Petroleum review November 1998



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ABBREVIATIONS

The following are used throughout Petroleum Review: kW = kilowatts (103)

MW = megawatts (106)

GW = gigawatts (109)

sq km = square kilometres

kWh = kilowatt hour

km = kilometre

b/d = barrels/day

- mn = million (105) bn = billion (10^9)
- tn = trillion (1012)
- cf = cubic feet
- cm = cubic metres
- boe = barrels of oil
- equivalent
- t/v = tonnes/vear

t/d = tonnes/day No single letter abbreviations are used. Abbreviations go together eg. 100mn cf/y = 100 million

cubic feet per year.

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Front cover: Kogas operations in South Korea. Photos by: David Hayes

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The Institute of Petroleum as a body is not responsible either for the statements made or opinions expressed in these pages. Those

readers wishing to attend future events advertised are advised to check with the contacts in the organisation listed, closer to the date, in case of late changes or cancellations.

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ROUNFrom the Editor

Zeebrugge to price Euro gas?

The ever closer integration of the European energy industries took a step forward in mid-October with the opening of the Interconnector pipeline from Bacton to Zeebrugge (see p11). In an important sense it links the fully competitive gas markets of the UK with the still cartelised markets of Europe. It is widely expected that over the next few years European gas markets, under pressure from the European Gas Directive, will move to become more competitive and more like the UK market.

The Interconnector's landfall at Zeebrugge opens the way for a key gas futures contract on which gas sales and purchases can be based. As it is possible to deliver Russian, Norwegian, UK and Algerian gas by pipeline to Zeebrugge and also to deliver LNG from anywhere in the world, a 'basis Zeebrugge' gas futures contract could do for the gas market what the Brent futures contract has done for the oil market.

The strange paradox is that the Interconnector will have a huge impact on gas pricing but only limited amounts of gas are likely to flow through it, at least in the early years. Current contracts involve sales of around 450mn cf/d to Germany and 350mn cf/d to the Netherlands compared to a line capacity of 1,900mn cf/d. Rapid expansion of exports is unlikely as gas supplies in Europe are plentiful and prices are falling in line with lower oil prices. Gazprom has already publicly noted that its gas export prices are currently 13% down on year earlier levels. UK gas suppliers could be forgiven for feeling a little aggrieved that the UK Government has just announced that the moratorium on approvals for gas-fired generation will continue while it completes its electricity review.

However, those lucky enough to hear the UK's new Director General Energy, Anna Walker, addressing members at a meeting at the IP in early October, will have been greatly reassured.

In her presentation on key energy policy issues, she made it quite clear that the government's main aim was to reform the electricity pool arrangements to make the electricity generation market more competitive (see also p9). As part of this process, the 'dash for gas' was being temporarily halted to allow coal-fired stations which still had useful economic life left in them to compete. She was adamant that the government had no commitment to maintaining UK mining jobs but did have a commitment to create a level playing field so that coal-fired generation could compete effectively. Another government concern was that the present pool arrangements were tending to make generation a one fuel activity. Projections that gas could capture up to 80% of the market were one of the concerns the government wanted to address.

To this end she strongly hinted that some form of emissions trading or emission trade-off was needed to allow generators to meet emission targets by fitting expensive flue gas desulfurisation to only some of the coal stations. All who were at the meeting were convinced of the sensible way the government was attacking the problem and of Anna Walker's clear grasp of the subject after just eight days in her new office.

Although many noted that this was a tough but pragmatic official the industry could do business with, the proof of the pudding will be how rapidly and effectively the electricity 'pool' is reformed and how quickly the effective moratorium on new gas-fired generation is lifted.

Memories

October also saw an unhappy anniversary for Opec - 25 years since it arrived on the global scene with the traumatic, unilateral doubling of the oil price. Now it finds it is receiving an oil price little better in real terms than it achieved 25 years earlier while its populations are much larger. Even its apparent achievement of nationalising the oil industries' assets is tempered by the fact it is increasingly asking, even begging, the oil industry to come back. Perhaps the strangest meeting of the month was between Crown Prince Abdullah of Saudi Arabia and the old Aramco partners Chevron, Exxon, Mobil and Texaco plus Phillips, Conoco and Arco (see p44). If the discussions really were about oil company access to the Kingdom's oil fields that would leave Mexico as the only country closed. Sic transit gloria Opec.

The oil industry has always had a long time horizon as its investments take years to come to fruition. According to Dr Colin Campbell the biggest single threat to the long-term health of the industry is the likelihood that resource constraints will mean that oil demand cannot be met in the surprisingly near future. Dr Campbell has spent a lifetime in the industry from field geologist to exploration director. His predictions have been attracting considerable interest. On 25 November he will be speaking at the Institute of Petroleum (see p55 for details). It is a meeting not to be missed. Chris Skrebowski



Due to the growth in deepwater exploration, a number of related websites have been developed in recent months. Deepwater Oil & Gas Monthly (www.dwog.co.uk) and Deepwater (www.deepwater.co.uk) are two well-established examples.

Deepwater Oil & Gas Monthly was launched by Smith Rea Energy Analysts and EIS Energy Information Services in March 1998. The service, upgraded last month, is offered via subscription. However, a demonstration version will be available for viewing from 9 November 1998 at www.dwog.co.uk

Deepnet (www.deepnet.co.uk) was launched by the Centre for Marine and Petroleum Technology (CMPT) in response to the demands of a number of oil majors. It is defined as an 'Internet-based deepwater technology information network', which is designed to consolidate effort and activity in this area. The primary objective is to 'encourage and facilitate the efficient exchange of information relevant to technology issues, solutions and related issues.'

The site includes the following areas: field development information; conferences and seminars; technology developers; initiatives; discussions; and links to related sites.

Deepnet currently has 37 members (a list of them appears in the visitors' area) and all staff of participating organisations are entitled to access the website.

The Institute of Petroleum's own website (www.petroleum.co.uk) is another invaluable resource for locating oil and gas data, and new material is continually being added.

You can access information on careers, education, statistics, events and publications, as well as useful addresses and hundreds of links to other sites. If you are a Corporate Member of the IP, we can even include your logo and a 100-word description of your business in our popular Corporate Directory.

The site is now attracting 7,500 page hits per week, and this number is growing fast. The full IP Library Catalogue, containing over 8,000 records, is now fully searchable online. Members can even fill in a loan request form and submit it electronically. Users can also search a database of periodicals held by the IP Library, and the full catalogue of IP Publications. We are always looking at ways of making our services more widely available to our Members, and remote access to our information sources is a priority.

If you have any questions regarding the IP website or the Internet in general, please contact Catherine Pope – cpope@petroleum.co.uk

NEW_{Upstream}

In Brief

Shell and Cairn seal Asia-Pacific deal

Shell and Cairn Energy have concluded a full 50:50 strategic exploration and production alliance in Bangladesh and parts of northeast India.

Under the terms of the agreement, Cairn will assign (subject to any necessary consents and approvals) one-third of its remaining position in Bangladesh to Shell. Assets comprise an 18.75% stake in the Sangu gas field and associated field development area in block 16, a 25% interest in the remainder of block 16, a 17.5% interest in the Semutang gas field in block 15, and a 25% stake in the remainder of block 15.

In return, Shell will:

- pay approximately \$94mn for 18.75% interest in Sangu, inclusive of field related historic costs from 1 January 1997;
- pay historic costs on the remainder of

the interests acquired, from 1 January 1997, of approximately \$21mn;

- provide a \$100mn gross exploration programme carry; and
- provide a \$110mn gross development programme carry, 50% of which is available for use on the Semutang gas field and 50% for use on future commercial discoveries within the area of mutual interest.

Following completion of the transfers, Cairn and Shell will each hold a 37.50% interest in the Sangu gas field (the remaining 25% being held by HBR Energy), a 35% stake in the Semutang gas field and a 50% interest in the remainder of blocks 15 and 16. In the event of the award of further blocks in the second Bangladesh licencing round, these will be held 50:50 by Cairn and Shell.

Alliance to develop South African gas field

Mossgas, the South African oil-from-gas producer, and UK-based Dresser-Kellogg Energy Services have signed a \$300mn alliance agreement for the development of the offshore EM gas field and its satellites located in the Bredasdorp Basin, South Africa. The Bredasdorp alliance is claimed to be the largest contract utilising alliance principles to be agreed in South Africa to date.

The two-phase development project involves the drilling of up to five subsea wells into the EM field, with two wells to be drilled in the initial phase. A single dual lateral well is to be drilled into the EBF field immediately after the first two EM wells. The first phase is scheduled for completion in April 2000, the second phase a year later. The wells will be linked by an 18-inch diameter pipeline to Mossgas' production platform on the FA field located 49 km to the east. The gas and associated condensate from these wells will be transported to shore in the existing pipelines currently used for gas and condensate from the FA field. The EM–FA pipeline design allows for the tie-in of future satellite fields. Exploration drilling in the nearby FH field is scheduled to commence in November 1998.

The FA fields will be depleted in 2001 and this new project will ensure continuity of gas supply and profitable operation of Mossgas until at least 2006', explains Dresser-Kellogg. The EM project will over its lifetime save South Africa in excess of R7.5bn in imported fuels.'

Crine looks to cut production costs further

The Crine Network forum of North Sea oil companies, contractors and suppliers has stated that in a bid to combat the continuing low oil price and possible impact that this may have on further investment and jobs in the offshore oil and gas business it will be necessary to reduce the cost of a North Sea barrel of oil to \$10 by the year 2000 and to aim to reduce this cost to \$8 by the year 2002. The forum also noted that these targets should be achieved safely and with proper regard to the environment.

The aim is to deliver a six point plan by the end of October with three shortterm and three longer term initiatives to meet the targets. One of the central elements of the plan will be a programme of activities aimed at increasing profitability and value from the improved management of the industry's supply chains. This will focus on major areas of expenditure, such as well engineering, and will work towards achieving breakthrough improvements in cost, value and efficiency, explains the group.

'It is important to recognise that eroding the margins of companies in supply chains will not deliver the gains required by the industry,' says Crine Network. 'This will only alienate the very companies whose positive involvement is an essential prerequisite for the success of the programme. Substantial benefits will only come from new, imaginative and innovative ways of working; more productive cooperation with key contracting parties; and the elimination of waste.'

United Kingdom

Coflexip Stena Offshore Ltd (CSOL) has secured a £12mn EPIC contract on the Conoco Jupiter Phase II project in the southern North Sea. The company is to supply, install, tie-in and hydrotest a 4.5-km, 12-inch diameter gas pipeline with a piggybacked 3-inch diameter methanol line from the existing Sinope tee to the new Europa minimum facilities development well centre in block 49/22.

The western area of the BP-operated North Sea Bruce field is understood to have come onstream on schedule. The new subsea facilities are designed to produce up to 450mn cf/d of gas via a pipeline tied back to a new compression/reception platform which is bridgelinked to the existing Bruce platforms.

Centrica is understood to have acquired certain oil and gas assets of PowerGen, including its 9% stake in Liverpool Bay and interests in North Sea fields Galleon, Ravenspurn, Johnston and Audrey. It is reported that Centrica may pay up to £250mn of the total £300mn consideration in cash.

Phillips Petroleum reports that it has drilled a successful appraisal well in block 22/28a of the UK North Sea. The well encountered a 600 ft oil column in the pre-Cretaceous reservoir.

Chris Smith, Secretary of State for Culture, Media and Sport, has been called on to declare Britain's northeast Atlantic continental shelf a millennium World Heritage site following the findings of a scientific cetaceans survey in the Frontier conducted by Greenpeace and the Whale and Dolphin Conservation Society. The area is being licenced by the UK Government for oil exploration.

Arco British and co-venturers Fina and BHP have announced a gas discovery on the Bombardier prospect in UK offshore block 205/23 located 100 km west of the Shetland Islands.

Bow Valley Energy reports that the 29/2c-12z appraisal well on the North Sea Kyle field has tested at 9,750 b/d of oil. Together with field partner Ranger Oil UK (operator), the company now plans to seek Phase 1 development approval with first oil planned in spring 1999. Production will be via a subsea tie-back to the Banff field FPSO. Peak production in Phase 1 is expected to reach over 20,000 b/d.



Arco and Mobil in new North Sea venture

Arco British and Mobil North Sea have signed an agreement to combine their offshore operations in the UK's southern North Sea under a single management company in a bid to 'reduce operating costs and enhance business performance'. Combined cost savings are expected to be around £5mn per year, a figure representing approximately 10% of current operating and maintenance costs.

The move will bring together assets including more than 15 of the southern North Sea's producing gas fields. It is hoped that the new agreement will provide opportunities to prolong the life of existing fields and make new, smaller fields in the area economically attractive to develop using existing infrastructure.

The proposed joint venture will be led by a new management company, based in East Anglia, in which Arco and Mobil will each hold a 50% stake. Interests currently held by each company in individual southern North Sea assets and licences will remain unchanged. It is intended that the new company will be able to take over operations by 1 September 1999.

Lasmo sells off its southern Italian assets

Lasmo has announced the sale of its southern Italian asset portfolio to a consortium comprising Enterprise Oil Italiana, Eni, Fina Italiana and Mobil Oil Italiana for a consideration of \$33.6mn in cash. The consortium also assumes Lasmo's existing obligation to make a further payment of \$5mn after an agreed amount of production from the Tempa Rossa heavy oil field. The field is currently at the pre-development stage and is due onstream in early 2002. Other assets sold include stakes in the concession of Gorgoglione and Tempa d'Emma in addition to nearby exploration acreage.

The agreement is subject to the approval of the Italian authorities. The sale will have an effective date of 1 July 1998. Lasmo reports that the expected loss on completion of the disposal is some £7mn, based upon a book value of £27mn.

First gas from Delilah North Sea field

Phillips Petroleum Company's Delilah field in block 48/30 of the southern North Sea came onstream late September at a rate of 19mn cf/d of gas. The field is capable of producing in excess of 23mn cf/d. It has taken just nine months from discovery to first gas, the project coming onstream two months ahead of schedule and on budget.

The field is located seven miles from Phillips' main Hewett complex, offshore Norfolk. Hewett produces gas from several nearby fields which is transported by pipeline to the company's gas processing plant at Bacton, Norfolk. Delilah gas will also be processed at Bacton and will bring Phillips' Bacton gas plant throughput to a potential 1.1bn cf/d, equivalent to over 9% of supplies into the UK national grid during a typical winter day.

Delilah production is transported by pipeline to the Hewett 48/29A platform via the existing 10-inch Della pipeline, utilising spare capacity within the Della/Little Dotty process system. This system currently transports gas production from both Della and Little Dolly subsea wells. The Delilah well, 48/30-16, was developed as an additional tie-back to this transport system.

Field partners are Phillips Petroleum (operator, 18.97%), Arco British (19.85%), Agip UK (18.82%), Fina Exploration (18.57%), Mobil North Sea (10.69%), Lasmo North Sea (8.53%) and Deminex UK Oil and Gas (4.58%).

UK invests in future oil and gas industry

The Engineering and Physical Sciences Research Council (EPSRC) and UK Department of Trade and Industry (DTI) are making available around £2mn/y over the next three years to fund new and wide-ranging research into oil and gas extraction. Matching funding from industry means that the potential value of research work that could be undertaken over the next three years is in the order of £9mn to £12mn.

- The aims of the programme are to:
- improve the effectiveness of oil and gas discovery and assessment technologies;
- improve the effectiveness and economics of oil and gas production technologies; and
- greatly reduce the environmental impact of these activities.

In Brief

Enterprise Oil, Saga Petroleum and Statoil report that the Corrib gas discovery appraisal well, located in block 18/20 around 70 km from Achill Island off the west coast of Ireland, has tested at 63mn cf/d.



Statoil reports that the Gullveig oil field, the first of the three Norwegian North Sea Gullfaks satellites, has come onstream. A total of 23 wells from Gullveig, Rimfaks and Gullfaks South are to be tied back to Gullfaks A. Bringing all fields onstream will virtually double output from the A platform which currently produces 138,000 b/d of oil.

Aberdeen-based Asset Geoscience has unveiled a Norwegian equivalent of its Target database of North Sea UK sector exploration and appraisal well information aimed at helping companies to strategically plan their North Sea drilling operations. The database of Norwegian exploration and appraisal wells was compiled with the assistance of the Norwegian Petroleum Directorate.

Statoil, Mobil and Saga Petroleum are understood to have formed a five-year partnership under which the three companies will jointly evaluate and apply for Norwegian North Sea acreage in future offshore licensing rounds.

Phillips Petroleum reports that Ekofisk II is currently running at 90% of its 306,000 b/d oil capacity and 60% of its 789mn cf/d gas capacity due to problems following the August start-up of new facilities. Gross average oil production for the third quarter was 216,000 b/d with gross gas production reaching 357mn cf/d.

Norsk Hydro is reported to have postponed plans for the development of the Fram oil and gas field in the Norwegian North Sea in the light of prevailing market conditions following the continued low oil price.

It is understood that Statoil is to take over responsibility for the development and operation of the Sygna oil field in the Norwegian North Sea from Saga Petroleum. The field is due onstream on 1 August 2000. Reserves are estimated to be between 60mn and 70mn barrels of oil. Peak production is expected to reach 40,000 b/d.

NEW_{Upstream}

In Brief

Asia-Pacific hat-trick for J P Kenny

J P Kenny has secured three major contracts in the Asia-Pacific from Japan Petroleum Exploration Co Ltd (Japex), Carigali/TL Offshore and Esso Production Malaysia Inc (EPMI).

A 30- to 40-inch diameter pipeline to transport natural gas from Korsakov, Sakhalin, Russia, to Tsurugain, Japan, is planned for the coming 21st century. Most of the pipeline will be offshore in water depths up to 1,500 metres. J P Kenny has been commissioned by Japex to undertake a design method study to investigate the past, current and future practices with respect to design, construction, operation and maintenance of major onshore and offshore pipeline systems, prior to planning the 1,900-km Russia to Japan route.

The company is also already working on the detailed engineering design of the 164-km, 24-inch diameter gas pipeline linking the Bunga Kekwa platform to the Resak platform, offshore Malaysia, and the 128-km, 28-inch diameter gas trunkline from the Resak platform to the onshore gas terminal for Petronas Carigali and TL Offshore. The scope of the contract covers the export/import riser and offshore pipeline, the subsea cable crossings, shore crossing/landfall, and the onshore pipeline to the terminal.

The third contract, awarded by Esso Production Malaysia, is for the detailed engineering design of the Larut Alpha pipelines. Located 120 km offshore the Malaysian peninsula, Larut Alpha is a central processing platform with modular topsides and an eight-legged jacket. The Larut pipelines comprise a 102-km, 12-inch diameter crude line and a parallel 98-km, 8-inch gas line from Larut Alpha to the Guntong Delta platform complex.

North America

Arco Alaska, Exxon and BP Exploration (Alaska) report that the Midnight Sun oil field adjacent to Prudhoe Bay is producing at 2,000 b/d of 29[°]API oil and 750,000 cf/d of gas.

Mobil Oil Canada is understood to be planning to invest \$4bn on the East Coast offshore oil and gas industry. Funds will be spent on the Hibernia, Terra Nova and the Sable Island fields, and new exploration/ development.

EEX Corporation is reported to have announced that up to 1bn barrels of recoverable oil may lie in the Llano discovery and six nearby prospects in the deep waters of the Gulf of Mexico. An appraisal well is to be drilled on Llano in 1Q1999.

Middle East

Dana boosts North Sea asset portfolio

Dana Petroleum has entered into a conditional agreement to acquire National Power's UK upstream asset portfolio comprising a 10% interest in the Victor gas field and exploration interests, ranging from 10% to 20% in 10 UK offshore blocks. Dana is to pay National Power £9.42mn in cash and is to issue 17,605,650 new ordinary shares of 1 pence each. National Power's shareholding in Dana will increase to 8.56% from 6.61%.

The UK is a core business area for Dana, the group already holding a 5% stake in the Victor gas field and interests in over 30 UK exploration blocks. The company has also built a strategic portfolio across the Atlantic Margin with six blocks in the Porcupine Basin and a partnership with the Faroes Oil and Gas Company.

The new agreement with increase Dana's Victor (blocks 49/22 and 49/17b) holding to 15% and will more than double its Atlantic Margin acreage by adding seven blocks between the UK and the Faroe Islands, six of which lie in Tranche 53 and one block 205/14. In addition, the deal will increase Dana's stake in two licences – blocks 21/7 and 44/24c – adjacent to its recent oil and gas discoveries in the UK North Sea. The tenth exploration block acquired in the deal is block 42/10b in the southern gas basin.

Commenting on the deal, Dana's Chief Executive Tom Cross said: 'This acquisition increases Dana's UK gas production threefold and adds substantially to our strategic position along the Atlantic Margin. Dana's overall sensitivity to oil price fluctuations will be reduced as the gas element of our total production rises from under 20% to over 40%.'

Namibia announces third licensing round

The Government of the Republic of Namibia recently launched its third petroleum licensing round in which the whole of the acreage onshore and offshore the country is being offered, including for the first time, deepwater areas.

Namibia remains a relatively underexplored country. To date, 10 wells have been drilled offshore, including four in the Kudu gas field. The Kudu area has been declared a petroleum field and the licensees are currently finalising a development plan under which the Kudu gas will initially be used to generate electricity in Namibia. The possibility of marketing gas direct to South Africa is also being investigated.

A total of 62,000 km of seismic has been acquired in Namibia and, since independence in 1990, a total of \$200mn will have been spent by the end of 1998 by first and second round licensees, Namcor and seismic contractors.

A number of new licensing and fiscal incentives are being offered in the third licensing round, including: extended exploration periods, reduced royalty and tax rates and new arrangements providing for the decommissioning of petroleum facilities at the end of field life. The deadline for submission of applications for exploration licenses is 31 March 1999. Arco Dubai has acquired Gulfstream Resources Canada Ltd's 25% interest in the Margham field off Dubai, bringing Arco's stake in the field to 100%. Arco and Gulfstream are also entering into a cost-sharing agreement for the upstream development of a Qatar natural gas project.

Saudi Arabian Texaco Inc and Kuwait Oil Company have announced an oil and gas discovery on the Humma prospect in the Partitioned Neutral Zone between Kuwait and Saudi Arabia. The discovery well tested at 3,400 b/d of crude oil and sweet gas.

Oil India Ltd (OIL) is reported to be planning to take a 20% stake in a development project in block 4 in Oman which has been proposed by TOTAL. The block is estimated to hold reserves of 120mn tonnes of oil and gas.

Russia & Central Asia

Texaco is reported to have acquired a 65% stake in western Kazakhstan's North Buzachi oil field from Nimir Petroleum Company for an undisclosed sum.

Aberdeen-based BJ Services reports that it has been awarded what is its first contract in Kazakhstan from Schlumberger IPM. The contract covers the supply of casing and tubing running, and fishing equipment for seven wells in the Aktau area.

NEW

Value of UK oil output falls to new low

Daily UK oil revenues fell 3% to £17.3mn in August, their lowest in cash terms since June 1991, according to the latest Royal Bank of Scotland *Oil and Gas Index*. A combination of low prices and the seasonal dip in production were held accountable for the drop. Compared with August 1997, oil revenues were down by 37.8%.

However, prices were reported to have shown recent signs of improvement, rising from an average of just over \$12/b during the summer months to around \$14/b as stock levels have started to moderate and because of a number of refinery outages.

Year Month	Oil production (av. b/d)	Gas production (av. mn cf/d)	Av. oil price (\$/b)
Aug 1997	2,428,302	5,883	18.38
Sep 1997	2,526,529	6,376	18.49
Oct 1997	2,619,632	8,249	19.89
Nov 1997	2,553,987	10,075	19.07
Dec 1997	2,709,258	10,950	17.38
Jan 1998	2,598,757	11,081	15.20
Feb 1998	2,582,700	10,341	14.07
Mar 1998	2,595,594	9,841	13.17
Apr 1998	2,571,241	8,879	13.53
May 1998	2,433,059	6,407	14.40
Jun 1998	2,406,521	6,414	12.12
Jul 1998	2,432,040	5,965	12.06
Aug 1998	2,344,312	6,008	12.05

Source: The Royal Bank of Scotland Oil and Gas Index

North Sea oil and gas production

Texaco targets Kazakhstan

Texaco has acquired a 65% working interest in the North Buzachi oil field in western Kazakhstan from Nimir Petroleum Company (NPC). The field will be Texaco's first sole operated project in Central Asia. NPC will retain the remaining 35% stake in the project.

The undeveloped, onshore North Buzachi field is estimated to hold between 1bn and 1.5bn barrels of 19–21 degree API oil in place. A pilot work programme will be carried out by Texaco to determine the commercial viability of the field which could come onstream within the next two to four years.

Sirri field in production

TOTAL has announced the start-up of production on the Sirri A field, located in Iranian waters in the eastern part of the Persian Gulf. The field will produce 7,000 b/d of crude from three wells in the start-up phase, with a production objective of 20,000 b/d from 11 wells.

The neighbouring Sirri E field will begin production in 1999 with output expected to plateau at 100,000 b/d. As the two fields come onstream, the National Iranian Oil Company will gradually take over as operator, although TOTAL will continue to be involved in operations until its investment has been fully recovered.

African first for block 14

The partners on deepwater block 14 offshore Angola have launched the first development phase of the large Kuito field. Production is scheduled to begin in 2H1999 with phase one output expected to quickly reach 100,000 b/d.

TOTAL holds a 20% interest in block 14, in association with Chevron (operator, 31%), Sonangol (20%), Agip (20%) and Petrogal (9%). A consortium comprising SBM, ABB and Coflexip Stena Offshore will supply a production, storage and offloading vessel capable of processing 100,000 b/d of crude. Produced gas is to be reinjected rather than flared, in what is claimed to be the first application of this technique in deep Angolan waters.

Two other structures, Landan and Benguela, have been identified to date on block 14.

Malory onstream

Mobil North Sea's Malory field has come onstream with an initial production of 60mn cf/d from a single well. The field, located in the southern North Sea, is being developed by a minimum facilities platform. Gas is transported via Mobil's Lancelot pipeline for processing at the Phillips operated Bacton gas terminal. Recoverable reserves are estimated at 75bn cf of gas.

In Brief

Kazakhoil is reported to have concluded four oil and gas development agreements with Kazakhstan Caspian Shelf, Inpex North Caspian, the Japanese National Oil Corporation and Phillips Petroleum. The agreements have been valued at a total of \$2bn.



Santos is reported to have discovered a new gas field in the South Australian part of the Cooper/Eromanga Basins. The Welcome Lake East 1 well tested at 3.66mn cf/d of gas with associated condensate flowing at 81.5 b/d.

Unocal is understood to have signed an agreement with Petrovietnam to extend offshore gas exploration acreage from block B into block 48/95 in the Gulf of Thailand.

Pogo Producing Company reports that the Jarmjuree prospect No 1 wildcat well in block B8/32 in the Gulf of Thailand has found 85 feet of net gas and oil sands.

BHP (as operator) and Canadian Petroleum are reported to be planning to jointly develop the Buffalo oil field offshore Western Australia, licence WA-260-P, at a capital cost of \$88mn. The field is scheduled to come onstream in late 1999, with production peaking at 40,000 b/d. Proven and probable reserves are estimated at 22mn barrels.

China National Offshore Oil Corporation is reported to have discovered a new oil field, Panyu 4-2, in the Pearl River Basin in the South China Sea. Oil reserves are estimated at 20mn tonnes.

Esso Production Malaysia Incorporated (EPMI) is understood to have brought its unmanned Raya A oil platform offshore Terengganu, Malaysia, into production.

Latin America

Germany's Wintershall is reported to be planning to spend \$650mn on oil and gas exploration in Argentina over the next seven to ten years following its recent acquisition of Deminex Argentina.

Petrobras and the Brazilian National Development Bank are reported to have signed a \$4.5bn financial deal that will fund the construction of five new oil platforms, six supply boats and two suezmax tankers.

NEW_{Upstream}

CMPT funds oil and gas development projects

The Centre for Marine and Petroleum Technology (CMPT) has awarded ten research and development Pathfinder Fund grants worth a total of £400,000, to seven UK universities and three UK companies to work on oil and gas related projects.

All projects in the Pathfinder programme are relatively high risk,

Angolan discoveries

TOTAL has reported a fourth major discovery on block 14 offshore Angola. the D14-10X well on the Belize structure tested at more than 10,000 b/d of oil.

The discovery follows that of the large Kuito structure in April 1997 and of Landana in December 1997 and Benguela in July 1998, both of which are currently being evaluated. Production at Kuito is scheduled to begin in 2H1999, with Phase I output expected to reach 100,000 b/d. TOTAL owns a 20% interest in block 14, Chevron (operator) holding 31%, Sonangol 20%, Agip 20% and Petrogal 9%. involving new and novel methodologies, or technology. Each project lasts less than one year. Areas currently being studied include drilling, downhole sensors, image processing and downhole measurement. All projects are aimed at cost reduction or efficiency improvements within the oil and gas industry.

Egyptian development

Amoco Egypt and partners Egyptian General Petroleum Company (EGPC) and IEOC (an affiliate of Italian oil and gas company Eni) have signed a 20year natural gas sales agreement for the Temsah natural gas field in the Nile Delta, offshore Egypt.

Field development costs for Temsah will be around \$700mn with gas deliveries expected to begin at 35mn cf/d in 2H1999, rising to 480mn cf/d by 2003. Proved reserves are put at 3.9tn cf.

Amoco and IEOC (operator) each hold 25% of the field, EGPC holding the remaining 50%.

Intriguing Atlantic seabed survey find

Scientists surveying the sea floor environment of the Atlantic to the north and west of Scotland have discovered a phenomenon not previously recorded in an area 90 miles to the northwest of Cape Wrath, it was revealed at the recent Atlantic Frontier Environmental Conference held in Aberdeen.

Data collected in the 1998 Atlantic Margin Environmental Survey on the biology, chemistry and geology of over 18,000 sq km of sea floor to the north of Shetland and west of the Western Isles this summer, has revealed an area of some 50 sq km in the northern Rockall Trough characterised by a pattern of mounds, many with associated 'tails'.

Early analysis of side-scan sonar and profile data taken at depths of up to 1,100 metres show these mounds to be up to 5 metres in height and 100 metres in diameter.

Sea floor photography shows that the mounds and their tails, which can be between 100 metres and 500 metres in diameter, appear to be colonised by a variety of marine life, occurring at a higher density than in the surrounding area.

The structural composition of these mounds is yet to be fully understood but species associated with them include fish, clusters of which are thought to be *Lophelia pertusa*, sponges and giant protozoans (single-celled creatures measuring up to 10 cm in diameter).

The 1998 survey is part of ongoing research which has surveyed a total of some 32,000 sq km of sea floor in the North Atlantic since 1996.

The work is being carried out by scientists at Southampton Oceanography Centre and is managed by the Atlantic Frontier Environmental Network (AFEN) to provide a regional assessment of the sea floor environment in those deepwater areas now licensed for hydrocarbon exploration in the North Atlantic.

Although no evidence of these mounds has been found in previous AFEN studies, which have employed the same survey techniques, separate research in Irish waters this summer and elsewhere in the Atlantic suggests that these features may not be unique to the west of Britain area.

Further analysis work is to be carried out to establish fully the nature of the mounds' geological and biological characteristics and the relationships between them. The information gathered will then be used to enable operators to take the appropriate steps to protect the environment.

In Brief

Gaffney, Cline & Associates (GCA) are to provide Brazil's Agencia Nacional do Petroleo (ANP) support and advisory services for the country's pending first round of oil and gas licensing.

Harken Energy Corporation reports that following evaluation of 3D seismic data the Ubaque structure in the Palo Blanco field in the Alcaravan/Miradores association contract areas of Colombia could be up to 400% larger than originally thought. Current calculations put the structure as large as 5,000 acres.



Petrolex Energy Corporation, a Coplex Resources' subsidiary, and partners Texican Oil and Quadra Resources report that the Compae #2 well has tested gas at 7.9mn cf/d. The well is the step-out evaluation of the Compae #1 discovery well on the Maracas Association contract in north Colombia.

It has been reported that Angola is set to increase its oil production to more than 2mn b/d over the next decade. The country currently exports 750,000 b/d, around 65% of which goes to the US, and has estimated reserves of 5bn barrels.

Egyptian General Petroleum Corporation and Repsol of Spain are reported to have signed a Memorandum of Understanding covering the joint exploration for oil and gas in North Africa and the Middle East.

Energy Africa has taken a 15% stake in a production sharing agreement for block 9, offshore Luanda, Angola, with state-owned oil company Sonangol and partners Texaco (operator, 40%), Mobil (35%) and Norsk Hydro (10%).

A number of foreign oil companies are reported to have been forced to shutin oil production in Nigeria following escalating violence by local activists against oil operations. Shell is understood to have shut-in around 300,000 b/d and Eni 120,000 b/d.

Canadian Occidental Petroleum's Ejulebe field offshore Nigeria is reported to have come onstream. The field is expected to produce at a rate of 10,000 b/d of oil.

Ranger Oil is reported to be planning to start production from the redeveloped Espoir field offshore the Ivory Coast by September 2000. The shallow water field holds an estimated 60mn barrels of oil reserves.

NEVIndustry News In Brief

UK environmental statistics revealed

The UK Department of the Environment, Transport and the Regions has published a digest of environmental statistics which outline trends in UK environmental conditions over recent years. Key points include the following:

- Under the Kyoto protocol, the UK has agreed to reduce emissions from a 'basket' of six greenhouse gases (carbon dioxide, methane, nitrous oxides, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride) by 12.5% below 1990 levels by 2008–2012. Emission of these gases weighted by global warming potential fell by 5.5% between 1990 and 1996.
- Carbon dioxide emissions fell by 7% between 1990 and 1995 (from 168mn tonnes to 157mn tonnes), due mainly to greater use of gas and reduced use of coal in electricity generation, and increased use of nuclear-generated electricity. However, emissions rose by 3% in 1996 (to 162mn tonnes), mainly because of the colder winter in 1996/97. 1997 emissions of carbon dioxide are provisionally estimated at 155mn tonnes.
- Power stations (28%) and road transport (20%) were the major sources of carbon dioxide emissions in 1996. Domestic, industrial and road transport consumption accounted for nearly 80% of the emissions by end user. The fuels that contributed most to carbon dioxide emissions were coal (25%) and petroleum (35%).
- Nitrous oxide emissions fell by 15% between 1990 and 1995 (from 215,000 tonnes to 183,000 tonnes), but increased by 3% between 1995 and 1996 (to 189,000 tonnes), mainly due to increased industrial production of adipic acid. Non-combustion processes accounted for 37% of total nitrous oxide emissions.
- Sulfur dioxide emissions fell to 2mn tonnes in 1996 from 2.4mn tonnes in 1995, a decrease of 14%. Total emissions were 4.9mn tonnes in 1980 and 6.4mn tonnes in 1970. Power stations accounted for 65% of sulfur dioxide emissions in 1996, compared with 61% in 1980 and 46% in 1970. Emissions by fuel type show coal accounting for 67% of sulfur dioxide emissions in

1996, compared with 64% in 1980 and 57% in 1970.

- Total black smoke emissions were estimated to be 338,000 tonnes in 1996 compared with 342,000 tonnes in 1995, a decrease of 1%. Emissions from road transport were 3% lower than in 1995 but were 68% higher than in 1980, and now make up nearly 60% of all black smoke emissions. Emissions by final domestic users fell by 77% between 1980 and 1996.
- Emissions of smaller particles, PM-10, fell by 41% between 1980 and 1996, to 213,000 tonnes. Road transport and non-combustion processes (such as construction, mining, quarrying and industry) are the major sources of such particles, accounting for over half of total emissions.
- UK emissions of nitrogen oxides fell to 2.1mn tonnes in 1996, a decrease of nearly 4% from the 1995 figure, and a fall of 26% from the peak of 2.8mn tonnes in 1989. Emissions from road traffic accounted for 47% of total emissions in 1996 but have fallen steadily since 1989 mainly as a result of the introduction of catalytic converters in cars.
- Carbon monoxide emissions fell to 4.6mn tonnes in 1996, 6% lower than in 1995 and 34% lower than in 1989. Road transport accounted for 71% of such emissions in 1996. Emissions from this source have fallen by 34% since 1989, mainly as a result of the introduction of catalytic converters in cars.
- UK emissions of lead from petrolengined vehicles began to decline following the reduction of the lead content of petrol in 1986. This decline has continued as a result of the introduction of unleaded petrol in 1988. Emissions in 1997 were estimated at 800 tonnes, 75% less than in 1988.
- Unleaded petrol accounted for 72% of UK deliveries in 1997, almost 4% higher than one year earlier.
- VOCs emissions fell to 2.1mn tonnes in 1996 from 2.2mn tonnes in 1995, a decrease of 4%. Emissions peaked in 1989 at 2.7mn tonnes. Road transport (30%) and solvent use (29%) were the main sources of emissions in 1996.

UK focuses on electricity from renewable resources

An extra 1.4mn homes in the UK are to be powered by electricity from renewable resources under a new Order laid in Parliament. Some 1,177MW of electricity will come from 261 projects, yet to be built in England and Wales, covered by the Fifth Non Fossil Fuel Obligation (NFFO). The projects include landfill gas, waste, hydro and wind farms.

The electricity will be the cheapest yet supplied under the NFFO scheme which began in 1990. The average price of power expected to be generated under NFFO-5 is 2.71 p/kWh, compared with the electricity pool price of 2.67 p/kWh. This is down from 4.35 p/kWh under NFFO-3.

United Kingdom

The merger between British-Borneo Petroleum Syndicate and Hardy Oil & Gas is reported to be going ahead after shareholder approval. The new company – British Borneo Oil & Gas – is said to be the third largest independent in the UK oil and gas sector.

Ramco Energy has reported a £3.7mn turnover for the 1H1998 and pre-tax profits of £0.5mn.



Norwegian shipyard and offshore supply company Umoe is understood to have acquired 20,000 shares in Anglo-Norwegian group Kvaerner.

Due to BP's merger with Amoco, the company will be breaking up its alliance with Statoil. The relationship has been legally terminated, but a BP spokesperson claimed that Statoil remains the company's preferred partner and the two companies will continue to cooperate.

The EU and car manufacturers are reported to have agreed a deal aimed at reducing carbon dioxide exhaust emissions by 25% to 140 g/km by 2008. The EU hopes to reduce a further 20 g/km of emissions through other means including fiscal measures in order to meet Kyoto targets.



Oryx Energy and Kerr-McGee have unveiled a \$4bn merger of their operations to become what is said to be North America's fourth largest independent oil and gas exploration and production company, the independent producer in the UK sector of the North Sea and the third largest in the Gulf of Mexico. The new company is called Kerr-McGee Corp. The deal is expected to produce annual cost savings of \$100mn.

Canadian oil and gas company Amber Energy is reported to have accepted a C\$780mn takeover bid from Alberta Energy Company.

It is understood that Shell plans to shed 20% of its North America workforce in a bid to cut costs.

NEV Industry News In Brief

Transneft pipeline tariff rise hits industry hard

The hard currency tariff to be paid by users of the Transneft pipeline system is to be increased from \$0.50/t in 3Q1998 to \$1.50/t, reversing the policy of lowering the tariff to help the Russian oil industry, reports the United Financial Group's Russia Morning Comment. The tariff was set at \$3/t in 1Q1998 and \$1.50/t in 2Q1998.

The move has hit hardest those companies with the highest levels of exports. The following table shows the impact on various companies based on the 4Q1998 export schedules.

Company	4Q1998 export schedule ('000 tonnes)	Annual revenue loss (\$mn)		
Rosneft	1,504	6.0		
Lukoil	4,812	19.2		
Surgutneftegaz	2,889	11.6		
Yukos	2,762	11.0		
Sidanco	1,657	6.6		
Slavneft	949	3.8		
VNK	892	3.6		
TNK	1,635	6.5		
Sibneft	1,438	5.8		
Onaco	729	2.9		
Tatneft	1,990	8.0		
Bashneft	1,054	4.2		
Komitek	283	1.1		

Source: United Financial Group's Russia Morning Comment

Estimated impact of Transneft tariff increase on Russian oil and gas companies

UK tackles distortion in electricity market

Announcing the publication of the government's Energy White Paper, UK Energy Minister John Battle stated that a major programme to reform UK electricity trading arrangements – the electricity pool – is being pushed forward. The reform is aimed at removing distortions in the electricity market and putting downward pressure on prices. Battle stated that:

- completely new electricity trading arrangements are to be developed which will provide security of supplies, transparent prices and a market which is competitive;
- the government will bring forward legislation to support the changes required, consultation on which will begin during October 1993; and
- the DTI and Offer will jointly lead the implementation process with full involvement of customers and industry.

A number of new electricity trading arrangements have been proposed:

- A forward market in which customers and suppliers can contract bilaterally for electricity. This would be for the physical delivery of electricity rather than just a financial arrangement. It is expected that most electricity would be traded in this market.
- Associated derivatives markets such as futures and options which will enable companies to hedge financial risk.
- A short-term bilateral market which

would provide for simple screen-based trading between generators, suppliers and large customers. This market would operate close to the time the electricity is due to be delivered – probably from a day ahead – and will close four hours ahead. It would allow parties to adjust their contract positions in the light of latest information, in particular regarding the weather and the availability of generating sets.

- A balancing market in which the National Grid Company (NGC) would be the sole counter-party to trades. This market would operate around four hours ahead of the moment of delivery (ie from the point the shortterm bilateral market closes). Generators, and particularly those with flexible plant, would be able to offer increases or decreases from their contracted output into this market and the demand side would be able to offer load reductions. NGC would buy these offers to balance supply and demand on the grid system and to manage transmission constraints.
- A process to deal with the financial settlement of electricity trades made in the market.
- Other markets may be developed if market participants require them.
 Some participants have suggested that a voluntary day-ahead auction would be a worthwhile addition.

Russia & Central Asia

Gazprom is reported to have stated that its gas export prices have fallen by 13% compared with last year. According to the United Financial Group's Russia Morning Comment, prices at the German border are around \$70/mn cm against \$80/mn cm a year ago, reflecting lower oil prices (to which gas prices are linked) and increasing gas-to-gas competition.



It is understood that the Russian Government has called off the sale of a 75% stake in Rosneft.

Shell has pledged to cut the emissions of greenhouse gases from its global operations by more than 10% by 2002, compared with 1990 levels.

Kvaerner Process Systems and Dresser-Rand Energy Systems have announced the formation of Multiphase Power and Processing Technologies LLC to develop and market proprietary expanders based on Biphase turbine technology and other equipment to separate gas and liquids, and to generate power from previously wasted energy during oil production. According to Kvaerner, the equipment will enable oil and gas producers to reduce the size of production platforms and subsea modules and enable the generation of power for production with no greenhouse emissions.

Following the acquisition earlier this year of UK tanker and trailer manufacturer Fruehauf's parent company Societe Europeenne De Semi Remorques (SESR) by Littlejohn Partners of the US, SESR has changed its name to General Trailers France. Its UK holding company Trailerco Holdings has also changed its name to General Trailers. In addition to owning the 'Fruehauf' brand, the newly named company owns the 'Trailer', 'Benalu' and 'Blond Baudouin' brands.

DuPont is reported to be planning to go ahead with the floatation of its Conoco subsidiary despite continued weak oil prices and the resultant volatility of the worldwide stock markets. Up to 25% of Conoco stock is expected to be publicly offered before the end of the year, with the remaining percentage offered to DuPont shareholders in 1999. Downstream In Brief

Ultramar and Phillips announce US joint venture

Ultramar Diamond Shamrock Corporation has announced plans to combined all of its US operating assets with the North American refining, marketing and transportation (RM & T) operations of Phillips Petroleum Company. The new joint venture - called Diamond 66 -is claimed to be the largest RM & T company in North America.

Under the terms of the deal, Ultramar Diamond will own 55% and Phillips 45% of Diamond 66. In addition, Phillips will receive or retain a one-time cash or cash equivalent amount of \$500mn from the joint venture company upon closing of the transaction in 1Q1999, and an additional \$300mn cash distribution one year from this date.

The merger is expected to generate incremental cost and productivity savings of more than \$250mn in the second year after the transaction. The venture is also expected to produce annual capital savings of at least \$50mn.

Diamond 66 will have its corporate headquarters in San Antonio, Texas, and will base a number of businesses in Bartlesville, Oklahoma, including the credit card,

pipeline, lubricants, aviation operations and various other support functions. The new venture will operate 10 refineries in North America with a total throughput capacity of more than 1mn b/d. It will have more than 12,000 branded outlets (6,100 UDS; 5,900 Phillips) in 36 US states and six Canadian provinces, including more than 2,500 company operated gasoline/convenience store outlets and more than 1,300 independent marketers.

The company will also operate an extensive crude and petroleum products transportation system with about 13,200 miles of pipeline, a unit train, and 64 strategically located product terminals (37 UDS; 27 Phillips), as well as an extensive natural gas liquids fractionating, transportation and storage operation, and chemicals businesses producing ammonia, solvents, aromatics and polymer grade propylene.

Approximately 1,000 jobs are expected to be lost as a result of the merger.

According to a Phillips spokesperson, the merger only affects the two companies' North American downstream operations and will not impact Phillips' operations elsewhere in the world.

Tough times continue for Europe's refiners

According to French consultant Petrofinance's 1998 edition of its report Oil Markets & Networks in Europe, refining margins are likely to remain under pressure in the short term. Even with a 'normal' winter, margins are expected to remain weaker during the 2H1998 than during the 1H1998, with four factors considered likely to have a detrimental impact on gasoil prices:

- levels of middle distillate are atypically high as a result of European refineries having operated at maximum capacity;
- European diesel demand, which has been buoyant during the 1H1998, appears to be now slowing;
- diesel demand in Asia is expected to remain weak; and
- the Russian crisis, by lowering domestic demand, may well leave additional surplus available for export.

The company expects the picture to improve in early 1999. It expects that Asian diesel demand will stabilise at its low level during the 2H1998 and start to recover moderately during the 1H1999. European diesel demand will continue to be strong at around 3% despite a slowdown in economic activity while demand for gasoline is expected to be strong in the US and Central Europe which may

help to revive the gasoil/crude spread.

In the medium term, however, the above is not expected to solve the overcapacity problems and tight margins faced by the refining sector. The report also states that company mergers 'can no longer represent a global solution to downstream difficulties'. Concentration is already high in many countries while further mergers are likely to be blocked by the anti-trust authorities. In addition, mergers do not address the overcapacity issue. Thirdly, in marketing, worsening of the competitive environment is often created by a very small number of service stations, so the departure or merger of some of the small and middle-sized players is not likely to radically change the competitive situation.

'Oil companies are - globally - aware of this,' says the report. 'Some have engaged in vast reorganisation programmes aimed at cutting costs, others have opted for even more radical solutions, like Statoil in Scandinavia, which regrouped its network with a supermarket chain. Most are trying to develop the non-fuel activity of their network: but this strategy also raised the question of whether they will be able to compete strongly in the non-oil sector, being confronted with competitors of a different nature."

United Kingdom

Kuwait Petroleum has launched a new dealer package for its 400-strong UK network of sites. The new arrangements aim to reduce dealer overheads by using the group's buying power to secure discounts for Q8 dealers.

Shell Gas Direct, which sells mains gas to UK industrial and commercial customers, has acquired around 3,000 small to medium sized customers from Total Gas Marketing for an undisclosed sum. The deal follows Shell's recent acquisition of Texaco Natural Gas.

UK electricity industry regulator Professor Stephen Littlechild has announced that the fossil fuel levy on electricity customers is to be reduced from 0.9% to 0.7% of annual bills from 1 January 1999 in response to the falling cost of renewable energy projects.

Europe

Wingas reports that the 320-km, 11bn cmly capacity Wedal pipeline has been completed, bringing gas-to-gas competition to the North-Rhine Westphalia for the first time.

National Power is reported to have been named the preferred buyer for a 20% holding in Patnow Adamow Konin (PAK), Poland's second largest electricity producer.

German companies MVV Energie, EnBW Energie Baden-Wurttemburg, Wintershall Wirtschaftliche Vereinigung and Deutscher Versorgungsunternehmen have formed a new energy trading company - Deutsche Energy One (DEO).The four partners each hold a 25% stake in the new Frankfurt-based venture, which will focus on energy supply and sales, particularly the physical supply of electricity, construction and operation of power plants, and provision of energy services.

Statoil reports that it has concluded a preliminary agreement on establishing 10 service stations in northwestern Russia.



National Power is reported to have announced plans to invest \$1bn in new gas-fired power generating plants in the US over the next three years.



Shell and Enron agree Cuiaba power deal

Shell International Gas and Enron International have finalised a partnership agreement to develop the Cuiaba power project, which comprises a gasfired combined cycle power plant in Mato Grasso state in west Brazil and a 630-km gas pipeline which will supply Bolivian gas to the plant.

The plant is to be developed in stages over the next three years and will have a final capacity of 480 MW. The total cost of the project is approximately \$500mn, with the first phase of development scheduled to start-up by the

end of 1998.

Shell equity in the project ranges between 25% and 35% for the power plant and pipeline respectively.

The power plant's entire electricity capacity will be sold by Empresa Produtora de Energia (the power plant project company) to Electronorte under a long term power purchase agreement. The project includes a second pipeline outlet for Bolivian gas to Brazil in addition to the main Bolivia-Brazil pipeline currently under construction and in which both Shell and Enron have an interest.

September UK fuel prices

Pence per litre
63.75
69.37
66.69
63.48
68.64
66.12
68.35
75.35
71.73

Source: PHH Allstar Fuel Report

News in Brief Service

The latest developments, deals and contracts in the oil and gas industry around the globe

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Interconnector onstream

The £450mn **UK-Continent** Gas Interconnector linking the UK's gas pipeline network to mainland Europe was officially inaugurated on 13 August amidst reports that it has received bookings for under half of its 20bn cm/y gas capacity. Falling gas prices on the Continent, where gas companies enter into long-term contracts as there is no spot gas market as in the UK, are thought to be the primary cause of lack of demand for capacity.

Distrigaz of Belgium, which holds a 5% stake in the Interconnector, is expected to be the first gas distributor to use the 235-km Bacton-Zeebrugge pipeline to sell gas to the UK. Other Interconnector partners are: British Gas (40%), BP (10%), Conoco (10%), Elf (10%), Gazprom (10%), Ruhrgas (5%), Amerada Hess (5%), and National Power (5%).

James Allcock, Chairman of Interconnector UK, is reported to have predicted the construction of a northern North Sea pipeline, linking Norway and Scotland, as the next step in the development of a fully integrated European gas pipeline network.

Syntroleum Corporation has retained Southwest Research Institute to test a new family of synthetic fuels being developed by Syntroleum for use in diesel engines. The company plans for the new fuels to meet the most stringent US environmental regulations and qualify as alternative fuels under the US Energy Policy Act of 1992.

Air Products and Chemicals is to build a 100mn cf/d hydrogen plant in Carson, California, to serve the nearby refining facilities of Equilon Enterprises - a joint venture between Texaco Refining & Marketing and Shell Oil Products - and Arco Products.



Qatargas is understood to have signed an agreement to supply 57,000 tonnes of LNG to Duke Energy of Houston in December 1998. The deal marks the Qatari company's first foray into the US market.

Russia & Central Asia

Transgas and Gazprom have agreed a \$10bn contract to supply 8-9bn cm of natural gas to the Czech Republic for the next 15 years. First deliveries are expected on 1 January 1999. It was also agreed to export of Russian gas to western Europe via existing pipelines in the Czech Republic until 2020.

Africa

Eni of Italy is understood to have signed an agreement with the Palestinian National Authority for the long-term supply of Egyptian gas to the Gaza Strip.

UK Deliveries into Consumption (tonnes)

Products	tAug 1997	*Aug 1998	tJan-Aug 1997	*Jan-Aug 1998	% Change
Naphtha/LDF	192,968	201,059	1,257,123	1,961,582	56
ATF – Kerosene	817,005	875,385	5,552,865	5,948,139	7
Petrol	1,836,371	1,818,880	14,856,763	14,388,015	-3
of which unleaded	1,328,490	1,442,214	10,543,478	11,146,565	6
of which Super unleaded	41,026	33,810	354,328	276,524	-22
Premium unleaded	1,287,464	1,408,404	10,189,150	10,870,041	7
Burning Oil	166,648	207,465	2,092,577	2,241,049	7
Automotive Diesel	1,160,400	1,187,910	9,821,039	9,936,371	-1
Gas/Diesel Oil	531,393	564,450	4,825,495	4,717,235	-2
Fuel Oil	203,882	197,522	2,751,712	1,871,503	-32
Lubricating Oil	68,908	60,358	585,760	553,472	-6
Other Products	750,555	721,017	5,746,880	5,379,119	-6
Total above	5,728,130	5,834,046	47,490,214	46,996,485	-1
Refinery Consumption	550,472	557,860	4,307,670	4,353,700	1
Total all products	6,278,602	6,391,906	51,797,884	51,350,185	-1
+ Revised with adjustments *preliminary					

round-up

Gas developments dominate as crisis hits energy demand growth

Over the last year, the Asia-Pacific has rarely been out of the headlines as a result of the region's financial problems. Until the full force of the crisis hit, the region was the fastest growing market for oil and gas with 1997 growth rates of 2.40% and 4.00% memoritude.

3.1% and 4.9% respectively.

Asia-Pacific

The region is a large net importer of hydrocarbons but over recent years output growth for oil (0.9%) has lagged well behind demand. Recent discoveries and developments in the region have increasingly focused on gas, although production growth has tended to fall short of demand growth.

In preparing this review of recent trends and upcoming oil and gas developments in the Asia-Pacific, we have drawn extensively on recent reports from Wood Mackenzie, the Edinburgh-based consultant. We would like to thank them and acknowledge their help and assistance.

Bangladesh

Bangladesh holds large gas resources Which provide over 60% of the country's total commercial energy supplies. Gas reserves are estimated to be 345bn cm. However, current levels of consumption – 8.5bn cm/y – mean that the country could significantly expand future gas production. Gas production is currently expanding; in 1999 it is likely to grow by almost 40% over 1998 forecast due to Sangu and Jalalabad being fully onstream.

The Bangladesh Government improved production sharing terms in March 1997 in a bid to encourage foreign investment. New terms include: no signature bonuses, no administration fee, no corporation tax, repatriation of profits and the right to export gas (although state-owned Petrobangla holds the first rights to gas export).

Five oil and gas exploration licences were awarded this year to foreign oil and gas companies in the county's second licencing round: Cairn Energy and Shell (Block 5); Triton, Unocal and PTI Oil and Gas (Block 7); Pangea Energy and OMV (Block 8) and Enron Oil and Okland International (Blocks 3 and 6).

The Shahbazpur field in the south of the country is expected to be signed to Unocal and is expected onstream in 2000/2001, while Cairn Energy and Shell's offshore Sangu field came onstream in June 1998. The two companies have invested nearly \$250mn developing the field, which has included the construction of a 45-km pipeline linking Sangu to offshore facilities near Chittagong.

Other recent developments include the discovery of gas by Cairn Energy with its Semutang-5 exploration well onshore Bangladesh which tested at 23mn cf/d while Mobil Oil recently signed joint venture contracts with Jamuna Oil Company of Bangladesh under which a \$25mn LPG import terminal and lubricant oil blending plant will be built in Chittagong.

Brunei

Brunei is a relatively mature oil and gas province with exploration activity having shown a downturn in recent years. With 1.4bn barrels of oil reserves and 400bn cm of gas reserves it is currently one of the Asia-Pacific's largest oil producers and one of the world's major LNG exporters.

The country produced 11.6bn cm/y of gas in 1996/97, demand growing by only 0.4% from a year earlier. With a gas R/P ratio of 39.1 years, Brunei has the potential to significantly expand gas production in the future. Gas is currently derived from six BSP-operated offshore fields: SW Ampa, Fairley, Champion, Peragam, Iron Duke and Gannet.

Brunei could also comfortably

Country	Oil Res. bn b	R/P ratio Years	Oil Prodn. '000 b/d	'96-97 A %	Oil Cons. '000 b/d	'96-97 <u>A</u> %	Gas Res. tn cm	R/P Ratio Years	Gas Prodn. bn cm
Australia	1.8	8.0	670	6.6	820	2.4	0.55	18.4	30.0
Bangladesh	-		_	_	60	5.4	0.31	39.1	7.9
Brunei	1.4	23.3	165	-1.5	-		0.40	34.4	11.6
China	24.0	20.5	3,210	1.0	4,010	6.4	1.16	52.3	22.2
India	4.3	15.6	790	2.1	1,750	4.7	0.49	22.9	21.4
Indonesia	5.0	9.0	1,560	-1.3	970	7.9	2.05	29.7	69.0
Japan			-		5,785	-1.3	-		
Malavsia	3.9	15.1	730	-1.8	430	6.7	2.26	57.4	39.4
Myanmar	-			_		_	-		
New Zealand	-			_	130	3.9			
Papua New Guinea	0.3	11.7	75	-28.5	_		0.26	100+	
Pakistan					330	-0.5	0.59	37.6	15.8
Philippines	_			_	375	3.7			
Singapore	_	_	-	_	560	5.6	-		-
South Korea	-	~ ~	-		2,250	4.4			
Taiwan	_		-	_	755	4.4	·		
Thailand	_		-		800	2.7	0.20	15.6	12.7
Vietnam	0.6	8.5	195	10.7			0.17	100+	
Othera	1.0	11.3	270	10.5	310	7.3	0.64	63.6	10.4
Total Asia-Pacific	42.3	15.6	7,665	0.9	19,525	3.1	9.08	37.7	240.4
Total World	1,037.6	40.9	72,215	3.1	71,670	2.1	144.76	64.1	2,223.0
Asia-Pacific as % of world	4,1	-	10.6	-	27.2	-	6.3		10.8

ASIA-PACIFIC Production, Consumption and Refinery Capacity

e: BP Statistical Review 1997, interpreted by Petroleum Review ^a Totals for countries not individually itemised expand oil production – having an oil R/P ratio of 23.3 years. Indeed, oil discoveries continue to be made. BSP announced a significant oil find with its Mampak-1 well drilled 3km west of the Magpie field in 1997. According to industry sources, the find is claimed to be the largest made by BSP since Iron Duke in 1983. A fast-track development programme is expected.

Liquids production has increased in recent years following a relaxation of the Brunei Government's energy resource conservation policy. According to Wood Mackenzie, production in 1997 rose by 18,000 b/d to average 185,000 b/d – a rise attributed to additional gas lift capacity on the Champion field and the Peragam field coming onstream.

A key development in 1997 was the commencement of the Maharaja Lela project following the signature of a gas sales agreement in April 1997. The field is located on the same structural trend as the Kinabalu field offshore Sabah and is due onstream in 1999. Reserves are put at 670bn cf of gas, 18.5mn barrels of condensate and 9.2mn barrels of oil. The field is to be developed by two platforms and up to ten appraisal and development wells at a cost of \$247mn. Construction of a multi-phase pipeline, which will carry both gas and liquids to shore, is to complete by year-end. Gas will be supplied to the LNG plant at Lumut.

Other field developments include BSP's Selangkir field, discovered in 1995 and due onstream in 1999. Development is expected to comprise a single wellhead platform tied to production facilities at Iron Duke. Gas will be exported via the Champion complex to the Lumut LNG plant. Meanwhile, a total of 16 wells are expected to be drilled from three platforms on BSP's Egret oil and gas field. Gas will account for up to 80% of initial production from the field which is due onstream in 2003.

The Mampak and Merpati discoveries are other future potential development projects.

In addition, negotiations over the unitisation of the Asam Paya oil and gas field in Block SK14, onshore Sarawak, Malaysia, recommenced in 1997. The field is thought to be an extension of Brunei's Rasau field. Recoverable reserves for Asam Paya are put at 20mn barrels of oil and up to 25bn cf of gas with first production expected in 2000.

China

China first became a net importer of oil in 1993, but by 1997 was only meeting 80% of its requirements from indigenous sources. Despite vigorous growth of production offshore China, production from some of the older onshore producing areas has declined. This means that oil imports are likely to continue to rise in the future as demand is currently rising by 6.4%/y. The country has an estimated 24bn barrels of oil reserves.

A number of new offshore oil fields have come onstream, including the Lufeng 22-1 field in 1997 which is estimated to contain 30mn barrels of reserves. Production is expected to peak at 40,000 b/d by the end of 1998. The field is being developed via a six-well subsea template tied back to an FPSO. Production also commenced from BOC-operated Suizhong 36-1 field in block J in 1997. Recoverable reserves are put at 212mn barrels of oil. The field reservoir is complicated and, as a

Country	95-97 \	Gas Cons. bn cm	'96-97 5 %	Ref. Cap. '000 b/d	1996-97 %
Australia	-2.0	19.6	-1.2	850	55
Bangladesh	3.6	7.5	-0.8	050	5,5
Brunei	0.4	_			
China	11.6	193	9.0	4 315	22
India	5.1	24.4	12.8	1 235	2.2
Indonesia	2.8	32.8	45	820	-8.0
Japan	_	65.1	-1.5	4 965	-0.0
Malaysia	7.4	17.8	n/c	4,505	-0.5
Myanmar		-			
New Zealand	_	5.0	5.0		
Papua New Guinea	-	-	5.0		12
Pakistan	3.9	15.8	39		
Philippines	_	0.1	-50.0		
Singapore	-	1.5	n/c	1 245	0.1
South Korea	-	16.4	21.6	2 195	20.8
Taiwan	_	52	15.6	2,133	20.0
Thailand	8.3	13.3	12.6	_	
Vietnam		-	12.0		
Othera	0.8	42	11.0	2 420	0.3
Total Asia-Pacific	4.0	250.5	49	18 045	2.5
Total World	-0.2	2,196.7	-0.2	79 200	1.8
Asia-Pacific as % of world	1 — I	11.4	-	22.8	

result, a pilot scheme is assessing which production technology is best suited to full field development. It has been suggested that full-scale development could comprise six offshore platforms with a 70-km pipeline linking the field to an onshore oil and gas treatment plant.

The country also has significant gas reserves of 1.16tn cm. Some 22.2bn cm of gas was produced in 1997. Gas output rose by 11.6% from 1996 levels while demand increased by 9%. According to Wood Mackenzie the build- up in production from Arco's offshore Yacheng 13-1 gas field was one of the drivers behind this increase, as was the beginning of production from Qikou 18-1 and 17-3 in the Boxi area offshore China. The Boxi area fields have combined reserves of 30mn barrels of liquids, with the Boxi area as a whole estimated to hold 40bn cf of recoverable gas.

China plans to double its gas production capacity to 30bn cm/y by 2005. Around 1tn cm of additional gas reserves are expected to be verified by the turn of the century. Continued exploration is also expected to further boost reserves, while proven gas reserves and production capacity are to be expanded.

Offshore exploration activity has fallen in recent years. According to Wood Mackenzie the country accounted for just 5% of exploration well activity in the entire Asia-Pacific region in 1997 compared with 16% a year earlier. Some of this fall is attributed to CNOOC decreasing its offshore exploration activity - in 1997 the company completed 19 wells, half the number of 1996 completions. However, this fall was partly offset by a rise in foreign company (including Kerr McGee, Phillips Petroleum and Texaco) drilling activity - 13 wells completed in 1997 compared with 9 in 1996.

There was also a notable drop in offshore licencing activity in 1997: a total of five awards made, compared with 17 the previous year. The Pearl Mouth River Basin continues to be the most active area offshore China. However, the Bohai Gulf is emerging as an important focal point in recent months, with a number of discoveries made in the past year, including one by Phillips and Union Texas in the Bozhong block. Interest in the East China Sea is beginning to fade.

CNOOC contracted PGS to conduct a 2,150 sq km 3D seismic survey in the Qiong Dong Nan Basin offshore Hainan Island, beginning in April 1998 – claimed to be the largest such survey to have been undertaken in China to date.

Future offshore field developments include the Jinzhou 9-3 field which has estimated recoverable reserves of 28mn barrels of oil and 10bn cf of gas. Due onstream in 1999, field production is round-up

expected to peak at 10,000 b/d. The field is to be developed using an artificial island and two wellhead platforms. The island will also be used for oil processing, treatment of injection water, oil storage and accommodation of personnel. A total of 56 producers and 12 water injectors are planned, with a 40-km pipeline transporting produced oil to shore.

Asia-Pacific

Arco and Texaco entered into a new petroleum contract with CNOOC in late 1998 to develop what is said to be China's second largest offshore oil field, the Qin Huang Dao 32-6 field in Bohai Bay. Field start-up is scheduled for mid-2003. Proved reserves are put at 200 mn barrels. The nearby Nanbao 35-2 field has estimated reserves of 110mn tonnes and is due onstream in 2004.

Licencing activity onshore China is more upbeat than that evidenced offshore – a total of 13 awards to foreign companies in 1997, including 11 PSCs. Awards included:

- Shanxi Petroleum's PSC for the Xiaohe block in the Ordos Basin;
- Chevron's deal covering some 1,800 sq km of the Shengli field in the North China Basin;
- Energy Development Corporation's Shengli Chengzihou block PSC;
- Daton Energy of Canada signing a PSC for the Erjiegou block in the Liaohe oil field in the North China Basin;
- Japan Energy-led consortium's geophysical survey agreement with CNPC for the Misaray block in the Tarim Basin;
- Enron's PSC covering the Chuanzhong block in the Sichuan Basin;
- Pan-China Resources and CNPC's PSC covering the Kongnan block in the Dagang oil field;
- ChinaAgip securing a PSC for the Beipuxi-Nampu block in the Gulf of Bohai;
- Australian independent Global Oil Corporation signed two PSCs covering acreage in the Songliao Basin;
- CNPC (Hong Kong) signed a PSC with its parent company for the Leng Jiapu field in the North China Basin;
- China Link Oil's licences for the Jilin Min-114, Qian-130 and Min-47 oil fields.

Just under a quarter of onshore exploration drilling activity has focused on the Shengli Basin in recent months. Other areas of activity included the Daqing, Liaohe and Huabei areas. However, interest in the Liaohe area fell by 35% in 1997 compared to a year earlier, interest waning by 10% in the Tarim Basin in the same period.

Meanwhile, onshore development

activity has focused on the maintenance of production from China's large northeastern fields, through the use of water injection and other enhanced oil recovery techniques such as the extensive polymer injection programme in operation in the Daqing complex in the Songliao Basin. Recent production decline on the Liaohe field has been stemmed through reactivating 1,200 shut-in wells.

CNPC subsidiary Sichuan Petroleum Administration continues with its \$950mn upgrade of the Sichuan Basin gas fields. The project aims to halt the forecast decline in gas production through expanding the existing gas transmission system, extensive drilling and work-over activity and the acquisition of new seismic data. Much of the pipeline system is also being rehabilitated.

China is also striving to reduce the use of coal and improve air quality by encouraging gas consumption. The development of the onshore Datianchi gas field in 1997 was initiated with this aim in mind. Other recent projects include the coming onstream of the Shixi field in the Junggar Basin at a rate of 17,400 b/d in 1997. Together with the Mabei field, combined recoverable reserves are put at 50mn barrels. Development of the Shaan-Gan-Ning gas field located in the Ordos Basin has also begun. The field holds estimated recoverable reserves of between 3tn and 4tn cf of gas and is expected to supply up

Country/Field	Operator Oil o o	r Gas S utput	Start-up date	Oil Res. (mn b)	Gas Res. ((bn cf)	Capex (Smn)	Production system
BANGLADESH							
Jalalabad, Sylhet	Occidental/Unocal	gas	end-98	9(cond)	900	130	onshore
Sangu*	Cairn	gas	jun-98	-	848	-	platform
Semutang	Cairn	gas	2000?	-	200-400	-	-
Shahbazpur	Unocal	gas	2000+	-	400	255	onshore
Sub Total				9(cond)	2,348-2,548	385	-
BRUNEI							
Asam Paya	BSP	oil	2000	20	25	80	Rasau extn
Maharaja Lela	Jasra-Elf Aquitaine	gas	1999	28	670	250	platform
Bungam	BSP	-	-	-	-	-	-
Earet	BSP	oil/gas	2003	-	-	-	3 platforms
Mampak	BSP	oil	eval	-	-	-	-
Selangkir	BSP	gas	end-99	-	300	50	platform
Sub Total		5	-	48	995	300	-
CHINA							
Donafana 1-1	Nanhai West Oil Con	o das	2001	-	3.000	700	platform
Ding Hu (Pingu)	Shanghai Pet/CNOO	C das	1999	30	210	580	platform
Ping Hu (Fingu)	Robai Oil/CNOOC	oil	2001	200		-	position
Quin Huang Dao 52-0	Bohai Oil/CNOOC	oil	2001	170	-	_	-
Nanbao 33-2	Robai Oil/CNOOC	oil	1998+	212		1 300	3 platforms
Suiznong 30-1 (FFD)	Nachai Wost	oil	1000	50		360	platform
VVei 12-1	Nannai vvest	oil	7000	50		230	platform
Zhao Dong	Apache	OII	2000	747	2 210	2 170	plation
Sub lotal				/ 12	3,210	3,170	
INDIA							
PY-1	Mosbacher	gas	1999/00	-	280	-	platform?
Sub Total					280		
MALAYSIA							
B11, off Sarawak	Sabah Shell	gas	2003	-	-	6 38	-
B12, off Sarawak	Sabah Shell	gas	2006	-	-	-	-
D35, off Sarawak	Sabah Shell	oil	end-98	-	-	-	2 platforms
E6, off Sarawak	Sabah Shell	gas	2002	-	-		-
E8, off Sarawak	Shell/Petronas Cariga	ali gas	end-2000	-	-	-	platform
F13, off Sarawak	Shell/Petronas Cariga	ali gas	2005	-	-	-	platform
F14. off Sarawak	Shell Malaysia	gas	2004	-	-		platform
F28, off Sarawak	Shell Malaysia	gas	2002		-	-	platform
F29, off Sarawak	Shell Malaysia	gas	2011	-	-	-	platform
G7. off Sarawak	Shell Malaysia	gas	2011	-	-	-	platform
M4. off Sarawak	Shell Malavsia	gas	2002	-	-	-	platform
Belumut	Esso Malaysia	oil	2003	40	-	200	platform
Bervl	Petronas Carigali	oil	2008	1		-	-
Bintang	Esso Malavsia	oil/gas	2002	25	1,500	800	platform
onitiong	Los manajora	Juges			MALAYSI	A contin	ued opposite

Current and Planned Field Developments in the Asia-Pacific Region

to 290mn cf/d of gas to Beijing, Xian and Yinchuan via three new pipeline systems. As part of this project, a \$475mn, 860-km pipeline linking the Changqing field to Beijing came onstream in September 1997. The 95mn cf/d capacity is to be increased to 190mn cf/d.

The largest discovery in the Tarim Basin to date, the Tazhong-4 field, came onstream in March 1997 at 36,000 b/d. The oil and gas pipeline infrastructure in the Tarim Basin has also been improved in recent years. A new 192-km, 24mn cf/d gas line linking the Lunnan field to the Korla petrochemical plant came onstream in 1997 while the first phase of a new 3,400km oil pipeline linking Korla with eastern China was recently completed.

Foreign interest is also being shown in downstream projects in China. Recent examples include the signing of a letter of intent between Fortune Oil's 56%-owned subsidiary Maoming Kingming with Maoming Petrochemical in mid-1998 to invest in 1mn cm of crude oil storage in Maoming. Project costs are estimated to be \$75mn. Jiangsu Total LPG was established at Zhenjiang in Jiangsu Province in mid-1998. The joint venture between TOTAL and Dagang economic zone development company will build and operate a 4,000 m³ LPG gas depot near Shanghai and Nankin. The project involves a total capital investment of \$10mn.

Country/Field	Operator	Oil or Gas	Start-up	Oil Res.	Gas Res.	Capex (Smo)	Production
Contraction of the second				firme as	The st	1-suite	afarent
MALAYSIA continued			-				
Bunga Orkid	Lundin Oil (Ex I	PC)oil/gas	2005	15	360	-	platform
Blocks PM5,8,9,10	Esso Malaysia	a gas	1998+	-		-	Pen Gas Util
Cili Padi	Occidental	gas	end-98		800	. ·=	platform
Jintan 1 (1st SK8 Dev)	Occidental	cond/gas	2001	75(cond)	2,300	- 1	2 platforms
Laila	Petronas Carag	jali oil	2011	-		-	-
Kinabalu*	Sabah Shell	gas	1998	180	2,000	350	platform
Larut Area	Esso Malaysia	a oil	2001	75	-	375	platform
Lawang/Langat	Esso Malaysia	a oil	2003	40	-	200	platform
MAS fields (PM12)	Petronas Carig	ali oil	1998	50		120	floater
PM3 FFD*	Lundin Oil (Ex-I	PC)oil/gas	1997	110	1,300	720	platform, floater
Resak Beranang	Petronas Carig	ali oil/gas	1999	15	1,500	650	3 platforms
SK8 fields	Occidental	oil/gas	2003	80	5,200	700	platform
SK10 fields	Nippon Oil	oil/gas	2005	50	1,300	477	platform, subsea
Yong/Raya	Esso Malaysia	a oil	1998	50	-	100	platform
Sub Total				550	13,460	4,342	
MALAYSIA-THAILAN	ADL O						
A18 Fields	CTOC/Arco	gas/oil	2003	120	7,700	1.750	platform
B17 Fields	Petronas	gas	2004	-	2,100	520	platform
Sub Total				120	9,800	2,270	Prestorio
MYANMAR					-		
Yadana	TOTAL	0.96	1000		7 200	1 100	9 platforms
Yetagun	Promier	gas	2000	50/cond)	1,500	625	o plationis
Sub Total	Freimer	gas	2000	50(cond)	9,100	1.735	platform, subsea
and all in the							
PHILIPPINES							
Malampaya	RD/Shell	gas/oil	2002	150	3,100	1,800	platform, floater, subsea
Sub Total	The second se	-		150	3,100	1,800	
THAILAND							
Benchamas	Pogo	gas/oil	1999	38	320	190	platform
Jakrawan*	Unocal	gas/oil	1998	10	500	-	2 platforms
Kaphong*	Unocal	gas	1998	-	-	-	-
Pailin	Unocal	gas	Q399	55	2,300	1,205	30 whead plats
Pakarong	Unocal	gas	1999	2	67	100	platform
Pladang	Unocal	gas/oil	1998	30	900	-	3 whead plats
Plamuk	Unocal	gas	1998	3	155	35	platform
Ton Sak	TOTAL	gas	1998	9	500	120	platform
Trat	Unocal	gas	1999	8	500	100	platform
Sub Total				155	5,242	1,750	1974 - Maria
VIETNAM							
Lan Tay/Lan Do	RP/Statoil	0.25	2002	10	2 000	870	platform
Rang Dong*	IVPC	oil/gas	mid-02	325-500	200-600	1 070	platform float
Ruby*	Petronas Carina	ali oil/gas	1998	100	150-500	400	platform floater
Sub Total	e cu onas cunge	in onegus	1350	435-610	2,350-3,100	2,340	platform, noater
GRAND TOTAL				2,229-2,404 4	9,885-50,835	18.090	
Key: * - already onstream	So	urce: Wood	Mackenzie	and Petrole	um Review		

Current and Planned Field Developments in the Asia-Pacific Region

India

ndia has had limited success in attracting international oil and gas companies to participate in exploration and the development of its hydrocarbon resources in the past. In a bid to encourage foreign investment, the government has improved terms and bidding procedures for licences. Around 49 oil exploration blocks are expected to be offered under the government's New Exploration Licencing Policy (NELP) later in 1998. The new legislation fixes royalty payments on an ad valorem basis instead of specific rates, fixes royalty payments for deepwater exploration at half the rate for offshore areas for the first seven years of commercial production, and allows free pricing for crude oil and gas marketing.

Domestic demand for oil and natural gas continues to grow more rapidly than production, creating a greater dependence on imports. The country produced around 675,000 b/d of oil in 1997, far less than the domestic requirement for 1.75mn b/d. Oil production is growing at a rate of about 2%/y with demand rising twice as fast. Meanwhile, a 5.1% annual increase in gas output is being significantly outstripped by a 12.8%/y rise in domestic demand.

Enron Oil & Gas India, operator of the Tapti field offshore India, proposed a new second phase development plan for the field earlier this year, which would see production rise from 180 mn cf/d to as much as 600 mn cf/d. The proposal includes four additional platforms, a new natural gas processing platform and the construction of a 36-inch diameter, 165-km natural gas pipeline to Hazira. The company has also proposed the construction of a pipeline in east India that will supply gas from either Bangladesh or from the northeast Indian state of Tripura. The company believes that gas demand from the power, fertilizer and steel industries in West Bengal will expand to between 14mn and 30mn cm/d over the next decade.

Cairn Energy reported in early 1998 that its RX-3 exploration well on the existing Rawa field tested in excess of 45mn cf/d of gas and 400 b/d of liquids and was suspended as a future gas producer.

Tullow Oil signed three PSCs in India in mid-1998 covering blocks GK-OSJ-1 (Gujarat Kutch Basin, offshore northwest India), KG-ON-1 (onshore in the Krishna Godavari Basin, southeast India), and CR-ON-90-1 (onshore in the Arakan Basin in Assam, northeast India). India's Oil and Natural Gas Corporation (ONGC) was reported in October 1998 to have invited 17 foreign oil companies to a possible farm-in covering the Cauvery, Krishna-Godavari deepsea exploration blocks and the offshore Kerala-Konkan Basin.

India is also looking to improve legisla-

round-up

tive conditions in its downstream sector. Recent developments include the abolishing of restrictions on crude imports by refineries. State-owned Indian Oil Corporation (IOC) had held a virtual monopoly over such imports. The government also announced plans to sell a 13% interest in IOC, in which it currently holds a 91% interest. IOC's seventh oil refinery is expected to reach full distillation capacity by year-end, at which point the company will control 670,000 b/d of India's 1.3mn b/d total refining capacity.

Asia-Pacific

Other downstream developments include the approval by IOC for the construction of a \$19.3mn, 60,000 kilolitre capacity oil terminal and associated facilities at the Jawaharlal Nehru port at Nhava Sheva near Mumbai. In mid-1998 Woodside Petroleum was reported to be seeking permission to construct a 2.5mn t/y LNG gas import terminal and 1,800 MW power station in the state of Tamil Nadu, in southeast India.

Malaysia

Malaysia is one of the Asia-Pacific's major oil exporters producing just under double its domestic demand. However, demand is rising at a rate of 6.7%/y, a trend that will limit future export growth.

The country is also a major gas exporter, primarily of LNG. Gas reserves are put at 2.26tn cm. It produced 39.4bn cm of gas in 1997 but consumed just 17.8bn cm.

According to Wood Mackenzie, drilling activity in Malaysia fell in 1997 to the lowest level seen since 1976, with just 12 well completions. However, the number of new licences awarded rose during the same period and several developments are in the pipeline – auguring well for near-to-medium term production. In addition, state company Petronas has launched new fiscal terms and reblocked the country in a bid to boost exploration activity.

Seven new PSCs were awarded in 1997: Shell signed an agreement covering the five Luconia gas fields (E11, F23, F5, E8 and F13) with Petronas Carigali assuming a 50% interest in the fields on 1 April that year. The two companies were also awarded three PSCs in Sarawak and Sabah, SK307, SB301 and deepwater Block SB J. Esso Malaysia (EPMI) returned to the region after an 11-year absence with the signing of a PSC covering blocks SB 302 and SB H, offshore Sabah. A key feature of the new contracts is the incorporation of the R/C formula in the determination of cost caps and profit splits only the second time this has been done Malaysia, commented Wood in Mackenzie at the time.

EPMI also signed a new gas PSC in June 1997 covering the sale of gas from 15 fields located offshore Peninsular Malaysia. Under the terms of the agreement, Petronas Carigali assumes a 50% share in all fields and is to operate those in the south with EPMI operating those fields located close to its existing Jerneh and Lawit fields.

Amerada Hess signed two PSC's for two blocks, one offshore Sarawak, the other off the Malaysian peninsula, in early 1998, a deal marking the US company's first step into the Malaysian arena.

A number of new developments have recently come onstream, including the Kinabalu oil field, Bunga Kekwa oil/gas field and Lawit gas field in 1997. Production from Kinabalu is expected to peak at 40,000 b/d in 1999, with associated gas production reaching 35mn cf/d during the initial development phase. Phase 1 development of Bunga Kekwa, which focused on oil production, is to be followed by full field development of oil and gas in late 1999. This will entail the development of other accumulations in the block, boosting production to 50,000 b/d of liquids and 250mn cf/d of gas by 2000. It is planned to install a manned production and an unmanned satellite wellhead structure on the Kekwa field with additional unmanned facilities on the Raya, Orkid and Pakma fields. Produced fluids will continue to be processed and stored on the Phase 1 development FPSO, with gas exported to Kerteh though a Petronas Carigali owned and operated line. Total reserves for the Bunga Kekwa block are put at around 100mn barrels of liquids and 1.1tn cf of gas.

The Lawit field, which came onstream in March 1997, is supplying the third phase of the Peninsular Gas Utilisation project (PGU III). A three-platform complex comprises a production/accommodation platform which is bridge-linked to a riser platform and remote vent.

More recently, EPMI's Seligi F platform offshore Terengganu came onstream in April 1998. Production is expected to peak at 21,000 b/d by the end of the year.

A number of other key developments are ongoing, including the Malong, Anding and Sotong group of discoveries in PM12 offshore Peninsular Malaysia. Recoverable reserves for the three fields are put at 50mn barrels. Development is via an FPSO with a production capacity of 45,000 b/d. First oil is expected late 1998.

Meanwhile, the SK8 and SK10 fields are being developed to supply the MLNG Tiga project which comprises the construction of two 3.4mn t/y LNG trains adjacent to the existing Bintulu facilities. SK8 has estimated recoverable reserves of 5.2tn cf of gas and 80mn barrels of condensate. Initial development of the SK8 fields will focus upon the Jintan field with first gas sales scheduled for May 2002. The Saderi and Serai fields will be tied into Jintan as subsea completions in 2006. Second phase development of the Cili Padi and Selasih fields, most likely via a production platform on each field tied into a new gas trunkline being constructed to Bintulu, is not expected until 2012/2013.

The SK10 Helang and Layang fields, which are to be developed in conjunction with Occidental's SK8 fields, hold 1.2tn cf of gas and 65mn barrels of liquids and 0.1tn cf of gas, respectively.

Sabah Shell Petroleum Company was scheduled to drill Malaysia's first deepwater exploration well in its Block G acreage, 100 km offshore Kota Kinabalu in October 1998.

Malaysia–Thailand Joint Development Area (JDA)

This region continues to be an active and successful exploration region with 12 well completions recorded in 1997, of which 8 were wildcat wells all encountering gas/condensate. The approach of the end of the exploration phase of the area's PSCs has acted as a primary driver of recent exploration activity, reports Wood Mackenzie, with Carigali-Triton Operating Company (CTOC) attempting to prove up as much reserves as possible prior to acreage relinquishments.

A new 400 sq km seismic survey covering the south of Block B-17 and all of Block C-19 – which has been little explored to date – was acquired in early 1998. Results from the Samudra-1 well and analysis of the new seismic highlight the potential of the southern part of the Malaysia-Thailand JDA.

Petronas signed two Memorandums of Understanding with PTT and the Malaysia-Thailand Joint Authority in June 1998. The deal covers the supply of nearly 11mn cm/d of gas from Block A-18 in the JDA, due onstream in 2001, and 7mn cm/d of gas from block B-17 which is due onstream the following year.

Three appraisal wells were completed on the Muda field in 1997 with a fourth spudded in December. Given the current economic crisis, it is difficult to predict when the fields will be brought onstream. The ongoing economic crisis may also delay development of the Cakerawala and other A18 fields by CTOC/Arco containing estimated recoverable reserves of 2tn cf of gas and 33mn barrels of liquids. Initial production from the field is expected to average 390mn cf/d during the first 10 years of supply and 195mn cf/d in the following decade. Currently due onstream in 2002, field development is expected to comprise production and accommodation platforms with three

satellite wellhead platforms. Produced liquids will be stored on an FPSO. Carbon dioxide will be stripped from production from day one. A number of export options have been considered, including the transport of gas to Rayong or Ratchaburi via the new Erawan riser platform or via a possible gas pipeline (a basic agreement having recently been reached between PTT and Petronas) linking the JDA with the Songkhla province in Thailand, continuing to Perlis in north Malaysia.

Myanmar (Burma)

Although the US government imposed sanctions on Myanmar in 1997, foreign interest continues in the region's oil and gas sector. This led to the exit of Texaco from Myanmar's upstream sector in September 1997, the company selling its entire upstream portfolio and Taninthayi Pipeline Company assets to Premier Oil which then sold on the majority of the assets to Petronas.

A total of 12 licencing awards were made in 1997, 10 of which were PSCs. Dataran Isibumi, a small Malaysian company, signed four PSCs for blocks M15, M16, M17 and M18, all located in the Gulf of Martaban. TOTAL and Unocal also signed two agreements covering block M8 in the Gulf of Martaban, PTTEP later farming-in to assume a 30% interest in the block. Pacrim Energy signed contracts for the C1 and RSF-9 blocks, the latter containing the depleted Pyalo gas field.

The high level of activity has continued in 1998 with the Myanmar offering PSCs for ten further blocks in the Rakhine and Moattama regions.

Myanmar oil production averaged 12,500 b/d in 1997 according to Wood Mackenzie, the bulk of output coming from the MOGE-operated Mann and Htaukshabin fields. 1997 production fell by 5% compared to that recorded in 1996. Meanwhile, gas production in 1997 reached 120mn cf/d, all of it sourced from Moge's onshore fields, the majority from the Apyuak field.

The major development projects in the region are the Yadana and Yetagun fields located in the Andaman Sea and Gulf of Martaban, respectively. The former is estimated to hold 7.3tn cf of recoverable gas reserves. Yadana production commenced in August 1998. Output is expected to peak at 650mn cf/d, of which 525mn cf/d is contracted to PTT in Thailand. The remaining gas will be supplied via pipeline to a power plant and fertilizer facility located close to Yangon. Gas is exported to Thailand via a 409-km line to Ban-I-Thong on the Thai border, from where the gas is carried via another line to Ratchaburi. A second 250km pipeline carries domestic gas supplies from Yadana to Yangon.

Yetagun is due onstream in early 2000 (although the timing could still slip back), the project making a significant step forward with the signing of a gas sales agreement in early 1997 between the then Texaco-led joint venture and PTT for the sale of 200mn cf/d of gas. Production is expected to plateau at 200mn cf/d of gas and 5,800 b/d of condensate. Proven plus probable reserves are put at 1.8tn cf of gas and 48mn barrels of condensate. Development will be via a gas production platform with a design capacity of 230mn cf/d of gas and 8,000 b/d of condensate. A number of development wells are to be drilled through a pre-installed 20-slot subsea template. Liquids will be separated and processed offshore via a dedicated floating, storage and offloading vessel. Gas will be exported via a 210-km pipeline to Zadi, from where it will be carried a further 70 km to the border via a pipeline running parallel with the Yadana pipeline. PTT will take delivery of the gas for its new 3,600 MW power station at Ratchaburi (which will also be taking gas from Yadana).

According to some industry sources, the Yadana and Yetagun projects have cornered the regional market for natural gas. The economic slump in the region means that any additional gas discoveries and subsequent developments may have difficulty in finding markets.

Pakistan

A though Pakistan's offshore concession areas have been rated as 'high cost and high risk' by the UK's Oil, Gas and Petrochemical Supplies Office (OSO), an increasing number of operators are looking to enter this arena, encouraged by the government giving top priority to attracting foreign E&P investment. Indeed, in a bid to encourage foreign interest, the government recently unveiled new PSC arrangements with improved conditions such as 'tax holidays', lower tax rates and a more attractive revenue split.

Pakistan has virtually no indigenous oil production and has significantly increased levels of oil imports in recent years to fuel the country's rapid economic growth. Gas production, however, is substantial and at 15.8bn cm in 1997, rather greater than the output of Brunei or Thailand. Demand for gas currently matches local production but is predicted to more than double by 2005.

A number of new commercial gas discoveries have been made in recent months, including that found in Hardy Oil & Gas's South West Miano licence offshore Pakistan in March 1998. The OMV-operated Sawan-1 exploration well tested at 58mn cf/d. Minimum proven reserves are put at 350bn cf of gas with total reserves in the Sawan field estimated to be between 1tn and 2tn cf of gas. Tullow Oil reported in early 1998 that its Suri-1 well located in Pakistan's onshore East Badin extension block B tested gas at commercial rates from three zones and was suspended as a future gas production well while Premier Oil stated that its Zamzama-1 well in the Dadu exploration licence tested at 24.6mn cf/d of gas.

More recently, Premier Oil was reported to have made a significant gas discovery with its Zarghun South-1 well on the Bolan concession in west Pakistan in October 1998. It is thought that the discovery could hold up to 0.5tn cf of gas.

Looking at the downstream sector, the UK OSO reported in early 1998 that the refining capacity in Pakistan was only 6.3mn tonnes, a figure expected to rise to 11mn tonnes by mid-2000 when the Parco refinery comes onstream. However, demand is expected to have risen to 22mn t/y during the same period. In order to attract investment in the refining sector, the government has raised its target for foreign investment from \$1.2bn to \$1.5bn.

Philippines

This region of the Asia-Pacific has seen a relative lull in exploration activity in recent years, with only one exploration well and two new geophysical survey and exploration contract awards to Shell and Forum Pacific recorded in 1997. Liquids production continued to fall in 1997, output dropping by 9% compared with the previous year. According to Wood Mackenzie, the 1997 average oil production figure was over 90% down on that recorded in 1993 (9,100 b/d), predominantly due to the decline and eventual shutdown of the West Linapacan A field in January 1996.

While the Nido and Matinloc fields produced 51% and 49% of the Philippines total liquids production in 1997, Wood Mackenzie predicts that commercial oil production in the country will cease by the end of 1998 unless other fields are reactivated or new fields brought onstream.

Such statistics indicate the level of importance that the Malampaya-Camago oil and gas field, offshore Palawan, will play in the future of the Philippines petroleum industry (see p19). The project is expected to reduce the Philippines' reliance of imported fuels by 20% to 30%. Field development began in early 1998 following the signing of a gas sales agreement between National Power and First Gas Holdings in January this year. Recoverable field reserves are put at 150mn barrels of oil and up to 3.1tn cf of gas. Production is expected to begin in early 2002 and is predicted to drive local Philippines liquids production to 45,000 b/d by 2004. Gas production is forecast to increase to 400mn cf/d by 2003.

round-up

Philippine National Oil Company was reported in October 1998 to have discovered what could be the country's largest natural gas deposit on Fuga Island off northern Luzon. However, no delineation drilling has yet been carried out although reserves have already been estimated at between 5tn and 18tn cf of gas – four times larger than the Malampaya-Camago gas field.

Asia-Pacific

Occidental recently announced that it was to swap its oil and gas interests in the Philippines and Malaysia for Shell's oil and gas holdings in Yemen and Colombia (see Petroleum Review, September 1998). Under the complex deal - said to be one of the largest cross exploration properties border exchanges ever undertaken - Shell will receive 100% ownership of Occidental's upstream subsidiary in the Philippines which holds a 50% interest in the SC-38 concession offshore the Philippines and includes the Malampaya-Camago gas fields. In addition, Shell receives all stock in Occidental Petroleum (Malaysia) Ltd which holds a 35.7% interest in the SK-8 block offshore Sarawak.

A new oil deregulation law was passed in the Philippines in early 1998 in a bid to help stabilise the exchange rate and improve the country's economic prospects. The new law, which replaces previous deregulation legislation declared unconstitutional by the Supreme Court in 1997, imposes a uniform 3% tariff on all petroleum products. There was a 4% tariff differential between crude oil and refined product imports under the old law.

South Korea

South Korea has very limited natural gas reserves in the Dolphin field offshore Ulsan and has no indigenous oil production.

Demand for oil is rising at a rate of 4.4%/y, the country consuming 2.25mn b/d in 1997. Demand for gas is rising rapidly as a result of the rapid economic growth of the region in recent years, reaching 21.6% in 1996/97. Indeed, South Korea has one of the highest gas consumption growth rates in Asia. LNG imports totalled 13mn tonnes in 1996 and 15.7mn tonnes in 1997. Half of current demand for gas is from power plants, while one-third of LNG imports meet domestic requirements.

Taiwan

Taiwan has small indigenous energy reserves and is heavily dependent on imports. Demand for oil rose by 4.4% in 1996/97, the country consuming 755,000 b/d of oil in that period. However, demand for gas is rising far faster – 15.6% in 1996/97. The government announced the liberalisation of the country's gas imports and power sector in 1997. As a result, private companies are increasingly looking to invest in this sector.

Thailand

Thailand is a relatively mature exploration province and recent licencing rounds have produced disappointing results. Indeed, in the 1997 licencing round, only one award was made – block W7/38 going to a Kerr-McGee-led consortium. As of 1 January 1997, only 35 contracts were active in Thailand (excluding the JDA): 63% located in the Gulf of Thailand, 17% in the Khorat Plateau, 11% in Central Thailand and 9% in the Andaman Sea.

Only one new field came onstream in 1997 – Pogo Producing Company's Tantawan field which entered production in February of that year. Recoverable reserves are put at 44mn barrels of liquids and 380bn cf of gas. Production is via four wellhead platforms and an FPSO. Gas is sold to PTT. Pogo has extended the gas sales agreement to cover the Benchamas/Pakakrong fields which are due onstream in 1999. The nearby Maliwan discovery is also to be developed in the future.

Other fields due onstream include Unocal's 2tn cf Pailin field in the Pattani Basin which is due to produce first gas in September 1999 at an initial rate of 165mn cf/d, rising to 330mn cf/d in 2001. Unocal plans to invest \$1.4bn in natural gas exploration and production in Thailand over the next five years – the bulk of funding being spent on the Pailin project. A number of smaller fields – Pladang, Kaphong and Plamuk are scheduled to come onstream by the close of 1998.

Meanwhile, the phased development of the 4.8tn cf Bongkot field in the Malay Basin continues. Phase III increased gas production to 550mn cf/d in mid-1998. A fourth phase to develop the south of the field is under consideration, as are plans to develop high carbon dioxide accumulations such as Ton Koon and Ton Nok Yoong.

The ongoing economic crisis has impacted development plans in Thailand with several key infrastructural projects delayed or cancelled. Of particular importance was the announcement of further delays in obtaining a commitment from PTT to build a third trunk line linking the Gulf of Thailand to either Ratchaburi or Rayong.

Vietnam

Licencing and exploration activity have reached their lowest levels in Vietnam for several years. Foreign companies appear increasingly disenchanted with the region, given lower than hoped for exploration success rates, problems with commercialising discoveries that are made, difficulties with signing contracts and high exploration costs. Furthermore, as commitments on blocks signed earlier in the 1990s are fulfilled, companies are, in the main, electing to withdraw rather than commit to expensive and risky second phase exploration programmes, states Wood Mackenzie.

As of 1 January 1997 there were only 15 PSCs active in Vietnam: 53% of which were located in the South Con Son Basin, 20% in Cuu Long, 13% in the Malay Basin, 7% in the Hanoi Trough and a further 7% in the Song Hong Basin.

That said, hydrocarbon production is set to increase with two fields - Petronas Carigali's Ruby and JVPC's Rang Dong discovery, both located in the Cuu Long Basin - due onstream by the close of 1998. The Rang Dong early production system (EPS) comprises a single fixed minimum facilities wellhead platform with crude exported via a dedicated FPSO. The 325mn barrel field came onstream in July 1998. Following the EPS stage, a number of fixed production/processing and satellite platforms are to be installed. EPS production is forecast to average at 45,000 b/d, rising to 95,000 b/d with full-scale development.

The Ruby field has recoverable reserves of up to 100mn barrels of oil, with a further 100mn barrels predicted to be recoverable from satellite discoveries Topaz, Emerald, Pearl and Diamond. First oil from a single fixed, minimum facilities platform tied to an FPSO is expected late 1998. Full field development is expected to comprise five wellhead platforms which will allow future workovers of satellite developments. EPS oil production is expected to reach 10,500 b/d, rising to 85,000 b/d with full-scale development. The absence of a gas market means that associated gas production is unlikely at present.

Meanwhile, a BP/Statoil-led alliance is looking to develop the Lan Tay and Lan Do gas discoveries which have combined recoverable reserves of 2tn cf. Field development will underpin a wider Nam Con Son gas utilisation scheme under which a 400-km pipeline will link the fields to Phu My, located close to the capital Ho Chi Minh City. First gas under this scheme is not expected until 2000 at the earliest.

Due to shortage of space, Australia, New Zealand, Indonesia, Japan and Papua New Guinea will be covered in our December 1998 issue. Malampaya

A pipelay challenge

Major contracts have recently been placed by Shell and its partners for the offshore platform and pipelines forming part of the \$4.5bn Malampaya gas-topower project, the largest and most significant investment in the history of Philippine business, writes Jeff Crook. The project signals the birth of the natural gas industry in the Philippines. First gas is due to be supplied from the facilities on 1 January 2002.

Key commercial agreements for the project were signed in January this year and were presented to Philippine President Fidel Ramos by the field project sponsors Shell Philippines Exploration BV, Occidental Philippines Inc, First Gas Power Corporation, National Power Corp, Manila Electric Company and KEPCO Philippines. The investment in the upstream gas and condensate production facilities accounts for \$2bn of the total, while the power plants and other downstream elements of the project account for the remaining \$2.5bn.

The Philippines is an archipelago of islands lying on the southeast side of the South China Sea. The Malampaya gas and condensate field lies in the South China Sea, in deep water around 80 km north of Palawan Island. Gas will be transported to a terminal at Batangas on the larger and more industrialised island of Luzon, close to the Philippine capital Manila.

The Malampaya field will provide fuel for power generation plants with an overall capacity of 2,700 MW. The largest of these plants, with capacity of 1,200 MW, is being built at Ilijan, close to Batangas, by KEPCO. A further 1,000 MW plant will be built close to Batangas, with another 500 MW plant to be located in the Calabarzon growth area. The availability of an indigenous gas fuel for these stations will not only improve the Philippine balance of trade, but will also provide a cleaner environment.

The offshore project involves connecting subsea wells in water depths of 850 metres to an offshore production platform in shallower water of 43 metres, closer to the shore. Major contracts were placed during August 1998 for the production platform and for the 510-km gas export pipeline connecting the production platform to the terminal at Batangas. The survey of this pipe route has recently been completed under an \$8mn contract. It is believed to be the largest ever single survey contract to have been undertaken in the world to date.

Production platform

Brown and Root Energy Services carried out the front-end engineering for the platform. This is a concrete gravity based structure designed to stand in 43 metres of water. One innovative feature of the design is that the deck will be installed by a 'float over' operation - claimed to be the largest such operation to be carried out in open seas anywhere in the world. The 10,000-tonne deck will be moved by barges until it is positioned over the concrete gravity base structure. As the barges are filled with seawater ballast the deck will settle gently on to the supporting columns. This method of deck installation has several advantages:

- it avoids the massive cost of chartering a heavy lift vessel;
- it allows the complete deck to be transported as one unit, minimising the offshore hook-up and commissioning costs; and
- it simplifies decommissioning because the entire deck can be

removed in one operation, irrespective of its weight. Offshore operators now give far more thought to decommissioning during the design stage as they have come to realise the huge cost of dismantling large production platforms into sections that can be handled by crane barge.

The design capacity of the Malampaya platform is 508mn cf/d of gas and 29,000 b/d of condensate. While gas will be transported by the export pipeline to Batangas, the condensate will be stabilised on the platform and stored in the concrete gravity structure and then exported by a shuttle tanker. The shuttle tanker will load from a CALM buoy located around 3 km from the platform.

After successful completion of the front-end engineering, Brown and Root Energy Services was awarded two major contracts, with an overall value of \$400mn, for design, procurement, fabrication, installation and commissioning of the platform. The contracts incorporate risk and reward elements that have become a familiar aspect of offshore contracting over the past few years. The engineering work will take place in Brown and Root's Houston office, while construction of the concrete gravity structure will take place in Subic Bay in the Philippines. Subic Bay is now a modern industrial park, but was once the site of a major US naval base.

Pipelines

Allseas Marine Contractors was awarded the contract for installation of the infield and export pipelines. The pipelaying work will commence in the year 2000 and will be carried out by the recently completed pipelay vessel *Solitaire*. The scope of work covers the 506-km long main export pipeline to Batangas, two 30-km long infield pipelines to the subsea manifold and a further 3-km long pipeline running to the condensate loading buoy.

The routing of the main export pipeline encounters difficult soil conditions and many seabed irregularities, with water depths between 200 and 650 metres. Allseas says that *Solitaire's* ability to lay pipelines at relatively low tension while operating in the dynamic position mode will significantly reduce the amount of route preparation and rectification work normally expected in these areas.

Dynamic positioned pipelayers offers a number of advantages over the more familiar anchored barges. These vessels can operate at any depth, and do not require tugs to constantly lift and reset Malampaya

anchors. The absence of anchor movements also reduces seabed disturbance and prevents accidental damage to subsea equipment, pipelines and cables in the vicinity of the pipe route.

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The Solitaire is the world's largest pipelayer, and the second dynamically positioned pipelayer to be ordered by Allseas. Allseas' Lorelay, its first dynamically positioned pipelayer, has laid more than 3,500 km of pipelines in depths of up to 1,640 metres of water. The success of the Lorelay led to the decision to build Solitaire. The Solitaire is a converted 125,000 dwt bulk carrier which entered pipelaying service earlier this year. The vessel currently has contracts for 1,300 km of pipelaying in the North Sea in addition to the Malampaya contract.

The Solitaire can lay 6 km of pipe per day whilst moving forward at a steady rate. To achieve this impressive speed, pipe sections are simultaneously joined by seven Phoenix automatic welding stations. The welding stations are mounted on a fixed structure which moves aft (within the hull of the vessel) as the pipe is paid out of the stern. At the end of the welding cycle, the structure is drawn forward in preparation for the next cycle. The 285-metre long pipelay vessel is propelled by eight azimuthing thrusters with 46,800 kW of installed power.

Unfortunately, the ambitious conversion project was plagued with difficulties and the pipelayer entered service several years late. Sembawang shipyard in Singapore was originally contracted to carry out the conversion. But after delays and disputes, the semi-complete vessel was brought back to Europe where the final stages of the conversion were completed by the Tyneside Swan Hunter shipyard, a yard which has been fighting for survival after the loss of a major naval contract.

Pipe route survey

An integrated geophysical and geotechnical survey of the Malampaya export pipe route was recently completed by Racal Survey under an \$8mn contract. The work employed Racal's survey vessel *MV Orient Explorer* for more than 300 days and *MV Eagle V* for some 50 days of inshore work. The offshore survey tasks were augmented by specialist nearshore and onshore studies. The two vessels worked a total of 308,000 hours without a lost time incident. One innovative aspect of the project was the use of high-speed data transfer from the survey vessels to Shell's offices in the Netherlands. This is said to have accelerated the decision making process and enabled the joint venture engineers to review field information to optimise the pipe route design as the survey progressed. The data transfer system integrated the results of all onboard sensors. The raw unprocessed records, core sample photography and completed charts and reports were then transferred directly over satellite links to Shell's office.

The wide range of water depth from zero to 1,000 metres presented one of many technical challenges and necessitated the deployment of three separate swathe bathymetry systems.

The environmentally sensitive nature of this area meant that it was necessary to identify pipeline routes that would avoid disturbance to coral reefs and areas of importance to the region's fishing industry. Part of the work included an analysis of the health of the coral reefs. Racal was also required to adhere to the joint ventures strict environmental and safety guidelines throughout the study.



European Union, the automotive industry and the oil industry, on the quality of transportation fuels required by 2005 to contribute to meeting European Air Quality Standards.

This major international Conference will bring together representatives from the European Commission, UK Government, the oil and automotive industries, environmentalists and academia to present their views on current and future legislation, the inter-relation between automotive vehicles and fuels and their impact on the environment, and the implications for the European refining industry. The concluding session will provide an opportunity to hear the opinions of industry representatives on how they see the way forward into the next millennium.

Who should attend?

- Refiners/Contractors
- Vehicle Manufacturers
- Policy Makers/Planners and Strategists
- R&D Managers
- Health, Safety and Environmental Personnel
- European and National Government and Civil Servants
- Non Governmental Organisations
- Transport Managers/Fleet Operators
- Oil and Motor Manufacturing Industry Consultants and Analysts

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Asia-Pacific South Korea

Coping with falling LNG demand

The past year has been a challenging one for stateowned Korea Gas Corporation (Kogas) as senior managers accustomed to planning for rapid growth in gas consumption have been forced to cope with the first downturn in gas demand since LNG imports began to arrive in 1986. While Kogas and the rest of South Korea's energy sector is still coming to grips with the sudden drop in energy demand, it is clear already that LNG consumption in 1998 will decrease by about 500,000 tonnes or about 4.5% compared with last year due mainly to the large reduction in gas used for power generation. David Hayes reports.

n the 1Q1998, during the coldest months of the year, Kogas imported 59 cargoes totalling 3.26mn tonnes of LNG, a decrease of almost 10% compared with 62 cargoes totalling 3.5mn tonnes in 1997. Gas consumption, including some from stocks, also was about 10% lower during the first quarter of this year at 3.3mn tonnes compared with 3.7mn tonnes in 1997.

'The economic impact on LNG consumption is greater than we expected for the gas industry,' commented one Kogas source. 'We review our long term supply and demand plans every two years. The last review was due in 1997. We almost finalised our plan but then the IMF situation occurred, so we modified our long term plan this February. Now we have to change our long term plan again because of the IMF impact. City gas consumption growth is down because last winter was warmer than usual. Also the IMF situation has affected domestic industry, but gas consumption has not dropped. What has happened is that there is less gas demand growth than expected.'

Ups and downs of demand

South Korea's gas consumption is marked by peak and trough each year. Peak gas consumption falls in January and February, the coldest months of the year when most households rely on gas for home heating. Summertime marks a trough in gas use as residential and commercial city gas customers turn to electric-powered air-conditioning to cool down in the sweltering heat.

The main cause of the fall in LNG consumption in 1998 has been the sharp reduction in gas used for power gener-State-owned Korea Electric ation.



Photo: David Hayes

Power Corporation (Kepco) used 846,000 tonnes in 1Q1998, a 39% decrease compared with 1.4mn tonnes used in 10 1997. City gas use, however, rose about 10% to 2.4mn tonnes during the first quarter this year compared with 2.2mn tonnes during the same period in 1997.

Kogas, in fact, had expected city gas consumption to be higher this year as gas transmission pipeline network expansion has made gas supplies available to more potential customers. Work was completed in 1996 extending the national gas transmission grid to Pusan, South Korea's second largest industrial centre after Seoul. Although industrial and commercial enterprises in Pusan are converting to natural gas from LPG, diesel and oil, the speed of conversion has been slower than Kogas expected.

We have surveyed city gas demand for industry, commercial and residential customers and our opinion is that the rate of consumption increase for city gas will remain consistent this year,' the Kogas source said. 'Up until the beginning of August gas consumption by industry was 10% higher than during the same period in 1997. We expect that total demand for city gas will be about 15% higher this year compared with 1997.'

While city gas consumption has been increasing in spite of South Korea's economic crisis, Kepco's decision to reduce LNG consumption has proven to be a headache for Kogas. The effect of Kepco burning less gas for power generation has been dramatic. By the end of May only 4.5mn tonnes of LNG had been used by all gas users this year, some 25% less than the previous forecast of 6mn tonnes LNG consumption which had been expected until the country's economic crisis began to hit hard.

Kepco's decision to reduce LNG use is due to a fall in peak load demand for electricity, marking the first drop in electricity consumption in more than 15 years, caused by a decline in energy demand among industrial electricity consumers. According to figures released by the Korea Energy Economics Institute, electricity generation fell about 3% during the first guarter of the year to 51,866 GWh, compared with 53,092 GWh in 1Q1997 as Kepco's industrial customers reduced plant operations and cut production due to a drop in demand for their products. Since then Kepco's summer peak load is understood to have dropped for the first time in 16 years falling to about 35,300MW in August compared with last year's record high of 35,851MW.

South Korea

In fact, Kogas has already sorted out immediate problems caused by Kepco cutting LNG consumption this year but now is fighting the electricity generator's plans to reduce its gas burn for the next two years.

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'We have already talked with Kepco about the amount of LNG for this year and solved the problem,' the Kogas source said. 'They offered to buy a low LNG amount and we negotiated an increased amount.'

Under the revised agreement Kepco will buy 4.14mn tonnes of LNG from Kogas in 1998, a drop of 22.6% compared with the 5.37mn tonnes purchased in 1997. In contrast Kogas expects sales to city gas companies to rise 14% to 6.5mn tonnes this year compared with 5.77mn tonnes in 1997.

In 1997 household customers were the largest consumers of city gas using 3.76mn tonnes, while commercial customers used 1.1mn tonnes and industrial customers 891,000 tonnes.

In 1998, however, industrial use of city gas is forecast to increase more than residential and commercial gas use this year in spite of the economic downturn as new city gas customers are being connected in Ulsan and Changwan where piped gas supplies recently have become available.

Consumption forecasts

Based on Kogas' latest forecasts South Korea is expected to consume about 10.64mn tonnes of LNG this year, representing a 4.5% decrease compared with 1997. In fact, LNG consumption this year will be 3mn tonnes less than Kogas' original forecast of 13.67mn tonnes made in its now under-review long-term plan.

According to original forecasts, Kepco was expected to burn 5.8mn tonnes of LNG to generate electricity this year, some 41% more than its actual planned gas consumption this year. City gas consumption, meanwhile, previously was forecasted at 7.8mn tonnes this year, compared with the now forecasted 6.5mn tonnes. Residential, commercial and industrial consumers are all likely to require less city gas than previously forecasted.

In spite of Kepco's reduced gas purchases, Kogas still will be able to balance LNG supply and demand this year by cancelling about 18 LNG cargoes that previously were expected to be required in addition to contractual commitments. Kogas is understood to have cancelled 15 Indonesian cargoes totalling 600,000 tonnes and three Malaysian cargoes totalling 170,000 tonnes – a combined total of 770,000 tonnes.

'We forecast consumption will be 10.64mn tonnes this year and we have contracted cargoes of about 11mn



Pyongtaek LNG terminal, Kogas, South Korea

tonnes, so there is no problem,' the Kogas source said. 'We will use the excess volume of LNG for our own needs in Pyongtaek and Inchon receiving terminals, and in our supply facilities. It's hard to say what level LNG demand will be in 1999. We are talking to Kepco now about their needs but it is difficult to know what it will be.'

The main problem for Kogas is that Kepco wants to cut its fuel bill during the current economic crisis and now plans to reduce its gas consumption for the next two years. However, Kogas has contractual take or pay obligations with overseas LNG suppliers to take account of. The corporation has been unable to resolve the issue in bilateral negotiations with Kepco and has asked the government to mediate on the matter.

'Take or pay is a rigid contract condition,' the source noted. 'To prevent a financial loss the government side must decide how to operate this condition. We have to persuade Kepco to increase the quantity of LNG purchased. If there is no agreement the government should mediate between the two parties.'

Meanwhile, South Korea's financial crisis and the resulting downturn in industrial growth have raised questions whether the country's ambitious LNG import programme will stay on track. Previously Kogas forecasted that LNG imports would rise to 20.7mn t/y in 2001 before rising to 25mn tonnes annually by 2006. By 2010 Kogas expected to import 29.3mn t/y.

At present the Ministry of Commerce, Industry and Electricity is finalising a review of the country's long term LNG supply and demand programme while concurrently reviewing South Korea's electricity industry development plans. Kogas, however, is unable to publish its long term programme until Kepco finalises its power development programme as the electricity utility is Kogas' largest customer. Originally due to be finished by mid-1997, Kogas' long term review was first delayed by last year's Photo: David Hayes

presidential elections and then the country's mounting economic difficulties. 'We expect our long term forecast to

be published at the end of October after Kepco prepares its own long term plan,. the Kogas source said. 'We expect it will take several years for gas demand to catch up with previous forecasts again.'

Privatisation programme

Meanwhile, the government has set a target of January 2003 for privatising Kogas as part of a programme to sell off various other state enterprises including Kepco. At present South Korea's gas industry is organised in two parts.

Kogas is the sole importer of LNG, supplying Kepco and city gas companies through its expanding national grid. Piped gas distribution is undertaken by the various privately owned and publicly listed city gas companies which distribute gas in designated geographical areas.

'Our idea at Kogas is that Kogas should be privatised as a whole and not split up into different companies. However, the government has said it will follow the UK experience,' the source said. 'One idea is to divide the LNG terminals and transmission network into different companies. Another idea involves privatising the LNG terminals one by one. There also was an idea to divide transmission into three regional companies serving Seoul, the southwest and the southeast. This idea has now been dropped.'

Foreign interest in Kogas' privatisation programme is running high. Kogas is talking to potential investors including Shell and Mobil while foreign gas companies including Gaz de France and British Gas also have signalled their interest.

Storage and infrastructure

Meanwhile, Kogas is pushing ahead with its huge construction programme to increase LNG import and handling facilities while expanding its national

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transmission pipeline network. Construction appears little affected by South Korea's economic crisis so far though new construction projects could be delayed as gas consumption growth is likely to remain slower than previously forecasted for several years.

In 1997 Kogas awarded MW Kellogg Ltd a basic engineering and consultancy contract for its third LNG terminal to be built in the south of the Korean Peninsular, near the eastern end of a transmission pipeline loop Kogas is building to connect the cities of Kwangju and Pusan. To be constructed on a 1.32mn square metre site in Anjong Industrial Complex at Tong Yong in South Kyongsang Province, the third LNG terminal will help increase security of gas supply to the national transmission network as well as boost gas utilisation in the southern region. In fact, city gas companies distributing an LPG/air gas mix already are well established in several southern cities but are waiting for natural gas supplies to arrive to convert their systems and expand business.

Kogas recently announced plans to attract US\$700mn in project financing from two or three international oil companies for Tong Yong terminal. Kogas hopes to start construction work on the Tong Yong facility at the end of 1998, aiming to complete the first phase of the new terminal in August 2002. Plans call for three 140,000 kilolitre storage tanks to be constructed initially, capable of handling about 4mn tonnes of LNG a year.

Depending on gas demand growth in the south and the possibility of other organisations such as Pohang Iron and Steel Corporation (POSCO) building their own LNG import facilities, Kogas plans to almost double the Tong Yong terminal's storage capacity by installing two 200,000 kilolitre storage tanks in Phase 2. A third expansion phase to install one more 200,000 kilolitre storage tank also is being proposed. However, a construction timetable has not been finalised for either Tong Yong's second or third phase.

Gas use for power generation will create the initial baseload demand to ensure the economic viability of Tong Yong LNG terminal. Kepco plans to convert an existing coal-fired power station in Pusan to burn gas and will build a new combined-cycle station to increase electricity supplies to the industrial port city. Elsewhere in the southeast region Kepco plans to build new gas-fired power stations in Taegu and Ulsan intended for peak load shaving. Work already is underway on the Ulsan combined cycle station while equipment procurement is underway to construct the Taegu power plant.

While design work continues for the third LNG receiving terminal, construction is underway to expand the handling capacity of Kogas' Pyongtaek and Inchon LNG terminals.

At the end of 1997 Pyongtaek terminal had nine LNG storage tanks, each able to hold 100,000 kilolitres of LNG. Installed facilities allow the terminal to supply 1,800 tonnes of LNG per hour. Work is due for completion by the end of 1998 to install a tenth 100,000 kilolitre capacity LNG storage tank and expand facilities enabling the terminal to send out 2,016 tonnes of LNG per hour.

Elsewhere, Inchon terminal, commissioned in November 1996, had three LNG storage tanks at the end of 1997, each able to hold 100,000 kilolitres of LNG. Work is due for completion by the end of 1998 to install three more 100,000 kilolitre capacity LNG storage tanks and expand facilities enabling the terminal to send out 1,980 tonnes of LNG per hour.

By the end of 2002 Kogas' long term plans call for the utility to operate three LNG terminals with 29 storage tanks capable of holding 3.5mn tonnes of LNG. The three terminals will be able to send out 6,250 tonnes of LNG per hour for transmission countrywide through Kogas' national high pressure pipeline grid.

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PETROLEUM REVIEW NOVEMBER 1998

Road transport

latest developments





Crane Fruehauf's new Millennium petroleum tanker is designed to operate at up to 44 tonnes

Tanker fleets are under constant pressure to minimise operating costs despite ever increasing environmental pressures. *Gibb Grace* assesses the impact of the latest technology and the forthcoming increase in maximum vehicle weight due to be implemented in the new year.

The UK should have adopted 40tonne vehicles along with the rest of the EU 15 years ago in 1983, but the jump from the previous limit of 32.5 tonnes, and particularly the jump in maximum axle weight from 10.2 tonnes to 11.5 tonnes, proved too much to swallow. As it was, the UK Government argued successfully that the country's bridges and roads could not take the extra weight and the pounding of the heavier drive axles, and won a derogation that limited the UK to a maximum vehicle weight of 38 tonnes and a maximum drive axle weight of 10.5 tonnes.

That derogation ends on 1 January 1999, meaning that UK road haulage can finally come into line with the rest of the EU member states. From that date, fiveaxle articulated vehicles, for example, can run at 40 rather than 38 tonnes. The two-tonne difference, though quite small in itself, is all available as extra payload, so articulated vehicles that used to carry 26 tonnes say, will be able to carry 28 tonnes, increasing productivity by some 8%.

Unfortunately, the reality is not quite as simple as that because the UK Government will almost certainly penalise these heavier five-axle vehicles and their heavier drive axles by disproportionately inflating the vehicle excise duty (VED) or road tax. In fact, the recent Transport White Paper pointed the way by introducing the idea of a six-axle, 41tonne vehicle. Such a vehicle, it is argued, would have the same payload as a fiveaxle, 40-tonne vehicle, but would cause significantly less road damage. Though the relative VED rates for the two types have yet to be announced, most hauliers believe that they will be set so as to encourage the 41-tonne vehicle.

This is not altogether unexpected, as right from the outset, so called '3+2' 38tonners – those with a three-axle tractor and a two-axle trailer – have paid less VED than the 2+3 configuration favoured in continental Europe. Nonetheless, until the actual differences are known it is impossible to say, from a cost point of view, which is the best way to jump. One thing is for sure, given the time to build new tanker trailers, most operators will have to stay with what they have, until well beyond January 1999.

Three-axle trailers

In the 1980s, the oil industry tended to favour the 3+2 configuration because of its lower VED, but more recently the trend has been towards 2+3 layouts, the reason being that the oil industry, along with most of the general haulage industry, still believes that 44 tonnes on six axles will be allowed at some time in the future. Either way, the three-axle trailer is a good bet, and it is notable that Crane Fruehauf's recently launched 'millennium' tanker trailer is a tri-axle, designed to suit both 40

Environmentally friendly tanker

ne tanker company with an eye to the future is J W Suckling Transport Ltd of Coryton, Essex, which runs a fleet of 50 tankers supplying petrol, diesel, gas oil and kerosene to garage forecourts, schools, hospitals and a variety of commercial customers throughout Essex and East London.

Managing Director Peter Larner spent a year or so developing the idea and building what he believes is a truly environmentally friendly tanker. Two 2+2 articulated vehicles have been built to replace two eight-wheel rigids on contract to Shell, and while one is conventional, the other has been enhanced in a number of ways with a view to finding out how they differ in service. The environmental vehicle runs on Shell ultra-low sulphur diesel to minimise particulates emissions, and is equipped with an Eminox continuously generating trap to further reduce exhaust emissions.

In November 1998, by which time the vehicles will have completed 10,000 miles service, the units will be taken to Millbrook Proving Ground for detailed emissions testing. Larner believes that the environmental vehicle will turn out to be substantially cleaner than the standard Euro 2 benchmark vehicle, with carbon monoxide and particulates down by 90%, hydrocarbons down by 80%, and nitrogen oxides (NOx) down by 25%.

The environmental vehicle cost saround £10,000 more than the standard vehicle, so Larner will also be evaluating the relative running costs. The environmental vehicle uses Shell synthetic oils in the engine, transmission and drive axle, and it is predicted that together they will improve fuel consumption by 6%. The vehicle is also running on low rolling resistance, Michelin Energy tyres, and these too are expected to reduce fuel

and 44 tonnes operation. At 40 tonnes it carries 39,100 litres, and at 44 tonnes it carries 41,400 litres. Interestingly, it is the longer 44-tonne version which is proving the most popular.

Because of the uncertainty over weights and 10-year economic life of tanker trailers, most companies have hedged their bets in the past by specifying unnecessarily large capacities. As a consequence, even those operators with two-axle trailers will be able to load to 40 tonnes as soon as the legal limit comes into force, although they will almost certainly have to pay a VED penalty. Even so, most fleet engineers seem to think that the extra two-tonne payload which



J W Suckling claims that its new Leyland DAF/Thompson Carmichael tanker will meet 2005 emissions levels



The environmental vehicle is equipped with an Eminox continuously generating trap to reduce exhaust emissions

consumption by a further 6%. It could take a year to determine the overall results, but Larner is convinced his new tanker will prove to be as environmentally clean as the Euro 4 vehicles planned for 2005.

equates to as much as 2,600 litres of product, will be more than offset by all but the most swingeing of taxes.

Heavier but safer

Much of the foot dragging by the UK Government over the introduction of heavier vehicles has been put down to safety issues, but recent advances in braking technology have effectively more than addressed that argument. Trucks are rapidly adopting disc brakes as they weigh less and perform better under all conditions than drum brakes, and from an operational point of view, the parts count is halved, service intervals are increased, and brake service time is substantially reduced. What is more, these inherent advantages have been improved even further by the introduction of electronic control.

Electronic braking systems (EBSs) have finally solved the age-old problems of tractor/trailer compatibility, by combining the anti-lock and basic brake functions. However, to get the best out of an EBS/disc braked tractor, it needs to haul an EBS equipped trailer, and ideally one that has disc brakes too. At the moment a disc braked tractor and trailer will not stop any faster than an outfit using a conventional drum system, but using EBS shortens the reaction time between the Road transport

latest developments

driver hitting the brake pedal and the brakes being applied by 0.3 seconds, reducing the overall braking distance by 7.5 metres at 56 mph. It would need a change in the EU braking regulations to allow faster deceleration, but there is no doubt discs could achieve it if the legislation were amended.

Crane Fruehauf has yet to build an EBS compatible tanker trailer, but tests on a disc braked prototype are well advanced, and the company expects to deliver the first production unit by the end of the year. There had been some concern over a possible safety hazard due to the heat generated by the discs, but detailed testing has shown this to be unfounded. Certainly, come the millennium, heavy truck brakes will have taken a major step forward, both in terms of improved safety and reduced cost of ownership. Both important factors for front line vehicles covering up to 300,000 km a year.

Environmental advances

Currently all new vehicles over 3.5 tonnes gross have to meet Euro 2 emission standards but come 2001, the requirements will tighten yet again with the introduction of Euro 3 emissions legislation. In order to meet Euro 3, the engines will almost certainly have to adopt electronic management, and this in turn will lead to improved fuel consumption and lower service costs. The introduction of engine management electronics will also allow the use of automated manual transmissions (AMTs), which will improve overall safety by making the driver's job less demanding. Though fully automatic, AMTs retain the efficiency of the manual transmission, and yet do not compromise fuel consumption.

Traditionally, tankers have been loaded from gantries, but the latest tankers are all loaded under pressure from below, giving a number of advantages. Safety is improved as the driver no longer has to climb up onto the tank, and filling can be completed up to twice as quickly, as more than one compartment can be filled at the same time. Also from the environmental point of view, as the various compartments are filled with product, the air and vapour mixture is expelled, collected and treated, rather than being released into the atmosphere.

Flagship tanker unveiled

K road tanker manufacturer Thompson Carmichael has embarked on the first phase of a major European market development drive with the launch of a new flagship petroleum tanker range – the ADR 5000 Series.

The new range – said to offer a 'very competitive tare weight' – will comply with the European ADR Framework Directive governing the carriage of dangerous goods by road in EU member states, which is due to be implemented on 1 January 1999.

The new tankers incorporate a number of features developed for the company's earlier 5000 Series petroleum tanker. Inter-compartmental leaks have been eliminated in this design through the use of extruded division structures, which, combined with an integral monocoque superstructure, provide a centre of gravity that is lower than conventional designs. This, in turn, offers greater stabilty. The tankers are elliptical in section and available in varying capacities and compartmentations. The tanker barrel shell is manufactured from either 5186 or 5083 stainless steel alloys. All the units are fitted with 500mm diameter drop test lids and can be fitted with all leading makes of running gear and bottom loading equipment.

The first ADR 5000 units produced are entering service with Hoyer UK, as a joint venture with Esso, while a fleet of Thompson's new urban artics have recently been delivered to Sucklings for operation with Shell Direct. Thailandbased C P Heil, Thompson's sister company which services the Far East, will be overseeing an order of ADR units that are destined for operation in China.

Q8 launches little tanker

uwait Petroleum (GB) Ltd's distributor group Q8 Fuelcare has announced plans to invest an additional £400,000 in its recently launched 'super-small' fuel tanker, bringing its fleet of such units to 11 vehicles in total.

Said to be one of the shortest sixwheel vehicles ever built, the tanker features a highly compact design and small turning circle which provide manoeuvrability in tight spots. The tanker is ideally suited to deliveries of fuel oil to locations such as farms, smaller industrial and domestic customers, states Q8. Indeed, the company reports an increase in business from customers in previously inaccessible locations in recent months.

The tanker is also claimed to take 'a more environmentally friendly approach to fuel transit, storage and delivery'. In a new departure from traditional small tanker designs, the fuel hoses, valves and operating unit on the new tanker are enclosed within a protective cabinet to prevent leakage and spills. Built to Q8 Fuelcare's specifications, the 26-tonne, rigid chassis has been supplied by ERF Ltd and is fitted out by Lakeland Tankers. The tanker also features a LectroCount onboard metering system in the cab. A number of add-on facilities are planned for future units, including electronic monitoring of load, delivery and payment information which will reduce the need for timeconsuming driver documentation and additional office paperwork. Such technology also provides the opportunity to offer a full range of payment options to customers including swipe card, direct debit accounts and cash on delivery.



risk management



Water cannon is sprayed around Brent Spar to stop Greenpeace boarding to occupy

In the second part of our series on geopolitical risk, *Gordon Cope* looks at the impact of non-governmental organisations (NGOs) on international exploration and production.

t was February 1995, and a tiny fishing vessel from a port in the Shetland Islands was braving the turbulent winter waves of the North Sea. Its mission was not to harvest cod, but to reconnoiter a redundant oil storage and offloading buoy – the Brent Spar. Onboard the vessel, Simon Reddy, a campaigner for Greenpeace, watched as the platform came into view. 'It was a rusting heap of junk,' he recalls. 'I knew right then we had to stop it from being dumped.'

E&P

Greenpeace is just one of the many non-governmental organisations, or NGOs, that have sprung up in recent years to pursue major moral and ethical causes. 'NGOs argue they are fulfilling a vital role when they call attention to commercial abuse or injustice which might otherwise be ignored,' says John Bray, a Principal Researcher with Control Risks Group Limited, a risk consultant. 'Where political and legal institutions are poorly developed, NGOs may provide a balance by helping represent more vulnerable sections in society.'

One of the most important NGO issues that affect oil companies is environmental protection. While some NGOs work with petroleum companies to manage resources, others have a more adversarial approach toward the industry. 'Oil and coal are the major contributors to climate change,' claims Greenpeace's Reddy. 'We want a fossil-fuel phase-out because of the climate change. We want to change to renewable energy sources, such as solar and wind.'

In 1994, Shell needed to dispose of the Brent Spar, a North Sea floating storage and tanker-loading buoy. It examined over a dozen options, including horizontal dismantling, refurbishment and deepwater disposal. It took into account technical and health risks, damage to the environment, and costs. It consulted with governments, complied with all regulations and followed all legal procedures. It finally chose disposal in a deepwater site in the North Atlantic, 150 miles off the west coast of Scotland, and received approval from the UK government.

Greenpeace objected to the plan as being scientifically flawed. We don't believe that government and industry have the right to use the ocean as a dumping ground,' says Reddy. Greenpeace was concerned that Brent Spar would set a precedent. You shouldn't look at the Brent Spar in isolation. There are 700 installations in the North Sea.'

As the towing date neared, Greenpeace landed protesters on the platform, but were evicted. They reboarded the platform during towing, this time beaming back video footage to the media. The images sparked off a wave of public protest that pressured the Dutch and German governments into openly criticising Shell's disposal plans. Other NGOs called for boycotts on Shell products. Shell stations were picketed, and some, unfortunately, were fire-bombed. 'Non-violence is fundamental to Greenpeace, and we publicly denounced that,' notes Reddy.

Shell reeled from the negative publicity. 'We were taken by surprise,' says Mark Wade, Head of Shell International Ltd's Social Accountability Team. 'We had done the right things politically, scientifically and environmentally. For a company that prided itself on being a principled organisation, why was it that we were suddenly perceived to be so lacking in this regard? It was important to us to get a fix on this, fast.'

Human rights

A second major NGO issue, human rights, can also have a profound impact on oil companies. 'NGOs say that international companies should use their influence to promote human rights,' says Bray. 'But, companies say they have no mandate to interfere in political issues. Their job is to maximise shareholder value within the boundaries of law.'

Burma is a case where the two mandates can collide. In 1988, Burmese civilians demanded democratic reform. Thousands were killed in demonstrations, and a military junta (SLORC), seized power. SLORC held elections in 1990, but when opposition forces led by Aung San Suu Kyi won, SLORC refused to accede power, and persecuted many opponents of the regime who attempted to establish a democracy.

In response, human rights groups formed the Free Burma Campaign (FBC), an international coalition. Burma Action Group (BAG), based in London, is part of the network. 'Our purpose is to achieve a restoration of human rights and democracy in Burma,' says Yvette Mahon, Director of BAG. 'We are attempting to do that through economic pressure on Burma's military regime.'

Many international firms contract the manufacture of their goods to third-world countries in order to take advantage of low wages or to service local populations. This economic decision, however, exposes them to consumer pressure in Western countries. 'NGOs now concentrate on "brand" names, because it is a commercial asset,' says Bray. 'Boycott campaigns can have direct impact on sales.'

The FBC organised a boycott of Pepsi products until the company withdrew from Burma. Likewise with clothing manufacturers Levi Strauss, Liz Claiborne and Eddie Bauer. 'We've had quite a bit of success with tour operators and textiles,' says Mahon.

Several major oil companies are present in the gas-prone waters off the coast of Burma. Unocal, TOTAL and Myanmar Oil and Gas Enterprise operate the \$1.2bn Yadana gas field. Premier Oil, Petronas of Malaysia and Nippon are working elsewhere in the Gulf of Martaban. 'Oil companies are more resistant to boycotts, because few have retail outlets,' comments Bray.

The FBC sought out sanctions in various forms. Several local and state governments, including the city of San Francisco and the State of Massachusetts, passed selective purchasing legislation that state they will not do business with companies that operate in Burma.

In 1997, authorised by US Congress, President Clinton imposed unilateral economic sanctions on Burma. Under the sanctions, American company Unocal is allowed to maintain its current investments in the Yadana gas field, but can make no new investments.

Staking out positions

Oil companies and NGOs have entered into a dialogue over human rights, but much of what one side professes goes right past the other. 'NGOs say it is natural for companies to lobby government on questions such as tariffs, which are political and economic,' notes Bray. 'Is it therefore so strange for them to lobby governments on human rights questions?'

Companies argue they lack the authority to intervene in issues which go beyond their commercial remit. 'We do not have the authority in the same way that government, other political institutions or churches have,' explained former Royal Dutch Petroleum President Cor Herkstroter in 1996. 'We are a business. We are not a social, political or moral authority. Our remit is to act as a commercial enterprise.'

NGOs note that many companies have incomes greater than the GNPs of the countries they are dealing with. 'Oil companies could show their financial clout in Burma by pulling out,' says Mahon.

Companies retort that their room to manoeuvre is limited. 'Burma maintains the right to nullify oil and gas contracts if the company becomes directly involved in opposition politics,' says Bray.

NGOs assert that income from oil is used to support repressive regimes. 'The military regime in Burma is close to bankruptcy,' says Mahon. 'Oil and drug money are the only things keeping it afloat. Oil money is, very simply, fueling the oppression.'

Oil companies argue that they will be in a country a long time, through many regimes, and that their extended presence will have lasting benefits. 'Through our unique position and importance in the country, and by working with the people of Myanmar, we can make a significant contribution to improving standards of living in a manner that would not be possible through any way other than constructive engagement,' says Premier's CEO Charles Jamieson.

Oil company action

Still, oil companies are responding, both to specific situations, and in the way they do business. Shell abandoned its plans to dispose of the Brent Spar at sea, and towed it back to a fjord in Norway. After extensive consultations, the company chose a £23mn plan to cut the Spar into ring sections that could be used to build a roll-on/roll-off ferry guay in Norway.

It also decided to completely overhaul the way it addresses the larger issues, such as the environment and human rights. 'The Royal Dutch/Shell Group is commercial in nature, and its primary responsibility has to be economic,' says Wade. 'But there is also an inseparable responsibility to ensure that our businesses are run in a way that is ethically acceptable to the rest of the world.' Shell International launched a complete re-evaluation of the way it did business. It conducted a series of worldwide consultations with governments, customers, members of the general public and NGOs, not only to hear peoples' expectations of the company, but also to get the best ideas of what the company could do.

'We have had a set of General Business Principles since 1976, and the latest in a number of updates was completed in 1997, following extensive consultation,' says Wade. 'We have published a guide for managers on human rights that will help Group companies better identify their roles and responsibilities in supporting human rights. By early 1997, we greatly strengthened our Health, Safety and Environment policy, commitment and procedure, and the boards of every single Shell company worldwide have adopted these principles and commitments."

In order to verify to NGOs that Shell is committed to change, it has arranged to have its processes independently verified by KPMG and Price Waterhouse.

The internal changes have resulted in a much greater sensitivity toward international projects, such as the Camisea gas field in Peru, and the Malampaya gas field in Indonesia. 'These are two day, real-time projects modern embodying all the principles that we've been talking about,' says Wade. 'In Peru, we worked with 50 NGOs on the community, national and international level to understand issues and address them. We acted with great care and sensitivity. For example, we resourced the rigs as an offshore development, by air - no roads through the forest."

Premier Oil listened to what the Burma Action Group and other stakeholders had to say. In the end, the company made the decision to remain in Burma. 'We respect the political and human rights concerns of certain governments and non-governments and their support of sanctions on Myanmar,' says Jamieson. 'However, we believe that the development of an emerging country's energy resources is one of the primary requisites for longer term economic growth.'

'Projects related to the development of natural resources usually require international finance and the application of modern technical skills in raising standards and business practices,' adds Jamieson. 'Premier can, and does, use its position in the country to support our employees, their communities and their future through health education and technical training.'

Premier established several community programmes in Burma, including its work with 'Save the Children', to provide pre-school age education and life skills training. 'The principal objective is to make a difference in the communities in which the company operates,' says Jamieson. 'The emphasis is on self-help, rather than hand-outs, to ensure sustained development in the future.'

Response to the corporate decisions that Shell and Premier have made has been mixed. 'We welcome Shells' decision to create a roll-on/roll-off (out of the Brent Spar),' says Greenpeace's Reddy. 'It is a sensible re-use option in line with present day political and public thinking with regard to waste management and sustainable development.'

'Premier has been in Burma since 1990, and while they may very well be helping a few hundred people through their community programmes, they are simultaneously supporting a brutal regime that is impoverishing an entire nation,' says Burma Action Group's Mahon. 'Nothing is happening. There is no pressure on the military regime. The situation is worse than ever. The generals have grown fat.'

Looking to the future

'Regional political and environmental concerns can create an international controversy at any time, anywhere,' says Bray. 'International companies must now conform to the highest standards everywhere.'

Bray's advice is to look before you leap into doing business in a new country. 'Due diligence should not only include political stability and integrity of a potential joint-venture partner; but also if there is an active NGO campaign on any issue focused on the host country.'

Bray also recommends that oil companies communicate their actions. When Control Risks Group surveyed 51 European companies, they found that 57% believed that the impact of pressure groups would increase in the next five years, yet only 20% had formal mechanisms for dialogue with NGOs, and only 12% had official procedures for evaluating them. 'Don't sit silently,' says Bray. 'Seek out feedback on your activities. Search for common ground.'

While Bray believes that many controversial projects can achieve successful maturation when companies, governments and NGOs reach consensus on how they should proceed, he is first to admit that it is never going to be a perfect world. 'No matter how hard people try, significant points of dispute may remain, especially in the areas of the environment and human rights.'

'The issue of climate change is now high on the public and political agenda, and the oil industry's core business is one of the major causes,' says Greenpeace's Simon Reddy. 'If the oil industry fails to respond in time to this issue, the consequences may make Brent Spar look like a walk in the park.'

The situation in Burma highlights the need for multinational companies to take a more active role in human rights issues,' says Mahon. They're not going to get off the hook. They might as well address the issue sooner, rather than later.'

Oil companies are taking heed, and persevering. 'We felt stung – not so much financially, but emotionally,' says Shell's Wade. 'We didn't like it, and we learned our lessons very quickly. We hoped we responded in the most visible and transparent way we know how. We are not abandoning our decisionmaking responsibilities to stakeholders. But, we are seeking out and valuing the views of others, and then making balanced decisions in the light of what people expect of us.'

'We talk to all interested parties, from governments to NGOs,' says Premier's Jamieson. 'A reputation as a good corporate citizen and safe operator takes time to build, and can be destroyed quickly. Decisions to enter a country are not taken lightly. Our presence has long-term economic and social benefits, and we are committed to carrying out our obligations.'

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Technology refining

Unleaded gasoline demand prompts Pemex expansion

Petroleos Mexicanos (Pemex) has embarked on a \$5bn investment programme to expand and upgrade its refining operations in order to produce only unleaded gasoline by the year 2000. As part of this project, the Mexican national oil company recently licensed Phillips Petroleum's HF (hydrofluoric acid) Alkylation and Hydrisom processes for major expansions at its Tula, Cadereyta and Salina Cruz plants.

emex refineries currently have combined processing capacities of 1.5mn b/d with a 15% to 20% increase in processing capacity possible when planned upgrades and new units are complete. Unleaded gasoline presently accounts for two-thirds of the Mexican gasoline pool. Pemex' Sshort-term refining goal is to replace 100% of the gasoline pool with unleaded gasoline by the end of the decade.

Claimed to be the world's third largest petroleum company in terms of operating income, Pemex had 1996 revenues of \$31bn and \$40bn of assets. Capital upgrading expenditures in refining for the year totalled \$689mn with similar levels of capital investment expected for 1997 and 1998.

The focus of the company's investment programme reflects consumer demand for cleaner fuels and Mexico's increasingly stringent environmental standards which mandate a reduction in lead and aromatics and have led to an increased demand for alkylation capability by the country's refiners. Alkylate is a key ingredient in unleaded fuels because it displaces olefins and aromatics from the gasoline pool, thereby reducing smog precursors and toxic compounds. Alkylate is sulfur-free and is high octane.

Among the extensive upgrade projects that began in 1995 were four new HF alkylation plants licensed from Phillips Petroleum Company to produce high octane gasoline blendstocks. In conjuction with Phillips HF Alkylation technology, Pemex also contracted the construction of Phillips' proprietary Hydrisom technology, a selective diolefin hydrogenation process for feed treatment which produces higher octane. Total capital investment was \$120mn.

Deciding factors

Phillips' HF Alkylation technology was selected over alternative sulfuric alkylation processes after a long evaluation process that addressed the parameters of capital cost, utilities consumption, processing yields, operating requirements and safety.

The sulfuric acid-based alkylation process was found to consume approximately 200 to 300 times more acid than the HF-based process. Transportation and safety issues become very important when bringing such large quantities of sulfuric acid into the refinery, explains Pemex. These issues become doubly important when spent sulfuric acid is shipped out of the refinery for regeneration, as is often the case. In contrast, not only does the HF acid-based alkylation process require less acid, that which is spent can be regenerated inside the refinery on-site.

The Phillips Hydrisom process can be used in conjunction with the company's HF Alkylation process to upgrade the olefin feed. Hydrisom removes butadiene and therefore reduces catalyst consumption. It also isomerises butene-1 to butene-2, which produces alkylate with a higher octane number.

The two processes are claimed to offer a number of advantages compared with other refining technologies, including:

- circulation of catalyst without the use of pumps or high pressure;
- on-site catalyst regeneration;
- very low catalyst consumption;
- stable process chemistry for maximum alkylate yields;
- Iow reaction temperatures which do not require refrigeration;
- excellent system operability;
- more efficient energy usage;
- environmental cost reduction from minimised waste-disposal; and
- minimum operating personnel.

The HF Alkylation technology also incorporates five primary prevention and monitoring safety functions:

- compartmentalised reactor-settler configuration;
- rapid acid transfer catalyst system;
- enhanced piping and vessel designs for improved system integrity;
- remote control shut-off valves; and
- water-spray network for catalyst release mitigation and control.

Upgrade hat-trick

Pemex has licensed the Phillips HF Alkylation and Hydrisom processes for major expansions at three of its



Cadereyta refinery, located east of Monterey, Nuevo Leon, Mexico

refineries. The 317,000 b/d Salina Cruz plant is located on southern Mexico's Gulf of Tehuantepec and already incorporates a 14,000 b/d HF Alkylation unit while a 8,000 b/d unit has been installed at the Tula refinery, near Mexico City.

The company's five-year, \$1.2bn modernisation programme at the Cadereyta refinery, located to the east of Monterey, Nuevo Leon, is said to be the most ambitious to be undertaken

by Pemex to date. When completed, the new configuration, incorporating a 6,000 b/d HF Alkylation unit, will produce an additional 80,000 b/d of high-quality unleaded gasolines and middle distillates.

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- Retail design for convenience store.



Tula refinery, near Mexico City



http://www.mintat.co.uk

Internet:

1999

IP Week 1999: 15–18 February

P Week in February is the focal point in Europe each year when leading figures in the oil and gas industry migrate to London for an intensive round of conference, industry and trade association events, company meetings and social functions. The Institute's own programme of events is the core of these activities. An influential programme of conferences appealing to an international audience has been planned, which together with the Annual Luncheon and Dinner, will form the core of IP Week 1999.

Monday 15 February

IP Week

International Conference on Financing the International Oil Industry – The Challenge of Major Projects

The reduction in the crude oil price and financial uncertainties in Asian and other emerging markets have added new dimensions to the challenge faced by the oil industry and its bankers. This major international Conference will concentrate on the important issue of financing major projects, particularly those in areas of economic transition.

Tuesday 16 February

Annual Luncheon

'The Century of Choice' Guest of Honour and Speaker Sir John Browne, Chief Executive, British Petroleum Company plc

The Dorchester Hotel, London: 12.30 -14.30.

Knowledge Management in the Oil and Gas Industry – Trends and Case Studies

Organised in association with ARTHUR The Dorchester Hotel, London: 15.00-18.30

Arthur Andersen will facilitate this Workshop designed to educate, inform and provoke thinking around the topic of Knowledge Management in the oil and gas industry.

The prime objective of the Workshop is

to ensure that as a senior executive you are well briefed in what Knowledge Management is, you understand examples of applications others are implementing in your industry, and you have a basis to assess your own organisation's progress in capitalising on your employees' know-how.

The Workshop will cover:

Knowledge Management Concepts and Case Studies - application to the Energy Business Knowledge . 6 Management at Enterprise Oil facilitated by John Keeble, its Director of Knowledge Management - Objectives - Process to date - Lessons learned @ Peer Group Discussions on Current Efforts - Framework to Evaluate Effectiveness of Knowledge Management - Reflection on Progress at your Organisation @ Summary and Application Demonstrations.

Who should attend?

This Workshop will be of key interest to senior operations and technical personnel, finance professionals and all individuals interested in understanding how this developing area can help improve their company performance.

A Cocktail Party will be held at the end of the Workshop.

London Branch Evening

Discussion Meeting Sakhalin Oil & Gas – Exploration of the East Sakhalin Shelf Paul Nixon, Sakhalin Project Manager (G&G), Vice President Texaco Exploration Sakhalin Inc Institute of Petroleum, London: 18.00-19.30

Wednesday 17 February

The 12th Oil Price Seminar and Exhibition on Crude Oil Pricing in Deregulated Markets in Asia

Supported by New York Mercantile Exchange

Notwithstanding the Asian and Russian economic difficulties, crude oil continues to flow to the Asia- Pacific region from the Middle East, the



Pat Thompson, Nymex

Atlantic basin and from the former Soviet Union westward to Europe and North America. The Asian and the FSU oil markets are gradually being deregulated with the result that prices are being set not by governments, but by the market.

This Seminar will review the latest fundamental supply/demand balances, the effects of deregulation, particularly in Asia, and will then focus on the changing way crude is priced east of Suez and the latest pricing arrangements for crude from the FSU.

The Annual Dinner

For full details and a ticket application form, please contact the Conference Department. Tickets are limited so early application is recommended.



International Conference on The Caspian Region: The Major Oil and Gas Play for the Next Decade

The development of the oil and gas industry in the countries surrounding the Caspian Sea will be one of the most important oil plays in the new millennium. This international Conference will address the key issues central to the development of this emerging oil and gas province.

The IP Week 1999 Programme of Events is now available from the IP Conference Department. Pauline Ashby, Conference Department, Institute of Petroleum, 61 New Cavendish Street, London W1M BAR, UK Tel: +44 (0)171 467 7100 Fax: +44 (0)171 255 1472 e-mail: pashby@petroleum.co.uk Fuels retailing tax

VAT threat to service station loyalty schemes

A tax concession to UK oil companies, which freed them from having to pay VAT on consumer durables redeemed by customers taking part in loyalty schemes, could be under threat because of an impending ruling at the European Court of Justice, writes *Keith Nuthall*.

n 1996, Customs and Excise ruled that petrol stations would no longer have to pay the VATman every time they handed over an item worth more than £15 in exchange for tokens, stamps or electronic points collected through buying fuel.

Until then, it had been assumed that because the items were marketed as gifts, the petrol industry was the final consumer, and as VAT is a consumption tax, it was liable to pay VAT.

But that year, following an earlier judgement at the European Court of Justice (ECJ), Customs and Excise decided that motorists actually purchased their tumblers, CDs or Sega Megadrives through paying a premium on the price of their petrol or diesel. Hence the driver was the final consumer and the oil industry was not... thus the oil industry did not have to pay VAT on the gifts that were not, in the eye of the law, actually gifts.

Unfortunately, earlier that year, a VAT tribunal had heard a case brought by Kuwait Petroleum (GB) Ltd against the payment of VAT through the earlier system when VAT was payable for such items. The case was referred by the tribunal to higher courts and has been heard at the High Court, the House of Lords and now the Luxembourg-based ECJ.

Oddly, the case was not dropped by Customs, even though it had reversed its policy to a system that was being argued for by Kuwait Petroleum's lawyers. And now, with a preliminary ruling by Advocate General Fennely, backing its earlier and abandoned position that motorists do not actually pay for loyalty scheme gifts when they stump up for their petrol, Customs and Excise is threatening to 'review' the system that has operated since 1996. A senior official told Petroleum Review that the result could be a return to the days of petrol companies being charged VAT on the gifts promoted in glossy catalogues as a means to entice their customers to use their petrol pumps.

A spokeswoman for Customs and Excise later said: 'It is a matter of record that [Kuwait's] appeal was lodged and part heard before the change of policy on 1 June 1996. What is the case is that now the matter has been referred to the European Court and our change of policy is known to the European Commission. Should we win, then the Commission would expect the decision to be implemented. This would not affect the Q8 scheme, because it ceased before our change in policy. But it would affect other schemes which continue to operate in the same way.'

The process is being watched carefully by the UK Petroleum Industries Association (UKPIA), whose Director General Dr Michael Frend said: 'Very substantial amounts of money are involved. We would be very interested in what the ruling is and what are the repercussions of that.'

Despite the preliminary ruling, Kuwait is still optimistic that the full court will reach a different view when it delivers its final judgment, probably next month. A spokesman told *Petroleum Review:* 'We dispute the negative ruling of the Advocate General. We're firmly of the opinion that our case is fair and just, and remain hopeful that the final outcome will be positive.'

If the news is bad for the oil industry, a hike in its tax bill is likely. The only silver lining is that under the old system, VAT was only payable on redemption if the goods handed over were worth more than £15 each.

Hence a collection of mugs would not attract VAT, while a wide-screen television picked up by a high mileage trucker would. Whether loyalty schemes would be scrapped is another question altogether. However, one senior industry figure pointed out that oil companies had been prepared to pay VAT on loyalty gifts in the past and so probably would in the future.



Petrotest Instruments GmbH & Co KG, Ludwig-Erhard-Ring 13, D-15827 Dahlewitz

markets

Base oil prices shift trade patterns

The combination of demand trends in Asian and European base oil markets, capacity additions in Asia and the US, and highly volatile currency movements over the last year, has altered prices and trade patterns significantly. According to a report from Petro Finance's Worldwide Lubricants Service, recent base oil prices have reflected a shift in European and US supply and demand patterns, with the latter now acting as the new swing supplier.

earing in mind that prices are not fully transparent in this nonfungible market (and less so today than a year ago), the market nevertheless seems to show that European prices have moved above those in the US during spring 1998. Meanwhile Singapore prices fell by 11% (Brightstock, BS) and 15% (SN 500) in 1H1998. The price movement between Rotterdam and the US Gulf Coast reflects the shift in respective surpluses, see Tables 1 and 2, which moved from 119% to 122% of net base oil demand in the US (+19% in volume) and from 121% to 119% in Europe

(-10% in volume). This shift occurred as a result of:

- new capacity in the US (Excel Paralube, Petro-Canada);
- a rise in European demand;
- reduced capacity in the UK (280 kt/a); and,
- a temporary plant shut down in Portugal (180 kt/a).

Market prices also corroborate recent developments in Asia's evolving supply and demand balance. Southeast Asia's 1995 deficit of over 1mn tonnes fell to 260,000 tonnes in 1997 and preliminary data shows demand weakening further over 1H1998, states Petro Finance's Paris office.

The Asian region was broadly balanced in 1997. Based on senior level industry sources, Petro Finance has confirmed that reverse trade was already taking place from Asia to the US market at the margin, even if, on the whole, US refiners remain price competitive in Asia – for SN 150 and BS at least. However, estimating transport costs to Asia at around \$30/t (\$40/t in late 1996), US output is fast pricing itself out of this previously captive market.

With preliminary data showing a continuing decline in Asian demand over the short term, Asian refiners can be expected to search for markets beyond their traditional region. Majors will be better positioned to supply distant customers in deficit regions, even by displacing own-company supplies from elsewhere. In contrast to local Asian refiners, they can garner a broader client base, better name recognition, more extensive logistics and more worldly marketing know-how.

Currency movements

Asia was rocked by important, if uneven, currency movements between June 1997 and June 1998 (see Figure 1). The price of finished products includes a significant portion of locallydenominated costs such as labour and blending plant operations. The devaluations will therefore be taxing for those companies relying on finished product trade. In fact, such flows should decline drastically in 1997–98 and beyond, predicts Petro Finance.

The case of base oil trade is somewhat different however. Exporting countries include Western Europe, the US, Singapore, Australia, Japan and Saudi Arabia. Asian exporters saw their currency rapidly devalue whereas European and Saudi currencies remained broadly unchanged.

Asian production is less cost effective than European and American producers (at technological parity), a disadvantage mitigated by currency movements. Thus, a proportion of total base oil export volumes from Europe and the US should therefore be taken up by Asian refiners solely on the basis of relative currency movements. The recent addition of very low-cost capacity in Asia only reinforces this process to the disadvantage of European supply. As to new Middle East capacity, notwithstanding local market growth, few clues are available as to where supply may now be targeted, comments the analyst.

Within Asia, however, those countries which traditionally make up the bulk of base oil exports have depreciated more or less uniformly versus the US dollar. Currency changes over 1997 and early 1998 should therefore affect

	Change 97/96						
Region	1996 (mn te	1997 onnes)	mn tonnes	US gallons (mn).	'000 b/d	°∕a	
North America	12.9	13.7	0.8	228.7	14.9	6.0	
Latin America	3.1	3.2	0.1	37.3	2.4	4.1	
Western Europe	8.5	8.3	-0.2	-58.0	-3.8	-2.3	
East/Central Europe	2.1	2.0	-0.1	-27.4	-1.8	-4.5	
Total China	3.4	3.6	0.2	53.0	3.5	5.2	
OECD Pacific	4.0	4.0	0.0	-6.5	-0.4	-0.6	
Southeast Asia	1.7	2.6	1.0	289.6	18.9	59.5	
Indian Subcont.	1.1	1.1	0.0	4.1	0.3	1.3	
Middle East	1.6	2.0	0.4	121.6	7.9	26.5	
Ex-USSR	8.1	8.0	-0.1	-36.0	-2.3	-1.5	
Africa	1.0	1.1	0.0	10.1	0.7	3.3	
Total	47.3	49.4	2.1	616.5	40.2	4.4	

Source: Petro Finance from NPRA, Oil & Gas Journal, local industry/corporate sources

Table 1: Production capacity by region

	Net demand*		Capacity		Change (%)		S/D (vol)	5/D (vol)	S/D (%)	S/D (%)	Utiliz'n rates	
Region	1995	1997	1995	1997	Demand	Capacity	1995	1997	1995	1997	1995	1997
Total world	31.7	33.0	46.2	49.4	4.3	7.1	0.5	1.1	102	103	70%	69%
Outside ex-USSR	29.2	30.3	37.9	41.5	3.8	9.4	0.1	1.1	101	103	77%	76%
Americas	11.0	11.3	15.1	16.9	3.1	11.9	1.0	1.3	109	111	79%	75%
North America	8.3	8.5	12.0	13.7	3.0	14.0	1.6	1.9	119	122	825	76%
Central/Latin America	2.7	2.8	3.1	3.2	3.5	4.0	-0.6	-0.6	78	78	69%	69%
Europe	6.0	6.1	10.7	10.2	0.4	-4.6	1.5	1.2	125	120	71%	71%
Western Europe	5.2	5.2	8.4	8.3	-0.1	-1.8	1.1	1.0	121	119	75%	75%
Central/East'n Europe	0.8	0.9	2.3	2.0	4.0	-14.9	0.4	0.2	154	126	55%	55%
Asia-Pacific	8.9	9.4	9.7	11.3	5.5	16.8	-0.9	-0.1	90	99	83%	82%
China	2.4	2.7	3.2	3.6	11.7	14.7	-0.3	-0.2	89	91	69%	69%
OECD Pacific	3.2	3.3	3.9	4.0	3.6	1.7	0.6	0.5	118	115	96%	96%
Southeast Asia	2.4	2.4	1.6	2.6	2.7	69.2	-1.1	-0.3	54	89	82%	82%
Indian Subcontinent	0.9	0.9	1.1	1.1	2.8	1.3	-0.1	-0.1	89	88	78%	78%
Middle East	1.7	1.8	1.6	2.0	5.6	26.5	-0.5	-0.3	70	84	76%	76%
Ex-USSR	2.5	2.7	8.2	8.0	9.5	-3.2	0.4	0.1	116	103	35%	35%
Africa	1.6	1.8	0.9	1.1	10.7	23.5	-1.0	-1.1	36	40	65%	65%

Notes: Units are in mn tonnes unless otherwise stipulated. *Finished product demand minus estimated additives share.

Source: Petro Finance Lubricant's Database

Table 2: World supply/demand (S/D) balance in 1995 and 1997

intra-regional flows relatively less then extra-regional flows. The Korean situation is an exception. Although a deficit country in 1996 (75,000 tonnes), the situation in 1997 suggests a slight surplus with numerous pressures to find export markets. The Korean currency devalued considerably more than those of other regional base oil exporters, suggesting a marked advantage for Korean sites in supplying regional demand.

The ability for European producers to sell their surplus production on African and Asian markets may appear more difficult today than a year ago due to new non-European capacity. However, trade flows are also affected by other considerations.

European exports have typically been intra-company flows, eg a refiner in Europe supplies its own company's network in deficit markets in Africa and Asia. Companies with capacity in several regions will therefore seek to maximise returns on a global basis and avoid costly competition from one plant against the other. In some cases, the cost of low plant utilisation may be lower than outright plant closure in another region. Given the relatively large surplus in Europe, some question whether intra-company transactions are, in fact, closed on the basis of reported market prices.

For local Asian blenders, the situation will change too. Finished products are



more price sensitive to local exchange rates (base oil costs make up about 8% of a bottled motor oil). The recent turmoil suggests a steep decline in finished product trade and a corresponding focus on local blending capacity, particularly in Asia. Locally blended output will be more competitively priced than finished product imports.

The switch from finished product imports to local blending may keep base oil trade above what it would otherwise be, acting as a floor below which base oil prices will not fall.

Along with others, US investments in high quality capacity ahead of stringent environmental regulations in 2000 have accelerated the trend towards high quality supply worldwide. The Asian crisis and its likely impact on the consumption of highly priced products makes the question of supply and demand balance particularly salient. Will Asian demand for high-quality products follow the pace of US supplies? Not only is new Asian capacity displacing European exports to the region, but in some base oil cuts, economics may make it preferable to reverse trade - from Singapore's high-tech plants to sophisticated customers in the US and beyond rather than shift to lower-grade production slates or cut prices below costs.

In fact, the lower production cost achieved in a newer plant does not necessarily translate into more competitive prices: demand may not match supply, and refiners have no interest in a price war. Moreover, the production cost advantage is real when measured against new but less advanced plants; but disappears when measured against older plants producing adequate base oil grades at even lower costs.

Database

shipping

Crude oil marine measurement loss update

Paul S Harrison,

Consultant to the PM-L-4(A) Marine Loss Database Panel, presents findings from analysis of 1997 data, updating the analysis which was reported in *Petroleum Review* in October 1997.

he PM-L-4(A) crude oil marine loss database panel collects and analyses worldwide crude oil shipping data with the aim of improving loss control through a better understanding of loss patterns and trends. Losses are almost entirely apparent or 'paper' losses rather than physical or real losses and occur due to a combination of fixed and random errors in the measurement systems used at load and discharge. However these losses can have an important financial impact. The PM-L-4(A) Panel was formed in 1986 and membership has grown steadily over the years. The following 23 companies are currently represented: AGIP Petroli Mobil Amerada Hess Petrofina SA **BP Oil** Petrogal SA Chevron Phillips International **PMI Pemex Repsol Petroleo** Conoco

Conoco Repsol Petroleo Elf France Saras Elf International Scanraff (Preem) Esso Petroleum Shell Company Statoil Exxon Company Sun Oil Company International Texaco Marathon TOTAL

Panel members submit their company data for analysis and an annual report is issued individually to all members. This report includes a confidential analysis of the individual company data together with a general global analysis of the entire annual data set. Membership is open to all users and producers of crude oil, and companies interested in joining the panel should contact Mike Trowsdale, Chairman of PM-L-4(A) via the Institute of Petroleum.

The size of the database has increased over the years, due partly to the growth in membership but also as a result of existing members gathering data from additional affiliates.

This growth in volume is shown in **Figure 1** with the 1997 total standing at 3.83bn barrels for voyages with full load and discharge data. This represents an increase of 17% over 1996.

Comparative figures for 1997 have not yet been published but it is estimated that full measurement data on over 35% of world seaborne crude is included in the 1997 database with bill of lading (BOL) data on 43% of the world total. A comparison with independent estimates of world seaborne trade in World Bulk Trades 1997 (published by Fearnleys in Oslo, Norway) showed that the 1996 database contained full data on 31% of the world total.

Data for over 7,000 individual voyages were submitted in 1997 with bills of lading totalling in excess of 4.75bn barrels. Of these voyages, over 5,500 had full bill of lading and out-turn data from



PETROLEUM REVIEW NOVEMBER 1998

Crude type	API gravity	Overall vol	umes (NSV	n	Calculation by voyage				
		Total barrels	Barrels loss	Barrels loss %	NS Mean	V loss % Std dev	No	NSV Mean S	loss % Std dev No
A960 Condensate	17.5	9 619 982	-33 003	-0.34	-0.32	0.76	22	-	
Alaskan North Slope	30.0	177,987,364	-104.301	-0.06	-0.05	0.16	246	-0.10	0.24 419
Alba	20.0	13.076.844	-7.570	-0.06	-0.06	0.17	26	_	
Amna	37.3	24,216,577	-56,489	-0.23	-0.24	0.20	46	-0.18	0.23 53
Anasuria	38.7	14,561,055	-24,941	-0.17	-0.16	0.85	23	-	
Arab Ex Lt	36.9	52,054,465	-71,051	-0.14	-0.18	0.44	81	-0.26	0.30 30
Arab Heavy	27.9	39,488,741	-199,284	-0.50	-0.36	0.68	85	-0.38	0.55 43
Arab Light	32.9	256,132,734	-581,687	-0.23	-0.17	0.38	306	-0.15	0.36 264
Arab Medium	30.7	119,508,881	-202,943	-0.17	-0.18	0.69	149	-0.24	0.36 85
BCF 17	17.1	-	-	0.25	0.22	0 40	70	-0.10	0.37 26
Basrah Light	34.2	23,323,388	-59,052	-0.25	-0.22	0.46	20	0.20	0.20 24
Belayim	28.2	13,342,321	-34,448	-0.26	-0.26	0.32	20	-0.28	0.28 34
Beryi Bonny Light	37.0	13,207,293	-25,125	-0.18	-0.14	0.09	54	-0.11	0.45 72
Bonny Light	28.6	11 364 030	-33,493	-0.08	-0.06	0.45	27	0.01	0.45 72
Bouri	26.0	18 923 007	-40 540	-0.21	-0.21	0.30	34	-0.44	0.56 32
Brass	41.9	17 283 089	-43,759	-0.25	-0.27	0.22	21	-0.30	0.32 25
Brent	38.4	124 125 409	-124,181	-0.10	-0.10	0.20	197	-0.07	0.16 102
Cabinda	32.9	29,898,910	18,128	0.06	0.13	0.67	40	-0.07	0.40 35
Cano Limon	29.5	17,995,154	-19.082	-0.11	-0.10	0.15	36	-	
Caripito Blend	22.3	23,832,421	18,204	0.08	0.07	0.34	47	-	
Cusiana	37.4	15,442,688	-42,528	-0.28	-0.27	0.22	23	-	
Danish	36.3	19,247,676	-40,038	-0.21	-0.26	0.25	38	-	
Draugen	40.3	54,680,124	-156,768	-0.29	-0.29	0.13	65	-	
Dubai	31.2	25,075,775	-65,974	-0.26	-0.26	0.20	35	-	
Ekofisk	38.8	109,012,987	-66,944	-0.06	-0.07	0.18	161	-0.06	0.12 117
Es Sider	36.6	21,409,447	-94,229	-0.44	-0.44	0.20	36	-0.43	0.21 31
Escravos	35.7	53,622,121	-66,391	-0.12	-0.13	0.25	50	-0.12	0.35 72
Flotta	36.5	52,016,588	-174,217	-0.33	-0.33	0.29	84	-0.28	0.24 72
Forcados	29.9	57,058,386	-120,569	-0.21	-0.20	0.35	44	-0.09	0.26 45
Forozan	30.6	35,915,126	-67,002	-0.19	-0.17	0.37	54	-0.38	0.70 62
Forties	40.4	128,362,996	-147,284	-0.11	-0.11	0.18	191	-0.13	0.18 186
Fulmar	39.2						-	0.18	0.22 31
Furrial	30.2	28,006,401	-54,786	-0.20	-0.18	0.21	50	-0.21	0.29 23
Guiltaks	33.1	120,150,496	-248,603	-0.21	-0.21	0.28	151	-0.21	0.14 1/8
Heidrun	28.5	28,475,171	14,100	0.05	0.02	0.21	45	-0.04	0.25 25
Iranian Heavy	30.0	10 /05 920	-210,255	-0.54	-0.25	0.50	25	-0.14	0.55 71
Isthmus	227	12 1/7 072	-23,110	-0.13	-0.07	0.10	32	-0.10	0.40 50
Khafii	28.4	8 216 115	-25 038	-0.30	-0.31	0.43	21	124	2 2
Kirkuk	36.1	58,033,820	-141,333	-0.24	-0.27	0.25	62		
Kuwait	31.0	29.820.885	-66,169	-0.22	-0.20	0.53	38	-0.13	0.39 26
Leona	23.3	9.098.877	7.218	0.08	0.17	0.66	22		
Lower Zakum	40.1	17,750,980	-80,303	-0.45	-0.44	0.13	41	-	
Maya	21.6	132,402,372	-331,349	-0.25	-0.27	0.30	229	-0.26	0.35 151
Mesa	30.3	29,638,532	-53,917	-0.18	-0.17	0.31	35	-0.11	0.32 22
Murban	39.7	30,799,955	-107,257	-0.35	-0.33	0.26	67	-	
Olmeca	38.7	93,732,691	-186,761	-0.20	-0.20	0.32	171	-0.27	0.24 112
Oman	33.2	15,584,141	-29,703	-0.19	-0.23	0.37	27	3.67	
Oriente	25.7	12,174,263	18,141	0.15	0.13	0.31	31	0.11	0.34 21
Oseberg	36.2	52,137,838	-62,234	-0.12	-0.11	0.22	72	-0.07	0.17 83
Qatar Land	37.8	23,781,700	-73,346	-0.31	-0.30	0.19	55	-	
Qatar Marine	33.8	15,005,627	-27,630	-0.18	-0.19	0.17	26		0.07 .04
Qualboe	36.6	46,364,466	-20,723	-0.04	-0.02	0.38	40	0.01	0.27 24
Rabi Light	34.0	20,351,854	-/0,284	-0.27	-0.20	0.23	175	0.19	0.25 227
Sabara Blond	32.2	40.088.705	-101,740	-0.15	-0.15	0.30	69	-0.16	0.35 227
Santa Barbara	35.6	12 709 207	-57 811	-0.05	-0.45	0.30	24	0.10	0.25 105
Sarir	37.6	12,103,307	-57,011	-	0.45	0.20		-0.36	0.27 41
Siberian Light	35.1	10,692,685	-15.038	-0.14	-0.15	0.28	23	-0.14	0.23 41
Souedie	24.2	8,969,737	-9.604	-0.11	-0.09	0.23	21	-0.17	0.27 27
Statfjord	38.8	197.063.010	-638,319	-0.32	-0.32	0.20	243	-0.36	0.15 217
Syrian Light	36.3	48,410,297	-159,371	-0.33	-0.33	0.29	81	-0.32	0.29 77
Tengiz	46.3	10,985,085	-42,705	-0.39	-0.39	0.32	29	-	
Troll	28.4	29,691,023	21,434	0.07	0.07	0.18	46	0.03	0.15 47
Umm Shaif	-	11,497,543	-46,312	-0.40	-0.39	0.12	33	-	
Upper Zakum	34.2	9,601,460	-23,237	-0.24	-0.29	0.26	22	-	

Table 1: Analysis by crude oil type 1997

shipping



which the loss information was derived.

Database

Weighted average loss

To allow year-on-year comparisons a weighted net (NSV) loss figure is calculated each year using a standard basket of crudes. These figures are also plotted in **Figure 1** and the overall improvement since 1989 is readily apparent. Weighted loss for 1997 stands at -0.23% (by convention losses are given negative values).

The calculation of the weighted loss figure has been a source of concern within the panel for some time as it has been based on the same sample crudes, load ports and weight factors which were generated by panel members in 1989. While giving a stable basis for comparison the relevance of these figures to the true global situation is becoming questionable as a number of new crudes have appeared during this time while some others have reduced or increased in volumes lifted. It is also noticeable that as the database has grown the average loss by voyage has remained consistently less than the

weighted figure, indicating that the weighting is perhaps biased towards the higher loss crudes.

The weighted approach is statistically valid but in order to apply it properly new weight factors are needed each year based on total lifted volumes for a large sample of load ports. So far it has not proved possible to obtain these figures reliably. However, with the database now covering over 30% of shipped volumes, it seems reasonable to assume that the overall mean loss by voyage provides a very good estimate of the global situation. This figure will itself be weighted by the number of voyages in the database for each crude/load port which is closely related to volume. The internal weighting will change year on year as crudes and volumes change but the database is now sufficiently large not to be unduly influenced by input from new members or by other minor structural changes.

A plot of the weighted loss and the database mean loss is shown in **Figure 2**.

It is interesting to note that both estimates show the fall from 1994 to 1995

NSV Loss %						
Original	Table corrected	Table difference %				
0.03	0.10	0.07				
-0.71	-0.63	0.08				
-0.42	-0.24	0.18				
-0.39	-0.31	0.08				
-0.33	-0.19	0.14				
-0.11	-0.11	0.00				
-0.11	-0.09	0.02				
-0.38	-0.34	0.04				
	0.03 -0.71 -0.42 -0.39 -0.33 -0.11 -0.11 -0.38	NSV Loss % Original Table corrected 0.03 0.10 -0.71 -0.63 -0.42 -0.24 -0.39 -0.31 -0.33 -0.19 -0.11 -0.11 -0.38 -0.34				

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

and then a gradual rise to 1997 indicating that this trend is real. Also, the average loss by voyage shows a consistently lower loss than the weighted figure. In future only the average loss by voyage will be reported.

Database development

In addition to expanding the size of the database in order to improve its representativity and to include data for additional crude oil types and ports the panel continues to review and implement appropriate additions to the range of data collected and to improve the analysis and reporting methods.

Vessel experience factor (VEF) corrected data together with table corrected bills of lading (BOL) measurements (for those ports using pre-1980 tables) were added in 1996. For 1997, load and discharge temperatures were included together with Reid vapour pressure (RVP) data. This information will be used to assist future loss analysis.

Loss comparison

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

For comparison, figures for NSV loss calculated by voyage are given for 1997 and 1996. Twenty-five additional crudes are included this year but three are not reported for 1997 as the number of data sets for these crudes has fallen below 20. API gravity for these crudes is given as the 1996 mean value.

Note that the data is not 'table corrected' (see above) but based on original bill of lading figures. The effect of using table corrected BOL data for specific crudes is shown in **Table 2**.

Details loss analysis

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

Overall results for each of the main measurement differences are shown in **Table 3**, comparing unweighted figures for 1997 with those for 1996. There is no significant difference between the two sets of results.

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

	1997		1996	
	Mean	Std. Dev.	Mean	Std. Dev.
NSV loss %	-0.20	0.37	-0.19	0.35
TCV loss %	-0.13	0.36	-0.12	0.33
Load difference %	+0.17	0.41	+0.16	0.41
Ship loss %	+0.02	0.20	+0.02	0.18
Discharge difference %	-0.33	0.44	-0.31	0.41
Water loss %	-0.07	0.18	-0.07	0.17
ROB difference %	+0.04	0.16	+0.04	0.15

quantities (free and dissolved) deducted. TCV is the NSV plus sediment and free and dissolved water.

Load difference is the TCV difference between ship received and shore delivered volume at loading. Discharge difference is the TCV difference between the ship discharged and shore received volume at discharge. Load and discharge differences are not corrected for vessel experience factor (VEF). However these corrections are now made in detailed reports to members.

Ship loss or 'transit difference' is the difference between ship TCV measurements at the load port before sailing and at the discharge port on arrival. Water loss is the difference between bill of lading and out-turn water and sediment, adjusted for ROB/OBQ water difference where figures are available. ROB difference is the difference between the TCV measured on the ship prior to loading (OBQ) and that remaining after discharge (ROB).

Conclusions

The 1997 data indicates that the loss reductions seen from 1989 through to 1995 may have begun to reverse with slight increases in overall loss noted in 1996 and 1997, irrespective of the method used to estimate the final figures.

Weighted average NSV loss for 1997 stands at -0.23% with the database mean loss at -0.20%.

The database continues to expand

and it is estimated that over 35% of world seaborne crude is included for 1997. However, the panel has a target of 50% and there are still some areas which are not well represented. A Membership Guide is now available and prospective new members are encouraged to contact the Institute of Petroleum for a copy. All additional data adds to the value of the database and the information which is derived from it.

Oil companies are urged to continue their support of these activities through their loss control groups as even at the low crude prices currently prevailing the annual worldwide loss in financial terms which these 'measurement losses' represent is around \$300mn and a clearer understanding of the situation enables these losses to be reduced.

Any questions or comments on the content of the paper or any other aspects of the activities of the panel should be addressed to Mike Trowsdale, Chairman of PM-L-4(A) panel via the Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK.

FIRST INTERNATIONAL CONFERENCE Health Effects of Vehicle Emissions

16th & 17th February 1999 : The Royal Society of Medicine, London

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- + Air quality legislation in EU/UK
- The cost of air pollution paying the price
- Traffic related pollution and chronic health effects
- Setting air quality guidelines for the protection of human health
- The transport contribution to air quality improvements
- Forging efficient partnerships to improve urban air quality
- Local authority view point meeting local traffic targets and guidelines
- New technologies and the need for better fuels
- The commercial ramification of cleaner fuels

Participants will include:

Dr Robert Maynard Dr David Maddison Dr Klaus Schindler Mr John Lucas Mr Robert Cosic Mr Stuart Holland Prof David Begg

Dr Rolaf van Leeuwen

Mr Michael Morris

Dr Margaret Ball

Dr Howard Ross

University College London Volkswagen, Germany Tesco Retailers Elf Oil Company ALTER Europe Robert Gordon University/ Edinburgh City Council World Health Organization, NI. Nabarro Nathanson University of Leeds Arthur D Little, Sweden

Department of Health

Mr Prudencio Perera Mr Richard Mills Dr Claire Holman Mr Mike Hawkins Dr Daniel Greenbaum Prof Stephen Holgate Mr Michael Walsh Dr Paul Greening Prof J Ayres Mr David Armstrong Mr Iain Todd Prof Paul Elliot

National Society for Clean Air SENCO Ford Motor Company Health Effects Institute, USA University of Southampton International Consultant, USA European Commission, DGIII Birmingbam Heartlands Hospital Transtech Consultancy Services Limited DETR Imperial College of Medicine

European Commision, DG XI (invited)

For further details contact the Organisers:

Energy Logistics International Ltd, 70-72 St Marks Road, Maidenhead, Berkshire SL6 6DW, UK Tel: +44 (0)1628 671717 Fax: +44 (0)1628 671720 Email: enquiries@energylogistics.co.uk

Technology, environment and the future of energy

The 17th congress of the World Energy Council (WEC), recently staged in Houston. coincided with the 75th anniversary of an organisation that has some 100 countries as members. About 4,000 delegates from around the world heard papers on topics varying from new technology in coal burning to the relationship between companies and the media. Philip Algar reports.

nevitably, many speakers, noting that it was the last such congress of the 20th century, succumbed to hyperbole. The gathering was expected to be 'the largest, most important energy event of the century'. Be that as it may, the timing of the conference and exhibition, after six years of planning, was excellent.

BP and Amoco had recently announced plans to merge, suggesting to commentators that more alliances could follow, partly to offset the economic consequences of the lowest real crude oil prices for decades.

Energy markets around the world are being deregulated and governments and companies want to provide power, particularly electricity, to the two billion people who currently lack access to commercial energy.

All this is promoting new structures in the energy sectors. In the oil industry, big is almost essential as flat markets deny economies of scale and higher upstream costs, and political risks are associated with some new areas. In the power sector, deregulation is inspiring a different kind of company and, according to many WEC speakers, supply groups will eventually become suppliers of all forms of energy.

Cynics with good memories will argue that this happened some years ago, and, after some expensive mistakes, groups retreated to their 'core' skills. This time, however, globalisation, deregulation and market conditions are more favourable and new entrants to the energy supply side may force a complete re-appraisal of a traditional company's activities.

Furthermore, this is occurring when all energy suppliers face massive additional financial burdens in order to meet more severe environmental regulations. Poor market conditions imply that such costs will not be fully recovered, especially in the short term.

Global warming

Many speakers and delegates believe that, for them, the scientific debate on global warming is now irrelevant. If customers believe that the traditional burning of fossil fuels could increase the prospects of global warming, progressive companies will listen and take what action they can. Many papers emphasised the need to heed customer demands. Consequently, some companies believe that waiting for firm evidence on global warming, before taking action, is undesirable.

This view is, of course, fiercely attacked by many US companies and the contrast between BP and the Dow Chemical Company, for example, was clear. William Stavropoulous, Dow Chairman, argued that whilst companies must be perceived as responsible, a science-based and sensible approach to global warming was required. The US would have to achieve increased energy efficiency of 300% over the next decade to meet Kyoto targets. According to Stavropoulous, the treaty called for 'too much, too soon. We favour a cost effective approach that allows us to learn as we go.' Industry needed time to raise its efforts and to lower its emissions and to learn how to avoid 'going down the wrong road'.

Some governments paid too much attention to industry but the residential and transportation sectors were more important. Administrations should also study consumers and their lifestyles because they represented the sector with the fastest growing emissions. 'Not enough consumers want small cars and governments must regulate or educate. We favour the latter,' he said.

The fuel mix

Most speakers emphasised the role of commercial energy in producing higher standards of living, especially in the developing world. Indeed, the number of people without access to commercial energy could double to four billion unless action was taken. Higher global energy demand usually implied higher emissions and greater prospects of global advancing warming. Consequently, there was much stress in the numerous debates on the need to develop and implement new technology that would break the link between higher energy demand and increased emissions.

Representatives from companies involved in renewable energy and participating in the associated exhibition, exuded optimism on prospects, notwithstanding low real energy prices. Technology is assisting in reducing costs, and modestly sized innovative dual-powered solar devices, for example, may soon bring low-cost electricity to remote villages. Nevertheless, whilst acknowledging the role that renewable energies might eventually play, most speakers thought that their contribution would remain modest for decades.

In the near future, of necessity, the fuel mix would be similar to that seen today. Natural gas would become more important, because it was perceived as an environmentally friendly fuel and reserves were now higher than previously thought. Other speakers argued that nuclear power, despite its apparent disadvantages, might be used increasingly in the future as it did not contribute much to emissions and thus to global warming.

Speeches

Former President and Houstonian George Bush opened the event. According to WEC officials, clearly irked by President Clinton's last minute refusal, this was the first time in the history of the organisation that a head of state had not opened proceedings. Bush, having received a standing ovation, said that over the next 21 years, global population could increase by two billion and energy demand might rise by 50%. He stressed the need for more affordable energy and maintained that everyone in the sector had to be more conservation-minded. Research and development must be sustained and technology could help provide energy to an increasing number of people without damaging the environment. He condemned those in the US who wanted to 'turn inwards'

companies would be able to respond to an environment in which they could not rely on an oil price increase or improvements in downstream margins? Which companies would be able to provide the customer with the products and services demanded, especially products which did not threaten the sustainability of the natural environment? Which companies would be able to extract the marginal barrel from existing fields and to reach out to the new sources of supply, for example, in Russia or in deep water? Which companies could organise themselves, both internally and in their relations with the

'we are living through the last days of the traditional oil company and its demise is related to the very topics of this conference: technology and development' Peter Bijur

and argued that the US must find a way to assist those who were less fortunate. Because of its economic strength, the US had an obligation to stay involved.

Although there were few presentations from oil company leaders, the two most discussed papers, that confronted key issues without equivocation, came from BP and Texaco.

Sir John Browne, Chief Executive Officer of BP, delivering a keynote address, told thousands of delegates that he was impressed by the optimistic tone of the sessions, despite all the problems encountered by the energy sector of late.

The oil industry faced four fundamental challenges, namely costs, quality, reach and organisation. Which



Sir John Browne, Chief Executive Officer of BP

external world, in a manner which stimulated and rewarded learning?

These issues were 'as intellectually challenging' as those faced by any other industry, anywhere, and 'in every case technology is at the heart of the answer'.

Discussing the environment, in a country where BP's stance has been criticised, Sir John said that customers 'want to choose products which do not threaten the quality of their environment by the way in which they are produced or used. Environmentalism is a complex issue. Of course, some of the detailed science on environmental issues such as climate change is imperfect and incomplete...but the fact that we don't know everything isn't a reason for ignoring the evidence which



Peter Bijur, Chairman and Chief Executive of Texaco

choice and supply increasing volumes of hydrocarbons to meet world demand without destroying the environment for the next generation, he explained.

This was neither about public relations or 'applying green paint'. Progress was about responding to customer choice and it was related to listening to 'what people are asking for and then using existing skills and new technology to provide what they want at a reasonable cost'.

Sir John said that critics alleged that the industry could not keep pace with the challenges, 'that we can only cope with one issue at a time, that we can't simultaneously provide world class returns on capital and air fit for our children to breathe and the most complex and stimulating jobs available in any sector without exception. They're wrong'.

'the oil industry faces four fundamental challenges: costs, quality, reach and organisation' John Browne

does exist and which has influenced the views of our customers and our staff. No rational company can ignore the wishes and views of its customers.

'I know some fear that the environmental issue threatens the whole future of the industry. Some people seem to believe that to engage in serious debate with the environmental lobby represents a form of suicide. Such fear can be paralysing and ultimately will be selfdefeating because nothing will threaten the future of the industry more than ignoring reality. But I'm convinced that the fear itself is misplaced.' The industry could respond to legitimate environmental concerns, provide Peter Bijur, Chairman and Chief Executive of Texaco, opened dramatically by noting that his text was inspired by a book on the last days of Pompeii. 'My basic message is that I believe that we are living through the last days of the traditional oil company and its demise is related to the very topics of this conference: technology and development. I believe that the companies that transcend and prosper will be new corporate beings, new in outlook and new in purpose.'

Having asked an international team of 30 colleagues to ponder some of the issues facing the industry, and having distilled their views into three scenarios,



conference review

Bijur said that the 'official future' was the least plausible. Despite current financial difficulties, it anticipates a continuation of today's circumstances, namely, continuing global integration, sustained economic growth and in an increasing demand for oil. Technological change and environmental regulation promote fuel efficiency and alternative fuels but oil continues to dominate the transport market.

Bijur was unimpressed by the arguments for marginal, incremental change: history was not linear. He believed that parts of each of the three scenarios had a 'reasonable chance of occurring'.

Initially, he examined the company's access to 'its very lifeblood, oil itself. This declining access will not be caused by expropriation as in eras gone by but by a change in the nature of competition. We believe that host governments will gradually exert more control over their own natural resources. They will be more selective in the kinds of companies they invite in. While nations have long desired the ability to develop their own resources and for their own companies to gain the expertise to run the fields, we see this becoming a practical reality."

Innovative companies could emerge, offering the necessary expertise without insisting upon an ownership interest, he explained. Such organisations would also be able to link their client countries to consumer markets. Under such a scenario, the role of the upstream company as a producer would be eroded and 'the company that wins will be the company that reinvents itself as a solution provider. An oil company's value will shift from the value of its reserves to the value of its knowledge, the strength of its relationships and the integrity of its reputation.' Traditional oil companies that did not transform themselves would be reduced to trading oil or focusing downstream where fierce competition would soon accelerate consolidations.

In the second scenario, new companies would 'insert themselves' between the traditional supplier and the customer. A company in California, for example, collects estimates of small companies' energy demand, via the Internet, and then puts the business out for tender. French and UK hypermarkets had captured gasoline customers, relegating oil companies to bulk suppliers. Eventually, the distinction between oil, gas and electricity companies would blur as new competitors offered customers 'units of power' from a variety of sources.

Under the third scenario, technology and environmental concerns become a tremendous force for change which could come faster than expected, especially in the transportation sector.

The final word

The World Energy Council concluded this stimulating event by making six recommendations:

- Industry and government should strive to widen the energy supply base into cost-effective options.
- The accelerated development and use of renewable energy resources must be given high priority to allow the supply of commercial energy those who lack access.
- Nuclear power should play a major role in contributing to electricity provision and to combat global warming.
- Government and industry should 'assess the societal cost of a trend to larger, more energy-consumptive options' because environmental and infrastructure costs are mounting.
- Auto-oil partnerships should reduce local air pollution, especially in developing economies, and should promote the transfer of advanced fuel and automotive technologies to those countries.
- The energy industry must sustain its commitment to research and development with government support for activities related to fostering the public good.

THE INSTITUTE **OF PETROLEUM**

International Conference on

Dispute Resolution in the International Oil and Gas Industries

London: 4 December 1998

organised with the support of the UK Energy Lawyers Group



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Meeting of minds to answer prayers?

Until a year or so ago booming Asian energy demand meant that Central Asian production was seen as the key to oil industry success, but now low prices, a series of dry holes and the political and economic problems of building pipelines have taken the bloom off the Caspian rose, writes *Peter S Adam* from Washington DC.

Perplexed, the pashas of petroleum are gathering to ponder and plan. Aspects of, and circumstances surrounding, a pair of their recent gettogethers evidence how quickly surprising twists and turns bring contradictory tendencies in the petroleum industry to the surface, and how slippery oil can be.

The possible participation of US oil companies in Saudi upstream activity was purportedly Topic A at a meeting between Saudi Crown Prince Abdullah and representatives of major US oil companies at the McLean, Virginia, home of Prince Bandar, the Saudi Ambassador to the US, on 26 September 1998. While such a step could improve Saudi finances and enrich participating oil companies, it might also make the Kingdom's production decisions more complex and reduce the influence it has over petroleum prices. A subsequent and totally unrelated meeting, dubbed by the press as a 'World Summit of Oil,' that took place the weekend of 2-4 October 1998 between major petroleum company chief executives in Venice under the aegis of a Washington, DC-based consultancy, Petroleum Finance Co., raised the spectre of restoration of an oil cartel that could fix prices.

The New World disorder

Collectively though, there is really nothing the Sultans, Sahibs and Sheiks of petroleum can do in the face of looming uncertainties... and most of them are aware of this. But there is a lot that they have to sort out before adjusting their enterprises to the emerging realities of the new world disunexpectedly low order: prices; unsteady financial markets; lack of consensus regarding the dynamics of oil company size and configuration; lack of conceptual frameworks in which to analyse the world; disappointments in Russia and Central Asia; political uncertainties in the US; the prospect of a recession on the horizon; and at some point, probably in the not-too-distant future, a possible reassessment of Saudi Arabia's place in the oil scheme of things prompted by the ascent of a new ruler.

King Fahd continues to ail. And getting a feel for the state of US-Saudi affairs was probably what prompted Crown Prince Abdullah, the heir apparent to the Saudi throne's recent visit to the US. This reverse 'continental tour' of sorts necessary for rounding out the Crown Prince's seasoning for the Desert Kingdom's top post would not have been complete, of course, without special meetings with the major US oil companies, the Aramco four - Exxon, Mobil, Chevron and Texaco - and lesser majors Philips, Arco and Conoco which have, since the discovery of oil in the Kingdom, been at the nexus of Saudi-American relations.

The Crown Prince's discussion with the US oil company executives at the home of Prince Bandar was, in the words of Lucio Noto, President of Mobil, about the 'the sharing of ideas,' presumably those pertaining to the terms under which the US oil corporations have access to Saudi crude. Financial considerations are seen as bringing the Saudis around on this issue which has been at the top of the companies' wish list for guite some time.

According to one jaded observer of US-Middle Eastern affairs, the Crown Prince's overture to the oil companies was merely a gambit in a carefully orchestrated 'charm offensive' which brought the Crown Prince to the US not only to learn, but to engage in some adept and discreet politicking.

The Saudis have found the recent political developments here in Washington, in conjunction with jittery world financial markets, disquieting... who could blame them? And the Kingdom is concerned that as it cedes share of the US petroleum market to others, principally Venezuela, its influence here will wane as well. US oil company support for Saudi is crucial here, and the Prince's overture ensures that they'll see to it that the Kingdom does not disappear from policy makers' radar screens.

The prospect of being let back into the Kingdom reminds the oil companies, many of which have been focusing a great deal of attention away from the Arabian Gulf and towards the newly opened up countries of Central Asia, which side their bread is buttered on, long-term. And they're likely to need no further inducement for them to help ensure the US supports Saudi aims, chief among them ensuring the continuity of the special relationship the Kingdom enjoys with the US in which in exchange for Saudi assurances that the world, and the US, enjoy access to plentiful supplies of crude, the US guarantees Saudi Arabia's, and its ruling family's, security.

Who's schmoozing who?

It was the importance of the US role as guarantor of Saudi's security that prompted the Crown Prince to take steps to address his 'image problem' there. Abdullah is widely viewed in Washington as 'more Islamic' than his sibling, King Fahd, meaning that at best the Crown Prince would somehow be more demanding vis-a-vis the US and the US oil companies, and at worst he'd be a fundamentalist in the mould of those that governed Iran before their revolutionary fervour spent itself. But the Crown Prince schmoozed like a pro, and Washington found this reassuring. The US is confident now it can do business with him.

The occasion of the Prince's visits also provided the opportunity for another official, this one American, to extend his education too. Secretary of Energy William Richardson attended the Prince meeting chez Bandar. Traditionally, this sort of gathering has fallen under the purview of the US Department of State, not Energy. But Richardson, who was formerly US Ambassador to the UN appears at this point, unlike his counterpart at the State Department, headed for greater things in US national politics. (Richardson, a Democratic stalwart whose mother is of Latin extraction, speaks Spanish fluently and is thought to be a contender for the slot of Vice-President in 2000.)

Concerns that anti-trust authorities would look askance at any discussion of oil prices precluded representatives of Shell and BP from attending the 'Summit of World Oil,' participants of which included the heads of Saudi Aramco and Statoil, presently the world's two largest crude exporters. Press reports had hinted strongly that the meeting's purpose was to provide a forum for discussing the mechanics of fixing prices. But the intent of the meeting's sponsor, the Petroleum Finance Co, was far less ambitious: to provide a setting for a relaxed, general and informal (off-the-record) discussion of common issues oil industry participants face.

At its outset, the consultancy distributed legal guidelines specifying what could and couldn't be discussed, as well as an agenda that included topics even the most ardent trust-buster would be hard pressed to find fault with: industry restructuring; changes in technology, oil geopolitics, and the role of international oil and gas industry in modern society. Still, sceptics weren't convinced. At a press conference following the meeting, Eni's President Franc Bernabe was asked if price fixing or price influencing came up. 'There is no way anybody can influence prices,' he said. 'The days when it could be are long gone, for oil and everyone else.' (And if corporations could do it, they certainly wouldn't at public meetings.)

The end of leisure

As Nobel Laureate, Paul Samuelson, noted in a recent interview, US industry has, across the board, relinquished

what he terms the 'leisure of oligopoly'. What he meant was that at one time large sectors of the US economy were less than competitive and the fact that they could influence prices was allowed, if not explicitly acknowledged by, Washington DC. The trade-off was that the big companies could not stiff labour, or lower and middle management. This was especially true for oil where the US State Department provided support for a US-dominated oil cartel, which the European countries tolerated because their companies, TOTAL, BP and Shell had stakes in arrangements such as the 'As-Is' Agreement negotiated at Achnacarry Castle in Scotland in 1928 between the then-Seven Sisters. [This effectively priced all crude as though it had originated from Texas and also defined company spheres of interest - Ed]

But a decade of deregulation and privatisation has left major industries subject to the vagaries of the market about which businessmen always are enthused about, though which they spend an inordinate amount of time trying to control. So now oil is just like telecommunications, financial services, transport, and all the other natural resource industries. And they're all up, in the words of the noted economist Henry Kaufman, for another 'furious round of consolidation'

While there is really nothing petroleum companies can do to achieve the pre-eminence they come to feel is their due, they can take some cold comfort from recent equity market action. Shares of major high flyers such as Coke, Procter and Gamble, and Gillette whose prospects were seen as hurt by worldwide economic turmoil have fallen more precipitously than the overall market. Oil shares on the other hand, have resisted the across-the board sell-off in equities that started last summer. And smaller oil and gas issues have fared no worse than their non-oil counterparts.

Size isn't everything

Without some sort of non-market pricing arrangement, be it Achnacarry or Opec, big oil ceases to be so big. And re-entry of the foreign oil companies into Saudi, which answers their dreams, may further weaken the already weak price controlling mechanism oil has. This could offset the advantages US companies might derive from favorable equity terms governing the sinking of their drill bits into Saudi sands. The machinations of petro-geopolitics may well lead to US oil companies having their dreams come true. But more tears are shed, over answered prayers, than for those that go unanswered.



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Canada oil and gas

Ambitious output plans appear realistic

Canada produces 3.4% of the world's oil, has eight years of proven conventional oil supply in the Western Sedimentary Basin (Alberta) and about 26 years of remaining potential. However, the Canadian **Government's ambitious** plans for future oil and gas production look realistic on the basis of some recent achievements by oil and gas exploration and production companies, writes Priscilla Ross.

A ccording to Canada's Energy Outlook 1996–2020 oil production (excluding oil sands) is forecast to increase 20% from 1.96mn b/d in 1995 to a minimum of 2.35mn b/d in 2010 and to remain at that level to 2020. Recent preliminary forecasts suggest that total oil production (including oil sands production) could increase to 3.2mn b/d on a more optimistic view of oil sands supply, following announcements of expansions by major producers such as Syncrude, Suncor and Shell.

The Canadian authorities anticipate that technological advances will lower finding and development costs for new reserves and increase recovery factors from existing reservoirs. For the outlook period, oil replacement costs are assumed to decline from the current level of C\$10.80/b to C\$8.10/b by 2002, while natural gas replacement costs are expected to remain at the current level of 65 cents/mn cf.

Conventional oil production is predominantly from the Western Sedimentary Basin and is projected to increase slightly by 2000 and then decline at an annual rate of under 1% a year.

Output from oil sands is projected to double to 850,000 b/d by 2020 and to account for 36% of Canada's total oil production compared to 20% currently.

Canada's frontier or offshore contribution will increase from 20,000 b/d in 1995 to 300,000 b/d by 2010 remaining at this level until 2020 and accounting for 12% of Canada's total oil production.

Imports are projected to increase from 680,000 b/d in 1990 to 1.03mn b/d in 2020, an increase of 50%. By 2020 imports will account for about 60% of domestic consumption. Exports will also grow sharply to account for over 70% of production, including exports of waxy crude from Hibernia and Terra Nova off the East Coast of Canada. Further expansion in oil sands production means that Canada will remain a net exporter of oil over the forecast period despite these massive changes in gross trade flows.

Trade surplus

Some 83% of Canada's natural gas and 81% of its oil originates from Alberta, where the famous Leduc oil discovery by Imperial Oil in 1947 really opened up the province.

The oil prone Leduc properties have once again become newsworthy as Imperial Oil sold almost 1,900 boe/d of production to Canadian independent Probe Exploration for C\$47mn, including infrastructure worth C\$12mn.

Steve Gibson, Probe's President and Chief Executive told Petroleum Review that the Leduc assets acquired from Imperial Oil still look prospective. Probe essentially paid C\$27mn for the Leduc (Devonian D3) and C\$20mn for the Ellerslie (lower Cretaceous Mannville). With the thin Nisku (D2) reservoir regarded as being almost depleted, no value was placed on identified reserves in other formations, which are intermittently productive across the acreage.

Gibson explained that the recovery factor for the D-3 zone was 65% and there were an estimated 400mn barrels of oil in place of which 260mn barrels have been recovered. For the D-2 zone with a 35% recovery factor 85mn barrels have been recovered.

Gibson believes: 'There is remaining potential for 100mn barrels with today's technology and using nothing exotic'. Imperial sold this Leduc acreage because for a company the size of Imperial, 100mn barrels is not exciting but for a junior it can be a company maker.

Worthwhile acquisition

The purchase has proved worthwhile for Probe, which acquired logs of the 1950s vintage and some 1,200 existing well bores, as it has been able to improve the economics by recompleting wells rather than redrilling. Probe has found that currently to drill, case and complete a well costs C\$500,000 while, on the newly acquired Leduc properties, recompletion is costing C\$50,000. In addition there are opportunities for horizontal drilling and additional hydrocarbons from deeper zones to a depth of 1,500 metres.

Some 200 of the well bores have already been recompleted and by end 1998 the schedule is to recomplete another 100.

Probe claims that it bought its first Imperial Leduc properties, in August 1997, on the basis that there were 2mn to 2.5mn barrels of remaining recoverable oil. A year later Probe puts recoverable reserves at 31.3mn barrels. Drilling in 1998 added 19.5mn barrels of recoverable reserves from the Sparky and Wabamun formations. An independent reserve estimate of these new discoveries has been completed effective of 30 June 1998.

Gibson claimed 'the original recoverable reserves were based on a very conservative view of a 35% recovery factor and over the next five years as reserves are upgraded from 35% some 75mn to 100mn barrels could be recognised and booked'.

He also pointed out that the average

Year	Oil (mn b/d)	Gas (bn cm)		
1987	1.91	78.6		
1988	2.00	90.8		
1989	1.96	96.7		
1990	1.97	99.3		
1991	1.98	105.4		
1992	2.06	116.1		
1993	2.19	125.5		
1994	2.28	135.9		
1995	2.40	148.2		
1996	2.48	153.6		
1997	2.56	156.8		

Source: BP Statistical Review, 1998

Canadian oil and gas production 1987–1997

costs for Canadian E&P companies for FDA (finding, development and acquisition) were C\$7.13/b whereas Probe's prospective FDA costs on its Leduc properties were so far C\$2.50/b to C\$3.50/b.

He added that the Leduc properties were purchased from Imperial for C\$18/b for reserves in the ground and subsequent reserve additions have been costed at C\$3.77/b.

Courage costings

Another Canadian junior, Courage Energy, which discovered gas in an area adjoining Probe's Leduc properties, reports average finding and development costs of C\$3.94/boe on its 1997 exploration successes covering properties in Alhambra, Alberta, Fiskerton onshore, UK, Fort St John, British Columbia and Leduc, Alberta.

At Leduc, Courage (100% interest) has negotiated access to a sour gas plant for its 1997 discovery. Construction of a pipeline commences in October 1998.

However, for the first six months of 1998 to end-June Courage reports that commodity prices received continue to be very weak and remain one of the company's biggest short-term concerns. Product prices received at the well-head were C\$17/b for light oil and NGL, 31% down on the same period in 1997 and C\$2.20/mn cf for natural gas, an 8% fall. Operating costs were reduced 14% to C\$5.11/boe.

Shifting exploration focus

Canada's hydrocarbon exploration has previously centred on the Western Sedimentary Basin but the majors are now shifting their focus to natural gas and heavy oil in this region. Conventional oil exploration is increasingly focused on the Eastern Canadian offshore play for the oil majors with some participation for juniors in joint ventures.

Several discoveries have been made in East Canada and its reserve potential is regarded as substantial by the industry (see *Petroleum Review*, July 1998). The Mobil operated Hibernia field is the main oil project on the East Coast with recoverable reserves of 666mn barrels (government estimate). Production came onstream in 1997 and is scheduled to peak at 135,000 b/d in 2000, hold this plateau until 2005 and then decline.

The Cohasset/Panuke oil project lies offshore Nova Scotia, close to the Sable Gas development (see below and *Petroleum Review*, October 1998. Cohasset began producing in 1993, and in 1995 averaged 22,000 b/d, but is now nearing the end of its commercial life.

The Terra Nova oil field close by is being brought onstream for first production in late 2000/2001 with a peak rate in 2003 of 115,000 b/d, and currently has a reserve estimate of 400mn barrels (see *Petroleum Review*, September 1998).

As production from Hibernia and Terra Nova starts to decline, other offshore fields such as Hebron (200mn barrels reserves), White Rose (240mn barrels) and Ben Nevis are to be developed to maintain the overall offshore output at 200mn b/d to 300mn b/d according to the Canadian Government.

The Sable Island project, a natural gas and natural gas liquids development is slated to begin production in 1999. Average annual output is estimated at 460mn cf/d. Sable is a 3.5tn cf project but the reserves of the basin are closer to 6tn cf (see Petroleum Review, October 1998).

The viability of this project is largely based on gas markets in the US Northeast. A new gas pipeline will be required to bring the gas to markets in Eastern Canada and the US Northeast. Regulators have approved this pipeline, known as Maritimes and Northeast.

Anticosti Island farm-in

Corridor Resources, a junior Canadian oil and gas exploration company, announced in December 1997 that Shell Canada would spend up to C\$20mn to drill four exploration wells and conduct 500 km of seismic on Anticosti Island to earn an interest in Corridor's Anticosti licences. Beyond Anticosti Island there are several other areas of Quebec, which are attracting the interest of petroleum including the explorers. Ouebec Lowlands, the Gaspe Peninsula, the Magdalen Islands and offshore in the Gulf of St Lawrence. Since 1863, there have been 120 wells drilled in the Gaspe region including seven on Anticosti Island.

In 1995, exploration permits were issued on 5,000 sq km in the Quebec province. The number quadrupled in 1996, and in 1997 permits were issued to explore a further 40,000 sq km.

In August 1998 the Jupiter exploration well on Anticosti encountered shows of natural gas in several intervals but no apparent commercial quantities of hydrocarbons. The well is the second of two wells drilled this summer as part of a four well farm-in by Shell Canada and Encal.

Corridor's interest in exploring Anticosti was initiated by shows of oil and/or gas that had been reported in seven wells drilled by Imperial Oil between 1963 and 1970. According to modern seismic obtained by Corridor in 1996 and 1997, there are promising structures with the potential for large volumes of hydrocarbons.

Another factor in Anticosti's favour is that the drilling is onshore and a well costs \$3mn onshore whereas an offshore well costs around \$20mn. According to Norm Miller, President of Corridor, Eastern Canada is a serious play because it has not been exposed to the same extent to modern exploration technology in the same way as Western Canada.

Corridor spent \$2mn exploring Anticosti Island partly in response to the success of the Mobil Oil Canada, PanCanadian Petroleum and Hunt Oil Co joint venture, which recently discovered oil in similar geology in western Newfoundland.

Remaining reserves

In overall terms Canada has about eight years of proven conventional oil reserves in the Western Sedimentary Basin and about 26 years of potential reserves remaining.

Remaining proved natural gas reserves in the Western Sedimentary Basin are 61tn cf, or more than 11 years supply, while potential reserves equate to 40 years of supply at current rates of production.

The Canadian government assumes that the ratio of investment to cashflow (reinvestment ratio) will decline from 118% in 1994 to 82% in 2006 and will remain at this level to 2020.

Investment levels are expected to run at C\$10bn to C\$11bn (\$1995 money) over the forecast period. In 1995 conventional oil related activity represented 57% of total investment. Oil related activity is expected to remain strong in the short-term reflecting continued plentiful natural gas supplies and low natural gas prices.

As the natural gas market tightens up however, conventional oil related activity is expected to fall to 43% of total investment by 2010 and to remain at that level until 2020.

The increase in natural gas exports should contribute more significantly to Canada's energy trade surplus. Earnings from natural gas exports were C\$8.7bn in 1997. Assuming an increase in natural gas exports and stable prices, revenues could touch \$9.5bn (in 1995 money) by 2020.

Phosphorus-based Valvemaster promoted for UK market

Leaded petrol is being phased out across Europe and will no longer be available on UK forecourts from 1 January 2000. To date, potassium and sodium additives have been used in countries in Europe that have already switched to unleaded. However one company, Associated Octel is promoting a phosphorus-based product— Valvemaster—for the UK market next year.

ost cars built before the mid-1980s and many built prior to 1990, were designed to run on leaded gasoline. The engines of such vehicles tend to have soft exhaust valve seats, which are protected by the leaded fuel – unlike more modern cars fitted with hard valve seats.

The proportion of the vehicle fleet with soft valve seats varies across Europe. It is already low in Scandinavia, Germany, Austria and the Netherlands, countries that have already phased out leaded grades.

In contrast, the rest of Europe has a significant number of vehicles requiring valve seat protection. One estimate for the UK (See *Petroleum Review*, November 1997) is that by 2000 around 4mn cars will be using leaded fuel of which 1.5mn will need valve seat protection.

With leaded fuel due to be phased out across Europe from 1 January 2000, many companies have been looking at alternatives for vehicles with soft valve seats which are prone to valve seat recession (VSR).

What is VSR?

Exhaust valve seat recession occurs when an exhaust valve impacts upon a soft cast iron valve seat at engine operating temperatures. The mechanism consists of:

- Localised welding of valve to seat resulting in transfer of material from seat to valve when the valve reopens, followed by oxidation of this material to iron oxide.
- Accumulation of these iron oxide nodules on the valve, which stand slightly proud of the valve face and are harder than the iron valve seat.

 Abrasion of the valve seat by the nodules on the valve (acting as a grinding wheel) which is exacerbated by valve rotation.

Refractory lead salts, such as oxide, sulfate and halides, which are associated with leaded fuel, act as solid lubricants preventing contact between the valve and valve seat. Unleaded fuel does not provide such protection and alternative protection is required.

Two different approaches

The two different approaches to providing this alternative protection without any engine modification are;

- lead replacement petrol with a VSR protection additive already added or;
- an aftermarket additive in a packaged form to be added to unleaded petrol.

Such additives act as a solid lubricant between the exhaust valve and the exhaust valve seat, much in the same way that lead in leaded gasoline did.

Associated Octel is promoting its product Valvemaster as a solution for both approaches with Valvemaster either sold in bulk to the oil companies for preblending into lead replacement petrol or sold in package forms to be added to a vehicle's tank by motorists when filling up with unleaded petrol.

Valvemaster alternative

The company's Valvemaster lead replacement additive is a phosphorus-based product originally developed by Du Pont in the US as a carburettor detergent. It was subsequently discovered to offer excellent VSR protection and has been used to treat many billions of litres of petrol. Most recently Valvemaster was successfully marketed in New Zealand and adopted by Shell, BP, Mobil, and Caltex when leaded petrol was removed in 1996.

Associated Octel claims that independent engine laboratory tests have proven that phosphorus-based Valvemaster provides superior performance to sodium or potassium-based lead substitutes and a comparable protection to lead under all normal driving conditions (see **Figures 1 and 2**). One test is said to show that four times as much sodium-based product was required to match the protection offered by Valvemaster. It is apparently the only product to have passed the Australian Standard for lead substitutes AS 4430.1-1996. Valvemaster is also claimed to be the only VSR protection additive to have





NEWTechnology



Pre-measured applicator

US Environmental Protection Agency registration.

The Valvemaster lead substitute is to be made available in a pre-measured applicator for single use only (see above). This injector system was originally developed for the New Zealand market and has been well received there. One application of the product is recommended for every 20 litres of unleaded petrol. For smaller treatments of less than 10 litres, a 400mldispenser bottle with a built-in measure will also be available. It is envisaged that the product in aftermarket form will cost around 3 pence to 5 pence per litre of petrol treated. The pre-measured doses are suitable for all 'normal' driving conditions including more 'severe' operations such as motorway driving and towing.

Alternatively, Valvemaster can be preblended into lead replacement petrol.

The best technical choice

Octel in a joint marketing effort with APS Chemicals of New Zealand is promoting Valvemaster as the best technical choice for the UK market given the high number of older vehicles with soft valve seats many of which are known to be particularly susceptible to VSR.

Octel believes that the New Zealand example, where they have many older UK makes is a better model than Germany and Scandinavia which opted for potassium and sodium additives. In those countries, they introduced alloy heads which are not at risk of VSR many years earlier than the UK.

For more information contact: Megan Harding, Associated Octel on Tel: +44 (0)171 647 2815 Fax: +44 (0)171 647 2800

Versatile Cats for rough-terrain transport



Textron's new Cushman RangeCat™ work vehicle has been designed to carry oil and gas industry personnel and cargo over rough-terrain. Available with or without tracks, the eight-wheel-drive vehicle features durable welded-steel construction and a certified rollover protection structure (ROPS). Three models are offered:

- The Cushman RangeCat 775 is powered by a 25-hp, air-cooled Kohler gas engine and has a maximum speed of 15 mph. It can handle up to 1,175 lbs of cargo and passengers. A double-roller-chain transmission, dual hydraulic disk brakes and caliper brake steering are standard while reinforced rubber tracks with steel cross bars and an all-weather canopy are optional.
- The Cushman RangeCat 1100 is powered by a 46-hp, liquid-cooled Kobuta turbo diesel engine. High-flotation

tyres and 1,500-lb rated capacity hydraulically-released parking brakes are fitted as standard. Specialised joystick-controlled hydrostatic steering provides enhanced manoeuvrability for operation on small, winding paths and tight areas. Optional features include heavy-duty mud tracks, snow tracks and all-weather canopy.

The Cushman RangeCat 1700 is powered bu a 42-hp, liquid-cooled Kubota turbo diesel engine and has a rated capacity of 2,300 lbs. The vehicle cab can accommodate up to three adult passengers and is equipped with duellever-controlled steering. Options include mud tracks, snow tracks and all-weather canopy.

Tel: +1 414 637 6711 Fax: +1 414 637 4465 e-mail: kcuculi@jacobsen.textron.com

Wireline protection

The Expro Group has developed a low maintenance sealing mechanism for maintaining the integrity of wirelines used in gas wells and high pressure control environments. The EX-Triseal system is a compact flowtube-based design similar to a conventional braided line grease control system. The system is suitable for use with super alloy wires, which are required in highly corrosive environments, as well as braided wires. It is claimed to have extended the working life of super alloy wire by up to five times in some cases.

The new system has been developed specifically for the Group's Venezuelan operations in Maturin where traditional pressure control systems are not effective enough to withstand prolonged wireline work. 'Conventional stuffing boxes were found to pare super alloy wires due to the force with which the packings have to grip the wire in order to contain the well fluids,' explains the company. 'This reduction in wire diameter combined with very high local stresses as the wire is dragged through the packings, causes premature and unpredictable breakages.'

The EX-Triseal system is capable of working in environments of up to 15,000 psi while avoiding the use of elastomers. High pressure grease at well head pressure $\pm 20\%$ is injected into flow tubes which run through in order to control and contain the well pressure. 'There are effectively no stresses applied to the wire as it passes through this pressure control system, so the wear on the wire is dramatically reduced,' says the company. 'Inhibitors can be mixed with the grease as long as they do not adversely affect its viscosity.'

Tel: +44 (0)1224 214600 Fax: +44 (0)1224 770295

NEWTechnology

Cost-effective liquid level measurement

A new level transmitter designed for use in demanding process conditions has recently been launched by Magnetrol International. Said to be unaffected by process variables, the Eclipse Transmitter is a two-wire, loop-powered, 24 VDC liquid level device featuring HART® communications.

The device is based on guided wave radar (GWR) which combines the two principles of time domain reflectometry (TDR) and equivalent time sampling (ETS). Using pulses of electromagnetic energy, TDR drives Eclipse's electronic distancemeasurement technology. ETS captures



these signals in real time (nanoseconds) and reconstructs them in equivalent time (milliseconds) to make TDR level measurement a practical and cost-effective reality,' explains the manufacturer.

According to the company, such an operating system enables the radar signals to travel within a waveguide that is physically in contact with the media which, in turn, minimises loss of signal.

Process variables such as foam, vapour, turbulence, agitation, low or changing dielectrics or shifting densities, that inhibit the performance and accuracy of existing level measurement technologies, are claimed not to produce reading inaccuracies with the Eclipse system. In addition, unlike some conventional level measurement equipment, Eclipse does not require a level change in order to be calibrated. This means that the unit can be set up, without level simulation tools, in the comfort of a workshop, ready to be installed on the tank in minutes, explains the company.

A dual-compartment design – tilted at an angle of 45° for ease of access when mounted on top of the probe – protects the electronics which are located in one compartment, their connection terminals located in the other compartment. A quick-disconnect, high frequency coupling allows the housing to be quickly attached to the probe. The housing can also be rotated by 360° to provide optimum wiring and viewing angle.

Two probes are offered and the system can operate in a wide range of liquids from light hydrocarbons to water-based slurries at temperatures of up to 200°C, and pressures of up to 50 bar.

Tel: +44 (0)1444 871313 Fax: +44 (0)1444 871317

Pipeline fittings

PetroTechnik's new range of polyethylene fusion fittings for its UPP underground pipeline system for service stations feature integral welding joints which speed on-site preparation time. Such a design is also said to eliminate the need for separate welding fittings, thereby saving material costs.

Tel: +44 (0)1449 722822 Fax: +44 (0)1449 721821



Pipeline interiors caught on camera



French company Hytec has developed a TV pipeline inspection system designed for the close internal examination of gas, water and sewage pipes with diameters ranging from 20 to 80 mm. The TVPM system comprises a miniature TV camera mounted on a flexible yet tough cable, which is driven by a motorised double-sheave assembly.

The new system is claimed to be twice as fast and more efficient than conventional systems using cameras on motorised skids over a range of 150 metres.

In addition, because the power source is located outside the pipe, it has the advantage of not being restricted in size and not suffering from chemical or mechanical damage from inside the pipe.

The black and white camera measures 25 mm in diameter, while the colour camera measures 40 mm, both of which are small enough to allow the system to be used in narrow pipes that are inaccessible to traditional skidmounted systems. The TVPM system is also said to be unaffected by propulsion problems suffered by traditional wheelmounted and track-mounted cameras as a result of obstruction or loss of grip on dirty or greasy pipe walls.

The new system can also support Type 1 and Type 2 explosion-proof cameras for internal inspection of gas supply pipes in explosive environments such as the petrochemical or mining industries.

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



Floating Production and Storage Vessels – Design Analysis and Operational Issues*

(Bentham Press, Dilke House, Malet Street, London WC1E 7JN, UK). ISBN 1874612 26 9. 430 pages. Price: £180 (UK), £225 (rest of world).

This handbook provides an overview of the basic technologies underlying the use of FPSOs including vessel hydrostatics, hydrodynamics, mooring, turret and riser systems, hydrocarbon processing, crude handling and operational aspects. It presents the latest techniques being used in each of these areas and outlines recent offshore experience.

Sulphur Dioxide Emissions from Oil Refineries and Combustion of Oil Products in Western Europe and Hungary (1995)*

(CONCAWE, Madouplein 1, 1210 Brussels, Belgium). 30 pages.

This report (No. 3/98) examines the sulphur balances of European oil refineries and the sulphur contents of oil products for the year 1995. Comparisons are made with data from the 1992 CONCAWE study. Data are included on the distribution of sulphur levels in the major product groups to allow assessment of the impact of regulatory measures. Compared with 1992, there was a significant decrease in sulphur in combustion products with a corresponding increase in sulphur recovered by refineries.

The Upstream Oil and Gas Industry into the 21st Century

Michael R Smith (FT Energy, Maple House, 149 Tottenham Court Road, London W1P 9LL, UK). ISBN 1 85334 860 0. 125 pages. Price: £395 (\$632).

This report addresses the key issues facing today's international upstream oil and gas industry. It describes and analyses current and future trends, and discusses the main drivers behind the changes. Each chapter is illustrated with case studies. Topics covered include opportunities and challenges, world production and reserves, exploration technology, engineering technology, unexplored frontiers, new investment strategies, environmental influences and pressures from alternative fuels.

India Power Projects: Regulation, Policy and Finance*

Dimple Sahi Bath (Available from Asia Law of Practice, 5/F Printing House, 6 Duddell Street, Central, Hong Kong. Fax: +852 2521 6110 or 852 2869 0504). Volume 1: ISBN 962 360 003 8, Volume 2: ISBN 962 936 004 7. Volume 1: 418 pages. Volume 2: 592 pages. Price: \$195 per volume.

This two-volume publication provides a comprehensive study of the structure of India's electricity sector, together with relevant government policy and investor concerns. The two volumes comprise 20 chapters covering the political, legal and economic liberalisation of the Indian infrastructure industry, an in-depth commentary on the power policy, clearances, guarantees, sources of energy, power generation options, transmission and distribution functions and the financing of power projects. Project risks and project documentation, land and environmental considerations, renewable energy sources, user analysis and comparisons with power industries of other southeast Asian countries are also included. The publication also features case studies, a study of the power industry in selected states, statistics, tables, charts and a glossary. The appendices include useful information on Indian corporate and commercial law and procedures.

The Gulf of Mexico – Revival and Opportunity in the Oil Industry

Judith Gurney (FT Energy, Maple House, 149 Tottenham Court Road, London W1P 9LL, UK). ISBN 1 85334 798 1. 180 pages. Price: £395 (\$632).

Written by Judith Gurney, a regular contributor to *Petroleum Review*, this report provides detailed comment and analysis of the oil industry in the Gulf of Mexico, through the full life cycle of exploration to abandonment of production facilities and clean-up of the seabed. It discusses the new technologies which lie behind the recent resurgence in production and their advantages and shortcomings in exploring for deepsea and sub-salt reserves. The report also highlights the investment possibilities and potential opportunities for oil companies and contractors, outlining the known and estimated reserves in the area, the region's production history, current exploration activities, the major and independent players involved, royalty and tax terms, and the federal and state safety and environmental regulations that apply.

* Available from IP Library



The IP Library continues to update both its bookshelves and on-line services in its drive to become the first point of contact for those seeking information about the international oil and gas industry, upstream and downstream.

Library Catalogues

- The IP Library Catalogue is now available on-line from our website at www.petroleum.co.uk Completed mid-October, the catalogue allows users to search for items by title, author, keyword and/or publisher. There is also a facility for IP members to order items for loan from the library.
- The IP Periodicals Catalogue can also be found on the website, while the International Petroleum Abstracts database should also come online, again through the website, to subscribers before the end of the year. This will allow users to search journal articles by keyword or author and order the full text from the library.

As usual, a number of new publications covering a wide range of petroleum industry related topics have been added to the library stock in the last month. Among them are:

- Adams, A.E. and MacKenzie, W.S. A Colour Atlas of Carbonate Sediments and Rocks Under the Microscope.
- Jenkins, Gilbert. Derivatives Trading by Oil Companies and Airlines: A Survey of the 1997 and 1998 Annual Reports with Critical Commentary.
- Jenkins, Gilbert. Aviation Fuels Business Worldwide 1998.
- Newbery, D. M. Fair Payment from Road-Users: A Review of the Evidence on Social and Environmental Costs.
- Control Risks Group, Outlook 98: Business, Politics, Security.

New library staff

A new Information Assistant, Octavia Leigh, has joined the library staff on a year's graduate training. Those with queries about working offshore and educational material should contact her on +44 (0)171 467 7116.

VENTForthcoming

NOVEMBER

4-5

Bruges

13th Annual European Autumn Gas Conference: Reshaping European Gas Trade Details: Overview Gas Conferences, UK Tel: +44 (0)171 650 1430

Fax: +44 (0)171 650 1431

4 November

London: Microbially Enhanced **Oil Recovery Details: Pauline Ashby**, The Institute of Petroleum

4-6

London Caspian Oil and Gas Summit Details: CW Associates, UK Tel: +44 (0)171 704 6161 Fax: +44 (0)171 704 8440

10 Loughborough, UK Programmable Equipment in Safety **Related Applications Seminar** Details: Keith Young, The Institution of Gas Engineers, UK Tel: +44 (0)171 636 6603 Fax: +44 (0)171 636 6602

10-11

London Algeria, Libya and Egypt Oil and Gas Summit Details: IBC Global Conferences, UK Tel: +44 (0)171 453 5491 Fax: +44 (0)171 636 6858

10-12 Las Vegas Envirosoft '98 Details: Wessex Institute of Technology, UK Tel: +44 (0)1703 293223 Fax: +44 (0)1703 292853

11-12

Seismic '98 Details: Rebecca Smith, Energy Logistics International Ltd, UK Tel: +44 (0)1628 671717 Fax: +44 (0)1628 671720

12-13 November London: The Future of Transportation Fuel Quality in Europe **Details: Pauline Ashby,** The Institute of Petroleum

12-13

Global Gas '98 **Details: Global Pacific & Partners** (Pty) Ltd, Houston, Texas, US Tel: +1 281 597 9578 Fax: +1 281 597 9589

12-13

Gas-to-Liquids World Forum **Details: IBC UK Conferences** Tel: +44 (0)171 453 5491 Fax: +44 (0)171 636 6858

16-17

London Gas-to-Liquids: Clean Fuels Strategy Details: Ben Willbond, SMi, UK Tel: +44 (0)171 252 1199 Fax: +44 (0)171 252 2272

16-17

London Individual Advancements Towards **Developing Smart Reservoirs** Details: Ben Willbond, SMi, UK Tel: +44 (0)171 252 1199 Fax: +44 (0)171 252 2272

16-18

Berlin European Refining Technology Conference (ERTC) Details: GTF Conferences, UK Tel: +44 (0)1737 830068 Fax: +44 (0)1737 830036

17

Aberdeen, UK Value and Profit from Supply Chain Culture Details: Crine Network, UK Tel: +44 (0)1527 518777 Fax: +44 (0)1527 518718

17-19

Amsterdam Oil-Gas- & PetroTech Details: Amsterdam RAI Tel: +31 (0)20 549 1212 Fax: +31 (0)20 644 5059

18-19

London

Rome

Aberdeen, UK Subsea Geotechnics Details: Penny Richards, IBC UK Conferences Tel: +44 (0)171 453 5491 Fax: +44 (0)171 636 6858

18-19 London Petroleum Trading and International Law Details: Abacus International, UK Tel: +44 (0)1245 328340 Fax: +44 (0)1245 323429

19 November London: IFEG Conference: Information Control – the Key to Success in the Energy Industries **Details: Catherine Pope,** The Institute of Petroleum

19-20

London European and North African LPG Details: Ben Willbond, SMi, UK Tel: +44 (0)171 252 1199 Fax: +44 (0)171 252 2272

London

23-24

London

Y2K Continuity Planning in Oil and Gas Details: EuroForum, UK Tel: +44 (0)171 878 6886 Fax: +44 (0)171 878 6885

23-24

London

Caspian: Focus on Azerbaijan - an Update on Developments in the Oil and Gas Industries, On and Offshore **Details: IBC UK Conferences** Tel: +44 (0)171 637 4383 Fax: +44 (0)171 631 3214

24-27 Shanghai

Petrochem 98, International Exhibition on Petrochemical Industries Details: Top Repute co. Ltd. Tel: +852 2851 8603 Fax: +852 2851 8637 e-mail: toprepute@hkabc.net

24-28

Milan, Italy OilGas'98 - 21st Inerpetrol Production Transport Refining Distribution Chemical Exhibition Tel: +39 02 669 1600 Fax: +39 02 669 7169

25-26

London

Oil and Gas Agreements Details: Langham Oil Conferences, UK Tel: +44 (0)1509 881022 Fax: +44 (0)1509 881576 e-mail: enquiries@langham.co.uk

25-26

London Integrated Risk Management in Oil and Gas Details: EuroForum, UK Tel: +44 (0)171 878 6886 Fax: +44 (0)171 878 6885

29-2 Dec

Gastech 98. The 18th International LNG/LPG/Natural Gas Conference & Exhibition Details: Gastech 98 Secretariat Tel: +44 (0)185 454533 Fax: +44 (0)185 454578

30-1 Dec

Paris

Dubai

Iraq Oil and Gas Post-Sanctions Details: CW Associates, UK Tel: +44 (0)171 704 6161 Fax: +44 (0)171 704 8440 e-mail: CW_Assoc@compuserve.com

DECEMBER

London

1-3 Petex 98 - Scaling the peaks, The PESGB's Conference & Exhibition **Details: Petex Office** Tel: +44 (0)171 495 6800 Fax: +44 (0)171 495 7808 e-mail: pesgb@pesgb.demon.co.uk

Membership News

NEW MEMBERS

Mr C Aberg, Sweden Mr S A Alexander, Netherlands Mr N R Barclay, Sumitomo Bank Dr R W Bentley, Reading Mr J W Blanchard, Rudall Blanchard Associates Limited Mr S E Bowers, Chemitrade Limited Mr J Conroy, Centre of Ecology & Hydrology Mr J M R Eagle, Guildford Dr A J P Fletcher, Bristol Mr J C Grainger, Halesowen Ms A-M Greenaway, Ginsters Limited Mr G Groeneveld , Saybolt Saudi Arabia Dr C-P Haelsig, Fluor Daniel BV Mr R D M Harris, Flightline Support Limited Mr T W Harris, Cornwall Mr K Hartono, Fareham Mr C E Henderson, Total Oil Marine plc Mr S Hennessy, Simon Management Mr I E Hogg, South Africa Mr M Hoye, Warner Lewis Mr D C Hughes, Valuation Office Agency Mr C Jones, W S Atkins Science & Technology Mr A Kamalati, West Hampstead Mr D M Kinnersley, PricewaterhouseCoopers Mr H Loechle, Warner Lewis Mr D J MacBean, PricewaterhouseCoopers Mr D Macey, Ashford Mr J A C Macrae, Braemar Energy Limited Captain R Mookherjee, Barber Ship Management Mr P A Mullin, Broadstairs Mr N Nadarajah, PA Consulting Group Mr C T Neil, Oxford Mr P A Noble, Broadland Fuels Limited Mr S Ovington, Preston Mr S R Randle, Morpeth Mr H J Reitner, Hydranten-Betribes Mr J A Saxton, Reading Mr A R Scott, Valuation Office Agency Mr S Scott, Bro Nant International Mr S D R Simpson, Minale Tattersfield & Partners Mr J G M Sinclair, Halliburton Mr S Sorrell, SPRU Science & Technology Policy Research Mr G C Still, Tunbridge Wells Captain P M Thahal, Helz Oil Limited Mr J P Titmas, Oxford, Mr C Vazquez, Facet International Mr P Walton, Aberdeenshire Mr M D Wilkinson, Marlow Dr P B Woodroof, Genting Oil & Gas Limited Dr M M Zagi, Ministry of Petroleum Resources

NEW STUDENTS

Mr C Ajuga, Thornton Heath Ms M-L Grace, London Mr M J Jenkins, Walton-on-Thames Mr E Karagiannis, Hull Ms K Vestreng, London

DEATHS

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

	Born
Dr R S Airs	1912
Mr C Bedson	1927
Mr C M Edghill	1921
Mr E C Housam	1923
Mr R W E Smith	1924
Mr N G Voute	1913
Mr J H Wilkinson	1930



AWARDS

The Tony Fox Memorial Studentship Award 1998/99 As members will know, the award was set up to commemorate the life of the late AF Fox, MBE, ARSM, BSc, FGS, Finst Pet. Tony Fox was a member of the Institute for over 30 years, serving on the Council from 1967 to 1975. He was twice Chairman of the IP Exploration and Production Group, and also Chairman of the IP Membership Committee for seven years. He also wrote a number of technical papers for the Institute. This year the award, which comprises a cheque, a certificate of recognition and a three-year student membership to the Institute, was presented by Ian Ward, Director General of the IP (right) to Simon Hiscocks (centre) watched by Mrs Fox (left). Simon is studying for an MSc in Geology at Imperial College.



Paul Beilby (left) presented with his Student Prize certificate, by John Evans, Membership Director(right).

Paul was judged to be the best student of the Petroleum Engineering Course for 1996/97 at Heriot Watt University. He was therefore awarded an Institute of Petroleum Student Prize - one of a number of awards the Institute makes to high achievers at various universities.

Are you moving in the near future? If so, have you let the Institute know?

Please complete the section below with your new details and return it to:

Sheila Wallace, Membership Assistant, Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK.

Fax: +44 (0)171 255 1472 e-mail: swallace@petroleum.co.uk

Name:	
* New Address:	Tel: No
	Fax No:
	Date of move:
	Country:
Post code:	
e-mail:	
*New Address – business/ho	me (delete as applicable)

IP Conferences and Exhibitions

International Conference on

The Future of Transportation Fuel Quality in Europe

organised in association with



London: 12-13 November 1998

In recent months, there has been considerable debate and discussion within the Commission and Parliament of the European Union, the automotive industry and the oil industry, on the quality of transportation fuels required by 2005 to contribute to meeting European Air Quality Standards.

This major international Conference organised in association with the French Association of Petroleum Technicians and Professionals (AFTP) and the German Society for Petroleum and Coal Science and Technology (DGMK) will bring together representatives from the European Commission, UK Government, the oil and automotive industries, environmentalists and academia to present their views on current and future legislation, the inter-relation between automotive vehicles and fuels and their impact on the environment, and the implications for the European refining industry.

The programme and registration form is now available.

Information for Energy Group Autumn Conference

Information Control – The Key to Success in the Energy Industries London: 19 November 1998

Organisations are ever more aware of the value and importance of information – whether held in electronic or hard copy form or in the heads of their employees.

This Conference will address the practical implications of controlling information, including legal aspects, storage and retrieval issues, and knowledge management.

- Knowledge Management
- Intranets
- Records Management
- Legal Issues
- Hard Copy

Who should attend?

This is an important Conference for anyone involved in the management or provision of information, such as Knowledge Managers, Information Officers, Librarians, Records Managers, Consultants, their Managers and anyone else responsible for information within their organisation. It will provide an excellent opportunity to hear the latest expert opinions and to network with colleagues and fellow professionals.

The programme and registration form is now available.

Autumn Luncheon

London: 30 November 1998

with Principal Speaker:

His Excellency Sheikh Ahmed Zaki Yamani Former Minister of Petroleum and Mineral Resources for Saudi Arabia, 1962–1986.

This event is now oversubscribed and a waiting list is in operation.

International Conference on

Dispute Resolution in the International Oil and Gas Industries London: 4 December 1998

organised with the support of the UK Energy Lawyers Group International Bar Association



In the four years since the IP and UKELG last held a joint conference on this topic there have been many developments both of procedure and of subject matter affecting the resolution of disputes in the international oil and gas industries.

This Conference will review the principal features of the Arbitration Act 1996, the increasing international use of Mediation as an alternative to litigation, the use of the Final Offer Arbitration and some possible techniques for minimising and avoiding disputes.

The programme and registration form is now available.

Next year

IP Week 1999

London: 15-18 February 1999

The ticket application form for the Annual Dinner is now available. **Tickets are limited so early application is recommended.**

The IP Week 1998 Programme of Events is now available.

For programmes and registration forms please write or fax:

Pauline Ashby, Conference Administrator, Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK Tel: +44 (0)171 467 7100 Fax: +44 (0)171 255 1472 e-mail: pashby@petroleum.co.uk

IP Discussion Groups & Events

The Institute of Petroleum Discussion Groups have been combined to form

The IP Discussion Group: Energy Economics, Environment

In recent years the interests of the former sectoral Discussion Groups – Exploration & Production, Energy Economics, Environment – have moved closer together, and earlier this year it was decided that they should be combined.

A new IP Discussion Group committee has been formed, representing these broad interests and also including IFEG and Education. It is believed that this should result in higher quality, higher profile and more interesting meetings than the individual groups were able to provide for themselves.

The Group is chaired by Dr Roger Cairns, formerly Managing Director of Hardy Oil & Gas

In future the Diary Dates page in Petroleum Review will be be named IP Discussion Groups & Events

All meetings are held at the Institute of Petroleum unless otherwise stated. Please tell the IP contact if you plan to attend any of these free meetings. Tel: +44 (0)171 467 7100 Fax: +44 (0)171 255 1472

Courses

'How soon will oil production peak?'

Wednesday 25 November 1998, 17.00 for 17.30 - 19.00

Colin Campbell, Associate Consultant,

Petroconsultants IP Contact: Jenny Sandrock

The IP Discussion Group Debate 'Global warming: hot air or cool appraisal?'

Monday 14 December 1998, 17.00 for 17.30-19.30

Chairman: John Mitchell, Chairman of the Energy Programme, Royal Institute of International Affairs

Speakers: Michael Jefferson, Director of Studies and Policy Development, World Energy Council William O'Keefe, Senior Vice-President, The American Petroleum Institute

IP Contact: Jenny Sandrock



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Contact: Professor M F Fox Tel: 0116.257 7117 mff@dmu.ac.uk or Dr S J Davies Tel: 0116.257 7698 sjd@dmu.ac.uk



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Arco has announced a realignment of its executive management team whereby **Michael E Wiley**, Executive Vice-President, will become President and assume the newly created position of Chief Operating Officer. He will report to Chairman and CEO **Mike Bowlin**. **Donald R Voelte**, Senior Vice-President, Corporate Planning, will become Executive Vice-President with responsibility for Latin America, Europe, Africa, the Middle East, CIS and Permian Basin. Arco President **William E Wade**, and Executive Vice-President **Anthony G Fernandes** will both be retiring from the company.

The DTI has named **Callum McCarthy** as the next Director General of Gas Supply and Director General of Electricity Supply. He will be appointed the first Energy Regulator for Great Britain, subject to legislation to amalgamate the regulatory regimes for gas and electricity.

Stig Bergseth, Executive Vice-President of Statoil, is the newly appointed General Chairman of Offshore Europe 99.

Rem Ivanovich Vyakhirev, Chairman of the Gazprom Management Committee, and **Baron Philippe Bodson**, Chairman of the Board of Executive Directors of Belgian company Tractebel SA, have agreed to join the Supervisory Board of Wintershall AG. Other members of the newly appointed Supervisory Board include **Max Dietrich Kley**, Member of the Board of Executive Directors of BASF AG, **Walter Seufert** and **Dr Eckart Sünner**, both Directors of BASF AG, and geologist **Dr Gerd Zuncke**.

Michael Page has joined the Board of Catalist as Finance Director, and **Akber Ali** joins from MPSI in a new role as UK Petrol Station Database Manager. **John Treasure** has become Product Manager for Fuel Price Data; he was previously Managing Director of Arciris. **John Webster** is setting up the Catalist Americas operation in Philadelphia after many years in the oil industry with MPSI and Shell Canada, and **Alan Woolridge** and **David Dutton**, previously with BP Oil, will now be managing Catalist's team of surveyors across Europe.

Gary Cardone has been appointed Managing Director of Dynegy UK and Dynegy Europe. He was previously Director and General Manager of Energy Trading. **Mike Fulwood**, who has been interim Managing Director since September 1977, will resume his duties as Managing Director, Europe, for Harrington and Hrehor Energy Consulting Group, and will continue to advise Dynegy on business development opportunities.

Canadian 88 Energy has appointed J P Bryan, as its new Chairman. Bryan is a former head of Gulf Canada Resources.

Phillips Petroleum has promoted **Bill Parker** to Executive Vice-President of Downstream Operations. Parker has served as Senior Vice-President of Refining, Marketing and Transportation since 1997, and will now take on the additional responsibility for the company's chemicals and plastics operations.

The PSL Group has appointed Tony Oldfield as its new Managing Director. He brings more than 19 years' experience in the upstream oil and gas industry from both operator and service company perspectives.



Bob Will (pictured) has been appointed Marketing and Business Development Manager for the Expro Group, responsible for cased hole intervention services. Alex Dodds is now Director of Marketing and Development. He was previously Vice-President responsible for new LNG markets and ventures at Mobil in Houston. Graeme Coutts, formerly Director of Marketing and Development, is now Chief Operating Officer.



Erik Tonseth has stepped down from his position as President and CEO of Kvaerner, and has also stepped down from the Board of Kvaerner ASA. Chairman of the Board **Christian Bjelland** will assume the responsibility of Chairman and CEO of the Group until a new Chief Executive is appointed. At the same time, **Tore N Sorensen** has been appointed Managing Director of Kvaerner.

John Rose, Chairman of the Institute of Petroleum Midland Branch, is now a Director of Mason Revis Partnership's new West Midlands office. **Sue Courtney** has been appointed Marketing Director of the company.

Clare Spottiswoode this month stands down from her post as UK gas industry regulator. She will become a Senior Executive at Enron where she will help develop the company's global water investment business.

Tom Doss, previously with Amoco, has now joined the Azerbaijan International Operating Co as Vice-President.

David Decker is Racal Survey's new Regional Director for Europe and Africa. He has worked in the oil and gas industry for around 20 years with the Schlumberger Group of companies.

Halliburton's Executive Committee now includes **Dick Cheney,** Halliburton Company's CEO; **William E Bradford**, Chairman of the Board of Directors; **David J Lesar**, President and Chief Operating Officer; and **Donald C Vaughn**, Vice Chairman. Along with William E Bradford, four other members of the Dresser Board of Directors have now joined the Halliburton Board following the recent merger of the two companies. They are **Lawrence S Eagleburger**, **Ray L Hunt**, **J Landis Martin** and **Jay A Precourt. Bill Bradford** is Halliburton Company's new Chairman of the Board.

William Guinness, a Director of a number of companies including British & Foreign Trust, has now become a Non-Executive Director of Sibir Energy.

London Marine Group has appointed **Nigel Clark** as Finance Director. He joins the group from Asprey.

David Duncan has become Manager of Odebrecht Oil and Gas Services ' new consultancy company ODB Global Consultants Ltd. He was formerly Director of Engineering for ABB Lummus Global in the UK prior to the acquisition of the business of that company by Odebrecht.

The New York Mercantile Exchange Board of Directors has promoted **Suellen Galish** to Vice-President and Senior Associate General Counsel, and **Nachamah Jacobovits** to Vice-President of Corporate Communications.

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