired generating capacity. Nuclear power is out and there is an environmental crackdown on coal-fired plants. Power use already accounts for 15% of US consumption but by 2020 it is expected to double to 9.2tn cf.

In Europe the supply situation is much easier, but prices are set to soar. Virtually all Europe's gas is priced against oil with roughly a six-month lag. As oil prices really took off in the spring, European gas prices will firm just as the winter boosts demand. This should be very positive for North Sea gas development.

Even more enigmatic is the situation in Russia. The country has massive gas resources but still derives the overwhelming bulk of supplies from just five or six fields. Half of these are already in decline. Low prices and failure to pay restricts Gazprom's ability to develop new fields. It is already pressuring customers including the electricity generator with cut-backs and cut-offs. Historically the state has never allowed this to be effective. But if the investment capital is lacking, Russia could achieve shortage amid plenty. Western Europe has the capital and the requirement, but would the Russian's let the West invest?

All in all it promises to be a very interesting winter for the world's oil and gas companies. The other area of great interest is whether the Chevron/Texaco merger is the last of the round of mega-mergers initiated by BP when it took over Amoco. Or whether it is the first in a new round of mergers and take-overs? If the latter, who will be next? Finally, for both gas in the US and oil globally, the overhang of unused or underused capacity has gone. The question is whether under the stimulus of high prices new capacity will emerge smoothly or erratically.

Chris Skrebowski

eworld

IntercontinentalExchange has expanded its **www.intercontinental exchange.com** trading platform to include global crude and refined oil products. Trading in natural gas and power are soon to follow.

Supply chain solution provider Aspen Technology and IBM have launched a new company and digital marketplace – PetroVantage – which aims to 'help the $1.4tn worldwide petroleum industry make faster, more efficient decisions involving trading and logistics of crude oil, intermediates and refined products.' For more information, visit **www.aspentech.com**

ShipIQ has announced a new portal at **www.ShipIQ.com** designed for use by ship charterers, ship owners and brokers involved in the transport of petroleum and its products. The online chartering service is said to offer a number of integrated services fulfilling the requirement of a vessel both pre- and post-fixture, providing an 'end-to-end' logistics solution to the petroleum shipping sector. It is to be launched this autumn.

A new energy trading marketplace – TradeSpark – has been established with the link up between business-to-business company eSpeed, energy and trading companies Coral Energy, Dominion, Koch Energy Trading, TXU Energy Trading, Williams Energy Marketing and Trading Company, and brokers Cantor Fitzgerald. The site will trade natural gas, electricity, coal, weather derivatives, nitrogen oxide and sulfur dioxide emission credits. For more information, visit **www.trade-spark.com**

The World Energy Council (WEC) has launched a greenhouse gas (GHG) emissions reduction database on its website at **www.worldenergy.com**

Energy business-to-business (B2B) portal **www.eyeforenergy.com** has recently extended its online presence to include news and readers polls. The site also offers webcasts of past conference presentations and video interviews.

BHP has launched what it claims it the mineral industry's first global trading and transaction portal on the Internet – BHP Minerals Connect. The site will allow users to access and download current and historical contract information, shipping documentation, invoicing and payment status in real time.

Leeds-based GMAP recently launched an Internet-enabled business simulation system for service stations – found at **ForecourtPlanner.com** – in association with e-business company Energis *Squared*. Designed to assess and predict the business potential for retail products and business services.

In Brief

UK

The Edinburgh-based analyst Wood *Mackenzie has identified 35 probable developments in the UK Continental Shelf that may receive project sanction or commence production in the short to medium term. The developments represent about 1.6bn boe. Some 43% of the possible projects are expected to be undertaken as subsea tiebacks.*

Noble Drilling has secured the front- *end engineering and design (FEED) contract covering drilling facilities on BP's West of Shetland Clair field.*

Start-up of TotalFinaElf's North Sea *Elgin/Franklin gas condensate project is reported to have been pushed back to the end of the year following delays in hook-up and commissioning.*

Europe

Aker Maritime has secured the con- *tract to build the jacket and topsides for the NKr2.8bn Valhall water injection project. Delivery is due by August 2002.*

The European Commission (EC) has *approved a French aid package of euros 60mn over two years for small and medium-sized businesses that suffered damages due to the 1999* Erika *oil spill, writes* Monica Dobie.

Heerema Marine Contractors has *secured a contract to decommission TotalFinaElf's North Sea Froy platform and the Lille Frigg and East Frigg subsea systems.*

Bulgarian gas monopoly Bulgargas is *reported to be selling its 35% stake in a gas exploration concession near the Black Sea port of Varna to Petreko Petroleum which already holds 65%. Reserves are put at between 1.5bn and 2bn cm of gas.*

UK company Paladin recently acquired *PetroCanada's E&P interests in the Norwegian North Sea fields Veslefrikk (9%), Njord (7.5%) and Huldra (0.5%) for $76mn.*

Some 11bn cm of Norwegian gas is *reportedly to be sold to Norsk Hydro's Grane project in a bid to improve oil recovery. Deliveries of 2bn cm/y are to begin in 2004 when the North Sea field comes onstream.*

NEWS Upstream

Japan signs up for North West Shelf LNG supplies

BHP reports that the six North West Shelf LNG Sellers have signed Letters of Intent with Tokyo Gas Company and Toho Gas Company of Japan for the sale and purchase of LNG from the North West Shelf in Western Australia. The contract covers the supply of LNG over 25 years, beginning in 2004, building to a volume of 1mn t/y by 2006.

Tokyo Gas is the largest gas utility in Japan, accounting for 40% of total Japanese gas sales. Toho Gas is Japan's third largest gas utility and services customers in the industrial centres of Nagoya and Yokkaichi. Participants in the North West Shelf LNG venture are: Woodside Energy (operator, 16.67%), BHP (16.67%), BP Developments Australia (16.67%), Chevron Australia (16.67%), Japan Australia LNG (16.67%) and Shell Development (Australia) (16.67%).

It is anticipated that further Letters of Intent will be signed with several other Japanese customers in the coming months and that the final investment decision to build a new LNG production train with a capacity of up to 4.2mn t/y will be made early next year.

Study on new and improved FPSOs

Noble Denton Europe is to launch a new joint industry project that aims to improve floating, production, storage and offloading (FPSO) vessel design. It is hoped that the improved designs will optimise system safety and reliability which, in turn, will lower operating costs and capital requirement.

The 'Onstream' study will focus upon reliability analysis and system modelling of critical limit states. It follows on from a preliminary study previously performed by Noble Denton for the UK Health and Safety Executive (HSE). The project is set to begin in January 2001 and is scheduled for completion with 18 months. For further information, visit **www.nodent.co.uk/onstream**

Barents Sea oil find

A new oil discovery has been made in production licence 229 in the Norwegian Barents Sea. It is reported that the Norwegian Petroleum Directorate (NPD) regards the find as a 'positive indication that it is possible to make hydrocarbon discoveries in the Barents Sea.'

Limited testing has been carried out and Norsk Agip, the operator, is currently evaluating data in order to define the size of the find. According to preliminary evaluation by the NPD, the size of the discovery could be between 177mn and 300mn barrels of recoverable oil.

Partners are: Norsk Agip (operator, 25%), Phillips Petroleum (25%), the State of Norway (20%), Enterprise Oil (15%) and Fortum (15%).

Drilling is now moving to the next site, production licence 201 (Troms III), located some 150 km southwest of the latest discovery.

Another African oil find for Chevron

Chevron reports that the Lobito-IX well in deepwater block 14 offshore Angola has tested at 10,200 b/d of high-quality 35° API gravity oil. Geologic and engineering studies are now planned to appraise the field and assess potential reserves.

This latest discovery is located near four previously discovered fields in the block: Kuito (discovered in 1997), Benguela (1998), Belize (1998) and Tomboco (2000).

Kuito, Angola's first deepwater development, came onstream in December 1999 and is currently producing more than 70,000 b/d of oil, with further development drilling underway.

Development plans are at an advanced stage for Benguela/Belize, with tendering of a contract expected shortly for front-end engineering and design.

The Tomboco field was discovered earlier this year and had a combined test rate of more than 17,000 b/d of high-quality crude oil from two separate zones. While development plans are still in the early stages, the Lobito and Tomboco fields provide potential synergies with the Benguela/Belize development.

Chevron holds a 31% interest in block 14, Sonangol, Agip Angola and TotalFinaElf-Angola each holding 20% stakes. The remaining 9% interest is held by Petrogal.

World offshore oil and gas prospects

The offshore oil and gas industry now accounts for over 33% of world oil production and over 25% of world gas production, according a recent report from Inverness-based Mackay Consultants. Offshore oil production is forecast to increase at an annual average rate of 4% over the period 2000–2004, states the report, which should be double the rate for the oil industry as a whole. Offshore gas production is predicted to rise at an even higher annual average of 5.8%, also double the rate for the gas industry as a whole.

Most of the anticipated increases in production will come from non-Opec countries, notably in West Africa, Eastern Europe and the US. They will help to ease the current supply shortages and also reduce Opec's influence on prices in the period to 2004, comments the company. However, oil production in the North Sea is expected to peak in 2001 and decline thereafter.

The high growth rate predicted for offshore gas production is attributable to two main factors, according to the report:

- **the development of commercial markets for gas in areas such as Africa and Asia-Pacific; and**
- **consumers switching from oil and coal to gas.**

Total offshore expenditure is reported to have fallen from $10.4bn in 1998 to $10.1bn last year, and is predicted to fall even further to $9.3bn in 2000. The reason for this decline is the collapse in oil prices during 1998, which resulted in the postponement of many development projects.

With the current high oil price, however, Mackay predicts that total offshore expenditure will increase again over the next four years to a new peak of $11.3bn in 2004. Over that period, the average annual growth will be about 5%.

For further details of the 185-page report entitled *Prospects for the World Offshore Oil and Gas Industry, 2004–2005,* contact Mackay Consultants on +44 (0)1463 223200.

Sunrise to bring in substantial revenues

A $4.7bn resource development proposed for the Timor Sea and Northern Australia would generate substantial regional employment and export revenue, according to recent research undertaken by Australia's Centre for International Economics (CIE).

The Sunrise gas project is a A$2.5bn plan to commercialise the Sunrise and Troubadour gas fields, operated by Woodside and held jointly with Shell, Phillips Petroleum and Osaka Gas.

The Greater Sunrise fields, containing an estimated 9.16tn cf of gas, have the potential to alleviate concerns about eastern Australia's reliance upon maturing and declining gas fields.

As these fields straddle the border between Australia and the Timor Gas Zone of Cooperation, the emerging nation of East Timor will also greatly benefit from the project, it is claimed.

Woodside and Shell, in early 2000, signed a Letter of Intent with Methanex covering gas deliveries from the Greater Sunrise fields to a proposed A$1.5bn methanol and syngas plant near Darwin.

The initial development will bring natural gas 500 km from the Timor Sea to the Gunn Peninsular near Darwin, supplying it to the Methanex plant as well as to other customers in the Northern Territory and to Mt Isa in Queensland. Investment in new pipelines for the project is put at $700mn.

During the operations phase, it is estimated that the Commonwealth will collect around A$300mn/y from company tax, petroleum revenue taxes and substantial additional taxes from the economic growth generated by the Sunrise project.

Exports are forecast to increase by A$760mn/y. Some 3,400 permanent jobs are predicted to be created around Australia as a result of the project, which is expected to have a 20-year plus lifetime.

It is also estimated that the project will lead to tax payments of up to A$100mn/y to East Timor once full gas production is reached. It will also open up training and employment opportunities to the East Timorese people.

Gas deliveries from the Sunrise gas project are slated to begin in 2005.

In Brief

***Norsk Hydro has awarded Aker** Maritime a NKr1bn contract to fabricate the 5,500-tonne drilling module for its North Sea Grane oil field platform. Delivery is slated for May 2003.*

***The A6/B4 field in the German sector** of the North Sea has come onstream. Some 1.2bn cm/y of gas is expected to be produced from the field.*

North America

***Husky Energy is reported to have** announced that first oil from its White Rose field offshore Newfoundland is slated for 3Q2004. Recoverable reserves are put at 230mn barrels of oil.*

***Aker Maritime is understood to have** secured a contract for the fabrication of the Spar floating production platform for Kerr-McGee's Boomvang project in East Breaks blocks 642, 643, 688 and 732 in the Gulf of Mexico.*

***Shell is understood to have been given** the green light to develop the $1.3bn Na Kika project in the Gulf of Mexico which is estimated to hold over 300mn boe of recoverable reserves. The company has also secured approval to develop the deepwater Princess field, which holds potential reserves of more than 200mn boe.*

***Production from Newfoundland's** Terra Nova field is reported to have been delayed from 1Q2001 until 2Q2001. Recoverable reserves are put at 370mn barrels of oil, with production forecast to average 49,000 b/d in 2001 and reaching 129,000 b/d in 2002.*

***Start-up of Phillips Petroleum's Alpine** oil field in Alaska was briefly delayed until the end of October.*

Middle East

***NIOC has awarded Cepsa of Spain a** contract to develop an extension of the 20-year old Cheshmeh Khosh oil field in Iran, writes* Stella Zenkovich. *It has also awarded a contract to Agip of Italy regarding the Darkhovin field which is located close to the Iraqi border.*

***BG International and its partners** Consolidated Contractors Company are reported to have announced a gas find offshore Gaza. The Gaza Marine-1 well tested at 37mn cf/d of gas.*

***J Ray McDermott is reported to have** secured a contract to fabricate and*

In Brief

install additional platforms, production modules and pipelines for Saudi Aramco's Safaniya and Zuluf fields.

Russia & Central Asia

***A total of 15 blocks, covering 9,000 sq** km, are to be offered in Russia's 9th Khanty Mansiiysk round in December.*

***The Board of Canadian company** Hurrican Hydrocarbons is reported to have approved the company's management to proceed with development of the Qyzylkiya, Aryskum and Maibulak (QAM) fields in Kazakhstan.*

***Drilling on Chaivo-6, a well on one of** three fields being developed by the Sakhalin-1 consortium, is reported to have proved over 2bn barrels of oil reserves.*

***Lukoil is reported to have acquired** 20% of the Kharyaga field development project from TotalFinaElf and Norsk Hydro. The deal has yet to receive government approval.*

Asia-Pacific

***Enron is reported to be seeking gov**ernment permission to withdraw from its joint ventures in India's Panna, Mukta and Tapti fields.*

***Canadian company Husky Energy is** understood to be taking a 40% stake in the two Wenchang oil fields offshore China. The fields are expected to cost some $300mn to develop and are due onstream in 1H2002. Reserves are put at 100mn barrels, with production forecast to peak at 50,000 b/d.*

***Conoco and partners on offshore** Vietnam block 15-1 claim to have achieved a record-setting combined flow rate of 17,800 b/d of oil from the block's first exploratory well in the Cuu Long Basin. An appraisal well and second exploration well are to be drilled on the block in 1Q2001 to confirm the potential of the acreage.*

***Pakistan is reported to have signed** three contracts worth $428mn with Lasmo, OMV, Premier Shell, British-Borneo and MND covering the supply of gas to Sui Southern Gas Company from the Zamzama, Bhit and Sawan gas fields.*

***Conoco is reported to have secured a** contract to supply all gas from Natuna Sea block B to Malaysia over a 20-year period beginning in 2002.*

Stepping up North Sea safety improvements

UK oil company managers, the workforce and trade unions recently renewed their commitment to continue raising safety performance in the oil and gas industry as the next phase of a pan-industry safety initiative – Step Change – was launched.

Originally unveiled in 1997, the Step Change campaign was launched amid concerns that the previously rapid rate of decline in the number of incidents offshore had stalled. The initiative set the ambitious target of improving safety by 50% by the end of 2000. While the 50% goal has not yet been achieved, provisional accident and injury statistics for the industry published by the UK Health and Safety Executive (HSE) for the 12 months to June 2000 show a 24% improvement on those for 1997, confirming an encouraging downward trend. Some companies are reported to have achieved outstanding performances with improvements of over 80%.

The initiative now plans to target the 'behavioural aspects of safety practice' rather than specific procedures or safety concerns and to build on its achievements to date. These include:

- An increased collaboration between operators, contractors, trade unions, the workforce and the HSE to develop and share good safety practices.
- Workforce involvement via newly created networks for offshore installation managers, and workforce safety representatives where information is exchanged and spread.
- The development of a safety leadership training programme.
- Standardisation of industry induction courses.
- The launch of 'Vantage', a new passport system currently being introduced for all workers offshore.
- The dissemination of a wide range of safety material, including guidelines, information packs, leaflets, posters, videos and the creation of the Step Change website which can be viewed at **www.oil-gas-safety.org.uk**
- The organisation of a programme of workshops and exhibitions, attended by more than 600 delegates from over 100 companies.

Two recently completed publications – *Task Risk Assessment Guidelines* and *Changing Minds – A Practical Guide for Behaviour Change in the Oil and Gas Industry* – are to be distributed as part of the next phase of the Step Change initiative.

George Watkins is stepping down as Chairman of Step Change, handing over control to Paul Blakely, General Manager of Talisman.

North Sea gas assets

Tullow Oil of Ireland reports that BP and Britoil have decided to retain minority interests in two southern North Sea gas assets in acreage Tullow acquired from the co-owners earlier this year. The acreage Tullow acquired included the Thames/Hewett and Murdoch North Sea gas fields, with proven and probable reserves of 242.6bn cf of gas. The co-owners have exercised pre-emption rights to retain block 48/18c, which contains the undeveloped Bedevere field, and block 49/30b.

Asgard B onstream

The second phase of the North Sea Asgard project – Asgard B – has come onstream. Initial gas production of 7mn cm/d is expected to rise to 18mn cm/d around mid-October. At this point, Asgard will contribute some 10% of total Norwegian gas exports.

Phase 1 oil production from Asgard began in May 1999. Combined oil and gas production is forecast to last until at least 2027 based on current plans and identified reserves.

Azeri multi-well workover programme

Commonwealth Oil & Gas has commenced a multi-well oil and gas well workover programme on its wholly owned subsidiary Commonwealth Gobustan's 67.25% owned Southwest Gobustan oil and gas concession in Azerbaijan.

The first well to be worked over is a gas well in the Duvanny field in the coastal block of the Exploration, Development and Production Sharing Agreement (EDPSA) area. It is expected that between five and eight wells will be worked over before the end of the year, and that oil and gas production of at least 1,000 boe/d will be achieved by then. The well workover programme will continue into 2001.

Deepwater studies and workshops

US-company Paragon Engineering Services is currently undertaking two deepwater studies that aim to engender industry-wide information exchange while creating avenues for safe, reliable oil and gas production in water depths of more than 5,000 feet. The studies – which are being carried out on behalf of the DeepStar project and in conjunction with the US Minerals Management Service – endeavour to build on lessons learnt to date and to avoid repeated flow assurance problems encountered by operators in ultra-deep waters.

Over the next year, the company is to interview both Gulf of Mexico and UK North Sea operators to develop case studies of 20 or more projects to uncover data that will translate into more successful deepwater projects. Issues to be addressed include:

- actual case histories involving hydrate and paraffin formation;
- fluid dynamics analysis;
- production profiles;
- engineering/design;
- operations/maintenance programmes; and
- overall problem-solving efforts with input from service companies commissioned to correct difficulties.

The company is also seeking to include trends for each case study and to identify potential risk factors associated with increased water depth.

A separate flow assurance workshop has already identified several new equipment development needs for flow assurance that will help bring a step-change in deepwater development:

- Reliable downhole instrumentation – reliable data from the well becomes more critical with increased water depth.
- Subsea pig launching systems – refinements for mechanical pigs and alternative systems are needed to facilitate pig reloading operations on single flowline systems with deepwater tiebacks.
- Well control umbilicals – replacement of hydraulic control umbilicals with control buoys near the well(s) may provide more dependability and flexibility.
- Top tension risers and steel catenary risers – industry is gathering comparative data as more installations are made.
- Coiled pipe fatigue data – ongoing use of both coiled/reeled line pipe and coiled tubing is expected to provide sufficient data for evaluating possible fatigue failure risk.
- Subsea separators – subsea separation is under study by a number of industry groups and is expected to have positive flow assurance impact within a year or two.
- Subsea production pumping systems – the need for this equipment increases with each well completion in deeper waters. The first units are planned for installation offshore Brazil this year.
- Ultra-deep pipeline intervention or remediation – an array of equipment concepts is in conceptual development, including robotic taping machines and remotely operated vehicles.
- Expanded pipelay depth capability – at present, studies indicate the upper limit in pipe diameter is about 24 inches in 10,500 ft of water; smaller diameter pipe can be laid in greater water depths.

A second flow assurance workshop is currently being considered for 1Q2001. Topics for discussion include: new pipeline insulation materials; chemical developments for wax deposition control; development of pipeline repair technology for pipe-in-pipe lines; and development of a standard oil analysis testing programme for deepwater assessment. For further information contact Paragon on Tel: +1 713 570 8091.

Oil and gas business mentoring

A new scheme – the Oil and Gas Business Mentoring Initiative – has been launched in the UK in a bid to promote greater understanding between companies in the UK offshore oil and gas sector. The scheme aims to help small and medium-sized businesses (SMEs) develop a strategic view of future industry needs while at the same time giving larger organisations a better insight into the issues facing the companies who provide many of their supplies and services.

Ten major players have joined the scheme – including BP, Shell, Halliburton and Wood Group – acting as personal mentors to 20 SME businesses across the country and working in close partnerships over an 18-month period to develop ways to better align business strategies and practices.

In Brief

***Phillips Petroleum is reported to have** signed a Letter of Intent with Multiplex Constructions for the construction of a 500-km pipeline to bring gas from the Bayu-Undan project in the Timor Sea onshore at Wickham Point, near Darwin. Pipeline capacity has yet to be decided. The $1.4bn liquids phase of the project is due to come onstream in 4Q2003.*

***Soco International has taken a stake in** block 9-2 offshore Vietnam.*

Latin America

***BP has discovered a major new natural** gas field offshore Trinidad and Tobago. The Red Mango field is estimated to contain some 3tn cf of gas reserves and 90mn barrels of oil condensate, making it the largest find in the country to date.*

***Shell is reported to have discovered** what is claimed could be a 560mn barrel oil field in BC-10 block in the Campos Basin offshore the coast of Brazil. The discovery has yet to be confirmed.*

***Canadian Occidental Petroleum and** Petrobras are understood to have been awarded Colombia's El Descanso block which lies adjacent to the companies' recent 1.4bn barrel Guando oil discovery in the Boqueron block. CanOxy has also secured a 100% interest in the Villarrica and Fusa blocks, also located close to Guando.*

Africa

***Agip of Italy and the Nigeria National** Petroleum Corporation are to jointly develop the Okono and Okpho oil fields in Nigerian block OPL 91.*

***The Egyptian Prime Minister Atif** Ubayd is reported to have announced a 'huge' natural gas discovery in the Delta area of Rashid that he claims will increase the country's strategic reserves to 40bn cm of gas.*

***Devon Energy of Canada has signed** 50:50 farmout agreements on the Keta block in Ghana, the Agali block in Gabon and the Marine IX block in the Republic of the Congo with US company Anadarko Petroleum.*

***TGS-Nopec Geophysical has begun a** new non-exclusive 2D programme covering deep waters offshore Liberia.*

In Brief

UK

China Petroleum and Chemical *Corporation (Sinopec) has been listed on the London Stock Exchange with what is claimed to be the largest American Depositary Shares (ADS) offering to date of $3.4bn.*

Europe

Spain's largest power company, *Endesa, is reported to be buying its rival Iberdrola for more than euro 15bn. Between them, the two companies currently hold some 80% of the Spanish electricity market. In order to gain approval for the merger, it is understood that the companies plan to divest enough assets to allow three new entrants into the market.*

OMV has increased its stake in *Hungarian oil and gas company Mol to more than 5% for an undisclosed sum.*

North America

Seven major energy companies are *understood to have formed a new partnership in a bid to reduce greenhouse gas emissions by up to 90mn tonnes by 2010. The Partnership for Climate Action group includes Shell and BP, aluminium manufacturer Canadian Alcan, Du Pont, Canadian oil sands producer Suncor Energy and Ontario Power Generation.*

Murphy Oil is reported to have *acquired Beau Canada Exploration for C$198mn.*

BP has completed its acquisition of the *remaining shares of Vastar Resources at a cost of $83/share, or $1.5bn. BP already owned 81.8% of the company's shares following its merger with Arco earlier this year.*

Middle East

Syrian gas production is set to almost *double, rising from 4.75bn cm to 8.75bn cm/y by 2005, according to Oil Minister Mohammed Maher Jamal. He also pledged to involve an increasing number of foreign oil and gas companies in E&P activities in the region. The doubling of gas production is a race against time, writes* Stella Zenkovich, *with 3,000 MW of generation capacity to be installed from 2004–2010.*

Internet Deal for UK oil and gas data

A new website has been launched providing a comprehensive library of basic geo-scientific information on the UK Continental Shelf (UKCS). The service will also give direct links to data held in repositories all over the world, writes *Cheryl Saponia*.

Deal (Digital Energy Atlas and Library) at **www.ukdeal.co.uk** has been developed by CDA, a subsidiary of the UK Offshore Operators Association (UKOOA), in conjunction with the British Geological Survey (BGS). The site has the full support of the UK Department of Trade and Industry, who will increasingly rely on Deal as its principle means of acquiring and distributing quality-assured data on the province.

Deal is expected to save the industry millions of pounds a year. By providing quick and simple access to reliable sources of information, costly duplication in data storage will be eliminated and search time reduced. In turn, this will free up industry specialists who can then concentrate on looking for new opportunities in the North Sea and adjacent offshore waters of the UKCS.

The site will ultimately provide three services: iDeal Information Services, uDeal Data Market Place (both available now), and eDeal Unified Data Network which should come online in December of this year.

iDeal provides data on wells, 3D seismic surveys, pipelines and umbilicals, field outlines and international boundaries. By 2001 this service will be extended to provide more information, including gravity and magnetic survey outlines, bathymetry, shipping lanes, and proposed new seismic survey sites. Benefits of this system include: naming consistency and standards, and up-to-date references and attribute information from the oil companies. It is also a simple way for operators to provide metadata to the DTI and related industries.

uDeal is a comprehensive catalogue of UKCS geological and geophysical data products for data vendors worldwide. Vendors can promote and sell their UKCS data products via the Internet. Plans for field data, regional reports and environmental data are hoped to be in place by next year. uDeal's advantages are that it is a single 'route-to-market' for data vendors, there is a reduction in search time for buyers and there is a choice of data products. It also allows licensees to meet their objectives under the seismic data release guidelines.

Finally, eDeal. This is the gateway to a network of distributed data repositories allowing companies to store, access, distribute and trade geo-scientific data on an 'entitlement' basis. The first major use of the system will be for post-stack seismic data. eDeal will eliminate the cost of duplicated data storage, will allow rapid access to all data relevant to investment decisions and thus enable licensees to meet their data obligations via the CDA/DTI Deed.

Aerial alliance for North Sea oil spill response

Oil Spill Response and Briggs Marine Environmental Services have joined forces to provide a combined aerial dispersant spray and surveillance service to oil industry operators in the North Sea.

Southampton-based Oil Spill Response already operates a Hercules L382G aircraft with what is said to be the world's largest aerial spray system. The new arrangement will enhance this with rapid response aircraft that will provide a smaller, but effective, first strike capability from Inverness and Coventry airports that has been endorsed by both the DTI and MCA.

Briggs Marine has a specialist surveillance aircraft fitted with state-of-the-art observation and recording equipment on permanent standby at Inverness.

Chevron/Texaco merger

Chevron and Texaco have agreed the $100bn merger of their operations to create ChevronTexaco Corporation. The combined company expects to achieve annual savings of at least $1.2bn within six to nine months of the merger's completion. The bulk of the savings, some $700mn, are expected to come from more efficient E&P activities. A further $300mn is to be saved from the consolidation of corporate functions, and $200mn from other operations. It is also planned to improve capital efficiency by funding the best growth opportunities of Chevron and Texaco, resulting in improved return on capital employed over time. Approximately 4,000 of the 57,000-strong combined workforce is expected to be made redundant.

ChevronTexaco will have reserves of 11.2bn boe, daily production of 2.7mn boe, assets of $77bn, and operations throughout the world. In the US, it will be the third largest producer of oil and gas, with production of 1.1mn boe/d, and will hold the nation's third largest reserve position with 4.2bn boe of proved reserves.

Dave O'Reilly, Chevron Chairman and Chief Executive Officer, will serve as Chairman and CEO of ChevronTexaco, which will be headquartered in San Francisco. Peter Bijur, Texaco Chairman and CEO, will become a Vice Chairman of the combined company, with responsibility for downstream, power and chemicals operations. Richard Matzke, Chevron Vice Chairman for Upstream Operations, will retain those reponsibilities in the new venture.

The merger is subject to approval from both companies' shareholders and government agencies, including the US Federal Trade Commission which is expected to require certain divestitures in the US downstream arena in order to address market concentration issues.

Takeover bid for Fletcher Challenge Energy

Shell has stated that it plans to continue with its attempt to take over New Zealand's Fletcher Energy Challenge despite its initial $1.63bn bid with Apache being rejected by the New Zealand Commerce Commission, the country's competition regulator.

The original proposal covered the acquisition by Shell of all Fletcher's assets in New Zealand and Brunei. The New Zealand assets – Maui, McKee, TAWN (Tariki, Ahuroa, Waihapa and Ngaere), Kaimiro, Ngatoro, Mangehewa, Pohokura and Tuihu fields – have total proven reserves of 177mn boe and total expected reserves of 299bn boe. The Brunei assets – Maharaja Lela, and blocks A and CD – hold total proven reserves of 35mn boe.

Downstream interests, such as the Challenge Petroleum retail network, the oil products terminals in New Plymouth, Timaru and Brisbane and the equity in the New Zealand Refining Company are proposed to be subsequently sold on to a new independent entity. Also to be divested would be Fletcher's interests in the Kupe field, in Kapuni Gas Contracts Ltd and in Fletcher Challenge Gas Investments Ltd.

It was also proposed that Apache take over control of Fletcher's exploration and production assets in Canada and Argentina.

New website targets new recruits

Oilcareers.com is a new online service for jobs in the UK offshore oil and gas industry, reports *Cheryl Saponia*. Job seekers can gain direct free access to company vacancies, and employers can advertise these vacancies at a low cost. The site also allows job candidates to post their CVs free of charge and with total confidentiality. Candidates are automatically alerted to any new vacancies that match their skills and they can then immediately apply online. The site also has links with other relevant websites, it has an online learning log and lifetime learning workbook and there is interactive training available. In addition, there is an advice and information helpline to assist users further.

The system is claimed to significantly improve the efficiency of the recruitment process. From placing an advert, through to the filtering and responding to applicants, everything is handled online at the click of a button.

Graeme Munro from Oilcareers said: 'Our system is proving to be an extremely effective yet confidential way for people to improve their employment situation'. Existing clients range from operators such as Shell, through large service companies, to small consultancies and employment agencies. The website also has the endorsement of the trade unions.

In Brief

Russia & Central Asia

***Following the crude oil export duty** hike on the back of high oil prices, the Russian Government has increased refined product export duties by euro 7/t, reports United Financial Group.*

***UK-based exploration company Sibir** Energy has joined forces with Moscow's Central Fuel Company to create the Moscow Oil Company.*

***Gazprom has posted a strong increase** in both sales revenue ($8.3bn; up 44% from 1H1999) and profitability ($672mn, up 343%) for 1H2000, reports the United Financial Group.*

***Lukoil and Tatneft have acquired over** 40% of the voting shares in the 200,000 b/d Moscow refinery and a similar stake in Mosnefteproduct – the largest oil retailer in the region – reports the United Financial Group.*

***Yukos has acquired a 20% stake in the** Eastern Siberian Oil Company from the pipeline construction company Rosneftegazstroy, according to the United Financial Group's* Russia Morning Comment. *Eastern Siberian Oil Company is a minor producer with 5bn barrels of reserves.*

***US company Chevron has acquired a** further 5% stake in Tengizchevroil, pushing its total shareholding to 50%, reports* Stella Zenkovich.

***Russian oil company Yukos has** acquired a 19.9% stake in the VSNK oil company of eastern Siberia as a prelude to its gaining full control and constructing an oil pipeline to China, reports* Stella Zenkovich.

Latin America

***Texaco is reported to have sold its one-**third share of Trinidadian company Trinmar to government-owned Petrotrin for T$115mn.*

Africa

***Sonatrach of Algeria and Cepsa of** Spain are setting up a joint venture responsible for a feasibility study for a new, direct gas pipeline linking Algeria with Europe via Spain. Algeria already has two such gas pipelines, writes* Stella Zenkovich, *but both are 'indirect' going via Tunisia and Morocco.*

In Brief

UK

P&O is reported to have signed an *agreement with Shell UK to jointly redevelop the former Shell Haven refinery site into to a major container facility at a cost of up to £500mn.*

Europe

A European Commission report on its *Auto-Oil II programme, which aimed to clean up fuel to match existing tighter standards for vehicle engines, has claimed that the regulations are having results, reports* Keith Nuthall. *It claims that regulated pollutants, such as nitrogen oxide, are expected to have fallen to 20% of their 1995 levels by 2002, leading to a marked improvement in air quality. There are still problems, however – the report states that additional work is required to tackle pollution from particulate matter, ozone and carbon dioxide.*

Iberdrola, Eni and Galp Energia have *joined forces to develop a trading and marketing company to operate in the recently liberalised Spanish gas market.*

A new network of forecourt convenience *stores has been launched by Statoil Ireland under the brand name Fareplay. The company is investing over IR£80mn over four years in its Irish Fareplay network.*

North America

Canadian company Enbridge is to *expand capacity on its main prairie pipeline system at an estimated C$120mn due to strong markets for oil in western Canada, reports* Monica Dobie. *The company is to start work on the second phase of its Terrace Expansion project, which will involve the construction of 123 km of new pipeline between its terminals in Hardisty, Alberta and Kerrobert, Saskachewan. If approval for the project is given by federal government regulators before the New Year, work on the expansion project will begin in 2H2001, with operations starting in 1H2002.*

Middle East

If a six-month feasibility study proves *positive, Shell and Tehran have agreed a joint venture to build a 70,000 b/d gas-to-liquids plant in southern Tehran*

EC Ministers urged to take action on fuel prices

European Union heads of government, meeting recently in Biarritz, France, have broadly backed a detailed European Commission plan aimed at protecting European industry from sharp fuel price rises in the future, reports *Keith Nuthall.*

A sign of how worried Brussels has been by the fuel price protests that have rocked many Member States, the plan proposed that Ministers back new powers allowing the EU to intervene centrally in European oil markets 'to limit price volatility, in order to combat speculation.' This would include building up EU oil stocks, that could be released in the event of a steep price hike.

Governments also agreed to resist the temptation to offset oil price rises by unilaterally cutting taxes in the future. However, a further measure, to harmonise EU excise duties, 'in particular by raising minimum rates,' did not receive the unanimous support for such an idea to be carried forward. The UK in particular was opposed to an extension of EU authority into its fiscal authority.

Generally, the plan sought to help hauliers and other fuel users. It suggests improving the organisation of the fuel market, giving users better predictions of future price movements. Heads of government also backed calls to improve relations with Opec countries, again to improve its intelligence on price movements.

The meeting also backed boosting cooperation with Russia to increase fuel supply alternatives, in particular by helping Moscow rehabilitate its oil and gas production and transport installations.

Final calls for EC Energie funding

The European Commission is shortly to announce the final calls for the non-nuclear energy component of the Fifth Framework Programme – Energie – with deadlines of February, March and December 2001. More than euro 550mn of funding is available, spread over the remaining years of the programme (2001 and 2002).

Following a major review of the work programme, Energie is now placing an increased emphasis on R&D and demonstration which relates more closely to the programme's main priorities – the Kyoto commitment to reduce emissions of the major greenhouse gas emissions and other pollutants by 2010 and to increase the share of new and renewable energy sources in the EU's energy balance.

The revised work plan is divided into two parts. The major part will comprise 'targeted actions' in the following fields: fuel cells and hydrogen; biomass; integration of renewables; clean urban transport and clean transport fuels; 'eco-buildings'; gas-fired power generation; energy storage; and photovoltaics. The smaller part of the programme will see a continuation of all the priority areas from the previous work programme.

For further information, contact the Energie Helpline on Tel: +44 (0)161 874 3636 or e:energie@enviros.com

EU proposes tighter emissions standards

European Union Ministers have been asked to approve new tighter emission standards for motorcycles and three-wheeled vehicles, writes *Keith Nuthall.* A proposed directive from the European Commission has suggested cutting maximum pollution levels of hydrocarbons and carbon monoxide for four-stroke motorcycles by 60% and emissions of carbon monoxide (CO) from two-stroke motorcycle by 30% by the year 2003. The Commission has also announced that it intends to tighten emission limits further for motorcycles in the year 2006.

Major Omani pipeline

Mott MacDonald has been appointed by Dodsal & Co as engineer under its contract with the Oman Gas Company for the design, procurement, installation and commissioning of a 700-km long, 24-inch diameter gas pipeline linking Saih Rawl in central Oman to Salalah in the south. The project is expected to complete by mid-2002.

Central Oman currently has a surplus of non-associated gas in existing fields. The $189mn pipeline project aims to utilise this resource to provide fuel for existing and new infrastructure in the south of the Sultanate, including a new power station to be built in Salalah's Raysut area.

Shell confirms commitment to GTL

Shell, the Egyptian General Petroleum Corporation (EGPC) and the Egyptian Oil Ministry have agreed on the terms of a development protocol for a 75,000 b/d gas-to-liquids (GTL) conversion plant in Egypt. The facility will use Shell's Middle Distillate Synthesis (SMDS) process and at least one LNG train to develop part of Egypt's uncommitted gas reserves. The SMDS facility could be in operation by late-2005, with the LNG plant onstream by mid-2004, reports Shell.

Shell is also conducting a feasibility study for a similar 75,000 b/d conversion facility in Trinidad and Tobago. The plant would require a gas intake of some 600mn cf/d – roughly equivalent to the gas input of a large LNG train. Plans are to put the plant into commercial operation by 2005/2006, doubling the level of middle distillate exports from the country.

Similar studies in Indonesia and Iran were announced earlier this year. The total potential development costs for Shell and partners for new GTL plants and related facilities now stands at more than $6bn over the next 10 years.

Shell already has extensive operational experience with SMDS technology which produces fuels that are free from aromatic and sulfur emissions. It currently operates a 12,000 b/d facility in Bintulu, Malaysia – the only commercial-scale plant of its type currently in existence. The company reports that technological innovation – in particular a breakthrough in synthesis catalyst performance – in combination with economies of scale and the commercial exploitation of Bintulu, has 'substantially reduced capital expenditure requirements to around $20,000 b/d, making a 75,000 b/d plant an attactive proposition, even at crude price levels of around $15/b.'

Synthetic fuel specs

Syntroleum reports that it has produced and shipped synthetic fuel made to JP-5 specifications under a purchase order from the Naval Surface Warfare Centre Crane Division, under sponsorship from the US Navy Office of Naval Research (ONR). The Navy project is to explore alternative fuels for fuel cell applications, in this case a synthetic version of a Navy logistics fuel JP-5. The fuel, which contains virtually no sulfur, aromatics or metals, is to be tested in a fuel cell system manufactured by IdaTech. The absence of contaminants such as sulfur is reported to simplify the fuel cell design which, in turn, reduces operating costs and size.

Previous tests of similar Syntroleum synthetic fuels in IdaTech fuel cell systems are claimed to have demonstrated performance that met or exceeded that of conventional petroleum fuels. 'Greater hydrogen density for the synthetic fuels was manifested by a significant increase of hydrogen yields from the reformers to produce between 4% and 11.6% more electricity than from conventional fuels,' states Syntroleum.

New ultra-low sulfur petrol

TotalFinaElf reports that it is to introduce a new ultra-low sulfur petrol to the European market at the beginning of 2001. Designed for use in passenger cars with new lean-burn direct-injection engines, the new fuel contains less than 0.001% of sulfur, or 15 times less than petrol currently sold on the market.

The new fuel will initially be sold at 100 Total and Elf service stations located in principal urban areas. Sales are planned to be progressively extended in all of France and Europe as the new generation of direct injection vehicles enters the market.

New Sweetwater GTL plant partner

Ivanhoe Energy has signed a Letter of Intent to participate as a partner in Syntroleum's 10,000 b/d Sweetwater gas-to-liquids (GTL) project currently under development on the Burrup Peninsular in Western Australia. Ivanhoe has funded $2mn for front-end engineering and other project development costs and will acquire a 13% equity position in the project for an additional $19mn.

Ivanhoe is also involved in 'advanced discussions' with national petroleum companies to convert stranded gas reserves into sulfur-free transportation fuels using the Syntroleum GTL process. The company's investment in the Sweetwater project will provide it with a strategic advantage in executing this plan.

In Brief

that will produce middle distillates. Gas will be sourced from the South Pars offshore field. Both NPC and NIOC will participate in the project.

***A total of 11 groups have expressed an** interest in the tender for the $870mn engineering, procurement and construction contract for the planned 75,000 b/d Sohar refinery in Oman. The plant is scheduled to come onstream in May 2004, writes* Stella Zenkovich.

Russia and Central Asia

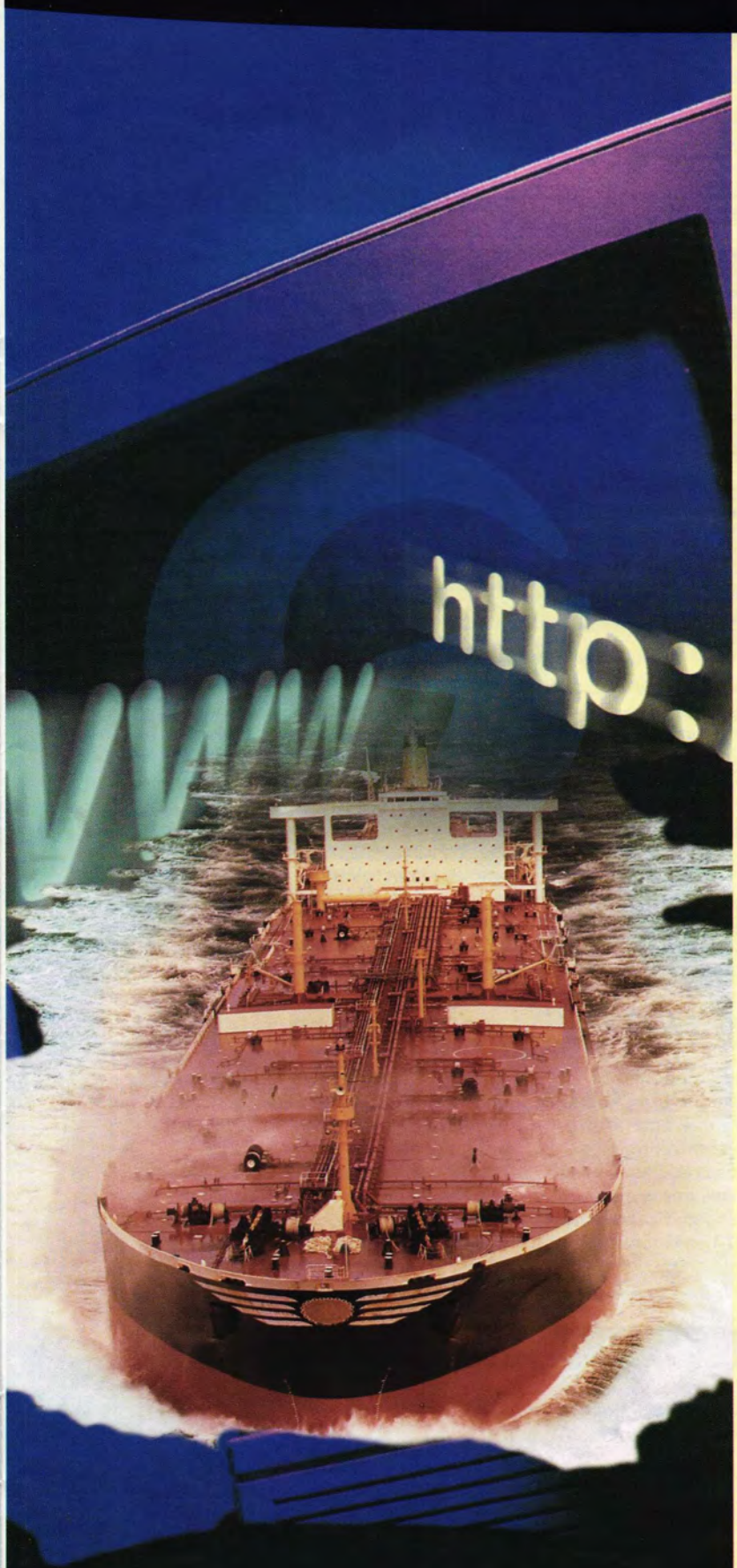
***Russia's Federal Energy Commission** has granted a 22% export tariff increase to Transneft which will be used to complete the Chechnya bypass pipeline, reports the United Financial Group's* Russia Morning Comment. *Previously, Transneft raised its tariffs in August 2000, by 12%, to finance the construction of the Baltic pipeline.*

***Lukoil has announced plans to acquire** an 85% stake in Norsi-oil, a holding company for Russia's 371,000 b/d Nizhny Novgorod refinery and two local oil retailers. The company has committed itself to investing $500mn in a refinery upgrade if successful in the deal, according to the United Financial Group's* Russia Morning Comment.

***Slavneft is reported to be planning to** open an office in Kiev and to develop a network of forecourts across the Ukraine. The company is to have five service stations in operation in the country by the end of the year, rising to between 75 and 100 sites over the next three years.*

***Lukoil has swapped some of its petro**chemical assets for the gas processing plant of Sibur in the Perm region, reports the United Financial Group's* Russia Morning Comment. *The acquisition of Permneftegazpererabokta will enable Lukoil to gain entry to Gazprom's main pipeline network – only one step away from the end-user markets in Russia and abroad, says United Financial Group.*

***OMV of Austria has acquired 25 service** stations in Bulgaria from local fuel retailer Petrol AO, writes* Stella Zenkovich. *The company already had three sites in operation in the country and plans to build its network to 35 sites by the end of 2000, and 70 outlets by 2005.*



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In Brief

Asia-Pacific

The Chinese Government has approved *proposed plans by ExxonMobil to develop a multibillion dollar refinery expansion and petrochemical complex with Fujian Petrochemical Company Ltd (FPCL) at the FPCL refinery in Fujian Province, China. The Fujian venture will be a partnership between FPCL (50%), ExxonMobil (25%) and Saudi Aramco (25%).*

Sakhalin Island Governor Igor *Farkhutdinov has stated that Sakhalin is to supply gas to Japan from 2005, writes* Stella Zenkovich. *Japan currently buys some 54mn tonnes of LNG, worth $7bn/y, from other sources.*

Shell is reported to be planning to *close 50% of its 80-strong network of service stations in Tasmania over the next five years as part of a rationalisation programme of its operations in the country.*

Africa

Sasol and Chevron have signed the *final agreements for the creation of a new company – Sasol Chevron Holdings – as part of their 50:50 global gas-to-liquids (GTL) joint venture. The new company plans to implement GTL ventures worldwide, anticipating investments in excess of $5bn over the next five to 10 years.*

Unipetrol Managing Director Adhaji *Ja'afaru Paki has attributed the delay in the take-off of the company's 10,000 b/d refinery in Sierra Leone to the political instability of the West African country, reports* Stella Zenkovich.

NEWS Downstream

Wincanton wins major logistics contract

Supply chain company Wincanton Logistics has secured a five-year contract extension with Texaco. Worth some £90mn, the contract is claimed to be one of the largest to be awarded by an oil company to a logistics provider in the UK to date.

Wincanton, which has held the contract with Texaco for nine years, provides a next-day distribution service from 14 Texaco supply points to service stations and commercial customers across the UK. The logistics company currently handles some 3.8bnl/y of fuel products on behalf of Texaco.

The contract will see the continuing renewal of the vehicle fleet, including 15 new 6x2 ERFs that will take advantage of the new weight increase to 44 tonnes from February 2001. Wincanton is also introducing Road Relay – a new in-cab electronic vehicle management system – into the fleet to reduce fuel and maintenance costs. The system will provide detailed reports on driving styles – from revving to braking – with the aim of optimising driver performance.

Canada to triple ethanol fuel production

The Canadian Government has promised to increase the use of ethanol fuel production to three times its current production rate, bringing it to 750mn litres per year, reports *Monica Dobie.* Ethanol, an expensive petrol substitute, produces significantly lower carbon dioxide (CO_2) emissions than conventional petrol.

The plan comes as part of a proposed government strategy to tackle global warming by reducing CO_2 emissions by 65 mega-tonnes a year. However, with a federal election looming, many people believe the fuel plan is a ploy to win the farmer vote by introducing large production schemes for corn – the main ingredient of ethanol – also allowing farmers easy and cheaper access to ethanol fuel derived from it.

UK Deliveries into Consumption (tonnes)

Products	†Aug 1999	*Aug 2000	†Jan–Aug 1999	*Jan–Aug 2000	% Change
Naphtha/LDF	285,409	157,468	2,138,717	1,443,098	–33
ATF – Kerosene	923,626	986,505	6,308,796	6,716,329	6
Petrol	1,809,271	1,815,198	14,204,853	13,957,861	–2
of which unleaded	1,585,314	1,682,304	12,107,022	12,835,448	6
of which Super unleaded	28,216	34,370	235,935	265,670	13
of which Premium unleaded	1,557,098	1,647,934	11,871,074	12,569,778	6
Lead Replacement Petrol (LRP)	0	132,894	0	1,122,413	–
Burning Oil	201,879	218,324	2,288,512	2,390,874	4
Automotive Diesel	1,243,496	1,295,368	9,970,029	10,221,685	2.5
GasOil/Marine Diesel Oil	528,563	556,453	4,492,082	4,582,367	2
Fuel Oil	123,562	110,975	1,393,198	1,024,118	–26
Lubricating Oil	60,916	65,005	522,823	538,613	3
Other Products	660,467	701,326	5,634,944	5,479,753	–3
Total above	5,837,189	5,906,622	46,953,954	46,354,698	–1.3
Refinery Consumption	519,041	470,555	4,161,303	3,505,598	–16
Total all products	6,356,230	6,377,177	51,115,257	49,860,296	–2

† Revised with adjustments * Figures dated from Feb 2000 onwards are the final figures as supplied by reporting companies, they are no longer provisional figures

Alliance in the pipeline

Starting in October, 1.325bn cf/d of natural gas began to flow 2,988 km from Fort St John, British Columbia, to Chicago, Illinois, via the newly-constructed Alliance Pipeline. It is the culmination of a dream to build Canada's first, large intercontinental pipeline from scratch in over 40 years. In between the vision and the reality, however, was an Olympian course of hurdles, reports *Gordon Cope*.

The saga began in 1986, when Canada's federal and provincial governments deregulated the gas industry, allowing the sector to sort out the market for itself. The task was easier said than done. On the one side were the producers, several dozen independent and major petroleum companies based in Calgary, who wanted to get their gas to the huge markets in Eastern Canada and the US. On the other side were the pipelines. Nova owned most of the gas transmission in Alberta, and TransCanada Pipe Lines held a near-monopoly on interprovincial transportation.

In between was a bottleneck. British Columbia and Alberta produced around 12bn cf of gas, but only half of that could be shipped out. The rest had to be sold locally – at a discount. The discount is known as the 'basis differential,' or the difference in price between what the gas would fetch in the US if there were sufficient export pipeline capacity, and what it fetches within the province. 'For years, the Alberta basis differential has been in the $1 range,' explains Tom Ebbern, an analyst with Newcrest Capital.

From a producer's point of view, current production was suffering from a lower price, and they couldn't get new discoveries out of the ground. 'By one calculation, there was about $3bn (annually) in lost revenues,' says Norm Gish, Chairman, President and CEO of Alliance Pipelines.

Seeking a solution

The obvious solution was to get rid of the bottleneck, but building a major new pipeline into Eastern markets was a multi-billion dollar investment, one that, given the uncertainties of a deregulated industry, major pipeline companies were reluctant to undertake.

The impasse – too much gas and not enough transportation – continued for several years, until one fateful day in the summer of 1994 when Glen Perry, then a gas marketer at Direct Energy Marketing, sat down with friends to dis-

cuss the problem. 'We thought, until you deregulate pipelines, you still had a monopoly,' explains Perry, now Alliance's Vice President of Business Development. 'I took a napkin out and drew a picture of the gas line from Fort St John to Chicago. The current [sinuous] route went through Winnipeg. If you drew a straight line, however, it was 15% shorter.'

Shortening the line wasn't enough – Perry's plan needed another angle. In the winter of 1994 he pulled the idea off the shelf and had a second look. 'Gas and natural gas liquids (NGLs) were going to the same market in Chicago,' reasoned Perry. 'If they're both going to the same market, why build two lines? Why not one?'

A combination of advanced technology, rich gas, a shorter route – and an opportunity to do an end run around the big pipelines – appealed to independent producers. They set up a C$2.5mn kitty to study its feasibility.

By the end of 1995, the study was finished. 'We showed that there was a supply and a market, that the engineering feasibility was straightforward, the costs were reasonable, and the regulatory environment favourable,' says Jack Crawford, Vice President of Regulatory Affairs at Alliance.

Green light for project

Almost two-dozen petroleum companies stepped up to form a limited partnership. On 10 June 1996, the Alliance project was underway.

Shortly after the announcement, Alliance brought Norm Gish onboard as Chairman. 'The advantages of the project were that it had the latest technology and higher [line] pressure,' he recalls. 'The disadvantage was that we had to come up with a concept in which we spent new investment dollars, but still competed with partially depreciated pipelines.'

Getting firm commitments from producers to ship on the proposed line was critical to the plan. In late 1996, Alliance held an 'open season', an eight-week period in which the company formally announced its intention to build a pipeline and invited petroleum companies to ship a portion of their production under a 15-year, take-or-pay contract.

According to Gish, the major pipelines were skeptical that Alliance would ever succeed in getting necessary commitments. 'They underestimated the resolve of the producers to have a competitive choice.'

In fact, by the end of eight weeks, Alliance had managed to line up 1.5bn cf of gas, more than enough to proceed with financing. Based upon a 30/70 equity/debt ratio, the partners put up $900mn, and 47 banks around the world loaned the remaining $2.1bn.

Getting all onboard

Before a single shovel of dirt could be moved, however, Alliance had to bring three very divergent stakeholders onside – the regulators, the environmentalists, and the property owners and communities that controlled the right-of-way.

By Alliance's calculations, there were 5,860 landowners, 200 towns, 130 municipal districts, 44 counties, three provinces and four states spread across the entire length of the route. One of the first tasks was to contact the landowners and explain that they would be compensated for the right-of-way, as well as for losses. 'If we dig up their crop, we'd buy it,' says Jay Godfrey, Manager of Communications for Alliance. 'If productivity is not restored, we'd make up the difference.'

From November 1996 to February 1997, Godfrey and his staff drove down the pipeline right-of-way and held 32 open houses. 'Our land manager was able to strike negotiated agreements with over 99.5% of landowners,' says Godfrey. 'We wanted to treat them with respect and honesty and treat them fairly.'

Concurrent with landowner negotiations, Alliance addressed environmental concerns. The proposed route of the pipeline crossed scores of streams, wetlands and forest. According to Canadian and US law, all lands affected by construction activities must be cleaned up and rehabilitated. 'We decided we were going to be a different kind of pipeline,' says Godfrey. 'We wanted to involve the environmental folks. We invited them into our boardroom and had them help us define what we have to do for our environmental impact statements and mitigations and remedial tasks.' Over three dozen groups participated. 'As a result there was only one environmental opposition at the NEB hearing.'

Because it spanned an international border, the Alliance Pipeline was subject to regulatory approval processes both in Canada and the US. In Canada, the process primarily involved the National Energy Board (NEB) and the Canadian Environmental Assessment Agency (CEAA). In the US, it primarily involved the Federal Energy Regulatory Commission (FERC).

Alliance Pipeline filed an application with the FERC and a preliminary submission with the NEB in December 1996. Over the course of the first half of 1997, the company submitted half a dozen thick binders, detailing a host of requirements, including technical plans, environmental plans and socio-

Pipeline stats

The Alliance Pipeline is a $3bn natural gas pipeline system from northeastern British Columbia to Chicago. It is designed for an initial throughput volume of 1.325bn cf/d of high-energy natural gas at a maximum allowable operating pressure of 1,740 psi.

Investors in Alliance Pipeline Limited Partnership, Alliance Pipeline LP and Aux Sable Liquid Products LP include affiliates of:

- Duke Energy Corporation – 9.8%
- Enbridge Inc. – 21.4%
- Fort Chicago Energy Partners LP – 26.0%
- The Coastal Corporation – 14.4%
- The Williams Companies, Inc. – 4.8%
- Westcoast Energy Inc. – 23.6%

There are three primary investors. Canadian-based Alliance Pipeline Limited Partnership, own and operate about 2,257 km of lateral and mainline pipe and facilities in Canada. American-based Alliance Pipeline LP, own and operate about 1,429 km of pipeline and facilities in the US. American-based Aux Sable Liquid Products LP, own and operate the NGL extraction and fractionation facilities located in Channahon, Illinois. The facilities will initially process up to 1.6bn cf/d.

The Canadian system includes:

339 km of 42-inch and 1,220 km of 36-inch diameter steel pipe.

36 receipt points connecting with lateral pipelines totaling about 698 km.

Seven mainline compressor stations of about 31,000 to 40,000 hp each, spaced about 193 km apart.

Mainline block valves spaced about every 32 km apart.

The US portion of the system now consists of:

- 1,429 km of 36-inch diameter steel pipe.
- Seven compressor stations of about 31,000 hp, spaced about 193 km apart.
- Mainline block valves spaced about every 32 km apart.

economic impact assessments.

Up until this time, Alliance's competitors had remained relatively mute, but soon made their opposition known. 'The existing pipelines threw their weight behind the battle,' says Godfrey. 'After filing our applications, the opponents filed information requests.' There were over 3,500 individual questions, some highly technical and complex. 'We had 10 days to respond over the Thanksgiving long weekend in 1997,' says Godfrey. 'We worked around the clock, night and day. When we filed, it blew the opposition away.'

While the FERC is primarily paper-filing, the NEB requires an open hearing, which lasted 78 days in the winter of 1997–1998. 'It was a long, slow regulatory process,' comments Gish. 'We were in good shape; we had producer, financial and market support. We were well received at the NEB and FERC. They wanted to see more competition, more negotiated approaches between pipelines and shippers.'

As the fortunes of Alliance progressed, the original producer-backers gradually divested their equity positions in the project. 'They said "We know E&P best – we want to stay producers,"' recalls Godfrey. The majority of Alliance ownership evolved toward pipeline operators, including Enbridge, Westcoast and Williams (**see box piece**).

Finally, in November 1998, Alliance was given the go-ahead to build the pipeline. 'The approval was a bit anti-climactic,' recalls Crawford. 'At that point in time, we had entered into the next phase.' It was time to put some steel into the ground.

Getting to work

In mid-February 1999, construction began with pre-clearing of the route in Northeast BC. Four contractors – OJ pipelines, Marine Pipelines, Washuk Pipelines and Parkland Oilfield – handled the construction of the Canadian mainline and laterals, and seven contractors handled the building of the mainline in the US.

At the height of construction, a combined crew of almost 7,000 people in both Canada and the US were laying pipe simultaneously at 10 spreads, or work sites. 'Construction was an incredibly efficient system,' says Gish. 'It was a moving assembly line. You had to have excellent scheduling and timing; removing the topsoil, digging the ditch, laying pipe, welding pipe, laying it in.'

Alliance used the strongest pipeline steel commercially available. 'When I was designing pipelines 20 years ago, they were using X-42 steel; that's steel with a structural strength of 42,000 psi,' says Crawford. 'Back then, they didn't have the ability to control the chemistry and rolling characteristics. Now, they have X-70 steel; 70,000 psi.'

The last weld, on 2 August 2000, ushered in the commissioning phase of the project.

According to Godfrey, commissioning is a transitory phase between construction and operating in which the company's 250 staff ensure that everything works. 'We have compressors every 120 miles, and a mainline block valve every 20 miles. The block valve is a big ball valve equipped with temperature and pressure sensors. If there's a variance from what it should be, the valve defaults to close.'

After all the compressors and valves were checked out, the line was purged of air. Over the course of two months, each section was filled with gas, forcing the air to vent into the atmosphere. The line pack – the amount of gas that the line can hold at full pressure – reached 8.2bn cf.

'We have a high pressure, rich-gas stream and the latest in compressor technology,' explains Crawford. 'There's nothing that can touch it in efficiency. We'll be the most efficient major gas pipeline in North America. Economically, we're equally competitive.'

Even though the Alliance pipeline moves 1.3bn cf/d of gas, about 10% of the total, it and other expansions on existing systems have already had an immense effect. 'The impact is huge in terms of helping raise the Alberta reference price up,' says Ebbern. 'Now, we've got too much export pipe, and it's caused the primary differential between Alberta and the US to shrink to around 30 cents.'

In addition, a thirst for environmentally-friendly gas by electrical generators in the US has doubled the price in the last year. The fact that producers can export more gas into such robust demand is one of the major reasons that the province's petroleum companies are having a banner profit year.

But it also means that consumers are paying more for their natural gas at home. In an effort to relieve the financial burden, the government of Alberta recently announced a plan to refund C$300 to every taxpayer in the province.

Looking ahead

As for Alliance, what does the future hold? The possibility of an Arctic line extending from its terminal in Fort St John to the immense gas reserves in the Mackenzie Delta and Alaska beckons. 'We've always conceived of Alliance as the southern part of that line,' says Crawford.

In the meantime, the staff at Alliance are going to take a moment to stop and smell the sweet gas. 'I feel pretty good,' says Gish. 'It's been a huge challenge. It's been very satisfying to be involved in a project this size.'

Future prospects for world LPG

Liquefied petroleum gas (LPG) occupies a small, but important, niche in the world energy portfolio. It is used by more than 500mn people worldwide. In 1999, LPG accounted for approximately 2.8% of total global energy consumption and 6.4% of the global petroleum used for energy purposes. A new report from *Datamonitor* – 'Global LPG 2000' – explores the historic performance and current state of 31 LPG retailing markets and forecasts their probable future trends.

The demand for LPG tends to be negatively influenced by the availability of natural gas. The latter has similar consumer properties to LPG but, usually, a lower unit price. Therefore, those regions where the natural gas infrastructure is more developed have seen faster growth in demand for natural gas compared with LPG. These regions include North America, Western Europe and, increasingly, Latin America. By contrast, Southern and Eastern Asia and parts of Eastern Europe and the former USSR are insufficiently served by natural gas pipeline networks. This presents significant opportunities for increasing LPG use.

At the same time, demand for LPG is positively influenced by two main factors. Firstly, the growth of total energy consumption, and secondly, the switch to gaseous fuel from other fossil fuels such as oil and coal. Combined, these two factors can more than outweigh the negative substitution effect of natural gas on LPG.

Analysis of LPG and natural gas volumes between 1995–99 shows that far from one displacing the other, both fuels have grown in absolute terms (see **Figure 1**). In fact, in all the geographic regions, as well as on a global level, the consumption figures for LPG and for natural gas were highly correlated (*R2* ranging from 0.76 for Europe to 0.96 for Asia-Pacific). This means that, despite being competitors, the two fuels can both benefit if total energy demand in a given country is growing, and/or scope remains for improving the structure of the country's energy balance.

Recent consumption trends

Between 1995–99, worldwide sales of LPG grew on average by 3.9% per annum, to reach approximately 195mn tonnes in 1999. Of this, 136mn tonnes were consumed as a fuel, while the remainder was used as a petrochemical feedstock. The growth of non-petrochemical volumes was slightly faster, at 4.1% per annum.

Global non-petrochemical growth was driven by Asia-Pacific demand that increased by an annual average of 6.1% between 1995–99. During that period, China and India were among the star performers. As a result, the Asia-Pacific region contributed over 50% of the global non-petrochemical volume growth in the study period. On the contrary, North American non-petrochemical demand grew by only 0.7% per annum. Europe and Latin America placed themselves between these two extremes by growing by 2.7% and 2.8% per annum, respectively.

Regional demand drivers

Over the last five years, robust Asia-Pacific growth has been related to improving living standards and better availability of LPG. By the same token,

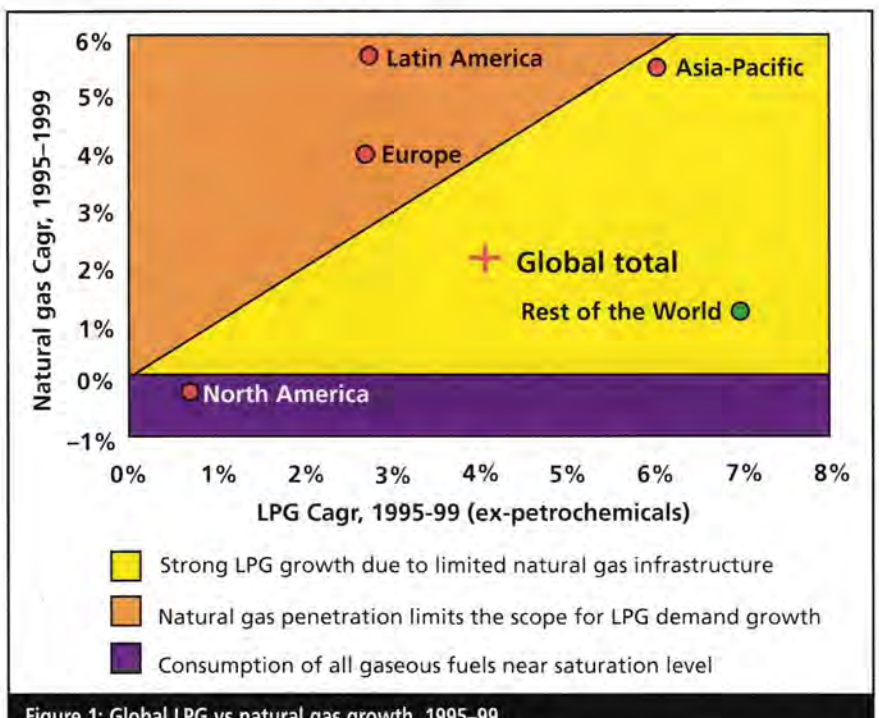

Figure 1: Global LPG vs natural gas growth, 1995–99

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stagnant retail volumes in North America and in most of Europe have reflected the maturity of those markets, with most of the growth opportunities long exhausted. In the US, LPG has been available since the 1920s, with the national market reaching maturity by the 1980s. Canada followed this trend but with several years' lag. Western European markets, while not yet at the same stage, are rapidly approaching maturity. Although a modest increase in growth rates is anticipated in European volumes in the next 10 years, it will be due to autogas on the one hand, and the developing East European markets on the other.

According to Datamonitor, Asia-Pacific will continue to be the fastest growing region of the global LPG market, expanding by 6% per annum for the next 10 years (see **Figure 2**). The low per capita LPG consumption in most of the Asian countries, combined with a largely undeveloped natural gas infrastructure, leaves ample scope for further growth. In Latin America, on the contrary, natural gas will be an increasing threat to LPG sales.

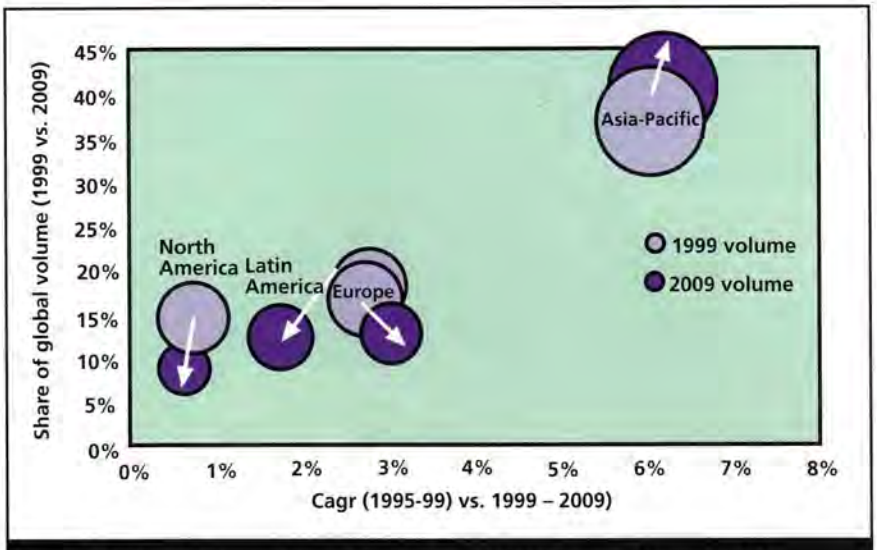

Figure 2: Global LPG demand growth by region, 1995–2009 (energy demand only)

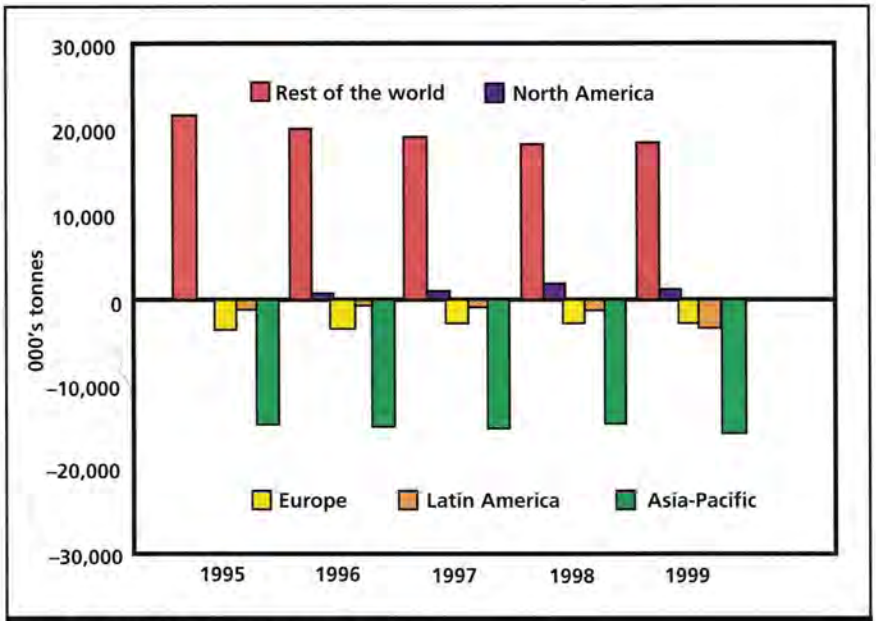

Figure 3: Global LPG trade balance, 1995–99

Domestic sales surge ahead

Part of the difficulty in understanding the dynamics of LPG consumption is due to the variety of the fuel's potential applications. LPG is used for domestic and commercial cooking and heating, where it competes against natural gas and fuel oil. In the less developed countries, domestic LPG also competes against coal and firewood.

In the industrial sector, LPG can be used instead of natural gas, fuel oil or electricity. As an auto fuel, LPG competes head-on with gasoline and diesel. In most of these sectors, the consumption of LPG depends both on the sophistication of the supply and distribution infrastructure and on the availability and price of the alternatives. Therefore, historically the dynamics of LPG demand have varied between market segments. This variance will almost certainly continue in the future.

Between 1995–99, the growth of each segment of the global LPG market varied both by region and by country. Of the main market applications, Asia-Pacific domestic demand exhibited the highest growth rate at 9.6% per annum. However, the scope for further growth in Asian domestic demand is far from exhausted. Datamonitor forecasts that in China alone, the domestic sector will add 18mn tonnes to global annual volumes by 2009, emerging as the single largest contributor to the growth in global annual volumes.

While lagging far behind Asia in the domestic sector, over the last five years Europe led the way in automotive LPG. The impressive performance of European autogas (7.1% Cagr – compound average growth rate) between 1995–99) reflected the fact that the region spearheaded the growing global awareness of environmental issues. As a result, both on the national and, increasingly, on the EU levels, autogas received preferential tax treatment compared to the more polluting auto fuels such as gasoline and diesel.

The Netherlands and Italy particularly positioned themselves as the prime autogas friendly counties. Even those European countries, such as Germany and Spain, which up to now have been slow in encouraging the use of LPG as an automotive fuel, are updating their fiscal policy in accordance with the European trends. Outside Europe, Australia and South Korea are expected to drive global growth in autogas volumes.

Although North America was the first region to introduce autogas on a significant scale, in the last decade the sector has been in decline. The decline was attributable to the relatively low gasoline prices in the US and Canada. This made the price differential between LPG and the traditional auto fuels insufficient to offset the conversion costs. There is little reason to expect that this situation will change in the near future, despite attempts by some US states such as California to introduce a greater proportion of environmentally friendly vehicles.

Overall, by 2009 the automotive

sector will slightly increase its share of total non-petrochemical demand, from 9% to 10%. At the same time, the share of industrial sales will decline, while the domestic and small commercial sector will increase its share of the global non-petrochemical LPG demand to 75% from the 72% it represented in 1999.

Infrastructure key to volume growth

There is an increasing asymmetry between the regional patterns of consumption and production of LPG. Specifically, in the fastest growing LPG markets, such as China and India, the development of refining and gas-separating capacity does not keep up with demand **(see Figure 3)**. The asymmetry is predicted to grow in the next ten years. This fact increases the importance of global LPG trade and makes the development of a supply infrastructure, including import terminals and storage facilities, doubly important for any company involved in a fast growing market that is not self-sufficient in LPG.

This point is underlined by the success of SHV Gas, which controls vast storage capacity in virtually all the markets where it operates. SHV's Polish subsidiary Gaspol owes a significant part of its success to its control of Poland's only LPG tanker terminal on the Baltic Sea. Recent examples of infrastructure investment in the high-growth markets include Caltex's 100,000-tonne Shantou underground cavern in the Guangdong province of China. United Gas Industries and Energy Transportation Group (both of the US) are jointly building importation/storage terminals in China and Romania.

Clearly, acquiring a workable supply and infrastructure network is a necessary but not sufficient condition for gaining a foothold in a promising market. Many developing countries still maintain artificial barriers to entry, from direct bans on full foreign ownership of LPG distribution chains, as in China, to government-regulated retail prices and/or margins, as in Thailand and India. In terms of competitiveness, the world's markets vary widely, from highly regulated semi-monopoly markets in parts of Asia and Africa, to the highly fragmented US market where the top 10 players represented less than 40% of 1999 retail volumes.

Nevertheless, the overall global trends are clearly towards deregulation on the one hand, and consolidation on the other. Both Thailand and India are committed to liberalising retail LPG prices in the next few years. Several emerging markets are set to follow suit. The trend towards consolidation is illustrated by the recent spate of mergers and takeovers in the US, such as Ferrellgas' takeover of Thermogas in December 1999, which resulted in the emergence of the nation's largest propane distributor. Repsol's 1999 acquisition of Argentina's YPF and Ecuador's Duragas consolidated the Spanish giant's position as a leading global player.

SHV powers away

However, on the global scale, the main recent development has been the creation of SHV Gas on 1 January 2000. The company was created through the merger of France's Primagaz, the UK-based Calor Group, and the Brazilian and Asian LPG subsidiaries of the Dutch owned SHV Group. The new company is active in 23 countries on four continents, – Europe, Asia, Latin America and North Africa. Its worldwide retail sales in 1999 were estimated at 6.1mn tonnes, well ahead of its main competitors such as Shell, Repsol YPF and TotalFinaElf. SHV's competitive positioning is particularly strong in Europe, where it accounted for 16% of the regional market. Its closest competitor, Shell, had just under 12% of European volumes.

For the global players, the greatest growth opportunities will come from operations outside their core markets. Datamonitor predicts that in the next ten years the focus of global growth will be firmly on the developing markets. Therefore, it is well-diversified LPG majors rather than those that concentrate on their well-established markets that will be best positioned to take advantage of the ensuing liberalisation.

*For further information, contact Datamonitor on Tel: +44 (0) 20 7675 7000 or e:***ukinfo@datamonitor.com** *or visit its website at* **www.datamonitor.com**

Selling the family silver

HWA* contests that now is the time to take a hard look at your company's portfolio and capitalise on those assets that were once 'the family silver' before they pass their sell-by date.

It is tempting to wait for that extra year of cash-flow, or the results of that next work-over, especially in times of high oil prices – but such a strategy can ultimately result in less revenue as the number of buyers dwindles with the age of the asset. The authors contest that such assets, along with other non-core oil and gas properties, are congesting company portfolios, distracting key staff, diverting management skill and impeding growth.

The benefits of selling company assets now are evident:

- **High product prices** –The oil price is currently at its highest level since the Gulf War while both European and North American gas prices are firm (at the moment). However the future is uncertain.
- **Rollover relief** – The current tax concession means there are no taxable capital gains if your sale involves UK assets and if the money is reinvested. If the oil price persists at $30+/b the government may be tempted to amend this benefit, so taking action sooner rather than later could be prudent.
- **Hungry buyers** – The investment community is beginning to show its face again, swelling the existing pool of buyers who are hungry for a deal. The more buyers there are, the higher the price.
- **Assets don't get any younger** – Irrespective of product price, these non-core assets will eventually need to be divested, but it will be divestment within an unknown oil price regime and most certainly nearer to abandonment.
- **Inefficiency** – These assets will continue to soak up valuable manpower that could be better employed evaluating the plethora of opportunities that are in the global market place and that offer much more growth potential for the company.
- **Inflation** – If high prices are sustained, high overheads are sure to follow. What seems to be a good asset to hold today may be one with diminishing returns eroded by oil-patch inflation tomorrow.

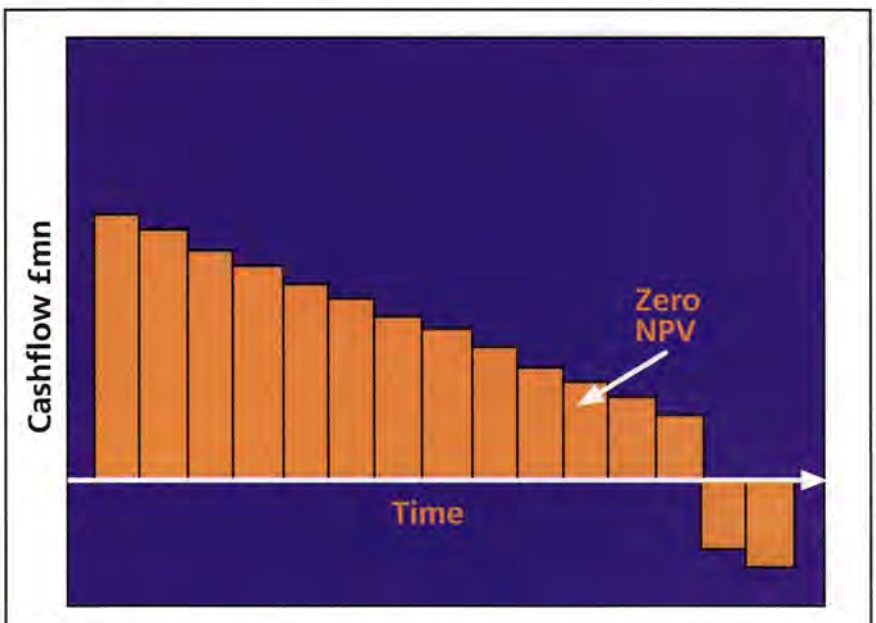

Figure 1: Typical asset cashflow profile

Many companies were urged by their banks or analysts to hedge a lot of their production this year. Sadly, the management of many of these companies wanted to let prices ride, but the pressure was too great and now these hedging deals have really undermined their potential earnings. We now believe it is very important that Financial Directors as well as Business Directors break the mould and avoid falling into the trap of holding onto anything that moves 'because it is valuable cashflow'. Nothing generates better cashflow than a sale, and as long as the opportunities are lined up for the future then now is the time to bite the bullet on selective sales.

Biting the bullet

A common question that can emerge in these circumstances is: 'What if oil prices continues to rise, won't we have made a terrible mistake?' The straightforward answer is, not at all, as long as the sales revenues are re-invested into new upstream opportunities, further price rises will only vindicate your decision because your new properties will be even more profitable.

Indeed, the flip-side to this logic is that retention of non-core acreage is really backward looking and implies a lack of recognition of new opportunities.

HWA uses the following example to illustrate the point.

Figure 1 shows a simplified typical pre-tax yearly cashflow for the asset in its latter years. Note the negative cash flow associated with abandonment which means the net present value (NPV) of the asset will be effectively zero some four years before final abandonment.

Figure 2 shows two value curves superimposed on the cashflow profile. The green line represents the approximate value that the owner might calculate on a straightforward discounted cashflow basis. Even in latter years the owner can demonstrate that the asset has some positive value and is often puzzled why buyers cannot reach their holding value.

But, the red dashed line tells the real story, however. In the middle of its life cycle the market value of the asset probably carries a premium to holding value. In its latter years there comes a critical point where new buyers are unable to get finance for the asset (usually within two to three years of abandonment) and because of that the effective value can drop to zero.

continued on p23...

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And the nominations are...

The IP extends its congratulations to those entrants who have been short-listed for the IP Awards 2000. The level of entries was exceptional. We thank all those who entered their achievements, helping to make this first year of the IP Awards so keenly contested.

Final judging took place on 16 October 2000. Judges included leading industry commentators, managers, executives and academics, whose task it was to select one overall winner in each category of entry. The winners will be announced at the Awards Lunch at The Savoy Hotel, London, on Monday 13 November 2000.

To reserve your place at the IP Awards 2000 Lunch, please contact the Conference Department at the IP on +44 (0)207 467 7100 or e: **pashby@petroleum.co.uk**

The short-listed entries are:

Information Technology Award

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Gerling at Lloyd's Ltd: for the implementation of Oilsure, an Internet-based trading system for oil cargo insurance, facilitating savings in time, administration and cost.

Schlumberger GeoQuest: for the implementation of the Licence Information for Trading (LIFT) system to encourage oil and gas licence trading within the UK Continental Shelf.

Shell International Ltd: for leading the implementation of an industry-wide exchange for e-procurement.

Communication Award

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the CWC group

Schlumberger GeoQuest: for the development and successful implementation of the BP Upstream Technology website.

Shell International Ltd: for the strategic implementation of a corporate identity programme to raise awareness of, and stimulate debate about, issues in the global industry.

Dr Joseph Stanislaw: for his achievements over the past three decades as a scholar, commentator and advisor to the global petroleum industry.

International Platinum Award

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BP Amoco plc: Emissions Trading System
BP has set itself a greenhouse gas emissions reduction target of 10% from its 1990 baseline over the period to 2010. In January 2000, BP launched a world-first group wide emissions trading system as a tool to assist delivery of this target as cost-effectively as possible. The company is already finding that this approach focuses creative energy in ways that help identify unexpected economic opportunities.

Shell International Ltd: Project Better World
Project Better World is a Shell employee-driven initiative. Its aim is to further strengthen Shell's commitment to sustainable development, by harnessing the skills and enthusiasm of staff. It has built partnerships with Earthwatch and Voluntary Service Overseas (VSO), through which staff apply their expertise to community development, capacity building and environmental conservation projects around the world. Since 1999, it has sent over 30 staff from 20 operating companies to overseas projects.

Shell International Ltd: Strategic Challenges and GameChanger™
The challenge: to create sustainable new ways of growing in a rapidly changing and more complex world. The answer: grow a new, more creative and adaptable organisation within the existing structure. To unlock the talent of Shell staff, an open job market was introduced. To create a market in ideas an internal venture capital market is being grown. Globally competitive assessment of capital spending proposals as well as the introduction of GameChanger™ has created an internal capital market.

Safety Award

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BP Amoco plc: for the achievements of the Sand Detection Project in reducing the safety risks of undetected/unmanaged sand production from oil and gas wells.

Phillips Petroleum Company UK Ltd: for the development of the Process for Safety and Environmental Excellence with worldwide application for the effective management of safety, health and environmental issues.

Schlumberger: for the successful implementation of the Driving Safety Initiative, a scheme to promote safer driving using training and performance monitoring.

Innovation Award

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Hedley Purvis Ltd: for the development of Informate, an information software tool for use in assembling bolted joints which can help to reduce environmental pollution and production costs.

Minton Treharne & Davies Ltd: for the development of CypherMark, a DNA tagging system for crude oil, bunker fuels and refined products.

Shell UK Ltd: for the successful installation of the Skiff Project Trident Platform, designed to reduce costs and reinvigorate the offshore gas industry.

Environment Award

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Conoco Inc: for the implementation of the Deir Ez Zor integrated natural gas project in Syria (DEZ Gas).

Fairbanks Environmental Ltd: for the implementation of Wetstock Management Standards for UK petrol stations.

Community Initiative Award

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LASMO

BHP Petroleum: for the development and implementation of the BHP New Deal Partnership in North Wales.

LASMO Oil Pakistan Ltd: for establishing the Dureji Health Centre, and implementing a sustainable programme of healthcare education and awareness.

Unocal Corporation: for initiating the Bangladesh Community Relations Programme, offering assistance with healthcare, education and community development.

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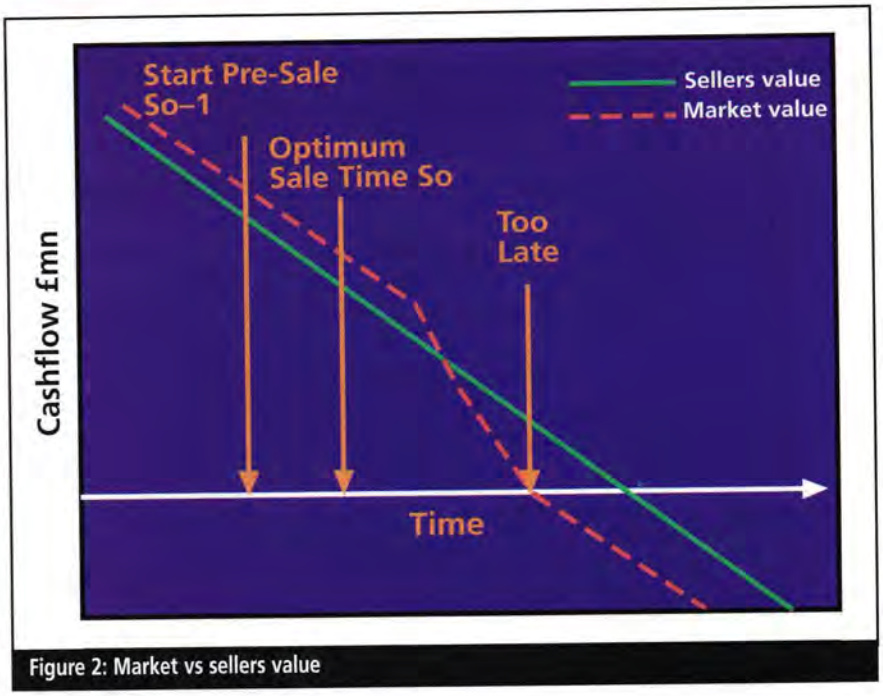

Figure 2: Market vs sellers value

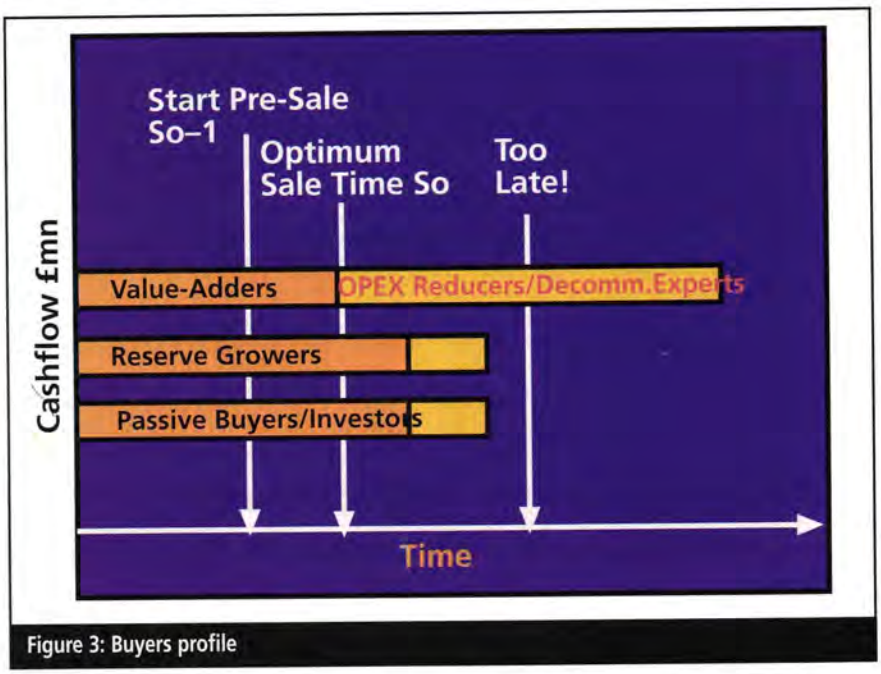

Figure 3: Buyers profile

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The buyers profile in **Figure 3** shows how the number of buyers eventually dwindles as the conditions for them to obtain funds and add value diminish. An important point to remember is that these processes take time and planning in advance is imperative. Waiting until the optimum sale time to start the sale process may be too late.

The authors are an established partnership of oil and gas professionals who have provided portfolio management services to most oil majors from their London offices since 1993. They are so convinced that the time is right for companies to divest their non-core producing assets that they have built a specific team to handle this niche work of disposals in the $10–$100mn range. They believe these assets and packages are generally too small for merchant banks and too big to entrust to 'one-man bands'. The team is called HWA Divestments and since its inception in 1999 it has already handled nine campaigns both in the UK and overseas. They see their strengths as a successful track record, competitive and attractive fee structure and first rate dataroom and marketing expertise. For further information, Tel: +44 (0)20 7493 1977 or e: **mail@hwa-energy.com*

Stepping on the gas

Low oil prices and consolidation within the international oil and gas industry in 1999, combined with a lack of attractive exploration acreage in the mature producing countries combined to produce only limited drilling and licensing and activity in South East Asia at the close of the millennium. However, the tide now appears to have turned and foreign interest is increasingly focusing on exploiting the region's gas reserves.

According to Edinburgh-based consultant Wood Mackenzie, licensing activity in South East Asia* in 1999 fell to its lowest level since 1990, with just 16 new awards signed in the region compared with 55 a year earlier. Indonesia was particularly badly hit, with just four new awards in 1999, compared with 22 awards in 1998. However, the country still remained the most explored country in the region, accounting for 56% of the total number of exploration wells completed in South East Asia.

Despite an overall drop in exploration drilling activity in the region in the past 18 months, production of both liquids and gas continues to grow at about 1% year-on-year – with increases in output from Brunei, Vietnam and Thailand compensating for a decline in Indonesian and Chinese production. Gas production continues on a strong upward growth trend, with significant increases seen in Indonesia, Thailand, Brunei and Vietnam. In the decade since 1989, total regional gas production has more than doubled on an annual basis. Malaysia and Thailand lead the way with annual gas production more than trebling in the last ten years.

Bangladesh

Bangladesh holds a significant amount of gas reserves (0.30tn cm), located mainly to the east of the country. Indigenous oil reserves are insignificant.

Unocal made a third major gas field discovery in Bangladesh – the Moulavi Basar field in block 14 – at the end of 1999. The new field tested 30mn cf/d of gas. The company also produces gas from the Jalalabad field in block 13 (which came onstream in mid-1999 and supplies some 12% of domestic gas demand) and the Bibiyana gas field, discovered in block 12 in 1998.

Shell and Cairn Energy have recently initialled a production sharing contract with state-owned Petrobangla covering blocks 5 and 10 in Bangladesh. The partners are planning to drill five exploration wells on block 10 and one on block 5. Meanwhile, a joint venture comprising Bangladesh Petroleum Exploration Company, Bangladesh Oil, Gas & Mineral Corporation, Petrobangla and Danish company Maersk Oil also initialled a production sharing contract covering offshore blocks 19 and 20.

Future developments may include production from the Shahbazpur field, in the south of the country.

Brunei

Brunei is a mature oil and gas province. It is currently one of South East Asia's largest oil producers and one of the world's largest LNG exporters.

Country	Oil Res bn b	Change 98/99	R/P ratio Years	Oil Prodn ,000 b/d	Growth 98/99 %	Oil Consmpt ,000 b/d	Growth 98/99 %	Gas Res tn cm	Change 98/99	R/P ratio Years
Australia	2.9	n/c	15	575	–10.7	840	2.6	1.26	n/c	41.3
Bangladesh	–	–	–	–	–	60	0.9	0.3	n/c	37.1
Brunei	1.4	n/c	20.8	180	16.4	–	–	0.39	n/c	34.7
China	24	n/c	20.6	3,195	–0.4	4,370	5.1	1.37	n/c	56.3
India	4.8	0.8>	14.5	775	–0.6	2,010	9.2	0.65	0.11>	26
Indonesia	5	n/c	9.7	1,445	–4.7	965	5.6	2.05	n/c	30.8
Japan	–	–	–	–	–	5,650	1.5	*	–	–
Malaysia	3.9	n/c	14	815	n/c	375	–8.4	2.31	n/c	53.8
Myanmar	–	–	–	–	–	–	–	*	–	–
New Zealand	–	–	–	–	–	130	0.4	*	–	–
Papua New Guinea	0.3	n/c	9.4	95	18.3	–	–	0.15	n/c	100+
Pakistan	–	–	–	–	–	345	–1.7	0.61	n/c	34.3
Philippines	–	–	–	–	–	375	–5.4	*	–	–
Singapore	–	–	–	–	–	545	–3.3	*	–	–
South Korea	–	–	–	–	–	2,165	7.6	*	–	–
Taiwan	–	–	–	–	–	820	7.2	*	–	–
Thailand	0.3	n/c	8.6	–	–	740	0.7	0.35	n/c	20.7
Vietnam	0.6	n/c	5.7	290	20.7	–	–	0.19	n/c	100+
Other[a]	0.8	0.1>	12.9	140	0.2	340	4.6	0.65	n/c	65.6
Total Asia-Pacific (A-P)	44	0.9>	16.3	7,635	–0.7	19,920	3.6	10.28	0.11>	40.4
Total World	1,033.8	18.2<	41	71,890	–2.3	73,215	1.6	146.43	0.04>	61.9
A-P as % of world	4.26	–	–	10.62	–	27.21	–	7.02	–	–

Table 1: Asia-Pacific Production, Consumption and Refinery Capacity

Source: BP Statistical Review 2000, *interpreted by* Petroleum Review
[a] Totals for countries not individually itemised

Despite levels of exploration drilling activity declining with no new discoveries being made, both liquids and gas production levels have increased during the past 18 months. This rise is predominantly due to the country's dominant player Brunei Shell Petroleum's (BSP) recent liquids output optimisation programme and the coming onstream of Elf's Maharaja Lela Jamajulalam field in February 1999. Located in offshore block B, Maharaja Lela is producing around 105mn cf/d of gas and 2,000 b/d of liquids from five wells and two wellhead platforms. Field reserves are put at 6mn barrels of oil, 15mn barrels of condensate and 670bn cf of gas.

Future projects include BSP's Egret oil and gas field, due onstream in 2003, and the Mampak oil and gas, and Merpati gas discoveries, although the latter is unlikely in the near term.

Industry has anticipated a new deepwater licensing round for several years and it is now thought likely that this will take place some time next year. The Brunei Government recently commissioned Petroleum Geo-Services to undertake what is claimed to be the largest 3D seismic survey in the world to date. The non-exclusive, 10,000 sq km survey will cover the offshore deep waters of the southern area of the Exclusive Economic Zone and is expected to complete in 2Q2001.

Cambodia

The oil and gas sector in Cambodia has been fairly quiet in recent years. There were no new license awards, changes or relinquishments and no exploration drilling activity in 1999. Although no production sharing agreements have been signed, Woodside Petroleum is currently undertaking a 15-month geological and geophysical study on blocks 1, 2, 3, 4 and 7 in the Gulf of Thailand.

The ongoing boundary dispute between Thailand and Cambodia continues to hamper interest in the region. The fact that Thailand is also currently oversupplied with gas means there is little incentive for the Thais to settle the boundary issue, comments Wood Mackenzie, and it is unlikely that exploration activity will begin in this region in the near future.

That said, Harrods Energy is reported to be currently in negotiations with the Cambodian Government, seeking exploration rights for the Tonle Sap block, possibly one of the country's richest hydrocarbon plays. Initial seismic studies are understood to have indicated two large, deep subterranean structures on the block that could contain large reserves of oil and gas.

Oil supply pressure as gas use soars

The table of regional statistics (**Table 1**) confirms there has been little change to the region's status as a growing oil consuming area with limited oil reserves. Regional oil demand growth was a healthy 3.6% in 1999 as regional economic recovery progressed. Regional oil production, however, declined by 0.7%. Rapid production growth in Brunei, Vietnam and Papua New Guinea was more than offset by production declines in China and Indonesia. The region's reserve base remains limited with only India recording an increase in reserves. The region's reserves to production (R/P) ratio is now 16.3 years, compared with the world's 41 years.

The picture for gas is somewhat better – consumption growth of 6%, production growth of 5.1%. The R/P ratio, at 40.4 years, compares with the world's 61.9, although only India recorded an increase in reserves.

Refining throughput in the region was effectively unchanged on the year, although refinery capacity increased by 1.6%.

In short, Asia-Pacific has adequate refining capacity for its needs. It also produces roughly similar amounts of gas to its consumption. Its apparent low R/P ratio for gas almost certainly reflects the fact that recent gas finds have not been booked in what is, in gas terms, a lightly explored area. The real weakness is oil, where limited reserves and declining production means the region is set to become an increasingly important buyer of Middle East crude.

Country	Gas Prodn bn cm	Growth 98/99%	Gas Consmpt bn/cm	Growth 98/99%	Refinery Cap ,000 b/d	Growth 98/99%	Refinery T'pt ,000 b/d	Growth 98/99%
Australia	30.6	0.7	19.8	-2.5	915	n/c	880	1.8
Bangladesh	8.1	4.2	7.9	1.7	–	–	–	–
Brunei	11.30	4.6	–	–	–	–	–	–
China	24.30	10.3	21.4	10.9	5,020	n/c	3,125	-3
India	24.90	1.1	23.7	2.2	1,615	19.2	–	–
Indonesia	66.4	4	27.2	0.4	930	n/c	–	–
Japan	–	–	74.6	7.3	5,110	0.4	4,150	-1.5
Malaysia	43	5.7	21	8.8	–	–	–	–
Myanmar	–	–	–	–	–	–	–	–
New Zealand	–	–	4.8	8.3	–	–	–	–
Papua New Guinea	–	–	–	–	–	–	–	–
Pakistan	17.8	10	17.8	10	–	–	–	–
Philippines	–	–	0.05	-25	–	–	–	–
Singapore	–	–	1.5	n/c	1,245	n/c	–	–
South Korea	–	–	18.7	21.8	2,315	n/c	–	–
Taiwan	–	–	6.2	-2.7	–	–	–	–
Thailand	17.1	10.6	16.4	3.4	–	–	–	–
Vietnam	–	–	–	–	–	–	–	–
Other[a]	11.3	6.3	4.5	5	2,720	1.5	8,360	4
Total Asia-Pacific (A-P)	254.8	5.1	268.2	6	19,870	1.6	16,515	n/c
Total World	2,329.6	2.5	2,292.6	2.4	81,440	0.7	67,735	0.2
A-P as % of world	10.94	–	11.70	–	24.4	–	23.08	0

Asia-Pacific Production, Consumption and Refinery Capacity

China

The Chinese E&P sector has been particularly upbeat in recent months with a number of key offshore discoveries announced, including Phillips Petroleum's 700–800mn barrel Peng Lai 19-3 oil field in block 11/05 in the Bohai Gulf which is due onstream in 2002. Kerr-McGee has also made discoveries in the Bohai Gulf with Caofedian 11-1-1 on block 04/36 in 1999 and its CFD 12-1-1 well in block 05/36 in August 2000. Recoverable reserves for CFD are put at 150mn barrels. Devon (formerly Sante Fe Snyder) made its second oil discovery in block 15/34 in the South China Sea. The Bootes find is estimated to contain over 60mn barrels of recoverable oil. These discoveries, coupled with CNOOC's (China National Offshore Oil Corporation) desire to increase foreign investment is expected to lead to even higher levels of activity in the coming months.

Offshore liquids production averaged 323,000 b/d in 1999, down 1% on the previous year. CNOOC brought onstream four new fields – Huizhou 32-5 (25mn barrels of reserves), Weizhou 12-1 (50mn barrels), Weizhou 11-4 east and Jinzhou 9-3 (67mn barrels) – with a combined output of 70,000 b/d.

Offshore gas production grew significantly in 1999, rising by more than 13% to 424mn cf/d compared with the previous year. The increase is attributed to the strength of production increases at Yacheng 13-1 and the start-up of the Ping Hu field.

More recently, PetroChina opened 15 new oil and gas concession blocks in the Bohai Bay Basin to foreign investment. The offer covers 12 development blocks, with estimated reserves of 657mn barrels of oil in place, and three exploration blocks.

Looking onshore, China National Star Petroleum (CNSPC) announced an oil discovery in the Luenpola Basin in northern Tibet in 1999, in what is claimed to be the highest wildcat in the world. Despite reserves being put at 22mn barrels, it is believed that the field will be uncommercial due to the high development costs in the hostile Tibet environment.

China National Petroleum Corporation (CNPC) has also reported a number of onshore oil discoveries in the past 18 months, including the North Dagang field in the North China Basin, Zhijing in Shaanbei and Daqingzijing in the southern Songliao Basin. The company has also found gas in the Tarim Basin, northwest China, with total reserve estimates put at 7tn cf. This has doubled the reserves CNPC has located in the basin over the past decade and prompted it to bring forward plans for a major gas pipeline linking the Tarim to east China.

In 1999, some 2.85mn b/d of liquids was produced onshore China, 40% of which was produced from Daqing, China's largest oil field area. Onshore gas production in 1999 averaged 1.823mn cf/d – up 52mn cf/d on 1998 output – 40% of which came from the Sichuan Basin.

BP is keen to expand its activities in China, recently announcing plans to invest up to $400mn in China Petroleum and Chemical Corporation (Sinopec). Both parties have signed a Memorandum of Understanding to develop options for cooperation in the upstream sector as well as extend their cooperation in downstream fuels retailing, LPG distribution and marketing; purified terephthalic acid (PTA) manufacturing and sales. Plans also include the integration of refining and petrochemical activities in East China. The companies have also agreed in principle to form a joint venture to acquire, revamp or build 500 dual-branded fuel stations in the Zheijang Province, East China.

Shell, too, plans to increase its presence in China, signing a Strategic Alliance Agreement with Sinopec to jointly develop a range of opportunities in oil and gas E&P, gas marketing and coal gasification. Shell is also to acquire 14% of the Initial Public Offering (IPO) of Sinopec, up to a maximum of $340mn. As part of the deal, Sinopec and Shell will jointly explore for and develop natural gas fields in areas including the Ordos Basin, in Inner Mongolia and Shaanxi Provinces, and the Tarim Basin. They are also to jointly operate a network of 500 service stations in major cities in the Jiangsu Province on China's east coast.

Earlier this year, Shell and PetroChina agreed to jointly study prospects for gas transmission and market development for the Changbei gas field in the Ordos Basin. It is Shell's first onshore upstream development in China and is said to be the largest yet undertaken by PetroChina in the country with a foreign investor. The project is expected to deliver up to 3bn cm/y of gas over 20 years. Production could begin by 2004.

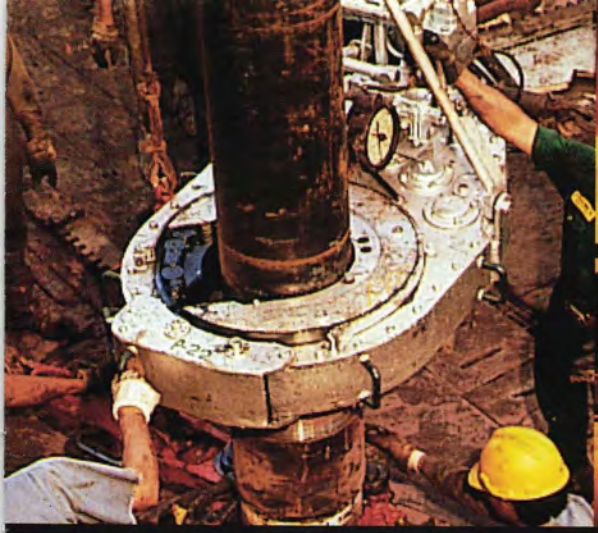
Country/Region	Japanese company (% interest)	Area	Licensees (% interest)
1999			
Australia	Japex (100%)	AC/P-29	
Azerbaijan	Japan Azerbaijan Oil (50%)	Yanan-tava Atashkyah Mugan-Deniz	Socar (50%)
Thailand	Moeco Thailand (4%)	Gulf of Siam Block 14A/15A/16A	PTTEP (80%) Uncoal (16%)
Indonesia	Inpex Masela (100%)	Timor Sea/Masela block	
Indonesia	Irian Jaya Gas and Oil Company	Irian Jaya/Semirak block	Pertamina (40%)
Norway	Idemitsu Snorre Oil Development Company	Borg, Snorre field etc	Statoil, ExxonMobil, Conoco, Shell etc
2000			
Indonesia	South Makassar Petroleum Exploration Company (85%)	Offshore Kapopsang block	Unocal (15%)
Vietnam	Moeco South West Petroleum Company	Gulf of Siam block 52/97	Unocal (43.4%) PVSC (30%) PTTEP (7%)
Malaysia	Nippon Oil Exploration Offshore (Malaysia)	Carigali (25%) block SK-10	

Table 2: E&P projects in which Japanese companies have become involved in 1999/2000

India

In the past, India has had limited success in attracting foreign E&P investment. However, the country changed its fiscal regime in 1999 in a bid to increase exploration activity, boost domestic production and reduce its dependence on imports that are primarily sourced from the Middle East under long-term contracts.

The policy appears to be working. At the end of 1999 the Indian Government gave the go-ahead to Gujarat State Petroleum Corporation for develop-



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Asia-Pacific overview

Country/Field	Operator	Oil or Gas output	Start-up date	Oil Res. (mn b)	Gas Res. (bn cf)	Capex ($mn)	Production system
BANGLADESH							
Bibiyana (block 12)	Unocal	gas/cond	2004	–	2,802	279	onshore
Jalalabad (block 13)	Unocal	gas/cond	mid-1999	–	844	149	–
Moulavi Basar (block 14)	Unocal	gas	–	–	–	–	–
Semutang	Cairn	gas	2000	–	150	37	onshore
Shahbazpur	Unocal	gas	2001/2?	–	333	255	onshore
Sub Total					**4,129**	**720**	
BRUNEI							
Asam Paya	BSP	oil	2000	50	25	80	onshore, unit'n Rasau
Bungam	BSP	gas	–	–	140	–	–
Egret	BSP	oil/gas	2003	50	500	–	3 platforms
Maharaja Lela (block B)	Jasra/Elf Aquitaine	oil/gas	Feb-99	23	699	312	plat., gas to Lumut LNG
Mampak	BSP	oil/gas	eval	–	–	–	–
Merpati	BSP	gas	eval	–	–	–	–
Selangkir	BSP	gas	end-99	–	300	50	plat., via Iron Duke
Sub Total				**123**	**1,664**	**442**	
CHINA							
Bootes	Devon (ex Santa Fe Sny)	oil	2003	60	–	–	FPS
Block 11-05	Phillips Petroleum	oil	2002	700	–	–	platform
CFD 11-1 (Bohai Bay)	Kerr-McGee	oil	2003	130	–	–	FPS
Changbei (Ordos Basin)	Shell	gas	2004	–	2,500	–	onshore
Dongfang 1-1	Nanhai West Oil Corp	gas	2001	–	2,000	553	platform
Huizhou 32-5	CACT	oil	Feb-99	25	–	–	subsea, Huizhou 26-1 plat.
Huizhou 26-1 N	CACT	oil	2001	10	–	–	subsea, Huizhou 26-1plat.
Jinzhou 9-3	CNOOC	oil	1999	67	–	–	platform
Nanbao 35-2	CNOOC	oil	2004	100	–	–	platform
Peng Lai 19-3(Bohai)Ph1	Phillips Petroleum	oil	late 2001	700–800	–	–	FPSO + 24-slot platform
Peng Lai 19-3(Bohai)Ph2	Phillips Petroleum	oil	2004	700–800	280	534	multi plats, cent'l process
Qikou 17-2	CNOOC	oil/gas	2000	26	9	–	Boxi area development
Qinhuangdao 32-6	CNOOC/Arco/Texaco	oil	2002	200	–	800	FPSO + 2 platforms
Suizhong 36-1 (Ph 2)	CNOOC	oil	2000+	338	–	1,300	3 platforms
Ursa	Devon (ex Santa Fe Sny)	oil	mid-2002	50	–	–	FPSO + platform
Wenchang	Devon (ex Santa Fe Sny)	oil	1H2002	100	–	300	FPS
Weizhou 12-1	CNOOC	oil	1999	50	–	360	platform
Weizhou 11-4 east	CNOOC	oil	1999	–	–	–	–
Zhao Dong	Apache	oil	2000	50	–	237	platform
Sub Total				**3,306–3,506**	**5,009**	**3,550**	
INDIA							
PY-1	Mosbacher	gas	1999/00	–	280	88	platform
Alora	ONGC	oil	–	–	–	–	onshore
Dholasan	–	oil	–	–	–	–	–
North Balol	ONGC	oil/gas	–	–	–	–	onshore
North Kathana	ONGC	oil	–	–	–	–	onshore
Kanawara	ONGC	oil	–	–	–	–	onshore
Unawara	ONGC	oil	–	–	–	–	onshore
Sub Total					**280**	**88**	
INDONESIA							
BD (Madura)	Mobil	gas/oil	2005+	20	465	310	platform
Belanak Block B	Conoco	gas/oil	2003	75	500	–	FPSO
Bentu	Santos	gas	2002+	–	–	–	nr Asamera-Duri pipeline
Block A, North Sumatra	Gulf Indonesia	gas	2002	–	467	240	onshore to fertiliser plant
Kakap (W Natuna project)	–	oil/gas	2000	23	350	809	platform
Merah Besar	Unocal	oil/gas	2003	52	160	–	mini TLP to West Seno
Natuna D Alpha	ExxonMobil	gas	2010+	–	46,000	–	16 platforms
NSO 'A' field extension	ExxonMobil, Malacca Str	gas	Jul-99	–	910	517	NNM platform
Nubi/Sisi	TotalFinaElf	gas	2007	40	2,700	200	plat. joint dev
Oseil	Kufpec	oil	2001	40	–	–	onshore
Pase B	ExxonMobil	gas	2000	80	–	–	–
Peciko	TotalFinaElf	gas/oil	Dec-99	73	6,100	1,250	2 platforms
Piala	CPI	oil	1999	10	–	–	–
Singa in South Sumatra	Amerada Hess	gas	2002	–	400	–	onshore
Sirasun/Terang	Arco, in Java Sea	gas	2005+	–	1,100	500	subsea via Pagerungam
Tangguh (Weriagah)	Arco	gas/oil	2006+	50	18,400	1,750	onshore platform
Tengah (Corridor)	Gulf Indonesia	gas	1999	–	62	–	onshore
West Natuna Gas Project	Conoco/Premier/Gulf	gas	2001	–	2,500	1,100	plat., pipe to Singapore
West Seno	Unocal	oil/gas	2002	180	170	–	mini TLP + barge prod'n
Wunut	Lapindo	gas	1999	–	233	42	onshore
Sub Total				**643**	**80,347**	**6,718**	
MALAYSIA							
Anding (PM 12)	Petronas Carigali	oil	1999	5	–	–	wellh'd plat. to FPSO
Angsi	Petronas Carigali	gas/oil	2002	95	1,000	–	180-km p'line to Kerteh
Asam Paya	BSP	oil	2000	20	25	80	ext'n of Maharaja Lela
B11, off Sarawak	Sabah Shell?	gas	2000	–	1,400	–	platform
B12, off Sarawak	Sabah Shell?	gas	2006	–	500	–	platform
E6, off Sarawak	Sabah Shell Carigali	gas	2002	–	–	–	–
E8, off Sarawak	Shell/Petronas Carigali	gas	2005	–	2,100	–	platform + comp.

Table 3: Current and Planned Field Developments in the Asia-Pacific Region

Country/Field	Operator	Oil or Gas output	Start-up date	Oil Res. (mn b)	Gas Res. (bn cf)	Capex ($mn)	Production system
MALAYSIA continued							
F13, off Sarawak	Shell/Petronas Carigali	gas	2009	–	–	–	platform (comp.)
F14, off Sarawak	Shell/Petronas Carigali	gas	2004	–	–	–	platform
F23, off Sarawak	Shell/Petronas Carigali	gas	–	–	–	–	–
F28, off Sarawak	Shell/Petronas Carigali	gas	2009	–	–	–	platform
F29, off Sarawak	Shell Malaysia	gas	2010	–	100	–	platform
G7, off Sarawak	Shell Malaysia	gas	2010	–	100	–	–
M4, off Sarawak	Shell Malaysia	gas	2002	–	600	–	platform
Belumut	EPMI	oil	2003	40	–	200	platform
Beryl	Petronas Carigali	oil	2010	–	400	–	platform
Bintang	Esso Malaysia	gas/oil	2009	25	1,500	800	platform
Block P (Tapis E)	Esso Malaysia	oil	Feb-99	140	1,000	–	platform
Blocks PM5,8,9,10	Esso Malaysia	gas	1998 on	–	–	–	Peninsular gas project
Bunga Orkid	Lundin Oil (ex IPC)	gas/oil	2015	7	420	–	platform
Helang (block SK 10)	Nippon Oil Exploration	gas	2005		1,200	–	platforms?
Jintan 1 (1st SK8 Dev)	Occidental	cond/gas	2003	75 (cond)	2,800	–	2 platforms
Laila	Petronas Caragali	gas	2010	–	300	–	platform
Larut Area	ExxonMobil	oil/gas	2000	65–75	–	375	platform
Lawang/Langat	Esso Malaysia	oil	2002	30	–	200	platform
Malong (PM12)	Petronas Carigali	oil	1999	30	–	120	wellh'd plat. to FPSO
PM3 FFD	Lundin Oil (ex-IPC)	gas	1997+	110	1,500	650	platform, floater
Resak Beranang	Petronas Carigali	cond/gas	Jan-00	50 (cond)	1,500	650	3 bridge-linked plats
SK8 fields	Occidental	gas	2003	80	5,200	700	platform
SK10 fields	Nippon Oil	gas	2005	50	1,300	477	central plat., subsea
Serudon/S Raya	Esso Malaysia	oil	2001	12 (liquids)	–	–	tie-backs to Yong/Raya
Sotong (PM 12)	Petronas Carigli	oil	1999	15	–	–	wellh'd plat. to FPSO
Sub Total				**849–859**	**22,945**	**4,252**	
MALAYSIA–THAILAND JDA							
Cakerawala	CTOC	gas	2006	17	2,100	750	platform
A18 Fields	CTOC/Arco	gas/oil	2006	120	7,700	1,750	Cakerawala is phase 1
B17 Fields	Petronas	gas	2008	–	1,500	–	Muda plat. + p'line link
Sub Total				**137**	**11,300**	**2,500**	
KOREA (SOUTH)							
Gorea–V	–	gas	Jun-02	–	200–300	–	–
Sub Total					**200–300**		
MYANMAR (Burma)							
Nyaungton	MOGE	oil/gas	1999	20	800	–	–
Yetagun	Premier	gas	Jun-00	50 (cond)	1,800	635	2 plats, 8 subsea
Sub Total				**70**	**2,600**	**635**	
PAPUA NEW GUINEA							
Gobe	Chevron	oil/gas	2002/3*	90	–	376	onshore
Hides	ExxonMobil	gas	2007*	–	113	106	onshore
Kutubu	Chevron	oil/gas	2002/3*	314	–	1,534	onshore
Moran	Chevron	gas	2002/3*	106	–	302	onshore
Sub Total				**510**	**113**	**2,318**	
PAKISTAN							
Bhadra	Lasmo	gas	–	–	500	–	onshore
Bhit	Lasmo	gas	2H2002	–	1,000	363	onshore
Miano (Sind Province)	British-Borneo	gas	1Q2001	–	374	105	onshore
Sawan (Sind Province)	OMV	gas	2H2002	–	2,000	210	onshore
Sawan (Sind Province)	OMV	gas	2H2002	–	2,000	–	onshore
Zamzama	BHP	gas	2001	–	1,000	–	onshore
Sub Total					**6,874**	**678**	
PHILIPPINES							
Malampaya	RD/Shell	gas	2001	120 (liquids)	3,400	1,800	plat., FPS, subsea
Sub Total				**120**	**3,400**	**1,800**	
THAILAND							
Arthit	PTTEP	cond/gas	2005	12 (cond)	300	–	–
Benchamas/Pakakrong	Chevron	gas/oil	Aug-99	–	320	190	4 plats + FSO
Jarmjuree B8/32	Chevron	oil/gas	Jun-09	10	150	–	platform
Maliwan	Chevron	oil/gas	Jun-09	30	201	–	platform
Pailin phase 1	Unocal	gas	Aug-99	55	2,040	375	central plats + 5 wellh'd
Pailin phase 2	Unocal	gas	mid-2002	as above	as above	1,700	central plats + 25 wellh'd
Trat	Unocal	gas	Sep-99	16	624	100	platform
Sub Total				**123**	**3,635**	**2,365**	
VIETNAM							
Lan Tay/Lan Do	BP/Statoil	gas	2003	10	2,000	870	platform
Red River Province	Vietnam Oil & Gas/Anzoil	gas	–	–	130	–	–
Sub Total				**10**	**2,130**	**870**	
GRAND TOTAL				**5,891–6,101**	**144,626–144,726**	**26,936**	

** Note: The dates listed are for first gas production. First commercial oil production dates for Gobe, Hides, Kutubu and Moran were 1988, 1991, 1992 and 1998 respectively.*

Current and Planned Field Developments in the Asia-Pacific Region *Source: Wood Mackenzie and Petroleum Review*

ment of the North Balol, Unawa, Dholasan, North Kathana, Kanawara and Allora oil fields in Gujurat state in the west of the country, while state-owned Oil and Natural Gas Corporation (ONGC) recently short-listed 17 companies as alliance partners on six blocks it was awarded this year under the National Exploration Licensing Policy.

The Gas Authority of India (GAIL) and Shell have formed a strategic alliance to identify various projects in India's upstream gas sector, as well as evaluate import possibilities and pipeline development in the country.

Cairn Energy made a 'significant' gas discovery with its first exploration well, CB-A-1 in block CB-OS2 offshore Gujarat in May. The well tested at 28.1mn cf/ of dry methane gas, with no carbon dioxide or hydrogen sulfide. Reserves are put at 400bn cf of gas.

Indonesia

The full impact of the 1998 oil price crash and the Indonesian economic crisis was felt in 1999, with only four new licensing awards made, compared with 22 a year earlier, and a 33% fall in drilling activity, according to Wood Mackenzie. There were, however, a few bright spots – including the signing of the West Natuna gas sales agreement and Conoco's exploration campaign on the South Natuna Sea block B proving up substantial gas reserves of some 2.5tn cf. Gulf Indonesia also made a significant gas discovery in the Suban/Durian Mabok structure on the Corridor PSC, with reserves estimated to be over 1tn cf. Meanwhile, Unocal discovered the North Janaka, Bangka, and Aton oil and gas fields on the Rapak PSC and the Gandang gas field in the Ganal PSC, both of which are located in East Kalimantan.

Ten new fields came onstream in Indonesia in 1999 (see **Table 3**), including TotalFinaElf's Peciko field, offshore Makaham, with recoverable reserves of 73.7mn barrels of oil and 6,100bn cf of gas; ExxonMobil's 910bn cf NSO A field extension and Lapindo's 233bn cf Wunut field in the Brantas block.

By January 2000, a total of 162 E&P contracts were active in Indonesia. Despite recent attention on the east of the country, in particular Irian Jaya, a significant level of activity remains in the more mature western basins of Sumatra, Java, Kalimantan and the Natuna Sea – reflecting the low commercial and technical risk in operations in these better explored western basins.

A number of significant deals have taken place in Sumatra in the past 18 months. Mobil has acquired a 50% stake in the North Sumatra block A PSC from Aceh Gas and Oil for a consideration of $18.1mn. Reserves are put at 476bn cf of sales gas, with first production expected in 2002. Local fertiliser plants are expected to purchase the bulk of gas, freeing up production from Mobil's North Sumatra B block, Pase and NSO PSCs for supply to the Arun LNG plant. In the south, Sumatra Energy Equity sold its 20% stake in the Lematung PSC to operator Amerada Hess for $2.9mn. The contract includes the currently producing Harimau oil and gas field, and the 400bn cf Singa gas field that is due onstream in 2002. Pertamina has approved the sale of Saga's 50% interest in Jambi Merang to Amerada Hess and Repsol YPF for $17.7mn. The block includes 14% of the Gelam field that is being developed as part of the Corridor gas project.

Total Indonesian liquids production in 1999 averaged 1.52mn b/d – a modest 2% year-on-year decline. Gas, however, showed a 16% year-on-year increase, reaching an average of 6.58bn cf/d. The rise is attributed to increased sales to the Bontang LNG plant, a recovery in the domestic gas market, and the first full year of gas production from the Corridor PSC.

Looking ahead, the 350bn cf Kakap gas reserves – being developed as part of the West Natuna gas project which is supplying gas to Singapore – were due onstream as *Petroleum Review* went to press. A number of fields are due onstream in 2001, including the Natuna Sea block A and B gas reserves and the Oseil oil field (see **Table 3**). The 180mn barrel deepwater West Seno oil field, being developed via a mini tension leg platform (TLP) and floating production unit (FPU), is due onstream in 2002, with the 52mn barrel Merah Besar project to be developed as a satellite field in 2003.

Japan

Japan, with virtually no indigenous oil and gas resources, is heavily reliant on imports to meet nearly all its energy needs. In 1999 its primary energy consumption stood at 507.4mn toe, accounting for some 5.95% of world primary energy demand. Despite continued efforts to reduce the country's dependence on crude oil, 52.3% of Japan's energy requirements was met by crude oil in 1999. Coal accounted for a further 16.4%, nuclear power 13.7%, natural gas 12.3% and hydroelectricity 3.9%.

Japan has continued to diversify its energy balance in recent years, with LNG imports increasing significantly. However, plans to further expand nuclear production were dealt a heavy blow following a serious nuclear accident in September 1999 when high levels of radiation leaked from a uranium processing plant near Tokyo. Strong public opposition to the construction of any new nuclear power plants is putting pressure on power firms to turn to LNG as an alternative. The government, too, is keen to see a rise in the use of natural gas over the traditional dependence on oil and coal as this will help it meet its commitment under the Kyoto Protocol to reduce greenhouse gas emissions.

Japan National Oil Corporation (JNOC) assists Japanese oil companies in various oil and gas exploration projects around the world in a bid to help increase the level of Japanese produced crude oil imports. In the fiscal year 1999, 651,000 b/d of imported crude was produced by Japanese companies, accounting for 15.2% of total crude imports.

JNOC had assisted around 300 companies by end-March 2000, at which time 85 of the companies were still actively involved in the oil and gas sector. Of these 85, 50 were producing, or about to produce, crude oil and natural gas in over 30 countries. A further 35 were conducting oil and gas exploration and development work. **Table 2** summarises those E&P projects in which Japanese companies have become involved in 1999/2000.

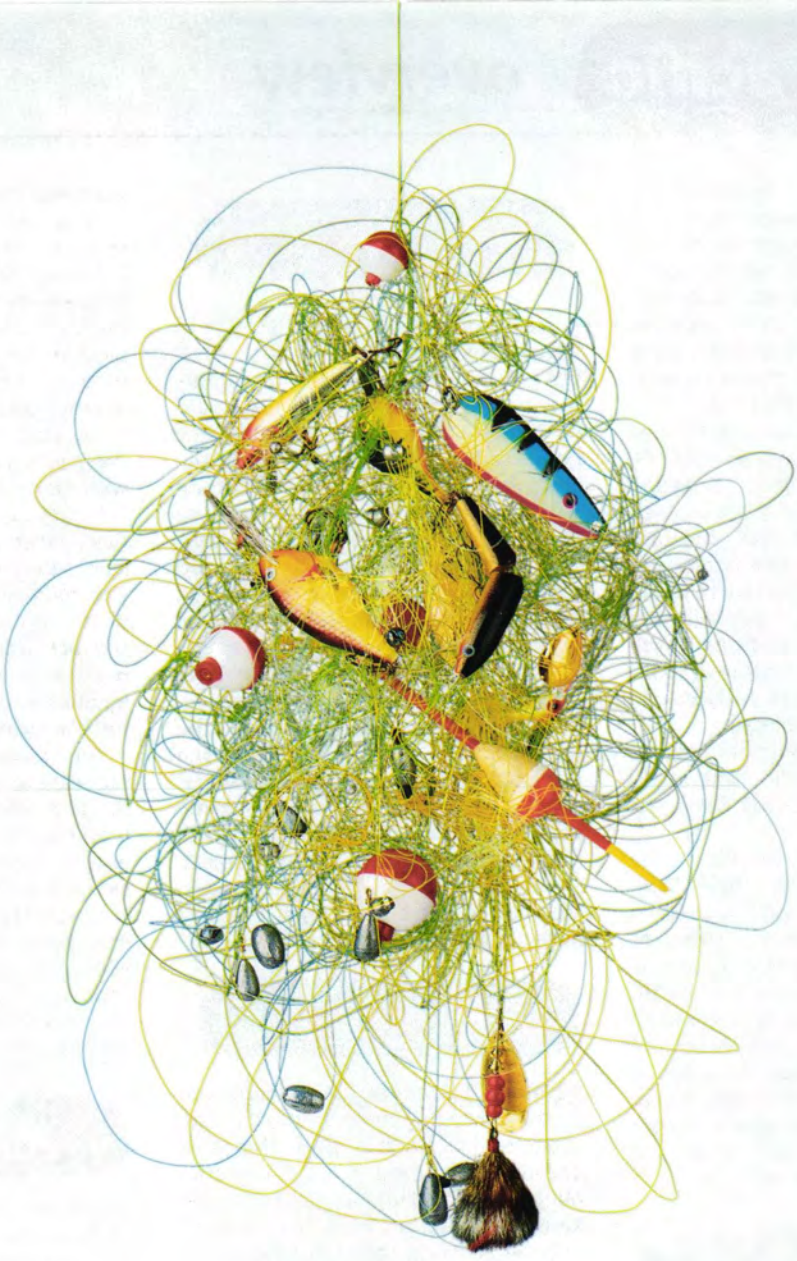
Not surprisingly, Japan has focused its E&P activities on the Asia-Pacific to date, with 33% of JNOC-assisted companies (28) working on projects in the region in March 2000. A further 16% of companies (14) are working on projects in Oceania and 12% (10) in the Middle East. JNOC is also involved in eight projects in North and South America, 11 in Europe, five in China, seven in Africa, and five in the Former Soviet Union (FSU).

Nippon Oil and Mitsubishi Oil merged in January 2000 to create Japan's largest oil company Nippon Mitsubishi Oil.

Malaysia

Although Malaysia is a major LNG exporter – primarily to Japan and South Korea – its domestic gas market became the focus of attention following the signing of a JDA gas sales agreement on 1 November 1999 (see Malaysia-Thailand JDA section).

A new player – Murphy Oil – entered the arena, signing three PSCs in 1999, covering offshore Sarawak blocks SK309 and SK311, and offshore Sabah block SBK – acting as operator in all three. Shell signed a PSC in Peninsular Malaysia. While the company already had extensive upstream interests in Sarawak and Sabah, prior to this agreement it did not



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hold any acreage offshore the Pensinsular where ExxonMobil and Petronas Carigali dominate the scene.

A key discovery in 1999 was the Sugat-1 find by Shell on the North Sabah PSC. However, given the lack of development of the local gas market, industry analysts believe the find is unlikely to be commercialised in the medium term.

Malaysian liquids production (oil and natural gas liquids) averaged 748,000 b/d in 1999, according to Wood Mackenzie, while sales gas output averaged 4bn cf/d. Petronas brought onstream the Malong (30mn barrels of oil reserves), Sotong (15mn barrels) and Anding (5mn barrels) fields offshore Peninsular Malaysia – all three developed via unmanned wellhead platforms and each linked to an FPSO. No new gas fields came onstream.

More recently, the 65mn barrel Larut oil field came onstream in 2000, as did the 1,500bn cf, 50mn barrel Resak gas condensate field.

Future projects include the ExxonMobil/Petronas Angsi field. With reserves of 1,000bn cf of gas and 95mn barrels of oil, the project is slated to enter production during 2002. Nippon Oil Exploration's Helang gas field in block SK-10, offshore Sarawak, is due onstream in 4Q2003. Reserves are put at 1,200 bn cf of gas, with output forecast to peak at 250mn cf/d. The Shell-operated Jintan field (2,800bn cf) is also expected onstream in 2003. Both Helang and Jintan will supply the MLNG Tiga plant.

Malaysia/Thailand Joint Development Area (JDA)

A landmark gas sales agreement was signed between Malaysia/Thailand Joint Authority and the operators of block A-18 in November 1999. The deal paves the way for first production from the JDA, with a target date of late 2002. Under the terms of the agreement Petronas Carigali (50%), Triton Energy (25%) and Arco (25%) will sell gas from block A-18 to PTT and Petronas on a 50:50 basis. Petronas will be responsible for the preliminary stage of the gas sales agreement, with the gas initially exported to Malaysia. Thailand will take its 50% share of the JDA gas reserves at a later date. The contract calls for a daily contract quantity of 390mn cf/d of gas and includes a take-or-pay provision specifying that the buyer must take at least 90% of the daily contract quantity.

The initial development of block A-18 focuses on the Cakerawala discovery.

Myanmar/Burma

Licensing and exploration activity in Myanmar ground to a halt in 1999, but January 2000 marked a slightly more promising future with the award of a new PSC covering EP4 to Prime Resource Management Cyprus and the spudding of two offshore wells on TotalFinaElf and Genting's respective M8 and M4 offshore blocks in February.

Onshore, MOGE made a significant discovery to the west on Yangon in 1999, and the Nyaungton field came onstream, producing some 12mn cf/d of gas and 800 b/d of condensate. Field reserves are put at 800bn cf of gas.

More recently, in mid-2000, the Yetagun field in the Andaman Sea came onstream. Field development was completed on time and on its $650mn budget, according to Premier Oil which holds a 26.67% stake in the project. Some 200mn cf/d of gas is being delivered to the gas buyer PTT of Thailand under a take-or-pay contract.

Pakistan

Pakistan's domestic fuel demand and corresponding supply shortfall are expected to double over the next decade. According to the Pakistan Ministry of Petroleum and Natural Resources, total proven recoverable oil reserves currently stand at 643mn barrels, with remaining recoverable reserves of 240mn barrels. Oil consumption has risen by 6% over the past six years, while indigenous production has remained static at about 50,000 to 60,000 b/d. The country has consumed 12.3tn cf of gas out of a total estimated 34.36tn cf of proven gas reserves.

According to Munsif Raza, Managing Director of Pakistan Petroleum when speaking at a recent conference, Pakistan has some 60bn barrels of oil reserves and 200tn cf of gas still to be discovered. However, he stressed that the country needed to revive its investment image and attract badly-needed funds to its E&P sector. Foreign investment fell after economic sanctions were imposed in 1998 following Pakistan's nuclear testing programme that was initiated in response to nuclear tests by its 'rival', neighbouring India. The country has also undergone a change of governments and has been involved in bitter rows over tariffs with its foreign-backed independent power producers (IPPs) this past year. The IPP dispute is reported to now be resolved, bar one outstanding disagreement with Hub Power Company.

In a bid to assess some of the country's as-yet undeveloped reserves, Pakistan Petroleum has contracted Western Geophysical to undertake a seismic survey in the Qadirpur West block in the Jacobabad and Ghotki districts of Sindh, as well as over the nearby Kandhkot and Badar gas discoveries. Qadirpur West is claimed to be the country's second largest gas field with more than 4tn cf of gas reserves.

Future projects include the Sawan field, which is due onstream in 2H2002. Field reserves are put at 2tn cf of gas. The field is to be developed in two phases, the first of which is expected to produce 200mn cf/d of gas. Phase two, which will involve the development of additional infrastructure, will bring a further 150mn cf/d into production.

The Government of Pakistan is reported to have introduced a new law to 'kick-start' its long-delayed programme for the privatisation of state enterprises. The first privatisation target is expected to be the LPG sector. The new law is understood to make it mandatory for the government to use 90% of privatisation proceeds to lessen the country's mounting national debt. The remaining 10% will be used in 'poverty alleviation programmes.'

Papua New Guinea

The development of Papua New Guinea's vast gas reserves will take off with the commissioning of a gas export pipeline between PNG and Queensland, anticipated in 2004. As a by-product of the PNG-Queensland gas project, propane and butane will be removed from the gas stream at an offshore processing facility for processing to LPG. It is also expected that the oil leg of the project at the currently producing Moran field will undergo full field development in 2001.

Although the 6tn cf Hides gas field in the Papuan Basin will be integral to the PNG-Queensland gas project, it is not expected to be included in the initial development phase that will encompass the development of gas reserves at Moran, Kutubu and Gobe (which are already producing oil). Hides is expected onstream post-2007. The pipeline project is expected to supply Queensland with up to 600mn cf/d of gas over 30 years.

Phillippines

The most significant licence change in the past 18 months was the govern-

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ment approval in November 1999 for Texaco acquiring a 45% stake in the Shell-operated Malampaya-Camago deepwater gas fields. PNOC negotiated a 10% stake in the project shortly thereafter. The development is due onstream in 2001, with gas production targeted at 400mn cf/d in 2003 and peak liquids production of 25,000 b/d in 2007. Reserves are put at 3.4tn cf of gas and 120mn barrels of liquids.

A key discovery was PNOC's Sultan Sa Barolngis find on block GSEC73A in the Cotabajo Basin in 1999. Reserves are put at some 60bn cf of recoverable gas. A proposed $40-50mn, 60-MW combined-cycle power plant could provide a potential market for the gas if the field proves commercial.

In August this year, BG International announced that its First Gas Holding joint venture's 1,000 MW Santa Rita power project in the Philippines entered full commercial production. Power generated from the $890mn project is being supplied to the Manila Electric Company, the country's largest electricity distributor, under a 25-year contract. Santa Rita has initially been operated on condensate fuel until the Malampaya gas field comes onstream. The field will then provide gas to fuel the power plant for 22 years. The Santa Rita plant – together with the 500-MW San Lorenzo power project that began construction in June and is due to be commissioned in 2002 – forms a key component of the Philippines strategic Malampaya Gas-to-Power project which will supply more than 20% of the electricity demand of the main island (Luzon) by 2002.

South Korea

(See *Petroleum Review*, January 2000.)

Taiwan

(See *Petroleum Review*, August 2000.)

Thailand

A lack of attractive acreage in a mature province and the current oversupply of gas to the Thai domestic market have led to lower levels of new license awards and well completions in the past 18 months. However, the licensing process has been modified in a bid to facilitate more flexible bidding and a recent licensing round put out to tender all currently open acreage. A total of 87 blocks were offered, including five onshore blocks in the northern Intermontane Basin, 17 onshore the Central Plains, five onshore the Southern Plains, eight offshore in the Gulf of Thailand and four in the Andaman Sea.

Three new fields came onstream in 1999 – Unocal's Trat field, with recoverable reserves of 16mn barrels of liquids and 624bn cf of gas, and its Pailin field in block B12/27 with 55mn barrels of recoverable liquids and 2,040bn cf of gas; and Chevron's Benchamas/Pakakrong project in block B8/32 which has reserves put at 38mn barrels of liquids and 320bn cf of gas.

Total liquids production in 1999 averaged 82,000, a 9.6% increase year-on-year. Thai gas sales continued an upward trend, reaching an average of 1,800mn cf/d, an increase of 9.9% year-on-year. Thai gas production fell in the 1H2000, however, as imported contracted gas from Myanmar displaced domestic production.

The PTTEP-operated Bongkot gas field in the Gulf of Thailand produces 550mn cf/d of contracted gas, supplying nearly one-third of the country's gas demand. The latest phase of field development to maintain this daily contract quantity is currently underway and involves the construction and installation of two further wellhead platforms and drilling of a further 42 wells.

Future projects include Chevron's Jarmjuree field located in block B8/32, close to the producing Benchamas and Maliwan fields. Although reserves figures are not available for Jarmjuree, the B8/32 concession has proven and potential reserves of 3tn cf of gas and in excess of 350mn barrels of oil. Unocal Thailand's Arthit field in the Gulf of Thailand is due onstream in 2005.

Vietnam

Prospects could be regarded as 'encouraging' in Vietnam, reports Wood Mackenzie. Three new licence awards were made in 1999 – blocks 07 and 08 to Vietnam American Exploration, block 52/97 to Unocal and block 16-1 in the Cuu Long Basin to Soco – and there has been a continued rise in liquids and gas production.

Vietnamese oil production in 1999 averaged 15mn tonnes, a 19% increase on 1998 despite the fact there were no new field start-ups. The majority of the increase is attributed to rising production from the Rang Dong and Ruby fields that came onstream in 1998 via early production systems. Gas production averaged 136mn cf/d, an increase of 40% on 1998 output. Gas is produced solely from the Bach Ho fields. Wood Mackenzie predicts that gas production will slow down over the next few years as output from Bach Ho reaches plateau at 150mn cf/d. However, start-up of BP's Lan Tay/Lan Do field – which is expected onstream in 2003 at the earliest – is likely to more than double current levels of gas production by the end of the decade. Development of the field is intended to underpin a wider Nam Con Son gas utilisation scheme, under which a 400-km pipeline will be built to Phu My, close to Ho Chi Minh City. This will provide sufficient spare capacity to transport gas from other nearby discoveries.

A BP and Statoil-led consortium is understood to be planning to sign a gas sales agreement with PetroVietnam covering the Lan Tay/Lan Do natural gas reserves in block 06.1 in the near future. The $1.5bn deal is claimed to be the country's biggest ever foreign-invested project to date. The block is reported to be the first of three gas fields that BP and partners plan to develop once other outstanding agreements with PetroVietnam are finalised. The other fields are located in nearby blocks 05.2 and 05.3 in the South China Sea.

Timor Gap Zone of Cooperation (ZOC)

Last year saw the East Timorese people vote for independence from Indonesia with the result of civil unrest and subsequent UN intervention. Although the impact of the political changes on the validity of the treaty signed by Indonesia and Australia regarding upstream development in the Zone of Cooperation remain to be fully resolved, discussions continue and it is hoped that a new Timor Gap Treaty will be agreed shortly. Under the terms of the original Treaty, royalties from the disputed territories were evenly split. However, East Timor is seeking a 90% share of the royalties based on a mid-point boundary claim between Timor and Australia.

Elang/Kakatua/Kakatua North are the only currently producing oil fields in the region. Recent estimates of recoverable and proven reserves have increased by 37%, or 5.5mn barrels, to 21.5mn barrels. The fields have already produced some 16.3mn barrels. Current output rose earlier this year to 20,000 b/d following the drilling of a sidetrack well from Elang-1 and remedial work undertaken on the Elang-2 and Kakatua North-1 production facilities. The increased reserves are expected to keep the project in production into 1H2002.

First liquids production from Phillips Petroleum's large Bayu-Undan gas and condensate project is expected in late

contined on p60...

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- **Kiala Ngone Gabriel, Head of Angolan Industrial Development Institute, Ministry of Industry**
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President Dos Santos, Angola's Head of State, has directed that the programme look beyond the immediate concerns of oil developments and at the wider impact of oil and gas in Angola. The international oil industry in Angola has already reacted enthusiastically to the President's suggestion and significant parts of the programme are devoted to these issues.

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The facts of the matter

In the course of the recent UK oil supply crisis it became clear that the various parties involved were not making full use of the available data sources. *Petroleum Review* asked *Nigel Lang*, Managing Director of Catalist, how much use had been made of the databases his company researches and maintains.

Q You operate a database of UK forecourt information. How up to date is the data and are there rival forecourt database companies or organisations?

A The Catalist database follows the principles of 'The 3 Cs' which means that the information must be Complete (every petrol station), Current and Consistent. Five years ago we surveyed every petrol station in the country and collected about 80 pieces of data for every site as well as digital photographs and accurate map grid references. It is kept up-to-date by constant monitoring of the market through customers, suppliers, dealers, media, fuel card transactions and most importantly, a network of people actually in the field, re-visiting sites.

There are a number of organisations that have data about petrol stations for a variety of purposes and we work in cooperation with many of these organisations to maximise of quality of everyone's information.

Q In the recent UK fuel crisis did you receive large numbers of additional requests for information?

A We received a great many requests during the fuel crisis but they were very ad hoc and we could not ascertain any clear lines of communication between official bodies. For example, we were contacted on Day 3 of the crisis by one high profile Government Department who found us via the Institute of Petroleum Library, despite the fact that another Government Department has been using our data for six months and in fact published it on their web site!

Q You produce mapping systems with site locations. Would this be suitable for people doing strategic planning for priority fuel supplies – Government, Police, Ambulance etc.?

A Once you have complete data then the mapping systems are an indispensable tool for the planning and monitoring of supply. After one of our Directors appeared on local TV on Day 4 we were contacted by the local police who spent half a day using the data and mapping systems to re-assign the designated (priority) sites in their area. With the benefit of hindsight this could have been ready before Day 1 had optimum use been made of available resources.

Q Did such groups approach you during and after the crisis?

A We find the people 'at the sharp end' want more involvement from Catalist but it has proved very difficult to talk to the right people about centralised coordination.

Q Did the oil companies draw on your services for their strategic planning and War rooms?

A At individual oil company level most of them already use our data and there is nothing we could add as they obviously have the most up-to-date information on their own sites. Where we could have been used was in coordination between brands and optimising the locations for designation of priority sites.

Q How do you think you could help in the event of another emergency? Who would most benefit from your services?

A Speed and quality of response is obviously vital and there is no substitute for detailed planning. The combination of the complete database and computer mapping systems enables us to support the planning and coordination once policy has been agreed. For example, once the criteria for site designation has been defined by all the relevant services this could be fed into the database and the locations optimised against any number of criteria such as distance to supply, proximity to hospitals, vehicular access, queuing space, security etc.

Q In the last emergency there were considerable problems with queuing vehicles blocking roads and gridlocking districts. Is your site mapping on a scale that could help in determining which sites are suitable for use as priority sites in an emergency? Could your maps be used in War rooms? You have digital photographs of every UK forecourt in operation. Do these provide useful information about access and egress from the sites?

A The UK has the best mapping in the world thanks to Ordnance Survey and this can be easily manipulated using computer mapping systems that most of the emergency services, oil companies, distributors, government departments and other related organisations have on their desktops. We are now supplying mapping for use on intranets so it is no longer the preserve of a few technicians but instantly available to every user in the organisation. The intranet software provides access to petrol station data, photographs, maps and local data relevant to each specific organisation.

A key lesson that must be learned from last time is that the final stage of planning has to be at local level. The benefit of utilising national data and common systems is that solutions are consistent across the country yet appropriate to local situations.

Q Do you have records of the number and location of forecourts that could be made operational but are not currently in use? Can you confirm that for safety reasons the fuel tanks on such sites are filled with water? Roughly how many operational (or near operational) UK forecourts are there that are not in use?

A We hold data on every location that is or has been a petrol station in the last five years (when there were 17,000 sites). Non-operational sites are categorised as Closed (1,400 sites), Out of Industry (1,650 sites) or Obsolete (800 sites) so it would be straightforward to contact all closed and Out of Industry sites to verify if they could be made operational.

Q Does your mapping include the locations of the UK refineries and the oil products supply pipelines? If not could they be easily added? Would this be useful in planning direct pipeline linkages from refineries and supply pipelines directly to forecourts?

A Any geographical data can be added to the mapping system and easily integrated with data already available.

Training to fuel the front line

In today's turbulent political environment the next armed conflict or humanitarian disaster is hard to predict. Anywhere and at anytime our Armed Forces may be asked to deploy to some foreign shore to provide assistance, to keep the peace, or to fight to make peace. Army engineers, known as Sappers, ensure the support infrastructure is in place. This summer saw a major aviation fuelling exercise.

The skills of our soldiers, sailors and airmen are recognised throughout the world. But just like anyone else, they are unable to function for an extended period without the appropriate infrastructure to support them. In many cases this may simply not exist or may have been destroyed, and that's when the Army's Royal Engineers are called in. Ports, airfields, roads, bridges, power, water and fuel will all be required.

The Corps of Royal Engineers is responsible for the assessment and repair of existing facilities and the construction of temporary or permanent installations as required. Being ready to do this at a moment's notice is an important part of the Corps' remit and exercises to rehearse the necessary skills are regularly undertaken. In June this year Army engineers practised their ability to move bulk aviation fuel from a simulated ship anchored offshore to an airfield in Cyprus to refuel the Royal Air Force's thirsty aircraft. A temporary fuel system incorporating barges, storage, a cross-country pipeline and aircraft hydrant refuelling equipment was constructed, commissioned and handed over to members of the Royal Logistic Corps and the RAF to operate.

The exercise was carried out at RAF Akrotiri, located on a peninsula in the southwest of Cyprus close to Limassol. The airfield is one of several British Forces bases in Cyprus and provides support to the troops stationed on the island and further afield. It provides a good location for exercising capabilities in hot, dry climates as temperatures in June are typically around 30°C.

The fuel system

Armed Forces standard tactical fuel handling equipment was used to construct the temporary fuel system. The equipment has largely been in service since the late 1960s and is due for replacement soon. Although it is manpower intensive, it is still effective and was used successfully to achieve the aim in this case, as it has been in a range of conflicts and exercises over the years.

The current equipment is component-based allowing reconfiguration to meet a range of different circumstances. Future equipment is likely to be procured to deliver complete fuel systems with increased use of skid-mounted or containerised equipment.

Ship to shore

Towed flexible barges, or dracones, which are approximately 70 metres long and hold 300 cm of fuel each, were used to move fuel at sea to a point close to the shore. Manufactured by Dunlop GRG from a nitrile rubber/nylon/neoprene laminate, the barges are used by industry for a range of purposes

including the transportation of petroleum waste and fuel slops at sea.

They arrive on site rolled up, are launched into sea and, once filled, they float largely due to the lower relative density of fuel. (Aviation fuel has a density of approximately 825 kg/cm.) Filled barges are then towed by boat to a point close to the shore where they are moored to a raft that is provided with hydraulic power from the beach. The barge discharge hose is then connected to pipework on the raft, which is manufactured by Alan Cobham Engineering. A hydraulically driven pump in the nose of the barge, powered from the raft, is used to pump the fuel contents to storage on the beach. The additional complexity of placing the transfer pump on the barge rather than on the raft is justified as the weight of the pump in the water deforms the end of the barge into a natural sump into which fuel flows allowing almost all the contents to be removed.

Storage

Fuel was stored in flexible tanks shaped like large, black pillows, manufactured by Dunlop, the tanks can store 136cm (30,000 gallons) of fuel each and are placed within earthwork bunds provided with a liner. Interconnecting pipework of aluminium alloy is used to allow for receipt, inter-tank transfer and delivery.

Pipeline

A surface-laid cross-county pipeline was constructed in two material types. Aluminium alloy pipe of 150-mm nominal diameter, manufactured by Victaulic in 6-metre lengths, suitable for 40 bar pressure and featuring the company's proprietary jointing system, was used in those sections of the pipeline exposed to greater pressures. While the joints in this alloy pipe have some degree of flexibility, care is needed to ensure that the line has only gradual changes in horizontal and vertical profile.

In other areas, 150-mm flexible hose in 50-metre lengths, suitable for 12 bar was used. The pipeline was driven by duty and standby Tangie Deutz 2 cm/min at 28 bar pumps. Testing was closely controlled using compressed air at very low pressure and also with water to one- and-a-half-times the intended operating pressure.

Hydrant refuelling equipment

Aircraft refuelling must be conducted within closely defined flow and pressure conditions to suit the aircraft. For obvious flight safety reasons the highest standards of fuel quality are required and exact fuel quantities must be measured

and compared with the on-aircraft gauges. Flow was adjusted to suit demand at the delivery pump and Alan Cobham hydrant control valves were used to limit pressure to between 1.7 bar and 3.8 bar. Accurate fuel bulk meters were included in the system and regular quality checks were carried out.

Design considerations

A number of design considerations had to be taken into account when developing the fuel system.

Increased evaporation

The air temperature in Cyprus in June varies between approximately 10°C at night and 30-plus °C during the day. All the fuel equipment in use was out in the open and in direct sunlight. These high temperatures affect the rate of evaporation from fuel in storage. The flash point of aviation fuel is in the region of 38°C. Although a Class II fuel under normal conditions, in the heat of the day the fire and explosion risk presented at the storage locations was almost that of a Class I product.

Thermal expansion

As the temperature varies, thermal expansion effects also occur in a pipeline:

- The pipeline increases in length. For alloy pipe in the sort of conditions experienced in Cyprus, this can be as much as 200 mm per 100 metres. This can lead to the pipe buckling and breaking like a thin strut if it is not free to move. This problem was overcome by the incorporation of expansion loops at intervals along the pipeline.
- There is a volumetric increase in the storage capacity of the pipeline and of the fuel it contains. This is the more significant effect from the fuel system designer's point of view. A 10°C temperature rise will lead to a 0.9% increase in fuel volume, but only a 0.07% increase in the internal volume of the aluminium alloy pipe. If the fuel is constrained between closed valves as the pipe and its contents are warmed, then the resulting thermal expansion can lead to large increases in pressure that are more than enough to rupture the pipe. In practice, the theoretical increase is not observed due to leakage across valves and movements at joints, but amelioration measures are still required. Two measures were used – a system of pressure relief valves and close control of operation to ensure that when not pumping a route for fuel expansion to storage was always available.

Transient conditions

Sudden changes in velocity lead to a transient condition in which a pressure wave travels at high velocity along the pipeline and is continually reflected from end to end while concurrently reducing in magnitude. Instantaneous velocity changes are possible on valve opening/closure or on pump failure. The magnitude of the pressure wave can be considerable and in fuel will travel at a speed of approximately 1,300 m/sec. The use of a low fluid velocity and valves with ratchet handles to prevent fast opening/closure controlled these unwelcome pressure surges. In addition, the anticipated maximum pressures due to the sum of surge and operating pressures were designed to be within the system safe pressure.

Static electricity

Static electricity can present a problem in two areas and is potentially a very hazardous situation as it could lead to the possibility of a spark occurring in a fuel/air atmosphere.

- The movement of fuel in the pipeline generates electrical charge. This is unavoidable and occurs both in alloy pipe and in the flexible hose. Its effects are minimised by the use of a fluid velocity around 2 m/sec. In the case of the alloy pipe, the charge readily escapes to ground, but the effect is more pronounced in the non-conducting flexible hose. A 30-metre run of alloy pipe with appropriate earthing was employed at the end of the flexible hose before the fuel entered the pipeline termination storage to provide a good route to earth.
- Incoming aircraft, particularly helicopters with their large rotating blades, can have a significant electric charge on arrival at the refuelling point. To ensure safe refuelling, two safety measures were used – the aircraft were earthed, and the aircraft and refuelling equipment were equipotentially bonded together.

Anchors and pipe guides

The alloy section of the pipeline was designed to be free moving longitudinally between expansion loops with pipe guides being used at these points to prevent bending stresses being introduced at the joints. Pipe anchors were constructed at bends of 45° or more and on sloping ground with a gradient in excess of 1:10, as the friction between the ground and the pipe is insufficient to restrain it adequately.

Entrained air

The creation of pockets of air within the pipeline is inevitable when it is filled prior to hydrostatic testing. Even when water is introduced slowly, air gathers at high points and becomes trapped and compressed. It is important to allow this air to escape before pressurising the line to prevent pockets of air being raised to dangerously high pressures. This was done by placing air release valves at high points and by pumping a small quantity of water through the line before testing began. Similar pockets of air/fuel vapour are formed in the line as it is packed with fuel and the same process was used to eliminate them. The creation of air/vapour pockets during decommissioning was avoided by pigging the pipeline. This involves forcing a foam cylinder, the 'pig', through the line under controlled pressure conditions.

Fuel quality

Quality concerns in respect of fuel for aircraft are paramount. A stone and sand trap was used at the beginning and end of the pipeline to provide a coarse filter. In addition, fuel was filtered and stripped of water by being passed through a coalescer both at the beach storage area and directly prior to entering the aircraft hydrant refuelling system. Quality checks were also carried out at points throughout the system in order to ensure appropriate standards.

Environmental issues

The Armed Forces take environmental issues very seriously. A fuel exercise of this type clearly attracts attention and great care must be taken to minimise the potential for pollution and to plan appropriate responses should it occur. In particular, careful consideration was given to how the fuel could be successfully removed from the system during decommissioning. This was achieved by pipeline pigging and careful placement of fittings to allow withdrawal of residual fuel. No fuel was released into the environment during the exercise.

Infrastructure delivery

Having completed the construction and commissioning of the fuel system, it was handed over to Royal Logistic Corps and RAF fuel operators to run. This temporary infrastructure was effectively used to deliver fuel to the airfield and to refuel Hercules C-130 transport aircraft operating from Cyprus over a period of two days.

The exercise was a great success and proved the ability of the Royal Engineer design and construction force, working together with Army and RAF fuel operators, to provide safe fuel to land-based aircraft from a source at sea. The in-service equipment was effective, if manpower intensive and, in the hands of the Sappers, proved capable of providing the fuel infrastructure our Armed Forces need to carry out their missions.

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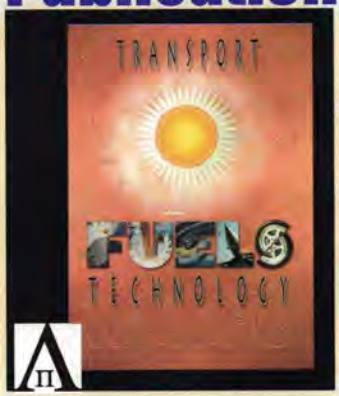

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Truck manufacturers take telematics onboard

Europe's truck manufacturers have been slow to react to the operating industry's growing use of telematics, but the situation is changing rapidly and most have now joined the fray. Luckily for them, the telecommunications industry is still improving its technology and they could still be in time to profit from the communications revolution. *Gibb Grace* reports.

Figure 1: Truck manufacturers such as Mercedes-Benz are moving into telematics

Information technology (IT) has taken a while to catch on in the road transport industry, but advances in the vehicle's themselves and continual pressure to increase productivity has hastened its development in recent years. Traditionally, drivers have communicated with depots and company offices by phone but, according to Volvo, such communications will be increasingly sent, in the future, as data files via the Internet. Using powerful, in-cab computers, drivers will be every bit as online as their colleagues back at base. The only difference will be that the mobile computer will access the Net via GSM (global system for mobile communications) mobile phone technology rather than a fixed landline.

Volvo's first fleet management package – Dynafleet – was originally launched in 1996 and updated to Dynafleet 2.0 in spring 1999. It uses a Windows-based programme to interface with a customer's existing computer network. It can also interface with GPS (global positioning system) to give the vehicle's position and use the short messaging system of the GSM mobile phone network to send and receive short text messages. At the beginning of this year, more than 1,000 Volvo trucks were using Dynafleet.

Spurred on by this interest from operators, Volvo has established an independent business unit – Volvo Transport Systems – with a head office in Gothenburg, Sweden. Director Jens Wergeland says: 'Our task is to integrate the truck into the logistical chain, and with Dynafleet the truck is always online.' Wergeland plans to sell 9,000 Dynafleet packages and reach a turnover of SKr100mn ($11.7mn) this year.

Scania was a bit slower off the mark than Volvo, but it too, has now established a special IT company called Infotronics. The company is also looking to use the Internet as a communications medium and although it is still in the early days, Managing Director, Peter Gillbrand says: 'Communicating via the Web will become as common and as natural as washing the windscreen or making a cup of coffee.'

An open approach

A major problem in applying IT to trucks is that new vehicles can take up to five years to develop and have only a ten-year life, whereas new IT developments are often overtaken within six months to a year. Gillbrand says that the challenge for Infotronics is to bridge the gap between these two worlds. Up until now, buying an

onboard system has tied the user into the associated software that may not deliver exactly what is needed. Scania's solution however, has been to create an 'open architecture' that can accept a variety of solutions.

Among these is Ericsson's GSM Pro concept that was launched in Europe in 1998. The system was developed to meet the needs of professional users who have traditionally used private mobile radio (PMR) to communicate. Scania claims GSM Pro retains the reliability and functionality of the GSM networks, with their unparalleled coverage, and can use GSM services such as messaging, data transmission and Internet access. The same phone can be used for both conventional GSM and PMR type services. And not least, the PMR function allows group communications without the cost and delay of having to build and operate a private network and the need to apply for a radio licence, states the company.

French manufacturer Renault V.I. has chosen to use satellite communications and has recently formed a partnership with the Euteltracs division of Alcatel, a leading European mobile communications company which already serves some 500 companies in Europe. Renault V.I. will promote and sell the Euteltracs equipment and is able to factory-fit it to any of its truck products. The latest version of Alcatel's management software – Fleet Manager 3.0 – is designed to integrate the Euteltracs data into existing information systems, and thus adapt to the requirements of an individual fleet.

Mercedes-Benz, who are the world's largest truck manufacturer, launched FleetBoard earlier this year, an all-embracing telematics system that uses GSM mobile phone and Internet technology to improve vehicle productivity. Theodor Maurer, Head of Telematics for the Trucks Business Unit believes it is only a matter of time before trucks are fully integrated into transport logistics operations. The main problem, he said, was to find the right communications format. The principle behind FleetBoard is that onboard data is accessed remotely using the short message service of the existing GSM mobile phone system. This information is then analysed by a specialised Bureau located in Stuttgart, Germany, and is placed on a dedicated server that can be accessed by users via the Internet.

Future progress

Although the truck manufacturers appear to be late in accepting the communications challenge, in truth, the technology is still in its infancy and much progress can be expected over the next few years. Even today, vehicles such as the Mercedes-Benz Actros use an advanced CAN (controller area network) data bus that transfers data between the various component system electronic control units (ECUs) at 500 kb/sec; onboard systems generate far more data than the existing telecommunication systems can cope with.

Figure 2: Next-generation telematics promises to revolutionise transport management

The weakest link is the current GSM mobile phone network. While its coverage across most of Europe is good and its short message service is the cheapest wireless communication currently available in Europe, it can only transfer data at 9.6 kb/sec – not enough to make telematics a real proposition. The new WAP (wireless application protocol) will improve matters somewhat, but the advent of general packet radio system (GPRS) or GSM2, with its more powerful data protocol, will increase transmission speeds significantly.

However, the industry will have to wait for the roll out of the universal mobile telecommunication system (UTMS) to achieve a real breakthrough. UTMS, which promises transmission speeds up to 200 times faster than current technology permits, could be with us as early as 2002.

With these continuing improvements in the telecommunications service, it is important that which ever system is adopted, it has the capacity to profit from such changes. Mercedes-Benz for one has promised it will continue to expand its FleetBoard product as these services become available.

Mercedes-Benz sees a growing demand for telematics in the future and has designed is FleetBoard system accordingly. The system can, and will, be extended to collect trailer and semi-trailer data. Because it uses an open platform, it will also accept administrative systems such as order acquisition, inventory control plus invoicing etc. At the same time, 'certified systems partners' will supply products that can selectively expand FleetBoard's functionality at no extra cost to the user. FleetBoard's software portfolio already covers trip planning, order management, vehicle locating and tracking, and route monitoring.

As Jens Wergeland of Volvo says, the transport industry is growing away from competing on products to competing on IT solutions. From small beginnings just a few years ago, telematics is emerging as an important, if not the most important means of improving productivity. Certainly, the truck manufacturers are taking the subject very seriously indeed, and their involvement could help revolutionise fleet management as we know it today.

So far, the manufacturers have tended to focus on long distance transport and, as yet, none of the companies mentioned has entered into a contract with an oil company. In the UK, these systems have not yet been reconciled with the provisions of the Institute of Petroleum's 'Petroleum Road Tanker Design and Construction' standard and oil company operational/safety requirements in terminals. That aside, the potential for use by the oil and gas distribution sector is there as most logistics systems use an 'open architecture' that is able to integrate with existing management systems.

Complexities of oil demand defy simple policies

Bold measures to step up crude oil production or to release oil from storage make good politics but poor logistical sense. Eight principal categories of petroleum products – and numerous sub-categories – supply a multitude of diverse markets, differing widely in prices and in elasticities of supply and demand. Additional supplies take many weeks to work their way through to ultimate markets, writes *Fred Thackeray*.

The sheer complexity of petroleum demand is strikingly illustrated in the accompanying tables, derived from the latest annual compilations of world energy statistics published by the IEA*.

Both the regional make-up of products demands and their rates of growth display variations of major commercial consequence. The data selected for **Tables 1** and **2** covers three key aspects of inland demand: the rapid growth of demand for gas/diesel in all regions except the FSU, in contrast to the sharp decline of demand for heavy fuel oils; the rapid growth of demand for natural gas which is partly due to ousting heavy

	1993	1998	% change 1993–98
World excl. FSU			
Gas/diesel (,000 b/d)	15,765	17,725	+12.4%
Heavy fuel oil (,000 b/d)	7,554	7,036	–6.9%
Total fuel oils	*23,319*	*24,761*	*+6.2%*
Natural gas (bn cm)	1,491	1,773	+16.9%
Natural gas (,000 boe/d)	24,850	29,550	+18.9%
Ratio nat.gas/fuel oils	*1.07*	*1.19*	–
OECD Europe			
Gas/diesel (,000 b/d)	4,826	5,229	+8.4%
Heavy fuel oil (,000 b/d)	1,573	1,371	–12.8%
Total black oils	*6,399*	*6,600*	*+3.1%*
Natural gas (bn cm)	354	431	+21.8%
Natural gas (,000 boe/d)	5,706	6,947	+21.8%
Ratio nat.gas/fuel oils	*0.9*	*1.05*	
OECD North America*			
Gas/diesel (,000 b/d)	3,589	4,085	+13.8%
Heavy fuel oil (,000 b/d)	1,243	1,234	–0.7%
Total black oils	*4,832*	*5,319*	*+10.0%*
Natural gas (bn cm)	676	720	+6.5%
Natural gas (,000 boe/d)	10,896	11,606	+6.5%
Ratio nat.gas/fuel oils	*2.25*	*2.18*	–
Latin America			
Gas/diesel (,000 b/d)	1,009	1,363	+35.1%
Heavy fuel oil (,000 b/d)	477	566	+18.7%
Total fuel oils	*1,486*	*1,929*	*+29.8%*
Natural gas (bn cm)	64	92	+43.8%
Natural gas (,000 boe/d)	1,032	1,483	+43.8%
Ratio nat.gas/fuel oils	*0.69*	*0.77*	–
Asia (excl. Japan)			
Gas/diesel (,000 b/d)	2,500	3,231	+29.2%
Heavy fuel oil (,000 b/d)	1,589	1,777	+11.8%
Total fuel oils	*4,089*	*5,008*	*+22.5%*
Natural gas (bn cm)	109	147	+34.9%
Natural gas (,000 boe/d)	1,757	2,369	+34.9%
Ratio nat.gas/fuel oils	*0.43*	*0.47*	–
FSU			
Gas/diesel (,000 b/d)	986	778	–20.1%
Heavy fuel oil (,000 b/d)	1,546	1,060	–31.4%
Total fuel oils	*2,532*	*1,838*	*–27.4%*
Natural gas (bn cm)	636	555	–12.7%
Natural gas (,000 boe/d)	10,252	8,946	–12.7%
Ratio nat.gas/fuel oils	*4.0*	*4.9*	–

**OECD North America comprises US, Canada and Mexico.*
Note: Conversion of natural gas to barrels of oil equivalent (boe) using factor of 6,000 cu ft/b.

Table 1: Inland consumption of gas/diesel, heavy fuel oils and natural gas, 1993 and 1998

fuel oil; and, in **Table 2**, the strong persistence of demand for motor gasoline, still the oil industry's biggest market.

Several significant features can be usefully singled out for the period 1993–98 (comprehensive data for 1999 is not yet available):

- World totals show gas/diesel consumption up by over 12%, whereas heavy fuel oil consumption dropped almost 7%. Natural gas consumption over the same period jumped about 17%.
- In Western Europe, the contrast between heavy fuel oil (down 12.8%) and natural gas (up 21.8%) was particularly marked.
- Latin American petroleum and natural gas consumption are both comparatively small but increasing at very high percentage rates, including all three products – gas/diesel, heavy fuel oil and natural gas.
- Asian demand for all fuel oils and natural gas has been growing very rapidly and – not shown in the tables – has now resumed rapid expansion after the economic setback in 1997/98.
- Only in Western Europe is gasoline demand stagnant.

The newly published statistics provide the basis for a number of other significant analyses for which the necessary information is not elsewhere available.

Of particular interest is the information on the consumption of gas/diesel, kerosine and aviation fuels. From a refining viewpoint these three constitute the broad category of middle distillates (ignoring for lack of data the inclusion of a small quantity of avgas along with jet fuels in the published data for aviation fuels). In 1998 the proportions of these in middle distillates' demand (also shown as a total in the **BP Annual Statistics of World Energy** at 1,177.6mn tonnes) were: gas/diesel 76.6%; kerosine 6.8%; jet fuels 16.6%.

	1993	1998	% change
World excl. FSU			
Motor gasoline	17,805	19,406	+9.0%
Total oil	68,038	74,061	+8.9%
Gasoline % of total	26.2%	26.2%	–
OECD Europe			
Motor gasoline	3,192	3,173	–0.6%
Total oil	14,480	15,615	+8.0%
Gasoline % of total	22.0%	20.3%	–
OECD North America			
Motor gasoline	8,632	9,491	+10.0%
Total oil	21,113	23,093	+9.4%
Gasoline % of total	40.9%	39.7%	–
Latin America			
Motor gasoline	1,024	1,237	+20.8%
Total oil	3,814	4,763	+24.9%
Gasoline % of total	26.8%	26.0%	–
Asia (excl. Japan)			
Motor gasoline	1,389	1,726	+24.2%
Total oil	8,261	10,937	+32.4%
Gasoline % of total	16.8%	15.8%	–
FSU			
Motor gasoline	1,064	850	–20.1%
Total oil	5,905	3,729	–36.9%
Gasoline % of total	18.0%	22.8%	–

Table 2: Shares of motor gasoline in total* oil consumption, 1993 and 1998, in ,000 b/d

It is even more significant, however, to separate from the gas/diesel figure, the share of automotive diesel. In a paper presented by Shell at a conference in Singapore in 1998, estimates were presented in graphical form showing demand in 1995 and forecast for 2010. For 1995, as in the IEA's new publications, total world gas/diesel demand was 17.3mn b/d, of which about 7.5mn b/d was automotive diesel. By 2010, the total was forecast to rise to about 28mn b/d. Within this total automotive diesel was forecast to jump more than twofold to about 18mn b/d, while other uses of gas/diesel remained virtually static at about 10mn b/d.

Such estimates have powerful implications for the environmental lobby and commercially for the developers of Fischer-Tropsch gas-to-liquids (GTL) who aim to produce low emissions, high cetane diesel as their principal products.

**Several publications, but principally:* Energy Statistics of Non-OECD Countries, *2000 Edition, and* Natural Gas Information, *1998 and 1999 Editions.*

IP THE INSTITUTE OF PETROLEUM

Branch News

Endress & Hausing Systems and Gauging Ltd has been awarded a commemorative plaque to mark its 50th anniversary of IP Membership. The award was presented to Keith Taylor, General Manager of Endress & Hauser at the IP North East Branch's Dinner on 4 October by IP Director General Jeff Pym. The company (previously Whessoe Varec) joined the Institute in January 1949 and has succeeded in maintaining its membership continuously throughout half a century. When presenting the plaque, Jeff Pym said: 'Endress & Hauser has been with the IP through much of its evolution to the organisation it is today'. He also added that he hoped that one of his successors would one day be able to mark the next 50 years of Endress & Hauser membership.

IP Week 2001

THE INSTITUTE OF PETROLEUM

London: 19–22 February

The Institute of Petroleum's 'IP Week' is the focal point in Europe each year when leading figures in the oil and gas industry travel to London for an intensive round of conferences, industry and trade association events, company meetings and social functions. The Institute's own programme of events forms the core of these activities.

The programme of events will include:

Monday: 19 February

International Finance Conference

Tuesday: 20 February

Seminar in cooperation with the International Bunker Industry Association

IBIA
THE INTERNATIONAL BUNKER INDUSTRY ASSOCIATION

Seminar in cooperation with Wood Mackenzie

WOOD MACKENZIE
global consultants

Seminar in cooperation with Cambridge Management Consulting

Cambridge Management Consulting
BUILDING THE NEW ECONOMY

Seminar in cooperation with Andersen Consulting

Andersen Consulting

IP Annual Luncheon held at the Dorchester Hotel

Wednesday: 21 February

14th Oil Price Seminar organised in cooperation with New York Mercantile Exchange

New York Mercantile Exchange
NYMEX/COMEX. Two divisions, one marketplace

Seminar in cooperation with the International Petroleum Industry Environmental Conservation Association

IPIECA

IP Annual Dinner held at the Grosvenor House Hotel

Thursday: 22 February

International Conference in cooperation with the International Association of Oil and Gas Producers (formerly E&P Forum)

OGP
International Association of Oil & Gas Producers
formerly E&P Forum

For a copy of the complete programme of events, please contact:

Conference Department,
Institute of Petroleum 61 New Cavendish Street,
London W1M 8AR, UK
Tel: +44 (0)20 7467 7100
Fax: +44 (0)20 7255 1472
Email: **pashby@petroleum.co.uk**

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MTBE and groundwater contamination in the UK

A recent study by environmental consultant Komex Europe on behalf of the Institute of Petroleum (IP) and the Environment Agency (EA) for England and Wales has shown that ether oxygenates such as MTBE (methyl tertiary butyl ether) do not currently pose a major threat to public water supplies derived from groundwater in England and Wales. Predictive modelling indicates that this is likely to remain the case in the future, providing there is no major increase in the percentage of MTBE used in petrol sold in the UK. *Gordon Lethbridge*,* a Member of the IP's Soil Waste Groundwater Working Group, reports.

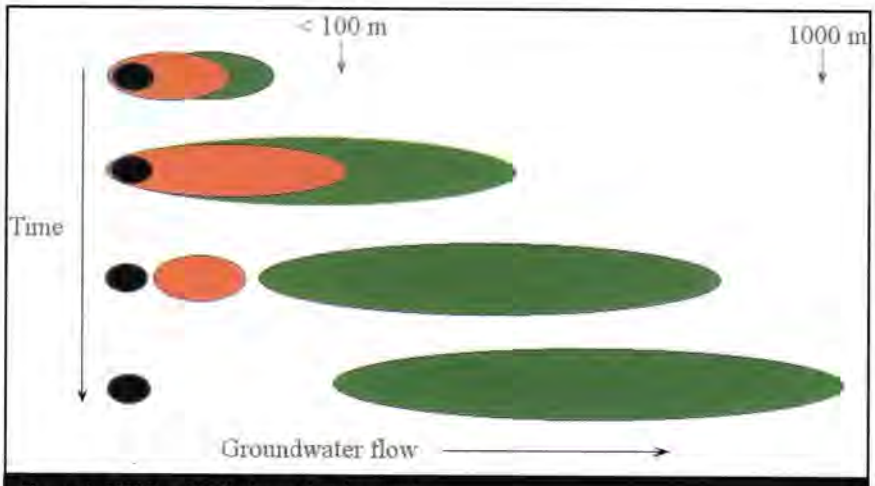

Figure 1: MTBE vs BTEX plume development

The announcement earlier this year concerning the banning of MTBE in California from the end of 2002 and the proposed phase-out of its use throughout the US because of groundwater contamination, has been raising concerns about its occurrence in groundwater in Europe. Although there are very few published data on this issue outside the US, it is vitally important that decisions concerning the future use of MTBE in Europe are based on a thorough understanding of the actual and potential risks of groundwater contamination in individual countries. This needs to include knowledge of MTBE's use, measures taken to prevent leaks and spills, and an understanding of the environmental behaviour and the risks associated with any potential alternatives. We cannot assume that we can extrapolate from the US to every country in Europe.

Why the concern?

The relatively high water solubility, lack of sorption to aquifer solids and low biodegradability of MTBE mean that once it enters the groundwater it has the potential to travel hundreds of metres (sometimes over a kilometre) from the site of a spill or leak (see **Figure 1**). Although MTBE is neither toxic nor a carcinogen, its very low taste (10–100 µg/l) and odour (0.05 ppm) threshold means that it has the potential to make very large volumes of potable groundwater undrinkable on aesthetic, although not on human health grounds. Bear in mind that in England and Wales around 35% of public drinking water is from groundwater, but in some parts of the country this rises to over 70%.

In contrast, the next most water-soluble components of petrol – benzene, toluene, ethylbenzene and xylenes (BTEX) – rarely travel more than 100 metres from the site of a spill or leak because they are rapidly biodegraded by ubiquitous, naturally occurring hydrocarbon degrading microorganisms present in the aquifer (**Figure 1**).

These and other issues surrounding the environmental debate concerning MTBE are discussed in more detail in the February 2000 issue of *Petroleum Review* (MTBE – How should Europe respond?).

Joint IP/EA study

Against this background, the IP's Soil, Waste and Groundwater Working Group (SWGWG) and the National Groundwater and Contaminated Land Centre of the EA have carried out a joint study of MTBE and other ether oxygenates in groundwater in the UK using the environmental consultant Komex Europe.

The data were acquired through the use of questionnaires, interviews and analysis of site investigation reports and groundwater quality monitoring databases.

The IP SWGWG developed a questionnaire and database to facilitate collection of data on the usage of ether oxygenates by the major oil companies and the occurrence of soil and groundwater contamination by these chemicals at their retail, depot, terminal and refinery sites. The data were checked and collated before being passed on to Komex.

Komex gathered data held by the EA (groundwater monitoring boreholes and site investigation reports), the water companies (public water supply wells) and the supermarkets via the Association of UK Oil Independents. Following discussions with the Petroleum Retailers Association (PRA), it was considered impractical to collect data from the remaining independents.

Major findings

The major oil companies provided information on 2,069 retail, depot and terminal sites that have been investigated for soil and groundwater contamination. At the time the data were collected (1Q2000) ether oxygenates had been specifically looked for at 837 (40%) of these investigated sites. They were detected (primarily as MTBE) in groundwater or perched water at approximately 29% and 25% percent of the 837 petrol retail and distribution sites respectively. Forty of the sites contaminated with MTBE were located above high vulnerability (high leaching potential of the underlying ground) aquifers (major or minor).

Since the location of individual sites was not revealed by the oil companies, it was not possible to determine how many of these 40 sites were within the catchment of a public water supply (PWS) borehole and therefore whether or not they present a risk to public water supplies. However, by overlaying the locations of all the retail sites in England and Wales from the Catalist database onto groundwater vulnerability maps, it is apparent that 44% of petrol stations on high vulnerability major aquifers, and 6% of those on high vulnerability minor aquifers, are within a source catchment zone. This indicates that around six of the 40 sites on high vulnerability aquifers are likely to lie within a source catchment zone and therefore could present a risk to PWS wells. To determine whether this is in fact the case would require site specific investigation.

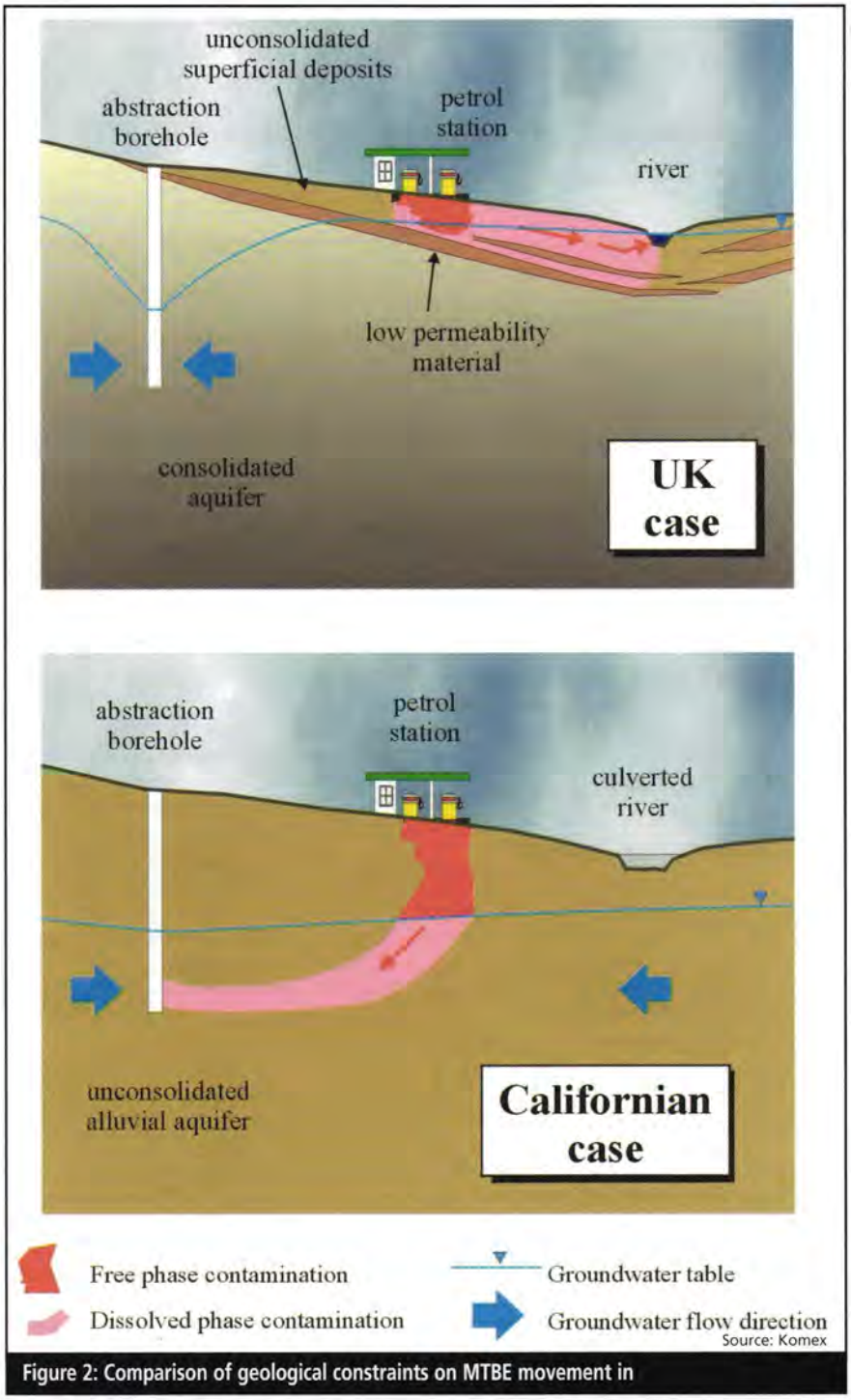

Figure 2: Comparison of geological constraints on MTBE movement in

The presence of six potential high-risk sites out of the 837 investigated should not be used to extrapolate across the whole 13,716-strong UK retail petrol filling station network, as many of the 2,069 sites from which the oil companies provided data for this exercise represent the high-risk end of their networks (identified as high risk based on location and age or known incidence of spills).

Between them, the EA and the water companies supplied data on almost 3,000 groundwater samples from 940 observation boreholes or PWS wells that have been analysed for ether oxygenates.

Of the 255 PWS wells regularly sampled for ether oxygenates by the water companies, 32 (12.5%) contained MTBE above the detection limit of 0.1 µg/l. Only three contained MTBE at concentrations in excess of the low end of the taste threshold range (5 µg/l). There is

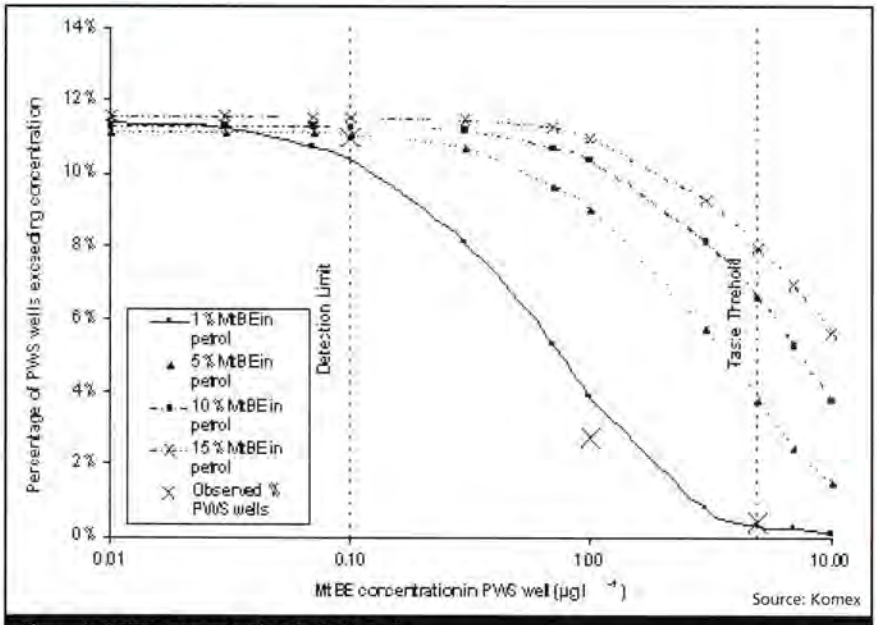

Figure 3: MTBE concentration in PWS wells

only one case in the UK where MTBE has been detected in mains water by the public. MTBE was detected in 13% of the EA's monitoring wells, but most contained less than 1 µg/l.

Modelling the future

Since the data collected during this study were incomplete (data from every petroleum site, water company and EA region was not available), a model was developed to predict the overall risks associated with MTBE contamination of groundwater throughout England and Wales, both now and in the future. It was calibrated with data from the study.

The model predicts that 203 (10%) of the 1,944 PWS boreholes in England and Wales can be expected to contain MTBE, but that only in six of them will the MTBE exceed the taste threshold. This number is unlikely to rise in the future, so long as the concentration of MTBE used is not increased. Thus, MTBE is not a problem waiting to happen, based on current usage.

The model also predicts the consequences of increasing the concentration of MTBE in petrol in the UK (see **Figure 2**). The number of PWS boreholes containing MTBE at concentrations exceeding the taste threshold increase from 0.3% at 1% (v/v) MTBE in petrol (the current situation), to 4% impacted at 5% (v/v) MTBE and to 8% impacted at 15% (v/v) MTBE.

UK versus US situation

The project has identified several reasons why MTBE contamination of groundwater is far less of a problem in the UK than it appears to be in the USA.

The concentration of MTBE used in UK petrol is an order of magnitude less than that used in the US. The Clean Air Act in the US mandates the use of oxygenates in petrol to provide a minimum of 2.7% (w/w) oxygen in the fuel. This results in MTBE being used at 10–15% (v/v). In contrast, MTBE is not used as an oxygenate in the UK, but as an octane booster in place of lead. This requires much lower concentrations of MTBE to be used. For example, premium unleaded petrol, which accounts for 85% of the petrol sold in the UK, contains on average less than 1% MTBE (v/v).

Parts of the US where MTBE contamination of groundwater is a major issue (such as California) are heavily reliant on shallow groundwater as a source of drinking water that is supplied by large numbers of shallow wells. In contrast, the UK uses small numbers of high yielding deep wells to provide drinking water from deep consolidated sandstone and chalk aquifers. The geology of the UK often works in our favour to protect these consolidated aquifers from contamination from above by the occurrence of low permeability alluvial deposits (silt and clay) between the ground surface and the aquifer (see **Figure 3**).

Groundwater recharge from rainfall is far higher in the UK than in California. In the UK, total licensed abstraction from a catchment is often restricted to maintain baseflow to nearby rivers. As many urban areas are situated in valleys, close to rivers and streams, a significant portion of the shallow urban groundwater is discharged to rivers and streams rather then being abstracted. It is this shallow urban groundwater that is most at risk from contamination. In contrast, high water consumption and low recharge in California have resulted in heavily depressed watertables and virtually all infiltration in urban areas is abstracted. Rivers are often culverted and remain high above the watertable and the catchment areas of PWS boreholes are extensive. MTBE entering groundwater from leaking petroleum facilities is therefore far more likely to travel to a PWS extraction borehole, particularly as there are few other discharge points for groundwater (**Figure 3**).

Key recommendations

The report recommends that:

- Water companies and the EA increase their monitoring of MTBE to cover all regions of the country.
- In areas where PWS wells are potentially vulnerable, investigations carried out at petroleum sites should be more comprehensive.
- Ether oxygenates should be looked for in all future investigations of retail and terminal/depot sites.
- Laboratory analytical methods for MTBE should be reviewed and best practise guidance produced.
- Caution should be exercised with respect to increasing the concentration of MTBE in petrol sold in the UK.

Overall conclusions

The report concludes that ether oxygenates such as MTBE do not currently pose a major threat to public water supplies derived from groundwater in England and Wales. Predictive modelling indicates that this is likely to remain the case in the future, providing that there is no major increase in the percentage of MTBE used in petrol sold in the UK. If, however, the concentration of MTBE in petrol was increased to 5% (v/v) or greater, there would be an order of magnitude increase in the number of PWS boreholes impacted with concentrations of MTBE above the taste threshold. This still leaves some doubt over small private water supplies which were not considered by the study.

The full report – entitled A Review of Current MTBE Usage and Occurrence in Groundwater in England and Wales. Environment Agency R&D Technical Report P406 – is available from The Stationary Office, The Publication Centre, PO Box 29, Norwich, NR3 1GN, UK; Tel: +44 (0)870 600 5522; **www.theso.co.uk**

** Gordon Lethbridge is the Technology Development Manager for the Contaminated Land Group of Shell Global Solutions based near Chester.*

Hitting near-historic highs

US refinery margins reached near-historic highs this year with crack spreads topping $12/b in early to mid-June, according to the Petroleum Industry Research Foundation. This is a dramatic transformation from the situation a year earlier, reports *Priscilla Ross*.

In 2000, especially in the second quarter, 10-year highs were being achieved for refining margins with the mid-West particularly strong. According to the International Energy Agency (IEA) refining margins increased in June 2000 in all major refining centres except the US Gulf Coast. US margins, despite being squeezed by high feedstock prices, remained exceptionally strong with cracking margins experiencing the strongest gains.

Back in March 1999, however, refiners on the East Coast and Gulf Coast were losing between $1 and $1.50 for each barrel of gasoline produced. This meant that crack spreads – the difference between the cost of a barrel of crude and the price a refiner can charge for the refined products – were negative.

A refiner needs to be assured that the products he refines will return at least $2.50/b over the price of the crude feedstock just to keep a plant at break-even level. That comes before any margin for overheads, marketing and distribution.

Low product stocks, combined with peak gasoline demand for the US driving season, strengthened US refining margins in 2000. Larry Goldstein, President of the Petroleum Industry Research Foundation told *Petroleum Review* that gasoline production was running at 8.4mn b/d, but that consumption was higher at 8.9mn b/d while stocks had fallen by nearly 6mn to some 205mn barrels of gasoline – representing some 23 days of consumption.

But the really big story in inventory contraction is the middle distillates – diesel and heating oil. According to Goldstein, middle distillate inventories of 109mn barrels had collapsed by 19%, or 25mn barrels, by July 2000 compared with the previous year when mid-July 1999 stocks stood at 134mn barrels.

Shifting the product mix

The US refining complex is very sophisticated by global standards and has the ability to switch product yields quickly. What has been happening at US refineries is that gasoline production has been maximised to cope with peak summer season consumption at the expense of rebuilding distillate stocks. There have also been some capacity constraints at US refineries this year with capacity utilisation at 91% in April 2000, compared with 84% in April 1999. By July 2000 capacity utilisation had reached 96%.

Increased agricultural demand for diesel, combined with lower product produced, virtually ensures distillate stocks levels will remain below normal in the run-up to the next Northern Hemisphere winter. This means that utilisation rates at US refiners will stay high for the foreseeable future.

Commenting on heating oil supply concerns, American Petroleum Institute (API) President, Red Cavaney said: 'Summertime distillate inventories are not necessarily a significant indicator of fuel availability once the season begins.' Weather, not inventories, were the principal factor in last year's Northeast home-heating oil supply concerns, he explained.

Andrew Fairbanks, Oil Analyst at Merrill Lynch said: 'High gasoline crack spreads are returning to long-term average levels. We should continue to see strong results for the independent refiners but not as strong as in 2Q2000.' He added that refining margins continued to be robust on the West Coast, particularly in California and also on the East Coast. The Merrill Lynch indicator margins for 21 July 2000 showed the East Coast at $5.66/b compared with $3.40/b last year. On the West Coast the margin was $9.90/b, in line with a year ago at $12.19/b.

Fairbanks expected stocks of middle distillates not to rebuild to average levels and that 'things would remain fairly snug.' Longer term he believes the US will have to continue to increase its imports of refined products, gasoline in particular. Fairbanks reckons US demand for gasoline averaged 8.2mn b/d with 500,000 b/d coming from imports. He noted: 'High crude prices of $30/b suppressed demand despite strong US GDP growth.'

Trading refining assets

Fairbanks estimated that there were 159 refineries in the US, with the majors controlling 40% to 50% of US refinery capacity. US independents make up the second tranche, accounting for 20% to 30% of capacity, the balance contributed by smaller players. Independents have become more important in refining through the 1990s, acquiring assets from the majors and state-owned assets. Fairbanks believes 'we may well see that process continuing.'

This year there has been significant two-way trade of refinery assets between the oil majors and the US independents. In July 2000, BP Amoco announced it had sold its Alliance site in Louisiana to Tosco, the US's largest independent refiner and marketer in a $660mn deal. Fairbanks thought this was a good deal from Tosco's point of view because if a new Alliance had to be built in the US today it would cost $2.8bn.

Thomas O'Malley, Tosco's Chairman

Company	US state	Revenues	Refining capacity	No refineries
Tosco	Pennsylvania Illinois Washington California Louisiana	$20bn	1.35m b/d	5
Valero	Texas California Louisiana New Jersey	$13bn	950,000 b/d	6
Ultramar	California			–
Sunoco	Pennsylvania Ohio Puerto Rico	$10bn	730,000 b/d	5
Tesoro	Alaska Hawaii Washington	$3bn	275,000 b/d	3

Figure 1: US independent refineries

said: 'Alliance is regarded as America's premier sweet crude oil refinery with high conversion capabilities and Tosco's first entry into the highly competitive Gulf Coast refining market.' The Alliance refinery has been configured to produce the clean gasoline and diesel fuel mandated by US regulators for their June 2000 deadline. Alliance has a crude cost advantage due to heavy feedstock processing capability. It also has petrochemical output with some 12,000 b/d of refinery grade propylene and has low operating costs compared with coking refineries. Tosco has an existing network of three refineries from the Mississippi River eastward that supply refined product to its large retail network along the eastern seaboard.

In June 2000, Tosco announced that it had completed the acquisition of the Wood River refinery in Roxana, Illinois, from Equilon Enterprises. The purchase price for the 295,000 b/d refinery was about $420mn. Equilon and Motiva are Texaco's refining joint ventures in the US with Shell. The sale of the Wood River refinery represented a loss of $31mn and Peter Bijur, Chairman of Texaco, said the company would continue to reduce its exposure to refining in the long term after the 'disappointing' second quarter downstream performance. Also in the US the El Dorado refinery was sold in November 1999.

In July 2000, Tosco announced the sale of its Avon refinery, San Francisco Bay, to independent Ultramar Diamond Shamrock Corporation of Texas. The purchase price was $800mn, including $650mn cash at closing plus a participation payment of up to $150mn covering the next eight years. Tosco will record a modest profit on the sale of the refinery and inventories.

BP Amoco, too, has said it plans to divest 15% of its refining portfolio or about 500,000 b/d of capacity. This target is expected to be achieved in 1H2001 when the company will have total worldwide refining capacity of 2.8mn b/d. However, this does not mean it is withdrawing from US refining. BP Amoco recently acquired Atlantic Richfield's refining and marketing operations which are, according to analysts, the most profitable in the industry. On the West Coast BP Amoco wants to retain the Arco brand and continue Arco's successful strategy of marketing low price fuel.

ExxonMobil, which had 44 refineries worldwide with a throughput of 5.5mn b/d of refined throughput in 1998, has also been selling refined capacity in 2000. In May 2000 it sold the Californian 160,000 b/d Benicia refinery and fuels terminal to independent Valero Energy. The transaction also included the transfer of Exxon fuels marketing assets in Oakland, San Francisco, San Jose and Santa Rosa to Valero in mid-June. The assets were purchased for $895mn plus an amount for inventories.

The agreement also involved Exxon's interest in about 340 service stations. The divestment of Exxon refining and marketing operations in California were required by the US Federal Trade Commission's Consent Agreement and the consent decree entered with the State of California. As a result, the 160,000 b/d Mobil Torrance, California, refinery and California pipelines and Mobil fuels marketing and supply operations in California, Arizona and Nevada were released from the 'held separate business' and fully integrated within the ExxonMobil group.

On the basis of Fairbanks' sums, with a state-of-the-art refinery costing an average $11,000 per refined barrel, the replacement cost of the Torrance refinery alone is $1.76bn.

Refining throughput

According to BP Amoco statistics, refinery throughput in the US was virtually unchanged in 1999, with an output of 14.805mn b/d compared with 14.890mn b/d in 1998. Globally, there is overcapacity in the refining industry.

World refinery capacity has increased by only 9% since 1984 but throughput is 22% higher. Utilisation levels have improved and refinery processes have become more sophisticated producing lighter and cleaner fuels. The US is the epitome of this general statement. By maximising gasoline production for the summer of 2000 and delaying restocking of middle distillates the US refinery complex seems destined to continue operating at high utilisation rates for the immediate future.

Reformulated gasoline

This summer in the US, Phase II Reformulated Gasoline (RFG) prices were particularly high in the run-up to the 1 June 2000 deadline to provide this 'environmentally-friendly' product on the retail forecourt. According to the IEA, uncertainties surrounding the Unocal patent and blending requirements to meet new environmental specifications were responsible for the price hike.

RFG reduces emissions and is expected to account for about one-third of US summer peak gasoline demand in the future.

Tier II plans, which are due to take effect from 2004, envisage a substantial tightening of the legislation and will result in light duty trucks, which include the currently highly popular sports utility vehicles, having to meet the same standards as passenger cars.

Patent problems

In February 1994, Unocal received the first of five US patents for new RFG formulations that burned cleaner, thereby improving air quality. When the company announced the first of these breakthrough patents in 1995, it said it intended to offer licences to refiners in order to spread the benefits of lower emissions as widely as possible to the industry and motoring public.

However, in April 1995, six major refiners sued Unocal, challenging the validity of the initial patent. After a drawn out trial in US District Court, a jury determined that Unocal's patent was valid and awarded damages for infringement by the six refiners. That court's verdict was upheld in March 2000 by the US Circuit Court (Washington, DC).

NEW Publications

Petroleum Refining: Separation Process. Volume Two

J P Wauquier (Éditions Technip, 27, rue Ginoux 75737 Paris, Cedex 15, France). ISBN 2 7108 0761 0. 680 pages. Price: FFr 750 ($110).

This volume covers the basic sciences, such as thermodynamics and mass transfer, and the techniques and technologies involved in the separation process. The book aims to help refiners consolidate margins and manufacture high added-value products while reducing the impact on the environment, improving the safety of operations and cutting costs.

Natural Gas in Asia

Ronald D Ripple (FT Energy, Maple House, 149 Tottenham Court Road, London W1P 9LL, UK). ISBN 1 8408 3094 8. Price: £395 ($632).

This report examines the production prospects of 18 Asian economies and considers the diverse use of natural gas across the area. It compares the overall energy mix of the Asian markets with that of North America and Europe. Also discussed is the potential growth in the region's energy sectors, as well as a forecast review for the growth of GDP, primary energy and sectoral consumption.

The Euro-Mediterranean Energy Partnership: An Exercise in Strategic Co-operation

Debra Johnson (FT Energy, Maple House, 149 Tottenham Court Road, London W1P 9LL, UK). ISBN 1 8408 3371 8. Price: £445 ($734).

This report provides an overview of the Euro-Mediterranean energy relationship and details the framework for industry co-operation. It identifies the EU demand–supply gap in the medium and long term, and outlines the demands of the growing Mediterranean markets. In addition, each Mediterranean country's resources are assessed, with trade and investment opportunities analysed.

A Practical Guide to Process Performance Prediction and Optimising Using Plant Operating Data

(ERA Technology, Cleeve Road, Leatherhead, Surrey KT22 7SA, UK). ISBN 0 7008 0707 1. 86 pages. Price: £250.

This report details work undertaken to improve the performance of power plants using operating data recorded during the production process. It describes techniques available for creating two types of mathematical models for predicting, planning and optimising plant operating performance. The report will appeal to managers and engineers involved in plant operations, maintenance and performance.

PICTURES WANTED

Author Hinton Sheryn is currently compiling information for a new publication entitled *An illustrated History of Road Tankers*, to be published by Ian Allan Publishers in spring 2001. He would be most grateful to hear from any *Petroleum Review* readers that could lend him photographs of tankers, from the early days of horse-drawn vehicles and the first petrol-driven tankers, right up to the more recent, high-tech tankers. He is interested in sourcing pictures from around the world.

If you can help, please contact him on Tel: +44 (0)1257 241193.

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Visitors to the IP library can now use *Moody's International Company Data* CD-ROM. Please remember we have many other CD-ROMS including *Petroleum Abstracts*.

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- *World Petroleum Arrangements 2000* (Eight volumes). Barrows Company, New York, US, 2000.
- *Europalub 1999: Lubricants Statistics*. Europalub, Rueil Malmaison, France, 2000.
- *World Offshore Field Development Guide: (Volume 2) Indian Subcontinent, Southeast Asia, Australasia, and Far East*. Third edition. Oilfield Publications, Herfordshire, UK, 2000.

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lis@petroleum.co.uk Visit our website at **www.petroleum.co.uk**

IP membership renewal

'It's a network, it's a way of keeping in touch with developments within the industry'

'It's the perfect source if you want to find out about the industry'

November 2000

Dear Member

You will soon be receiving your Membership Renewal Notice for 2001. Remember, it is your continued support that enables the IP to operate as an important independent body, offering expert and impartial guidance, and renewing your membership subscription entitles you to continue receiving the following benefits:

- *Petroleum Review* free of charge every month; a saving of up to £190.00 p.a.
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'It gives us access to resources that we wouldn't have at a normal members' organisation'

'The fact that the IP exists and has the independence associated with it is very important for the industry'

Original quotes from current IP members

Petroleum Measurement Manual Part X: Meter Proving. Section 12: Aviation Fuelling Positive Displacement Meters

In order to ensure that an aircraft fuelling equipment meter reads accurately, it is necessary for it to be checked at regular intervals. The principles and methods described in this new publication provide the minimum requirements for the proving of positive displacement meters used in aviation fuel handling systems. They describe proving by reference meter or volumetric tank methods.

This Section of the Part X of the Petroleum Measurement Manual has been prepared for international use and will assist all those involved in the proving of aviation fuelling equipment meters.

ISBN 0 85293 302 9 **£56.00** **25% discount for IP Members**

Guidelines for the design and safe operation of shell and tube heat exchangers to withstand the impact of tube failure

These new guidelines are of particular interest to all those concerned with the design and operation of shell and tube heat exchangers containing high pressure gas which is either heated or cooled by a low pressure utility fluid. The publication provides guidance to take account of any possible catastrophic tube failure. Where the integrity of the low-pressure side of the exchanger is protected by over-pressure protection devices it is important to ensure these are located so that they operate effectively before pressures are generated that could damage the pressure envelope. Such systems may be designed with the assistance of one-dimensional dynamic computer models. To date, these models have had little support for their accuracy. Through a series of research projects co-ordinated by the Institute of Petroleum and by gathering industry good working practice for safe design, the engineer will now have increased confidence and an understanding of these tools and their strengths and weaknesses.

The research studies were carried out in phases, culminating in a Joint Industry Project involving a number of companies and organisations. These investigations were only possible due to the combined interests of the participants and their contribution is acknowledged. Although it has not been possible to validate the computer models, the results included in these guidelines do give indicative support to the methodology of the computer simulations and to the suitability of the approach.

These guidelines have been written primarily for application to shell and tube heat exchangers for service offshore on the UK continental shelf. However, many of the recommendations may also apply to other parts of the world, or to equivalent exchangers onshore in refinery and petrochemical service.

ISBN 0 85293 286 3 **£40.00** **25% discount for IP Members**

Petroleum Measurement Manual Part II: Tank Calibration. Section 1: Strapping, internal diameter and internal offset methods for the calibration of vertical cylindrical tanks

The static measurement of bulk quantities of oil stored in tanks is dependent on the calibration of the tanks. Any errors made in the calibration and any systematic errors in tank calibration tables may result in very large cumulative losses or gains throughout the long period of time in which the tables remain in force.

This new Petroleum Measurement Manual details three calibration methods that have been drawn up to provide an accuracy consistent with the most stringent requirements and the procedures and equipment described represent the minimum requirements to achieve an acceptable level of measurement uncertainty. The three methods that are described are calibration by strapping (which is the measurement of external circumference using a strapping tape), calibration by direct measurement of the internal diameter of the tank using a tape and calibration by measurement of internal diameter using an offset measurement method. These methods are for tanks having cylindrical courses that are substantially vertical and it is assumed that any deformation of the tank is within limits set by recognised National or International Construction Standards.

This new Measurement Manual has been prepared for international use and provides vital information for all those involved with the calibration of vertical cylindrical tanks.

ISBN 0 85293 228 6 **£60.00** **25% discount for IP Members**

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NEWS Technology

High accuracy oil sampler

According to Jiskoot, its new electronically-driven product sampler 0007EL, gives repeatable and accurate sampling of refined hydrocarbons and light crude in remote hazardous area sites with no plant air.

Up to 50 samples per minute can be extracted from the line. This reportedly generates more sample volume for analysis from a small batch than most other makes on the market and ensures the most accurate samples possible.

Repeatable samples are achieved regardless of variation in pipeline pressure, viscosity and gravity, ensuring that the batch being sampled is not biased by sample grabs of different sizes.

The unit can be retrofitted without installation costs, according to the company, while minimum use of seals combined with a low-cost consumption motor reduces maintenance and lifecycle costs.

Tel: +44 (0)1892 518000
Fax: +44 (0)1892 518100

New gas analyser

Ametek Process Instruments has just unveiled its Model 933 hydrogen sulfide analyser. Designed to monitor hydrogen sulfide (H_2S), carbonile sulfide (COS) and mercaptans (MeSH), the analyser requires no consumables or reagents other than gas. Developed for remote, unattended operations, calculations, data processing, calibration, self-diagnostics and column switch times are all controlled by two onboard microprocessors, which, according to Ametek, reduce the complexity of the hardware and simplify the operations of the analyser system.

Tel: +44 (0)1380 720831
Fax: +44 (0)1380 720597

Flowmeter improves plant efficiency

The latest generation Panametrics GF868 ultrasonic flare-gas flowmeter has been launched on the market. It uses an improved proprietary algorithm to determine instantaneous molecular weight and mass flow rate of gas.

The meter reduces product loss by identifying sources of leaks into the flare system. It is also said to improve compliance with pollution control regulations and reduce energy usage by accurately controlling the amount of steam fed to the flare tip.

The manufacturer states that the meter is reliable even under unsteady flow, pulsating pressure, varying composition and temperature and harsh environments, as well as under the wide flow ranges typical of flare systems, because it uses digital signal processing circuitry. It has no moving parts or orifices to wear or clog and does not require regular maintenance.

Flow velocity is measurable from 0.1 to 275 ft/sec (0.03–85 m/sec) bi-directionally in pipe or stack sizes up to 120-inches diameter. A two-channel version allows two flare lines to be monitored or a two-path installation on one flare for enhanced performance.

Tel: +44 (0)20 8643 5150
Fax: +44 (0)20 8643 4225

Instant detection of pressure fluctuations

Elfab has developed a high specification detection option for its Posi-Guard and Vac-Guard range of bursting discs that instantly detects pressure fluctuations within ultra-low pressure systems such as atmospheric storage tanks. The system has a built-in sensing element that immediately sends out a signal to process control systems when a disk ruptures.

Bursting disks are high-precision pressure-relief devices that are designed to burst at specific pressure, preventing potentially dangerous pressure fluctuations. The new system is, according to the company, meeting with the current need for the instantaneous detection of over/under-pressure occurrences within ultra-low pressure systems.

Fitted with a permanent, hard-wired cable connected directly to process control systems, the new system does not require 'fit–for–work' re-certification after each operation, claims the company.

Tel: +44 (0)191 293 1234
Fax: +44 (0)191 293 1200

Portable valve reduces manpower

Easi-drive is the new portable valve operating system from Smith Flow Control. It is designed for use with manual valves in situations where the valve size, pressure rating or work environment would otherwise demand a dedicated actuator or require a work crew. By reducing valve operation to a one-man activity, Easi-drive is claimed to eliminate operator fatigue and greatly reduce the risk of injury. In addition, operator efficiency is said to be greatly enhanced by significantly reducing operating time.

Easi-drive comprises of three elements: drive gun, valve coupler and power pack, making it fully portable and adaptable to any size or type of valve. It is also available with three types of alternative power sources: pneumatic, hydraulic and electric. It can be run on adjacent plant air or single-phase electrical supply.

Tel: +44 (0)1376 517901
Fax: +44 (0)1376 518720

Throwing off subsea shackles

VRVT transducers manufactured by Penny & Giles Controls have been incorporated in special aluminium subsea cylinders that are used to disconnect offshore oil pipeline bundles from towing vessel wires. A total of 40 cylinders, which weigh a fraction of their steel counterparts, were recently manufactured from 7075 aircraft grade aluminium by Whittaker Engineering of Stonehaven, near Aberdeen, who specialise in the design of lightweight ancillaries for remotely operated vehicles. The units have been ordered by Rockwater, part of the Halliburton Subsea Group.

The rigid pipeline bundles, which can be several kilometres long, are fabricated on land and towed to site for installation. Wires connecting the 'bundles' to the towing vessels are released remotely by the cylinders, which operate 200-tonne shackle pins and a variety of hydraulic control valves. The interface steelworks, including the cylinders, are recovered for use in future operations. Positioning signals from the in-cylinder VRVTs are monitored in the control cabin from which the operator also controls the hydraulic systems. The VRVTs replace previously used limit switches, which were fitted outside the cylinders and could provide only a simple in/out position signal. The VRVTs provide a variable signal via

their remote electronics and can therefore give the exact position of the cylinder at all times – aiding the recovery process. Enclosed within the cylinder, the VRVTs are protected from accidental damage.

Tel: +44 (0)1202 409409
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Low environmental impact carrier fluid

Uniqema's Oilfield Business Unit has launched ArivaSol™, a new carrier fluid for use in oilfield drilling and production applications. Based on phenyl ester technology, the fluid is claimed to offer the solvent performance of conventional aromatic carrier fluids with excellent environmental impact characteristics.

ArivaSol is claimed to be readily biodegradable, non-bioaccumulating, exhibits a low aquatic toxicity and is non fish tainting. 'This means that it can be used with other high performance chemicals, eg in demulsifier and corrosion inhibitor formulations, to help customers meet demanding production targets,' states the company.

The fluid has gained wide regulatory clearance, including EINECS (Europe), MITI (Japan), AICS (Australia), TSCA (US), CEPA:DSL (Canada) as well as PICCS (Philippines).

The fluid offers similar solvency power to aromatic hydrocarbon-based solvents with enhanced physical properties that will give enhanced performance in the field, states Uniqema. ArivaSol has a flashpoint of 99°C, a boiling point of 219°C, pour point of <–60°C, density at 25°C of 1.008 kg/l, and viscosity at 25°C of 2.32 cSt.

Tel: +44 (0)1642 432392
Fax: +44 (0)1642 437431

Online vessel cleaning first for North Sea

A new system for cleaning separators or vessels while they are fully operational and online has been developed by Drain Brain Offshore Services. Claimed to be highly cost effective as it avoids the necessity of a shutdown to complete cleaning works, the system recently completed offshore trials with a major North Sea operator. It was successfully used on a stage two separator measuring some 60 ft long by 18 to 20 ft diameter, followed by a second test on an additional vessel laden with sand deposits.

The system is designed and built to full offshore specifications, states the company, and is capable of operating at vessel pressures up to 40 bar. A second version is being built to operate at pressures up to 80 bar.

The system fits directly onto existing platform vessels and uses a combination of airflow and water pressure systems, including specially designed manifolds combining pneumatic/hydraulic equipment with full double isolation on all equipment/platform interfaces.

Water jetting systems inject water through a specially designed cross-flow manifold unit. This monitors the flow of the material coming from the vessel, together with any gases that may be present. Should gas be encountered, gas detectors set to 15 LEL activate and also shut the system down without affecting vessel performance, explains the company.

Oil is removed from batches of material which is taken from the separator. Particulates can be macerated if required and any sand or scale can be returned to sea. Separated and collected oil contaminants can be returned to the platform system through a low pressure point on the process pipework as required.

Pre-cleaning together with post-cleaning thermal imaging surveys are undertaken to confirm the quality of the process.

Tel: +44 (0)1285 740682
Fax: +44 (0)1285 740638

If you would like your new product releases to be considered for our Technology News pages, please send the relevant information and pictures to:
Cheryl Saponia
Editorial Assistant, *Petroleum Review*
61 New Cavendish Street, London W1M 8AR, UK

Membership News

NEW MEMBERS

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Mr D C Hedges, Wootton
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Mr R Wilkins, Borehamwood

STUDENT PRIZEWINNER

Mr G Pyke, Orpington

NEW CORPORATES

Oceans Environmental Engineering, 4 Cumberland House, Greensipe Lane, Bradford BD8 9TF, UK
Tel: +44 (0)1274 480033 Fax: +44 (0)1274 483003
www.oceans.com

Representative: Helen Fazakerley, Project Manager
Provider of showcase examples of reed bed treatment systems to remediate hydrocarbon-contaminated land and water.

Oxford Geotechnica Int (UK) Ltd, Mountjoy Research Centre, Durham University Science Park, Durham DH1 3SW, UK
Tel: +44 (0)191 384 3366 Fax: +44 (0)191 384 9260
e: admin@OGI.co.uk

Representative: Dr Stephen D Thomas
OGI is an independent specialist groundwater engineering and management company serving the Construction, Water and Environment industries. OGI is engaged primarily by industry to direct investigation of potentially contaminated ground and the management of any subsequent protection or remediation measures that are required to satisfy all interested parties.

Talisman Energy (UK) Ltd, Belmont House, Talisman House, 1 Berry Street, Aberdeen AB25 1DL, UK
Tel: +44 (0)1224 413 200 Fax: +44 (0)1224 413 400

Representative: Mr Paul Blakeley, General Manager
Upstream Oil & Gas exploration, development and production.

Asia-Pacific overview

...continued from p34

2003, with full commercial production in 2004. Recoverable field reserves are put at 400mn barrels of condensate and LPG and 3.4tn cf of gas, with a field life of more than 20 years. Development is expected to cost $1.65bn. It will comprise of two fixed steel platforms (CPPs), a smaller wellhead platform and an attendant floating, storage and offloading (FSO) vessel. Phase One liquids extraction – LPG and condensate – will be performed on one of the CPPs, prior to the products being transported via pipelines to the nearby FSO for onward export by shuttle tanker. Dry gas will be recycled into the reservoir.

Gas from Phase Two of Bayu-Undan will be exported by subsea pipeline to a destination near Darwin, Australia. The decision and timing of this second phase – possibly onstream in 2004 – will be driven by the availability of sufficient gas for an LNG plant and/or domestic gas markets to enable approval and construction of an export pipeline from Bayu-Undan

Erawan field, Thailand ***Photo: Unocal***

to Darwin, states Phillips. It is possible that this new pipeline infrastructure could be extended to include other fields, such as Greater Sunrise, Evans Shoal and Petrel-Tern, as well as existing and new discoveries east and west of the ZOC.

Woodside Energy and Shell recently each sold 10% stakes in the Sunrise, Sunset and Troubadour (Greater Sunrise), and Evans Shoals gas and condensate fields in the ZOC to Osaka Gas of Japan. Osaka plans to ship some 4mn tonnes of LNG from the fields to Japan, starting in 2010. The Sunrise gas project is expected to generate substantial export revenue and regional employment (see p4).

** Wood Mackenzie's* South East Asia Upstream Report *covers Brunei, Cambodia, China, Indonesia, Malaysia, Malaysia-Thailand Joint Development Area, Myanmar, Philippines, Thailand, Vietnam and Zone of Cooperation. We thank the consultancy for its help in producing this review.*

Attaka field, Indonesia ***Photo: Unocal***

IP Discussion Groups & Events

Energy, Economics, Environment

Last in the series of presentations on

'The Late Life of the North Sea'

16 Nov – Changes in the Banking Paradigm, by Colin Bousfield and Kevin Price, Barclays Capital

IP contact: Jenny Sandrock

PETEX 2000

28–30 November
Business Design Centre, London N1

Europe's premiere technical conference and exhibition for the exploration industry. The conference includes a half-day session jointly organised by the Institute of Petroleum and the PESGB on 'The Changing Face of the Exploration and Production Industry.' The presenters of the session are all top-level executives from the industry.

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Branch Activities

Aberdeen
Contact: *George Wood Tel: +44 (0)1224 205736*
24 Nov: Annual Dinner with main speaker, Clare Spottiswoode

Essex
Contact: *Arnold Carlson Tel: +44 (0)1268 794615*
8 Nov: Ladies' evening – confectionery and wine tasting

Humber
Contact: *Dave Hughes Tel: +44 (0)1469 555237*
23 Nov: The Refinery Road to Clean Fuels

Midlands
Contact: *Margaret Ward Tel: +44 (0)1299 896654*
15 Nov: LPG in Automotive Vehicles: Opportunities and Practical Considerations

North East
Contact: *John Sparke Tel: +44 (0)1642 546411*
17 Nov: Afternoon visit to Pipeline Integrity International, Cramlington

Energy, Economics, Environment Discussion Groups
Please notify the contacts if you plan to attend any of the advertised events. All events will take place at the IP unless stated otherwise
Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK
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***e:* jsandrock@petroleum.co.uk**

IP Conferences and Exhibitions

International Conference for the Oil and Gas Industry on

Successful E–Commerce Strategies

London: 8 November 2000

The IP invites you to attend this timely conference which brings together experiences from a leading international panel of industry users, software providers and on-line exchanges. It will offer practical advice and guidance which will enable you to identify the benefits of using e-commerce, understand how it can enhance your position among other market players and become one of your key business tools.

Speakers include representatives from:
● BP ● IBM ● IndigoPool.com ● Oracle ● Schlumberger ● Texaco

Brochure with full conference programme is now available

IP Awards Lunch

London: 13 November 2000

Guest of Honour and Speaker:
Lord Levene of Portsoken KBE, Chairman, Investment Banking Europe, Deutsche Bank AG

Responding to the Challenge of the New Economy

For nearly a century, the IP has encouraged and facilitated technical excellence in an industry that prides itself on attaining the highest possible standards. We are, therefore, uniquely placed to acknowledge outstanding new initiatives and examples of good practice within the international oil and gas industry. For the first time this year the IP, in association with Wood Mackenzie, will present seven awards at this prestigious IP event. In addition, there will also be a unique opportunity to hear an internationally renowned figure speak on issues influencing our global industry today.

It is expected that many companies will purchase tables and maximise the opportunity to entertain guests at one of the key social events in the industry year.

The ticket application form is now available

Microbial Developments in the Oil Industry

London: 21–22 November 2000

This conference has been organised by the Institute of Petroleum's Microbiology Committee with the aim of providing delegates with an overview of microbial issues within the oil industry and bringing them up to speed with latest developments.

This conference aims to update delegates on the issues and latest microbiological developments across the whole of the industry, and will cover topics such as microbially enhanced recovery, corrosion, reservoir souring, use of biocides, bioremediation, environmental impacts, monitoring, general fuels, aviation and metal working fluids. It will be of interest to those in both the upstream, downstream and oil service sectors.

Who should attend?
Those working in: ● Drilling and Production ● Supply and Trading ● Transport/pipelines/shipping ● Marketing/sales/distribution ● Environment Storage ● Microbiology Medical/health and safety ● Lubricants ● Product quality assurance/analysis/testing/measurement

North Sea: Current Developments in Upstream Issues

Aberdeen: 23 November 2000

This half day seminar organised to coincide with the IP Aberdeen Branch Annual Dinner will discuss the economic aspects and technical solutions employed in the North Sea operations.
Speakers include: ● Professor Alex Kemp, Aberdeen University.

Interspill 2000

Brighton, UK: 28–30 November 2000

A major conference and exhibition featuring the activities of the European spill response, both at sea and on land, under the direction of the British Oil Spill Control Association and organised by the IP.

Interspill 2000 will be of interest to:
● Port and harbour authorities ● Oil, chemical and transport industries ● Offshore oil field operators ● Central and local authorities ● Emergency services ● National and international environmental agencies.

Brochure with full conference programme is now available

Dispute Resolution in the International Oil and Gas Industries

The Role of Alternative Dispute Resolution

London: 4 December 2000

This Conference will be of particular benefit to:
● Oil and Gas company legal departments
● Lawyers working in the profession who act on behalf of oil and gas company clients
● Senior commercial management in the oil and gas industry who require a concise overview of the use of these means for resolving disputes
● Consultants and professional staff who may from time to time be asked to serve as expert witnesses, mediators or expert determinators in oil and gas disputes

Brochure with full conference programme is now available
For further information please see contact details below.

For further information on any of the above conferences please contact:
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EVENTS Forthcoming

NOVEMBER 2000

6–8 **Barcelona**
Submarine Communications: Delivering Global Bandwidth in the New Millennium
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Fax: +44 (0)20 7636 1976
e: cust.serv@informa.com

6–8 **Fujairah, UAE**
1st International Fujairah Bunkering and Fuel Oil Forum
Details: Conference Connection Group, Singapore
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Fax: +65 2264 117

7–8 **Dubai**
Petroleum Measurements
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Fax: +41 22 348 7978
e: ghb@ghb-consultants.com

7–9 **Berlin**
4th Russia and CIS Republics Refining and Petrochemicals Roundtable
Details: The World Refining Association and Energy Exchange
Tel: +44 (0)1242 529090
Fax: +44 (0)1242 529060
e: wra@theenergyexchange.co.uk

8–9 **Singapore**
Petroleum Trading and Cargo Shortages
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Fax: +44 (0)1245 323429
e: register@abacus-int.com

8–9 **Aberdeen**
Subsea Pipeline Engineering
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Fax: +44 (0)1892 544735

9–10 **London**
Legal Developments in Energy Trading
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Fax: +44 (0)1509 881576

9–10 **Damascus**
Syria Investment Forum
Details: IBC Gulf Conferences, UAE
Tel: +971 4 3369992
Fax: +971 4 3360116

13–14 **London**
The Future of European Refining
Details: SMi Energy Conferences, UK
Tel: +44 (0)20 7252 2222
Fax: +44 (0)20 7252 2272

13–15 **London**
E-Business for Oil and Gas
Details: IQPC, UK
Tel: +44 (0)20 7430 7300
Fax: +44 (0)20 7430 7303
e: oil@iqpc.co.uk

13–15 **Rome**
ERTC 5th Annual Meeting
Details: GTF Conferences, UK
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e: events@gtforum.com
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13–15 **Singapore**
An Overview of the Organic Chemical Industry: Technology and Economics
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e: chem10@us.ibm.com

13–16 **Cranfield**
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14–15 **Tripoli**
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14–17 **Texas**
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15–16 **Seoul**
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15–16 **London**
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19–20 **London**
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22 **Coventry**
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21–22
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Details: Christine Pullen, The Institute of Petroleum

27–28 **London**
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27–28 **London**
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27–28 **London**
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28–30
Interspill 2000
Details: Christine Pullen, The Institute of Petroleum

28–29 **Budapest**
Commercial Opportunities in the Energy Sector of Central and Eastern Europe
Details: The Adam Smith Institute, UK
Tel: +44 (0)20 7490 3774
Fax: +44 (0)20 7505 0079
e: energy@asi-conferences.com

30–1 Dec **Washington DC**
Latin American Energy Finance
Details: The CWC Group, UK
Tel: +44 (0)20 7704 6161
Fax: +44 (0)20 7704 8440
e: bookings@thecwcgroup.com

MOVES People

David Green, UK Freight Transport Association Director General, will become the association's Executive Vice President from 1 January 2001. He will also be the first member of staff to join the FTA National Executive Board as a Director of the FTA. This should help the development of relationships with central government, officials and ministers states the FTA. Green will continue in his post as President of the International Road Transport Union (IRU). **Richard Turner**, currently the Deputy Director General of the FTA will become Chief Executive, reporting to the National Executive Board and the President.

Theoilsite.com has opened for trading and has appointed **Pierre Godec** as Director. There are over 70 oil companies and over 600 suppliers, providing over 2,000 catagories of equipment and services, already registered on the site.

Repsol YPF has restructured its Management System due to last year's merger. **Ramón Blanco** has been appointed as the new Corporate Vice President.

Ray Dafter has joined corporate and financial specialist consultancy Granfield as a Board Director. Dafter was the former Corporate Affairs Director of Enterprise Oil.

Vopak has made several appointments. **Ben Jaski** has been made President Chemicals Logistics Europe and Africa, **Martijn Notten** Vice President Marketing and Sales and **Ted van Dam Merrett** President of the Oil Logistics Europe and Middle East Business Unit. In addition, **Paul Dekker** has been appointed Senior Vice President. Business Development for Oil Logistics Europe and the Middle East. **John-Paul Broeders** has been appointed President Logistics Asia.

Syntroleum Corporation stockholders have re-elected Directors **Mark Agee**, **Frank Bumstead** and **Robert Rosene, Jr** to hold office until 2003.

Iain Campbell has joined Robertson Research International as Manager, Reservoir Group. He will be responsible for the development of Integrated Multi Disciplinary Services.

***Brian Reese* has joined Paragon Engineering Services as a Pipeline Project Manager. He will be managing a number of projects including pipeline removals across the Houston Ship Canal and an LGP pipeline development in North Texas. *Daniel Ransbottom, Thomas Ford* and *Brian Kennedy* also recently joined Paragon.**

The Supervisory Board of Wintershall has appointed **Reinier Zwitserloot** as a Member of the Board. He will take over Division 2 Exploration and Production, previously the responsibility of **Dr Peter Reichetseder**.

Global Marine has elected **Alexander Krezel** as Vice President, Corporate Secretary and Assistant General Counsel and **Michael Dawson** as Vice President, Investor Relations and Corporate Communications.

Karen Ogulnick has been promoted to Vice President of Nymex ACCESS®, the exchange's electronic trading system.

Kuwait Petroleum has appointed *Brian Stanley* (second left) as Managing Director, International Operations. He is responsible for all Q8's operations in the UK and is supported by a new management team consisting (from left) of *Ian Rose, Clive Pestridge* and *Miles Mayall*.

Viset Choopiban has been appointed the new Chairman of Thailand's PTT Exploration and Production. He will hold the position concurrently with the post of Govenor of the Petroleum Authority of Thailand. He replaces **Surakiart Sathirathai**.

OBITUARY

Dr Keith Taylor CBE FInstPet

The Institute of Petroleum regrets to announce the death of Keith Taylor, former IP Vice President (1991/1994), after a year-long fight against cancer.

Dr Taylor joined Esso in 1964 at Fawley refinery and went on to hold senior mangerial positions in refining, research, marine transportation, logistics and corporate planning for both Esso Petroleum and Esso Europe. In January 1980, he joined Exxon in New Orleans, US, and the following year was made responsible for production and drilling operations in the Gulf of Mexico. He returned to London in 1982 as Operations Manager and then Production Manager for Esso Exploration and Production UK. In 1984, he was appointed Executive Assistant to the Chairman of Exxon Corporation in New York, returning once again to London in 1985 to become Managing Director, Esso Exploration and Production. He was Chairman and Chief Executive of Esso UK from February 1993 until his retirement in April this year.

Of particular note was Dr Taylor's enduring commitment to promoting excellence in engineering. He was particularly active in the Institution of Chemical Engineers, culminating in his appointment as President in 1995. He was elected a Fellow of the Royal Academy of Engineering in recognition of his engineering achievements and was also an Honorary Fellow of the Institution of Civil Engineers. Committed to safe operations in the oil and gas industry, he was President of the UK Offshore Operators Association (UKOOA) for an unprecedented two terms (1988/1989) during and following the Piper Alpha tragedy.

Dr Taylor's contribution to industry was recently recognised with the award of a CBE in this year's Birthday Honours List.

Our thoughts go out to his wife Addie and his family.

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Minale Tattersfield has 35 years experience in petrol station design and has worked internationally for companies including BP, AGIP, Italiana Petroli (IP), Repsol-YPF, Afriquia, Total, Elinoil, LUKoil, among others.

In the area of transport design, we have also completed major projects for London Transport, BAA and Eurostar.

Speed is essential in the redesign and refurbishment of petrol stations to minimise loss of revenue, however consulting and co-ordinating specialist design consultancies for each individual area can be time consuming.

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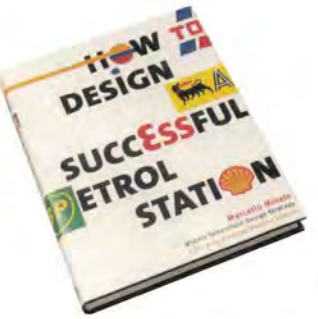
We have specialist skills needed for each area of the complex process of petrol station design.

- Graphic design for brand identity and signage,
- Architectural/urban design for the building, canopy and surrounding landscape,
- Industrial design for petrol pump, car wash, lube bay, self-standing structure,
- Packaging design for lube products,
- Retail design for convenience store.



How to Design a Successful Petrol Station by Marcello Minale, published by Booth-Clibborn Editions.

256 pages in full colour, portraying the development of the most successful petrol station networks. A valuable document for all those involved or interested in the industry.

In the bookshops from November 2000.

Minale Tattersfield Design Strategy

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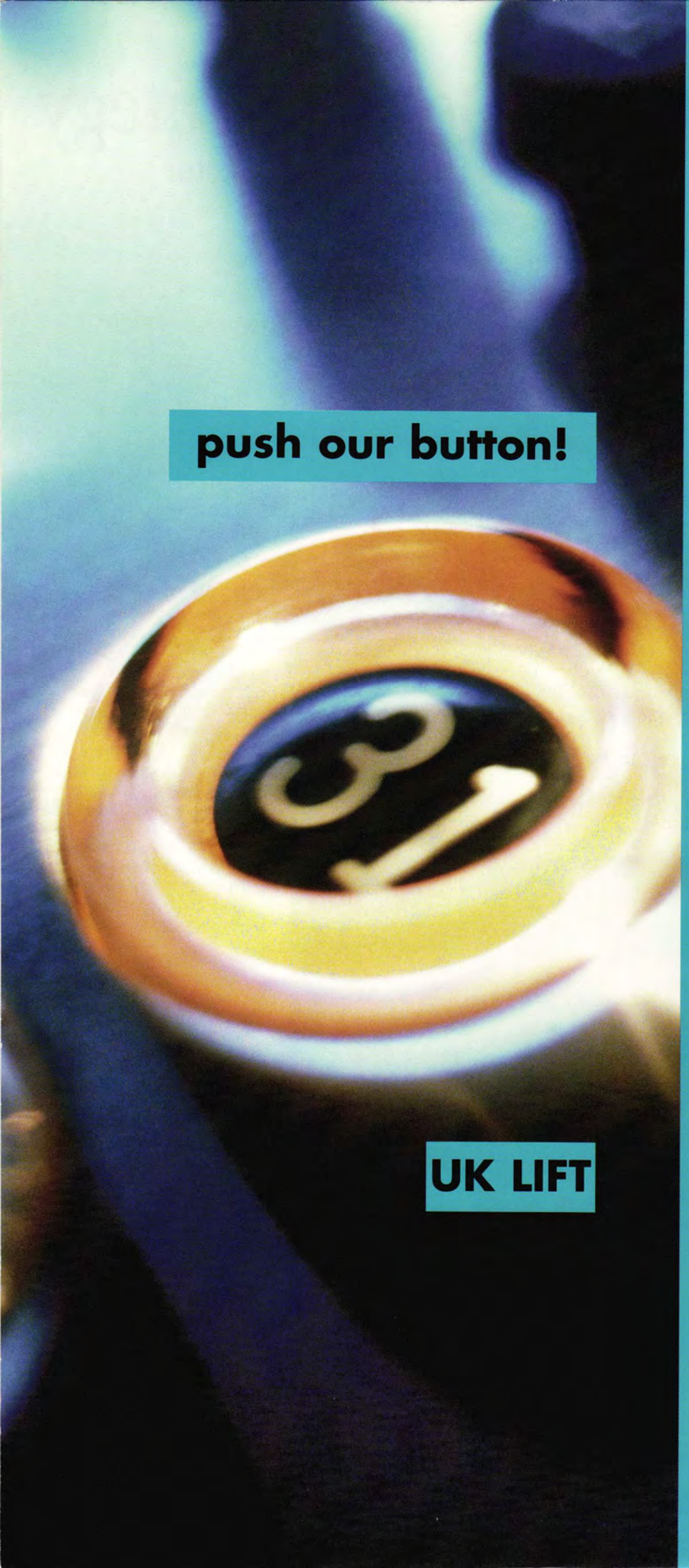

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